

Evidenztabelle **Abrahamsson et al 2013**

*Int J Oral Maxillofac Surg* 2013; 42: 742-749  
<http://dx.doi.org/10.1016/j.ijoms.2012.10.006>, available online at <http://www.elsevier.com/locate/ijoms>


 Oral &  
 Maxillofacial  
 Surgery

 Clinical Paper  
 TMJ Disorders

# TMD before and after correction of dentofacial deformities by orthodontic and orthognathic treatment

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**Abstract.** The aims of the study were to investigate the alteration of temporomandibular disorders (TMD) after correction of dentofacial deformities by orthodontic treatment in conjunction with orthognathic surgery; and to compare the frequency of TMD in patients with dentofacial deformities with an age and gender matched control group. TMD were evaluated in 121 consecutive patients (treatment group), referred for orthognathic surgery, by a questionnaire and a clinical examination. 18 months after treatment, 81% of the patients completed a follow-up examination. The control group comprised 56 age and gender matched subjects, of whom 68% presented for follow-up examination. TMD were diagnosed according to research diagnostic criteria for TMD. At baseline examination, the treatment group had a higher frequency of myofascial pain ( $P = .035$ ) and arthralgia ( $P = .040$ ) than the control group. At follow-up, the frequencies of myofascial pain, arthralgia and disc displacement had decreased in the treatment group ( $P = .050$ ,  $P = .004$ ,  $P = .041$ , respectively). The frequency of TMD was comparable in the two groups at follow-up. Patients with dentofacial deformities, corrected by orthodontic treatment in conjunction with orthognathic surgery, seem to have a positive treatment outcome in respect of TMD pain.

<b>Population</b> <i>Setting</i> <i>Komorbiditäten</i>	<b>Klasse-II-Anomalie, transversale Anomalie, vertikale Anomalie, Zahnengstand, „Malokklusion/Dysgnathie“ allg.</b> <ul style="list-style-type: none"> <li>• Test: Patienten der MKG (Universität Malmö, Schweden)</li> <li>• Kontrolle: Patienten der Zahnklinik (Malmö, Schweden)</li> <li>• Community dwelling</li> </ul>
<b>Schweregrad</b>	Keine Angaben

<b>Einschlusskriterien</b> <i>Bei Review: PICOS</i>	dentofacial deformities
<b>Ausschlusskriterien</b>	<ol style="list-style-type: none"> <li>1. craniofacial syndromes,</li> <li>2. systemic arthritic and muscular diseases</li> <li>3. a dentition of fewer than 24 teeth</li> </ol>
<b>Intervention</b> <small>Versuchsgruppe</small>	<p><b>kieferorthopädisch-kieferchirurgische Kombinationsbehandlung</b></p> <p>VERSUCHSGRUPPE: <b>patients with surgery / KFO-KCH group</b></p> <p>N=121 / N=98 (Ende) / Alter = 22,4 ± 7,5 Jahre / ♂:♀ = 51:70</p> <ul style="list-style-type: none"> <li>• Gebissphase: permanents Gebiss ≥18</li> <li>• KFO-Behandlung: Spätbehandlung</li> </ul>
<b>Kontrolle</b> <small>Kontrollgruppe</small>	<p><b>keine kieferorthopädische Therapie</b></p> <p>KONTROLLGRUPPE: <b>untreated control</b></p> <p>N=56 (Anfang) / N=38(Ende) / Alter = 23.4 ± 7.4 Jahre / ♂:♀ = 23:33</p> <ul style="list-style-type: none"> <li>• Gebissphase: permanents Gebiss ≥18</li> <li>• KFO-Behandlung: keine Behandlung</li> </ul>
<b>Outcome</b>	<p><b>direkter oder schadenspräventiver medizinischer Nutzen bzw. Korrektur/Prävention der Anomalie/Malokklusion/Dysgnathie</b></p> <ul style="list-style-type: none"> <li>• Okklusion, Kaufunktion, Funktion</li> </ul> <p>PRIMÄRZIELGRÖßE: TMD pain, jaw fatigue, TMJ clicking (audible/ palpation), osteoarthritis (crepitation) (frequency per week)</p> <p>SEKUNDÄRZIELGRÖßE: TMD pain at rest (y/n)</p> <p>TERTIÄRZIELGRÖßE: TMD pain during mandibular movements (y/N)</p> <p>QUARTÄRZIELGRÖßE: severity of discomfort (likert scale 1-4)</p> <p>anxiety: VAS scale</p> <p>follow up questionnaire: treatment satisfaction</p>
<b>Studientyp</b>	<b>Beobachtungsstudie (Kohortenstudie oder Fall-Kontroll-Studie)</b>
<b>Schlussfolgerungen der Autoren</b>	<ol style="list-style-type: none"> <li>1. Patients with dentofacial deformities, corrected by orthodontic treatment in conjunction with orthognathic surgery, seem to have a positive treatment outcome in respect of TMD pain.</li> <li>2. After treatment frequency of TMD is low and comparable to that in a control group.</li> </ol>

<p><b>Zusammenfassung der Ergebnisse</b></p>	<p><b>GRUPPE patients with surgery / KFO-KCH group VS. GRUPPE untreated control</b></p> <p><b>PRIMÄRZIELGRÖßE</b></p> <p>At baseline, the most common diagnoses in both treatment and control groups were myofascial pain, disc displacement and arthralgia. At follow-up, the frequencies of these diagnoses were significantly reduced in the treatment group, but at the same time, the treatment group exhibited a significant increase in osteoarthritis post-treatment (Table 3). Compared with the control group, significantly more subjects in the treatment group had myofascial pain and arthralgia at baseline, but post-treatment these differences had been eliminated (Table 3).</p> <p>Myofascial pain was the only TMD diagnosis with a significant gender difference before treatment (<math>P = .015</math>); it was more common in women (32%) than in men (12%), but at follow-up, no genderrelated differences were found for any of the TMD diagnoses.</p> <p>After stratifying the treatment group according to the type of dentofacial deformity (Table 2), those with a Class III relationship combined with a normal vertical relationship of the jaws having myofascial pain (<math>n = 13</math>) and/or arthralgia (<math>n = 8</math>) had significantly decreased after treatment (<math>n = 4</math>, <math>P = .022</math> and <math>n = 2</math>, <math>P = .031</math> respectively). None of the other subgroups showed significant differences in TMD diagnoses between baseline and follow-up.</p> <p><b>SEKUNDÄRZIELGRÖßE</b> <i>Ergebnistext (Copy&amp;Paste) – Nur Leitlinien-relevante Ergebnisse, welche PICO-Einschlusskriterien erfüllen aufnehmen</i></p> <p>In the treatment group, self-evaluated TMD discomfort, evaluated on a verbal scale, decreased significantly from baseline to follow-up (Fig. 2).</p> <p>At baseline, the treatment group reported significantly more TMD symptoms than the control group (Table 4).</p> <p>With the exception of weekly jaw fatigue, there were no significant inter-group differences in TMD symptoms at follow-up.</p> <p>The treatment group experienced significantly fewer TMD symptoms at follow-up than at baseline, except for weekly TMJ clicking. In the control group, there were no differences in TMD symptoms between baseline and follow-up (Table 4). With respect to gender, there were no significant differences in frequency of TMD symptoms in either group, at baseline or at</p>
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<p><b>Angaben auffälliger positiver und/oder negativer Aspekte</b></p> <p>Studiendesign</p> <p>Durchführung</p> <p>Auswertung</p> <p>Funding</p> <p><u>Interessenkonflikte</u></p> <p><u>Bias (SIGN, AMSTAR II, Einzelstudien)</u></p>	<p><i>Studiendesign: nicht randomisiert, unterschiedliche Ausgangssituationen hinsichtlich Kiefergelenksschmerzen / KFO-Behandlungsbedarf</i></p> <p><i>Durchführung: gute Durchführung</i></p> <p><i>Auswertung: Statistik: kein non-inferiority test</i></p> <p><i>Power der Studie/Patientenzahl: 0,89</i></p> <p><i>Funding: nein</i></p> <p><i>Interessenkonflikte: nein</i></p> <p><i>Bias (SIGN/AMSTAR/EinzelstudienRoB – alle negativen Punkte aus Fragebogen auflisten):</i></p> <ul style="list-style-type: none"> <li>- Keine Verblindung möglich</li> </ul>
<p><b>Schlussfolgerung des Begutachters</b></p>	<p><u>methodische Qualität:</u> akzeptabel</p> <p><u>Klinische Aussagekraft:</u> moderat (diverse Malokklusionen integriert)</p>
<p><b>Evidenzlevel (SIGN)</b></p>	<p>2+</p>
<p><b>Qualität (RoB, SIGN /AMSTAR II)</b></p>	<p>akzeptabel ⊕</p>

## Evidenztabelle **Agou, Locker et al. 2011**

### Does psychological well-being influence oral-health-related quality of life reports in children receiving orthodontic treatment?

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**Introduction:** Although the associations between oral biologic variables such as malocclusion and oral-health-related quality of life (OHRQOL) have been explored, little research has been done to address the influence of psychological characteristics on perceived OHRQOL. The aim of this study was to assess OHRQOL outcomes in orthodontics while controlling for individual psychological characteristics. We postulated that children with better psychological well-being (PWB) would experience fewer negative OHRQOL impacts, regardless of their orthodontic treatment status. **Methods:** One hundred eighteen children (74 treatment and 44 on the waiting list), aged 11 to 14 years, seeking treatment at the orthodontic clinics at the University of Toronto, participated in this study. The child perception questionnaire (CPQ11-14) and the PWB subscale of the child health questionnaire were administered at baseline and follow-up. Occlusal changes were assessed by using the dental aesthetic index. A waiting-list comparison group was used to account for age-related effects. **Results:** Although the treatment subjects had significantly better OHRQOL scores at follow-up, the results were significantly modified by each subject's PWB status ( $P < 0.01$ ). Furthermore, multivariate analysis showed that PWB contributed significantly to the variance in CPQ11-14 score (26%). In contrast, the amount of variance explained by the treatment status alone was relatively small (9%). **Conclusions:** The results of this study support the postulated mediator role of PWB when evaluating OHRQOL outcomes in children undergoing orthodontic treatment. Children with better PWB are, in general, more likely to report better OHRQOL regardless of their orthodontic treatment status. On the other hand, children with low PWB, who did not receive orthodontic treatment, experienced worse OHRQOL compared with those who received treatment. This suggests that children with low PWB can benefit from orthodontic treatment. Nonetheless, further work, with larger samples and longer follow-ups, is needed to confirm this finding and to improve our understanding of how other psychological factors relate to patients' OHRQOL. (Am J Orthod Dentofacial Orthop 2011;139:369-77)

<b>Population</b>	„Malokklusion/Dysgnathie“ all children seeking treatment at the orthodontic clinics at the University of Toronto
<b>Schweregrad</b>	According to published DAI categories, 44.2% of the overall sample had handicapping malocclusions, 25.7% had severe malocclusions, 23.9% had definite malocclusions, and 6.2% had minor malocclusions.
<b>Einschlusskriterien</b>	To be eligible, a child had to be fluent in English and have good general health.
<b>Ausschlusskriterien</b>	Children with severe dentofacial deformities were excluded.

<p><b>Intervention</b> Versuchsgruppe</p>	<p><b>Kategorie aus Einschlusskriterien</b> <i>Patients receiving treatment</i></p> <p>VERSUCHSGRUPPE: <b>treatment</b></p> <p>N=74 / Alter = 11-14 Jahre / ♂:♀ = keine Angabe</p> <ul style="list-style-type: none"> <li>• Gebissphase: spätes Wechselgebiss</li> <li>• KFO-Behandlung: reguläre Behandlung</li> </ul>
<p><b>Kontrolle</b> Kontrollgruppe</p>	<p><b>keine kieferorthopädische Behandlung</b> <i>patients awaiting treatment.</i></p> <p>KONTROLLGRUPPE: <b>control</b></p> <p>N=44 / Alter = 11-14 Jahre / ♂:♀ = keine Angabe</p> <ul style="list-style-type: none"> <li>• Gebissphase: spätes Wechselgebiss</li> <li>• KFO-Behandlung: keine kieferorthopädische Behandlung</li> </ul>
<p><b>Outcome</b></p>	<p><b>direkter oder schadenspräventiver medizinischer Nutzen bzw. Korrektur/Prävention der Anomalie/Malokklusion/Dysgnathie</b> <b>Kategorie aus Einschlusskriterien</b></p> <ul style="list-style-type: none"> <li>• <b>mundgesundheitsbezogene Lebensqualität (MLQ), psychische Entwicklung</b></li> </ul> <p>PRIMÄRZIELGRÖßE: <i>oral-healthrelated quality of life (OHRQOL) including Oral symptoms, functional limitations, emotional and social well-being</i></p> <p>SEKUNDÄRZIELGRÖßE: <i>psychological well-being</i></p>
<p><b>Studientyp</b></p>	<p><b>Beobachtungsstudie (Kohortenstudie oder Fall-Kontroll-Studie)</b></p>
<p><b>Schlussfolgerungen der Autoren</b></p>	<p>The findings of this study highlight the importance of considering inherent psychological parameters in orthodontic psychosocial research. More specifically, the results support the mediator role of PWB when evaluating OHRQOL outcomes in children with a malocclusion. Children with better PWB are, in general, more likely to report better OHRQOL regardless of their orthodontic treatment status. On the other hand, children with low PWB, who did not receive orthodontic treatment, experienced worse OHRQOL, compared with those who received treatment. This suggests that children with low PWB might benefit from orthodontic treatment, but further work, with larger samples and longer follow-ups, is needed to confirm this finding and to improve our understanding of how other psychological factors relate to patients' OHRQOL.</p>
<p><b>Zusammenfassung der Ergebnisse</b></p>	<p><b>GRUPPE treatment VS. GRUPPE control</b></p> <p><b>PRIMÄRZIELGRÖßE</b> <i>Table II also summarizes the T2 data for the treatment and control subjects, with a guide to interpreting these scores in Table I. The CPQ11-14, EWB, SWB, and DAI scores for the treatment subjects were the only variables that changed significantly over the study period. In contrast, these scores did not change significantly for the control group.</i></p> <p><b>SEKUNDÄRZIELGRÖßE</b> <i>As expected, PWB scores remained relatively constant over time for both the treatment and control subjects. Furthermore, these PWB scores were slightly higher but not significantly different from those reported for normal schoolchildren.<sup>43</sup></i></p>

<b>Angaben auffälliger positiver und/oder negativer Aspekte</b>	<i>Klares Studiendesign und reliable Durchführung. Keine Angabe von Konfidenzintervallen, keine ITT Analyse trotz hoher Dropoutraten. Keine Powerkalkulation, keine Angabe zum Funding. Es lagen keine Interessenskonflikte vor</i>
<b>Schlussfolgerung des Begutachters</b>	<u>methodische Qualität:</u> befriedigend
	<u>Klinische Aussagekraft:</u> Children with low psychological well-being can benefit from orthodontic treatment.
<b>Evidenz-level (SIGN)</b>	<b>2+</b>
<b>Qualität (RoB, SIGN /AMSTAR II)</b>	<b>Acceptable ⊕</b>

# Evidenztabelle **Andiappan, Gao et al. 2015**

## Systematic Review Article

### **Malocclusion, orthodontic treatment, and the Oral Health Impact Profile (OHIP-14):**

#### ***Systematic review and meta-analysis***

**Manoharan Andiappan<sup>a</sup>; Wei Gao<sup>b</sup>; Eduardo Bernabé<sup>c</sup>; Ngianga-Bakwin Kandala<sup>d</sup>; Ana Nora Donaldson<sup>e</sup>**

#### **ABSTRACT**

**Objective:** To synthesize evidence on the impact of malocclusion and its associated treatment on people's quality of life across studies that used the Oral Health Impact Profile (OHIP-14) questionnaire in the adult population.

**Materials and Methods:** A systematic search of the English literature using Medline, PubMed, and EMBASE yielded 98 unique citations. Studies using OHIP-14 with individuals 15 years of age and older were included. After initial screening, 64 citations were excluded and another 9 were excluded after reading full text reports; the remaining 25 were included in the review. All studies were observational and used one of three study designs: 11 compared the same group before and after treatment (pre-post design), 10 compared groups with and without malocclusion (independent groups design) and four compared an orthodontically treated group with an independent group requiring treatment (treated-untreated groups design). Only three studies using the pre-post design and four using the independent groups design reported comparable OHIP-14 data and were combined in separate meta-analyses. Meta-analysis was carried out using *metan* command in *Stata*.

**Results:** The standardized mean difference (SMD) in OHIP-14 total score was 1.29 (95% CI: 0.67 to 1.92) for the three studies using the pre-post design. Similarly, the SMD score was 0.84 (95% CI: 0.25 to 1.43) for the four studies using the independent groups design. There was evidence of high heterogeneity and publication bias among the studies included.

**Conclusions:** This meta-analysis revealed that OHIP-14 scores were significantly lower after receiving treatment for malocclusion and in individuals without malocclusion/orthodontic treatment need compared to those with such condition (independent groups). (*Angle Orthod.* 2015;85:493–500.)

**KEY WORDS:** Malocclusion; Orthodontic treatment; Oral health related quality of life; Review

<b>Population</b>	„Malokklusion/Dysgnathie“ allg .
<i>Setting</i>	<ul style="list-style-type: none"> <li>individuals aged 15 years and above</li> </ul>
<i>Komorbiditäten</i>	
<b>Schweregrad</b>	Nicht angegeben



<p><b>Einschlusskriterien</b></p> <p>Bei Review: PICOS</p>	<ul style="list-style-type: none"> <li>• Population: individuals aged 15 years and above</li> <li>• Intervention:             <ul style="list-style-type: none"> <li>- malocclusion (determined via clinical examination): nicht LL-relevant</li> <li>- its associated treatment (ie, orthodontic therapy or orthognathic surgery)</li> </ul> </li> <li>• Comparison:             <ul style="list-style-type: none"> <li>- individuals without malocclusion (for assessing the impact of malocclusion) – nicht LL-relevant</li> <li>- individuals requiring either orthodontic treatment or orthognathic surgery (for assessing the impact of the treatment of malocclusion, before and after treatment)</li> <li>- independent group requiring treatment (i.e. untreated)</li> </ul> </li> <li>• Outcome:             <p>PRIMÄRZIELGRÖßE: OHRQoL measured using the short-version of the OHIP, OHIP-14</p> </li> <li>• Study type: intervention and/or observational studies</li> </ul>
<p><b>Ausschlusskriterien</b></p>	<ol style="list-style-type: none"> <li>1. studies carried out with children or adolescents (below the age of 15);</li> <li>2. letters to editors, unpublished articles, case reports, case series, and reviews;</li> <li>3. studies published in languages other than English;</li> <li>4. duplicate studies (studies originating from the same subjects by the same investigators but published in different journals); and</li> <li>5. articles providing no information on sample size, mean, or standard deviation for the OHIP-14 total score, or insufficient information for their calculation.</li> </ol>
<p><b>Intervention</b></p> <p>Versuchsgruppe</p>	<p><b>kieferorthopädische Behandlung, kieferorthopädisch-kieferchirurgische Kombinationsbehandlung</b></p> <p>VERSUCHSGRUPPE: <b>orthodontic therapy or orthognathic surgery (after treatment)</b></p> <p>N=?? (Anfang) / N=?? (Ende) / Alter = 12-52 Jahre / ♂:♀ = ?:?</p> <ul style="list-style-type: none"> <li>• Gebissphase: spätes Wechselgebiss, permanentes Gebiss &lt; 18. Lebensjahr, permanentes Gebiss ≥ 18. Lebensjahr</li> <li>• KFO-Behandlung: reguläre Behandlung, Spätbehandlung</li> </ul>
<p><b>Kontrolle</b></p> <p>Kontrollgruppe</p>	<p><b>keine kieferorthopädische Therapie, keine Kontrollgruppe</b></p> <p>KONTROLLGRUPPE:</p> <ol style="list-style-type: none"> <li>1. <b>individuals requiring either orthodontic treatment or orthognathic surgery (before treatment)</b></li> <li>2. <b>independent group requiring treatment (i.e. untreated)</b></li> </ol> <p>N=?? (Anfang) / N=?? (Ende) / Alter = 12-52 Jahre / ♂:♀ = ?:?</p> <ul style="list-style-type: none"> <li>• Gebissphase: spätes Wechselgebiss, permanentes Gebiss &lt; 18. Lebensjahr, permanentes Gebiss ≥ 18. Lebensjahr</li> <li>• KFO-Behandlung: keine Behandlung</li> </ul>

<p><b>Outcome</b></p>	<p><b>direkter oder schadenspräventiver medizinischer Nutzen bzw. Korrektur/Prävention der Anomalie/Malokklusion/Dysgnathie</b></p> <ul style="list-style-type: none"> <li>• <b>mundgesundheitsbezogene Lebensqualität (MLQ), psychische Entwicklung</b></li> </ul> <p>PRIMÄRZIELGRÖÖE: OHRQoL measured using the short-version of the OHIP (OHIP-14)</p>
<p><b>Studientyp</b></p>	<p><b>Systematisches Review, Meta-Analyse</b></p> <p><i>Review:</i> Inkludierte Studien in Bezug auf PICO: Observational studies N=14 LL-relevante Studien (gesamtes Review: N = 25)</p> <p><i>Review:</i> Gesamt-Teilnehmerzahl in Bezug auf PICO: N=3.333 (für 14/25 LL-relevante Studien)</p>
<p><b>Schlussfolgerungen der Autoren</b></p>	<p>This meta-analysis revealed that:</p> <p><b>OHIP-14 scores were significantly lower after receiving treatment</b> (indicating improvement in quality of life) for malocclusion (pre-post study design) and in individuals without malocclusion/orthodontic treatment need compared to those with such condition (independent groups study design).</p> <p>There is a lack of standardization among studies in terms of study designs and reporting of OHIP-14 scores; hence, there <b>is poor evidence</b> on this topic.</p>
<p><b>Zusammenfassung der Ergebnisse</b></p>	<p><b>orthodontic therapy or orthognathic surgery (after treatment) VERSUS individuals requiring either orthodontic treatment or orthognathic surgery (before treatment) (KEINE META-ANALYSE FÜR UNTREATED CONTROL)</b></p> <p><b><i>OHRQoL measured using the short-version of the OHIP, OHIP-14:</i></b> Nur 3/14 LL-relevanten Studien mit Meta-Analyse für 1. Kontrollgruppe:</p> <p>For the four (TIPPFEHLER: three!) studies that used the pre-post study design, the standardized mean difference (SMD) was 1.29 (95% CI: 0.67 to 1.92), <b>indicating that the OHIP-14 score decreased after treatment.</b></p> <p>The mean SMD score was significantly different from 0 (P &lt;.001).</p> <p>The studies involved in the meta-analysis were <b>heterogeneous</b> and the heterogeneity was statistically significant (P = .047).</p> <p>The variation in SMD measured as a percentage (I<sup>2</sup>) was 67.2% (pre-post study design).</p> <p>The between-study variance was 0.20 for the pre-post study design.</p>

<p><b>Angaben auffälliger positiver und/oder negativer Aspekte</b></p> <p>Studiendesign</p> <p>Durchführung</p> <p>Auswertung</p> <p>Funding</p> <p><u>Interessenkonflikte</u></p> <p><u>Bias (SIGN, AMSTAR II, Einzelstudien)</u></p>	<p><i>Studiendesign: klare Definition von Ein- &amp; Ausschlusskriterien a priori, STROBE-Checklist geplant, Meta-Analyse, nur englische Artikel eingeschlossen</i></p> <p><i>Durchführung: Literatursichtung und Datenextraktion durch zwei unabhängige Rater, keine Ergebnisse der Überprüfung der Studienqualität (lt. Studiendesign STROBE Checklisten verwendet), tw Tippfehler in der Anzahl der zur Meta-Analyse hinzugezogenen Einzelstudien</i></p> <p><i>Auswertung: Meta-Analyse wenn möglich durchgeführt, die genauen Studiendesigns der Einzelstudien wurden nicht genannt (nur “observational studies”) – in der Diskussion wird hauptsächlich von “cross-sectional” gesprochen, keine narrative Analyse der restlichen 11/14 LL-relevanten Studien (ohne Meta-Analyse), Jugendliche und Erwachsene werden berücksichtigt</i></p> <p><i>Power der Studie/Patientenzahl: 3.333/14 LL-relevant; aber nur 3 Studien mit Meta-Analyse (110 Teilnehmer)</i></p> <p><i>Funding: -</i></p> <p><i>Interessenkonflikte: -</i></p> <p><i>Bias (SIGN/AMSTAR/EinzelstudienRoB – alle negativen Punkte aus Fragebogen auflisten):</i></p> <p><i>Publikationsbias (Reviews): Bias due to small study effect was tested using Begg’s test and Egger’s test. The two tests showed <b>no evidence of bias</b> (P 5 .30 and .43 for the pre-post study design and 0.31 and 0.32 for the independent group study design, respectively). Publication bias was assessed using funnel plots with 95% pseudo CI (Figure 3). There was <b>no evidence of publication bias</b> in the first meta-analysis.</i></p>
<p><b>Schlussfolgerung des Begutachters</b></p>	<p><u>methodische Qualität:</u> Einzelstudien und Review moderat</p> <hr/> <p><u>Klinische Aussagekraft:</u> Die mundgesundheitsbezogene Lebensqualität scheint von der Malokklusion bzw. der Korrektur durch eine kieferorthoädische oder kombiniert kieferorthopädisch-kieferchirurgische Behandlung abzuhängen. Da die Aussage auf die Meta-Analyse von nur drei Studien zurückgeht, ist die Aussagekraft jedoch eingeschränkt.</p>
<p><b>Evidenz-level (SIGN)</b></p>	<p>2+</p>
<p><b>Qualität (RoB, SIGN /AMSTAR II)</b></p>	<p>Moderat ⊕⊕</p>

# Evidenztable Anthony, Zimba et al. 2018

## Impact of Malocclusions on the Oral Health-Related Quality of Life of Early Adolescents in Ndola, Zambia

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Received 1 March 2018; Revised 24 April 2018; Accepted 12 May 2018; Published 3 June 2018

Academic Editor: Claudio Rodriguez Lobo

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The study aimed to assess the prevalence of malocclusions and its impact on oral health-related quality of life (OHRQoL) among early adolescents in Ndola, Zambia. It used a random sample of 384 primary school children aged 12–14 years. The Child Oral Health Impact Profile Short Form 19 (COHIP SF19) was used to assess OHRQoL, and the Dental Aesthetic Index (DAI) was used to examine dentofacial anomalies. The chi-square test was used to study whether there was a statistically significant association between variables and multivariate logistic regression for the influence of sociodemographic and malocclusions on OHRQoL. Statistical significance was set at  $p < 0.05$ . Participants' sociodemographics were 53.6% female, 41.7% aged 13 years, and 43.2% from grade six. The overall reported impact on OHRQoL was 11.7%, which was significant ( $p < 0.001$ ) by age and sex, and higher in females than males. The overall prevalence of malocclusions was 27.9%, which was significant ( $p = 0.005$ ) by sex, and higher in males than females. Children with malocclusions reported significant ( $p < 0.001$ ) negative oral health impact compared to the children without malocclusions. Spacing, diastema, and crowding were most prevalent malocclusions that showed clear inverse association with OHRQoL. The study findings provide indications that malocclusions are negatively associated with OHRQoL among Zambian early adolescents.

<b>Population</b>	<p>“Malokklusion/Dysgnathie“ allg.</p> <p>early adolescence school-going children in Ndola, Zambia</p>
<b>Schweregrad</b>	Keine Angabe
<b>Einschlusskriterien</b>	children aged 12 to 14 years at four randomly selected public primary schools in Ndola district of Copperbelt Province located in central Zambia.
<b>Ausschlusskriterien</b>	Children under orthodontic or cosmetic dentistry treatment were excluded in this study.
<b>Intervention</b> Versuchsgruppe	<p><b>Keine</b></p> <p><i>Keine Intervention durchgeführt</i></p> <p><b>VERSUCHSGRUPPE: school-going children</b></p> <p>N=384 / Alter = 12-14 Jahre / ♂:♀ = 178:206</p> <ul style="list-style-type: none"> <li>• Gebissphase: spätes Wechselgebiss ; permanentes Gebiss &lt; 18. Lebensjahr</li> <li>• KFO-Behandlung: keine</li> </ul>

<b>Outcome</b>	<p><b>direkter oder schadenspräventiver medizinischer Nutzen bzw. Korrektur/Prävention der Anomalie/Malokklusion/Dysgnathie</b></p> <ul style="list-style-type: none"> <li>• <b>Okklusion, Kaufunktion, Funktion</b></li> </ul> <p>PRIMÄRZIELGRÖßE: <i>Relationship between OHRQoL and malocclusion (Anteriomaxillary overjet, Anteriposterior molar relation, vertical anterior open bite, anteriomandibular overjet, missing teeth in maxilla, spacing, crowding, diastema, overall malocclusion)</i></p>
<b>Studientyp</b>	<b>Querschnittsstudie</b>
<b>Schlussfolgerungen der Autoren</b>	<p>The study estimated the prevalence of malocclusion and established their negative association with OHRQoL among early adolescents in Ndola, Zambia. Age, sex, spacing, crowding, and diastema were significantly associated with the higher impact on OHRQoL. Though the prevalence of malocclusion was significantly higher in males, significant impact on OHRQoL was found in females rather than their male counterparts. The findings of the study further showed that increase in age and being a female appear to be strong influential factors on children’s perception of OHRQoL. Further large-scale studies with different age and ethnic groups are needed to establish an inference on association between malocclusions and OHRQoL of Zambian adolescents.</p>
<b>Zusammenfassung der Ergebnisse</b>	<p><b>PRIMÄRZIELGRÖßE</b> <i>Table 5 summarizes the relationship between OHRQoL and different kinds of malocclusions. The most prevalent malocclusion was spacing (10.9%) followed by diastema (9.9%) and crowding (7.6%), and the least prevalent was missing teeth in the maxilla (0.5%). The impact of overall malocclusions on OHRQoL was 29.9% as compared to no malocclusions (4.7%) and showed the statistically significant relationship (p &lt; 0.001). Out of eight reported malocclusions in the study, anteriomaxillary overjet showed highest (100%) impact and statistically significant association (p &lt; 0.001) with OHRQoL compared to the children without anteriomaxillary overjet. Anteriposterior molar relation (p = 0.027), anteriomandibular overjet (p = 0.010), spacing (p &lt; 0.001), crowding (p = 0.001), and diastema (p &lt; 0.001) also showed the statistically significant impact on OHRQoL of children as compared to the children with no respective malocclusions. No impact was recorded on OHRQoL in children with missing teeth in the maxilla (0%). No statistically significant impact on OHRQoL was observed in children with missing teeth in the maxilla (p = 0.605) and children with vertical anterior open bite (p = 0.123) as compared to the children with no respective malocclusions.</i></p>
<b>Angaben auffälliger positiver und/oder negativer Aspekte</b>	<p><i>Kohortenstudie mit Schulkindern in Sambia zur Bestimmung der Prävalenz von Malokklusionen und dem Zusammenhang mit der Lebensqualität. Bestimmung der OHRQoL mittels Fragebogen. Keine Verblindung, dafür Abschätzung der Subjektanzahl. Keine Intervention wurde untersucht.</i></p>
<b>Schlussfolgerung des Begutachters</b>	<u>methodische Qualität:</u> ok
	<u>Klinische Aussagekraft:</u> The study findings provide indications that malocclusions are negatively associated with OHRQoL among Zambian early adolescents.
<b>Evidenzlevel (SIGN)</b>	<b>3</b>
<b>Qualität</b>	<b>Acceptable ⊕</b>

# Evidenztabelle **Arraj, Rossi-Fedele et al. 2019**

Received: 23 January 2019 | Revised: 20 April 2019 | Accepted: 20 April 2019

DOI: 10.1111/ort.12481

COMPREHENSIVE REVIEW

Dental Traumatology WILEY

## The association of overjet size and traumatic dental injuries—A systematic review and meta-analysis

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### Abstract

**Background/Aims:** Traumatic dental injuries are one of the most prevalent diseases globally, impacting people of different ages and socio-economic statuses. As disease prevention is preferable to management, understanding when an individual's overjet is prone to dental trauma helps identify at-risk patients, so to institute preventive strategies. The aim of this study was to identify the different overjet sizes that present an increased risk for developing dental trauma across different ages and dentition stages.

**Methods:** The title and protocol were registered and published a priori with the Joanna Briggs Institute (JBI) and PROSPERO (CRD420170604907) and followed the JBI methodology of systematic reviews of association etiology. A three-step search strategy was performed, including electronic searches of gray literature and four databases. Studies of healthy human participants of any age and in any dental dentition stage were considered for inclusion. Only high methodological quality studies with low risk of bias were included. Where possible, meta-analyses were performed using the random-effects model, supplemented with the fixed-effects model in situations where statistical heterogeneity was  $\leq 50\%$ , assessed using the  $I^2$  statistic.

**Results:** The study identified 2718 articles, 41 were included. An increased overjet was significantly associated with higher odds of developing trauma in all dentition stages and age groups. Children 0–6 years with an overjet  $\geq 3$ mm have an odds of 3.37 (95%CI, 1.34–8.38,  $P = 0.009$ ) for trauma. Children in the mixed and secondary dentition with an overjet  $> 5$ mm have an odds of 2.43 (95%CI, 1.34–4.42,  $P = 0.004$ ). Twelve-year-old children with an overjet  $\geq 5$ mm have an odds of 1.81 (95%CI, 1.44–2.27,  $P = 0.0001$ ).

**Conclusions:** The results confirm the association between increased overjet and dental trauma. A child in the primary dentition could be considered as having an overjet at risk for trauma when it is  $\geq 3$ mm. In the early secondary dentition, the threshold for trauma is an overjet  $\geq 5$ mm.

### KEYWORDS

dental trauma, meta-analysis, orthodontics, overjet, pediatrics, systematic review

<b>Population</b> <i>Setting</i> <i>Komorbiditäten</i>	<b>„Malokklusion/Dysgnathie“ allg.</b> <ul style="list-style-type: none"> <li>healthy human participants of any age and in any dental dentition stage</li> </ul>
<b>Schweregrad</b>	Nicht angegeben
<b>Einschlusskriterien</b> <i>Bei Review: PICOS</i>	<ul style="list-style-type: none"> <li>population: healthy human participants of any age and in any dental dentition stage</li> <li>intervention: keine Intervention (TDI für Vergleich)</li> <li>comparison: keine Kontrollgruppe overjet size (in millimeters) für Vergleich</li> <li>outcome: PRIMÄRZIELGRÖßE: traumatic dental injuries TDI</li> <li>study type: Prospective and retrospective cohort (longitudinal) studies, case-control studies, and analytical cross-sectional studies</li> </ul>
<b>Ausschlusskriterien</b>	<ol style="list-style-type: none"> <li>healthy human participants of any age and in any dental dentition stage</li> <li>Reviews, text and opinion-based articles, conference abstracts, case reports, case series, and descriptive cross-sectional</li> </ol>
<b>Intervention</b> <i>Versuchsgruppe</i>	<b>Keine Intervention</b> VERSUCHSGRUPPE: <b>TDI</b> N=66.366 (Anfang) / N=?? (Ende) / Alter = 1-55,5 Jahre / ♂:♀ = ?:? <ul style="list-style-type: none"> <li>Gebissphase: frühes bis spätes Wechselgebiss, permanentes Gebiss &lt; und ≥ 18. Lebensjahr</li> <li>KFO-Behandlung: (Früh-, reguläre, Spätbehandlung)</li> </ul>
<b>Kontrolle</b> <i>Kontrollgruppe</i>	<b>Keine Kontrollgruppe</b> KONTROLLGRUPPE: <b>overjet size</b> N=66.366 (Anfang) / N=?? (Ende) / Alter = 1-55,5 Jahre / ♂:♀ = ?:? <ul style="list-style-type: none"> <li>Gebissphase: frühes bis spätes Wechselgebiss, permanentes Gebiss &lt; und ≥ 18. Lebensjahr</li> <li>KFO-Behandlung: keine Behandlung</li> </ul>
<b>Outcome</b>	<b>medizinischer Schaden, Nebenwirkungen bzw. Zunahme der Anomalie /Malokklusion/Dysgnathie</b> <ul style="list-style-type: none"> <li><b>Traumaprophylaxe (dentales Frontzahntrauma)</b></li> </ul> PRIMÄRZIELGRÖßE: traumatic dental injuries TDI
<b>Studientyp</b>	<b>Systematisches Review, Meta-Analyse (nicht für alle Studien)</b> <i>Review:</i> Inkludierte Studien in Bezug auf PICO: cross-sectional studies N = 33 for meta-analysis, N = 41 for systematic review <i>Review:</i> Gesamt-Teilnehmerzahl in Bezug auf PICO: N=66.366

<p><b>Schlussfolgerungen der Autoren</b></p>	<p>There is a <b>significant association between increased overjet and TDIs. The OR varies according to age range, dentition stages, and differing overjet thresholds.</b> A child in the primary dentition could be considered as having an overjet at risk for trauma when it is greater than, or equal to 3 mm. In the early secondary dentition, the threshold is an overjet greater than, or equal to 5 mm.</p>
<p><b>Zusammenfassung der Ergebnisse</b></p>	<p><b>traumatic dental injuries TDI AND overjet size (in millimeters)</b></p> <p><i>Subgruppen:</i></p> <ul style="list-style-type: none"> <li>- <b>Overjet size: &gt;3 mm, ≥3 mm, &gt;3.5 mm, &gt;5 mm, ≥5 mm, &gt;5.5 mm, &gt;6 mm, ≥6 mm, or &gt;7 mm</b></li> <li>- <b>Age/ dentition stage</b></li> </ul> <p><b>traumatic dental injuries TDI: Age 0-6 years &amp; overjet ≤3 mm vs &gt;3 mm:</b> The preliminary meta-analysis had low statistical heterogeneity and produced an <b>OR of 2.52</b> (n = 2374; 95% CI, 1.77 to 3.60; P &lt; 0.00001). On repeating the meta-analysis using the fixed-effects model, the OR decreased to 2.47. When the outlier study was removed and the meta-analysis repeated, the OR increased to 2.58 (n = 1774; 95% CI, 2.01 to 3.33; P &lt; 0.00001 (Table 3, Figure 2).</p> <p><b>Age 0-6 years &amp; overjet &lt;3 mm vs ≥3 mm:</b> The initial meta-analysis gave an <b>OR of 2.26</b> (n = 1998; 95% CI, 0.97 to 5.25; P = 0.06). With removal of the outlier study, the repeated meta-analysis produced an OR of 3.37 (n = 1705; 95% CI, 1.36 to 8.38; P = 0.009) (Table 3, Figure 2).</p> <p><b>Age 7-15 years &amp; overjet size of ≤3 mm vs &gt;3 mm:</b> low statistical heterogeneity and an <b>OR of 2.05</b> for TDI (n = 7076; 95% CI, 1.63-2.60; P &lt; 0.00001). After the meta-analysis was repeated using the fixed-effects model, the OR decreased to 1.94 and the CI slightly narrowed. (Table 3, Figure 3). When the meta-analysis was repeated <b>with inclusion of two studies that focused on 12-year-old children, this produced a high degree of statistical heterogeneity and increased the OR to 2.72</b> (n = 8680; 95% CI, 1.86-3.98; P &lt; 0.00001) (Table 3, Figure 3).</p> <p><b>Age 8-14 years &amp; overjet size ≤5 mm vs &gt;5 mm:</b> OR of <b>2.43</b> for TDI (n = 8628; 95% CI, 1.34-4.42; P = 0.004) (Table 3, Figure 4). Next, the meta-analysis was repeated with inclusion of six studies that focused on <b>12-year-old children. This narrowed the CI and reduced the OR to 2.04</b> (n = 19 992; 95% CI, 1.59-2.60; P &lt; 0.00001) (Table 3, Figure 4).</p> <p><b>Age 11-14 years &amp; overjet &gt;3.5 mm:</b> OR for TDI was <b>1.87</b> (n = 2709; 95% CI, 0.88-4.00; P = 0.10) (Table 3, Figure 5).</p> <p><b>Age 11-15 years &amp; overjet ≥5 mm:</b> OR of <b>1.89</b> for TDI (n = 3285; 95% CI, 1.45-2.47; P &lt; 0.00001). Supplementation with the fixed-effects model gave similar results (Table 3, Figure 6).</p> <p><b>Age 12 years (thus in the secondary dentition) &amp; overjet &gt;3 mm:</b> OR of <b>5.19</b> for TDI (n = 1604; 95% CI, 3.92-6.89; P &lt; 0.00001 ). Supplementation with the fixed-effects model gave near identical results (Table 3, Figure 7).</p> <p><b>Age 12 &amp; overjet &gt;5 mm:</b> OR of <b>1.81</b> for TDI (n = 11 364; 95% CI, 1.44-2.27; P &lt; 0.00001) (Table 3, Figure 7).</p>



	<p><b>Age 12-16 years &amp; overjet &gt;6 mm:</b> The first meta-analysis produced an <b>OR of 2.72</b> (n = 2405; 95% CI, 1.13-6.58; P = 0.03). Exclusion of an outlier study increased the OR, narrowed the CI and reduced statistical heterogeneity. This meta-analysis was subsequently supplemented using the fixed-effects model that gave an <b>OR of 3.85</b> (n = 1677; 95% CI, 2.38-6.23; P &lt; 0.00001) (Table 3, Figure 8).</p> <p>Children in <b>the primary dentition with an overjet &gt;5 mm experienced 25% more TDIs.</b>40 Children in <b>the secondary dentition with an increased overjet ≥3 mm have 1.2 to nearly five times increased prevalence of TDI.</b>25,38,54 In contrast, an OR of 1.7 for TDI was shown among children with an overjet&gt;3 mm46 and this was not statistically significant. <b>Individuals in the mixed or secondary dentition had four times higher risk</b> of developing TDI when the <b>overjet was &gt;6 mm,</b>47 while those with an <b>overjet &gt;3.5 mm had a seven-fold increased risk.</b>56 Two studies where the highest age of participants was <b>greater than 50 years found participants with an overjet &gt;3 mm had nearly double the risk</b> of experiencing TDI.29,30</p>
<p><b>Angaben auffälliger positiver und/oder negativer Aspekte</b></p> <p>Studiendesign</p> <p>Durchführung</p> <p>Auswertung</p> <p>Funding</p> <p><u>Interessenkonflikte</u></p> <p><u>Bias (SIGN, AMSTAR II, Einzelstudien)</u></p>	<p><i>Studiendesign: Registrierung a priori bei PROSPERO und JBI, keine Intervention und Kontrollgruppe gemäß PICOS, methodische Qualität der Einzelstudien wurde zwar überprüft – aber keine richtige RoB-Analyse, Meta-Analyse</i></p> <p><i>Durchführung: umfangreiche Literaturrecherche, Literatursichtung/ Qualitätsprüfung der Einzelstudien durch zwei unabhängige Rater, Meta-Analysen unter Berücksichtigung der Heterogenität und Subgruppen (Alter, Ausmaß des Overjets), nur Studien hoher methodischer Qualität eingeschlossen – keine Darstellung der Überprüfung</i></p> <p><i>Auswertung: nur Querschnittsstudien eingeschlossen, große Altersspanne (1-55,5), keine Angaben zur Geschlechterverteilung, große Datenmenge, unterschiedliche Messmethodiken – keine radiologischen, keine Angabe wie viele Teilnehmer der jeweiligen OJ-Subgruppen angehören → OR &amp; Meta-Analyse beruhen auf der Aufteilung der Teilnehmer in OJ-Klassen – hier wsl. Fehldarstellung (ein größerer OJ müssten ein höheres Trauma-Risiko zeigen)</i></p> <p><i>Power der Studie/Patientenzahl: 41/ 66.366 (Meta-Analyse nur 33 Studien)</i></p> <p><i>Funding: -</i></p> <p><i>Interessenkonflikte: The authors confirm that they have no conflict of interest.</i></p> <p><i>Bias (SIGN/AMSTAR/EinzelstudienRoB – alle negativen Punkte aus Fragebogen auflisten):</i></p> <p><b>3. Did the review authors explain their selection of the study designs for inclusion in the review?</b></p> <p><b>6. Did the review authors perform data extraction in duplicate?</b></p> <p><b>7. Did the review authors provide a list of excluded studies and justify the exclusions?</b></p> <p><b>9. Did the review authors use a satisfactory technique for assessing the risk of bias (RoB) in individual studies that were included in the review?</b></p> <p><b>10. Did the review authors report on the sources of funding for the studies included in the</b></p> <p><b>13. Did the review authors account for RoB in individual studies when interpreting/ discuss results of the review?</b></p> <p><b>15. If they performed quantitative synthesis did the review authors carry out an adequate investigation of publication bias (small study bias) and discuss its likely impact on the result review?</b></p> <p><i>Publikationsbias (Reviews): -</i></p>

<b>Schlussfolgerung des Begutachters</b>	<u>methodische Qualität:</u> Review moderat, Einzelstudien niedrig
	<u>Klinische Aussagekraft:</u> Eine vergrößerte sagittale Frontzahnstufe scheint mit einem höheren Risiko ein dentales Trauma zu erleiden vergesellschaftet zu sein – unabhängig vom Alter. Jedoch sind Kinder während der Milchgebissphase schon bei kleineren Overjets betroffen als Jugendliche oder gar Erwachsene. Anhand des Reviews kann nicht bestimmt werden, wie stark das Risiko mit zunehmendem Maß des Overjets steigt. Auch kann keine Kausalität hergestellt werden, da verschiedenste Störfaktoren (sportliche Aktivität, Geschlecht etc.) nicht berücksichtigt wurden. Aufgrund fehlender radiologischer Abklärung könnte die tatsächliche Prävalenz erhöht sein.
<b>Evidenzlevel (SIGN)</b>	<b>3</b>
<b>Qualität (RoB, SIGN /AMSTAR II)</b>	<b>Moderat ⊕⊕</b>

# Evidenztabelle **Baram, Yang et al. 2019**

## Orthodontic Treatment Need and the Psychosocial Impact of Malocclusion in 12-Year-Old Hong Kong Children

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Received 22 March 2019; Accepted 2 June 2019; Published 12 June 2019

Academic Editor: Carlo Eduardo Medina-Solis

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**Objective:** To determine the prevalence of orthodontic treatment need in 12-year-old children in Hong Kong and its relationship with the psychosocial impact of malocclusion and to assess their associations with sociodemographic factors. **Materials and Methods:** A random sample of 687 12-year-old children was recruited from 45 secondary schools in Hong Kong. Orthodontic treatment need was assessed on study models by five indices: the Dental Health Component of the Index of Orthodontic Treatment Need (IOTN-DHC), the Aesthetic Component of the IOTN (IOTN-AC), the Dental Aesthetic Index (DAI), the Index of Complexity Outcome and Need (ICON), and the Peer Assessment Rating (PAR). The psychosocial impact of malocclusion on participants and sociodemographic factors were obtained from a questionnaire. Logistic regression was used to examine the correlations between treatment need and the psychosocial impact of malocclusion as well as their associations with sociodemographic factors. **Results:** The final number of participants was 667 (309 boys and 358 girls, participation rate 667/687 = 97.1%). The prevalence of orthodontic treatment need varied depending on the indices used (30.9–47.8%), but significant correlations were found among the five indices ( $p < 0.001$ ). The uptake of treatment among the cohort was 1.7%. Boys had higher IOTN-DHC ( $p = 0.05$ ), DAI ( $p = 0.05$ ), and PAR ( $p = 0.001$ ) scores than girls. IOTN-AC was significantly associated with the psychosocial impact of malocclusion ( $p = 0.05$ ). Parents' level of education and household income were not significantly associated with either treatment need or the psychosocial impact of malocclusion ( $p > 0.05$ ). **Conclusion:** The need for orthodontic treatment in 12-year-old children in Hong Kong remained high, and the uptake of treatment was low. Boys had a higher normative treatment need than girls. Among the five indices, IOTN-AC appears to be the best indicator of the psychosocial impact of malocclusion.

<b>Population</b>	<b>„Malokklusion/Dysgnathie“ allg</b> random sample of 687 12-year-old children was recruited from 45 secondary schools in Hong Kong
<b>Schweregrad</b>	Keine Angabe
<b>Einschlusskriterien</b>	All children born between 1 April and 31 May 1997 in Hongkong schools
<b>Ausschlusskriterien</b>	Keine Angabe
<b>Intervention</b> Versuchsgruppe	<b>Keine Intervention, aber Malokklusion/kraniofaziale Fehlbildung</b> VERSUCHSGRUPPE: N=687/ Alter = 13 ± ?? Jahre / ♂:♀ = 339:328 <ul style="list-style-type: none"> <li>• Gebissphase: spätes Wechselgebiss</li> <li>• KFO-Behandlung: keine</li> </ul>

<b>Outcome</b>	<p><b>direkter oder schadenspräventiver medizinischer Nutzen bzw. Korrektur/Prävention der Anomalie/Malokklusion/Dysgnathie</b></p> <ul style="list-style-type: none"> <li>• <b>mundgesundheitsbezogene Lebensqualität (MLQ), psychische Entwicklung</b></li> </ul> <p>PRIMÄRZIELGRÖßE: <i>Psychosocial Impact of Malocclusion (CPQ11-14)</i></p> <p>SEKUNDÄRZIELGRÖßE: <i>Assessment of Orthodontic Treatment Need (IOTN-AC, IOTN-DHC, DAI, ICON, PAR)</i></p>
<b>Studientyp</b>	<b>Querschnittsstudie</b>
<b>Schlussfolgerungen der Autoren</b>	<p>(1)The orthodontic treatment need of 12-year-old children in HongKong remained highwhile uptake of treatmentwas low.</p> <p>(2) Boys had a higher normative need than girls at the age of 12.</p> <p>(3) Among the five indices, the IOTN-AC appears to be the best indicator of psychosocial impact of reasonable request.</p>
<b>Zusammenfassung der Ergebnisse</b>	<p><b>PRIMÄRZIELGRÖßE</b> <i>For the psychosocial impact of malocclusion, 60% of the children were concerned</i>Table 1: Normative orthodontic treatment need assessed with the IOTN-AC, DAI, ICON, and PAR. No definite treatment need Definite treatment need IOTN-AC 89.1% (n = 594) 10.9% (n = 73) IOTN-DHC 52.2% (n = 348) 47.8% (n = 319) DAI 69.4% (n = 463) 30.6%(n = 204) ICON 62.1% (n = 414) 37.9%(n = 253) PAR 88.6% (n = 591) 11.4% (n = 76) Definite treatment need: IOTN-AC: categories 8-10, IOTN-DHC: categories 4 and 5,DAI: score <math>\geq 36</math>, ICON: <math>&gt;42</math>, PAR: initial score <math>\geq 25</math>. about what other people thought of their teeth, 34% had avoided smiling and laughing, and 48% had been teased or called names because of their teeth (Table 3). Among the five indices, only IOTN-AC showed a significant association with the psychosocial impact ofmalocclusion (<math>p = 0.04, 0.02, 0.09</math>, respectively) (Table 3).</p> <p><b>SEKUNDÄRZIELGRÖßE</b> <i>Ergebnistext (Copy&amp;Paste) – Nur Leitlinien-relevante Ergebnisse, welche PICO-Einschlusskriterien erfüllen aufnehmen</i></p>
<b>Angaben auffälliger positiver und/oder negativer Aspekte</b>	<p><i>Gut durchgeführt Querschnittstudie zur Korrelation von kieferorthopädischer Behandlungsbedürftigkeit und dem psychischen Wohlbefinden der Kinder in Hongkong. Valide und reliabel Durchführung. Keine Angabe von Konfidenzintervallen. Keine Verblindung.</i></p>
<b>Schlussfolgerung des Begutachters</b>	<p><u>methodische Qualität</u>: gut</p> <p><u>Klinische Aussagekraft</u>: The need for orthodontic treatment in 12-year-old children in Hong Kong remained high, and the uptake of treatment was low. Boys had a higher normative treatment need than girls. Among the five indices, IOTN-AC appears to be the best indicator of the psychosocial impact of malocclusion</p>
<b>Evidenzlevel (SIGN)</b>	<b>3</b>
<b>Qualität</b>	<b>Acceptable ⊕</b>

# Evidenztabelle **Bates, McDonald 2005**

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## The relationship between severity of obstructive sleep apnoea/hypopnoea syndrome (OSAHS) and lateral cephalometric radiograph values: A clinical diagnostic tool

**Background:** This prospective cross-sectional cohort study examined the relationship between radiographic anatomy and the severity of OSAHS. The severity of OSAHS can be measured subjectively in terms of the Epworth score and objectively in terms of the apnoeahypopnoea index (AHI). **Methods:** 121 lateral cephalometric radiographs were traced under uniform conditions and a series of 50 landmarks identified, from which 48 angular and linear measurements were made. Significant changes occurred when comparison of these measurements with the severity of OSAHS were made. **Results:** Body mass index (BMI), the maxillary-mandibular planes angle (MMPA) and the linear measurement between points 7 and 12, (the pharyngeal dimension measured from the tip of the soft palate to the corresponding horizontal point on the posterior pharynx), increased significantly with increasing severity of OSAHS as measured by the Epworth score. Overjet, lower lip length, and the distance from the hyoid bone to a point B on the mandible all increased significantly with increasing severity of OSAHS, as measured by the AHI. The hyoid bone was found to rotate counter clockwise as the severity of OSAHS increased, as a result the distance between the most anterior superior point on the hyoid bone and the maxillary plane was seen to decrease as severity of OSAHS increased in terms of AHI. **Conclusions:** Some radiographic anatomical features show significant change as the severity of OSAHS increases and these features could be used in the identification of patients who have severe OSAHS. The Logit equation derived from the findings of this study may also be a useful clinical tool in predicting the likelihood of a subject suffering from severe OSAHS. **Keywords:** Obstructive sleep apnoea, severity, lateral cephalometric radiograph. *Surgery, 1 October 2005 135-145*

<b>Population</b>	„Malokklusion/Dysgnathie“ allg. Adult patients were recruited prospectively to the study consecutively as referred from the sleep disorder waiting list of the Orthodontic Department, Victoria Hospital, Kirkcaldy, Fife
<b>Schweregrad</b>	keine Angabe
<b>Einschluss-kriterien</b>	In order to meet the inclusion criteria of the study, patients were dentate, white Caucasians with a history of snoring or confirmed sleep apnoea and no history of respiratory disease, and had not previously undergone surgery relevant to the condition.

<b>Ausschlusskriterien</b>	keine Angabe
<b>Intervention</b> Versuchsgruppe	<p><b>keine Behandlung, aber Malokklusion/kraniofaziale Fehlbildung</b></p> <p>VERSUCHSGRUPPE:</p> <p>N=121 Alter = MIN:28, MAX:85 / ♂:♀ = 68:53</p> <ul style="list-style-type: none"> <li>Gebissphase: permanentes Gebiss ≥ 18. Lebensjahr</li> <li>KFO-Behandlung: keine Behandlung</li> </ul>
<b>Outcome</b>	<p><b>direkter oder schadenspräventiver medizinischer Nutzen bzw. Korrektur/Prävention der Anomalie/Malokklusion/Dysgnathie</b></p> <ul style="list-style-type: none"> <li><b>Atmung und Luftraum (Airway space, Schlafapnoe), Schlucken und Sprechen</b></li> </ul> <p>PRIMÄRZIELGRÖßE: <i>Apnoea/Hypopnoea Index (AHI)</i></p> <p>SEKUNDÄRZIELGRÖßE: <i>Epworth Scale</i></p>
<b>Studientyp</b>	<b>Querschnittsstudie</b>
<b>Schlussfolgerungen der Autoren</b>	<p>Increasing severity of OSAHS in terms of Epworth score is related to increasing BMI, MMPA, and the pharyngeal dimension pt 7-12. Increasing severity of OSAHS in terms of AHI is related to increases in overjet, H1B and lower lip length and to decreases in H1NL. The hyoid bone rotates counter clockwise as OSAHS becomes more severe. No statistically significant differences were found in the head posture variables with increasing severity of daytime sleepiness or AHI. Subjects with increasing BMIs have increasing severity of AHI and Epworth scores and therefore severity of OSAHS. Increasing severity of OSAHS is not related to age. The logit equation could provide a useful clinical tool in assessment of a patient's likelihood to suffer severe OSAHS, using values which were found to be significant factors in prediction by this study. Subjective assessment of daytime sleepiness by the Epworth scale was not found to correlate with objective assessment of OSAHS by AHI in this study.</p>
<b>Zusammenfassung der Ergebnisse</b>	<p><b>PRIMÄRZIELGRÖßE</b> <i>The mean AHI value was 18.2 (range 0-77). Patients were divided for data analysis dependant on their score. The data were skewed towards the lower AHI values, concordant with the referral pattern for treatment with a mandibular repositioning splint. Initially, low or high AHI score related to the cephalometric measurements using logistic regression were examined. The patient group was divided in two, &lt;20 (low AHI) and &gt;20 (high AHI). None of the factors examined by our study was found to show any significant change as severity of AHI increased.</i></p> <p><i>The group was divided into sets with an interval of seven points of AHI score contained within each set. When divided into six groups as above, OJ (p value=0.0135), H1B (p value=0.0005), H1NL (p value=0.0163) and LL length (p value=0.0016) were significant factors that showed change with increasing AHI.</i></p>

<p><b>Zusammenfassung der Ergebnisse</b></p>	<p><b>SEKUNDÄRZIELGRÖßE</b> <i>The mean Epworth score for the study group was 9.4 (range 0-22) equating to mild-moderate OSAHS as defined by Johns in 1991. Patients were divided for data analysis dependant on their score.4 This mean level of Epworth score was expected, as the group of patients best treated with an MRS are those with mild to moderate OSAHS.21</i></p> <p><i>The patient group was initially divided into &lt;12 and &gt;12 on the Epworth scale. After statistical analysis, BMI (p = 0.0016) and MMPA (Maxillary Mandibular Plane Angle) (p=0.0365) were factors which had statistically significant increases with increasing severity of daytime sleepiness when compared with those with mild daytime sleepiness.</i></p> <p><i>The group was subdivided again into smaller groups highlighting significant factors as severity of daytime sleepiness increased. Johns (1991) stated that the mean Epworth score for mild OSAHS was 9.5, for moderate OSAHS it was 11.5 and in severe OSAHS it was 16.4 Sub-groups had to be small enough to detect changes in features between mild, moderate and severe OSAHS. A change of three points on the Epworth scale can be considered clinically significant. Therefore, our groupings followed this parameter, with an interval of three points on the scale contained within each subgroup. BMI (p value=0.0096), MMPA (p value=0.0280) and Pt7-12 (point on posterior pharyngeal wall at same horizontal level as tip of soft palate) (p value=0.0031) showed statistically significant increases in value as severity of daytime sleepiness increased.</i></p>
<p><b>Angaben auffälliger positiver und/oder negativer Aspekte</b></p>	<p><i>Kohortenstudie mit klarer Fragestellung. Ausführliche Beschreibung der cephalometrischen Auswertung. Keine Verblindung, keine Angaben von Konfidenzintervallen, keine Angaben zu initial gescreenten Patienten, keine Angaben zum Funding oder möglichen Interessenskonflikten.</i></p>
<p><b>Schlussfolgerung des Begutachters</b></p>	<p><u>methodische Qualität:</u> ok</p> <p><u>Klinische Aussagekraft:</u> Some radiographic anatomical features show significant change as the severity of OSAHS increases and these features could be used in the identification of patients who have severe OSAHS. The Logit equation derived from the findings of this study may also be a useful clinical tool in predicting the likelihood of a subject suffering from severe OSAHS</p>
<p><b>Evidenz-level (SIGN)</b></p>	<p><b>3</b></p>
<p><b>Qualität</b></p>	<p><b>Acceptable ⊕</b></p>

# Evidenztabelle **Bauss et al. 2008**

## Influence of Overjet and Lip Coverage on the Prevalence and Severity of Incisor Trauma

## Einfluss von Overjet und Lippenbedeckung auf die Prävalenz und den Schweregrad von Frontzahntraumata

Oskar Bauss<sup>1</sup>, Stefan Freitag<sup>2</sup>, Johannes Röhling<sup>1</sup>, Alexander Rahman<sup>1</sup>

### Abstract

**Objective:** The aim of this study was to assess the influence of overjet size and lip coverage on the prevalence and severity of incisor trauma.

**Patients and Methods:** Dental records made on presentation of 1,367 patients were examined for data concerning the prevalence, type and severity of incisor trauma. Original overjet was measured on the pre-treatment study models and divided into two categories: normal overjet (0-3.0 mm) and increased overjet (> 3.0 mm). Lip coverage of the upper incisors was estimated with reference to photographs showing the patient's face and was then rated as adequate or inadequate. The patients were then divided into three groups: normal original overjet and adequate lip coverage (Group 1), increased original overjet and adequate lip coverage (Group 2), and increased original overjet and inadequate lip coverage (Group 3).

**Results:** Group 1 patients revealed a significantly lower prevalence of traumatic injuries than those in Group 2 ( $p = 0.028$ ) or Group 3 ( $p = 0.003$ ), and the odds ratios compared to Group 1 were 1.6614 for Group 2 and 2.0336 for Group 3. Regarding the type of trauma, Group 3 patients showed a significantly higher frequency of periodontal injuries than those in Group 1 ( $p = 0.018$ ) or Group 2 ( $p = 0.005$ ).

Furthermore, Group 3 patients had significantly more injuries to two or more teeth per person than patients in Group 1 ( $p = 0.001$ ) or Group 2 ( $p = 0.001$ ).

**Conclusions:** Increased overjet and inadequate lip coverage increase the risk and severity of incisor trauma. Early orthodontic treatment might prevent dental trauma in these patients.

**Key Words:** Dental trauma · Overjet · Lip coverage

### Zusammenfassung

**Ziel:** Es sollte der Einfluss eines vergrößerten Overjets und einer inadäquaten Lippenbedeckung auf die Prävalenz und den Schweregrad von Frontzahntraumata untersucht werden.

**Patienten und Methodik:** Aus den Anfangsunterlagen von 1367 Patienten wurden die Prävalenz, der Typ und die Anzahl von Frontzahntraumata ermittelt. Der Umfangswert für den Overjet wurde am Anfangsmodell bestimmt und in zwei Kategorien eingeteilt: normaler (0-3,0 mm) und vergrößerter (> 3,0 mm) Overjet. Die Lippenbedeckung der Oberkiefer Schneidezähne wurde anhand der prätherapeutischen Frontalfotos beurteilt und als adäquat oder inadäquat eingestuft. Anschließend wurden die Patienten in drei Gruppen eingeteilt: normaler Overjet und adäquate Lippenbedeckung (Gruppe 1), vergrößerter Overjet und adäquate Lippenbedeckung (Gruppe 2) und vergrößerter Overjet und inadäquate Lippenbedeckung (Gruppe 3).

**Ergebnisse:** Die Patienten in Gruppe 1 zeigten eine signifikant niedrigere Traumaprävalenz als die Patienten in Gruppe 2 ( $p = 0.028$ ) oder Gruppe 3 ( $p = 0.003$ ). Bei Vergleich mit der Gruppe 1 betrug die Odds Ratio 1,6614 für Gruppe 2 und 2,0336 für Gruppe 3. Hinsichtlich der Traumatypes traten parodontale Verletzungen bei den Patienten in Gruppe 3 signifikant häufiger auf als bei den Patienten in Gruppe 1 ( $p = 0.018$ ) oder Gruppe 2 ( $p = 0.005$ ).

Weiterhin zeigten Patienten in Gruppe 3 signifikant häufiger eine Verletzung von zwei oder mehr Zähnen als Patienten in Gruppe 1 ( $p = 0.001$ ) oder Gruppe 2 ( $p = 0.001$ ).

**Schlussfolgerungen:** Ein vergrößerter Overjet und eine inadäquate Lippenbedeckung erhöhen nicht nur das Risiko, sondern führen auch zu einer Zunahme des Schweregrades von Frontzahntraumata. Eine frühzeitige kieferorthopädische Behandlung dieser Risikopatienten könnte einen wesentlichen Beitrag zur Traumaprophylaxe leisten.

<b>Population</b>	<b>Klasse-II-Anomalie</b> Dental records made on presentation of 1,367 patients were examined for data concerning the prevalence, type and severity of incisor trauma.
<b>Schweregrad</b>	keine Angabe
<b>Einschlusskriterien</b>	keine Angabe
<b>Ausschlusskriterien</b>	keine Angabe



<p><b>Intervention</b> Versuchsgruppe</p>	<p><b>keine Behandlung, aber Malokklusion/kraniofaziale Fehlbildung</b> <i>increased original overjet and adequate lip coverage</i> VERSUCHSGRUPPE: <b>group 2</b> N=532 / Alter = ?? Jahre / ♂:♀ = ?:?  <ul style="list-style-type: none"> <li>Gebissphase: frühes Wechselgebiss, spätes Wechselgebiss, permanentes Gebiss &lt; 18. Lebensjahr, permanentes Gebiss ≥ 18. Lebensjahr</li> <li>KFO-Behandlung: keine</li> </ul> </p>
<p><b>Intervention</b> Versuchsgruppe</p>	<p><b>keine Behandlung, aber Malokklusion/kraniofaziale Fehlbildung</b> <i>increased original overjet and inadequate lip coverage</i> VERSUCHSGRUPPE: <b>group 3</b> N=342 Alter = ?? ± ?? Jahre / ♂:♀ = ?:?  <ul style="list-style-type: none"> <li>Gebissphase: frühes Wechselgebiss, spätes Wechselgebiss, permanentes Gebiss &lt; 18. Lebensjahr, permanentes Gebiss ≥ 18. Lebensjahr</li> <li>KFO-Behandlung: keine</li> </ul> </p>
<p><b>Kontrolle</b> Kontrollgruppe</p>	<p><b>keine Behandlung, keine Malokklusion/kraniofaziale Fehlbildung</b> <i>normal original overjet and adequate lip coverage</i> KONTROLLGRUPPE: <b>group 1</b> N=493 / Alter = ?? ± ?? Jahre / ♂:♀ = ?:?  <ul style="list-style-type: none"> <li>Gebissphase: frühes Wechselgebiss, spätes Wechselgebiss, permanentes Gebiss &lt; 18. Lebensjahr, permanentes Gebiss ≥ 18. Lebensjahr</li> <li>KFO-Behandlung: keine</li> </ul> </p>
<p><b>Outcome</b></p>	<p><b>direkter oder schadenspräventiver medizinischer Nutzen bzw. Korrektur/Prävention der Anomalie/Malokklusion/Dysgnathie</b>  <ul style="list-style-type: none"> <li><b>Traumaprophylaxe (dentales Frontzahntrauma)</b></li> </ul> <p>PRIMÄRZIELGRÖßE: <i>Prevalence of dental trauma</i>                  SEKUNDÄRZIELGRÖßE: <i>Frequency of hard tissue and periodontal tissue injuries</i></p> </p>
<p><b>Studientyp</b></p>	<p><b>Querschnittsstudie</b></p>
<p><b>Schlussfolgerungen der Autoren</b></p>	<p>Increased overjet and inadequate lip coverage are two major risk factors for incisor trauma. Patients who presented both increased overjet and inadequate lip coverage were most at risk of trauma. We found more severe injuries among patients with increased overjet and inadequate lip coverage. This was reflected in our observation of both an increase in periodontal injuries and rise in the number of teeth involved. Inadequate lip coverage could play a decisive, concurrent role due to the absence of soft-tissue protection. Within the context of prevention-oriented dentistry, our results support the argument in favor of the early correction of relevant dental malpositions and anteroposterior jaw malrelationships for these patients at risk.</p>

<p><b>Zusammenfassung der Ergebnisse</b></p>	<p><b>PRIMÄRZIELGRÖßE</b> We noted previous incisor traumata in 7.1% of the patients in Group 1 (n = 35), in 11.3% of those in Group 2 (n = 60) and in 13.5% of the patients in Group 3 (n = 46). Group 1 patients presented a significantly lower prevalence of trauma than patients in Group 2 (p = 0.028) or those in Group 3 (p = 0.003) (Figure 1). The OR for sustaining incisor trauma was – in comparison to patients with normal overjet and adequate lip coverage – 1.6634 for those with increased overjet and adequate lip coverage (95% confidence interval: 1.0789–2.5646) and 2.0336 for patients with increased overjet and inadequate lip coverage (95% confidence interval: 1.2882–3.2102), i.e., their risk was increased by 66% and 100%, respectively.</p> <p><b>SEKUNDÄRZIELGRÖßE</b> We identified significant differences among the three study groups regarding types of trauma. Thus periodontal injuries were significantly more frequent in Group 3 than Group 1 (p = 0.018) or Group 2 patients (p = 0.015) (Figure 5).</p>
<p><b>Angaben auffälliger positiver und/oder negativer Aspekte</b></p>	<p>Kohortenstudie zum Zusammenhang von Überbiss und Frontzahntrauma. Klare Fragestellung. Keine Angaben zum Funding, Interessenskonflikten, Powerkalkulation, Konfidenzintervallen.</p>
<p><b>Schlussfolgerung des Begutachters</b></p>	<p><u>methodische Qualität:</u> gut</p> <p><u>Klinische Aussagekraft:</u> Increased overjet and inadequate lip coverage increase the risk and severity of incisor trauma. Early orthodontic treatment might prevent dental trauma in these patients.</p>
<p><b>Evidenzlevel (SIGN)</b></p>	<p>3</p>
<p><b>Qualität</b></p>	<p>Acceptable ⊕</p>

# Evidenztabelle **Borzabadi-Farahani, Borzabadi-Farahani 2011**

## The association between orthodontic treatment need and maxillary incisor trauma, a retrospective clinical study

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**Objectives:** Identifying risk factors for dental trauma in children is important. The main aim of this retrospective study was to investigate the association between maxillary incisor trauma (MIT) and variables such as gender, malocclusion complexity, and orthodontic treatment need (OTN).

**Study design:** ICON (Index of Complexity, Outcome and Need) scores were calculated in 502 schoolchildren (253 girls and 249 boys, aged 11–14 years). Subjects were categorized into 5 ICON complexity groups (easy to very difficult) and into 2 groups according to OTN (ICON >43, ICON <44). Logistic regression was performed to test for any differences in risk of MIT among subjects in different ICON complexity groups and to estimate the predictive value of gender, OTN, and ICON scores for MIT.

**Results:** Nine percent experienced incisor trauma (93.4% maxilla, 6.6% mandible). Enamel fracture was the most common type (6.2%) of dental trauma. Boys had greater odds of MIT compared with girls (odds ratio [OR] 2.16, 95% confidence interval [CI] 1.11–4.21). Subjects with OTN showed greater odds of MIT compared to those without (OR 2.37, 95% CI 1.21–4.64). Only subjects presenting with difficult complexity grade (64 < ICON < 77) showed significantly higher odds of experiencing MIT (OR 3.16, 95% CI 1.25–8.01) compared with the easy complexity group (ICON <29).

**Conclusion:** The higher risk of experiencing MIT in malocclusions with difficult complexity warrants more vigilant screening of this group before and during dental or orthodontic treatment. (Oral Surg Oral Med Oral Pathol Oral Radiol Endod 2011;112:e75–e80)

<b>Population</b>	„Malokklusion/Dysgnathie“ allg. sample of 11- to 14-year-old Iranian schoolchildren (average age 12.4 years old), Iran
<b>Schweregrad</b>	Keine Angabe
<b>Einschlusskriterien</b>	11- to 14-year-old Iranian schoolchildren (average age 12.4 years old) according to a stratified cluster sampling method, defining the students in 6 public schools as 6 strata.
<b>Ausschlusskriterien</b>	Keine Angabe
<b>Intervention</b> Versuchsgruppe	<b>Keine Behandlung</b> VERSUCHSGRUPPE: N= 502 (Anfang) / N=502 (Ende) / Alter = 12,4 ± ?? Jahre / ♂:♀ = 253:249 <ul style="list-style-type: none"> <li>• Gebissphase: spätes Wechselgebiss</li> <li>• KFO-Behandlung: keine Behandlung</li> </ul>
<b>Outcome</b>	<b>direkter oder schadenspräventiver medizinischer Nutzen bzw. Korrektur/Prävention der Anomalie/Malokklusion/Dysgnathie</b> <ul style="list-style-type: none"> <li>• Traumaprophylaxe (dentales Frontzahntrauma)</li> </ul> <b>PRIMÄRZIELGRÖßE:</b> Correlation of traumatic injuries to maxillary incisors and ICON complexity grades.

<b>Studientyp</b>	<b>Querschnittsstudie</b>
<b>Schlussfolgerungen der Autoren</b>	In the present study, prevalence of incisor trauma was 9%. The prevalence of incisor trauma in this study was low compared with other studies. Female gender decreased the risk of MIT by 46.2%. Each unit increase in ICON score increased the risk of MIT by 1.2%. With increase in the ICON complexity grade, the odds of experiencing MIT also increased. Only subjects with difficult complexity grade (64 < ICON < 77) showed a significantly higher odds of experiencing MIT compared with the easy complexity group (ICON < 29). We observed a relative decrease in the odds of experiencing trauma for subjects with very difficult ICON complexity grade compared with subjects with difficult and moderate complexity grades. The current findings may be important for targeting and screening certain vulnerable groups during dental or orthodontic treatment.
<b>Zusammenfassung der Ergebnisse</b>	<b>PRIMÄRZIELGRÖßE</b> Male subjects had greater odds of experiencing MIT compared with female subjects (odds ratio [OR] 2.16, 95% confidence interval [CI] 1.11-4.21). Subjects with orthodontic treatment need (ICON >43) had greater odds of experiencing MIT compared with subjects with no orthodontic treatment need (ICON < 44; OR 2.37, 95% CI 1.21-4.64). Univariate logistic regression showed that female gender reduced the risk of MIT by 46.2% [OR 0.462, effect 0.771 (SE 0.340), 95% CI 0.23-0.90] and that risk of injury increased by 1.2% for every unit increase in ICON scores [OR 1.012, effect 0.011 (SE 0.006), 95% CI 0.99-1.02]. The odds of experiencing MIT increased with increase of ICON complexity grade. However, a decrease in the odds of experiencing MIT for subjects with very difficult ICON complexity grade was observed. Only subjects with difficult complexity grade (64 < ICON < 77) showed significantly higher odds of experiencing MIT (OR 3.16, 95% CI 1.25-8.01) compared with subjects with easy complexity grade (ICON <29; Table III).
<b>Angaben auffälliger positiver und/oder negativer Aspekte</b>	Gut durchgeführt Querschnittsstudie zum Zusammenhang von Malokklusionen und Frontzahntraumata. Keine Verblindung, keine Information zu Interessenskonflikten. Angabe von Konfidenzintervallen, valide und reliabele Datenerhebung.
<b>Schlussfolgerung des Begutachters</b>	<u>methodische Qualität:</u> gut  <u>Klinische Aussagekraft:</u> The higher risk of experiencing MIT in malocclusions with difficult complexity warrants more vigilant screening of this group before and during dental or orthodontic treatment.
<b>Evidenzlevel (SIGN)</b>	<b>3</b>
<b>Qualität</b>	<b>Acceptable ⊕</b>

# Evidenztabelle Bourdiol et al. 2017

## Only severe malocclusion correlates with mastication deficiency



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### ARTICLE INFO

Article history:  
 Received 22 March 2016  
 Received in revised form 1 December 2016  
 Accepted 1 December 2016

**Keywords:**  
 Masticatory deficiency  
 Masticatory restrictive indicator  
 Index of treatment need  
 Global oral health assessment index  
 Malocclusion  
 Dental malocclusion

### ABSTRACT

**Objective:** The relation between level of dental malocclusion and extent of masticatory deficiency was studied.  
**Design:** Three groups of human young adults were formed: (i) subjects needing orthodontics plus orthognathic surgery (SevDFD, n = 18), (ii) subjects needing orthodontic treatment only (ModDFD, n = 12), and (iii) subjects needing no treatment (NoDFD, n = 12). For mastication tests, carrot bolus were collected at the deglutition time. Bolus particle size range was expressed as d50 value, which was compared with the Masticatory Restrictive Indicator (MRI), Index of treatment need (ITN), global oral health assessment index (GOHAI) and chewing kinematics characteristics were also recorded. We used a general linear model univariate procedure followed by a Student-Newman-Keuls test.  
**Results:** All the SevDFD subjects showed impaired mastication with MRI above the normal limit (d50 mean = 7.23 mm). All the ModDFD subjects had one more below this limit (d50 mean = 2.34 mm), and so could adapt to a low level of masticatory impairment as also indicated by kinematics. ITN indicated a treatment need for ModDFD (3.7 ± 0.5) and SevDFD (4.3 ± 0.6) groups, while GOHAI values were unsatisfactory only for SevDFD (42.6 ± 9.2 vs. 55.1 ± 1.8).  
**Conclusion:** Our findings emphasize the need for an objective evaluation of masticatory function to discern truly deficient mastication from mild impairment allowing satisfactory adaptation of the function. However, malocclusions are known to worsen with time justifying thus their corrections as early as possible.

<b>Population</b>	<p>„Malokklusion/Dysgnathie“ allg.</p> <p>Three groups of human young adults were formed: (i) subjects needing orthodontics plus orthognathic surgery (SevDFD, n = 18), (ii) subjects needing orthodontic treatment only (ModDFD, n = 12), and (iii) subjects needing no treatment (NoDFD, n = 12). University Hospital (CHU) Clermont-Ferrand, France</p>
<b>Schweregrad</b>	unterschiedlich
<p><b>Einschlusskriterien</b></p> <p>Bei Review: PICOS</p>	<p>Inclusion criteria were: age above 16 and below 36 years, full dentition not counting wisdom teeth, healthy oral mucosa and temporo-mandibular joint, good or well-controlled general health, and ability to understand and answer questionnaires. Subjects were also young adults with only few intracoronal restorations or fillings. None of them presented a dental bridge and two patients presented a unique molar crown.</p>
<b>Ausschlusskriterien</b>	<p>Exclusion criteria were: removable dentures, previous orthodontic or oral surgery treatments, and allergy to the test foods. The required sample size was estimated from a preliminary pilot study that measured the carrot bolus granulometry between ModDFD (n = 10) and SevDFD (n = 10). The mean D50 values of the carrot bolus increased from 2512 ± 380 mm to 6924 ± 2762 mm respectively.</p>
<p><b>Intervention</b></p> <p>Versuchsgruppe</p>	<p><b>kieferorthopädisch-kieferchirurgische Kombinationsbehandlung</b></p> <p>subjects needing orthodontics plus orthognathic surgery</p> <p>VERSUCHSGRUPPE: <b>SevDFD</b></p> <p>N=18 (Anfang) / N=18 (Ende) / Alter = 26 ± 9 Jahre / ♂:♀ = 12:6</p> <ul style="list-style-type: none"> <li>Gebissphase: permanentes Gebiss ≥ 18. Lebensjahr</li> <li>KFO-Behandlung: Spätbehandlung (Erwachsenenbehandlung)</li> </ul>

<b>Intervention</b> Versuchsgruppe	<b>kieferorthopädisch Behandlung</b> <i>subjects needing orthodontic treatment only</i> VERSUCHSGRUPPE: <b>ModDFD</b> N=12 (Anfang) / N=12 (Ende) / Alter = 26 ± 4 Jahre / ♂:♀ = 9:3 <ul style="list-style-type: none"> <li>• Gebissphase: permanentes Gebiss ≥ 18. Lebensjahr</li> <li>• KFO-Behandlung: Spätbehandlung (Erwachsenenbehandlung)</li> </ul>
<b>Kontrolle</b> Kontrollgruppe	<b>keine kieferorthopädische Therapie</b> <i>subjects needing no treatment</i> KONTROLLGRUPPE: <b>NoDFD</b> N=12 (Anfang) / N=12 (Ende) / Alter = 23 ± 4 Jahre / ♂:♀ = 8:4 <ul style="list-style-type: none"> <li>• Gebissphase: permanentes Gebiss ≥ 18. Lebensjahr</li> <li>• KFO-Behandlung: keine</li> </ul>
<b>Outcome</b>	<b>direkter oder schadenspräventiver medizinischer Nutzen bzw. Korrektur/Prävention der Anomalie/Malokklusion/Dysgnathie</b> <ul style="list-style-type: none"> <li>• <b>Prävention oraler Erkrankungen und von Störungen der Gebissentwicklung (u.a. Mundhygienefähigkeit, Karies, PA, Zahnretentionen u. -verlagerung)</b></li> </ul> PRIMÄRZIELGRÖßE: <i>Kinematic evaluation (Cycle number, Sequence duration, Frequency)</i> SEKUNDÄRZIELGRÖßE: <i>Granulometric evaluation d50 values (µm)</i>
<b>Studientyp</b>	<b>Querschnittsstudie</b>
<b>Schlussfolgerungen der Autoren</b>	Patients with impaired mastication were characterized by a high IOTN, decreased interarch functional areas and decreased quality of life. Subjects with a low level of masticatory impairment and/or moderate malocclusion were able to adapt. Though characterized by a high level of IOTN, these subjects expressed a near-satisfactory quality of life, which is probably why they were not seeking treatment. The study emphasizes the need for the objective evaluation of masticatory function so as to separate true impairment from mild, harmless impairment that allows compensatory adaptation. Nevertheless, aesthetic demand corresponds to a patient seeking a satisfactory betterment of his appearance allowing assertion of his self-evaluation. Malocclusion are known to worsen with age which justifies their corrections and maintenance, as early as possible, through orthodontic therapy considered this time a preventive therapeutic

<p><b>Zusammenfassung der Ergebnisse</b></p>	<p><b>GRUPPE SevDFD VS. GRUPPE ModDFD VS. GRUPPE NoDFD</b></p> <p><b>PRIMÄRZIELGRÖßE</b> <i>The number of masticatory cycles, the duration of the sequence and the frequency of cycles within the sequence are given when chewing up to 15 cycles and until deglutition (Table 2). The number of masticatory cycles occurring until swallowing increased from NoDFD to SevDFD, but the differences were not significant. By contrast, the duration of the mastication sequence both at deglutition (<math>p &lt; 0.05</math>) and after 15 cycles (<math>p &lt; 0.001</math>) depended on the group of subjects observed (Table 2). This duration increased significantly between NoDFD and SevDFD at deglutition and at 15 cycles, and also between ModDFD and SevDFD at 15 cycles. No difference was seen between NoDFD and ModDFD. For the frequency of cycles within the sequence, SevDFD differed from the other two for both sequences ending at deglutition (<math>p &lt; 0.01</math>) and sequences ending at 15 cycles (<math>p &lt; 0.001</math>), while NoDFD and ModDFD did not differ from each other.</i></p> <p><i>Cycle number increased significantly only with the hardest gelatine products between NoDFD and SevDFD (<math>p &lt; 0.05</math>); ModDFD was not different from the other two. While chewing the two hardest gelatine products, sequence duration increased significantly from NoDFD to SevDFD and from ModDFD to SevDFD (<math>p &lt; 0.001</math>); NoDFD and ModDFD did not differ significantly. Whatever the gelatine being chewed, frequency increased between NoDFD and ModDFD and between ModDFD and SevDFD (<math>p &lt; 0.001</math>). Hardness effect was strong, and induced a significant increase in both cycle number and sequence duration (<math>p &lt; 0.001</math>). This increase depended on the group of subjects (<math>p &lt; 0.001</math>), SevDFD being the most affected and NoDFD the least. Also, the increase in hardness significantly influenced masticatory frequency (<math>p &lt; 0.05</math>) indiscriminately in all the groups (Table 3).</i></p> <p><b>SEKUNDÄRZIELGRÖßE</b> <i>All d50 values of the carrot boluses obtained at swallowing in SevDFD were above 4 mm. One subject in ModDFD had a d50 value above 4 mm. All the d50 values obtained at swallowing in NoDFD were below 4 mm (Fig. 1). A significant difference in d50 was observed between SevDFD and the two other groups, both at deglutition and after 15 cycles (<math>p &lt; 0.001</math>), but no difference was observed between NoDFD and ModDFD (Fig. 2). Variations of mastication parameters were only explained by group type.</i></p>
<p><b>Angaben auffälliger positiver und/oder negativer Aspekte</b></p>	<p><i>Sehr gut durchgeführte Fall-Kontroll-Studie. Fragestellung klar herausgearbeitet. Keine Verblindung, keine Angabe zum Funding oder möglichen Interessenskonflikten, keine Angabe von Konfidenzintervallen.</i></p>
<p><b>Schlussfolgerung des Begutachters</b></p>	<p><u>methodische Qualität:</u> sehr gut</p> <p><u>Klinische Aussagekraft:</u> Findings emphasize the need for an objective evaluation of masticatory function to discern truly deficient mastication from mild impairment allowing satisfactory adaptation of the function. However, malocclusions are known to worsen with time justifying thus their corrections as early as possible.</p>
<p><b>Evidenzlevel (SIGN)</b></p>	<p><b>3</b></p>
<p><b>Qualität (RoB, SIGN /AMSTAR II)</b></p>	<p><b>Acceptable ⊕</b></p>

## Evidenztabelle **Burden 1995**

### An investigation of the association between overjet size, lip coverage, and traumatic injury to maxillary incisors

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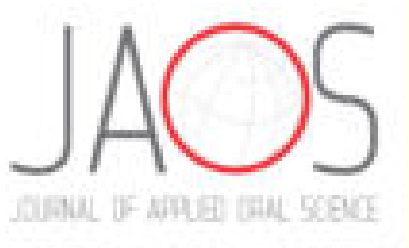
**SUMMARY** This study investigated the association between overjet size and lip coverage when assessing the likelihood of traumatic injury to maxillary incisors. Eleven-hundred-and-thirty-seven 11- and 12-year-olds were examined in school for traumatic injury to their maxillary incisors. The size of overjet and the adequacy of lip coverage of the maxillary incisors was assessed for each child. One-hundred-and-sixty-seven (15 per cent) had experienced traumatic injury to their maxillary incisors. Both increased overjet and inadequate lip coverage of the maxillary incisors were found to be significant risk factors. However, inadequate lip coverage was the single most important independent predictor of traumatic injury ( $P < 0.001$ ), with a relative odds ratio of 2.62. The results suggest that much of the predictive value of increased overjet may be explained by inadequate lip coverage.

<b>Population</b>	<p>„Malokklusion/Dysgnathie“ allg.</p> <p>The study population was defined as aU children in their first year of secondary school, aged 11-12 years, attending state-maintained schools. A cluster sample of 10 secondary schools was randomly selected from the 233 secondary schools within Northern Ireland, representing a complete cross-section of socio-economic status</p>
<i>Schweregrad</i>	keine Angabe
<i>Einschlusskriterien</i>	aged 11-12 years, attending state-maintained schools
<i>Ausschlusskriterien</i>	keine Angabe
<b>Intervention</b> Versuchsgruppe	<p><b>Keine Behandlung</b></p> <p>VERSUCHSGRUPPE</p> <p>N=1107 / Alter = 11,7 MIN:10,9 MAX:12,6 Jahre / ♂:♀ = 577:530</p> <ul style="list-style-type: none"> <li>Gebissphase: spätes Wechselgebiss</li> <li>KFO-Behandlung: keine</li> </ul>
<b>Outcome</b>	<p><b>direkter oder schadenspräventiver medizinischer Nutzen bzw. Korrektur/Prävention der Anomalie/Malokklusion/Dysgnathie</b></p> <ul style="list-style-type: none"> <li><b>Traumaprophylaxe (dentales Frontzahntrauma)</b></li> </ul> <p>PRIMÄRZIELGRÖßE: <i>prevalence of traumatic injury in each of the overjet subgroups</i></p> <p>SEKUNDÄRZIELGRÖßE: <i>Relationship between traumatic injury to upper incisors and lip coverage.</i></p>



<b>Studientyp</b>	<b>Querschnittsstudie</b>
<b>Schlussfolgerungen der Autoren</b>	<ol style="list-style-type: none"> <li>1. Children with overjets greater than 3.5 mm have an increased risk of sustaining traumatic injury to their incisors.</li> <li>2. Children with lips which fail to cover and protect the teeth have an increased risk of sustaining traumatic injury to their incisors.</li> <li>3. Children with, both increased overjet and inadequate lip coverage have the highest risk of traumatic dental injury.</li> <li>4. Inadequate lip coverage is a better predictor of traumatic injury than increased overjet.</li> </ol>
<b>Zusammenfassung der Ergebnisse</b>	<p><b>PRIMÄRZIELGRÖßE</b> <i>Subjects with an overjet greater than the normal range (0-3.5 mm) were more likely to have received traumatic injury to their upper incisors (Chi square, P&lt;0.001). No significant difference was found in the prevalence of traumatic injury between those children whose overjet was &gt; 3.5-6 mm, &gt; 6-9 mm, and &gt;9 mm (Chi square, P=0.51). However, these results must be interpreted with caution due to the small number of subjects with very large overjets (Table 2). In females with overjets &gt; 3.5 mm the prevalence of traumatic injury tended to increase with increased overjet, although this trend was not statistically significant. No such trend was noted for the males who had overjets &gt;3.5 mm.</i></p> <p><b>SEKUNDÄRZIELGRÖßE</b> <i>One-quarter of the sample were considered to have inadequate lip coverage of their maxillary incisor teeth. Twenty-nine per cent of the children with inadequate lip coverage had received a traumatic injury to their incisors compared to only 10 per cent of those with adequate lip coverage (Table 3), this difference was statistically significant (Chi-square, P&lt;0.001).</i></p>
<b>Angaben auffälliger positiver und/oder negativer Aspekte</b>	<i>Querschnittstudie zur Korrelation von Malokklusionen und der Prävalenz von Frontzahntraumata. Klare Angaben zur Population und Fragestellung. Keine Angaben zum Funding, Interessenskonflikten, Konfidenzintervallen.</i>
<b>Schlussfolgerung des Begutachters</b>	<p><u>methodische Qualität:</u> gut</p> <p><u>Klinische Aussagekraft:</u> The results suggest that much of the predictive value of increased overjet may be explained by inadequate lip coverage.</p>
<b>Evidenz-level (SIGN)</b>	<b>3</b>
<b>Qualität</b>	<b>Acceptable ⊕</b>

# Evidenztabelle **Buyuknacar, Gulec 2020**



## Correlation between the cephalometric measurements and acoustic properties of /s/ sound in Turkish

### Abstract

Gözde Bilgin BUYUKNACAR   
Aysegül GÜLEÇ 

**Objectives:** To evaluate the acoustic properties of the /s/ sound in individuals with different occlusion types and to investigate relationships between these properties and cephalometric measurements. **Methodology:** Sixty patients were divided into three groups based on malocclusion. Group 1 included 20 patients (mean age: 14.85±2.01 years) with Class I skeletal and dental relationships. Group 2 included 20 patients (mean age: 13.49±1.78 years) with Class II skeletal and dental relationships. Group 3 included 20 patients (mean age: 12.46±2.62 years) with Class III skeletal and dental relationships. Cephalometric tracings were obtained from cephalometric radiographs. All included patients were native speakers of Turkish. The /s/ sound was selected for center of gravity analysis. Correlations between cephalometric values and acoustic parameters were also investigated. **Results:** The center of gravity of the /s/ sound had the lowest value in Group 2 ( $p<0.05$ ). For the /s/ sound in Group 3, moderate positive correlations were found between center of gravity and Sella-Nasion to Gonion-Gonathion angle ( $p<0.05$ ,  $r=0.444$ ) Lower incisor to Nasion-B point ( $p<0.023$ ,  $r=0.505$ ), and Lower incisor to Nasion-B point angle ( $p<0.034$ ;  $r=0.476$ ). No correlation was found in other cephalometric measurements. **Conclusions:** The /s/ sound was affected by malocclusion due to the changing place of articulation. Therefore, referral to an orthodontist for malocclusion treatment especially patients with class III in the early period is suggested for producing acoustically ideal sound.

<b>Population</b>	<p>„Malokklusion/Dysgnathie“ allg.</p> <p>Sixty patients were divided into three groups based on malocclusion. Group 1 included 20 patients (mean age: 14.85±2.01 years) with Class I skeletal and dental relationships. Group 2 included 20 patients (mean age: 13.49±1.78 years) with Class II skeletal and dental relationships. Group 3 included 20 patients (mean age: 12.46±2.62 years) with Class III skeletal and dental relationships.</p>
<b>Schweregrad</b>	keine Angabe
<b>Einschlusskriterien</b>	<ul style="list-style-type: none"> <li>• Class I dental and skeletal relationships;</li> <li>• Class II skeletal and dental relationships characterized by mandibular retrognathia and positive overjet;</li> <li>• Class III skeletal and dental relationships characterized by maxillary retrognathia and negative overjet.</li> </ul>

<b>Ausschlusskriterien</b>	
<b>Intervention</b> Versuchsgruppe	<p><b>keine Behandlung</b></p> <p><i>Class I skeletal and dental relationships</i></p> <p>VERSUCHSGRUPPE: <b>Group 1</b></p> <p>N=20 / Alter = 14,85 ± 2,01 Jahre / ♂:♀ = 8:12</p> <ul style="list-style-type: none"> <li>• Gebissphase: späte Wechselgebiss</li> <li>• KFO-Behandlung: keine</li> </ul>
<b>Intervention</b> Versuchsgruppe	<p><b>keine Behandlung</b></p> <p><i>Class II skeletal and dental relationships</i></p> <p>VERSUCHSGRUPPE: <b>Group 2</b></p> <p>N=20 / Alter = 13,49 ± 1,78 Jahre / ♂:♀ = 9:11</p> <ul style="list-style-type: none"> <li>• Gebissphase: späte Wechselgebiss</li> <li>• KFO-Behandlung: keine</li> </ul>
<b>Intervention</b> Versuchsgruppe	<p><b>keine Behandlung</b></p> <p><i>Class III skeletal and dental relationships.</i></p> <p>VERSUCHSGRUPPE: <b>Group 3</b></p> <p>N=20 / Alter = 12,46 ± 2,62 Jahre / ♂:♀ = 8:12</p> <ul style="list-style-type: none"> <li>• Gebissphase: späte Wechselgebiss</li> <li>• KFO-Behandlung: keine</li> </ul>
<b>Outcome</b>	<p><b>direkter oder schadenspräventiver medizinischer Nutzen bzw. Korrektur/Prävention der Anomalie/Malokklusion/Dysgnathie</b></p> <ul style="list-style-type: none"> <li>• <b>Atmung und Luftraum (Airway space, Schlafapnoe), Schlucken und Sprechen</b></li> </ul> <p>PRIMÄRZIELGRÖßE: <i>Cephalometric and acoustic analysis</i></p>
<b>Studientyp</b>	<b>Querschnittsstudie</b>
<b>Schlussfolgerungen der Autoren</b>	<p>In conclusion, this study showed that the /s/ sound is affected by malocclusion due to change in articulation points. Moderate positive correlations were found between center of gravity and Sella-Nasion to Gonion-Gnathion angle, lower incisor to Nasion-B point and lower incisor to Nasion-B point angle in patients with class III malocclusion. No correlation was found in other cephalometric measurements. Our findings show that it is important to refer to orthodontic treatment to patients especially with class III in the early period. One can suppose that the orthodontic treatment may conduce to acoustically-ideal sound production by changing the place of articulation of the sounds.</p>

<b>Zusammenfassung der Ergebnisse</b>	<b>PRIMÄRZIELGRÖßE</b> <i>The median values from the groups are shown in Table 1. Center of gravity of the /s/ sound had the lowest value in Group 2 and statistically different from the Group 1. For the /s/ sound in Group 3, moderate positive correlations were found between center of gravity and Sella-Nasion to Gonion-Gnathion angle (Sn-GoGn) (<math>p&lt;0.05</math>, <math>r=0.444</math>), Lower incisor to Nasion-B point (L1-NB mm) (<math>p&lt;0.023</math>, <math>r=0.505</math>), and Lower incisor to Nasion-B point angle (L1-NB°) (<math>p&lt;0.034</math>, <math>r=0.476</math>) (Table 2).</i>
<b>Angaben auffälliger positiver und/oder negativer Aspekte</b>	<i>Gut durchgeführte Kohortenstudie. Keine Angaben zum Patientenscreening. Angaben zum Funding und möglichen Interessenskonflikten vorhanden. Keine Verblindung bei der Auswertung, aber genaue Angaben zur Daten erheben. Keine Angabe von Konfidenzintervallen.</i>
<b>Schlussfolgerung des Begutachters</b>	<u>methodische Qualität:</u> gut  <u>Klinische Aussagekraft:</u> The /s/ sound was affected by malocclusion due to the changing place of articulation. Therefore, referral to an orthodontist for malocclusion treatment especially patients with class III in the early period is suggested for producing acoustically ideal sound.
<b>Evidenzlevel (SIGN)</b>	<b>3</b>
<b>Qualität</b>	<b>Acceptable ⊕</b>

# Evidenztabelle **Choi, Kim et al 2015**

## Assessment of masticatory function in patients with non-sagittal occlusal discrepancies

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Non-sagittal occlusal discrepancies such as posterior cross-bite and anterior openbite are common types of malocclusion, but studies on masticatory function related to these malocclusions have been scarce. The aim of this study was to quantify the masticatory performance in patients with non-sagittal discrepancies compared to those with normal occlusion, using both objective and subjective measures. Maximum bite force and contact area using Dental Prescale<sup>®</sup> system as a static objective assessment, Mixing Ability Index (MAI) as a dynamic objective evaluation and food intake ability (FIA) as a subjective assessment were analysed from 21 people in normal occlusion (Group N) and 64 patients with posterior cross-bite (Group C), anterior openbite (Group O) or both (Group B). The differences of the maximum bite force, the contact area, the MAI and the FIA were compared, and their correlations were figured out.

The non-sagittal malocclusion groups showed lower values in the maximum bite force, the contact area, the MAI and the FIA compared to those in the normal group ( $P < 0.0001$ ). Compared to Group N, Groups C, O and B showed 61.3%, 42.1% and 40.1% of the maximum bite force, and 84%, 84% and 76% of hard food FIA, respectively. However, there were no significant differences among Groups C, O and B. The MAI showed higher correlation with the FIA ( $r = 0.38$ ,  $P = 0.01$ ), than with the maximum bite force and the contact area (both  $r = 0.24$ ,  $P < 0.1$ ). These results revealed that masticatory function in patients with non-sagittal discrepancies is significantly reduced both objectively and subjectively.

**Keywords:** bite force, malocclusion, mastication, openbite, orthodontics, questionnaires

Accepted for publication 8 August 2014

<b>Population</b>	„Malokklusion/Dysgnathie“ allg. Individuals with normal or malocclusion, South Korea
<b>Schweregrad</b>	Keine Angabe
<b>Einschlusskriterien</b>	1 Natural dentition with no missing teeth except for the third molars. 2 No significant facial deformity, such as mandibular prognathism or asymmetry. 3 Normal or marginal cephalometric measurements for anteroposterior and vertical relationships such as ANB, mandibular plane angle and gonial angle (21). 4 No previous history of orthodontic treatment. 5 No significant temporomandibular disorders or symptoms. 6 Minimal crowding of <3 mm in each dental arch.
<b>Ausschlusskriterien</b>	Keine Angabe

<b>Intervention</b> Versuchsgruppe	<p><b>Keine Behandlung, aber Malokklusion/kraniofaziale Fehlbildung</b></p> <p><i>buccal cross-bite</i></p> <p>VERSUCHSGRUPPE: <b>group C</b></p> <p>N=22 / Alter = 20,36 ± 4,8 Jahre / ♂:♀ = 11:11</p> <ul style="list-style-type: none"> <li>• Gebissphase: permanentes Gebiss ≥ 18. Lebensjahr</li> <li>• KFO-Behandlung: keine Behandlung</li> </ul>
<b>Intervention</b> Versuchsgruppe	<p><b>Keine Behandlung, aber Malokklusion/kraniofaziale Fehlbildung</b></p> <p><i>anterior openbite</i></p> <p>VERSUCHSGRUPPE: <b>group O</b></p> <p>N=22 / Alter = 23,27 ± 4,6 Jahre / ♂:♀ = 6:16</p> <ul style="list-style-type: none"> <li>• Gebissphase: permanentes Gebiss ≥ 18. Lebensjahr</li> <li>• KFO-Behandlung: keine Behandlung</li> </ul>
<b>Intervention</b> Versuchsgruppe	<p><b>Keine Behandlung, aber Malokklusion/kraniofaziale Fehlbildung</b></p> <p><i>both buccal cross-bite and anterior openbite</i></p> <p>VERSUCHSGRUPPE: <b>group B</b></p> <p>N=20 / Alter = 23,20 ± 9,0 Jahre / ♂:♀ = 6:14</p> <ul style="list-style-type: none"> <li>• Gebissphase: permanentes Gebiss ≥ 18. Lebensjahr</li> <li>• KFO-Behandlung: keine Behandlung</li> </ul>
<b>Kontrolle</b> Kontrollgruppe	<p><b>Keine Malokklusion/kraniofaziale Fehlbildung</b></p> <p><i>normal occlusion</i></p> <p>KONTROLLGRUPPE: <b>group N</b></p> <p>N=21 / Alter = 24,62 ± 2,1 Jahre / ♂:♀ = 13:8</p> <ul style="list-style-type: none"> <li>• Gebissphase: permanentes Gebiss ≥ 18. Lebensjahr</li> <li>• KFO-Behandlung: keine Behandlung</li> </ul>
<b>Outcome</b>	<p><b>direkter oder schadenspräventiver medizinischer Nutzen bzw. Korrektur/Prävention der Anomalie/Malokklusion/Dysgnathie</b></p> <ul style="list-style-type: none"> <li>• <b>Okklusion, Kaufunktion, Funktion</b></li> </ul> <p>PRIMÄRZIELGRÖßE: <i>Masticatory function (Max bite force, Contact area, MAI, Total FIA, Hard FIA, Soft FIA, Key food FIA)</i></p>
<b>Studientyp</b>	<b>Querschnittsstudie</b>

<b>Schlussfolgerungen der Autoren</b>	<p>Taken together, this study quantified that the masticatory function in patients with non-sagittal malocclusions was significantly reduced in all parameters used, which were objective static and dynamic measurements, and subjective assessment. The empirical quantification of the vague perception of ‘bad bite’ is clinically important to find the validity of occlusal reconstruction in those patients. This notion also implicates that correct vertical and transverse relationship of occlusion may be critical components of occlusion which contributes to the normal masticatory function. However, radical or aggressive treatment modalities for occlusal reconstruction must be substantiated by additional evidences that those treatments could either restore or elevate masticatory efficiencies. It is yet to be studied whether orthodontic/prosthetic restructuring would eventually restore the masticatory function.</p>
<b>Zusammenfassung der Ergebnisse</b>	<p><b>GRUPPE C VS. GRUPPE O VS. GRUPPE B VS. GRUPPE N</b></p> <p><b>PRIMÄRZIELGRÖßE</b> Compared to Group N, the overall malocclusion group, Groups C, O and B showed reduced maximum bite force, contact area, MAI and FIA (<math>P &lt; 0,001</math>, Tables 2 and 3). The mean maximum bite forces were 772 N in Group N, 475 N in Group C, 325 N in Group O and 310 N in Group B, which were only 61,5%, 42,1% and 40,1% of that of Group N, respectively. The MAI value of the normal occlusion group was positive, while those of the malocclusion groups were negative (Table 3). The intra-class correlation coefficient of the MAT was 0,948 (<math>P = 0,018</math>). The subjective masticatory ability was also shown to be low in the groups of non-sagittal discrepancies, especially in the hard and the key foods FIA. The hard food FIA of Groups C, O and B was 84%, 84% and 76% of that observed in Group N, respectively. However, there were no differences in the FIA of five soft foods between Groups N and C (Table 3). The evaluation of the correlation between the maximum bite force and the contact area revealed a strong correlation (<math>r = 0,99</math>, <math>P &lt; 0,001</math>) (Table 4). On the other hand, the MAI and the maximum bite force showed significant but weak correlation (<math>r = 0,24</math>, <math>P &lt; 0,05</math>). The correlations between the maximum bite force and the FIA and between the MAI and the FIA showed moderate correlations (<math>r = 0,358</math>, <math>r = 0,383</math>, respectively, <math>P &lt; 0,01</math>). Among the FIA, the total FIA was strongly related to hard food FIA and key food FIA (<math>r = 0,921</math>, <math>r = 0,956</math>, respectively, <math>P &lt; 0,01</math>).</p>
<b>Angaben auffälliger positiver und/oder negativer Aspekte</b>	<p>Sehr gut durchgeführte Studie zur Kaufunktion mit einer Vergleichsgruppe mit normaler Okklusion. Keine Angabe zu initial gescreenten Patienten. Keine Verblindung. Angaben zum Funding und Interessenskonflikten vorhande. Keine Angabe von Konfidenzintervallen.</p>
<b>Schlussfolgerung des Begutachters</b>	<p><u>methodische Qualität:</u> sehr gut</p> <p><u>Klinische Aussagekraft:</u> masticatory function in patients with non-sagittal discrepancies is significantly reduced both objectively and subjectively.</p>
<b>Evidenzlevel (SIGN)</b>	3
<b>Qualität</b>	Acceptable ⊕

# Evidenztabelle **Corrêa-Faria, Martins et al. 2016**

## Dental Traumatology

Dental Traumatology 2016, 30: 167-176. doi: 10.1111/ctd.12268

### Clinical factors and socio-demographic characteristics associated with dental trauma in children: a systematic review and meta-analysis

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**Key words:** tooth injuries; systematic review; tooth, deciduous; etiology

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Accepted 21 January 2016

**Abstract – Objective:** The aim of this systematic review and meta-analysis was to search for scientific evidence regarding the factors associated with traumatic dental injury (TDI) in the primary dentition. **Methodology:** An electronic search addressing factors associated with TDI was conducted in the PubMed, ISI, LILACS, Cochrane Library, and Embase databases. Data were extracted and analyzed regarding risk factors, statistical test, effect measures, and study design. **Results:** The online search strategy led to the initial retrieval of 2566 articles. After evaluating the titles and abstracts, 24 papers were selected for complete review and data collection. TDI was associated with males (OR: 1.24; 95%CI: 1.09–1.41), inadequate lip coverage (OR: 1.81; 95%CI: 1.50–2.17), overbite (OR: 1.438; 95%CI: 0.94–2.19), and age (1 vs 2 years – OR: 0.47; 95%CI: 0.38–0.58; 2 vs 3 years – OR: 0.78; 95%CI: 0.67–0.91; 3 vs 4 years – OR: 0.82; 95%CI: 0.71–0.95). Overjet and anterior open bite were associated with TDI in the majority of studies. **Conclusions:** Males, older children, and those with inadequate lip coverage, overbite, or overjet are more likely to have TDI in the primary dentition.

<b>Population</b>	„Malokklusion/Dysgnathie“ allg.
<i>Setting</i>	<ul style="list-style-type: none"> <li>in the primary dentition</li> </ul>
<i>Komorbiditäten</i>	
<b>Schweregrad</b>	Nicht angegeben



<p><b>Einschlusskriterien</b></p> <p>Bei Review: PICOS</p>	<ul style="list-style-type: none"> <li>• population: in the primary dentition</li> <li>• intervention: keine Intervention zur Auswertung: cc</li> <li>• comparison: keine Kontrollgruppe zur Auswertung: keine Malokklusion</li> <li>• outcome: PRIMÄRZIELGRÖßE: traumatic dental injury TDI</li> <li>• study type: Epidemiological studies (cross-sectional, case-control, cohort, and clinical trials)</li> </ul>
<p><b>Ausschlusskriterien</b></p>	<ol style="list-style-type: none"> <li>1. review articles, case reports, expert opinions,</li> <li>2. studies conducted on the permanent dentition or involving data from both the primary and permanent dentition,</li> <li>3. studies addressing specific groups (e.g., patients with cerebral palsy).</li> </ol>
<p><b>Intervention</b></p> <p>Versuchsgruppe</p>	<p><b>Keine Intervention</b></p> <p>VERSUCHSGRUPPE: <b>increased overjet, inadequate lip coverage, absence of overbite</b></p> <p>N=12116 (Anfang) / N=?? (Ende) / Alter = 0-6 Jahre / ♂:♀ = ??:?</p> <ul style="list-style-type: none"> <li>• Gebissphase: Milchgebiss</li> <li>• KFO-Behandlung: (Frühbehandlung)</li> </ul>
<p><b>Kontrolle</b></p> <p>Kontrollgruppe</p>	<p><b>Keine Kontrollgruppe</b></p> <p>KONTROLLGRUPPE: <b>normal overjet, adequate lip coverage, overbite</b></p> <p>N=11958 (Anfang) / N=?? (Ende) / Alter = 0-6 Jahre / ♂:♀ = ??:?</p> <ul style="list-style-type: none"> <li>• Gebissphase: Milchgebiss</li> <li>• KFO-Behandlung: keine Behandlung</li> </ul>
<p><b>Outcome</b></p>	<p><b>medizinischer Schaden, Nebenwirkungen bzw. Zunahme der Anomalie /Malokklusion/Dysgnathie</b></p> <ul style="list-style-type: none"> <li>• Traumaprophylaxe (dentales Frontzahntrauma)</li> </ul> <p>PRIMÄRZIELGRÖßE: traumatic dental injury TDI</p>
<p><b>Studientyp</b></p>	<p><b>Systematisches Review, Meta-Analyse</b></p> <p>Review: Inkludierte Studien in Bezug auf PICO: 1 case control, 15 cross-sectional N=24 gesamtes Review, LL-relevant 16</p> <p>Review: Gesamt-Teilnehmerzahl in Bezug auf PICO: N=12116 für 16/24 LL-relevante Studien</p>
<p><b>Schlussfolgerungen der Autoren</b></p>	<p>In conclusion, this study confirmed the association between TDI in the primary dentition and increased overjet, lip coverage, and gender.</p>

<p><b>Zusammenfassung der Ergebnisse</b></p>	<p><b>TDI</b></p> <p><b>Increased overjet vs normal overjet:</b> As the data on the association between increased overjet and TDI had statistical heterogeneity among the studies above 75%, the association between these variables was discussed qualitatively and meta-analysis was not performed. <b>Increased overjet was evaluated in 12 studies, the majority of which confirmed the association with TDI</b> in both bivariate analyses (10, 13) and regression models (2, 3, 11, 12, 29).</p> <p><b>Inadequate lip coverage vs adequate lip coverage:</b> Lip coverage was evaluated in 12 studies (3, 8, 9, 11–13, 19, 20, 24, 30, 33, 34), eight of which were included in the meta-analysis (3, 8, 11–13, 19, 25, 33). In the remaining four studies, it was not possible to extract data for meta-analysis from one (30), two studies were excluded after the sensitivity test (9, 34), and one was a case–control study (20). In the meta-analysis, <b>children with inadequate lip coverage had a significantly greater frequency of TDI (OR = 1.81; 95% CI: 1.50–2.17) (Fig. 2).</b></p> <p><b>absence of overbite vs Overbite:</b> Overbite was evaluated in four studies (3, 10, 21, 28), two of which were included in the metaanalysis (3, 10). The other studies were excluded due to the impossibility of grouping the data (29) and the use of a different study design (21). Figure 3 shows the meta-analysis of two studies regarding the association between TDI and overbite (3, 10). The pooled effect measures for the two studies demonstrated that <b>children with overbite did not have increased frequency of TDI (OR: 1.43; 95% CI: 0.94–2.19).</b> Other malocclusions, such as anterior open bite, were evaluated in nine studies (1, 2, 9–11, 20, 29, 30, 35). <b>Anterior open bite was associated with TDI in the majority</b> of studies in regression models adjusted for overjet (2, 20, 29), gender (20, 30), age (2, 20), and lip coverage (20). Similar results were found using simple logistic regression (11) and the chi-square test (9). However, no significant association between these variables was found in the studies conducted by Viegas et al. (3) (OR: 1.31; 95% CI: 0.60–2.86) and Goettens et al. (10) (P = 0.84). In the study by Bonini et al. (20), the multiple regression analysis demonstrated a statistically significant association between anterior open bite and TDI (OR: 1.46; 95% CI: 1.05–2.01), <b>but this malocclusion lost its significance when lip coverage was incorporated into the model (OR: 1.12; 95% CI: 0.68–1.86).</b></p>
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<p><b>Angaben auffälliger positiver und/oder negativer Aspekte</b></p> <p>Studiendesign</p> <p>Durchführung</p> <p>Auswertung</p> <p>Funding</p> <p><u>Interessenkonflikte</u></p> <p><u>Bias (SIGN, AMSTAR II, Einzelstudien)</u></p>	<p><i>Studiendesign: PROSPERO-Registrierung a priori, keine Kontrollgruppe/ Intervention in den PICOS, Meta-Analyse, Newcastle-Ottawa Quality Assessment Scale – Ergebnisse nicht präsentiert (nur Ergebnisse genannt), keine Messmethodik zur Trauma-Erfassung vorgegeben, Einschluss der Population auf das Milchgebiss sinnvoll</i></p> <p><i>Durchführung: Literatursichtung/ Qualitätsprüfung durch zwei unabhängige Rater, Meta-Analyse nur bei Heteogenität &lt; 75%</i></p> <p><i>Auswertung:hauptsächlich Querschnittsstudien eingeschlossen, verschiedene Faktoren wurden als potenzieller Risikofaktor untersucht – nicht alle LL-relevant, großer Datenpool, hauptsächlich brasilianische Studien, unterschiedliche Messmethodiken</i></p> <p><i>Power der Studie/Patientenzahl: 16/ 12116 (gesamtes Reveiew N=24)</i></p> <p><i>Funding:</i> This study was supported by the following Brazilian fostering agencies: National Research Commission (CNPq; Ministry of Science and Technology) and the State of Minas Gerais Research Foundation (FAPEMIG).</p> <p><i>Interessenkonflikte:</i> The authors certify that they have no commercial or associative ties that represent a conflict of interest in connection with the manuscript.</p> <p><i>Bias (SIGN/AMSTAR/EinzelstudienRoB – alle negativen Punkte aus Fragebogen auflisten):</i></p> <p><b>3. Did the review authors explain their selection of the study designs for inclusion in the review?</b></p> <p><b>6. Did the review authors perform data extraction in duplicate?</b></p> <p><b>7. Did the review authors provide a list of excluded studies and justify the exclusions?</b></p> <p><b>9. Did the review authors use a satisfactory technique for assessing the risk of bias (RoB) in individual studies that were included in the review?</b></p> <p><b>10. Did the review authors report on the sources of funding for the studies included in the review?</b></p> <p><b>11. If meta-analysis was performed did the review authors use appropriate methods for statistical combination of results?</b></p> <p><b>14. Did the review authors provide a satisfactory explanation for, and discussion of, any heterogeneity observed in the results of the review?</b></p> <p><i>Publikationsbias (Reviews):</i>v Publication bias was evaluated when at least 10 studies could be grouped in a funnel plot. Publication bias was evaluated by visually inspecting asymmetry in the funnel plot (43) and using Egger’s test (44).</p>
<p><b>Schlussfolgerung des Begutachters</b></p>	<p><u>methodische Qualität:</u> Review und Einzelstudien moderat</p> <hr/> <p><u>Klinische Aussagekraft:</u> Kinder, die sich in der Milchgebissphase befinden, scheinen ein erhöhtes Risiko für ein dentales Trauma zu haben, wenn der Overjet vergrößert und/ oder der Lippenschluss inkompetent ist. Allerdings sind dies nicht die einzigen Faktoren, da auch eine Reihe soziodemographischer Faktoren zum Trauma beitragen. Da das Review vornehmlich auf brasilianischen Populationen und beruht, sind die Aussagen nur eingeschränkt auf die deutsche Bevölkerung übertragbar.</p>
<p><b>Evidenzlevel (SIGN)</b></p>	<p><b>3</b></p>
<p><b>Qualität (RoB, SIGN /AMSTAR II)</b></p>	<p><b>Moderat ⊕⊕</b></p>

# Evidenztabelle **Dimberg, Arnrup et al. 2015**



European Journal of Orthodontics, 2015, 39–47  
doi:10.1093/ejo/cjw008  
Advance Access publication 11 September 2014



## Systematic review

# The impact of malocclusion on the quality of life among children and adolescents: a systematic review of quantitative studies

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## Summary

**Background:** Among child and adolescent patients, persistent but untreated malocclusions may or may not have psychological and social impacts on the individual's quality of life.

**Objectives:** To gain knowledge of malocclusions and its impact on oral health-related quality of life (OHRQOL), we conducted a systematic review of quantitative studies for evidence regarding the influence of malocclusions on OHRQOL in children and adolescents.

**Materials and methods:** Five databases (MEDLINE via PubMed, EMBASE, PsycInfo, CINAHL, and the Cochrane Library) were searched using specified indexing terms. The following inclusion criteria were used: child or adolescent study population; healthy study participants without syndromes such as cleft lip/palate or severe illness; no previous or ongoing orthodontic treatment among participants; a focus on malocclusions and quality of life; controlled or subgrouped according to malocclusions/no malocclusions; malocclusions and/or orthodontic treatment need assessed by professionals using standardized measures; self-assessed OHRQOL estimated using validated questionnaire instruments; full-text articles written in English or Scandinavian languages. Quality of evidence was classified according to GRADE guidelines as high, moderate, or low.

**Results:** The search produced 1142 titles and abstracts. Based on pre-established criteria, the full-text versions of 70 articles were obtained, 22 of which satisfied the inclusion criteria. After data extraction and interpretation, six publications were deemed eligible for full inclusion. All six were of cross-sectional design, and the quality of evidence was high in four cases and moderate in the remaining two. The four studies with a high level of quality reported that anterior malocclusion had a negative impact on OHRQOL, and the two with a moderate level of quality reported that increased orthodontic treatment need had a negative impact on OHRQOL.

**Conclusion:** The scientific evidence was considered strong since four studies with high level of quality reported that malocclusions have negative effects on OHRQOL, predominantly in the dimensions of emotional and social wellbeing.

<b>Population</b> <i>Setting</i> <i>Komorbiditäten</i>	<p><b>„Malokklusion/Dysgnathie“ allg.</b></p> <ul style="list-style-type: none"> <li>healthy Child or adolescent study population</li> </ul>
<b>Schweregrad</b>	Nicht angegeben
<b>Einschlusskriterien</b> <i>Bei Review: PICOS</i>	<ul style="list-style-type: none"> <li>population: healthy Child or adolescent study population</li> <li>intervention: keine Intervention (zur Auswertung: malocclusion/ orthodontic treatment need)</li> <li>comparison: keine Kontrollgruppe (zur Auswertung: no malocclusions)</li> <li>outcome: PRIMÄRZIELGRÖßE: Self-assessed OHRQOL (using validated questionnaire instruments)</li> <li>study type: -</li> </ul>
<b>Ausschlusskriterien</b>	<ol style="list-style-type: none"> <li>syndromes such as cleft lip/ palate or severe illness</li> <li>previous or ongoing orthodontic treatment among participants</li> </ol>
<b>Intervention</b> <i>Versuchsgruppe</i>	<p><b>Keine Intervention</b></p> <p>VERSUCHSGRUPPE: <b>malocclusion/ orthodontic treatment need</b></p> <p>N=?? (Anfang) / N=?? (Ende) / Alter = 8-15 Jahre / ♂:♀ = ?:?</p> <ul style="list-style-type: none"> <li>Gebissphase: frühes bis spätes Wechselgebiss, permanentes Gebiss &lt; 18. Lebensjahr</li> <li>KFO-Behandlung: (Frühbehandlung, reguläre Behandlung)</li> </ul>
<b>Kontrolle</b> <i>Kontrollgruppe</i>	<p><b>Keine Kontrollgruppe</b></p> <p>KONTROLLGRUPPE: <b>no malocclusions</b></p> <p>N=?? (Anfang) / N=?? (Ende) / Alter = 8-15 Jahre / ♂:♀ = ?:?</p> <ul style="list-style-type: none"> <li>Gebissphase: frühes bis spätes Wechselgebiss, permanentes Gebiss &lt; 18. Lebensjahr</li> <li>KFO-Behandlung: keine Behandlung</li> </ul>
<b>Outcome</b>	<p><b>direkter oder schadenspräventiver medizinischer Nutzen bzw. Korrektur/Prävention der Anomalie/Malokklusion/Dysgnathie, medizinischer Schaden, Nebenwirkungen bzw. Zunahme der Anomalie /Malokklusion/Dysgnathie</b></p> <ul style="list-style-type: none"> <li><b>mundgesundheitsbezogene Lebensqualität (MLQ), psychische Entwicklung</b></li> </ul> <p>PRIMÄRZIELGRÖßE: Self-assessed OHRQOL (using validated questionnaire instruments)</p>
<b>Studientyp</b>	<p><b>Systematisches Review</b></p> <p><i>Review:</i> Inkludierte Studien in Bezug auf PICO: cross-sectional studies N=6</p> <p><i>Review:</i> Gesamt-Teilnehmerzahl in Bezug auf PICO: N=3698</p>
<b>Schlussfolgerungen der Autoren</b>	<p>The scientific evidence was considered strong since four studies with high level of quality reported that <b>malocclusions in the aesthetic zone have negative effects on OHRQOL</b>, predominantly in the dimensions of emotional and social wellbeing.</p>

<p><b>Zusammenfassung der Ergebnisse</b></p>	<p><b>malocclusion/ orthodontic treatment need VERSUS no malocclusions</b></p> <p><b>Self-assessed OHRQOL (using validated questionnaire instruments):</b> Four studies reported <b>that severe malocclusions</b>, predominantly anterior crowding, spaced dentition, or increased overjet <b>had a negative impact on OHRQOL</b> (23, 25–27). Two studies stated that <b>increased orthodontic treatment need had a negative impact on OHRQOL</b> (22, 24). In addition, two studies revealed that malocclusions predominantly affected the dimensions of emotional wellbeing and social wellbeing (25, 26).</p> <p>In five of the studies, the samples included subjects in pre- or early adolescence; in all these studies, the associations between malocclusions or treatment need were confirmed by multivariate analyses with confounders taken into account (22, 24–27). The sixth study reported a negative effect of malocclusion on OHRQOL, in particular in terms of anterior spacing or overjet, in even younger children (8–10 years) (23).</p>
<p><b>Angaben auffälliger positiver und/oder negativer Aspekte</b></p> <p>Studiendesign</p> <p>Durchführung</p> <p>Auswertung</p> <p><u>Funding</u></p> <p><u>Interessenkonflikte</u></p> <p><u>Bias (SIGN, AMSTAR II, Einzelstudien)</u></p>	<p><i>Studiendesign: keine Registrierung a priori, kein Studientyp definiert gemäß PICOS, keine Intervention/ Kontrollgruppe nach PICO, keine Meta-Analyse, keine RoB-Analyse, GRADE-Bewertung, verschiedene Messmethodiken zugelassen</i></p> <p><i>Durchführung: nur Studien von mittlerer &amp; hoher Qualität (GRADE) eingeschlossen, detaillierte narrative Analyse, Literatursichtung/ GRADE-Bewertung durch drei unabhängige Rater</i></p> <p><i>Auswertung: nur Querschnittsstudien eingeschlossen, die Beschreibung der Einzelstudien ermöglicht nicht immer einer Aufteilung in Kontroll- und Versuchsgruppe, unterschiedliche Fragebögen zur Erfassung der MLQ/ unterschiedliche Indizes zur Bestimmung des KFO-Behandlungsbedarfes, 5/6 Studien beruhen auf brasilianischer Bevölkerung</i></p> <p><i>Power der Studie/Patientenzahl: 6/ 3698</i></p> <p><i>Funding: Örebro County Council (OLL-394591)</i></p> <p><i>Interessenkonflikte: -</i></p> <p><i>Bias (SIGN/AMSTAR/EinzelstudienRoB – alle negativen Punkte aus Fragebogen auflisten):</i></p> <p><b>2. Did the report of the review contain an explicit statement that the review methods were established prior to the conduct of the review and did the report justify any significant deviations from the protocol?</b></p> <p><b>3. Did the review authors explain their selection of the study designs for inclusion in the re</b></p> <p><b>6. Did the review authors perform data extraction in duplicate?</b></p> <p><b>7. Did the review authors provide a list of excluded studies and justify the exclusions?</b></p> <p><b>9. Did the review authors use a satisfactory technique for assessing the risk of bias (RoB) in individual studies that were included in the review?</b></p> <p><b>10. Did the review authors report on the sources of funding for the studies included in the</b></p> <p><b>14. Did the review authors provide a satisfactory explanation for, and discussion of, any heterogeneity observed in the results of the review?</b></p> <p><i>Publikationsbias (Reviews): -</i></p>
<p><b>Schlussfolgerung des Begutachters</b></p>	<p><u>methodische Qualität:</u> Review und Einzelstudien moderat</p> <p><u>Klinische Aussagekraft:</u> Wenn Kinder eine Malokklusion aufweisen – vor allem im ästhetisch relevanten Bereich – scheint sich dies negativ auf die mundgesundheitsbezogene Lebensqualität auszuwirken.</p>

<b>Evidenz-level (SIGN)</b>	<b>3</b>
<b>Qualität (RoB, SIGN /AMSTAR II)</b>	<b>Moderat ⊕⊕</b>

# Evidenztabelle **Doshi and Bhad-Patil 2011**



## Speech defect and orthodontics: A contemporary review

Umal Hiralal Doshi, BDS, MDS<sup>1</sup>  
Wasundhara A. Bhad-Patil, BDS, MDS<sup>2</sup>



In conjunction with the lips, tongue, and oropharynx, the teeth play an important role in the articulation of consonants via airflow obstruction and modification. Therefore, along with these articulators, any orthodontic therapy that changes their position may play a role in speech disorders. This paper examines the relevant studies and discusses the difficulties of scientific investigation in this area. The ability of patients to adapt their speech to compensate for most handicapping occlusion and facial deformities is recognized, but the mechanism for this adaptation remains incompletely understood. The overall conclusion is that while certain malocclusions show a relationship with speech defects, this does not appear to correlate with the severity of the condition. There is no direct cause-and-effect relationship. Similarly, no guarantees of improvement can be given to patients undergoing orthodontic or orthognathic correction of malocclusion. *ORTHODONTICS (CHIC)* 2011;12:340–353.

**Key words:** cleft palate, hearing loss, malocclusion, orthognathic surgery, speech defect

<b>Population</b> <i>Setting</i> <i>Komorbiditäten</i>	<b>Malokklusion allgemein</b>
<b>Schweregrad</b>	Keine Angaben
<b>Einschlusskriterien</b> <i>Bei Review: PICOS</i>	<ul style="list-style-type: none"> <li>• Population: - (humans)</li> <li>• Intervention: keine Intervention</li> <li>• Comparison: keine Kontrollgruppe</li> <li>• Outcome: malocclusion</li> </ul> <p>Study type: -</p>



<b>Ausschlusskriterien</b>	Keine Angaben
<b>Intervention</b> Versuchsgruppe	<p><b>Keine Intervention</b></p> <p>VERSUCHSGRUPPE: <b>malocclusion</b></p> <p>N=- (Anfang) / N=?? (Ende) / Alter = - Jahre / ♂:♀ = -</p> <ul style="list-style-type: none"> <li>• Gebissphase: -</li> <li>• KFO-Behandlung: -</li> </ul>
<b>Kontrolle</b> Kontrollgruppe	<p><b>Keine Kontrollgruppe</b></p> <p>KONTROLLGRUPPE: <b>normal occlusion</b></p> <p>N=- (Anfang) / N=?? (Ende) / Alter = - Jahre / ♂:♀ = -</p> <ul style="list-style-type: none"> <li>• Gebissphase: -</li> <li>• KFO-Behandlung: keine Behandlung</li> </ul>
<b>Outcome</b>	<p><b>medizinischer Schaden, Nebenwirkungen bzw. Zunahme der Anomalie /Malokklusion/Dysgnathie</b></p> <ul style="list-style-type: none"> <li>• <b>Atmung und Luftraum (Airway space, Schlafapnoe), Schlucken und Sprechen</b></li> </ul> <p>PRIMÄRZIELGRÖßE: malocclusion</p>
<b>Studientyp</b>	<p><b>Systematisches Review</b></p> <p>Review: Inkludierte Studien N=132</p>
<b>Schlussfolgerungen der Autoren</b>	<p><i>overall conclusion is that while certain malocclusions show a relationship with speech defects, this does not appear to correlate with the severity of the condition. There is no direct cause-and-effect relationship. Similarly, no guarantees of improvement can be given to patients undergoing orthodontic or orthognathic correction of malocclusion. ORTHODONTICS (Chic) 2011;12:340-353.</i></p>

<p><b>Zusammenfassung der Ergebnisse</b></p>	<p>Any osseous, muscular, dental, or soft tissue deformity that impairs the movement or appearance of the organs of articulation may contribute to defective speech. Dental appliances (orthodontic or prosthetic) can cause disorders of articulation of linguodental, labiodental, or lingualveolar consonants. But speech is a learned process, and the parts of the body that help in speech production have remarkable capacity for compensation. Thus, even when severe anatomical limitations are present, normal speech is observed.</p> <p>Until now, there have been no long-term or focused scientific investigations in this area. Based on the evidence revealed in this study, no guarantees of improvement can be given to patients undergoing orthodontic or orthognathic treatment.</p> <p>In the absence of focused scientific studies, based on the available literature, the following eight conclusions can be drawn:</p> <ol style="list-style-type: none"> <li>1. Anterior open bite, anterior spacing, maxillary anterior crowding, and Class III malocclusion have a consistent association with speech problems.</li> <li>2. Orthodontic therapy alone does not guarantee speech improvement, since there are other predisposing conditions that could contribute to speech pathology.</li> <li>3. Speech problems associated with orthodontic appliances are short-term. Major problems have been found with removable appliances and lingual brackets.</li> <li>4. In most, preoperative misarticulations following orthognathic surgery improvement can be expected.</li> <li>5. With preexisting speech problems in patients with genetic or developmental disorders, the orthodontist has a major role to play along with the speech therapist.</li> <li>6. Speech problems and their correction in cleft patients depends on the type of cleft deformity, the technique and timing of surgical assistance, the growth and developmental pattern, hearing involvement, and assistance from the other services.</li> <li>7. For a patient to learn speech during and after orthodontic treatment, evaluation of functional and environmental factors such as hearing, airway problems, and developmental and genetic disorders is imperative.</li> <li>8. In the presence of these nonorthodontic factors, relearning speech during or after orthodontic procedures is not easily accomplished or indeed possible.</li> </ol>
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<p><b>Angaben auffälliger positiver und/oder negativer Aspekte</b></p> <p>Studiendesign</p> <p>Durchführung</p> <p>Auswertung</p> <p>Funding</p> <p><u>Interessenkonflikte</u></p> <p><u>Bias (SIGN, AMSTAR II, Einzelstudien)</u></p>	<p><i>Studiendesign: keine Registrierung a priori, keine Definition der PICOS, keine RoB-Analyse, keine Meta-Analyse</i></p> <p><i>Durchführung: keine Angaben zu Datenextraktion und Literatursichtung, keine Angaben zu den Charakteristika der Einzelstudien, nur narrative Analyse</i></p> <p><i>Auswertung: Studiendesign der Einzelstudien nicht bekannt, keine Angaben zu Alter/Geschlecht/Art der Malokklusion etc. der Teilnehmer</i></p> <p><i>Power der Studie/Patientenzahl: 132</i></p> <p><i>Funding: -</i></p> <p><i>Interessenkonflikte: -</i></p> <p><i>Bias (SIGN/AMSTAR/EinzelstudienRoB – alle negativen Punkte aus Fragebogen auflisten):</i></p> <p><b>2. Did the report of the review contain an explicit statement that the review methods were established prior to the conduct of the review and did the report justify any significant deviations from the protocol?</b></p> <p><b>3. Did the review authors explain their selection of the study designs for inclusion in the review?</b></p> <p><b>4. Did the review authors use a comprehensive literature search strategy?</b></p> <p><b>5. Did the review authors perform study selection in duplicate?</b></p> <p><b>6. Did the review authors perform data extraction in duplicate?</b></p> <p><b>7. Did the review authors provide a list of excluded studies and justify the exclusions?</b></p> <p><b>8. Did the review authors describe the included studies in adequate detail?</b></p> <p><b>9. Did the review authors use a satisfactory technique for assessing the risk of bias (RoB) in individual studies that were included in the review?</b></p> <p><b>10. Did the review authors report on the sources of funding for the studies included in the review?</b></p> <p><b>13. Did the review authors account for RoB in individual studies when interpreting/ discussing the results of the review?</b></p> <p><b>14. Did the review authors provide a satisfactory explanation for, and discussion of, any heterogeneity observed in the results of the review?</b></p> <p><i>Publikationsbias (Reviews): -</i></p>
<p><b>Schlussfolgerung des Begutachters</b></p>	<p><u>methodische Qualität:</u> Review niedrig, Einzelstudien nicht beurteilbar</p> <hr/> <p><u>Klinische Aussagekraft:</u> akzeptabel</p>
<p><b>Evidenzlevel (SIGN)</b></p>	<p><b>3</b></p>
<p><b>Qualität (RoB, SIGN /AMSTAR II)</b></p>	<p><b>Moderat ++</b></p>

## Evidenztabelle Duarte-Rodrigues et al. 2020

### Oral disorders associated with the experience of verbal bullying among Brazilian school-aged children

#### A case-control study

Lucas Duarte-Rodrigues, DDS, MSc; Maria Leticia Ramos-Jorge, DDS, MSc, PhD;  
 Ana Caroline Alves-Duarte, DDS, MSc; Thiago Fonseca-Silva, DDS, MSc, PhD;  
 Carlos Flores-Mir, DDS, PhD; Leandro Silva Marques, DDS, MSc, PhD

#### ABSTRACT

**Background.** Dental features have been considered a potential target of verbal bullying (VB) among school-aged children. The authors conducted a study to investigate the association between the presence of oral disorders and the occurrence of VB among 8- through 10-year-old school-aged children.

**Methods.** The study included 445 school-aged children 8 through 10 years old. VB was verified by a specific validated question from the Child Perceptions Questionnaire 8-10 index. Oral disorders such as untreated caries, fluorosis, clinical consequences of untreated caries, and malocclusion were evaluated. The Pearson  $\chi^2$  test and bivariate and multivariate conditional logistic regression analyses were used for statistical analysis.

**Results.** A total of 390 school-aged children completed the study. The results of the multivariate logistic regression model showed that a severe malocclusion (odds ratio [OR], 2.29; 95% confidence interval [CI], 1.03 to 5.10), a greater maxillary misalignment (OR, 2.23; 95% CI, 1.03 to 4.73), and the presence of a tooth with pulp exposure (OR, 2.93; 95% CI, 1.58 to 5.45) were significantly associated with the occurrence of VB.

**Conclusion.** Children aged 8 through 10 years with a severe malocclusion, larger maxillary misalignment, or the presence of pulp exposure had increased odds of experiencing VB compared with children without those oral health conditions.

**Practical implications.** Once oral disorders involved in VB are identified, appropriate approaches should be used to address this issue. With this course of action, oral health care professionals may use the treatment and preventive care to eliminate potential factors for peer aggression.

**Key Words.** Oral health; bullying; quality of life; malocclusion.

JADA 2020;151(6):399-406

<https://doi.org/10.1016/j.adaj.2020.02.001>

<b>Population</b>	„Malokklusion/Dysgnathie“ allg. The study included 445 school-aged children 8 through 10 years old. VB was verified by a specific validated question from the Child Perceptions Questionnaire 8-10 index
<b>Schweregrad</b>	keine Angabe

<b>Einschlusskriterien</b>	For the selection of control participants, students from the same class as the case participants were selected.
<b>Ausschlusskriterien</b>	School-aged children undergoing orthodontic treatment and those who had any systemic disorder or any intellectual impairment were not included in this study.
<b>Intervention</b> Versuchsgruppe	<p><b>keine Behandlung</b></p> <p>VERSUCHSGRUPPE: <b>verbal bullying</b></p> <p>N=89 (Anfang) / N=78 (Ende) / Alter = MIN:8 MAX:10 / ♂:♀ = ?:?</p> <ul style="list-style-type: none"> <li>Gebissphase: frühes Wechselgebiss</li> <li>KFO-Behandlung: keine Behandlung</li> </ul>
<b>Kontrolle</b> Kontrollgruppe	<p><b>keine Behandlung</b></p> <p>KONTROLLGRUPPE: <b>no verbal bullying</b></p> <p>N=356 (Anfang) / N=312 (Ende) / Alter = MIN:8 MAX:10 / ♂:♀ = ?:?</p> <ul style="list-style-type: none"> <li>Gebissphase: frühes Wechselgebiss</li> <li>KFO-Behandlung: keine Behandlung</li> </ul>
<b>Outcome</b>	<p><b>direkter oder schadenspräventiver medizinischer Nutzen bzw. Korrektur/Prävention der Anomalie/Malokklusion/Dysgnathie</b></p> <ul style="list-style-type: none"> <li><b>mundgesundheitsbezogene Lebensqualität (MLQ), psychische Entwicklung</b></li> </ul> <p>PRIMÄRZIELGRÖßE: <i>correlation verbal bullying and malocclusion</i></p>
<b>Studientyp</b>	<b>Querschnittsstudie</b>
<b>Schlussfolgerungen der Autoren</b>	Based on this study model and in this specific sample, children aged 8 through 10 years with a severe malocclusion, larger maxillary misalignment, or presence of pulp exposure have increased odds (OR, 2-3) of experiencing VB compared with children without these oral health conditions.
<b>Zusammenfassung der Ergebnisse</b>	<p><b>GRUPPE VERBAL BULLYING VS. GRUPPE NO VERBAL BULLYING</b></p> <p><b>PRIMÄRZIELGRÖßE</b> <i>The distribution of independent variables in the case and control groups is described in Table 1. Statistically significant differences (P &lt; .05) between groups were observed regarding the presence of malocclusion, untreated dental caries, clinical consequences of caries (PUFA/ pufa index), and exposed pulp (P-PUFA/p-pufa index). In relation to occlusal parameters, dental crowding and maxillary misalignment also showed significant differences (P &lt; .05). In the bivariate analysis, school-aged children who had pulp involvement (P-PUFA/pufa index) (odds ratio [OR], 2.46; 95% confidence interval [CI], 1.36 to 4.29; P = .003), clinical consequences of untreated dental caries (PUFA/pufa index) (OR, 2.36; 95% CI, 1.32 to 4.19; P = .004), very severe malocclusion (OR, 2.26; 95% CI 1.09 to 4.72, P = .029), greater maxillary misalignment (OR, 1.91; 95% CI, 1.05 to 3.47; P = .034), presence of untreated caries (OR, 1.76; 95% CI 1.04 to 2.99; P = .036), or anterior dental crowding (OR, 1.70; 95% CI, 1.02 to 2.86; P = .043) had a greater chance of experiencing VB (Table 2). The multivariate logistic regression model results showed that the presence of a tooth with pulp involvement (OR, 2.93; 95% CI, 1.58 to 5.45; P ¼ .001), severe malocclusion (OR, 2.29; 95% CI, 1.03 to 5.10; P ¼ .042), and greater maxillary misalignment ( _ 3 millimeters) (OR, 2.23; 95% CI, 1.05 to 4.73; P = .038) remained significantly associated with the occurrence of VB among schoolaged children (Table 2).</i></p>

<p><b>Angaben auffälliger positiver und/oder negativer Aspekte</b></p>	<p><i>Gut durchgeführte Fall-Kontroll-Studie zum Zusammenhang von Mobbing und Malocclusionen. Klare Fragestellung. Angaben zum Funding, Interessenskonflikten und von Konfidenzintervallen. Powerkalkulation vorhanden. Keine Angaben zu ITT-Analysen trotz drop-outs. Keine Verblindung, aber valide und reliable Datenerhebung</i></p>
<p><b>Schlussfolgerung des Begutachters</b></p>	<p><u>methodische Qualität:</u> gut</p> <p><u>Klinische Aussagekraft:</u> Children aged 8 through 10 years with a severe malocclusion, larger maxillary misalignment, or the presence of pulp exposure had increased odds of experiencing VB compared with children without those oral health conditions.</p>
<p><b>Evidenz-level (SIGN)</b></p>	<p><b>3</b></p>
<p><b>Qualität</b></p>	<p><b>Acceptable ⊕</b></p>

## Evidenztabelle **Englisch, Buschang et al. 2002**

### **Does Malocclusion Affect Masticatory Performance?**

Jeryl D. English, DDS, MS<sup>a</sup>; P.H. Buschang, PhD<sup>b</sup>; G.S. Throckmorton, PhD<sup>a</sup>

**Abstract:** This purpose of this study was to evaluate the largely untested assumption that malocclusion negatively affects masticatory performance. A sample of 185 untreated subjects (48% male and 52% female) from 7 to 37 years of age, representing subjects with normal occlusion (n = 38), Class I (n = 56), Class II (n = 45), and Class III (n = 46) malocclusion, were evaluated. Masticatory performance was evaluated objectively using artificial (CutterSil<sup>®</sup>, median particle size and broadness of the distribution) and real foods (number of chews for jerky and almonds), and subjectively using a visual analog scale. The results showed no significant differences in age or the body mass index (Wt/Ht<sup>2</sup>) between the occlusion groups. Subjects with normal occlusion had significantly smaller particle sizes ( $P = .001$ ) and broader particle distributions ( $P < .001$ ) than subjects with malocclusion. Compared with the normal occlusion group, the median particle sizes for the Class I, II, and III malocclusion groups were approximately 9%, 15%, and 34% larger, respectively. There were also significant group differences in their subjective ability to chew fresh carrots or celery ( $P = .019$ ) and firm meat ( $P = .003$ ). Class III subjects reported the greatest difficulty, followed by Class II subjects, Class I subjects, and subjects with normal occlusion, respectively. We conclude that malocclusion negatively affects subjects' ability to process and break down foods. (*Angle Orthod* 2002;72:21–27.)

<b>Population</b>	<p>„Malokklusion/Dysgnathie“ allg.</p> <p>A sample of 185 untreated subjects (48% male and 52% female) from 7 to 37 years of age, representing subjects with normal occlusion (n = 38), Class I (n = 56), Class II (n = 45), and Class III (n = 46) malocclusion, were evaluated. Subjects were chosen after an initial screening examination at the Department of Orthodontics, Baylor College of Dentistry.</p>
<b>Schweregrad</b>	Keine Angabe
<b>Einschlusskriterien</b>	<ul style="list-style-type: none"> <li>• Approximately equal number of males and females,</li> <li>• Ages 7 years through young adult with malocclusions requiring orthodontic treatment.</li> </ul>
<b>Ausschlusskriterien</b>	<ul style="list-style-type: none"> <li>• Missing teeth (excluding third molars);</li> <li>• Symptoms of TMJ dysfunction to include pain and crepitus;</li> <li>• Active orthodontic treatment;</li> <li>• Full-coverage dental restorations or tooth replacements</li> </ul>

<b>Intervention</b> Versuchsgruppe	<p><b>Keine Behandlung, aber Malokklusion/kraniofaziale Fehlbildung vorhanden</b></p> <p>VERSUCHSGRUPPE: <b>Class I</b></p> <p>N=56 / Alter = MIN:7, MAX:37 / ♂:♀ = ??:</p> <ul style="list-style-type: none"> <li>• Gebissphase: frühes Wechselgebiss, spätes Wechselgebiss, permanentes Gebiss &lt; 18. Lebensjahr, permanentes Gebiss ≥ 18. Lebensjahr</li> <li>• KFO-Behandlung: keine</li> </ul>
<b>Intervention</b> Versuchsgruppe	<p><b>Keine Behandlung, aber Malokklusion/kraniofaziale Fehlbildung vorhanden</b></p> <p>VERSUCHSGRUPPE: <b>Class II</b></p> <p>N=45 / Alter = MIN:7, MAX:37 Jahre / ♂:♀ = ??:</p> <ul style="list-style-type: none"> <li>• Gebissphase: frühes Wechselgebiss, spätes Wechselgebiss, permanentes Gebiss &lt; 18. Lebensjahr, permanentes Gebiss ≥ 18. Lebensjahr</li> <li>• KFO-Behandlung: keine</li> </ul>
<b>Intervention</b> Versuchsgruppe	<p><b>Keine Behandlung, aber Malokklusion/kraniofaziale Fehlbildung vorhanden</b></p> <p>VERSUCHSGRUPPE: <b>Class III</b></p> <p>N=46 / N Alter = MIN:7, MAX:37 Jahre/ ♂:♀ = ??:</p> <ul style="list-style-type: none"> <li>• Gebissphase: frühes Wechselgebiss, spätes Wechselgebiss, permanentes Gebiss &lt; 18. Lebensjahr, permanentes Gebiss ≥ 18. Lebensjahr</li> <li>• KFO-Behandlung: keine</li> </ul>
<b>Kontrolle</b> Kontrollgruppe	<p><b>Keine Malokklusion/kraniofaziale Fehlbildung vorhanden</b></p> <p>KONTROLLGRUPPE: <b>Bezeichnung</b></p> <p>N=38 / Alter = MIN:7, MAX:37 / ♂:♀ = 17:21</p> <ul style="list-style-type: none"> <li>• Gebissphase: frühes Wechselgebiss, spätes Wechselgebiss, permanentes Gebiss &lt; 18. Lebensjahr, permanentes Gebiss ≥ 18. Lebensjahr</li> <li>• KFO-Behandlung: keine</li> </ul>
<b>Outcome</b>	<p><b>direkter oder schadenspräventiver medizinischer Nutzen bzw. Korrektur/Prävention der Anomalie/Malokklusion/Dysgnathie</b></p> <ul style="list-style-type: none"> <li>• <b>Okklusion, Kaufunktion, Funktion</b></li> </ul> <p>PRIMÄRZIELGRÖßE: <i>Masticatory performance</i></p>
<b>Studientyp</b>	<b>Querschnittsstudie</b>



<p><b>Schlussfolgerungen der Autoren</b></p>	<p>Malocclusion negatively affects subjects' ability to process and break down foods. Compared to normal occlusion, the median particle sizes for Class I, Class II, and Class III malocclusions were approximately 9%, 15%, and 34% larger, respectively. Individuals with normal occlusion also produced a wider distribution of particles, which indicates better masticatory performance. Malocclusion has no effect on the number of chews required to swallow jerky and almonds. Malocclusion affects an individual's perception of how well they can chew. Groups differed significantly in their subjective ability to chew fresh carrots and celery and firm meat. Compared with normal occlusion, individuals with Class III malocclusions reported the greatest difficulty, followed by Class II malocclusions and Class I malocclusions.</p>
<p><b>Zusammenfassung der Ergebnisse</b></p>	<p><b>GRUPPE control VS. GRUPPE Class I, II, III</b></p> <p><b>PRIMÄRZIELGRÖßE</b> <i>The descriptive statistics for age, stature, and weight of subjects with normal occlusion and those with Class I, Class II, and Class III malocclusions are listed in Table 1. Age, weight, or statural differences among the normal occlusion group and 3 malocclusion groups were not statistically significant. Median particle size and broadness of the particle distribution (Table 2) showed statistically significant (<math>P &lt; .001</math>) group differences. The Class I, Class II, and Class III malocclusion groups had median particle sizes approximately 9%, 15%, and 34% larger than the group with normal occlusion, respectively. Post-hoc tests showed that the group with normal occlusion had significantly (<math>P &lt; .02</math>) smaller median particle size and broader distributions than the Class II and Class III groups. The Class I group also had significantly (<math>P &lt; .01</math>) smaller particles and a broader distribution of particles than the Class III group. There were no significant group differences in the number of chews to swallow either jerky or almonds. Patients with malocclusion also perceived chewing disabilities with the harder foods. There were significant group differences (Table 3) in the reported ability to chew fresh carrots or celery and steaks or other firm meats (Figure 2). The group with normal occlusion reported a significantly (<math>P &lt; .05</math>) greater ability to chew fresh carrots and celery than all 3 malocclusion groups. They also reported being better able (<math>P &lt; .01</math>) to chew steak and other firm meats than the Class II or Class III groups. The Class I group also reported being more able (<math>P &lt; .05</math>) to chew steak and other firm meats than the Class III group. Approximately 25% of the Class III group reported difficulties in chewing raw carrots, raw celery, steak, or other firm meats.</i></p>
<p><b>Angaben auffälliger positiver und/oder negativer Aspekte</b></p>	<p>Angaben zum Funding, Angaben von Konfidenzintervallen. Keine Angaben zu möglichen Interessenskonflikten. Keine Angaben zu initial gescreenten Patienten (Selectionbias). Keine Powerkalkulation.</p>
<p><b>Schlussfolgerung des Begutachters</b></p>	<p><u>methodische Qualität:</u> gut</p> <p><u>Klinische Aussagekraft:</u> malocclusion negatively affects subjects' ability to process and break down foods.</p>
<p><b>Evidenzlevel (SIGN)</b></p>	<p>3</p>
<p><b>Qualität</b></p>	<p><b>Acceptable ⊕</b></p>

# Evidenztabelle **Farronato, Giannini et al. 2012**

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## Correlations between malocclusions and dyslalias

### ABSTRACT

**Aim** The aim was to evaluate the relationship between malocclusions and dyslalias and to plan a multidisciplinary approach between orthodontics and speech therapy. **Study design** 880 children (448 males and 432 females) ranging in age from 6 to 10 years were examined at the Department of Orthodontics at Milan University to determine if a relationship between malocclusions and dyslalia exists and their correlations.

**Methods** The children were examined by a speech therapist and an orthodontist. An examination of the occlusion and phonetic was conducted and compared with an age-matched control group.

**Results** Correlations between malocclusion and dyslalia were found. The presence of Class II occlusion, diastema, increase in overjet, presence of open and deep bite, asymmetry have high tendency to be associated with speech disorders such as dyslalias. The presence of crowding and anterior cross bite have moderate tendency to be associated with such disorders; on the contrary Class I occlusion, upper incisors protrusion, posterior cross bite and MID have low tendency to be associated with dyslalias.

**Conclusion** The effect of dyslalia on the speech organs is not constant. On the other hand, the effect of malocclusion on dyslalia seems to be more relevant and more frequent and to increase proportionally depending on the severity of the malocclusion.

<b>Population</b>	<b>„Malokklusion/Dysgnathie“ allg.</b> 880 children (448 males and 432 females) ranging in age from 6 to 10 years were examined at the Department of Orthodontics at Milan University to determine if a relationship between malocclusions and dyslalia exists and their correlations. Department of Orthodontics of the University of Milan Fondazione IRCCS Cà Granda – Ospedale Maggiore Policlinico and the Department of Speech Therapy of the same hospital
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<b>Schweregrad</b>	Keine Angabe
<b>Einschlusskriterien</b>	<ul style="list-style-type: none"> <li>growing patients;</li> <li>no evidence of significant hearing loss;</li> <li>adequate cooperation;</li> <li>no history of orthodontic treatment.</li> </ul>
<b>Ausschlusskriterien</b>	<ul style="list-style-type: none"> <li>history of hearing loss;</li> <li>previous orthodontic treatment;</li> <li>informed consent not granted;</li> <li>nasal or laryngeal disorder;</li> <li>congenital anomalies.</li> </ul>
<b>Intervention</b> Versuchsgruppe	<p><b>Keine Behandlung</b></p> <p>VERSUCHSGRUPPE:</p> <p>N=880 (Anfang) / N=880 (Ende) / Alter = 6 -10 Jahre / ♂:♀ = 448:432</p> <ul style="list-style-type: none"> <li>Gebissphase: frühes, spätes Wechselgebiss</li> <li>KFO-Behandlung: keine</li> </ul>
<b>Outcome</b>	<p><b>direkter oder schadenspräventiver medizinischer Nutzen bzw. Korrektur/Prävention der Anomalie/Malokklusion/Dysgnathie</b></p> <ul style="list-style-type: none"> <li><b>Atmung und Luftraum (Airway space, Schlafapnoe), Schlucken und Sprechen</b></li> </ul> <p>PRIMÄRZIELGRÖßE: <i>Correlations between the different types of malocclusions and dyslalias</i></p> <p>SEKUNDÄRZIELGRÖßE: <i>prolonged habits, mouth or mixed breathing and tongue thrust proceeding</i></p>
<b>Studientyp</b>	<b>Querschnittsstudie</b>
<b>Schlussfolgerungen der Autoren</b>	<p>The review of the literature and the data obtained in this study validate the close relationship existing between malocclusions and speech disorders. Neuromuscular dysfunction of the oral and masticatory system leads to morphologic deviations from the ideal which, in turn, may further compromise the neuromuscular dysfunction itself. The assessment is complicated because neuromuscular problems that cause speech problems also can be causative agents for malocclusions. The existence of correct phonation in presence of severe malocclusions can be explained through the physiologic compensation for the anatomic deformity which makes the function possible. Nevertheless, the frequent relationship between malocclusions and dyslalia is supported by the statistical data emerging from our study. The cooperation of phoniatriests, orthodontists, and speech therapists is essential for offering a comprehensive and exhaustive physiopathologic explanation.</p>

<p><b>Zusammenfassung der Ergebnisse</b></p>	<p><b>PRIMÄRZIELGRÖßE</b> <i>The vocal profiles of children with malocclusions were compared with data from the group of children without malocclusions. Of the 880 subjects examined, only 28.9% (255) had no malocclusions, against 71% (625) which had malocclusions. Eulalic: 529 (60.1%); dyslalic: 351 (39.9%); subjects both eulalic and without malocclusions were only 192 (21.8%); subjects both with malocclusion and dyslalic were 288 (32.7 %); subjects who had malocclusions and eulalic were 377 (38.2 %), and those who were dyslalic and with no malocclusions, only 64 (7.3%). Subjects with malocclusions with only one dyslalic form were 96 (10.9%); 144 (16.4%) had two dyslalic forms; 48 (5.4%) had three or more dyslalic forms. Dyslalic subjects with only one malocclusion form were 40 (4.5%); 112 (12.7%) had two malocclusions forms; 136 (15.4%) had three or more malocclusions forms. Of the detected dyslalias, patients were divided according to the consonant affected (Table 2). For the forms of malocclusions recorded, 289 had Class II (32.8%) within the total number of examined subjects and 112 in dyslalic subjects; 17 had Class III (1.9%) within the total number of examined subjects as well as within the group of dyslalic subjects. Incisor diastema or the absence of incisors were detected in 40 of the total patients (4.5%) and in 38 (4.3%) of the dyslalic subjects. Patients presenting crowding were 25 (2.8%) of the total and 16 (1.8%) of the dyslalic. Upper incisors protrusion was present in 369 of the total patients (41.9%) and in 135 (15.3%) of the dyslalic. Lower incisors protrusion was present in 17 of the total patients (1.9%), the same as within the sample of dyslalic. No major double protrusion was evidenced.</i></p> <p><b>SEKUNDÄRZIELGRÖßE</b> <i>The total number of subjects with unilateral anterior crossbite was 49 (5.5%); 24 subjects (2.7%) were dyslalic. Twenty-four subjects (2.7%) had bilateral anterior crossbite; 16 of them (1.8%) were dyslalic. A total of 80 (9%) open-bite cases were detected, of which only 72 were dyslalic (8.2%). Deep bite affected 289 patients (32.8%), of which 128 (14.5%) were dyslalic. There were 55 cases (6.3%) of TMD, but none among them were dyslalic. Facial asymmetries affected dyslalic and non dyslalic subjects the same way: 32 and 32 cases, respectively (3.6%). In Table 4 patients are divided on the basis of oral habits.</i></p>
<p><b>Angaben auffälliger positiver und/oder negativer Aspekte</b></p>	<p><i>Querschnittstudie. Keine Angabe zur Finanzierung oder zu Interessenskonflikten. Keine klare Darstellung und Unterscheidung der Gruppen. Prozentuale Darstellung der Ergebnisse. Keine Angaben zu initial gescreenten Patienten. Keine Angabe von Konfidenzintervallen.</i></p>
<p><b>Schlussfolgerung des Begutachters</b></p>	<p><u>methodische Qualität:</u> ok</p> <hr/> <p><u>Klinische Aussagekraft:</u> The effect of dyslalia on the speech organs is not constant. On the other hand, the effect of malocclusion on dyslalia seems to be more relevant and more frequent and to increase proportionally, depending on the severity of the malocclusion.</p>
<p><b>Evidenzlevel (SIGN)</b></p>	<p><b>3</b></p>
<p><b>Qualität</b></p>	<p><b>Acceptable ⊕</b></p>

# Evidenztabelle **Feldens, Borges et al. 2016**



Dental Traumatology 2016, 30: 429-437, doi: 10.1111/doi:10.1111

COMPREHENSIVE REVIEW

## Risk factors for traumatic dental injuries in the primary dentition: concepts, interpretation, and evidence

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**Key words:** tooth injuries; risk factors; child; preschool; primary teeth

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Accepted 29 March, 2016

**Abstract** – The purpose of this comprehensive review is to explore the main concepts related to quantification and interpretation of risk factors and investigate characteristics associated with traumatic dental injuries (TDI) in the primary dentition. Initially, the main concepts related to causality and risk factors were summarized, including how to measure, express, and compare risk as well as interpret statistical significance. Based on a structured search through PubMed, original research articles regarding TDI and associated factors in the primary dentition were then reviewed by two examiners. Studies with a sample size of at least 300 children aged between 0 and 6 years were summarized according to journal, country, study design, and type of statistical analysis. Variables associated with TDI in primary teeth were identified from studies with multivariable analysis. Measures of effect size and *P* values were presented. Thirty-two studies were retrieved; most were cross-sectional in design and only 17 (53.1%) performed multivariable analysis. Most investigations did not find an association between gender and socioeconomic variables with TDI. Increased overjet was the only factor consistently identified as an associated factor. Behavioral characteristics have been recently investigated and suggested as potential risk factors for TDI in the primary dentition. In conclusion, increased overjet is undoubtedly associated with TDI in the primary dentition. As behavioral factors may be targeted by preventive strategies, their role on TDI occurrence should be clarified in future cohort studies. Clinicians should understand the terms and measures described in studies on risk factors to properly apply knowledge and benefit patients.

<b>Population</b>	„Malokklusion/Dysgnathie“ allg.
<i>Setting</i>	<ul style="list-style-type: none"> <li>primary dentition (age range between 0 to 6 years)</li> </ul>
<i>Komorbiditäten</i>	
<b>Schweregrad</b>	Nicht angegeben

<p><b>Einschlusskriterien</b></p> <p>Bei Review: PICO</p>	<ul style="list-style-type: none"> <li>• population: primary dentition (age range between 0 to 6 years)</li> <li>• intervention: keine Intervention (zur Auswertung: TDI)</li> <li>• comparison: keine Kontrollgruppe (zur Auswertung: Oral factors (increased overjet, inadequate lip seal, open bite))</li> <li>• outcome:</li> </ul> <p>PRIMÄRZIELGRÖÖE: TDI traumatic dental injury</p> <ul style="list-style-type: none"> <li>• study type: sample size of at least 300 children</li> </ul>
<p><b>Ausschlusskriterien</b></p>	<ol style="list-style-type: none"> <li>1. studies conducted in hospitals, dental services or dental schools</li> <li>2. studies with no inferential statistics reported (P value or confidence intervals)</li> <li>3. Studies conducted at healthcare services</li> </ol>
<p><b>Intervention</b></p> <p>Versuchsgruppe</p>	<p><b>Keine Intervention</b></p> <p>VERSUCHSGRUPPE: <b>TDI</b></p> <p>N=8798 (Anfang) / N=?? (Ende) / Alter = 0-6 Jahre / ♂:♀ = ?:?</p> <ul style="list-style-type: none"> <li>• Gebissphase: Milchgebiss</li> <li>• KFO-Behandlung: (Frühbehandlung)</li> </ul>
<p><b>Kontrolle</b></p> <p>Kontrollgruppe</p>	<p><b>Keine Kontrollgruppe</b></p> <p>KONTROLLGRUPPE: <b>Oral factors (increased overjet, inadequate lip seal, open bite)</b></p> <p>N=8798 (Anfang) / N=?? (Ende) / Alter = 0-6 Jahre / ♂:♀ = ?:?</p> <ul style="list-style-type: none"> <li>• Gebissphase: Milchgebiss</li> <li>• KFO-Behandlung: keine Behandlung</li> </ul>
<p><b>Outcome</b></p>	<p><b>medizinischer Schaden, Nebenwirkungen bzw. Zunahme der Anomalie /Malokklusion/Dysgnathie</b></p> <ul style="list-style-type: none"> <li>• <b>Traumaprophylaxe (dentales Frontzahntrauma)</b></li> </ul> <p>PRIMÄRZIELGRÖÖE: TDI traumatic dental injury</p>
<p><b>Studientyp</b></p>	<p><b>Systematisches Review</b></p> <p>Review: Inkludierte Studien in Bezug auf PICO: cross-sectional studies N=13 LL-relevant (gesamtes Review N = 32)</p> <p>Review: Gesamt-Teilnehmerzahl in Bezug auf PICO: N=8798</p>

<p><b>Schlussfolgerungen der Autoren</b></p>	<p>Health promotion is a sociopolitical process that proposes the adoption of healthy habits and lifestyles at both the individual and collective levels as well as the creation of safe environments. Besides educational actions, it is also important to map situations of risk in the community and participate in social control and accident prevention measures. The implementation of health promotion programs and strategies necessarily involves an understanding of the factors associated with the imbalance in the health-illness process. In this sense, clinicians should be familiar with the terms and measures employed in studies on risk factors so that the knowledge produced by scientific research can be translated into practice for the benefit of patients.</p> <p>The available evidence demonstrates that accentuated overjet is undeniably a significant risk factor, while the role of socioeconomic characteristics is contradictory. Behavioral factors, such as breastfeeding, bottle-feeding, and pacifier use, have been suggested to be associated with TDI. As such behaviors can be effectively targeted by preventive strategies, their effect on the occurrence of TDI should be investigated in future cohort studies.</p>
<p><b>Zusammenfassung der Ergebnisse</b></p>	<p><b>Accentuated overjet stands out among the few variables consistently demonstrated as risk factors for the occurrence of TDI in both the primary and permanent dentitions.</b> A recent systematic review including children, adolescents, and adults concluded that accentuated overjet accounts for 22% of TDIs worldwide (51). Indeed, accentuated overjet is the most commonly identified risk/associated factor in the primary dentition (8, 10, 23, 28, 34–37, 40, 41). Studies also report <b>that inadequate lip seal and open bite are risk factors</b>, as children with these conditions are more exposed to fractures and displacements in cases of falls and collisions (10, 32, 34, 37, 40–42).</p> <p>It is undeniable that accentuated overjet, open bite, and inadequate lip protection are associated, and it is difficult to separate the effects of these conditions. The debate seems to regard to what extent these conditions, either combined or separately, increase the risk of TDI (11). Performing a separate quantification of the independent effect of these conditions has important clinical implications and would contribute to the definition of the best way to prevent TDI. In early childhood, advising new mothers about breastfeeding, pacifier use, and bottle-feeding would probably be a more effective strategy than orthodontic correction.</p>

<p><b>Angaben auffälliger positiver und/oder negativer Aspekte</b></p> <p>Studiendesign</p> <p>Durchführung</p> <p>Auswertung</p> <p>Funding</p> <p><u>Interessenkonflikte</u></p> <p><u>Bias (SIGN, AMSTAR II, Einzelstudien)</u></p>	<p><i>Studiendesign: keine Registrierung a priori, keine Intervention/ Kontrollgruppe, keine Meta-Analyse, keine RoB-Analyse, Begrenzung der Population auf das Milchgebiss sinnvoll, nur Studien mit einem relativ großen Datenpool (mind. 300 Kinder) eingeschlossen,</i></p> <p><i>Durchführung: nur 1 Datenbank, keine Angaben zum Studienflow, Literatursichtung/ Datenextraktion nicht durch zwei unabhängige Rater, keine Angabe zur Geschlechterverteilung der Einzelstudie, nur narrative Analyse – nur oberflächliche Auswertung der Malokklusionen (keine Details bzgl. Ausmaß etc.)</i></p> <p><i>Auswertung: LL-relevante Studien fast nur (11/13) in Brasilien durchgeführt, LL-relevante Studien sind nur Querschnittsstudien, große Datenmenge</i></p> <p><i>Power der Studie/Patientenzahl: 13/ 8798</i></p> <p><i>Funding: -</i></p> <p><i>Interessenkonflikte: The authors do not have conflict of interest in this study.</i></p> <p><i>Bias (SIGN/AMSTAR/EinzelstudienRoB – alle negativen Punkte aus Fragebogen auflisten):</i></p> <p><b>2. Did the report of the review contain an explicit statement that the review methods were established prior to the conduct of the review and did the report justify any significant deviations from the protocol?</b></p> <p><b>3. Did the review authors explain their selection of the study designs for inclusion in the re</b></p> <p><b>4. Did the review authors use a comprehensive literature search strategy?</b></p> <p><b>5. Did the review authors perform study selection in duplicate?</b></p> <p><b>6. Did the review authors perform data extraction in duplicate?</b></p> <p><b>7. Did the review authors provide a list of excluded studies and justify the exclusions?</b></p> <p><b>9. Did the review authors use a satisfactory technique for assessing the risk of bias (RoB) in individual studies that were included in the review?</b></p> <p><b>10. Did the review authors report on the sources of funding for the studies included in the</b></p> <p><b>13. Did the review authors account for RoB in individual studies when interpreting/ discuss results of the review?</b></p> <p><b>14. Did the review authors provide a satisfactory explanation for, and discussion of, any heterogeneity observed in the results of the review?</b></p> <p><i>Publikationsbias (Reviews): -</i></p>
<p><b>Schlussfolgerung des Begutachters</b></p>	<p><u>methodische Qualität:</u> Review und Einzelstudien niedrig</p> <p><u>Klinische Aussagekraft:</u> Im Milchgebiss – vornehmlich der brasilianischen Kinder - scheint, neben einer Vielzahl von anderen Faktoren, das Vorliegen einer Malokklusion das Risiko eines dentalen Traumas zu erhöhen. Zwar zählen verschiedene Formen der Malokklusion dazu – eine vergrößerte sagittale Frontzahnstufe, ein offener Biss und ein inkompetenter Lippenschluss, jedoch lässt sich aus dem Artikel nicht ableiten, inwieweit sich diese Faktoren gegenseitig beeinflussen. Zudem kann keine Aussage hinsichtlich des Ausmaßes der jeweiligen Malokklusion getroffen werden.</p>
<p><b>Evidenzlevel (SIGN)</b></p>	<p><b>3</b> Artikel über nicht analytische Studien, z.B. Falldarstellungen oder Fallserien oder Querschnittsstudien</p>
<p><b>Qualität (RoB, SIGN /AMSTAR II)</b></p>	<p><b>Moderat ++</b></p>



# Evidenztabelle Ferrando-Magraner et al. 2019

J Clin Exp Dent. 2019;11(2):194-202

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Journal section: Orthodontics  
Publication Type: Review

doi: 10.4317/jced.55217  
<https://dx.doi.org/10.4317/jced.55217>

## Oral health-related quality of life of adolescents after orthodontic treatment. A systematic review

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Ferrando-Magraner E, García-Sanz V, Bellot-Arch C, Montiel-Company JM, Almerich-Silla JM, Paredes-Gallardo V. Oral health-related quality of life of adolescents after orthodontic treatment. A systematic review. J Clin Exp Dent. 2019;11(2):194-202.

[http://www.medrxiv.org/content/10.1101/2019.01.12.190194.pdf](http://www.medrxiv.org/content/10.1101/2019.01.12.190194)

Received: 23/12/2018  
Accepted: 14/01/2019



### Abstract

**Background:** Given the prevalence of malocclusions and the impact they have on oral health, patients' quality of life assessments provide useful information, not only in terms of patients' needs and expectations before treatment, but about whether or not orthodontic treatments meet them satisfactorily. The present systematic review was carried out to evaluate changes in the quality of life of adolescent patients after orthodontic treatment.

**Material and Methods:** An electronic search was conducted in the Pubmed, Embase, Cochrane and Scopus databases. The review followed PRISMA guidelines for systematic reviews and meta-analyses.

**Results:** Of the 817 studies identified in the initial search, only 10 met the inclusion criteria. In relation to the instrument used to assess oral health-related quality of life (OHRQoL), half the studies used the oral health impact profile-14 (OHIP-14) and the other half the child perceptions questionnaire (CPQ 11-14). All the studies, with the exception of Benson *et al.*, reported a significant improvement in OHRQoL at the end of treatment.

**Conclusions:** There is a positive association between OHRQoL and orthodontic treatment in adolescent patients.

**Key words:** Quality of life, life quality, oral health related quality of life, QoL, OHRQoL, orthodontic treatment, adolescents, teenagers.

<b>Population</b> <i>Setting</i> <i>Komorbiditäten</i>	<p><b>„Malokklusion/Dysgnathie“ allg.</b></p> <ul style="list-style-type: none"> <li>adolescent patients</li> </ul>
<b>Schweregrad</b>	Nicht angegeben
<b>Einschlusskriterien</b> <i>Bei Review: PICOS</i>	<ul style="list-style-type: none"> <li>Population: adolescent patients</li> <li>Intervention: conventional fixed orthodontic apparatus, whether combined with auxiliary apparatus or no</li> <li>Comparison: before treatment</li> <li>Outcome: PRIMÄRZIELGRÖßE: OHRQoL (assessed by means of validated instruments)</li> <li>Study design: randomized clinical trials, longitudinal studies, cross-sectional studies, cohort studies, and case-control studies</li> </ul>
<b>Ausschlusskriterien</b>	<ol style="list-style-type: none"> <li>Studies with patient samples requiring orthodontic treatment combined with surgery were excluded.</li> <li>patients with craniofacial anomalies</li> <li>patients with general pathologies or syndromes.</li> </ol>
<b>Intervention</b> <i>Versuchsgruppe</i>	<p><b>Kieferorthopädische Behandlung</b></p> <p>VERSUCHSGRUPPE: <b>after orthodontic treatment</b></p> <p>N=1384 (Anfang) / N=?? (Ende) / Alter = 10-25 Jahre / ♂:♀ = 533 : 820</p> <ul style="list-style-type: none"> <li>Gebissphase: spätes Wechselgebiss, permanentes Gebiss &lt; und ≥ 18. Lebensjahr</li> <li>KFO-Behandlung: reguläre Behandlung, Spätbehandlung</li> </ul>
<b>Kontrolle</b> <i>Kontrollgruppe</i>	<p><b>Keine Kontrollgruppe</b></p> <p>KONTROLLGRUPPE: <b>Before conventional fixed orthodontic treatment</b></p> <p>N=1581 (Anfang) / N=?? (Ende) / Alter = 10-25 Jahre / ♂:♀ = 635:944</p> <ul style="list-style-type: none"> <li>Gebissphase: spätes Wechselgebiss, permanentes Gebiss &lt; und ≥ 18. Lebensjahr</li> <li>KFO-Behandlung: keine Behandlung</li> </ul>
<b>Outcome</b>	<p><b>direkter oder schadenspräventiver medizinischer Nutzen bzw. Korrektur/Prävention der Anomalie/Malokklusion/Dysgnathie</b></p> <p><b>medizinischer Schaden, Nebenwirkungen bzw. Zunahme der Anomalie /Malokklusion/Dysgnathie</b></p> <ul style="list-style-type: none"> <li><b>mundgesundheitsbezogene Lebensqualität (MLQ), psychische Entwicklung</b></li> </ul> <p>PRIMÄRZIELGRÖßE: OHRQoL (assessed by means of validated instruments)</p>

<p><b>Studientyp</b></p>	<p><b>Systematisches Review</b></p> <p><i>Review:</i> Inkludierte Studien in Bezug auf PICO: 7 Prospective longitudinal stuiies, 3 cohort studies N=10</p> <p><i>Review:</i> Gesamt-Teilnehmerzahl in Bezug auf PICO: N=1581 (cave: Drop-outs nicht eindeutig zu errechnen)</p>
<p><b>Schlussfolgerungen der Autoren</b></p>	<p>The limited quality and methodology of the studies included in the present systematic review point to the need for further research that analyzes the impact of orthodontic treatment on OHRQoL among adolescents. Studies should have patient samples with clearly defined age ranges, balanced distribution of the sexes, longitudinal follow-up, with losses reduced as far as possible, and <b>using the same validated and reliable assessment instrument.</b></p> <p>A <b>positive association was found between OHRQoL and orthodontic treatment</b> in adolescent patients; orthodontic treatment of adolescent patients presenting malocclusion by means of fixed apparatus produces a significantly improved OHRQoL at the end of treatment.</p>
<p><b>Zusammenfassung der Ergebnisse</b></p>	<p><b>Before conventional fixed orthodontic treatment VERSUS after orthodontic treatment</b></p> <p><b>OHRQoL (assessed by means of validated instruments):</b> Most works point to <b>significant differences in OHR-QoL between pre- and post-treatment</b> assessments (1,8,12,18,21-25). Among the studies using the OHIP-14, pre- and post-treatment scores varied between 14 and 16 points. In those using the CPQ11-14, values varied between 0.91 and 9.9 points.</p> <p>None of the studies considered the influence of the type of apparatus employed on QoL. One article emphasized age as a significant factor affecting CPQ 11-14 scores (24).</p> <p>Qualitative analysis of the studies reviewed (1,8,12,18,21-25) concluded that orthodontic treatment by means of fixed apparatus produces a <b>significant improvement in OHR-QoL among adolescent</b> patients by the end of treatment, with the exception of one work by Benson <i>et al.</i> (26), who did not find any significant differences in pre- and post-treatment OHRQoL.</p> <p>Die in PROSPERO geplanten Subgruppenanalysen wurden nicht durchgeführt.</p>

<p><b>Angaben auffälliger positiver und/oder negativer Aspekte</b></p> <p>Studiendesign</p> <p>Durchführung</p> <p>Auswertung</p> <p>Funding</p> <p><u>Interessenkonflikte</u></p> <p><u>Bias (SIGN, AMSTAR II, Einzelstudien)</u></p>	<p><i>Studiendesign: Registrierung a priori (PROSPERO), Einschluss auf jugendliche Patienten begrenzt, Ausschluss von Studien niedriger Qualität</i></p> <p><i>Durchführung: RoB-Analyse und Literatursichtung durch zwei unabhängige Rater, viele Datenbanken in der Literaturrecherche eingeschlossen</i></p> <p><i>Auswertung: keine eindeutige Patientenzahlen – zwar wurde “N(losses)” angegeben aber die Drop-outs wurden nicht immer eindeutig subtrahiert oder addiert, keine einheitliche Messmethode (2 verschiedene Fragebögen: OHIP-14, CPQ 11-14), mehr weibliche als männliche Patienten eingeschlossen, durch teilweise zusätzliche Kontrollgruppen höhere Teilnehmerzahl in der Kontrollgruppe</i></p> <p><i>Power der Studie/Patientenzahl: 10/1581</i></p> <p><i>Funding: -</i></p> <p><i>Interessenkonflikte: The authors have declared that no conflict of interest exist.</i></p> <p><i>Bias (SIGN/AMSTAR/EinzelstudienRoB – alle negativen Punkte aus Fragebogen auflisten):</i></p> <p><b>3. Did the review authors explain their selection of the study designs for inclusion in the review?</b></p> <p><b>6. Did the review authors perform data extraction in duplicate?</b></p> <p><b>7. Did the review authors provide a list of excluded studies and justify the exclusions?</b></p> <p><b>9. Did the review authors use a satisfactory technique for assessing the risk of bias (RoB) in individual studies that were included in the review?</b></p> <p><b>10. Did the review authors report on the sources of funding for the studies included in the</b></p> <p><b>14. Did the review authors provide a satisfactory explanation for, and discussion of, any heterogeneity observed in the results of the review?</b></p> <p><i>Publikationsbias (Reviews): -</i></p>
<p><b>Schlussfolgerung des Begutachters</b></p>	<p><u>methodische Qualität:</u> Review und Einzelstudien moderat</p> <p><u>Klinische Aussagekraft:</u> Durch eine kieferorthopädische Behandlung scheint die mundgesundheitsbezogene Lebensqualität von Jugendlichen verbessert zu werden. Da die meisten Studien keine Kontrollgruppe hatten, scheint diese Feststellung aber subjektiv zu sein.</p>
<p><b>Evidenzlevel (SIGN)</b></p>	<p>2+</p>
<p><b>Qualität (RoB, SIGN /AMSTAR II)</b></p>	<p>Moderat ⊕⊕</p>

# Evidenztabelle **Gameiro, Magalhaes et al. 2017**

## Is the main goal of mastication achieved after orthodontic treatment? A prospective longitudinal study

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DOI: <https://doi.org/10.1093/ajph/107.11.1773-1778>

**Objective:** To investigate the masticatory and swallowing performances in patients with malocclusions before and after orthodontic treatment, comparing them to an age- and gender-matched control group with normal occlusion. **Methods:** Twenty-three patients with malocclusions requiring orthodontic treatment were included in this prospective study. One month after appliance removal, seventeen patients completed a follow-up examination and the data were compared with those of a control group with thirty subjects with normal occlusion. Masticatory performance was determined by the median particle size for the Optocal Plus<sup>®</sup> test food after 15 chewing strokes, and three variables related to swallowing were assessed: a) time and b) number of strokes needed to prepare the test-food for swallowing, and c) median particle size of the crushed particles at the moment of swallowing. **Results:** At the baseline examination, the malocclusion group had a significantly lower masticatory performance and did not reach the particle size reduction at the moment of swallowing, when compared with the control group. After treatment, the masticatory performance significantly improved in the malocclusion group and the particle size reduction at swallowing reached the same level as in the control group. **Conclusions:** The present results showed that the correction of malocclusions with fixed appliances can objectively provide positive effects in both mastication and deglutition processes, reinforcing that besides aesthetic reasons, there are also functional indications for orthodontic treatment.

<b>Population</b>	<p>„Malokklusion/Dysgnathie“ allg.</p> <p>Twenty-three patients with malocclusions requiring orthodontic treatment were included in this prospective study. One month after appliance removal, seventeen patients completed a follow-up examination and the data were compared with those of a control group with thirty subjects with normal occlusion.</p>
<b>Schweregrad</b>	keine Angabe
<b>Einschlusskriterien</b>	an uneventful medical history and good oral health; an approximately equal number of occlusal units (an occluding molar pair is counted as two occlusal units, whereas a premolar pair is counted as one occlusal unit)13 with malocclusions requiring orthodontic treatment.
<b>Ausschlusskriterien</b>	previous orthodontic treatment or symptoms of temporomandibular joint dysfunction.
<b>Intervention</b> Versuchsgruppe	<p><b>kieferorthopädische Behandlung</b></p> <p>Ten individuals had Class I malocclusions, five had Class II, and three had Class III.</p> <p>VERSUCHSGRUPPE: <b>malocclusion</b></p> <p>N=24 (Anfang) / N=17 (Ende) / Alter = 24,2 ± 6 Jahre / ♂:♀ = 9:8</p> <ul style="list-style-type: none"> <li>Gebissphase: permanentes Gebiss ≥ 18. Lebensjahr</li> <li>KFO-Behandlung: Spätbehandlung (Erwachsenenbehandlung)</li> </ul>

<p><b>Kontrolle</b> Kontrollgruppe</p>	<p><b>keine kieferorthopädische Therapie</b> KONTROLLGRUPPE: <b>control</b></p> <p><i>The patients and the control group were homogeneous with regard to sex, age and facial type.</i></p> <p>N=?? (Anfang) / N=?? (Ende) / Alter = ?? ± ?? Jahre / ♂:♀ = ?:?</p> <ul style="list-style-type: none"> <li>• Gebissphase: permanentes Gebiss ≥ 18. Lebensjahr</li> <li>• KFO-Behandlung: keine</li> </ul>
<p><b>Outcome</b></p>	<p><b>direkter oder schadenspräventiver medizinischer Nutzen bzw. Korrektur/Prävention der Anomalie/Malokklusion/Dysgnathie</b></p> <ul style="list-style-type: none"> <li>• <b>Okklusion, Kaufunktion, Funktion</b></li> </ul> <p>PRIMÄRZIELGRÖßE: <i>masticatory performance</i> SEKUNDÄRZIELGRÖßE: <i>swallowing function</i></p>
<p><b>Studientyp</b></p>	<p><b>Beobachtungsstudie (Kohortenstudie oder Fall-Kontroll-Studie)</b></p>
<p><b>Schlussfolgerungen der Autoren</b></p>	<ol style="list-style-type: none"> <li>1. Patients with malocclusions present impaired masticatory and swallowing functions, since their food bolus contain much larger particles than the normal occlusion counterparts.</li> <li>2. At long-term follow-up examination, masticatory and swallowing performances are reestablished to those observed in the normal occlusion group.</li> </ol>
<p><b>Zusammenfassung der Ergebnisse</b></p>	<p><b>GRUPPE malocclusion VS. GRUPPE control</b></p> <p><b>PRIMÄRZIELGRÖßE</b> <i>The results of masticatory variables registered during the masticatory performance tests are shown in Table 1. Before treatment, the median particle size after 15 chewing strokes (X50-15) was higher in the patients than in the control group (5.7 mm vs. 4.8 mm, p &lt; 0.05). After treatment, the masticatory performance had significantly improved in the patients group and reached similar levels (5.1 mm) as in the control group, as confirmed by the absence of significant differences between groups. The total time spent during mastication and the time of each masticatory cycle did not change after treatment in the patients group. The inter-group differences were also not significant regarding these variables.</i></p>
<p><b>Zusammenfassung der Ergebnisse</b></p>	<p><b>SEKUNDÄRZIELGRÖßE</b></p> <p><i>The data regarding swallowing variables are shown in Table 2. The swallowing thresholds (time and number of strokes) for Optocal did not vary significantly after treatment in the patients group. These variables registered both before and after treatment were also similar to those observed in the control group. However, the median particle size of the particles at the moment of swallowing (X50-sw) was significantly affected by the orthodontic treatment. Before treatment, the X50-sw was higher in the patients than in the control group (4.5 mm vs. 3.0 mm, p &lt; 0.05). After treatment, the X50-sw had significantly decreased in the patients group and reached similar levels (3.4 mm) as in the control group, indicating an improvement in the swallowing threshold of patients. Table 3 shows the correlations between the X50 of the particles at the moment of swallowing (X50-sw), the X50 of the particles after 15 chewing strokes (X50-15) and the other swallowing thresholds. Significant positive correlations between the X50 of swallowing (X50-sw) and the X50 after 15 strokes (X50-15) were observed in the control group, and also in the patients group after treatment. In this group, these variables were not significantly correlated before treatment.</i></p>

	<i>The X50 of swallowing (X50-sw) were negatively correlated with the other swallowing variables (number of strokes and total time) in both the patients (before and after treatment) and in the control group. Therefore, if subjects used more strokes before swallowing, the collected particles were smaller, indicating a better swallowing threshold.</i>
<b>Angaben auffälliger positiver und/oder negativer Aspekte</b>	<i>Gut durchgeführte Kohortenstudie. Methoden gut und nachvollziehbar erklärt. Keine Angaben zu initial gescreenten Patienten, keine Angaben von Konfidenzintervallen. Keine Interessenskonflikte vorhanden. Powerkalkulation durchgeführt, allerdings erschienen weniger Patienten zum follow-up als eigentlich vorgesehen.</i>
<b>Schlussfolgerung des Begutachters</b>	<u>methodische Qualität:</u> gut
	<u>Klinische Aussagekraft:</u> The present results showed that the correction of malocclusions with fixed appliances can objectively provide positive effects in both mastication and deglutition processes, reinforcing that besides aesthetic reasons, there are also functional indications for orthodontic treatment.
<b>Evidenz-level (SIGN)</b>	<b>2+</b>
<b>Qualität</b>	<b>Acceptable ⊕</b>

## Evidenztabelle Hassan, Amin 2010

# Association of orthodontic treatment needs and oral health-related quality of life in young adults

All H. Hassan<sup>a</sup> and Hatem El-Sayed Amin<sup>b</sup>

<sup>a</sup>Jeddah, Saudi Arabia, and <sup>b</sup>Tanta, Egypt

**Introduction:** Our objective was to assess the effect of different orthodontic treatment needs on the oral health-related quality of life of young adults. **Methods:** The study sample comprised 366 young adult orthodontic patients (153 men, 213 women; age range, 21–25 years). Each participant was assessed for orthodontic treatment need and oral health-related quality of life by using the dental health component of orthodontic treatment need index and the shortened version of oral health impact profile questionnaire. **Results:** Orthodontic patients who had little or no, borderline, and actual need for orthodontic treatment represented 14.8%, 56%, and 29.2% of the total sample, respectively. Orthodontic treatment need significantly affected mouth aching, self-consciousness, tension, embarrassment, irritability, and life satisfaction in both sexes. Also, orthodontic treatment need significantly affected taste and relaxation in both men and women. However, pronunciation and the ability to do jobs or function effectively were not significantly associated with orthodontic treatment needs in either sex. **Conclusions:** These findings emphasize the impact of malocclusion on oral health-related quality of life of young adults. (Am J Orthod Dentofacial Orthop 2010;137:42-7)

<b>Population</b>	<b>„Malokklusion/Dysgnathie“ allg</b> A consecutive sample of young adults seeking orthodontic treatment at the Faculty of Dentistry, King Abdulaziz University, were recruited in the study according to the order of registration on the waiting list.
<b>Schweregrad</b>	Keine Angabe
<b>Einschlusskriterien</b>	Patients who had a perceived need for orthodontic treatment and who were about to undergo orthodontic therapy were included
<b>Ausschlusskriterien</b>	Exclusion criteria were chronic medical conditions, previous orthodontic treatment, craniofacial anomalies such as cleft lip and palate, untreated dental caries, and poor periodontal health status as indicated by a community periodontal index score of 3 or more. <sup>19</sup>
<b>Intervention</b> Versuchsgruppe	<b>Keine Behandlung, aber Malokklusion/kraniofaziale Fehlbildung</b> N=366 / Alter = MIN:21, MAX:25 Jahre / ♂:♀ = 153:213 <ul style="list-style-type: none"> <li>• Gebissphase: permanentes Gebiss ≥ 18. Lebensjahr</li> <li>• KFO-Behandlung: keine</li> </ul>
<b>Outcome</b>	<b>direkter oder schadenspräventiver medizinischer Nutzen bzw. Korrektur/Prävention der Anomalie/Malokklusion/Dysgnathie</b> <ul style="list-style-type: none"> <li>• mundgesundheitsbezogene Lebensqualität (MLQ), psychische Entwicklung</li> </ul> <b>PRIMÄRZIELGRÖßE:</b> <i>Impacts on daily activities in relation to sex and orthodontic treatment needs</i>
<b>Studientyp</b>	<b>Querschnittsstudie</b>



<b>Schlussfolgerungen der Autoren</b>	These results highlight the impact of malocclusion on OHRQOL of young adults and emphasize the importance of patient-based evaluation of oral health status and oral health needs.
<b>Zusammenfassung der Ergebnisse</b>	<b>PRIMÄRZIELGRÖßE</b> In Table II, the chi-square test shows that pronunciation was not significantly affected by the need for orthodontic treatment in either men ( $X^2 = 2.6; P = 0.2$ ) or women ( $X^2 = 1.11; P = 0.5$ ). Taste, however, was significantly affected by the level of orthodontic treatment need in men ( $X^2 = 6.9; P = 0.03$ ) but not in women ( $X^2 = 5.6; P = 0.06$ ). Among the examined subjects, the proportions of orthodontic patients who found it uncomfortable to eat any food, had an unsatisfactory diet, and had to interrupt their meals were significantly correlated with orthodontic treatment needs in both men ( $X^2=11.9, 9.6, \text{ and } 7.9; P = 0.003, 0.008, \text{ and } 0.01, \text{ respectively}$ ) and women ( $X^2 = 7.8, 13.9, 11.3; P = 0.02, 0.00, \text{ and } 0.00, \text{ respectively}$ ). Also, in both male and female patients, the need for orthodontic treatment significantly affected painful mouth aching ( $X^2= 10.2 \text{ and } 10.9; P = 0.006 \text{ and } 0.00, \text{ respectively}$ ), self-consciousness ( $X^2 = 16.4 \text{ and } 17.8; P = 0.00$ ), and feelings of tension ( $X^2 = 12.8 \text{ and } 9.9; P = 0.00$ ). Relaxation was also significantly associated with the level of orthodontic treatment need in women ( $X^2 = 5.68; P = 0.03$ ), but it did not reach the level of significance in men ( $X^2= 3.5; P = 0.17$ ). Moreover, embarrassment, irritability with other people, and the general feeling of less satisfaction in life were significantly associated with higher orthodontic treatment needs in both men ( $X^2 = 11.3, 16.7, \text{ and } 12.5; P = 0.003, 0.00, \text{ and } 0.00$ ) and women ( $X^2 = 10.1, 18.5, \text{ and } 14.2; P = 0.00, 0.01, \text{ and } 0.00$ ). On the other hand, orthodontic treatment needs did not significantly affect the ability of the patients to do their jobs or function effectively ( $X^2 = 3.8 \text{ and } 2.07; P = 0.15 \text{ and } 0.35 \text{ in men; } X^2=2.9 \text{ and } 1.49; P=0.23 \text{ and } 0.40 \text{ in women, respectively}$ ).
<b>Angaben auffälliger positiver und/oder negativer Aspekte</b>	Querschnittsstudie mit klarer Fragestellung. Keine Angaben zur Finanzierung. Keine Interessenskonflikte vorhanden. Keine Powerkalkulation, keine Konfidenzintervalle, keine Verblindung, aber reliable und valide Auswertung.
<b>Schlussfolgerung des Begutachters</b>	<u>methodische Qualität:</u> Gut  <u>Klinische Aussagekraft:</u> These findings emphasize the impact of malocclusion on oral health-related quality of life of young adults.
<b>Evidenz-level (SIGN)</b>	3
<b>Qualität</b>	Acceptable ⊕

## Evidenztabelle Helm, Kreiborg et al. 1985

### *Psychosocial implications of malocclusion: A 15-year follow-up study in 30-year-old Danes*

**Sven Helm, Sven Kreiborg, and Beni Solow**

*Copenhagen, Denmark*

Long-term psychosocial effects of malocclusion should be studied longitudinally from childhood to adulthood in orthodontically untreated populations. In 1965-66, the occurrence of morphologic traits of malocclusion was recorded in 977 Danish adolescents who had no access to organized orthodontic care. In a follow-up study 15 years later, a questionnaire was mailed to the subjects; this contained general questions about body image and specific inquiries concerning self-perception and social implications of dental appearance. The response rate was 86%. Ten percent had received orthodontic treatment. In the remaining individuals, only one entry among thirteen items of body image—the teeth—was rated significantly less satisfactory by subjects with malocclusion at adolescence than by subjects without malocclusion at adolescence. The lowest ratings were observed in subjects with extreme maxillary overjet, extreme deep bite, and crowding. Highly significant differences were found between the two groups (subjects with and without malocclusion) in recalling adolescent awareness of malocclusion, dissatisfaction with the appearance of the teeth, and unfavorable appearance of the teeth compared with those of peers. Schoolmates' teasing occurred seven times more often in the presence of malocclusion. Differences were less marked in the perceptions of the same individuals in adulthood. However, in both adolescence and adulthood unfavorable perceptions of the teeth were expressed significantly more often by subjects with extreme maxillary overjet, extreme deep bite, and crowding. No association was found between malocclusion and present occupational status. It was concluded that certain malocclusions, especially conspicuous occlusal and space anomalies, may adversely affect body image and self-concept, not only at adolescence but also in adulthood.

<b>Population</b>	„Malokklusion/Dysgnathie“ allg.  In 1965-66, the occurrence of malocclusion was recorded in the entire population of schoolchildren in a region without organized orthodontic care. <sup>25</sup>
<i>Schweregrad</i>	Keine Angabe
<i>Einschlusskriterien</i>	The registrations were performed according to the method developed by Bjork, Krebs, and Solow. <sup>28</sup> School grades 7 through 10 consisting of 1,252 children with adolescent dentition, ranging in age from 13 to 19 years, were selected for the present study.
<i>Ausschlusskriterien</i>	Keine Angabe
<b>Intervention</b> Versuchsgruppe	<b>Keine Behandlung, aber Malokklusion/kraniofaziale Fehlbildung</b>  VERSUCHSGRUPPE: <b>with malocclusion</b>  N=606 (Anfang) / N=606 (Ende) / Alter = MIN:28, MAX:34 Jahre / ♂:♀ = ??:?  <ul style="list-style-type: none"> <li>• Gebissphase: permanentes Gebiss ≥ 18. Lebensjahr</li> <li>• KFO-Behandlung: keine</li> </ul>

<b>Kontrolle</b> Kontrollgruppe	<p><b>Keine Malokklusion</b></p> <p>KONTROLLGRUPPE: <b>without malocclusion</b></p> <p>N=152 (Anfang) / N=152 (Ende) / Alter = MIN:28, MAX:34 Jahre / ♂:♀ = ?:?</p> <ul style="list-style-type: none"> <li>Gebissphase: permanentes Gebiss ≥ 18. Lebensjahr</li> <li>KFO-Behandlung: keine</li> </ul>
<b>Outcome</b>	<p><b>direkter oder schadenspräventiver medizinischer Nutzen bzw. Korrektur/Prävention der Anomalie/Malokklusion/Dysgnathie</b></p> <ul style="list-style-type: none"> <li><b>mundgesundheitsbezogene Lebensqualität (MLQ), psychische Entwicklung</b></li> </ul> <p>PRIMÄRZIELGRÖßE: <i>relationships between malocclusion and satisfaction with appearance in general</i></p>
<b>Studientyp</b>	<b>Querschnittsstudie</b>
<b>Schlussfolgerungen der Autoren</b>	<ol style="list-style-type: none"> <li>Dental appearance, in particular malocclusion, plays an important role in general body image.</li> <li>Malocclusion may adversely affect body image and self-concept not only in adolescence but also in adulthood.</li> <li>Dissatisfaction with one's own dental appearance and teasing about teeth are experienced particularly by subjects with extreme maxillary overjet, extreme deep bite, and space anomalies.</li> </ol>
<b>Zusammenfassung der Ergebnisse</b>	<p><b>GRUPPE with malocclusion VS. GRUPPE without malocclusion</b></p> <p><b>PRIMÄRZIELGRÖßE</b> <i>Examining further malocclusion traits were related to the mean scores of the comparison group (Table V). Low scores were observed for a number of malocclusion traits. The most conspicuous differences were found in perception of the teeth. Dissatisfaction was expressed particularly by subjects with maxillary overjet greater than 9 mm, with crowding, and with deep bite greater than 7 mm. A low relative score for facial body image was observed in the case of extreme maxillary overjet. Moreover, the smile was perceived to be relatively less pleasing among individuals with crossbite or crowding</i></p>
<b>Angaben auffälliger positiver und/oder negativer Aspekte</b>	<p><i>15-Jahres follow-up einer Querschnittsstudie aus den 60er Jahren. 1985 publiziert. Keine Angaben zur Reliabilität und Validität der Datenerhebung. Auswertung von Fragebögen, die von den Probanden ausgefüllt wurden. Keine Angaben zu Interessenskonflikten oder zur Finanzierung. Keine Angaben zur Ethik. Keine genauen Angaben zur Geschlechterverteilung. Aber klare Abgrenzung einer Kontrollgruppe ohne Malokklusion.</i></p>
<b>Schlussfolgerung des Begutachters</b>	<p><u>methodische Qualität:</u> gut</p> <hr/> <p><u>Klinische Aussagekraft:</u> It was concluded that certain malocclusions, especially conspicuous occlusal and space anomalies, may adversely affect body image and self-concept, not only at adolescence but also in adulthood.</p>
<b>Evidenzlevel (SIGN)</b>	<b>3</b>
<b>Qualität</b>	<b>Acceptable ⊕</b>

## Evidenztabelle **Huynh, Morton et al. 2011**

### Associations between sleep-disordered breathing symptoms and facial and dental morphometry, assessed with screening examinations

Nelly T. Huynh,<sup>a</sup> Paul D. Morton,<sup>b</sup> Pierre H. Rompré,<sup>c</sup> Athena Papadakis,<sup>a</sup> and Claude Remise<sup>d</sup>  
 Montreal, Québec, Canada

**Introduction:** Chronic snoring is considered abnormal in a pediatric population. This disorder is often attributed to enlarged tonsils and adenoids, but multiple anatomic obstructions should also be considered. Facial and dental morphometry associations with various sleep-disordered breathing symptoms were investigated at an orthodontic clinic. **Methods:** Parents or guardians were asked to complete a 4-part questionnaire on behalf of their children (n = 604; <18 years of age), including medical and dental history, bruxism and temporomandibular disorder habits, sleep and daytime behavior, and sleep duration and quality. All subjects underwent a clinical screening assessment by the same orthodontist to identify standard dental, skeletal, functional, and esthetic factors. **Results:** In contrast to sleep-disordered breathing or sleep apnea in adults, which is predominantly associated with obesity, sleep-disordered breathing symptoms in this pediatric cohort were primarily associated with adenotonsillar hypertrophy, morphologic features related to a long and narrow face (dolichofacial, high mandibular plane angle, narrow palate, and severe crowding in the maxilla and the mandible), allergies, frequent colds, and habitual mouth breathing. **Conclusions:** Because of the recognized impact of pediatric snoring on children's health, the determination of these good predictors can help in preventing and managing sleep-disordered breathing. If a health professional notices signs and symptoms of sleep-disordered breathing, the young patient should be referred to a sleep medicine specialist in conjunction with an orthodontist if there are dento-skeletal abnormalities. (Am J Orthod Dentofacial Orthop 2011;140:762-70)

<b>Population</b>	„Malokklusion/Dysgnathie“ allg. subjects from the general orthodontic department of a university clinic (Universite de Montreal in Canada).
<b>Schweregrad</b>	keine Angabe
<b>Einschlusskriterien</b>	The subjects were under 18 years of age
<b>Ausschlusskriterien</b>	keine Angabe
<b>Intervention</b> Versuchsgruppe	<b>keine Behandlung, aber Malokklusion/kraniofaziale Fehlbildung</b> N=604 (Anfang) / N=604 (Ende) / Alter = 13,01 ± 2,28 Jahre / ♂:♀ = 275:329 <ul style="list-style-type: none"> <li>• Gebissphase: spätes Wechselgebiss</li> <li>• KFO-Behandlung: keine</li> </ul>

<p><b>Outcome</b></p>	<p><b>direkter oder schadenspräventiver medizinischer Nutzen bzw. Korrektur/Prävention der Anomalie/Malokklusion/Dysgnathie</b></p> <ul style="list-style-type: none"> <li>• <b>Atmung und Luftraum (Airway space, Schlafapnoe), Schlucken und Sprechen</b></li> </ul> <p>PRIMÄRZIELGRÖßE: <i>associations between evaluated maxillary and mandibullary dental crowding and reported pediatric obstructive sleep apnea symptoms</i></p> <p>SEKUNDÄRZIELGRÖßE: <i>associations between evaluated mandibular deficiency and reported pediatric obstructive sleep apnea symptoms</i></p> <p>TERTIÄRZIELGRÖßE: <i>associations between evaluated mandibular deficiency, evaluated incisor overjet, and reported pediatric obstructive sleep apnea symptoms</i></p> <p>QUARTÄRZIELGRÖßE: <i>associations between evaluated palatal morphology, evaluated maxillary width, and reported pediatric obstructive sleep apnea symptoms</i></p> <p>QUINTÄRZIELGRÖßE: <i>associations between evaluated vertical facial morphology and reported pediatric obstructive sleep apnea symptoms</i></p>
<p><b>Studientyp</b></p>	<p><b>Querschnittsstudie</b></p>
<p><b>Schlussfolgerungen der Autoren</b></p>	<p>Pediatric sleep-disordered breathing symptoms reported in this cohort were primarily associated with morphologic characteristics of a long and narrow face, nasal breathing resistance (allergies, frequent colds), and mouth-breathing. Sleep-disordered breathing symptoms and the associated craniofacial features were often reported in the orthodontic clinical setting.</p>
<p><b>Zusammenfassung der Ergebnisse</b></p>	<p><b>PRIMÄRZIELGRÖßE</b> <i>Dental arch deficiency was assessed by maxillary and mandibular dental crowding on a scale from spacing to severe crowding. Severe crowding in the maxilla and the mandible was significantly associated with increased snoring, loud snoring, dry mouth on awakening, and fewer hours of sleep compared with other subjects (Table VII). Furthermore, severe maxillary crowding was significantly associated with poor sleep quality (8.5% of subjects with severe crowding had poor sleep; P = 0.018; OR, 3.0 [95% CI, 1.2-7.4]), daytime somnolence reported by either teachers (8.2%; P = 0.008; OR, 3.7 [95% CI, 1.5-9.2]) or parents (12.4%; P=0.053; OR, 2.1 [95% CI, 1.0-4.2]). Severe mandibular crowding had a statistically significant relationship with daytime mouth breathing (43.3%; P = 0.046; OR, 1.6 [95% CI, 1.03-2.05]. Hypertrophied tonsils were significantly associated with loud snoring (10.1% of subjects with hypertrophied tonsils had loud snoring; P = 0.027; OR, 2.5 [95% CI, 1.1-5.5]) and habitual snoring (16.7%; P = 0.054; OR, 1.8 [95% CI, 1.0-3.4]) compared with other subjects. Tonsils were also enlarged in subjects who were screened during the winter (northern hemisphere, January-April) compared with those screened at other times of the school year (P = 0.031; OR, 2.1 [95% CI, 1.1-4.2])</i></p> <p><b>SEKUNDÄRZIELGRÖßE</b> <i>A retrusive mandible showed an associative trend (P &lt;0.09) with morning headaches (6.3% of subjects with retrusive mandible had morning headaches; OR, 2.5 [95% CI, 1.0-6.1]), reported tooth grinding (16.9%; OR, 1.7 [95% CI, 1.0-3.0]), and clenching (21.1%; OR, 1.5 [95% CI, 1.0-2.5]) compared with other subjects (Table VI). T tests demonstrated significant protective associations between mandibular deficiency traits and less time to get to sleep, but not for longer sleep time. However, all patients had an adequate average of over 9 hours of sleep.</i></p>

<p><b>Zusammenfassung der Ergebnisse</b></p>	<p><b>TERTIÄRZIELGRÖßE</b> Anteroposterior deficiencies were not highly associated with reported pediatric obstructive sleep apnea symptoms compared with other subjects. However, poor scholastic results were significantly associated with reported obstructive sleep apnea symptoms and severe overjet. Morning headaches and reported tooth grinding were also significantly associated with both retrognathia and overjet (Table V).</p> <p><b>QUARTÄRZIELGRÖßE</b> Snoring, mouth breathing, and daytime sleepiness were significantly associated with a narrow palate and decreased maxillary width (Table IV). A narrow palate was further associated with decreased sleep duration (<math>P = 0.02</math>), poor sleep quality (12.2% of subjects with narrow palate had poor sleep; <math>P = 0.008</math>; OR, 4.4 [95% CI, 1.6-11.6]), morning headache (10.0%; <math>P = 0.024</math>; OR, 3.7 [95% CI, 1.3- 10.6]), and daytime somnolence (22.0%; <math>P &lt; 0.001</math>; OR, 4.4 [95% CI, 2.1-9.4]). Moreover, a posterior crossbite was significantly statistically associated with loud snoring (14.5%; <math>P = 0.003</math>; OR, 3.8 [95% CI, 1.6-7.1]).</p> <p><b>QUINTÄRZIELGRÖßE</b> Skeletal and dental morphologic traits in the vertical, transverse, and sagittal skeletal planes were examined, as well as the shape and dimensions of the dentoalveolar arches. In the vertical plane, most subjects had mesofacial morphologies (71.4%) and convex profiles (86.4%). Dolichofacial, or long-face morphology, was observed in 15.7% of the subjects. In the transverse plane, a narrow palate was identified in 8.4% of the subjects. Posterior crossbites involving 2 or more teeth were found in 10.4% of subjects. In the sagittal or anteroposterior plane, most subjects appeared to have a regular bite (51.2%-59.2%) or an abnormal overbite or overjet (35.4%-43.7%). The rest had an underbite or underjet (5.1%-5.4%). Severe maxillary and mandibular dental crowding in the dentoalveolar arch was found in 16.1% of the subjects. Enlarged tonsils were observed in 17.3% of the subjects. A large tongue was subjectively assessed in only 0.7%, although a fissured tongue was seen in 8.2%. Primary mouth breathing was noted by the clinician in 21.5% of the subjects; most were primarily nose breathers (46.3%), followed by mixed nose-mouth breathers (32.3%). Four morphologic characteristics from the clinical examinations were related to larger vertical facial dimensions: dolichofacial morphology, greater facial height, high mandibular plane angle, and anterior open bite. The dolichofacial and high mandibular plane angle characteristics were significantly statistically associated with several snoring and breathing symptoms as well as daytime somnolence (Table III). A positive association was also found between long-face characteristics and longer time to fall asleep</p>
<p><b>Angaben auffälliger positiver und/oder negativer Aspekte</b></p>	<p>Gut durchgeführte Querschnittsstudie. Klare Darstellung der Ergebnisse. Angaben von Konfidenzintervallen. Verblindete Auswertung. Reliable Datenerhebung. Angaben zu Interessenskonflikten. Keine Angaben zur Finanzierung und initial gescreenten Patienten.</p>
<p><b>Schlussfolgerung des Begutachters</b></p>	<p><u>methodische Qualität:</u> gut</p> <p><u>Klinische Aussagekraft:</u> Because of the recognized impact of pediatric snoring on children’s health, the determination of these good predictors can help in preventing and managing sleep-disordered breathing.</p>
<p><b>Evidenzlevel (SIGN)</b></p>	<p>3</p>
<p><b>Qualität</b></p>	<p>Acceptable ⊕</p>

# Evidenztabelle **Järvinen 1978**

## Incisal overjet and traumatic injuries to upper permanent incisors

A retrospective study

SEPPO JÄRVINEN

Department of Dentistry, University of Kuopio, Finland

The relationships between traumatic injuries to upper incisors and incisal overjet were studied in a sample of 1445 orthodontically untreated children aged 7 to 16 years. Traumatic injuries of the hard dental tissues and enariations of teeth were recorded. The frequency of injuries was 14.2 % in children with normal overjet (0–3 mm), 28.4 % in children with increased overjet (3.1–6 mm), and 38.6 % in children with extreme overjet (> 6 mm). The severity of injuries was also greater in children with extreme overjet than in children with overjet ranging from 0 to 6 mm. Furthermore, the range of injuries increased in relation to the overjet. Two or more injured incisors were found in 19.2% of the children with normal overjet, in 22.2% of the children with increased overjet, and in 46.7 % of those with extreme overjet. Partly published in Finnish in Proc. Finn. dent. Soc. 71: Suppl. V, 1977.

<b>Population</b>	<p>„Malokklusion/Dysgnathie“ allg.</p> <p>The subjects of the present study were thus 1445 children aged 7 to 16 years, 719 girls and 726 boys (Table 1).</p>
<i>Schweregrad</i>	The children were classified into four groups, based on the overjet measured with a millimeter-scaled gauge
<i>Einschluss-kriterien</i>	keine Angabe
<i>Ausschluss-kriterien</i>	keine Angabe
<b>Intervention</b> Versuchsgruppe	<p><b>keine Behandlung, aber Malokklusion/kraniofaziale Fehlbildung</b></p> <p><b>VERSUCHSGRUPPE: Negative overjet (&lt; 0 mm) group 1</b></p> <p>N=8 / Alter = MIN:7 MAX:16 Jahre / ♂:♀ = 5:3</p> <ul style="list-style-type: none"> <li>Gebissphase: frühes, spätes Wechesgebiss, permanentes Gebiss &lt;18</li> <li>KFO-Behandlung: keine</li> </ul>

<p><b>Intervention</b> Versuchsgruppe</p>	<p><b>keine Behandlung, aber Malokklusion/kraniofaziale Fehlbildung</b>  <b>VERSUCHSGRUPPE: Increased overjet (3.1-6 mm) group 3</b>                  N=278 / Alter = MIN:7 MAX:16 Jahre / ♂:♀ = 150:128</p> <ul style="list-style-type: none"> <li>Gebissphase: frühes, spätes Wechesgebiss, permanentes Gebiss &lt;18</li> <li>KFO-Behandlung: keine</li> </ul>
<p><b>Intervention</b> Versuchsgruppe</p>	<p><b>keine Behandlung, aber Malokklusion/kraniofaziale Fehlbildung</b>  <b>VERSUCHSGRUPPE: Extreme overjet (&gt; 6 mm) group 4</b>                  N=127 / Alter = MIN:7 MAX:16 Jahre / ♂:♀ = 65:62</p> <ul style="list-style-type: none"> <li>Gebissphase: frühes, spätes Wechesgebiss, permanentes Gebiss &lt;18</li> <li>KFO-Behandlung: keine</li> </ul>
<p><b>Kontrolle</b> Kontrollgruppe</p>	<p><b>keine Malokklusion/kraniofaziale Fehlbildung</b>  <b>KONTROLLGRUPPE: Normal overjet (0-3 mm) group 2</b>                  N=1032 / Alter = MIN:7 MAX:16 Jahre / ♂:♀ = 506:526</p> <ul style="list-style-type: none"> <li>Gebissphase: frühes, spätes Wechesgebiss, permanentes Gebiss &lt;18</li> <li>KFO-Behandlung: keine</li> </ul>
<p><b>Outcome</b></p>	<p><b>direkter oder schadenspräventiver medizinischer Nutzen bzw. Korrektur/Prävention der Anomalie/Malokklusion/Dysgnathie</b></p> <ul style="list-style-type: none"> <li><b>Traumaprophylaxe (dentales Frontzahntrauma)</b></li> </ul> <p>PRIMÄRZIELGRÖßE: <i>injured upper incisors</i></p>
<p><b>Studientyp</b></p>	<p><b>Querschnittsstudie</b></p>
<p><b>Schlussfolgerungen der Autoren</b></p>	<p>In cases with extreme ovejet, early orthodontic treatment might be considered in order to reduce the risk of traumatic injuries to upper incisors. The importance of early orthodontic treatment may be even greater than first appears, because of the problems in later orthodontic treatment caused by possible injuries to upper incisors (6, 12).</p>
<p><b>Zusammenfassung der Ergebnisse</b></p>	<p><b>Versuchsgruppen VS. Kontrollgruppe</b></p> <p><b>PRIMÄRZIELGRÖßE</b> <i>Of the children with normal ovejet, 80.3 % had crown infractions or enamel fractures only, 17.7 % had enameldentin fractures and 2.0% severe injuries. In children with increased ovejet, the corresponding percentages were 77.2%, 20.3% and 2.5 %; and in children with extreme ovejet, they were 57.1 %, 32.7 % and 10.2 %. The difference was statistically significant between the extreme ovejet group and the other ovejet groups (p &lt; 0.05). The number of injured teeth increased in relation to the overjet. Two or more injured incisors were found in 19.2 % of the children with normal ovejet, in 22.2% of the children with increased ovejet, and in 46.7% of those with extreme overjet. The difference between the extreme ovejet group and the other ovejet groups was statistically significant (p &lt; 0.01).</i></p>



<b>Angaben auffälliger positiver und/oder negativer Aspekte</b>	<i>Gut durchgeführte Querschnittstudie aus den 70er Jahren. Klare Fragestellung und Durchführung. Keine Angaben zu Approval der Ethikkommission. Keine Powerkalkulation. Keine Angaben von Konfidenzintervallen.</i>
<b>Schlussfolgerung des Begutachters</b>	<u>methodische Qualität:</u> gut
	<u>Klinische Aussagekraft:</u> the range of injuries increased in relation to the overjet.
<b>Evidenz-level (SIGN)</b>	<b>3</b>
<b>Qualität</b>	<b>Acceptable ⊕</b>

# Evidenztable Järvinen 1979

## Traumatic injuries to upper permanent incisors related to age and incisal overjet

### A retrospective study

SEPPO JÄRVINEN

Department of Dentistry, University of Kuopio, Finland

The relationship between traumatic injuries to upper permanent incisors and incisal overjet, with special reference to the age at which the trauma occurred, was studied in a sample of 1437 orthodontically untreated children aged 7–16 years. Traumatic injuries to hard dental tissues and exfoliations of teeth were recorded. Before 10 years of age, the increase of the prevalence rates was most rapid in the extreme (> 6 mm) overjet group in both sexes; the ratios between the extreme and normal (0–3 mm) overjet groups being 6.5/1 in girls and 3.0/1 in boys. According to the estimate, about 50 % of the girls and 70 % of the boys in this overjet group with injuries were affected before the age of 10 years.

<b>Population</b>	<p>„Malokklusion/Dysgnathie“ allg.</p> <p>The material used in this study was based on the epidemiological material of 1445 orthodontically untreated children chosen in connection with a previous study by the author (5).</p>
<b>Schweregrad</b>	<p>The children were classified into four groups, based on the overjet measured with a millimeter-scaled gauge</p>
<b>Einschlusskriterien</b>	<p>keine Angabe</p>
<b>Ausschlusskriterien</b>	<p>keine Angabe</p>
<b>Intervention</b> Versuchsgruppe	<p><b>keine Behandlung, aber Malokklusion/kraniofaziale Fehlbildung</b></p> <p><b>VERSUCHSGRUPPE: Increased overjet (3.1-6 mm) group 2</b></p> <p>N=278 / Alter = MIN:7 MAX:16 Jahre / ♂:♀ = 150:128</p> <ul style="list-style-type: none"> <li>Gebissphase: frühes, spätes Wechesgebiss, permanentes Gebiss &lt;18</li> <li>KFO-Behandlung: keine</li> </ul>

<p><b>Intervention</b> Versuchsgruppe</p>	<p><b>keine Behandlung, aber Malokklusion/kraniofaziale Fehlbildung</b></p> <p>VERSUCHSGRUPPE: <b>Extreme overjet (&gt; 6 mm) group 3</b></p> <p>N=127 / Alter = MIN:7 MAX:16 Jahre / ♂:♀ = 65:62</p> <ul style="list-style-type: none"> <li>• Gebissphase: frühes, spätes Wechesgebiss, permanentes Gebiss &lt;18</li> <li>• KFO-Behandlung: keine</li> </ul>
<p><b>Kontrolle</b> Kontrollgruppe</p>	<p><b>keine Malokklusion/kraniofaziale Fehlbildung</b></p> <p>KONTROLLGRUPPE: <b>Normal overjet (0-3 mm) group 1</b></p> <p>N=1032 / Alter = MIN:7 MAX:16 Jahre / ♂:♀ = 506:526</p> <ul style="list-style-type: none"> <li>• Gebissphase: frühes, spätes Wechesgebiss, permanentes Gebiss &lt;18</li> <li>• KFO-Behandlung: keine</li> </ul>
<p><b>Outcome</b></p>	<p><b>direkter oder schadenspräventiver medizinischer Nutzen bzw. Korrektur/Prävention der Anomalie/Malokklusion/Dysgnathie</b></p> <ul style="list-style-type: none"> <li>• <b>Traumaprophylaxe (dentales Frontzahntrauma)</b></li> </ul> <p>PRIMÄRZIELGRÖßE: <i>injured upper incisors related to age</i></p>
<p><b>Studientyp</b></p>	<p><b>Querschnittsstudie</b></p>
<p><b>Schlussfolgerungen der Autoren</b></p>	<p>In cases with extreme ovejet, early orthodontic treatment might be considered in order to reduce the risk of traumatic injuries to upper incisors. The importance of early orthodontic treatment may be even greater than first appears, because of the problems in later orthodontic treatment caused by possible injuries to upper incisors (6, 12).</p>
<p><b>Zusammenfassung der Ergebnisse</b></p>	<p><b>Versuchsgruppen VS. Kontrollgruppe</b></p> <p><b>PRIMÄRZIELGRÖßE</b> <i>The prevalence of traumatic injuries to upper permanent incisors increased at different rates in different overjet groups (Table 3). Within the age levels analyzed, the prevalence rates were seen to increase with age in the normal (0-3 mm) and increased (3.1-6 mm) overjet groups in girls and in the normal overjet group in boys, while a corresponding increase in girls with extreme (&gt; 6 mm) overjet and in boys with increased or extreme overjet was seen only within the age groups of 7-9 and 10-12 years. Before the age of 10, the increase of the prevalence rates was most rapid in the extreme overjet group in both sexes. The ratio between the increased and normal overjet groups was 4.7/1 in girls and 2.1/1 in boys and, between the extreme and normal overjet groups, 6.5/1 in girls and 5.0/1 in boys. The differences between the overjet groups were statistically highly significant (p &lt; 0.001). After the age of 10, the corresponding ratios were 2.6/1 and 2.8/1 in girls, and 1.5/1 and 2.1/1 in boys. The differences between the overjet groups were still statistically significant (p &lt; 0.001). The estimated accumulation of the prevalence of injuries was markedly high before the age of 10 in the extreme overjet group in both sexes, and especially in boys (Table 4). According to the estimate, about 50% of the girls and 73 % of the boys in this overjet group with injuries were affected before that age.</i></p>
<p><b>Angaben auffälliger positiver und/oder negativer Aspekte</b></p>	<p><i>Gut durchgeführte Querschnittstudie aus den 70er Jahren. Klare Fragestellung und Durchführung. Keine Angaben zu Approval der Ethikkommission. Keine Powerkalkulation. Keine Angaben von Konfidenzintervallen.</i></p>

<b>Schluss- folgerung des Begutachters</b>	<u>methodische Qualität:</u> gut
	<u>Klinische Aussagekraft:</u> the range of injuries increased in relation to the overjet.
<b>Evidenz- level (SIGN)</b>	<b>3</b>
<b>Qualität</b>	<b>Acceptable ⊕</b>

# Evidenztabelle **Johnson, Sandy 1999**

Review Article

## Tooth position and speech—is there a relationship?

Nicola C. L. Johnson, BDS, FDS RCS; Jonathan R. Sandy, PhD, FDS, MOrth RCS

**Abstract:** Although it is widely accepted that teeth play an important role in speech production, the relationship between tooth position and speech remains controversial. This review paper examines the relevant studies and discusses the difficulties of scientific investigation in this area. The ability of patients to adapt their speech to compensate for abnormal tooth position is recognized, but the mechanisms for this adaptation remain incompletely understood. The overall conclusion is that while certain dental irregularities show a relationship with speech disorders, this does not appear to correlate with the severity of the malocclusion. There is no definitive proof that alteration of tooth position can improve articulation disorders.

**Key Words:** Malocclusion, Speech

<b>Population</b> <i>Setting</i> <i>Komorbiditäten</i>	Malokklusion allgemein
<i>Schweregrad</i>	Keine Angaben
<i>Einschlusskriterien</i> <i>Bei Review: PICOS</i>	<ul style="list-style-type: none"> <li>• Population: - (humans)</li> <li>• Intervention: keine Intervention</li> <li>• Comparison: keine Kontrollgruppe</li> <li>• Outcome: malocclusion</li> </ul> <p>Study type: -</p>
<i>Ausschlusskriterien</i>	Keine Angaben
<b>Intervention</b> <i>Versuchsgruppe</i>	<p><b>Keine Intervention</b></p> <p>VERSUCHSGRUPPE: <b>malocclusion</b></p> <p>N=- (Anfang) / N=?? (Ende) / Alter = - Jahre / ♂:♀ =-</p> <ul style="list-style-type: none"> <li>• Gebissphase: -</li> <li>• KFO-Behandlung: -</li> </ul>

<p><b>Kontrolle</b> Kontrollgruppe</p>	<p><b>Keine Kontrollgruppe</b> KONTROLLGRUPPE: <b>normal occlusion</b> N=- (Anfang) / N=?? (Ende) / Alter = - Jahre / ♂:♀ = -</p> <ul style="list-style-type: none"> <li>• Gebissphase: -</li> <li>• KFO-Behandlung: keine Behandlung</li> </ul>
<p><b>Outcome</b></p>	<p><b>medizinischer Schaden, Nebenwirkungen bzw. Zunahme der Anomalie /Malokklusion/Dysgnathie</b></p> <ul style="list-style-type: none"> <li>• <b>Atmung und Luftraum (Airway space, Schlafapnoe), Schlucken und Sprechen</b></li> </ul> <p>PRIMÄRZIELGRÖßE: malocclusion</p>
<p><b>Studientyp</b></p>	<p><b>Systematisches Review</b> <i>Review:</i> Inkludierte Studien N=42</p>
<p><b>Schlussfolgerungen der Autoren</b></p>	<p>The ability of patients to adapt their speech to compensate for abnormal tooth position is recognized, but the mechanisms for this adaptation remain incompletely understood. The overall conclusion is that while certain dental irregularities show a relationship with speech disorders, this does not appear to correlate with the severity of the malocclusion. There is no definitive proof that alteration of tooth position can improve articulation disorders.</p>
<p><b>Zusammenfassung der Ergebnisse</b></p>	<p>Many of the traditionally associated links between occlusal traits and speech problems do not have a scientifically sound research basis. The research problem is fraught with difficulties. Speech is an activity unique to humans, and animal experimentation has almost no place in the study of speech production. The available studies fall into three categories:</p> <ol style="list-style-type: none"> <li>1. Subjects with speech problems examined for malocclusion</li> <li>2. Subjects with malocclusion examined for speech problems</li> <li>3. Unselected populations studied for coincidental malocclusion and speech difficulties.</li> </ol> <p>Only the last category offers the benefits of nonselection, but many of these studies have been carried out on undergraduate students, which may introduce bias. In addition, there are varying methodologies for specifying articulation defects / distortions / disorders and for identifying malocclusions. Reliability and validity of these measures are seldom reported. Comparisons between different populations and different linguistic areas also present difficulties. The importance of evaluating individual malocclusion traits is clear. The most consistently reported traits are Class III arch relationships, anterior openbite, increased overjet, and spacing. However, there is no clear evidence of a direct relationship between severity of malocclusion and severity of misarticulation. Some sounds seem more sensitive to alterations of the oral structures than others. This may relate to the order of difficulty of individual sound production, since the sounds acquired last are those most often reported as distorted. The ability to adapt and compensate appears to play a significant role. Bloomer“ summarized this well: Normal structure + normal function = normal speech, Abnormal structure + adaptive function = normal speech, Abnormal structure + no adaptive function = abnormal speech, Normal structure + abnormal function = abnormal speech. Thus, the recommendation is to consider speech carefully when examining and assessing a patient. Recognition of commonly misarticulated sounds should be possible during normal conversation, and any potential relationship to malocclusion made. There is no substantial evidence that orthodontic treatment will influence any articulation disorders, and in such cases cooperation with a speech therapist is essential.</p>

<p><b>Angaben auffälliger positiver und/oder negativer Aspekte</b></p> <p>Studiendesign</p> <p>Durchführung</p> <p>Auswertung</p> <p>Funding</p> <p><u>Interessenkonflikte</u></p> <p><u>Bias (SIGN, AMSTAR II, Einzelstudien)</u></p>	<p><i>Studiendesign: keine Registrierung a priori, keine Definition der PICOS, keine RoB-Analyse, keine Meta-Analyse</i></p> <p><i>Durchführung: keine Angaben zu Datenextraktion und Literatursichtung, keine Angaben zu den Charakteristika der Einzelstudien, nur narrative Analyse</i></p> <p><i>Auswertung: Studiendesign der Einzelstudien nicht bekannt, keine Angaben zu Alter/Geschlecht/Art der Malokklusion etc. der Teilnehmer</i></p> <p><i>Power der Studie/Patientenzahl: 42</i></p> <p><i>Funding: -</i></p> <p><i>Interessenkonflikte: -</i></p> <p><i>Bias (SIGN/AMSTAR/EinzelstudienRoB – alle negativen Punkte aus Fragebogen auflisten):</i></p> <p><b>2. Did the report of the review contain an explicit statement that the review methods were established prior to the conduct of the review and did the report justify any significant deviations from the protocol?</b></p> <p><b>3. Did the review authors explain their selection of the study designs for inclusion in the review?</b></p> <p><b>4. Did the review authors use a comprehensive literature search strategy?</b></p> <p><b>5. Did the review authors perform study selection in duplicate?</b></p> <p><b>6. Did the review authors perform data extraction in duplicate?</b></p> <p><b>7. Did the review authors provide a list of excluded studies and justify the exclusions?</b></p> <p><b>8. Did the review authors describe the included studies in adequate detail?</b></p> <p><b>9. Did the review authors use a satisfactory technique for assessing the risk of bias (RoB) in individual studies that were included in the review?</b></p> <p><b>10. Did the review authors report on the sources of funding for the studies included in the review?</b></p> <p><b>13. Did the review authors account for RoB in individual studies when interpreting/ discussing results of the review?</b></p> <p><b>14. Did the review authors provide a satisfactory explanation for, and discussion of, any heterogeneity observed in the results of the review?</b></p> <p><i>Publikationsbias (Reviews): -</i></p>
<p><b>Schlussfolgerung des Begutachters</b></p>	<p><u>methodische Qualität:</u> Review niedrig, Einzelstudien nicht beurteilbar</p> <hr/> <p><u>Klinische Aussagekraft:</u> akzeptabel</p>
<p><b>Evidenzlevel (SIGN)</b></p>	<p><b>3</b></p>
<p><b>Qualität (RoB, SIGN /AMSTAR II)</b></p>	<p><b>Moderat ++</b></p>

## Evidenztabelle **Jung 2010**

# Evaluation of the effects of malocclusion and orthodontic treatment on self-esteem in an adolescent population

**Min-Ho Jung**  
Seoul, Korea

**Introduction:** The purpose of this study was to evaluate the effects of malocclusion and orthodontic treatment on adolescent self-esteem. **Methods:** A total of 459 middle school students were clinically evaluated for dental crowding. Lip protrusion was also measured with a specially designed ruler. Rosenberg's self-esteem scale was used to determine each subject's level of self-esteem. **Results:** The results showed that sex played a role in the relationship between self-esteem and malocclusion. For the girls, crowding of the anterior teeth had significant effects on their self-esteem; however, there was no significant difference in the boys' self-esteem. After fixed orthodontic treatment, the girls had higher self-esteem than the untreated malocclusion group. Girls with an ideal profile and good tooth alignment also showed higher self-esteem than students with crowding or protrusion. **Conclusions:** This clinical study proved that malocclusion and fixed orthodontic treatment can affect self-esteem in adolescent girls. (Am J Orthod Dentofacial Orthop 2010;138:160-6)

<b>Population</b>	<p>„Malokklusion/Dysgnathie“ allg.</p> <p>The sample consisted of adolescents aged 12 to 15 years from the first to third grades of 5 middle schools in Seoul, Korea.</p>
<b>Schweregrad</b>	keine Angabe
<b>Einschlusskriterien</b>	(1) buccal segment (canines and premolars) eruption was completed; (2) there were no craniofacial anomalies, including cleft lip or palate; (3) all first molars were in place with no proximal caries or restorations; (4) there were no congenital missing teeth or impacted teeth mesial to the first molar; (5) and the questionnaire had been fully completed.
<b>Ausschlusskriterien</b>	keine Angabe
<p><b>Intervention</b></p> <p>Versuchsgruppe</p>	<p><b>kieferorthopädische Behandlung</b></p> <p><i>Finished fixed orthodontic treatment (after debonding of fixed appliances)</i></p> <p>VERSUCHSGRUPPE: <b>DB</b></p> <p>N=459 (Anfang) / N=459 (Ende) / Alter = ?? ± ?? Jahre / ♂:♀ = 143:316</p> <ul style="list-style-type: none"> <li>Gebissphase: spätes Wechselgebiss, permanentes Gebiss &lt; 18. Lebensjahr</li> <li>KFO-Behandlung: reguläre Behandlung</li> </ul>



<b>Intervention</b> Versuchsgruppe	<p><b>kieferorthopädische Behandlung</b></p> <p><i>During fixed orthodontic treatment</i></p> <p>VERSUCHSGRUPPE: <b>FO</b></p> <p>N=677 (Anfang) / N=677 (Ende) / Alter = ?? ± ?? Jahre / ♂:♀ = 211:466</p> <ul style="list-style-type: none"> <li>• Gebissphase: spätes Wechselgebiss, permanentes Gebiss &lt; 18. Lebensjahr</li> <li>• KFO-Behandlung: reguläre Behandlung</li> </ul>
<b>Intervention</b> Versuchsgruppe	<p><b>kieferorthopädische Behandlung</b></p> <p><i>During or finished removable appliance (including headgear) orthodontic treatment</i></p> <p>VERSUCHSGRUPPE: <b>RO</b></p> <p>N=251 (Anfang) / N=251 (Ende) / Alter = ?? ± ?? Jahre / ♂:♀ = 85:166</p> <ul style="list-style-type: none"> <li>• Gebissphase: spätes Wechselgebiss, permanentes Gebiss &lt; 18. Lebensjahr</li> <li>• KFO-Behandlung: reguläre Behandlung</li> </ul>
<b>Kontrolle</b> Kontrollgruppe	<p><b>keine kieferorthopädische Therapie</b></p> <p><i>No orthodontic treatment</i></p> <p>KONTROLLGRUPPE: <b>NO</b></p> <p>N=3122 (Anfang) / N=3122 (Ende) / Alter = ?? ± ?? Jahre / ♂:♀ = 1126:1996</p> <ul style="list-style-type: none"> <li>• Gebissphase: spätes Wechselgebiss, permanentes Gebiss &lt; 18. Lebensjahr</li> <li>• KFO-Behandlung: keine</li> </ul>
<b>Outcome</b>	<p><b>direkter oder schadenspräventiver medizinischer Nutzen bzw. Korrektur/Prävention der Anomalie/Malokklusion/Dysgnathie</b></p> <ul style="list-style-type: none"> <li>• <b>mundgesundheitsbezogene Lebensqualität (MLQ), psychische Entwicklung</b></li> </ul> <p>PRIMÄRZIELGRÖßE: <i>self-esteem index (SI) scores</i></p>
<b>Studientyp</b>	<b>Querschnittsstudie</b>
<b>Schlussfolgerungen der Autoren</b>	<p>In this psychological assessment of a large adolescent population, we found that anterior crowding causes low self-esteem in adolescent girls. FO or RO treatment could not improve self-esteem during treatment; however, after fixed treatment, significantly higher self-esteem was observed in the girls. Subjects who finished FO treatment showed similar levels of self-esteem as did those with normal occlusion and good profile. For the boys, there was no significant difference in self-esteem between the groups.</p>
<b>Zusammenfassung der Ergebnisse</b>	<p><b>GRUPPE DB, FO, RO VS. GRUPPE NO</b></p> <p><b>PRIMÄRZIELGRÖßE</b> <i>For the boys, their orthodontic treatment history made no difference in self-esteem levels; however, for the girls, self-esteem increased after FO treatment (Table IV).</i></p>

<b>Angaben auffälliger positiver und/oder negativer Aspekte</b>	<i>Querschnittstudie zur psychischen Entwicklung von Schulkindern. Keine Angaben zur Finanzierung, keine Altersangaben, keine Powerkalkulation, aber sehr große Kohorte. Keine verblindete Auswertung.</i>
<b>Schlussfolgerung des Begutachters</b>	<u>methodische Qualität:</u> gut  <u>Klinische Aussagekraft:</u> This clinical study proved that malocclusion and fixed orthodontic treatment can affect self-esteem in adolescent girls.
<b>Evidenz-level (SIGN)</b>	<b>3</b>
<b>Qualität</b>	<b>Acceptable ⊕</b>

# Evidenztabelle **Kania, Keeling et al. 1996**

## Risk factors associated with incisor injury in elementary school children

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Susan P. McGonny, PhD; Timothy T. Wheeler, DMD, PhD;  
Gregory J. King, DMD, DMSc

### Abstract

This study examined risk factors associated with incisor injury in 3395 third and fourth grade school children in Alachua County, Florida. One of six orthodontists completed a standardized examination form for each child to assess severity of incisor injury, gender, age, race, skeletal relationships, morphologic malocclusion, incisor exposure, interdial gap, TMJ sounds, chin trauma, and history of lower facial trauma. One in five (19.2%) exhibited some degree of incisor injury. This was limited to a single tooth in 73.1% of those with injury, while enamel injury predominated (89.4%). The majority of the injuries (75.4%) were localized in the maxillary arch, with central incisors the most frequently traumatized. Chi-square tests of association indicated that gender, race, school, orthodontist, history of lower facial trauma, chin trauma, profile, and maxillary and mandibular horizontal positions were associated with incisor injury ( $P < 0.05$ ). Wilcoxon rank sum tests identified differences in age, overjet, time of screening, and interdial gap between those with and without injury ( $P < 0.05$ ). Results of logistic regression analyses indicated risk of incisor injury was greater for children who had a prognathic maxilla, a history of trauma, were older, were male, and had greater overjet and mandibular anterior spacing.

<b>Population</b>	„Malokklusion/Dysgnathie“ allg. third and fourth grade school children in Alachua County, Florida
<i>Schweregrad</i>	keine Angabe
<i>Einschluss-kriterien</i>	Students who had health permission screening forms on file with the school system and were at school on the day of the screening.
<i>Ausschluss-kriterien</i>	keine Angabe
<b>Intervention</b> Versuchsgruppe	<b>keine Behandlung</b> N=3391 (Anfang) / N=3391 (Ende) / Alter = 9 ± ?? Jahre / ♂:♀ = 1773:1618 <ul style="list-style-type: none"> <li>• Gebissphase: frühes Wechselgebiss</li> <li>• KFO-Behandlung: keine</li> </ul>

<b>Outcome</b>	<p><b>medizinischer Schaden, Nebenwirkungen bzw. Zunahme der Anomalie /Malokklusion/Dysgnathie Subkategorie Outcome 1</b></p> <ul style="list-style-type: none"> <li>• <b>Traumaprophylaxe (dentales Frontzahntrauma)</b></li> </ul> <p>PRIMÄRZIELGRÖßE: <i>relationship between discrete variables and incisor injury (Sex, Race, history of lower face trauma, chin trauma, profile, maxilla, mandible, TMJ sounds)</i></p> <p>SEKUNDÄRZIELGRÖßE: <i>relationship between age, gender and incisor injury</i></p>
<b>Studientyp</b>	<b>Querschnittsstudie</b>
<b>Schlussfolgerungen der Autoren</b>	<ol style="list-style-type: none"> <li>1. One in five (19,2%) third and fourth grade scholl children in Alachua County, Florida had clinically detecable incisor injury. Incisor injury in these children primarily involved the enamel only (89%), was localized in the maxilla (75%), involved the maxillary centrals (67%), and affected a single tooth (73%).</li> <li>2. Age, gender, race ,school, time of screening, orthodontist, history of facial trauma, chin trauma, profile, overjet, interlabial gap, and maxillary and mandibular horizontal positions were associated with incisor injury....</li> <li>3. The risk of any incisor injury was greater for children who had a prognathic maxilla, a history of trauma, were older, were male, and had greater overjet and mandibular anterior spacing. ...</li> </ol>
<b>Zusammenfassung der Ergebnisse</b>	<p><b>PRIMÄRZIELGRÖßE</b> <i>Univariate results for discrete variables are presented in Table 2. A significantly higher percentage of incisor injury was found in males, non-Caucasions, students reporting a history of trauma, and in those with chin trauma, Class II profile, Prognathic maxilla and prognathic mandible. There were no differences between the injury and no injury groupy in frequency of TMJ sounds.</i></p> <p><b>SEKUNDÄRZIELGRÖßE</b> <i>The relationship between age, sex, and incisor injury is illustrated in Fiugre 1. Notice that both boys and girls had low amounts of injury in the youngest age group. Care must be taken in interpreting these results from regression analysis, particularly when interaction variables are considered. Students with a prognathic maxilla had a higher incidence of incisor injury (Figure 2).</i></p>
<b>Angaben auffälliger positiver und/oder negativer Aspekte</b>	<i>Querschnittstudie zum Thema Zahntrauma. Keine Verblindung, keine Powerkalkulation, aber recht große Kohohrte. Keine Angaben zu Interessenskonflikten.</i>
<b>Schlussfolgerung des Begutachters</b>	<p><u>methodische Qualität:</u> gut</p> <p><u>Klinische Aussagekraft:</u> Results indicated risk of incisor injury was greater for children who had a prognathic maxilla, a history of trauma, were older, were male and had greater overjet and mandibular anterior spacing.</p>
<b>Evidenz-level (SIGN)</b>	<b>3</b>
<b>Qualität</b>	<b>Acceptable ⊕</b>

# Evidenztabelle **Khosravanifard et al. 2012**

## Association between orthodontic treatment need and masticatory performance

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 Vahid Rakhshan, DDS<sup>4</sup>

**Aim:** This retrospective cohort study assessed the differences between the masticatory performance of individuals with and without orthodontic treatment need. **Methods:** Masticatory performances of 120 participants with equal numbers of males and females (n = 60 each) with and without treatment need (n = 60 each, determined using the index of the complexity, outcome, and need [ICON]) matched by age and sex were assessed. Participants chewed on test foods at sequences of 20, 30, 40, 40, 30, and 20 masticatory cycles. After sieving the chewed particles, the masticatory parameters (median particle size [MPS], masticatory frequency [MF], and broadness of particle distribution [BPD]) were calculated. The associations between treatment need and the MPS with age, weight, and stature, as well as the relationship between sex and MPS and MF, were assessed. **Results:** According to the independent samples t test, MPS of subjects with and without treatment need differed significantly ( $P < .05$ ) while MF did not. The differences between BPD values reached the level of significance only after 40 cycles of mastication ( $P < .05$ ). Females showed significantly greater MPS values. Only at the 40-cycle sequence did females in need of treatment chew significantly slower. According to the repeated-measures ANOVA, no significant differences existed ( $P > .05$ ) between each of the MPS, MF, and BPD values measured at different sequences. No significant correlations were found between MPS and age, sex, or stature ( $P > .05$  [Spearman correlation coefficient]). **Conclusion:** The masticatory performance of individuals with and without treatment need differed for MPS and BPD (at the 40-cycle sequence). Age, weight, and stature did not affect the treatment need and MPS. Females showed poorer results regarding MPS—only at the 40-cycle sequence did females with malocclusion chew significantly slower. *Orthodontics (Chic)* 2012;13:e20–e28.

<b>Population</b>	„Malokklusion/Dysgnathie“ allg participants with equal numbers of males and females (n = 60 each) with and without treatment need (n = 60 each), Iran
<b>Schweregrad</b>	ICON scores > 46.

<b>Einschlusskriterien</b>	Inclusion criteria were the subjects' willingness to participate, a full dentition, an absence of any pain in orofacial areas, an absence of any signs or symptoms of temporomandibular disorders or dysfunctions (TMD), no history of orthodontic treatment, no acute/urgent dental problems, and no more than two dental restorations.
<b>Ausschlusskriterien</b>	Keine Angabe
<b>Intervention</b> Versuchsgruppe	<b>Keine Behandlung, aber Malokklusion/kraniofaziale Fehlbildung</b> VERSUCHSGRUPPE: <b>ICON scores &gt; 43</b> N=60 / Alter = 26 Jahre / ♂:♀ = 30:30 <ul style="list-style-type: none"> <li>• Gebissphase: permanentes Gebiss ≥ 18. Lebensjahr</li> <li>• KFO-Behandlung: keine</li> </ul>
<b>Kontrolle</b> Kontrollgruppe	<b>Keine Malokklusion/kraniofaziale Fehlbildung</b> KONTROLLGRUPPE: <b>ICON scores &lt; 43</b> N=60 / Alter = 26, Jahre / ♂:♀ = 30:30 <ul style="list-style-type: none"> <li>• Gebissphase: permanentes Gebiss ≥ 18. Lebensjahr</li> <li>• KFO-Behandlung: keine</li> </ul>
<b>Outcome</b>	<b>direkter oder schadenspräventiver medizinischer Nutzen bzw. Korrektur/Prävention der Anomalie/Malokklusion/Dysgnathie</b> <ul style="list-style-type: none"> <li>• <b>Okklusion, Kaufunktion, Funktion</b></li> </ul> PRIMÄRZIELGRÖßE: <i>Masticatory performance (median particle size (MPS), broadness of particle distribution (BPD))</i>
<b>Studientyp</b>	<b>Querschnittsstudie</b>
<b>Schlussfolgerungen der Autoren</b>	Within the limitations of this study, the masticatory performance of individuals with and without treatment need differed significantly from certain aspects (the MPS and the BPD, the latter only at the 40-mastication sequence). The MF did not differ significantly between the two groups. The age, weight, and stature did not affect the treatment need and the masticatory performance. Females showed greater particle sizes (poorer results); however, only at the 40-cycle sequence did the females in the definite treatment need group tend to chew significantly slower than their male counterparts.
<b>Zusammenfassung der Ergebnisse</b>	<b>GRUPPE ICON scores &lt; 43 VS. GRUPPE ICON scores &gt; 43</b> <i>PRIMÄRZIELGRÖßE According to the independent samples t test, there was not a significant difference between the MF of individuals in need of orthodontic treatment and those without treatment needs at all 20-, 30-, and 40-cycle sequences (P &gt; .05). The MPS was significantly different between the two groups (P &lt; .05) (Table 3). The BPD was significantly different between the two groups at only the 40-cycle sequence. The t test showed a significant difference between the MPS of males and females regardless of their ICON scores (Table 4 and Fig 1). The MF of the control males and females was similar. However, the difference between the males and females in the definite treatment group was more clear. The male-female difference at 40-cycle sequence was significant (Table 4 and Fig 2).</i>

<p><b>Zusammenfassung der Ergebnisse</b></p>	<p><i>According to the repeated-measures ANOVA, the MPS of individuals without treatment need were not significant through different sequences (males, <math>P = .552</math>; females, <math>P = .278</math>). Such a similarity was observed between the MPS of individuals in need of treatment at different chewing sequences (males, <math>P = .752</math>; females, <math>P = .495</math>). Also, there were no significant differences between the MF values and between the BPD values at different chewing sequences, neither for the males nor for the females with or without treatment needs (all <math>P</math> values for the MF <math>&gt; 0.9</math>, all <math>P</math> values for the BPD <math>&gt; 0.5</math>). Using the Spearman correlation coefficient, no statistically significant correlations were observed between the MPS with age, weight, and stature (all rho statistics <math>&lt; 0.25</math>, all <math>P</math> values <math>&gt; .08</math>).</i></p>
<p><b>Angaben auffälliger positiver und/oder negativer Aspekte</b></p>	<p><i>Sehr gut durchgeführte retrospektive Kohortenstudie. Angabe von Konfidenzintervallen. Keine Angaben zu Interessenskonflikten, Finanzierung, initial gescreenten Patienten, möglichen Confoundern. Keine Powerkalkulation angegeben.</i></p>
<p><b>Schlussfolgerung des Begutachters</b></p>	<p><u>methodische Qualität:</u> sehr gut</p> <p><u>Klinische Aussagekraft:</u> The masticatory performance of individuals with and without treatment need differed for MPS and BPD (at the 40-cycle sequence). Age, weight, and stature did not affect the treatment need and MPS. Females showed poorer results regarding MPS—only at the 40-cycle sequence did females with malocclusion chew significantly slower</p>
<p><b>Evidenzlevel (SIGN)</b></p>	<p><b>3</b></p>
<p><b>Qualität</b></p>	<p><b>Acceptable ⊕</b></p>

## Evidenztabelle **Kim, Hong et al. 2010**

### Three-dimensional analysis of pharyngeal airway in preadolescent children with different anteroposterior skeletal patterns

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**Introduction:** In growing patients with skeletal discrepancies, early diagnosis, evidence-based explanations of etiology, and assessment of functional factors can be vital for the restoration of normal craniofacial growth and the stability of the treatment results. The aims of our study were to compare the 3-dimensional pharyngeal airway volumes in healthy children with a retrognathic mandible and those with normal craniofacial growth, and to investigate possible significant relationships and correlations among the studied cephalometric variables and the airway morphology in these children. **Methods:** Three-dimensional airway volume and cross-sectional areas of 27 healthy children (12 boys, 15 girls; mean age, 11 years) were measured by using cone-beam computed tomography volume scans, and 2-dimensional lateral cephalograms were created and analyzed. The subjects were divided into 2 groups based on their ANB angles (group I:  $2^\circ \leq \text{ANB} \leq 5^\circ$ ; group II:  $\text{ANB} > 5^\circ$ ), and cephalometric variables, airway volumes, and cross-sectional measurements were compared. **Results:** There were statistically significant differences in the following parameters: height of the posterior nasal plane ( $P < 0.05$ ), pogonion to nasion perpendicular distance ( $P < 0.01$ ), ANB angle ( $P < 0.01$ ), mandibular body length ( $P < 0.01$ ), facial convexity ( $P < 0.01$ ), and total airway volume ( $P < 0.05$ ). No statistically significant differences between the 2 groups were found in the cross-sectional area and the volumetric measurements of the various sections of the airway except for total airway volume, which had larger values in group I ( $P < 0.05$ ). **Conclusions:** The mean total airway volume, extending from the anterior nasal cavity and the nasopharynx to the epiglottis, in retrognathic patients was significantly smaller than that of patients with a normal anteroposterior skeletal relationship. On the other hand, differences in volume measurements of the 4 subregions of the airway were not statistically significant between the 2 groups. (Am J Orthod Dentofacial Orthop. 2010;137:356.e1-366.e11)

<b>Population</b>	<p>„Malokklusion/Dysgnathie“ allg.</p> <p>Pharyngeal airway structures were studied in 27 healthy children (12 boys, 15 girls) with a mean age of 11.19 <math>\pm</math> 1.28 years (Table I) who were referred to the Department of Orthodontics of Kangdong Sacred Heart Hospital, Hallym University Medical Center, Seoul, Korea, for treatment.</p>
<b>Schweregrad</b>	ANB $> 5^\circ$
<b>Einschlusskriterien</b>	keine Angabe
<b>Ausschlusskriterien</b>	Those who had symptoms of upper respiratory infection, pharyngeal pathology such as adenoid hypertrophy and tonsillitis or a history of adenoidectomy or tonsillectomy were excluded.
<b>Intervention</b> Versuchsgruppe	<p><b>keine Behandlung, aber Malokklusion/kraniofaziale Fehlbildung</b></p> <p><b>VERSUCHSGRUPPE: ANB <math>&gt; 5^\circ</math> (group 2)</b></p> <p>N=13 / Alter = MIN:9,08; MAX:12,33 Jahre / ♂:♀ = 5:8</p> <ul style="list-style-type: none"> <li>• Gebissphase: spätes Wechselgebiss</li> <li>• KFO-Behandlung: keine Behandlung</li> </ul>



<p><b>Kontrolle</b> Kontrollgruppe</p>	<p><b>keine Malokklusion/kraniofaziale Fehlbildung</b> KONTROLLGRUPPE: <math>2^\circ &lt; ANB &lt; 5^\circ</math> (group 1) N=13 / Alter = MIN:10,50; MAX:12,92 Jahre / ♂:♀ = 7:7</p> <ul style="list-style-type: none"> <li>• Gebissphase: spätes Wechselgebiss</li> <li>• KFO-Behandlung: keine Behandlung</li> </ul>
<p><b>Outcome</b></p>	<p><b>direkter oder schadenspräventiver medizinischer Nutzen bzw. Korrektur/Prävention der Anomalie/Malokklusion/Dysgnathie</b></p> <ul style="list-style-type: none"> <li>• <b>Atmung und Luftraum (Airway space, Schlafapnoe), Schlucken und Sprechen</b></li> </ul> <p>PRIMÄRZIELGRÖßE: <i>cephalometric, cross-sectional, and volumetric variables (Ana plane, Pna plane, Uph plane, Mph plane, Lph plane, Cehalometric analysis, airway volume)</i></p>
<p><b>Studientyp</b></p>	<p><b>Querschnittsstudie</b></p>
<p><b>Schlussfolgerungen der Autoren</b></p>	<ol style="list-style-type: none"> <li>1. Accurate volumetric determination of 3D pharyngeal airway is possible in preadolescents by using CBCT scans.</li> <li>2. There is no sexual dimorphism in the 2D lateral cephalometric analysis or the 3D airway measurements of preadolescents.</li> <li>3. The mean total airway volume, extending from the anterior nasal cavity and the nasopharynx to the epiglottis, of retrognathic patients was significantly smaller than that of patients with a normal anteroposterior skeletal relationship. On the other hand, differences in volume measurements of the 4 subregions of the airway were not found to be significantly different between the 2 groups.</li> <li>4. In preadolescents, volumetric measurements of the airway are significantly correlated to anteroposterior and vertical cephalometric variables, mainly anterior facial height and ANB angle.</li> </ol>
<p><b>Zusammenfassung der Ergebnisse</b></p>	<p><b>GRUPPE group 1 VS. GRUPPE group2</b></p> <p><i>PRIMÄRZIELGRÖßE Means and standard deviations for cephalometric, cross-sectional, and volumetric variables were compared by sex; since no sex differences were found in any measurement, the subjects were combined for subsequent analysis. Table IV gives the comparison results of groups I and II. There were statistically significant differences in the following parameters: height of the posterior nasal plane (<math>P &lt; 0.05</math>), pogonion to nasion perpendicular distance (<math>P &lt; 0.01</math>), ANB (<math>P &lt; 0.01</math>), mandibular body length (<math>P &lt; 0.01</math>), facial convexity (<math>P &lt; 0.01</math>), and total airway volume (<math>P &lt; 0.05</math>). According to the lateral cephalometric analysis, group II had retruded mandibles and a greater skeletal anteroposterior discrepancy, as evidenced by the pogonion to nasionperpendicular distance, ANB, and facial convexity values. No statistically significant difference between the 2 groups was found in the cross-sectional area and volumetric measurements of the different parts of the airway. However, total airway volume, which is the sum of the 4 separate volumes of the airway, was significantly greater in group I (<math>P &lt; 0.05</math>). The linear measurements of the cross sections indicated that the height of the posterior nasal plane was the only significant mean found, with greater values in group I (<math>P &lt; 0.05</math>). Tables V and VI show the correlations among the studied variables. Table V shows the correlations of sections of the airway with each other, and Table VI shows correlations between the 2D cephalometric variables and the 3D volumetric measurements of the airway. The nasal airway volume and the superior pharyngeal airway volume had a positive correlation (<math>P &lt; 0.01</math>).</i></p>

<b>Zusammenfassung der Ergebnisse</b>	<i>Some analyses from the lateral cephalograms tended to be correlated with airway volume. The anterior facial heights showed positive correlations to all volumetric measurements except the middle pharyngeal airway volume. Posterior facial height showed significant correlations with total airway volume and inferior pharyngeal airway volume (P &lt;0.05). Additionally, total airway volume was significantly correlated with ANB angle and mandibular body length (P&lt;0.05).</i>
<b>Angaben auffälliger positiver und/oder negativer Aspekte</b>	<i>Keine Angaben zum Funding. Keine Interessenskonflikte der Autoren vorhanden. Sehr kleine Fallzahl. Keine Powerkalkulation, keine Angabe von Konfidenzintervallen, keine Verblindung. Keine Angabe zu initial gescreenten Patienten.</i>
<b>Schlussfolgerung des Begutachters</b>	<u>methodische Qualität:</u> gut  <u>Klinische Aussagekraft:</u> The mean total airway volume, extending from the anterior nasal cavity and the nasopharynx to the epiglottis, in retrognathic patients was significantly smaller than that of patients with a normal anteroposterior skeletal relationship
<b>Evidenzlevel (SIGN)</b>	<b>3</b>
<b>Qualität</b>	<b>Acceptable ⊕</b>

*J Prosthet Dent*  
64:257-260, 1993

## *Masticatory Function in Patients With Mandibular Prognathism Before and After Orthognathic Surgery*

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Masticatory function was analyzed in 54 patients with mandibular prognathism before or after orthognathic treatment and in 40 adults with normal occlusion. Masticatory efficiency was evaluated spectrophotometrically by measuring the amount of adenosine triphosphate eluted from masticated adenosine triphosphate granules. Occlusal contact was evaluated by calculating the number and area of occlusal contacts from the illuminated images of a silicone record of the occlusion that was stored in the image analysis system with the aid of a charge-coupled device camera. The mean masticatory efficiency of the preoperative group was approximately half that of the control group. The value for the postoperative group was slightly higher than that for the preoperative group, but there was no statistical difference between the two groups. Likewise, the number and area of occlusal contacts in the preoperative group were also approximately half or less as compared with those of the control group, and they did not show significant changes postoperatively. Statistically, there were correlations between the masticatory efficiency and the number and area of occlusal contacts. The results indicate that although the occlusal relationship of the upper and lower teeth were greatly improved by orthognathic treatment, the postoperative occlusion is not light enough and may need further adjustment at the end of the treatment.

<b>Population</b>	<b>Klasse-III-Anomalie</b>
<i>Setting</i>	- Patients with (postoperative group) previous Class III malocclusion who had undergone surgical orthodontic treatment or with (preoperative group) untreated mandibular prognathism
<i>Komorbiditäten</i>	• Niigate, Japan
<i>Schweregrad</i>	keine Angaben
<i>Einschlusskriterien</i>	Preoperative group: - Untreated mandibular prognathism Postoperative group: - Previous mandibular prognathism - Orthognathic surgery (BSSO, Le Fort I; at least 1 year ago) Control group: - Class I occlusion

Ausschlusskriterien	- Not fulfilling inclusion criteria
Intervention Versuchsgruppe	<p><b>Kieferorthopädische- kieferchirurgische Kombinationsbehandlung</b></p> <p><b>Preoperative:</b> Untreated mandibular prognathism.  <b>Postoperative:</b> Orthognathic surgery (Bilateral sagittal split osteotomy [BSSO] or Le Fort I osteotomy and bilateral sagittal split osteotomy [BSSO] for maxillary advancement and mandibular setback, respectively)</p> <p><b>VERSUCHSGRUPPE 1 Preoperative</b>  N= 27 (Anfang) / N=27 (Ende) / Alter = 23 (16- 49) years ♂:♀ = 8:19</p> <ul style="list-style-type: none"> <li>• Gebissphase: permanentes Gebiss ≥ 18. Lebensjahr</li> <li>• KFO-Behandlung: reguläre Behandlung</li> </ul> <p><b>VERSUCHSGRUPPE 2 Postoperative</b>  N= 27 (Anfang) / N= 27 (Ende) / Alter = 22 (18- 32) years ♂:♀ = 13:14</p> <ul style="list-style-type: none"> <li>• Gebissphase: permanentes Gebiss ≥ 18. Lebensjahr</li> <li>• KFO-Behandlung: reguläre Behandlung</li> </ul> <p><b>KEIN LONGITUDINALER VERGLEICH. PATIENTEN DER PRÄ-bzw. POSTOPERATIVEN GRUPPE SIND NICHT IDENTISCH.</b></p>
Kontrolle Kontrollgruppe	<p><b>keine kieferorthopädische Therapie</b></p> <p><b>Control (Class I):</b> The control group was formed by 40 patients with normal occlusion.</p> <p><b>KONTROLLGRUPPE 1: Control (Class I)</b>  N=40 (Anfang) / N=40 (Ende) / Alter = = 24 (19- 30) years ♂:♀ = 24:16</p> <ul style="list-style-type: none"> <li>• Gebissphase: permanentes Gebiss ≥ 18. Lebensjahr</li> <li>• KFO-Behandlung: reguläre Behandlung</li> </ul>
Outcome	<p><b>direkter oder schadenspräventiver medizinischer Nutzen bzw. Korrektur/Prävention der Anomalie/Malokklusion/Dysgnathie</b></p> <ul style="list-style-type: none"> <li>• Okklusion, Kaufunktion, Funktion</li> </ul> <p><b>PRIMÄRZIELGRÖßE: Masticatory efficiency</b></p> <p><b>SEKUNDÄRZIELGRÖßE: Number of occlusal contacts, Area of occlusal contacts</b></p>

<b>Studientyp</b>	<b>Beobachtungsstudie (Kohortenstudie oder Fall-Kontroll-Studie)</b>
<b>Schlussfolgerungen der Autoren</b>	<p>The mean masticatory efficiency of <b>the preoperative group was approximately half that of the control group.</b></p> <p>The value for the <b>postoperative group was slightly higher than that for the preoperative group, but there was no statistical difference between the two groups.</b></p> <p>Likewise, the number and <b>area of occlusal contacts in the preoperative group were also approximately half or less as compared with those of the control group,</b> and they did not show significant changes postoperatively.</p> <p>Statistically, there were <b>correlations between the masticatory efficiency and the number and area of occlusal contacts.</b></p> <p>The results indicate that although the occlusal relationship of the upper and lower teeth were greatly improved by orthognathic treatment, <b>the postoperative occlusion is not tight enough and may need further adjustment at the end of the treatment.</b></p>

**Zusammenfassung der Ergebnisse**

**GRUPPE Preoperative VS. GRUPPE Control (Class I)**  
**GRUPPE Postoperative VS. GRUPPE Control (Class I)**

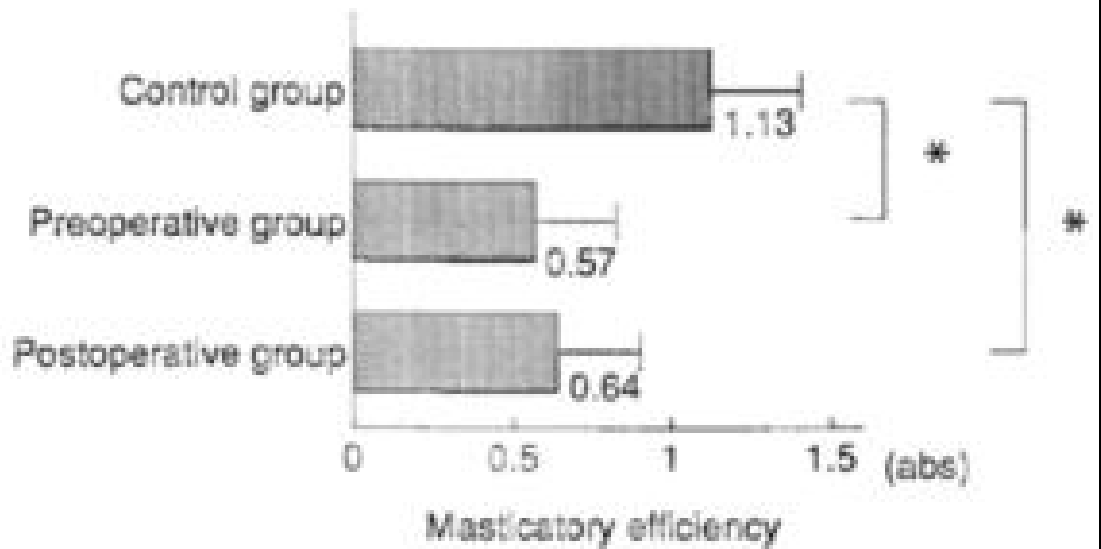
Preoperative group: presurgical

Postoperative group : min 1 year postsurgical

KEIN LONGITUDINALER VERGLEICH. GRUPPEN UNETRSCHEIDLICH ZUSAMMENGESETZT

**Masticatory efficiency**

ATP release Assay. Masticatory efficiency was measured using adenosine triphosphate (ATP) enteric-coated granules.

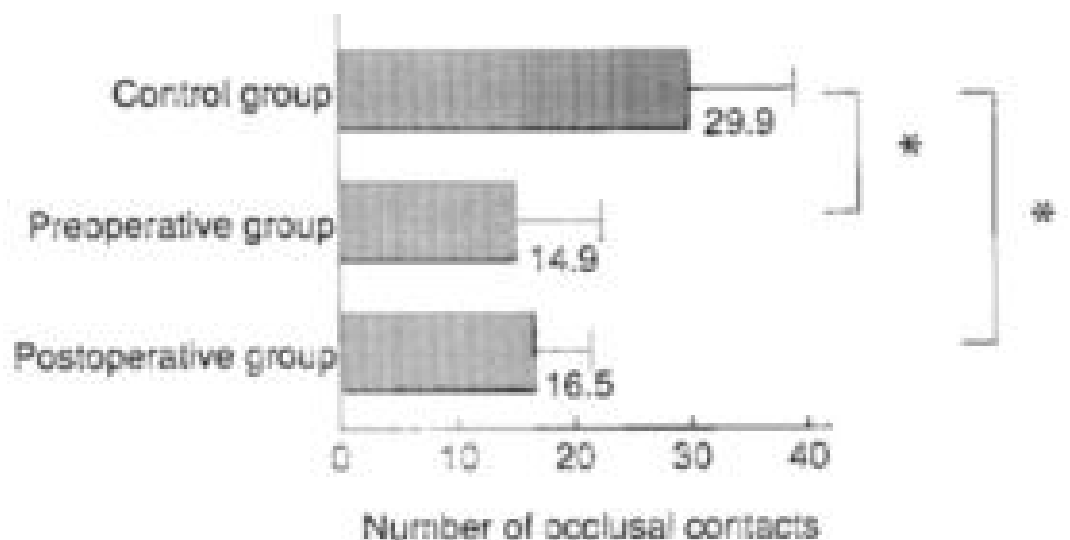


**FIGURE 4.** Masticatory efficiency in the three groups. Results shown represent mean ± SD. \* =  $P < .001$ .

**Occlusion: Number of occlusal contacts, Area of occlusal contacts**

The number and area of occlusal contacts were evaluated by a black silicone method's using an image analysis system.

**Number of occlusal contacts**



**FIGURE 5.** Number of occlusal contacts in the three groups. Results represent mean ± SD. \* =  $P < .001$ .

<p><b>Zusammenfassung der Ergebnisse</b></p>	<p><b>Area of occlusal contacts</b></p> <table border="1"> <caption>Data for Figure 6: Areas of occlusal contact</caption> <thead> <tr> <th>Group</th> <th>Mean Area (mm²)</th> </tr> </thead> <tbody> <tr> <td>Control group</td> <td>31.8</td> </tr> <tr> <td>Preoperative group</td> <td>12.4</td> </tr> <tr> <td>Postoperative group</td> <td>10.2</td> </tr> </tbody> </table> <p><b>FIGURE 6.</b> Areas of occlusal contact in the three groups. Results represent mean ± SD. * = <math>P &lt; .001</math>.</p>	Group	Mean Area (mm²)	Control group	31.8	Preoperative group	12.4	Postoperative group	10.2
Group	Mean Area (mm²)								
Control group	31.8								
Preoperative group	12.4								
Postoperative group	10.2								
<p><b>Angaben auffälliger positiver und/oder negativer Aspekte</b></p> <p>Studiendesign</p> <p>Durchführung</p> <p>Auswertung</p> <p><u>Funding</u></p> <p><u>Interessenkonflikte</u></p> <p><u>Bias (SIGN)</u></p>	<p>Die Äquivalenz von Versuch- und Kontrollgruppe ist nicht gegeben. Tatsächlich unterscheiden sich bereits die beiden Versuchsgruppen (Präoperativ, Postoperativ). Es wurden keine longitudinalen Untersuchungen mit derselben Versuchsgruppe durchgeführt. Eine gesunde Kontrollgruppe könnte eine Referenz für die gemessenen Mastikationsparameter darstellen. Dies lässt Schlüsse bezüglich der verfügbaren Mastikationsfunktion bei Klasse III Patienten zu. Das Studiendesign erlaubt jedoch keine schlüssigen Aussage hinsichtlich des Behandlungserfolgs einer orthognathen OP im Bezug auf die Mastikationsfunktion.</p> <p>Die klinische Relevanz ist dadurch stark eingeschränkt.</p> <p><i>Funding:</i> keine Angabe</p> <p><i>Interessenkonflikte:</i> keine Angabe</p> <p><i>Bias (SIGN):</i> Die Äquivalenz von Versuch- und Kontrollgruppe ist nicht gegeben. Power/ Sample Size Berechnungen wurden nicht durchgeführt. Eine Verblindung fand nicht statt.</p>								
<p><b>Schlussfolgerung des Begutachters</b></p>	<p><u>methodische Qualität:</u> akzeptabel (mit deutlicher Tendenz zur Abwertung)</p> <p><u>Klinische Aussagekraft:</u> Das Studiendesign erlaubt jedoch keine schlüssigen Aussage hinsichtlich des Behandlungserfolgs einer orthognathen OP im Bezug auf die Mastikationsfunktion.</p> <p>Die klinische Relevanz ist dadurch stark eingeschränkt.</p>								
<p><b>Evidenz-level (SIGN)</b></p>	<p>2+</p>								
<p><b>Qualität (RoB, SIGN)</b></p>	<p>acceptable (+)</p>								

# Evidenztabelle Kobayashi, Honma et al. 2001

## Changes in masticatory function after orthognathic treatment in patients with mandibular prognathism

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**SUMMARY.** Changes in masticatory function were measured in 27 patients in whom mandibular prognathism was corrected surgically. The mean value of masticatory efficiency before treatment was 46% of that of control subjects with normal occlusion. It improved, but remained at 60% of the control value postoperatively. Similar changes were seen in the number and area of occlusal contacts and the integrated muscle activities of the masseter and temporalis on the chewing side, but the postoperative improvement in masticatory efficiency was mainly the result of improvement in masseter activity. The mean values of masticatory cycle variables in the patient group did not differ significantly from those of the controls. Their preoperative mean coefficients of variation, which were significantly higher than those of the controls, decreased significantly postoperatively. These results suggest that the stability of masticatory rhythm was improved by orthognathic surgery. © 2001 The British Association of Oral and Maxillofacial Surgeons

<b>Population</b>	<b>Klasse-III-Anomalie (inkl. LKG)</b> The patients studied were seven men and 20 women in whom mandibular prognathism with or without open bite and asymmetry was corrected surgically.
<b>Schweregrad</b>	keine Angabe
<b>Einschlusskriterien</b>	keine Angabe
<b>Ausschlusskriterien</b>	No cases of cleft palate or craniofacial syndrome were included
<b>Intervention</b> Versuchsgruppe	<b>kieferorthopädisch-kieferchirurgische Kombinationsbehandlung</b> <i>For correction of jaw deformities, bilateral sagittal split osteotomies were used in 19 patients, and bilateral body osteotomies in two. Combinations of Le Fort I osteotomy and bilateral sagittal split osteotomies were used in four patients. Combinations of unilateral sagittal split osteotomy and vertical ramus osteotomy or body osteotomy were used in the other two patients.</i> <b>VERSUCHSGRUPPE: patients</b> N=27 Alter = 21 MIN:16, MAX:39 Jahre / ♂:♀ = 7:20 <ul style="list-style-type: none"> <li>Gebissphase: permanentes Gebiss &lt; 18. Lebensjahr, permanentes Gebiss ≥ 18. Lebensjahr</li> <li>KFO-Behandlung: reguläre Behandlung Spätbehandlung (Erwachsenenbehandlung)</li> </ul>



<p><b>Kontrolle</b> Kontrollgruppe</p>	<p><b>keine kieferorthopädische Therapie</b> <i>normal occlusion</i></p> <p>KONTROLLGRUPPE: <b>control</b></p> <p>N=40 Alter = 24 MIN:19, MAX:30 Jahre / ♂:♀ = 24:16</p> <ul style="list-style-type: none"> <li>• Gebissphase: permanentes Gebiss ≥ 18. Lebensjahr</li> <li>• KFO-Behandlung: keine Behandlung</li> </ul>
<p><b>Outcome</b></p>	<p><b>direkter oder schadenspräventiver medizinischer Nutzen bzw. Korrektur/Prävention der Anomalie/Malokklusion/Dysgnathie</b></p> <ul style="list-style-type: none"> <li>• <b>Okklusion, Kaufunktion, Funktion</b></li> </ul> <p>PRIMÄRZIELGRÖßE: <i>Masticatory rhythm</i></p> <p>SEKUNDÄRZIELGRÖßE: <i>Masticatory efficiency</i></p> <p>TERTIÄRZIELGRÖßE: <i>number and area of occlusal contacts</i></p>
<p><b>Studientyp</b></p>	<p><b>Beobachtungsstudie (Kohortenstudie oder Fall-Kontroll-Studie)</b></p>
<p><b>Schlussfolgerungen der Autoren</b></p>	<p>In conclusion, all aspects of masticatory function in the patients with mandibular prognathism were improved by orthognathic treatment, but with the exception of the masticatory rhythm, the final values were worse than those of the control group with normal occlusion. For more improvement in masticatory function, further adjustment of occlusal contacts and muscle exercise may be needed after operation.</p>
<p><b>Zusammenfassung der Ergebnisse</b></p>	<p><b>GRUPPE patient VS. GRUPPE control</b></p> <p><b>PRIMÄRZIELGRÖßE</b> <i>The mean duration of muscle contraction of the masseter on the chewing side before treatment was 0.25 seconds (range 0.16–0.44) and the value increased after preoperative orthodontic treatment and decreased after operation, but the final value did not differ significantly from the 0.27 seconds (range 0.22 to 0.38) of the control group (Table 2). The mean coefficient of variation before treatment was 15.0% (range 7.4–28.4%), which was significantly higher than the 10.5% (range 7.5–14.0%) of the control group. The value increased after preoperative orthodontic treatment and decreased gradually after operation. The final value was 11.9% (range 2.5–24.7%), which was not significantly different from that of the control group. The mean latency and the mean CV of the masseter before treatment were 0.37 seconds (range 0.26–0.58) and 15.2% (range 4.7–24.9%), respectively, which increased after preoperative orthodontic treatment and decreased after operation, but the final values were 0.36 seconds (range 0.26–0.50) and 10.5% (range 0.6–21.9%) and did not differ significantly from the 0.34 seconds (range 0.20–0.52) and the 12.4% (range 6.1–15.9%) of the control group (Table 3). The mean cycle time of the masseter before treatment was 0.62 seconds, (range 0.46–0.80), and the value increased after preoperative orthodontic treatment and decreased gradually after operation, but the final value was 0.59 seconds, (range 0.44–0.80), which was not significantly different from that before treatment and the 0.61 seconds (range 0.48–0.86) of the control group (Table 4). On the other hand, the mean CV before treatment was 10.6% (range 4.5–19.7%), which was significantly higher than the 7.0% (range 4.6–9.5%) of the control group. The values decreased after operation and the final value was 7.5% (range 2.0–13.4%), which did not differ significantly from the control group. The integrated muscle activities of the masseter and temporalis increased after operation, but the final values were significantly lower than those of the control group (Table 5).</i></p>

<b>Zusammenfassung der Ergebnisse</b>	<p><i>The CV of the integrated masseter and temporalis muscle activities, however, showed a tendency to decrease after operation and the final values did not differ significantly from those of the control group. These were positive correlations between masticatory efficiency and the number and area of occlusal contacts and the integrated muscle activity of the temporalis in the control group (Table 6). Masticatory efficiency in the patients was strongly correlated with the number and area of occlusal contacts before treatment and after preoperative orthodontic treatment and six months after operation, and with the area of the occlusal contacts and integrated muscle activity of the masseter one and two years after operation</i></p> <p><b>SEKUNDÄRZIELGRÖßE</b> <i>The mean value of masticatory efficiency before treatment was 0.52 absorbance, with a range of 0.08 to 1.01 (Table 1). The value decreased after preoperative orthodontic treatment and increased gradually after operation. The final mean value was 0.68 absorbance, range 0.22–1.25, which was significantly higher than before treatment, but significantly lower than the 1.13 (range 0.73–1.89) of the control group.</i></p> <p><b>TERTIÄRZIELGRÖßE</b> <i>The mean number of occlusal contacts before treatment was 17, with a range of 2–37 contacts, and the value decreased after preoperative orthodontic treatment and increased gradually after operation, but the final value was 20, range 8–38, which did not differ significantly from before treatment and was significantly lower than the 30 contacts (range 8–48) of the control group (Table 1). Similar changes were observed in the area of occlusal contacts. The mean areas of occlusal contacts before treatment and two years after operation were 11.1mm<sup>2</sup> (range 2.1– 42.1mm<sup>2</sup>) and 12.4mm<sup>2</sup> (range 3.4– 30.2mm<sup>2</sup>) respectively, which were less than half of the 31.8mm<sup>2</sup> (range 8.3–78mm<sup>2</sup>) of the control group (Table 1).</i></p>
<b>Angaben auffälliger positiver und/oder negativer Aspekte</b>	<p><i>Keine Angaben zum Funding, Interessenskonflikten, zur Verblindung. Keine Powerkalkulation durchgeführt. Reliable Datenerhebung.</i></p>
<b>Schlussfolgerung des Begutachters</b>	<p><u>methodische Qualität:</u> gut</p> <hr/> <p><u>Klinische Aussagekraft:</u> These results suggest that the stability of masticatory rhythm was improved by orthognathic surgery.</p>
<b>Evidenzlevel (SIGN)</b>	2+
<b>Qualität</b>	<b>Acceptable ⊕</b>

# Evidenztabelle Koike, Sujino et al. 2013

## Gastric emptying rate in subjects with malocclusion examined by [<sup>13</sup>C] breath test

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**SUMMARY** Masticatory function is significantly lower in individuals with malocclusion than in those with normal occlusion. Although several studies suggest that masticatory function influences gastrointestinal digestive function, the relationship between malocclusion and gastrointestinal symptoms has not been studied extensively. We hypothesised that insufficient masticatory function would increase the functional burden of the stomach and have some influence on the gastrointestinal system. The purpose of this study was to investigate masticatory function and gastric emptying rate in subjects with malocclusion. Eleven healthy dentate female volunteers and eleven female patients with malocclusion underwent a <sup>13</sup>C-acetate breath test with a liquid meal. Maximum <sup>13</sup>CO<sub>2</sub> exhalation time (T<sub>max</sub>) was compared statistically between both groups. Masticatory function was assessed by colour-changeable chewing gum. In addition, the frequency scale for the symptoms of gastroesophageal reflux disease (PSSG) and questionnaires on food intake were given to both groups. The mean T<sub>max</sub> of the malocclusion group was significantly longer than that of the normal occlusion group (P = 0.007). Masticatory performance, measured by colour-changeable gum and questionnaires, was significantly lower in the malocclusion group than in the normal occlusion group (P = 0.023, P = 0.003). There was no significant difference in the PSSG results between the two groups (P = 0.262). This study suggested that there was a correlation between malocclusion and gastric emptying function in women.

**KEYWORDS** malocclusion, masticatory function, gastric emptying, digestion, colour-changeable chewing gum, questionnaires

Accepted for publication 24 April 2013

<b>Population</b>	„Malokklusion/Dysgnathie“ allg. Eleven Japanese female adult patients with malocclusion who visited the Orthodontic Science department at Tokyo Medical and Dental University Hospital Faculty of Dentistry in 2011 seeking orthodontic treatment were randomly selected. The patients were diagnosed as having various types of malocclusion requiring orthodontic treatment. According to Angle’s classification, they were Class I, Class II and Class III. Eleven female control subjects with normal occlusion were recruited from the students and staff of Tokyo Medical and Dental University.
<b>Schweregrad</b>	keine Angabe
<b>Einschlusskriterien</b>	We chose only women as subjects in our study because Hellmig et al. (29) found a significant difference in gastric emptying between men and women.
<b>Ausschlusskriterien</b>	keine Angabe

<p><b>Intervention</b> Versuchsgruppe</p>	<p><b>keine Behandlung, aber Malokklusion/kraniofaziale Fehlbildung</b></p> <p>VERSUCHSGRUPPE: <b>malocclusion</b></p> <p>N=11 / Alter = 25,5 ± 4,8 Jahre / ♂:♀ = 0:11</p> <ul style="list-style-type: none"> <li>• Gebissphase: permanentes Gebiss ≥ 18. Lebensjahr</li> <li>• KFO-Behandlung: keine</li> </ul>
<p><b>Kontrolle</b> Kontrollgruppe</p>	<p><b>keine Malokklusion/kraniofaziale Fehlbildung</b></p> <p>KONTROLLGRUPPE: <b>Bezeichnung</b></p> <p>N=11 / Alter = 26,5 ± 1,0 Jahre / ♂:♀ = 0:11</p> <ul style="list-style-type: none"> <li>• Gebissphase: permanentes Gebiss ≥ 18. Lebensjahr</li> <li>• KFO-Behandlung: keine</li> </ul>
<p><b>Outcome</b></p>	<p><b>direkter oder schadenspräventiver medizinischer Nutzen bzw. Korrektur/Prävention der Anomalie/Malokklusion/Dysgnathie</b></p> <ul style="list-style-type: none"> <li>• <b>Okklusion, Kaufunktion, Funktion</b></li> </ul> <p>PRIMÄRZIELGRÖßE: <i>Evaluation of gastric emptying rate</i></p> <p>SEKUNDÄRZIELGRÖßE: <i>Evaluation of masticatory function</i></p>
<p><b>Studientyp</b></p>	<p><b>Querschnittsstudie</b></p>
<p><b>Schlussfolgerungen der Autoren</b></p>	<p>This study demonstrated that malocclusion affects digestion and delays gastric emptying. Our study is the first step in clarifying the ambiguous relationship between malocclusion and digestion. Although further studies are needed to confirm the details of our findings, our study sheds light on possible correlations between malocclusions of different types and severity, masticatory muscle activity, chewing performance and gastrointestinal symptoms before and after orthodontic treatment.</p>
<p><b>Zusammenfassung der Ergebnisse</b></p>	<p><b>GRUPPE malocclusion VS. GRUPPE control</b></p> <p><b>PRIMÄRZIELGRÖßE</b> Figure 4 shows the <sup>13</sup>C breath excretion curve of the malocclusion group and the control group. The control group showed more <sup>13</sup>CO<sub>2</sub> excretion than the malocclusion group, and there was a significant difference (P = 0.044) between the two groups at 40 min. Figure 5 shows that the T<sub>max</sub> values of the malocclusion group (mean ± s.d.: 51.8 ± 8.3 min, median: 50, range: 40–75 min) were significantly longer (P = 0.007) than those of the normal occlusion group (mean ± s.d.: 42.7 ± 4.4 min, median: 40, range: 40–50 min).</p> <p><b>SEKUNDÄRZIELGRÖßE</b> The a* value of the malocclusion group (mean ± s.d.: 13.3 ± 6.8 points, median: 16.0, range: 6.40–21.2 points) was significantly lower (P = 0.023) than that of the normal occlusion group (mean ± s.d.: 21.0 ± 4.3 points, median: 19.4, range: 14.3–28.7 points) (Fig. 1). Moreover, the malocclusion group had a significantly higher (P = 0.003) score of chewing difficulty (mean ± s.d.: 0.153 ± 0.14 points, median: 0.118, range: 0.000– 0.529 points) than the normal occlusion group (mean ± s.d.: 0.024 ± 0.03 points, median: 0.019, range: 0.000–0.078 points) (Fig. 2). Although the malocclusion group had a higher FSSG score (mean ±s.d.: 10.4 ± 6.6 points, median: 9, range: 1–21 points) than the normal occlusion group (mean ±s.d.: 6.3 ±2.9 points, median: 6, range: 1–10 points), no significant difference (P = 0.262) was found (Fig. 3).</p>

<b>Angaben auffälliger positiver und/oder negativer Aspekte</b>	<i>Angaben zum Funding. Keine Angaben zur Interessenskonflikten, Konfidenzintervallen, Verblindung. Keine Powerkalkulation. Aber sehr geringe Fallzahl. Reliable und valide Datenerhebung.</i>
<b>Schlussfolgerung des Begutachters</b>	<u>methodische Qualität:</u> gut  <u>Klinische Aussagekraft:</u> This study suggested that there was a correlation between malocclusion and gastric emptying function in women
<b>Evidenz-level (SIGN)</b>	<b>3</b>
<b>Qualität</b>	<b>Acceptable ⊕</b>

# Evidenztabelle **Kragt, Dharmo et al. 2016**

Clin Oral Invest (2016) 20:1881–1894  
 DOI 10.1007/s00784-015-1481-3



ORIGINAL ARTICLE

## The impact of malocclusions on oral health-related quality of life in children—a systematic review and meta-analysis

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Received: 29 September 2015 / Accepted: 23 November 2015 / Published online: 4 December 2015  
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Received: 29 September 2015 / Accepted: 23 November 2015 / Published online: 4 December 2015  
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### Abstract

**Introduction** A limited amount of systematic literature reviews on the association between malocclusions and oral health-related quality of life (OHRQOL) summarizes inconclusive results. Therefore, we conduct a systematic review and meta-analysis on the association of malocclusions with OHRQOL in children.

**Methods** Relevant studies were identified in PubMed, Embase, Cochrane, Google Scholar and other databases. All studies with data on malocclusions or orthodontic treatment need and OHRQOL in children were included. Methodological quality of the studies was assessed with the Newcastle-Ottawa Scale (NOS). Random effects models were used to estimate summary effect measures for the association between malocclusion and OHRQOL in a continuous and a categorical

data analysis. Tests for heterogeneity, publication bias and sensitivity of results were performed.

**Results** In total, 40 cross-sectional studies were included in the meta-analysis. Summary measures of the continuous data show that OHRQOL was significantly lowered in children with malocclusions (standardized mean difference (95 % CI) = 0.29 (0.19–0.38)). The summary odds ratio for having an impact on OHRQOL was 1.74 times higher in children with malocclusion than in children without malocclusions. Heterogeneity among studies was partly explained by malocclusion assessment, age of the children and country of study conduct.

**Conclusion** Our results provide evidence for a clear inverse association of malocclusion with OHRQOL. We also showed that the strength of the association differed depending on the age of the children and their cultural environment.

**Clinical relevance** Dentists benefit from understanding the patient differences regarding the impact of malocclusions.

**Keywords** Meta-analysis · Quality of life · Malocclusions · Children

**Electronic supplementary material** The online version of this article (doi:10.1007/s00784-015-1481-3) contains supplementary material, which is available to authorized users.

<b>Population</b>	„Malokklusion/Dysgnathie“ allg.
<i>Setting</i>	• children
<i>Komorbiditäten</i>	
<b>Schweregrad</b>	Nicht angegeben

<p><b>Einschlusskriterien</b></p> <p>Bei Review: PICOS</p>	<ul style="list-style-type: none"> <li>• population: children</li> <li>• intervention: keine Intervention (zur Auswertung: orthodontic treatment need or malocclusion)</li> <li>• comparison: keine Kontrollgruppe (zur Auswertung: no or less malocclusion resp. orthodontic treatment need)</li> <li>• outcome: PRIMÄRZIELGRÖßE: OHRQOL (questionnaire validated for the use in children)</li> <li>• study type: human Studies</li> </ul>
<p><b>Ausschlusskriterien</b></p>	<ol style="list-style-type: none"> <li>1. Letters to the editors, conference proceedings, unpublished studies, case reports and series as well as reviews</li> <li>2. participants requiring orthognathic surgery</li> <li>3. syndromic patients</li> <li>4. studies using general (health related) quality of life measures</li> <li>5. Studies that only measured the impact of orthodontic treatment or had a before-after design without appropriate information on control groups before treatment started.</li> <li>6. studies with children that already had orthodontic treatment</li> <li>7. studies that did not use a healthy comparison group (no or less malocclusion resp. orthodontic treatment need)</li> <li>8. studies with subjects having a mean age of 18 years or older</li> </ol>
<p><b>Intervention</b></p> <p>Versuchsgruppe</p>	<p><b>Keine Intervention</b></p> <p>VERSUCHSGRUPPE: <b>orthodontic treatment need or malocclusion</b></p> <p>N=?? (Anfang) / N=?? (Ende) / Alter = 2,53-17,2 Jahre / ♂:♀ = ?:?</p> <ul style="list-style-type: none"> <li>• Gebissphase: Milchgebiss, frühes bis spätes Wechselgebiss, permanentes Gebiss &lt; 18. Lebensjahr</li> <li>• KFO-Behandlung: (Frühbehandlung, reguläre Behandlung)</li> </ul>
<p><b>Kontrolle</b></p> <p>Kontrollgruppe</p>	<p><b>Keine Kontrollgruppe</b></p> <p>KONTROLLGRUPPE: <b>no/ less malocclusion resp. orthodontic treatment need</b></p> <p>N=?? (Anfang) / N=?? (Ende) / Alter = 2,53-17,2 Jahre / ♂:♀ = ?:?</p> <ul style="list-style-type: none"> <li>• Gebissphase: Milchgebiss, frühes bis spätes Wechselgebiss, permanentes Gebiss &lt; 18. Lebensjahr</li> <li>• KFO-Behandlung: (keine Behandlung)</li> </ul>
<p><b>Outcome</b></p>	<p><b>direkter oder schadenspräventiver medizinischer Nutzen bzw. Korrektur/Prävention der Anomalie/Malokklusion/Dysgnathie, medizinischer Schaden, Nebenwirkungen bzw. Zunahme der Anomalie /Malokklusion/Dysgnathie</b></p> <ul style="list-style-type: none"> <li>• <b>mundgesundheitsbezogene Lebensqualität (MLQ), psychische Entwicklung</b></li> </ul> <p>PRIMÄRZIELGRÖßE: OHRQOL (questionnaire validated for the use in children)</p>

<p><b>Studientyp</b></p>	<p><b>Systematisches Review, Meta-Analyse</b></p> <p><i>Review:</i> Inkludierte Studien in Bezug auf PICO: cross-sectional studie N = 57 für gesmates Review, N = 40 für Meta-Analyse</p> <p><i>Review:</i> Gesamt-Teilnehmerzahl in Bezug auf PICO: N = 28496 für Meta-Analyse, N = 6229 für narrative Analyse, N total = 34.725</p>
<p><b>Schlussfolgerungen der Autoren</b></p>	<p>The association of malocclusion and OHRQOL has mainly been assessed in cross-sectional studies. From these studies, it can be concluded that children perceive a <b>small impact of malocclusions on OHRQOL. The effect of malocclusions on OHRQOL is modified by the age of the children and their cultural</b> environment. Further research should investigate whether remaining heterogeneity in the association of malocclusions with OHRQOL can be explained by other individual factors of the children.</p>
<p><b>Zusammenfassung der Ergebnisse</b></p>	<p><b>orthodontic treatment need or malocclusion VERSUS no/ less malocclusion resp. orthodontic treatment need</b></p> <p><i>Subgruppenanalysen: method of malocclusion assessment, age of participants, country of study conduction, sample recruitment</i></p> <p><b>OHRQOL (questionnaire validated for the use in children):</b> The summary results show a small but <b>significant SMD in OHRQOL scores between children with malocclusions (n= 7772) and without malocclusion (n=6549) (SMD=0.29, 95 % CI=0.19–0.39)</b>. We observed high heterogeneity (I<sup>2</sup>= 85 %) among the studies that were combined for the summary measure on malocclusions and OHRQOL scores, which only partly could be explained by the different OHRQOL measures. Although there were significant differences in summary estimates among the different OHRQOL measures (X<sup>2</sup>=23.07, p&lt;0.001), all indicated a small significant SMD difference in OHRQOL between children with and without malocclusions. Only when OHRQOL was measured with the ECOHIS there was no difference in OHRQOL between children with and without malocclusions (SMD=0.00, 95 % CI=–0.15–0.16).</p> <p>The summary result shows that <b>children with malocclusion (n=9293) are 1.74 times more likely to have an impact on OHRQOL than children without malocclusions (n=10,717) (SOR=1.74, 95 % CI=1.46–2.08)</b>. Again, we observed high heterogeneity (I<sup>2</sup>=81 %) among the studies that were combined for the summary measure on the impacts of malocclusions and OHRQOL, which only partly, but more than in the continuous meta-analysis, could be explained by the different OHRQOL measures. The difference in SOR between the different OHRQOL measures was significant (X<sup>2</sup>=33.00, p&lt;0.001), and again, when OHRQOL was measured with the ECOHIS, no association was found between malocclusions and OHRQOL.</p>



Subgroup analyses

Subgroup analysis based on the **method of malocclusion assessment reduced only slightly the heterogeneity** in summary estimates, but we found significant differences in summary estimates between the subgroups (continuously,  $X^2=12.92$ ,  $df=3$ ,  $p=0.005$ ; dichotomous,  $X^2=18.07$ ,  $df=4$ ,  $p=0.001$ ). In the continuous analysis, the association between malocclusion and OHRQOL scores was lost, when malocclusions assessment was based on hypodontia or simply the presence/absence of any malocclusion trait. In contrast, the dichotomous analysis shows that children with malocclusion based on hypodontia are most likely to have any impact on OHRQOL compared to children with malocclusions based on other assessments.

Subgroup analysis based on the **age of the participants** reduced heterogeneity to a bigger extent, and we found significant differences in summary estimates between the subgroups (continuously,  $X^2=25.98$ ,  $df=3$ ,  $p<0.001$ ; dichotomous,  $X^2=27.58$ ,  $df=3$ ,  $p<0.001$ ).

In the continuous as well as in the dichotomous analysis, we could **not see a significant association of malocclusions and OHRQOL in children of age <8 years**. Children between 11 and 14 years old were the most likely to have an impact of malocclusions on OHRQOL ( $SOR=2.28$ ,  $95\%CI=1.61-3.24$ ), whereas the biggest difference in OHRQOL scores was seen in children older than 14 years old ( $SMD=0.59$ ,  $95\%CI=0.40-0.78$ ).

After stratification based on the **country of study conduction**, we did **not found significant differences** between subgroups in the **continuous meta-analysis, but we did between the subgroups in the dichotomous analysis** (continuously,  $X^2=11.50$ ,  $df=6$ ,  $p=0.07$ ; dichotomous,  $X^2=13.57$ ,  $df=4$ ,  $p=0.009$ ). In general, children with malocclusion were significantly more likely to have lower OHRQOL than children without malocclusions among all countries, **except for the studies conducted in Nigeria/Tanzania, where the association based on the continuous analysis goes in the other direction** ( $SMD=-0.06$ ,  $95\%CI=-0.30-0.17$ ).

Stratification based **on sample recruitment neither reduced** heterogeneity nor showed differences between the subgroups.

Narrative analysis:

All studies that investigated the association between malocclusions measured **with the DAI and OHRQOL measured by the CPQ found significant lower OHRQOL in children with malocclusions** [2, 3, 9, 10]. However, these association were mostly weak and one study showed that this association between malocclusion based on DAI scores and CPQ scores was lost in children with low self-esteem [2]. All studies that investigated the association between **malocclusions measured with the IOTN-DHC and OHRQOL measured by the CPQ found no relationship** between OHRQOL and orthodontic treatment need (IOTN-DHC >3 ) [7, 8, 14, 15]. Only one study investigated additionally the correlation between IOTN scores and CPQ scores, which was significant but weak [7]. One study investigated the relationship of malocclusions measured with the ICON and showed only non-significant higher OHRQOL scores (CPQ) in the severe and moderate group compared to the acceptable group [11]. Johal et al found highly statistical

	<p>significant differences between groups with either an increased overjet or spaced dentition compared to a control group [12]. Finally, one study investigated the relationship between tooth agenesis with OHRQOL measured by the CPQ. Tooth agenesis was associated with lower OHRQOL, however there was no correlation with the number of missing teeth [13]. Two studies that were not included in the meta-analysis used the <b>ECOHIS to assess OHRQOL</b> in children up to 5 years old [1, 16]. Both studies investigated the relationship between the presence of malocclusion and ECOHIS scores as well as kind of malocclusion with ECOHIS scores, but <b>no significant association</b> between any malocclusion trait and children's OHRQOL was found [16, 23].</p> <p>One study used the <b>COHIP to assess OHRQOL</b> in children. Ahn et al. related the IOTN-DHC scores with OHRQOL measured by the COHIP and found <b>significant but little worse OHRQOL in children with orthodontic treatment need (IOTN-DHC &gt; 3) [4]. Castro et al used the OIDP</b> to assess OHRQOL in children and found an <b>significant association</b> between inadequate position of the teeth with lower OHRQOL (OIDP &gt; 0) [6]. In total, 4 articles of the studies that were not included in the meta-analyses investigated the relationship between the IOTN-AC and OHRQOL in children [5, 7, 15, 17]. Of these, three article did not find a relationship between IOTN-AC scores and OHRQOL measured with the CPQ [15] or the OIDP [5, 17]. One article found a significant but weak association between the IOTN-AC and OHRQOL measured with the CPQ [7]. In contrast, the studies that were included into the meta-analyses and assessed the IOTN-AC found significant relations between the IOTN-AC scores and OHRQOL [19, 22], except Kragt et al. who did only find a borderline significant relation [20].</p>
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<p><b>Angaben auffälliger positiver und/oder negativer Aspekte</b></p> <p>Studiendesign Durchführung Auswertung Funding</p> <p><u>Interessenkonflikte</u></p> <p><u>Bias (SIGN, AMSTAR II, Einzelstudien)</u></p>	<p><i>Studiendesign: PROSPERO-Registrierung a priori, kein Studientyp in PICOS definiert, keine Intervention/Kontrollgruppe nach LL-Parametern, Meta-Analyse, keine Messmethodik zur MLQ-Erfassung vorgeschrieben, verschiedene Indizes zur Beurteilung des KFO-Behandlungsbedarfes zugelassen, Kontrollgruppe ohne Malokklusion, methodische Qualität der Einzelstudien nach validierter Methodik ausgewertet (NOS)</i></p> <p><i>Durchführung: Meta-Analyse wenn möglich – sonst narrative Analyse, Literatursichtung durch zwei unabhängige Rater, keine Angaben zur Geschlechterverteilung, laut Einschlusskriterien sind Kontrollgruppen nötig – keine Aufteilung der Teilnehmer in Versuchs- und Kontrollgruppe, gute Meta-Analyse unter Berücksichtigung diverser Subgruppen, update der Literatursuche, Sensitivitätsanalyse</i></p> <p><i>Auswertung: große Datenmenge, verschiedene Fragebögen/MLQ-Messmethodiken, große Altersspanne (2,53-17,2) der Teilnehmer, gute Diskussion unter Beachtung von Heterogenität und Subgruppen</i></p> <p><i>Power der Studie/Patientenzahl: 57/34.725 Meta-Analyse 40/28.496</i></p> <p><i>Funding: -</i></p> <p><i>Interessenkonflikte: The authors declare that they have no competing interests.</i></p> <p><i>Bias (SIGN/AMSTAR/EinzelstudienRoB – alle negativen Punkte aus Fragebogen auflisten):</i></p> <p><b>3. Did the review authors explain their selection of the study designs for inclusion in the review?</b></p> <p><b>6. Did the review authors perform data extraction in duplicate?</b></p> <p><b>7. Did the review authors provide a list of excluded studies and justify the exclusions?</b></p> <p><b>9. Did the review authors use a satisfactory technique for assessing the risk of bias (RoB) in individual studies that were included in the review?</b></p> <p><b>10. Did the review authors report on the sources of funding for the studies included in the</b></p> <p><i>Publikationsbias (Reviews): Small study bias, respectively publication bias, was inspected in funnel plots</i></p>
<p><b>Schlussfolgerung des Begutachters</b></p>	<p><u>methodische Qualität:</u> Review gut, Einzelstudien moderat</p> <p><u>Klinische Aussagekraft:</u> Kinder und vor allem Jugendliche scheinen durch das Vorliegen einer Malokklusion negativ in ihrer mundgesundheitsbezogenen Lebensqualität beeinträchtigt zu werden. Dabei kann nicht beurteilt werden, inwieweit die Form der Malokklusion sich auf die MLQ auswirkt.</p>
<p><b>Evidenzlevel (SIGN)</b></p>	<p><b>3</b></p>
<p><b>Qualität (RoB, SIGN /AMSTAR II)</b></p>	<p><b>Moderat ⊕⊕</b></p>

# Evidenztabelle **Kragt, Jaddoe et al. 2017**

## The association of subjective orthodontic treatment need with oral health-related quality of life

Lea Kragt<sup>1,4</sup>, Vincent Jaddoe<sup>2,3,4</sup>, Eppo Wolvius<sup>1,4</sup>, and Edwin Ongkosuwito<sup>1,4</sup>

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### Abstract

**Objectives**—The existing body of evidence reports an inconsistent association between subjective and objective orthodontic treatment need. The concept of oral health-related quality of life (OHRQoL) might help to explain the differences in subjective and objective orthodontic treatment need. Our aim was to investigate the association of subjective orthodontic treatment with OHRQoL in children.

**Methods**—This cross-sectional study was embedded in the Generation R Study, a population-based prospective cohort study. OHRQoL and subjective orthodontic treatment need were assessed by parental questionnaires. Questionnaire items were individually compared among children with no, borderline and definite subjective orthodontic need. The association between subjective orthodontic treatment need and OHRQoL was investigated in multivariate regression analysis with weighted least squares. Differences by sex and levels of objective orthodontic treatment need were evaluated.

**Results**—In total, 3774 children were included in the analysis. Children with borderline subjective orthodontic treatment need and those with definite subjective orthodontic treatment need had significantly poorer OHRQoL, based on the fully adjusted model (adjusted regression coefficient [ $\alpha\beta$ ]= -0.49, 95%CI: -0.75, -0.20; [ $\alpha\beta$ ]= -1.58, 95%CI: -1.81, -1.58, respectively). The association between subjective orthodontic treatment need and OHRQoL was stronger in girls than in boys and stronger in children with objective orthodontic treatment need than in those with none.

**Conclusions**—OHRQoL is poorer in children with subjective orthodontic treatment need. This has not been investigated before in such a large-population based study and clearly offers an explanation for the lack of concurrence between objective and subjective orthodontic treatment need.

<b>Population</b>	„Malokklusion/Dysgnathie“ allg. OHRQoL and subjective orthodontic treatment need were assessed by parental questionnaires. Questionnaire items were individually compared among children with no, borderline and definite subjective orthodontic need.
<b>Schweregrad</b>	keine Angabe

<b>Einschlusskriterien</b>	keine Angabe
<b>Ausschlusskriterien</b>	keine Angabe
<b>Intervention</b> Versuchsgruppe	<p><b>keine Behandlung, aber Malokklusion/kraniofaziale Fehlbildung</b></p> <p>VERSUCHSGRUPPE: <b>definite need</b></p> <p>N=1767 / Alter = MIN:9,5, MAX:10,5 Jahre / ♂:♀ = 810:957</p> <ul style="list-style-type: none"> <li>• Gebissphase: frühes Wechselgebiss</li> <li>• KFO-Behandlung: keine Behandlung</li> </ul>
<b>Intervention</b> Versuchsgruppe	<p><b>keine Behandlung, aber Malokklusion/kraniofaziale Fehlbildung</b></p> <p>VERSUCHSGRUPPE: <b>borderline need</b></p> <p>N=958 / Alter = MIN:9,5, MAX:10,5 Jahre / ♂:♀ = 498:460</p> <ul style="list-style-type: none"> <li>• Gebissphase: frühes Wechselgebiss</li> <li>• KFO-Behandlung: keine Behandlung</li> </ul>
<b>Kontrolle</b> Kontrollgruppe	<p><b>keine Malokklusion/kraniofaziale Fehlbildung</b></p> <p><b>Kategorie aus Einschlusskriterien</b></p> <p>KONTROLLGRUPPE: <b>no need</b></p> <p>N=1049 / Alter = MIN:9,5, MAX:10,5 Jahre / ♂:♀ = 810:957</p> <ul style="list-style-type: none"> <li>• Gebissphase: frühes Wechselgebiss</li> <li>• KFO-Behandlung: keine Behandlung</li> </ul>
<b>Outcome</b>	<p><b>direkter oder schadenspräventiver medizinischer Nutzen bzw. Korrektur/Prävention der Anomalie/Malokklusion/Dysgnathie</b></p> <ul style="list-style-type: none"> <li>• <b>mundgesundheitsbezogene Lebensqualität (MLQ), psychische Entwicklung</b></li> <li>• <b>Subkategorie Outcome 1</b></li> <li>• <b>Subkategorie Outcome 2</b></li> </ul> <p>PRIMÄRZIELGRÖßE: <i>associations between subjective orthodontic treatment need and OHRQoL</i></p> <p>SEKUNDÄRZIELGRÖßE: <i>COHIP-ortho item scores</i></p>
<b>Studientyp</b>	<b>Querschnittsstudie</b>
<b>Schlussfolgerungen der Autoren</b>	<p>In summary, we conclude that OHRQoL is poorer in children with subjective orthodontic treatment need. This has not been investigated before in such a large-population based study and clearly offers an explanation for the variability between objective and subjective orthodontic treatment need. Further research should not only focus on the association between subjective orthodontic treatment need and OHRQoL in populations of different ages, but also investigate in more detail the role of personal and environmental factors other than sex, such as socio-economic status, on the association between OHRQoL, subjective orthodontic treatment need and malocclusions.</p>

<p><b>Zusammenfassung der Ergebnisse</b></p>	<p><b>GRUPPE no VS. GRUPPE definite, borderline</b></p> <p><b>PRIMÄRZIELGRÖßE</b> In Table 3 the findings of the regression model for subjective orthodontic treatment need and total COHIP scores are shown. In contrast to children without subjective orthodontic treatment need, children with borderline orthodontic treatment need as well as children with definite subjective orthodontic treatment need had significant lower total COHIP scores after adjustments for SES and objective orthodontic treatment need (adjusted regression coefficient <math>[a\beta] = -0.49</math>, 95%CI: -0.75, -0.30; <math>[a\beta] = -1.58</math>, 95%CI: -1.81, -1.58, respectively). The trend estimates for the association between subjective orthodontic treatment need and total COHIP scores were significant (<math>p &lt; 0.001</math>). In the group without subjective orthodontic treatment need, girls had generally lower total COHIP scores than boys (Appendix Table S4/S5). In addition, the effect of definite subjective orthodontic treatment need on OHRQoL was significantly stronger in girls than in boys (<math>[a\beta] = -1.93</math>, 95%CI: -2.27, -1.60 and <math>[a\beta] = -1.27</math>, 95%CI: -1.58, -0.96, respectively, <math>p &lt; 0.001</math>). The associations between subjective orthodontic treatment need and OHRQoL stratified by objective orthodontic treatment need are also presented in Table 3. After stratification by objective orthodontic treatment need based on the IOTN-AC, the association between subjective treatment need and total COHIP scores was stronger in children with an IOTN-AC <math>&gt;5</math> for the borderline and the definite subjective need group than in children with an IOTN-AC <math>\leq 5</math> (<math>p</math> value = 0.024). Similarly, after stratification by objective orthodontic treatment need based on the IOTN-DHC, the association between definite subjective treatment need and total COHIP scores was stronger in children with an IOTN-DHC <math>&gt;3</math> than in children with an IOTN-DHC <math>\leq 3</math> (<math>p = 0.039</math>). In contrast, the association between borderline perceived subjective treatment need and total COHIP score was significantly stronger in children with an IOTN-DHC <math>\leq 3</math> (<math>[a\beta] = -0.57</math>, 95%CI: -0.85, -0.30) than in children with an IOTN-DHC <math>&gt;3</math> (<math>[a\beta] = -0.42</math>, 95%CI: 0.02, -0.85)..</p> <p><b>SEKUNDÄRZIELGRÖßE</b> Table 2 shows the mean COHIP-ortho item scores of the children with no perceived orthodontic treatment need, borderline perceived orthodontic treatment need and definite perceived orthodontic treatment need. Children with borderline perceived orthodontic treatment need had lower scores than children with no perceived need for the items about ‘crooked teeth’, ‘discolored teeth’ and ‘bleeding gums’. Children with definite orthodontic treatment need showed lower scores than children without perceived orthodontic treatment need on all items except ‘pain’, ‘bad breath’ and ‘attractiveness’. Most of the effect sizes were small except for the item ‘crooked teeth’ in the borderline perceived and definite orthodontic treatment need groups (<math>d=0.36</math>, <math>p \leq 0.001</math>; <math>d=0.98</math>, <math>p \leq 0.001</math>) as well as the item ‘anxious’ in the definite perceived orthodontic treatment need group (<math>d=0.34</math>, <math>p \leq 0.001</math>).</p>
<p>Angaben auffälliger positiver und/oder negativer Aspekte</p>	<p>Sehr große Fallzahlen. Angaben zur Finanzierung und Interessenskonflikten vorhanden. Befragung der Probanden durch Fragebögen. Keine Evaluation durch Ärzte. Angaben von Konfidenzintervallen. Angabe was man bei fehlenden Daten getan hat.</p>
<p>Schlussfolgerung des Begutachters</p>	<p><u>methodische Qualität</u>: ok</p> <p><u>Klinische Aussagekraft</u>: OHRQoL is poorer in children with subjective orthodontic treatment need. This has not been investigated before in such a large-population based study and clearly offers an explanation for the lack of concurrence between objective and subjective orthodontic treatment need.</p>
<p>Evidenzlevel (SIGN)</p>	<p>3</p>
<p>Qualität</p>	<p>Acceptable ⊕</p>

# Evidenztabelle **Kunz, Platte et al. 2018**

## Correlation between oral health-related quality of life and orthodontic treatment need in children and adolescents—a prospective interdisciplinary multicentre cohort study

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Received: 5 February 2018 / Accepted: 17 April 2018 / Published online: 8 June 2018  
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### Abstract

**Purpose:** Oral health-related quality of life (OHRQoL) is a construct for assessing the self-perceived oral health of patients. The aim of this study was to investigate the correlation between OHRQoL and orthodontic treatment need in consideration of demographic and psychological factors.

**Patients and methods:** This multicentre study included 250 patients with an indication for orthodontic diagnostics. In cooperation with the Institute of Clinical Psychology at the University of Würzburg, validated and internationally acknowledged questionnaires were selected to assess OHRQoL (COHIP-G19) and health-related quality of life (HRQoL). Self-esteem and behavioural problems were taken into consideration as possible psychological factors. Orthodontic treatment need was assessed using the Index of Orthodontic Treatment Need—Dental Health Component (IOTN-DHC), the Index of Orthodontic Treatment Need—Aesthetic Component (IOTN-AC) and the Dental Aesthetic Index (DAI). Possible significant correlations between the collected parameters and OHRQoL were evaluated by means of linear regression analysis.

**Results:** Objective orthodontic treatment need (IOTN-DHC and DAI) was significantly correlated with OHRQoL. Further factors significantly influencing OHRQoL in children and adolescents were age, HRQoL, self-esteem and behavioural problems.

**Conclusions:** Objective orthodontic treatment need significantly influences OHRQoL in children and adolescents. Further studies are required to investigate if OHRQoL may be improved by correcting misaligned teeth and jaws.

<b>Population</b>	<p><b>„Malokklusion/Dysgnathie“ allg.</b></p> <p>A multicentre study design was chosen to obtain a sufficiently large patient cohort for statistical analysis. According to the sample size calculation performed by the institute of clinical epidemiology and biometry of the University of Würzburg, 250 patients were recruited from the outpatient departments of three different university hospitals (University Hospital of Würzburg, University Hospital of Regensburg and University Hospital of Erlangen) and one orthodontic dental practice.</p>
<b>Schweregrad</b>	keine Angabe
<b>Einschlusskriterien</b>	(1) age 7–17 years, (2) sufficient knowledge of the German language, (3) sufficient reading skills and (4) indication for orthodontic diagnostics, clinically assessed by one of the cooperating partners in the course of the first orthodontic consultation of the patients.
<b>Ausschlusskriterien</b>	presence of congenital craniofacial deformity (cleft lip or palate or craniofacial syndrome) and already initiated or completed orthodontic treatment.
<b>Intervention</b> Versuchsgruppe	<p><b>keine Behandlung</b></p> <p>N=250 / Alter = 12,15 ± 2,02 Jahre / ♂:♀ = 131:119</p> <ul style="list-style-type: none"> <li>• Gebissphase: frühes Wechselgebiss, spätes Wechselgebiss, permanentes Gebiss &lt; 18. Lebensjahr</li> <li>• KFO-Behandlung: keine</li> </ul>

<b>Outcome</b>	<p><b>direkter oder schadenspräventiver medizinischer Nutzen bzw. Korrektur/Prävention der Anomalie/Malokklusion/Dysgnathie</b></p> <ul style="list-style-type: none"> <li>• <b>mundgesundheitsbezogene Lebensqualität (MLQ), psychische Entwicklung</b></li> </ul> <p>PRIMÄRZIELGRÖßE: <i>Correlation of OHRQoL and orthodontic treatment need</i></p>
<b>Studientyp</b>	<b>Querschnittsstudie</b>
<b>Schlussfolgerungen der Autoren</b>	Our study showed significant correlations between OHRQoL and age, HRQoL, self-esteem and the indices for objective assessment of orthodontic treatment need (IOTNDHC and DAI).
<b>Zusammenfassung der Ergebnisse</b>	<b>PRIMÄRZIELGRÖßE</b> <i>The results of the t-tests are depicted in Table 4. The indices for assessing orthodontic treatment need yielded different results: only 33 patients showed unequivocal subjective orthodontic treatment need (IOTN-AC ≥ 8), whereas 153 patients (IOTN-DHC ≥ 4) and 115 patients (DAI ≥ 36) showed unequivocal objective orthodontic treatment need. The comparison of OHRQoL between patients with and without unequivocal orthodontic treatment need also yielded different results. OHRQoL did not significantly differ between patients with and without unequivocal orthodontic treatment need classified according to the IOTNAC (p= 0.389) but between patients with and without unequivocal orthodontic treatment need classified according to the IOTN-DHC (p= 0.027) and the DAI (p= 0.002).</i>
<b>Angaben auffälliger positiver und/oder negativer Aspekte</b>	<i>Sehr gut durchgeführte Kohortenstudie. Angaben zur Finanzierung und Interessenskonflikten vorhanden. Mehre Methoden wurden zur Datenerhebung verwendet. Alle davon valide und reliabel. Keine Angabe zu initial gescreenten Patienten oder von Konfidenzintervallen. Powerkalkulation vorhanden.</i>
<b>Schlussfolgerung des Begutachters</b>	<p><u>methodische Qualität:</u> sehr gut</p> <p><u>Klinische Aussagekraft:</u> Objective orthodontic treatment need significantly influences OHRQoL in children and adolescents</p>
<b>Evidenzlevel (SIGN)</b>	<b>3</b>
<b>Qualität</b>	<b>High quality ⊕⊕</b>



# Evidenztabelle **Kunz, Platte et al. 2019**

## Impact of specific orthodontic parameters on the oral health-related quality of life in children and adolescents

A prospective interdisciplinary, multicentre, cohort study

Felix Kunz<sup>1</sup>  · Petra Platte<sup>2</sup> · Stefan Kell<sup>3</sup> · Laura Geim<sup>4</sup> · Florian Zeman<sup>5</sup> · Peter Proff<sup>6</sup> · Ursula Hirschfelder<sup>7</sup> · Angelika Stellzig-Eisenhauer<sup>8</sup>

Received: 27 January 2019 / Accepted: 8 April 2019 / Published online: 8 June 2019  
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### Abstract

**Purpose** The aim of the present study was to analyse the impact of specific orthodontic findings on oral health-related quality of life (OHRQoL) when taking into consideration age and psychological factors in children and adolescents.

**Methods** In all, 250 children and adolescents with an indication for orthodontic diagnostics were recruited using a multi-centre study design. Using validated and internationally acknowledged questionnaires, we assessed OHRQoL, tooth-related quality of life (TRQoL), self-esteem and behavioural problems. We also examined a selection of specific orthodontic findings using photos, model casts and cephalometric analyses, and investigated the impact of these parameters on OHRQoL using simple linear regression analyses. Thereafter, we added all the significant specific orthodontic and psychological parameters to a multiple linear regression model using a stepwise forwards selection procedure.

**Results** We were able to identify different specific orthodontic findings that have a significant impact on OHRQoL. These were the type of lip closure, the position of the chin, the Little-index of the upper jaw, the overjet, the overbite and the ANB angle. Moreover, we were able to demonstrate that psychological and some specific orthodontic parameters have a significant impact on OHRQoL.

**Conclusion** Specific orthodontic findings have a significant impact on patients' perceived OHRQoL. Further longitudinal studies are required to investigate whether the treatment and correction of these malocclusions also improve the OHRQoL of children and adolescents.

<b>Population</b>	„Malokklusion/Dysgnathie“ allg. 250 children and adolescents
<b>Schweregrad</b>	keine Angabe
<b>Einschlusskriterien</b>	(1) age between 7 and 17 years, (2) satisfactory knowledge of the German language with (3) adequate reading skills and (4) an indication for complete orthodontic diagnostics.
<b>Ausschlusskriterien</b>	Patients with congenital craniofacial anomalies and those with already initiated or completed orthodontic treatment in the past were excluded. There was no other preselection of the participants.
<b>Intervention</b> Versuchsgruppe	<b>keine Behandlung</b> N=250 / Alter = 12,15 ± 2,02 Jahre / ♂:♀ = 131:119 <ul style="list-style-type: none"> <li>Gebissphase: frühes Wechselgebiss, spätes Wechselgebiss, permanentes Gebiss &lt; 18. Lebensjahr</li> <li>KFO-Behandlung: keine</li> </ul>
<b>Outcome</b>	<b>direkter oder schadenspräventiver medizinischer Nutzen bzw. Korrektur/Prävention der Anomalie/Malokklusion/Dysgnathie</b> <ul style="list-style-type: none"> <li><b>mundgesundheitsbezogene Lebensqualität (MLQ), psychische Entwicklung</b></li> </ul> PRIMÄRZIELGRÖßE: <i>Correlation of OhrQoL and demographic, psychological and orthodontic parameters</i>

<b>Studientyp</b>	<b>Querschnittsstudie</b>
<b>Schlussfolgerungen der Autoren</b>	The aim of this prospective interdisciplinary, multicentre, cohort study was to investigate the impact of specific orthodontic findings on the OHRQoL of children and adolescents. To this end, we considered a huge variety of specific orthodontic parameters, some of them for the first time in this context. As a consequence, we were able to identify six parameters that significantly influence OHRQoL. In cooperation with the Institute of Clinical Psychology at the University of Würzburg, we selected validated and internationally acknowledged questionnaires to assess both OHRQoL and psychological cofactors that potentially influence OHRQoL such as self-esteem or behavioural problems. Using a multiple linear regression analysis, we were able to demonstrate that psychological and specific orthodontic parameters have a significant impact on OHRQoL at the same time. It is therefore necessary to consider both psychological and orthodontic parameters when interpreting OHRQoL. Further longitudinal studies are required to investigate if the treatment of these malocclusions also improves the OHRQoL of children and adolescents.
<b>Zusammenfassung der Ergebnisse</b>	<b>PRIMÄRZIELGRÖßE</b> <i>The results of the multiple linear regression analysis are shown in Table 5. All the demographic, psychological and orthodontic parameters that had a statistically significant impact on the COHIP-G19 (p-value &lt;0.05) in the simple linear regression analyses were considered to be potential predictors for the multiple linear regression analysis. These were age, the KIDSCREEN-10, the SDQ, the RSES, lip closure, the position of the chin, the Little-index-upper, the Δ-Overjet, the Δ-Overbite and the Δ-ANB. As in the single linear regression analyses, the COHIP-G19 was the criterion for the multiple linear regression analysis. We used a forward-type selection of the aforementioned parameters for the final multiple regression analysis. The order of the selection in the model was as follows: (1) SDQ (R2-change= 0.197; p&lt; 0.001); (2) KIDSCREEN- 10 (R2-change= 0.047; p&lt; 0.001); (3) Δ -Overjet (R2-change= 0.045; p&lt; 0.001); (4) Little-index-upper (R2-change= 0.019; p= 0.020); and (5) Δ-Overbite (R2- change= 0.015; p= 0.036). Adding further variables (age, RSES, lip closure, position of the chin and Δ-ANB) did not significantly improve the R2-change. These parameters were therefore not included in the final multiple regression model. Using the five selected parameters, the final multiple linear regression model (R2= 0.323; F(5, 199)= 18.972; p&lt; 0.001) was statistically significant and explained 32.3% of the total variance in OHRQoL.</i>
<b>Angaben auffälliger positiver und/oder negativer Aspekte</b>	<i>Angaben zur Finanzierung und zu Interessenskonflikten vorhanden. Datenerhebung reliabel, Angaben zur Validität fehlen. Klare Fragestellung. Angaben zu initial gescreenten Patienten und von Konfidenzintervallen fehlen.</i>
<b>Schlussfolgerung des Begutachters</b>	<u>methodische Qualität:</u> gut
	<u>Klinische Aussagekraft:</u> Specific orthodontic findings have a significant impact on patients' perceived OHRQoL.
<b>Evidenzlevel (SIGN)</b>	<b>3</b>
<b>Qualität</b>	<b>Acceptable ⊕</b>

# Evidenztabelle **Laranjo, Pinho 2014**

## Cephalometric study of the upper airways and dentoalveolar height in open bite patients

### Étude céphalométrique des voies aériennes supérieures et de la hauteur dentoalvéolaire chez les patients avec béance

Filipe LARANJO<sup>1</sup>, Teresa PINHO<sup>2\*</sup>

#### Summary

Open bite is related to various etiological factors and, in many cases, is difficult to diagnose. The present study is aimed at evaluating, through cephalometric analysis, the dimensions of the upper airways and dentoalveolar height in open bite (OB) patients versus normal overbite patients. The relationship between the width of the upper airways and the lack of overbite is also studied, in order to differentiate between dental open bite (DOB) and skeletal open bite (SOB).

**Materials and methods:** Eighty X-rays were selected from files of orthodontic patients to form the control sample (n = 40) and open bite sample (n = 40). Dimensions of the upper airways and dentoalveolar height were measured in both samples, using 16 linear measurements, two angle values and one ratio.

**Results:** In OB patients, anteroposterior narrowing of the upper airways, mainly in the nasopharynx and oropharynx, was observed, together with forward displacement of the hyoid bone and increased maxillary and mandibular dentoalveolar

heights, and anterior facial height. In SOB, the overbite was more negative and facial growth was more clockwise-oriented than in DOB. Greater narrowing of the airways in the anteroposterior orientation was also noted. In DOB, there was evidence of muscular adaptation, as shown by increased values of the hyoid bone displacement to a more anterior and lower position, and increased values of the vertical dimensions of the airways. An increase in posterior facial height was also observed allowing anterior rotation of the mandible.

**Conclusion:** The results suggest that the airway's dimensions reflect a tendency to open bite. The variable vertical airway length (VAl) and the position of the hyoid bone allow the subjective potential of these individuals to be determined and make the treatment of open bites more predictable.

<b>Population</b>	<b>Malokklusion allgemein</b> The material consisted of 80 lateral cephalometric radiographs, which were selected from a set of orthodontic patients based on clinical and radiographic history.
<b>Schweregrad</b>	anterior open bite (overbite less than 0 mm), subdivided, according to the severity of the angle of the mandibular plane, into dental open bite (DOB) when the mandibular plane angle was lower than 33°, and skeletal open bite (SOB) when the mandibular plane angle was equal to or greater than 33° (hyperdivergent profile).
<b>Einschluss-kriterien</b>	The samples selected for this study were from Caucasian subjects, all had permanent teeth and both samples were selected to eliminate differences related to gender and age.

<b>Ausschlusskriterien</b>	subjects having received any kind of oropharyngeal surgery; those with a history of orthodontic or orthognathic treatment; subjects with a history of pathology in the oropharynx region; syndromic individuals; and subjects with active periodontal disease, multiple missing teeth or significant changes in their dental anatomy. Low-definition radiographic records were also excluded.
<b>Intervention</b> Versuchsgruppe	<b>Keine Behandlung, aber Malokklusion/kraniofaziale Fehlbildung</b> VERSUCHSGRUPPE: <b>open bite</b> N=40 / Alter = 18,13 ± ?? Jahre / ♂:♀ = 22:18 <ul style="list-style-type: none"> <li>• Gebissphase: permanentes Gebiss &lt; 18. Lebensjahr, permanentes Gebiss ≥ 18. Lebensjahr</li> <li>• KFO-Behandlung: keine</li> </ul>
<b>Kontrolle</b> Kontrollgruppe	<b>Keine Malokklusion/kraniofaziale Fehlbildung</b> KONTROLLGRUPPE: <b>control</b> N=40 / Alter = 20,37 ± ?? Jahre / ♂:♀ = 13:27 <ul style="list-style-type: none"> <li>• Gebissphase: permanentes Gebiss &lt; 18. Lebensjahr, permanentes Gebiss ≥ 18. Lebensjahr</li> <li>• KFO-Behandlung: keine</li> </ul>
<b>Outcome</b>	<b>direkter oder schadenspräventiver medizinischer Nutzen bzw. Korrektur/Prävention der Anomalie/Malokklusion/Dysgnathie</b> <ul style="list-style-type: none"> <li>• <b>Atmung und Luftraum (Airway space, Schlafapnoe), Schlucken und Sprechen</b></li> </ul> PRIMÄRZIELGRÖßE: <i>Dentoalveolar measurements (Is-PP, li-PM, Ms-PP, Mi-PM, PFH, AFH, PFH/AFH)</i> SEKUNDÄRZIELGRÖßE: <i>Airway measurements (NPH, OPH1, OPH2, Ans-Pns-P(°), Mp-H, Ep-P, Hph, C3-H, Val)</i>
<b>Studientyp</b>	<b>Querschnittsstudie</b>
<b>Schlussfolgerungen der Autoren</b>	Open bite patients showed a general narrowing of the airways in the anteroposterior dimension, more significantly at the nasopharynx (NPH) and oropharynx (OPH1).
<b>Zusammenfassung der Ergebnisse</b>	<b>GRUPPE control VS. GRUPPE open bite</b> <i>PRIMÄRZIELGRÖßE Table II summarizes the variables concerning dentoalveolar and skeletal heights. Table II shows that dentoalveolar heights (Is-PP, li-PP, Ms-PP and Mi-PM) were significantly increased in the open bite group, as was AFH. On the other hand, the control group showed a significantly higher PFH/AFH than that of the open bite group. Considering all the individuals in the open bite group and based on the mandibular plane angle, it was found that 24 patients presented dental open bite (60%) and 16 (40%) presented skeletal open bite. This enabled us to program three study samples: control, dental open bite (DOB) and skeletal open bite (SOB). Anova and Bonferroni multiple comparison tests were used to study the variables between the three groups, and some variables showed major differences. OPH1 only showed statistically significant differences between the control group and SOB (mControl &gt; mSOB), meaning that there was a major decrease of the anteroposterior size of the oropharynx in SOB.</i>

<p><b>Zusammenfassung der Ergebnisse</b></p>	<p><i>Mp-H, Ep-P, Val and PFH showed statistically significant differences only between the control group and DOB (mControl &lt; mDOB), which reflects a vertical increase of the airways and of the position of the hyoid bone, as well as PFH only in DOB. The PFH/AFH ratio showed statistically significant differences between the control group and SOB, and between DOB and SOB (mSOB &lt; mDOB mControl), indicating that this ratio was lower in SOB than in DOB and the control group, while the latter two groups were similar. Considering the remaining variables, the results were close to those obtained previously when a comparison was made between the two initial samples. The Pearson correlation test was used to study correlations between variables in the open bite group in an attempt to find significant associations between variables. Statistical significance was set at <math>P &lt; 0.05</math>, and positive associations were based on <math>r &gt; 0.8</math>, for strong correlation, <math>0.4 &lt; r &lt; 0.8</math> for moderate correlation and <math>r &lt; 0.4</math> was considered weak. The test showed a moderate positive association between Val and all dentoalveolar heights, mainly of the first upper molars (Ms-PP). A strong positive correlation between Val and PFH was also found. There was also a strong positive association between the first upper molar dentoalveolar height (Ms-PP) and facial height variables (PFH and AFH). All the observed associations were positive, meaning that an increase in one variable was followed by an increase in the others.</i></p> <p><b>SEKUNDÄRZIELGRÖßE</b> Table I summarizes the values obtained for the dimensions of the airways. Variables NPH and OPH1 are clearly significantly lower in the open bite group, signifying a reduction of the anteroposterior size of the nasopharynx and oropharynx. On the other hand, variables Mp-H, Ep-P and Val were significantly increased in the open bite group, indicating that the vertical dimension of airways was higher and the hyoid bone positioned lower position in this group.</p>
<p><b>Angaben auffälliger positiver und/oder negativer Aspekte</b></p>	<p><i>Reliable und valide Datenerfassung, keine Angabe zu Funding, Blinding, initial gescreenten Patienten und von Konfidenzintervallen.</i></p>
<p><b>Schlussfolgerung des Begutachters</b></p>	<p><u>methodische Qualität:</u> ok</p> <hr/> <p><u>Klinische Aussagekraft:</u> The results suggest that the airway's dimensions reflect a tendency to open bite.</p>
<p><b>Evidenzlevel (SIGN)</b></p>	<p><b>3</b></p>
<p><b>Qualität</b></p>	<p><b>Acceptable ⊕</b></p>

## Evidenztabelle Lee and Yu 2012

### Masseter muscle changes following orthognathic surgery A long-term three-dimensional computed tomography follow-up

Da-Hye Lee<sup>a</sup>; Hyung-Seog Yu<sup>a</sup>

#### ABSTRACT

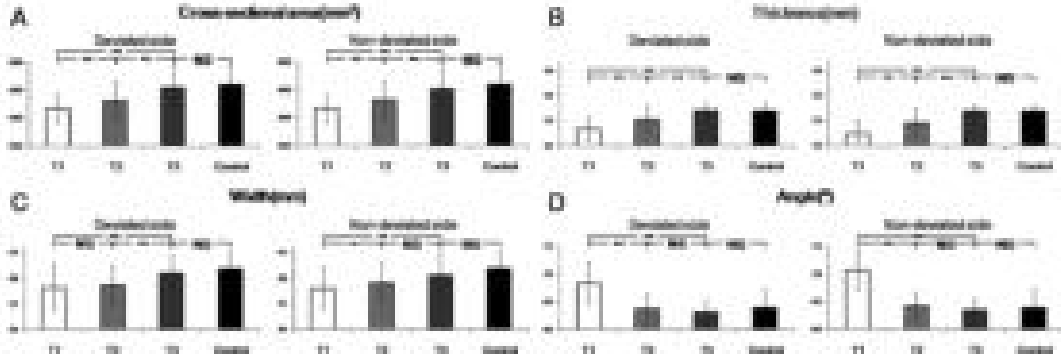
**Objective:** To evaluate the long-term changes of masseter muscle morphology in skeletal Class III patients with facial asymmetry following two-jaw orthognathic surgery (Le Fort I osteotomy + intraoral vertical ramus osteotomy).

**Materials and Methods:** Using computed tomography (CT), a longitudinal study was conducted on 17 skeletal Class III patients with facial asymmetry. Measurements from the reconstructed three-dimensional (3D) CT images were compared from T1 (before surgery), T2 (1 year after surgery), and T3 (4 years after surgery). The maximum cross-sectional area (CSA), orientation, thickness, and width of the masseter muscle were measured on both the deviated and nondeviated sides. The control group included 17 volunteers with skeletal and dental Class I relationships without dentofacial deformities.

**Results:** At T1, there were no significant differences in CSA, thickness, or width of masseter muscle between the deviated and nondeviated sides. Masseter muscle orientation was significantly more vertical on the nondeviated side than on the deviated side at T1 ( $P < .01$ ); no significant bilateral differences were noted at T2 and T3. At T1, masseter muscle measurements were significantly lower than controls ( $P < .01$ ). During T1–T3, a significant increase was noted in CSA, thickness, and width ( $P < .01$ ) of masseter muscle. At T3, no significant difference was noted between the study and control groups.

**Conclusion:** After surgery, the masseter muscle measurements of skeletal Class III asymmetry patients showed no significant differences compared with the control group within the 4-year follow-up period, indicating adaptation to the new skeletal environments and increased functional demand. (*Angle Orthod.* 2012;82:792–798.)

<b>Population</b> <i>Setting</i> <i>Komorbiditäten</i>	Klasse-III-Anomalie
<i>Schweregrad</i>	-
<i>Einschluss-kriterien</i> <i>Bei Review: PICOS</i>	with facial asymmetry (mandibular prognathism with chin deviation of more than 3.5 mm from the facial midline)
<i>Ausschluss-kriterien</i>	Patients with hemifacial microsomia, cleft lip and/or palate, or disease of the temporomandibular joint were excluded from the study.

<p><b>Intervention</b> Versuchsgruppe</p>	<p><b>kieferorthopädisch-kieferchirurgische Kombinationsbehandlung</b></p> <p>VERSUCHSGRUPPE: <b>orthognathic two-jaw surgery with preoperative and postoperative orthodontic treatment</b></p> <p>N=17 (Anfang) / N=17 (Ende) / Alter = 21,71 Jahre / ♂:♀ = 6:11</p> <ul style="list-style-type: none"> <li>Gebissphase: permanentes Gebiss</li> <li>KFO-Behandlung: Spätbehandlung</li> </ul>
<p><b>Kontrolle</b> Kontrollgruppe</p>	<p><b>keine kieferorthopädische Therapie</b></p> <p>KONTROLLGRUPPE: <b>control group with skeletal and dental Class I relationship without dentofacial deformities</b></p> <p>N=17 (Anfang) / N=17 (Ende) / Alter = 20,27 Jahre / ♂:♀ = 6:11</p> <ul style="list-style-type: none"> <li>Gebissphase: permanentes Gebiss</li> <li>KFO-Behandlung: keine Behandlung</li> </ul>
<p><b>Outcome</b></p>	<p><b>direkter oder schadenspräventiver medizinischer Nutzen bzw. Korrektur/Prävention der Anomalie/Malokklusion/Dysgnathie</b></p> <ul style="list-style-type: none"> <li><b>Okklusion, Kaufunktion, Funktion</b></li> </ul> <p>PRIMÄRZIELGRÖßE: <i>The maximum CSA, thickness, and width of the masseter muscle were measured on both the deviated and the non-deviated side, using the reconstructed 3D CT axial images of T1, T2, and T3.</i></p>
<p><b>Studientyp</b></p>	<p><b>Beobachtungsstudie (Kohorten- oder Fall-Kontroll-Studie)</b></p>
<p><b>Schlussfolgerungen der Autoren</b></p>	<p>There were no significant differences between the deviated and nondeviated side of masseter muscle measurements of skeletal Class III asymmetry patients, except for masseter muscle orientation. The masseter muscle measurements of skeletal Class III asymmetry patients were significantly lower than that of the control group before surgery. After surgery, the masseter muscle measurements of skeletal Class III asymmetry patients reached those of the control group within a 4-year follow-up period.</p>
<p><b>Zusammenfassung der Ergebnisse</b></p>	<p><b>GRUPPE Intervention VS. GRUPPE Kontrolle</b></p>  <p>Figure 6. The changes of masseter muscle from T1 to T3. (A) Cross-sectional area (mm<sup>2</sup>). (B) Thickness (mm). (C) Width (mm). (D) Angle (°). T1 indicates before surgery; T2, 1 year after surgery; T3, 4 years after surgery; NS, not significant; * P &lt; .05; ** P &lt; .01; *** P &lt; .001.</p>

<p><b>Angaben auffälliger positiver und/oder negativer Aspekte</b></p> <p>Studiendesign</p> <p>Durchführung</p> <p>Auswertung</p> <p>Funding</p> <p><u>Interessenkonflikte</u></p> <p><u>Bias (SIGN, AMSTAR II, Einzelstudien)</u></p>	<ul style="list-style-type: none"> <li>• geringe Fallzahl</li> <li>• Surrogatparameter Massetermorphologie für Mastikation</li> <li>• Keine Fehleranalyse</li> <li>• heterogene Geschlechterverteilung</li> </ul> <p><i>Power der Studie/Patientenzahl: etwas gering</i></p> <p><i>Funding: This research was supported by a faculty research grant (#6-2009-0029) of Yonsei University College of Dentistry and Oral Science Research Center.</i></p> <p><i>Interessenkonflikte: nicht angegeben</i></p>
<p><b>Schlussfolgerung des Begutachters</b></p>	<p><u>methodische Qualität:</u> akzeptabel</p> <hr/> <p><u>Klinische Aussagekraft:</u> gut</p>
<p><b>Evidenzlevel (SIGN)</b></p>	<p>2+</p>
<p><b>Qualität (RoB, SIGN /AMSTAR II)</b></p>	<p><b>Akzeptabel ⊕</b></p>



# Evidenztabelle **Liu, McGrath et al. 2009**

## Review Article

### **The Impact of Malocclusion/Orthodontic Treatment Need on the Quality of Life**

*A Systematic Review*

**Zhijian Liu<sup>a</sup>; Colman McGrath<sup>b</sup>; Urban Hägg<sup>a</sup>**

#### **ABSTRACT**

**Objective:** To assess the current evidence of the relationship between malocclusion/orthodontic treatment need and quality of life (QoL).

**Materials and Methods:** Four electronic databases were searched for articles concerning the impact of malocclusion/orthodontic treatment need on QoL published between January 1960 and December 2007. Electronic searches were supplemented by manual searches and reference linkages. Eligible literature was reviewed and assessed by methodologic quality as well as by analytic results.

**Results:** From 143 reviewed articles, 23 met the inclusion criteria and used standardized health-related QoL (HRQoL) and orthodontic assessment measures. The majority of studies (18/23) were conducted among child/adolescent populations. Seventeen of the papers were categorized as level 1 or 2 evidence based on the criteria of the Oxford Centre for Evidence-Based Medicine. An observed association between HRQoL and malocclusion/orthodontic treatment need was generally detected irrespective of how they were assessed. However, the strength of the association could be described as modest at best. Key findings and future research considerations are described in the review.

**Conclusions:** Findings of this review suggest that there is an association (albeit modest) between malocclusion/orthodontic treatment need and QoL. There is a need for further studies of their relationship, particularly studies that employ standardized assessment methods so that outcomes are uniform and thus amenable to meta-analysis. (*Angle Orthod.* 2009;79:585–591.)

**KEY WORDS:** Malocclusion; Orthodontic treatment need; Quality of life, Oral health-related quality of life

<b>Population</b>	„Malokklusion/Dysgnathie“ allg.
<i>Setting</i>	• -
<i>Komorbiditäten</i>	
<b>Schweregrad</b>	Nicht angegeben

<p><b>Einschlusskriterien</b></p> <p>Bei Review: PICO</p>	<ul style="list-style-type: none"> <li>• Population: -</li> <li>• intervention: keine Intervention (zur Auswertung: Malocclusion/Orthodontic Treatment Need)</li> <li>• comparison: keine Kontrollgruppe (zur Auswertung: QoL, HRQoL, and OHRQoL)</li> <li>• outcome: PRIMÄRZIELGRÖßE: QoL, HRQoL, and OHRQoL</li> <li>• study type: -</li> </ul>
<p><b>Ausschlusskriterien</b></p>	<ol style="list-style-type: none"> <li>1. lack of standardized measures in assessing QoL, HRQoL, or OHRQoL;</li> <li>2. lack of effective statistical analyses</li> <li>3. case reports and review papers</li> </ol>
<p><b>Intervention</b></p> <p>Versuchsgruppe</p>	<p><b>Keine Intervention</b></p> <p>VERSUCHSGRUPPE: <b>Malocclusion/Orthodontic Treatment Need</b></p> <p>N=9898 (Anfang) / N=?? (Ende) / Alter = 8-“adult” Jahre / ♂:♀ = ??:?</p> <ul style="list-style-type: none"> <li>• Gebissphase: frühes bis spätes Wechselgebiss, permanentes Gebiss &lt; und ≥ 18. Lebensjahr</li> <li>• KFO-Behandlung: (Frühbehandlug, reguläre Behandlung, Spätbehandlung)</li> </ul>
<p><b>Kontrolle</b></p> <p>Kontrollgruppe</p>	<p><b>Keine Kontrollgruppe</b></p> <p>KONTROLLGRUPPE: <b>QoL, HRQoL, and OHRQoL</b></p> <p>N=9898 (Anfang) / N=?? (Ende) / Alter = 8-“adult” Jahre / ♂:♀ = ??:?</p> <ul style="list-style-type: none"> <li>• Gebissphase: frühes bis spätes Wechselgebiss, permanentes Gebiss &lt; und ≥ 18. Lebensjahr</li> <li>• KFO-Behandlung: keine Behandlung</li> </ul>
<p><b>Outcome</b></p>	<p><b>direkter oder schadenspräventiver medizinischer Nutzen bzw. Korrektur/Prävention der Anomalie/Malokklusion/Dysgnathie, medizinischer Schaden, Nebenwirkungen bzw. Zunahme der Anomalie /Malokklusion/Dysgnathie</b></p> <ul style="list-style-type: none"> <li>• <b>mundgesundheitsbezogene Lebensqualität (MLQ), psychische Entwicklung</b></li> </ul> <p>PRIMÄRZIELGRÖßE: QoL, HRQoL, and OHRQoL</p>
<p><b>Studientyp</b></p>	<p><b>Systematisches Review</b></p> <p>Review: Inkludierte Studien in Bezug auf PICO: 4 longitudinal, 19 cross-sectional studies N=23</p> <p>Review: Gesamt-Teilnehmerzahl in Bezug auf PICO: N=9898</p>

<p><b>Schlussfolgerungen der Autoren</b></p>	<ul style="list-style-type: none"> <li>• There is a growing interest in the relationship between malocclusion/orthodontic treatment need and HRQoL.</li> <li>• This review suggests that there is an <b>association (albeit modest) between malocclusion/orthodontic treatment need and poor HRQoL</b>, and that they coexist in the same population.</li> <li>• There is a need to determine appropriate assessment methods of malocclusion/orthodontic treatment need and of quality of life (QoL, HRQoL, and/or OHRQoL measures) to enable meta-analysis of their relationship.</li> </ul>
<p><b>Zusammenfassung der Ergebnisse</b></p>	<p><b>Malocclusion/Orthodontic Treatment Need AND QoL, HRQoL, and OHRQoL</b></p> <p><b>QoL, HRQoL, and OHRQoL:</b> the majority of the findings from cross-sectional studies indicated an <b>association between QoL (irrespective of how it was assessed) and malocclusion/orthodontic treatment need</b> (irrespective of how it was assessed) (<math>P &lt; .05</math>). The strength of the correlation (<b>r value</b>) between malocclusion/orthodontic treatment need status and QoL, where reported, <b>ranged from 0.15 to 0.45</b>. The <b>regression analyses</b> (linear and logistic) showed that the strength of the association between malocclusion/orthodontic treatment need status and QoL was <b>above 4.0 for some studies</b> (adjusted odds ratio/regression coefficient) (Table 1).</p>
<p><b>Angaben auffälliger positiver und/oder negativer Aspekte</b></p> <p>Studiendesign</p> <p>Durchführung</p> <p>Auswertung</p> <p>Funding</p> <p>Interessenkonflikte</p> <p>Bias (SIGN, AMSTAR II, Einzelstudien)</p>	<p><i>Studiendesign: keine Registrierung a priori, Einschlusskriterien nach PICOS nicht definiert, keine Meta-Analyse, nicht nur MLQ sondern auch gesundheitseozogene und allgemeine LQ gemessen, keine Festlegung der Messmethodik, Qualität der Einzelstudien nach validierter Methodik überprüft, keine eigentliche RoB-Analyse</i></p> <p><i>Durchführung: nur narrative Analyse, kruxe Diskussion ohne Besprechung von Subgruppen/Störfaktoren, Literatursichtung durch drei unabhängige Rater, verschiedene Messmethodiken</i></p> <p><i>Auswertung: unterschiedliche Messmethodiken, große Altersspanne – Obergrenze nicht genau bekannt (“adult”), hauptsächlich Querschnittsstudien</i></p> <p><i>Power der Studie/Patientenzahl: 23/9.898</i></p> <p><i>Funding: -</i></p> <p><i>Interessenkonflikte: -</i></p> <p><i>Bias (SIGN/AMSTAR/EinzelstudienRoB – alle negativen Punkte aus Fragebogen auflisten):</i></p> <p><b>2. Did the report of the review contain an explicit statement that the review methods were established prior to the conduct of the review and did the report justify any significant deviations from the protocol?</b></p> <p><b>3. Did the review authors explain their selection of the study designs for inclusion in the re</b></p> <p><b>6. Did the review authors perform data extraction in duplicate?</b></p> <p><b>7. Did the review authors provide a list of excluded studies and justify the exclusions?</b></p> <p><b>9. Did the review authors use a satisfactory technique for assessing the risk of bias (RoB) in individual studies that were included in the review?</b></p> <p><b>10. Did the review authors report on the sources of funding for the studies included in the</b></p> <p><b>13. Did the review authors account for RoB in individual studies when interpreting/ discuss results of the review?</b></p> <p><b>16. Did the review authors report any potential sources of conflict of interest, including any they received for conducting the review?</b></p> <p><i>Publikationsbias (Reviews): -</i></p>

<b>Schlussfolgerung des Begutachters</b>	<u>methodische Qualität:</u> Review niedrig, Einzelstudien moderat
	<u>Klinische Aussagekraft:</u> Das Vorliegen einer Malokklusion scheint Individuen in ihrer Lebensqualität zu beeinflussen. Zur Art der Malokklusion und möglichen Störfaktoren kann anhand dieses Reviews aber keine Aussage getroffen werden.
<b>Evidenzlevel (SIGN)</b>	<b>3</b>
<b>Qualität (RoB, SIGN /AMSTAR II)</b>	<b>Moderat (++)</b>

# Evidenztabelle **Magalhães, Pereira et al. 2010**

Review Article

## The influence of malocclusion on masticatory performance

A systematic review

Isabela Brandão Magalhães<sup>a</sup>; Luciano José Pereira<sup>a</sup>; Leandro Silva Marques<sup>a</sup>; Gustavo Hauber Gameiro<sup>a</sup>

**ABSTRACT**

**Objective:** To systematically review the relationship between malocclusions and masticatory performance. In addition, we will perform a qualitative analysis of the methodological soundness of the studies.

**Materials and Methods:** A literature survey was done by applying the Medline database (www.ncbi.nlm.nih.gov) in the period from January 1965 to June 2009, using the "Medical Subject Headings" term malocclusion crossed with various combinations of the following terms: masticatory performance, masticatory efficiency, and chewing efficiency. The articles were separated into two main topics: (1) the influence of malocclusion treatment (orthognathic surgery) and (2) the influence of malocclusion type and severity.

**Results:** The search strategy used identified 78 articles. After selection according to the inclusion/exclusion criteria, 12 articles qualified for the final analysis. The research quality and methodological soundness were high in one study, medium in 10 studies, and low in one study. The most serious shortcomings comprised the clinical trials and controlled clinical trials designs with small sample sizes and inadequate description of selection criteria. Lack of method error analysis and the absence of blinding in measurements were other examples of shortcomings.

**Conclusions:** Malocclusions cause decreased masticatory performance, especially as it relates to reduced occlusal contacts area. The influence of malocclusion treatment (orthognathic surgery) on masticatory performance is only measurable 5 years after treatment. (*Angle Orthod.* 2010;80:981–987.)

**KEY WORDS:** Masticatory performance; Malocclusion; Orthognathic surgery; Systematic review

<b>Population</b> <i>Setting</i> <i>Komorbiditäten</i>	<p><b>„Malokklusion/Dysgnathie“ allg.</b></p> <ul style="list-style-type: none"> <li>• individuals with orthognathic surgery</li> </ul>
<b>Schweregrad</b>	Nicht angegeben
<b>Einschlusskriterien</b> <i>Bei Review: PICOS</i>	<ul style="list-style-type: none"> <li>• population: individuals with orthognathic surgery</li> <li>• intervention: orthognathic surgery</li> <li>- Malokklusion nicht LL-relevant (Tabelle 3) -</li> <li>• comparison: untreated/normal controls</li> <li>• outcome: PRIMÄRZIELGRÖßE: masticatory performance (objective parameters)</li> <li>• study type: -</li> </ul>

<b>Ausschlusskriterien</b>	<ol style="list-style-type: none"> <li>1. Case reports and case series</li> <li>2. Review articles and abstracts</li> <li>3. Dental mutilated patients</li> <li>4. Systemic and neurologic diseases</li> <li>5. Cleft lip and/or palate or other craniofacial syndrome diagnosis</li> </ol>
<b>Intervention</b> Versuchsgruppe	<p><b>kieferorthopädisch-kieferchirurgische Kombinationsbehandlung</b></p> <p>VERSUCHSGRUPPE: <b>orthognathic surgery</b></p> <p>N=52 (Anfang) / N=?? (Ende) / Alter = 14-55 Jahre / ♂:♀ = 20:32</p> <ul style="list-style-type: none"> <li>• Gebissphase: permanentes Gebiss &lt; und ≥ 18. Lebensjahr</li> <li>• KFO-Behandlung: reguläre Behandlung, Spätbehandlung</li> </ul>
<b>Kontrolle</b> Kontrollgruppe	<p><b>keine kieferorthopädische Therapie</b></p> <p>KONTROLLGRUPPE: <b>untreated class I malocclusion</b></p> <p>N=85 (Anfang) / N=?? (Ende) / Alter = 22-33 Jahre / ♂:♀ = 37:48</p> <ul style="list-style-type: none"> <li>• Gebissphase: permanentes Gebiss ≥ 18. Lebensjahr</li> <li>• KFO-Behandlung: keine Behandlung</li> </ul>
<b>Outcome</b>	<p><b>direkter oder schadenspräventiver medizinischer Nutzen bzw. Korrektur/Prävention der Anomalie/Malokklusion/Dysgnathie, Nebenwirkungen bzw. Zunahme der Anomalie /Malokklusion/Dysgnathie</b></p> <ul style="list-style-type: none"> <li>• <b>Okklusion, Kaufunktion, Funktion</b></li> </ul> <p>PRIMÄRZIELGRÖßE: masticatory performance (objective parameters)</p>
<b>Studientyp</b>	<p><b>Systematisches Review</b></p> <p>Review: Inkludierte Studien in Bezug auf PICO: longitudinal controlled clinical trials N = 4 (gesamtes Review: N = 12, aber wegen der LL-irrelevanten Intervention "Malokklusion" 8 Studien nicht LL-relevant)</p> <p>Review: Gesamt-Teilnehmerzahl in Bezug auf PICO: N=137</p>
<b>Schlussfolgerungen der Autoren</b>	<p>The influence of malocclusion treatment (orthognathic surgery) on masticatory performance is only measurable 5 years after treatment.</p>

<p><b>Zusammenfassung der Ergebnisse</b></p>	<p><b>Orthognathic surgery VERSUS untreated class I malocclusion</b></p> <p><i>Zeitpunkt: before and after orthognathic surgery</i></p> <p><b>masticatory performance (objective parameters):</b> The influence of malocclusion treatment (orthognathic surgery) on masticatory performance showed that <b>mastication was still hampered in comparison to results obtained from controls, even after surgical correction. In addition, surgical correction did not improve masticatory performance significantly.</b><sup>15,16,18</sup> However, it was suggested that <b>after surgery, some time is needed in order for the muscles to adapt</b> to the new bone position. The muscle fibers are stretched and may also decrease bite force when compared to the situation before surgery.<sup>15,19</sup> This fact was confirmed when a <b>significant increase in masticatory performance was noted 5 years after surgery.</b><sup>17</sup> According to these results, it is important to consider that longitudinal studies with short postsurgical time evaluation should be observed cautiously, since the musculature may need a long time to readapt the new incorporated modifications. It seems that at least 5 years are needed to measure a real improvement in masticatory performance.<sup>17</sup> In addition, simultaneous evaluation of number and area of occlusal contacts, bite force, muscle thickness, amount of lateral jaw movement, pain, and muscle activity are encouraged in order to control all covariables after orthognathic surgery, once masticatory performance may be influenced by all of these factors.<sup>6,20,21</sup></p>
<p><b>Angaben auffälliger positiver und/oder negativer Aspekte</b></p> <p>Studiendesign</p> <p>Durchführung</p> <p>Auswertung</p> <p><u>Funding</u></p> <p><u>Interessenkonflikte</u></p> <p><u>Bias (SIGN, AMSTAR II, Einzelstudien)</u></p>	<p><i>Studiendesign: keine Registrierung a priori, keine Meta-Analyse, kein Studientyp gemäß PICO definiert, keine klare Definition der Population gemäß PICO, keine Messmethodik zur Erhebung der Zielgröße bestimmt</i></p> <p><i>Durchführung: nur 1 Datenbank durchsucht, RoB-Analyse und Datenextraktion durch zwei unabhängige Rater, keine detaillierten Angaben zur Literatursichtung</i></p> <p><i>Auswertung: praktikable Aufteilung der Suchergebnisse bzgl. zweier Interventions-Gruppen (Malokklusion nicht LL-relevant, kieferorthopädisch-kieferchirurgische Kombinationstherapie LL-relevant), longitudinale CCT, Kontrollgruppe größer als Versuchsgruppe, in beiden Gruppen mehr weibliche als männliche Patienten eingeschlossen, plausible Diskussion der narrative Analyse</i></p> <p><i>Power der Studie/Patientenzahl: 4/137 (nur 4/12 Studien LL-relevant)</i></p> <p><i>Funding: The authors are grateful to the Brazilian fostering agencies: Fundaçãõ de Amparo a Pesquisa do Estado de Minas Gerais (FAPEMIG) and Fundaçãõ de Amparo Pesquisa do Estado do Rio Grande do Sul (FAPERGS), which supported the present study.</i></p> <p><i>Interessenkonflikte: -</i></p> <p><i>Bias (SIGN/AMSTAR/EinzelstudienRoB – alle negativen Punkte aus Fragebogen auflisten):</i></p> <p><b>2. Did the report of the review contain an explicit statement that the review methods were established prior to the conduct of the review and did the report justify any significant deviations from the protocol?</b></p> <p><b>3. Did the review authors explain their selection of the study designs for inclusion in the re</b></p> <p><b>4. Did the review authors use a comprehensive literature search strategy?</b></p> <p><b>5. Did the review authors perform study selection in duplicate?</b></p> <p><b>7. Did the review authors provide a list of excluded studies and justify the exclusions?</b></p> <p><b>14. Did the review authors provide a satisfactory explanation for, and discussion of, any heterogeneity observed in the results of the review?</b></p> <p><i>Publikationsbias (Reviews):-</i></p>

<b>Schlussfolgerung des Begutachters</b>	<u>methodische Qualität:</u> Review und Einzelstudien moderat
	<u>Klinische Aussagekraft:</u> Werden Patienten kombiniert kieferorthopädisch-kieferchirurgisch therapiert, so scheint es postoperativ erst verzögert (nach fünf Jahren) zu einer Verbesserung der Kaufunktion zu kommen. Aufgrund des geringen Datenumfanges kann aber keine belastbare Aussage getroffen werden.
<b>Evidenzlevel (SIGN)</b>	2+
<b>Qualität (RoB, SIGN /AMSTAR II)</b>	Moderat ⊕⊕



# Evidenztabelle **Magno, Nadelman et al. 2020**

Received 11 August 2021 | Revised 1 March 2022 | Accepted 20 August 2022  
DOI: 10.1002/lsm.12174

UNSOLICITED SYSTEMATIC REVIEW

WILEY

## Associations and risk factors for dental trauma: A systematic review of systematic reviews

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**Funding information**  
Fundação Carlos Chagas Filho de Amparo à Pesquisa do Estado do Rio de Janeiro, Grant/Award Number: E-26/010.100/PR/2018 and E-26/202.333/2019

**Abstract**  
**Objective:** We sought to revise, qualify and summarize the body of evidence based on current information on the known associations and risk factors for traumatic dental injury (TDI) occurrence with an overview of systematic reviews.  
**Methods:** Electronic searches were performed with no language nor date restrictions. According to the PICO strategy, systematic reviews that investigated participants (P) with (E) and without (O) the presentation of factors relating to TDI and these factors' association with TDI episodes (O) as primary or secondary outcomes were included. Quality assessment and bias control were carried out according to the AMSTAR 2 checklist. In cases of systematic review results of discordance, the Jadad decision algorithm was applied.  
**Results:** After titles, abstracts and full texts were read, 19 systematic reviews were included in this overview. Four were classified with critically low, eleven with low and four with moderate methodological quality, respectively. In all studies, 249 cross-sectional, 34 epidemiological surveys, 22 cohort, 9 case-control, 4 longitudinal, 3 ecological and 30 unspecified studies were included. Male gender, child age, greater overjet, inadequate lip coverage, anterior open bite, caries in the permanent dentition, overweight, a previous history of TDI, tongue piercing, the use of alcoholic beverages and participation in sports were all associated with a greater chance of suffering TDI.  
**Conclusions:** Sociodemographic, clinical and environmental factors are associated with a greater chance of TDI occurrence. However, most of the systematic reviews included were of a low quality and may not provide an accurate and comprehensive summary of the available research that addresses the question of interest. Well-designed primary studies on different aspects of TDI are encouraged to provide higher quality scientific evidence.

**KEYWORDS**  
review, risk factors, tooth injuries

<b>Population</b> Setting Komorbiditäten	<b>„Malokklusion/Dysgnathie“ allg.</b> <ul style="list-style-type: none"> <li>children, adolescents or adults</li> </ul>
<b>Schweregrad</b>	Nicht angegeben
<b>Einschlusskriterien</b> Bei Review: PICOS	<ul style="list-style-type: none"> <li>population: children, adolescents or adults</li> <li>intervention: keine Intervention (zur Ausertung: risk factor – LL-relevant nur overjet, overbite, anteriore open bite, inadequate lip coverage)</li> <li>comparison: keine Intervention (zur Ausertung: risk factor – LL-relevant nur overjet, overbite, anteriore open bite, inadequate lip coverage)</li> <li>outcome:                         <p>PRIMÄRZIELGRÖßE: traumatic dental injury TDI</p> </li> <li>study type: Systematic reviews that included primary studies (either observational or clinical trials)                         <ul style="list-style-type: none"> <li>methodological quality assessment with some tool for this purpose.</li> <li>report the frequency of relevant events and the total number of individuals per group or had to incorporate statistical analyses including p values, prevalence ratios, odds ratios or risk ratios.</li> </ul> </li> </ul>
<b>Ausschlusskriterien</b>	Literature reviews, critical reviews, systematic reviews without quality methodological assessment, letters to the editor, case reports or case series, and observational or clinical studies
<b>Intervention</b> Versuchsgruppe	<b>Keine Intervention</b> VERSUCHSGRUPPE: <b>risk factor (overjet, overbite, anteriore open bite, inadequate lip coverage)</b> N=- (Anfang) / N=?? (Ende) / Alter = ?? ± ?? Jahre / ♂:♀ = ?:? <ul style="list-style-type: none"> <li>Gebissphase: -</li> <li>KFO-Behandlung: -</li> </ul>
<b>Kontrolle</b> Kontrollgruppe	<b>Keine Kontrollgruppe</b> KONTROLLGRUPPE: <b>nonexposed individuals</b> N=-(Anfang) / N=?? (Ende) / Alter = ?? ± ?? Jahre / ♂:♀ = ?:? <ul style="list-style-type: none"> <li>Gebissphase: -</li> <li>KFO-Behandlung: (keine Behandlung)</li> </ul>
<b>Outcome</b>	<b>medizinischer Schaden, Nebenwirkungen bzw. Zunahme der Anomalie /Malokklusion/Dysgnathie</b> <ul style="list-style-type: none"> <li><b>Traumaprophylaxe (dentales Frontzahntrauma)</b></li> </ul> PRIMÄRZIELGRÖßE: traumatic dental injury TDI

<p><b>Studientyp</b></p>	<p><b>Systematisches Review</b></p> <p><i>Review:</i> Inkludierte Studien in Bezug auf PICO: systematische Reviews N=3 LL-relevant (32 cross-sectional studies, 3 longitudinal studies, 1 case control 1 cohort, 24 transversal studies) (gesamtes Review N = 19)</p> <p><i>Review:</i> Gesamt-Teilnehmerzahl in Bezug auf PICO: N=???</p>
<p><b>Schlussfolgerungen der Autoren</b></p>	<p>Certain sociodemographic, clinical and environmental factors are associated with a greater chance of TDI. However, most of the systematic reviews included in the present research were of a low quality and may not provide an accurate and comprehensive summary of the necessary evidence to accurately answer the question of interest. Well-designed primary studies on different aspects of TDI are encouraged to provide scientific synthesis studies with higher evidence quality.</p>
<p><b>Zusammenfassung der Ergebnisse</b></p>	<p><b>risk factor (overjet, overbite, anteriore open bite, inadequate lip coverage) VERSUS nonexposed individuals</b></p> <p><b>traumatic dental injury TDI:</b> A higher prevalence of TDI was observed in [...] those with inadequate lip coverage,17,18 overbite,17 overjet,16-18</p>
<p><b>Angaben auffälliger positiver und/oder negativer Aspekte</b></p> <p>Studiendesign</p> <p>Durchführung</p> <p>Auswertung</p> <p><u>Funding</u></p> <p><u>Interessenkonflikte</u></p> <p><u>Bias (SIGN, AMSTAR II, Einzelstudien)</u></p>	<p><i>Studiendesign: Registrierung a priori bei Open Science Framework data-Base – aber dort keine weiteren Angaben als den Titel, definierte PICOS-Kriterien, keine Einschränkung bzgl. des Alters</i></p> <p><i>Durchführung: keine Meta-Analyse, hauptsächlich tabellarisch die Ergebnisse zusammengefasst, kurze Diskussion ohne Berücksichtigung von Störfaktoren etc., Experten während der Literatursuche kontaktiert, Malokklusion als Risikofaktor zwar in verschiedene Formen unterteilt -aber keine Aufteilung bzgl. der Ausmaßes, Literatursichtung/ Datenextraktion durch drei unabhängige Rater</i></p> <p><i>Auswertung: keine Angaben zur Alters- und Geschlechterverteilung, keine Angaben zur Verteilung der Teilnehmer in Kontroll- und Versuchsgruppe</i></p> <p><i>Power der Studie/Patientenzahl: 3 (32 corss-sectional studies, 3 longitudinal studies, 1 case control 1 cohort, 24 transversal studies) Reviews LL-relevant (gesamt 19)</i></p> <p><i>Funding:</i> Fundação Carlos Chagas Filho de Amparo à Pesquisa do Estado do Rio de Janeiro, Grant/ Award Number: E-26/010.100992/2018 and E-26/202.333/2019</p> <p><i>Interessenkonflikte: -</i></p> <p><i>Bias (SIGN/AMSTAR/EinzelstudienRoB – alle negativen Punkte aus Fragebogen auflisten): gilt nicht da Review über Reviews</i></p> <p><i>Publikationsbias (Reviews): -</i></p>
<p><b>Schlussfolgerung des Begutachters</b></p>	<p><u>methodische Qualität:</u> Einzelstudien und Review niedrig</p> <hr/> <p><u>Klinische Aussagekraft:</u> Das Risiko eines dentalen Traumas scheint durch orale Fehlfunktionen bzw. Malokklusionen (Overjet, inkompetenter Lippenschluss) erhöht zu werden. Diese Aussage ist aber nicht näher zu definieren bzgl. des Ausmaßes der jeweiligen Malokklusion und des Alters der Betroffenen.</p>

<b>Evidenz-level (SIGN)</b>	<b>2+</b>
<b>Qualität (RoB, SIGN /AMSTAR II)</b>	<b>Moderat ⊕⊕</b>

# Evidenztabelle Mandall et al. 2000

*European Journal of Orthodontics* 23 (2000) 175–183

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## Perceived aesthetic impact of malocclusion and oral self-perceptions in 14–15-year-old Asian and Caucasian children in Greater Manchester

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**SUMMARY** The aims of this study were to evaluate (i) the effect of ethnicity, social deprivation, and normative orthodontic treatment need on orthodontic aesthetic self-perception, self-perceived need for orthodontic treatment, and oral aesthetic impact of malocclusion; (ii) the effect of ethnicity, social deprivation, and gender on perceived orthodontic treatment need and use of orthodontic services; (iii) the influence of perceived oral aesthetic impact of malocclusion on perceived need and wish for orthodontic treatment; and (iv) whether orthodontic treatment experience influences perceived oral aesthetic impact of malocclusion.

A stratified, random sample of 434 14–15-year-old children from schools in Manchester, UK, was obtained. Information was collected on orthodontic aesthetic self-perception and orthodontic treatment experience using a questionnaire. The former data were combined to form an Oral Aesthetic Subjective Impact Scale (OASIS). Normative orthodontic treatment need was measured with the Index of Orthodontic Treatment Need (IOTN).

Children with higher clinical need for orthodontic treatment perceived themselves as worse off than their peers with lower need. More socially deprived children or those with high IOTN aesthetic component (AC) scores had a higher (i.e. more negative) aesthetic impact (OASIS) score. Asians and females had higher IOTN dental health component (DHC) scores, but a better aesthetic appearance than Caucasians and males. More deprived children were less likely to have received orthodontic treatment. Despite this, OASIS scores were similar between treated and untreated children. Untreated children who wished for orthodontic treatment had higher IOTN AC and OASIS scores.

<b>Population</b> <i>Setting</i> <i>Komorbiditäten</i>	„Malokklusion/Dysgnathie“ allg. <ul style="list-style-type: none"><li>schools in Manchester (UK)</li></ul>
<b>Schweregrad</b>	Keine Angaben
<b>Einschlusskriterien</b> <i>Bei Review: PICOS</i>	All 14–15-year-old Asian and Caucasian children from schools in Manchester were eligible for inclusion in the study
<b>Ausschlusskriterien</b>	Keine Angaben

<p><b>Intervention</b> Versuchsgruppe</p>	<p><b>Keine Intervention</b> <b>Keine Versuchsgruppen</b> STUDIENPOPULATION INSGESAMT: N=434 (Anfang) / N=334 (Ende) / Alter = 14-15 Jahre / ♂:♀ = “matched for age”</p> <ul style="list-style-type: none"> <li>• Gebissphase: keine Angaben</li> <li>• KFO-Behandlung: keine Behandlung</li> </ul>
<p><b>Kontrolle</b> Kontrollgruppe</p>	<p><b>Keine Kontrollgruppe</b></p>
<p><b>Outcome</b></p>	<p><b>direkter oder schadenspräventiver medizinischer Nutzen bzw. Korrektur/Prävention der Anomalie/Malokklusion/Dysgnathie</b></p> <ul style="list-style-type: none"> <li>• <b>mundgesundheitsbezogene Lebensqualität (MLQ), psychische Entwicklung</b></li> </ul> <p>PRIMÄRZIELGRÖßE: <i>Orthodontic Aesthetic Subjective Impact Score (OASIS score)</i>          SEKUNDÄRZIELGRÖßE: <i>orthodontic treatment need (IOTN dental health component score)</i>          TERTIÄRZIELGRÖßE: <i>level of social deprivation (Townsend’s Index of Social Deprivation)</i></p>
<p><b>Studientyp</b></p>	<p><b>Querschnittsstudie</b></p>
<p><b>Schlussfolgerungen der Autoren</b></p>	<ol style="list-style-type: none"> <li>1. Ethnicity and social deprivation were not important variables with respect to orthodontic aesthetic self-perception.</li> <li>2. Socially deprived children or those with high aesthetic need had a more negative perceived aesthetic impact of their malocclusion, but this did not influence their accuracy of perceived treatment need.</li> <li>3. Asians and females had higher orthodontic treatment need on dental health grounds than Caucasians and males, despite having a lower aesthetic need for treatment.</li> <li>4. Asians do not seem disadvantaged compared with Caucasians with respect to the use of orthodontic services. However, more socially deprived children seem to suffer such disadvantage in contrast to less deprived children.</li> <li>5. Perceived aesthetic impact of malocclusion is unlikely to be reliably influenced by receipt of orthodontic treatment. However, such perceived aesthetic impact seems important with respect to a wish for treatment and, therefore, potential use of orthodontic services.</li> </ol>

<b>Zusammenfassung der Ergebnisse</b>	<p><b>PRIMÄRZIELGRÖÙE, SEKUNDÄRZIELGRÖÙE, TERTIÄRZIELGRÖÙE</b> A considerable number of children (94 per cent) perceived their anterior tooth arrangement to be acceptable (IOTN AC score 1–4). A comparison of child and examiner IOTN AC scores showed that only 54 per cent agreed with the examiner regarding need for treatment.</p> <p>This revealed that ethnicity, social deprivation, and gender did not influence a child’s orthodontic aesthetic self-perceived AC scores or self-perceived need for orthodontic treatment. Children with a poorer aesthetic anterior tooth arrangement, as recorded by the examiner, generally perceived themselves as worse off (<math>P &lt; 0.001</math>). Table 3 also shows that there was a higher orthodontic treatment need on dental health grounds as measured by the examiner in Asians (<math>P = 0.017</math>) or females (<math>P = 0.014</math>). Paradoxically, AC scores were worse in Caucasian (<math>P = 0.03</math>) or male groups (<math>P = 0.004</math>). There were no statistically significant differences between Asians and Caucasians for use of orthodontic services.</p> <p>Perceived oral aesthetic impact did not influence a child’s perceived need for orthodontic treatment. However, increased scores (higher concern) were registered in untreated children who wanted appliances compared with those who did not. Receiving orthodontic treatment did not appear to significantly change the child’s perceived aesthetic impact of malocclusion. However, children with poorer IOTN AC scores or from more deprived backgrounds had a more negative perception of their teeth (higher OASIS score) compared with children with more aesthetic malocclusions or more affluent backgrounds.</p>
<b>Angaben auffälliger positiver und/oder negativer Aspekte</b>  Studiendesign Durchführung Auswertung Funding Interessenkonflikte Bias (SIGN, AMSTAR II, Einzelstudien)	<p>Studiendesign: prospektiv, randomisiert, unkontrolliert, keine Verblindung, Gruppenzuteilung anhand des Outcomes</p> <p>Durchführung: akzeptabel</p> <p>Auswertung: akzeptabel</p> <p>Power der Studie/Patientenzahl: keine Powerkalkulation, N = 434</p> <p>Funding: keine Angaben</p> <p>Interessenkonflikte: keine Angaben</p> <p>Bias (SIGN/AMSTAR/ EinzelstudienRoB – alle negativen Punkte aus Fragebogen auflisten):</p> <ul style="list-style-type: none"> <li>- Non-Responders wurden nicht kategorisiert</li> <li>- Limitationen der Studie wurden ungenügend diskutiert</li> </ul>
<b>Schlussfolgerung des Begutachters</b>	<p><u>methodische Qualität</u>: akzeptabel</p> <p><u>Klinische Aussagekraft</u>: moderat</p>
<b>Evidenzlevel (SIGN)</b>	<b>3</b>
<b>Qualität (RoB, SIGN /AMSTAR II)</b>	<b>Acceptable ⊕</b>

# Evidenztabelle **Marquezin, Kobayashi et al. 2013**

## Assessment of masticatory performance, bite force, orthodontic treatment need and orofacial dysfunction in children and adolescents

Maria Carolina Salomé Marquezin<sup>a</sup>, Fernanda Yukie Kobayashi<sup>a</sup>, Ana Bheatriz Marangoni Montes<sup>a</sup>, Maria Beatriz Duarte Gavião<sup>a</sup>, Paula Midori Castelo<sup>b,c</sup>

**Objective:** Few studies have evaluated the relationship between morphological and functional characteristics of the masticatory apparatus in young subjects. Thus, the aim of this study was to evaluate masticatory performance (MP), maximal bite force (BF), orthodontic treatment need and orofacial dysfunction in children and adolescents.

**Design:** The sample consisted of 316 subjects of both genders, with an age range 6–16 years divided into 4 groups: early mixed, intermediate mixed, late mixed and permanent dentition. MP was evaluated by the individual's ability to comminute a chewable test material in order to determine median particle size ( $X_{50}$ ) and distribution of particles in different sieves ( $\% \leq$ ). BF was determined using a digital gnatodynamometer with fork strength of 10 mm. Orofacial function and orthodontic treatment need were screened using the Nordic Orofacial Test-Screening (NOT-5) protocol and Index of Orthodontic Treatment Need (IOTN), respectively. The results were submitted to descriptive statistics, normality test, analysis of variance and stepwise multiple linear regression to test relationship between MP and studied independent variables.

**Results:** Variance of  $X_{50}$  and  $b$  between groups was statistically significant. But evaluation of variables that significantly contributed to MP variation showed that age, body mass index (BMI), BF and the presence of sleep bruxism were negatively related to  $X_{50}$  and the NOT-5 clinical scores showed a positive relationship with  $X_{50}$ .

**Conclusion:** In the studied sample, age, BMI, BF and the presence of sleep bruxism were related to better MP, but the increase in NOT-5 scores was significantly related to poorer MP.

<b>Population</b>	<p>„Malokklusion/Dysgnathie“ allg.</p> <p>The sample consisted of 316 subjects of both genders, with an age range 6–16 years divided into 4 groups: early mixed, intermediate mixed, late mixed and permanent dentition.</p>
<i>Schweregrad</i>	Keine Angabe
<i>Einschlusskriterien</i>	Keine Angabe
<i>Ausschlusskriterien</i>	Keine Angabe
<p><b>Intervention</b></p> <p>Versuchsgruppe</p>	<p><b>Keine Behandlung</b></p> <p>VERSUCHSGRUPPE: <b>early mixed dentition</b></p> <p>N=20 / Alter = 7,50 ± 1,05 Jahre / ♂:♀ = 9:11</p> <ul style="list-style-type: none"> <li>• Gebissphase: frühes Wechselgebiss</li> <li>• KFO-Behandlung: keine</li> </ul>



<b>Intervention</b> Versuchsgruppe	<p><b>Keine Behandlung</b></p> <p>VERSUCHSGRUPPE: <b>intermediate mixed dentition</b></p> <p>N=73 / Alter = 8,26 ± 1,33 Jahre / ♂:♀ = 30:43</p> <ul style="list-style-type: none"> <li>• Gebissphase: frühes Wechselgebiss, spätes Wechselgebiss</li> <li>• KFO-Behandlung: keine</li> </ul>
<b>Intervention</b> Versuchsgruppe	<p><b>Keine Behandlung</b></p> <p>VERSUCHSGRUPPE: <b>late mixed dentition</b></p> <p>N=89 / Alter = 10,83 ± 1,13 Jahre / ♂:♀ = 42:47</p> <ul style="list-style-type: none"> <li>• Gebissphase: spätes Wechselgebiss</li> <li>• KFO-Behandlung: keine</li> </ul>
<b>Intervention</b> Versuchsgruppe	<p><b>Keine Behandlung</b></p> <p>VERSUCHSGRUPPE: <b>early mixed dentition</b></p> <p>N=134 / Alter = 12,27 ± 1,61 Jahre / ♂:♀ = 57:87</p> <ul style="list-style-type: none"> <li>• Gebissphase: permanentes Gebiss &lt; 18. Lebensjahr</li> <li>• KFO-Behandlung: keine</li> </ul>
<b>Outcome</b>	<p><b>direkter oder schadenspräventiver medizinischer Nutzen bzw. Korrektur/Prävention der Anomalie/Malokklusion/Dysgnathie</b></p> <ul style="list-style-type: none"> <li>• <b>Okklusion, Kaufunktion, Funktion</b></li> </ul> <p>PRIMÄRZIELGRÖßE: <i>Maximal BF measurement and Masticatory performance determination</i></p>
<b>Studientyp</b>	<b>Querschnittsstudie</b>
<b>Schlussfolgerungen der Autoren</b>	<p>The results found in the studied sample provided the following conclusions: age, BMI, maximal BF and the presence of bruxism showed negative relations to X50, that is, a better MP; moreover, NOT-S clinical exam scores showed positive relations to X50, which means that the increase in NOT-S scores was significantly related to poorer MP. These factors that are potentially related to a decrease in MP must be followed up to ensure oral and general health in growing individuals.</p>
<b>Zusammenfassung der Ergebnisse</b>	<p><b>PRIMÄRZIELGRÖßE</b> <i>The descriptive statistics of the demographic, parafunctional and clinical characteristics of the four groups are shown in Tables 2 and 3. The distributions of X50 and b deviated from normality and they are expressed as medians and interquartile ranges in Table 4. According to the analysis of variance, X50 and b showed statistically significant differences among groups. The post hoc test also showed that the permanent dentition group had significantly smaller X50 than intermediate and late mixed dentition groups. In addition, the intermediate and late mixed dentition groups showed broader distribution of particles than the early mixed dentition group. Table 5 shows the results of the stepwise linear regression model used to test which independent variables significantly contributed to variation in X50. According to the results found, age, BMI, BF and the presence of bruxism showed negative relations to X50; that is, the increase in age, BMI, BF and the presence of sleep bruxism were related to better MP.</i></p>

	<i>The scores of NOT-S clinical examination showed positive relation to X50, which means that the increase in NOT-S scores was significantly related to poorer MP.</i>
<b>Angaben auffälliger positiver und/oder negativer Aspekte</b>	<i>Querschnittsstudie zum Einfluss von OTN auf die Kaufunktion. Keine Verblindung, aber reliable Datenerhebung. Unterteilung der Schüler entsprechend der Gebissphase. Angaben von Konfidenzintervallen. Keine Angaben zu initial gescreenten Schülern und warum/ob welche nicht in die Studie inkludiert wurden. Keine Angaben von Einschluß- und Ausschlußkriterien.</i>
<b>Schlussfolgerung des Begutachters</b>	<u>methodische Qualität:</u> ok
	<u>Klinische Aussagekraft:</u> In the studied sample, age, BMI, BF and the presence of sleep bruxism were related to better MP; but the increase in NOT-S scores was significantly related to poorer MP.
<b>Evidenzlevel (SIGN)</b>	<b>3</b>
<b>Qualität</b>	<b>Acceptable ⊕</b>

# Evidenztabelle Masood, Masood et al. 2014

## Cross-bite and oral health related quality of life in young people

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**Objective:** This study sought to assess the impact of posterior cross-bite on OHBQoL in young people aged 15–25 and to determine whether the impact on higher domains of Oral Health Impact Profile-14 (physical disability, psychological disability, social disability and handicap) is a direct function of the cross-bite or mediated through the lower domains of OHP-14 (functional limitation, pain and discomfort).

**Methods:** One hundred and forty-five young adults [72 cross-bite cases and 73 controls] aged 15–25 years, attending orthodontic clinics at the Faculty of Dentistry, Universiti Teknologi MARA participated in this study. Participants completed the OHP-14 and had a clinical examination for cross-bite. Data analyses included descriptive statistics, t-test and bivariate and multivariate regression modelling.

**Results:** There was no significant difference between the case and control groups in gender, age and education level. The mean scores (±SD) for OHP-14 total and all domains were significantly higher in cross-bite patients as compared to controls. The bivariate and multivariate regression analyses showed functional limitation was significantly associated with all the higher domains in all four models, whereas pain was only significantly associated with the psychological domain and discomfort was only significantly associated with the physical disability domain.

**Conclusion:** The possession of a posterior cross bite has a significant association with OHBQoL, especially on the functional limitation and psychological disability domains, among 15–25 years old young people. The relationship of cross-bite and lower domains of OHP-14 with higher domains of OHP-14 was in agreement with the relationships proposed by Locker's conceptual model of oral health.

**Clinical significance:** Patients with a cross bite were more limited in their oral functions and experienced greater psychological discomfort than did controls. It is possible that part of patients' rationale for seeking treatment would be to alleviate such impacts on their oral health related quality of life.

<b>Population</b>	<b>transversale Anomalie</b>  One hundred and forty-five young adults [72 cross-bite cases and 73 controls] aged 15–25 years, attending orthodontic clinics at the Faculty of Dentistry, Universiti Teknologi MARA participated in this study.
<i>Schweregrad</i>	Keine Angabe
<i>Einschlusskriterien</i>	To be eligible, the participant had to be in good general health
<i>Ausschlusskriterien</i>	Participants who required a surgical intervention or who had chronic medical conditions, severe dentofacial anomalies such as cleft lip and palate, untreated dental caries, and poor periodontal health status as indicated by a community periodontal index score of 3 or more were excluded, as were those who had undergone previous orthodontic treatment

<p><b>Intervention</b> Versuchsgruppe</p>	<p><b>Keine Behandlung, aber Malokklusion/kraniofaziale Fehlbildung</b></p> <p>VERSUCHSGRUPPE: <b>crossbite</b></p> <p>N=72 (Anfang) / N=71(Ende) / Alter = MIN:15, MAX:25 Jahre / ♂:♀ = 29:42</p> <ul style="list-style-type: none"> <li>• Gebissphase: permanentes Gebiss</li> <li>• KFO-Behandlung: keine</li> </ul>
<p><b>Kontrolle</b> Kontrollgruppe</p>	<p><b>Keine Malokklusion/kraniofaziale Fehlbildung</b></p> <p>KONTROLLGRUPPE: <b>control</b></p> <p>N=74 (Anfang) / N=73 (Ende) / Alter = MIN:15, MAX:25 Jahre / ♂:♀ = 27:45</p> <ul style="list-style-type: none"> <li>• Gebissphase: permanentes Gebiss</li> <li>• KFO-Behandlung: keine</li> </ul>
<p><b>Outcome</b></p>	<p><b>direkter oder schadenspräventiver medizinischer Nutzen bzw. Korrektur/Prävention der Anomalie/Malokklusion/Dysgnathie</b></p> <ul style="list-style-type: none"> <li>• <b>mundgesundheitsbezogene Lebensqualität (MLQ), psychische Entwicklung</b></li> </ul> <p>PRIMÄRZIELGRÖßE: <i>ssociation between OHIP-14 and crossbite, gender, age group and education level. (OHIP, education level, age ,sex, crossbite)</i></p>
<p><b>Studientyp</b></p>	<p><b>Querschnittsstudie</b></p>
<p><b>Schlussfolgerungen der Autoren</b></p>	<p>The possession of a posterior cross bite among 15–25 years old young people has a significant association with impairment of oral health related quality of life especially on the functional limitation and psychological disability domains. The relationship of cross-bite and the lower order domains of OHIP-14 (functional limitation, pain and discomfort) with higher domains of OHIP-14 (physical disability, psychological disability, social disability and handicap) were concordant with Locker’s conceptual model of oral health.</p>
<p><b>Zusammenfassung der Ergebnisse</b></p>	<p><b>GRUPPE crossbite VS. GRUPPE control</b></p> <p><i>PRIMÄRZIELGRÖßE Table 2 displays the mean, standard deviation, median and the range for the total OHIP-14 score and its domains for both case and control groups. The mean scores (±SD) for the total OHIP-14 and all domains were significantly higher in crossbite patients as compared to controls. The social disability (2.85 ± 2.06) domain of OHIP-14 showed least impact due to cross-bite. Whereas, the psychological discomfort domain had the highest impact with a mean (±SD) of 4.24 ±1.69. Table 3 summarizes the bivariate and multivariate analyses to establish the association between OHIP-14 and crossbite, gender, age group and education level. Although crossbite only accounted for 11% of the variation in OHIP-14 score, this association was highly significant ( &lt; 0.001). People with cross-bite have 8.4 points higher impact scores on OHIP-14 when compared to controls, after controlling for other covariates this impact increased to 9.2 points on OHIP-14 scale. Although, females reported a slightly higher impact than males, this was not significant in both the bivariate and multivariate analyses. Only the 22–25 year old age group has a significant negative association with overall OHIP-14 score ( p &lt; 0.05) and age explained 10% of the variation in OHIP-14 score. This age group association becomes stronger in the multivariate model. Table 4 shows the multivariate regression analysis to identify the impacts of lower domains of OHIP-14 on higher domains of OHIP-14 after adjusting for cross-bite and other covariates.</i></p>

<p><b>Zusammenfassung der Ergebnisse</b></p>	<p><i>Sex, age and education level had no significant association with any of the higher domains of OHIP-14. Functional limitation was significantly associated with all the higher domains in all four models, whereas pain was only significantly associated with the psychological domain (model 2) and discomfort was only significantly associated with physical disability. Interestingly, the presence of a cross-bite was not significantly associated with the disability domains (models 1, 2 and 3) it was only associated significantly with the handicap domain.</i></p>
<p><b>Angaben auffälliger positiver und/oder negativer Aspekte</b></p>	<p><i>Kohortenstudie zum Einfluss von Zahnfehlstellungen auf die OHRQoL. Keine Angaben zur Finanzierung. Keine Angabe von initial gescreenten Patienten. Unklare Trotz Drop-outs keine ITT-Analysen. Keine Verblindung, aber reliable und valide Datenerhebung.</i></p>
<p><b>Schlussfolgerung des Begutachters</b></p>	<p><u>methodische Qualität:</u> ok</p> <hr/> <p><u>Klinische Aussagekraft:</u> Patients with a cross bite were more limited in their oral functions and experienced greater psychological discomfort than did controls. It is possible that part of patients' rationale for seeking treatment would be to alleviate such impacts on their oral health related quality of life.</p>
<p><b>Evidenz-level (SIGN)</b></p>	<p><b>3</b></p>
<p><b>Qualität</b></p>	<p><b>Acceptable ⊕</b></p>

# Evidenztabelle Maspero, Prevedello et al. 2014

## REVIEWS

MINERVA STOMATOL 2014;68:217-27

### Atypical swallowing: a review

C. MASPERO, C. PREVEDELLO, L. GIANNINI, G. GALIATI, G. FARRONATO

**Aim.** Atypical swallowing is a myofunctional problem consisting of an altered tongue position during the act of swallowing. High incidence in population, multifactorial etiology and the recurring connection with the presence of malocclusions made it a topic of strong interest and discussion in science. The purpose of this review is to illustrate the current orientation on the topic of atypical swallowing, trying in particular to answer two questions: 1) what kind of connection is there between atypical swallowing and malocclusion; 2) what kind of therapy should be used to solve it.

**Methods.** This review was conducted on the Medline database [www.ncbi.nlm.nih.gov/pubmed] searching for the keywords "atypical swallowing" and "tongue thrust". We examined all the documents from the year 1970 onwards, excluding the ones about syndromic cases of the central motor system.

**Results.** The causal relation between the two problems seems to be biunique: some authors affirm that this oral habit starts as a

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compensation mechanism for a preexisting malocclusion (especially in case of open-bite); other texts show that it has a tendency to exacerbate cases of malocclusion; it is also proven that a non-physiological tongue thrust can negatively influence the progress of an ongoing orthodontic therapy. Thereby, the best therapeutic approach seems to be a multidisciplinary one: beside orthodontics, which is necessary to correct the malocclusion, it is essential to set up a myofunctional rehabilitation procedure to correct the oral habit, therefore granting long time perma-

nent results. There is also proof of a substantial difference between the results obtained from early (deciduous or primary mixed dentition) or later treatments.

**Conclusions.** The biunique causal relation between atypical swallowing and malocclusion suggests a multidisciplinary therapeutic approach, orthodontic and myofunctional, to temporarily solve both problems. An early diagnosis and a prompt intervention have a significantly positive influence on the therapy outcome.

**Key words:** Dental occlusion - Orthodontics - Deglutition.

compensation mechanism for a preexisting malocclusion (especially in case of open-bite); other texts show that it has a tendency to exacerbate cases of malocclusion; it is also proven that a non-physiological tongue thrust can negatively influence the progress of an ongoing orthodontic therapy. Thereby, the best therapeutic approach seems to be a multidisciplinary one: beside orthodontics, which is necessary to correct the malocclusion, it is essential to set up a myofunctional rehabilitation procedure to correct the oral habit, therefore granting long time perma-

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<b>Population</b> <i>Setting</i> <i>Komorbiditäten</i>	<b>„Malokklusion/Dysgnathie“ allg.</b> <ul style="list-style-type: none"> <li>• Details: - (humans)</li> </ul>
<b>Schweregrad</b>	nicht angegeben
<b>Einschlusskriterien</b> <i>Bei Review: PICOS</i>	<ul style="list-style-type: none"> <li>• Population: - (humans)</li> <li>• Intervention: keine Intervention (zur Auswertung: atypical swallowing)</li> <li>• Comparison: keine Kontrollgruppe</li> <li>• Outcome: PRIMÄRZIELGRÖßE: malocclusion</li> <li>• Study type: -</li> </ul>
<b>Ausschlusskriterien</b>	<ol style="list-style-type: none"> <li>1. any text prior to the 1990s</li> <li>2. texts about diseases of the central nervous system</li> </ol>
<b>Intervention</b> <i>Versuchsgruppe</i>	<b>Keine Intervention</b> <b>VERSUCHSGRUPPE: atypical swallowing</b> N=- (Anfang) / N=?? (Ende) / Alter = - Jahre / ♂:♀ =- <ul style="list-style-type: none"> <li>• Gebissphase: -</li> <li>• KFO-Behandlung: -</li> </ul>
<b>Kontrolle</b> <i>Kontrollgruppe</i>	<b>Keine Kontrollgruppe</b> <b>KONTROLLGRUPPE: malocclusion</b> N=- (Anfang) / N=?? (Ende) / Alter = - Jahre / ♂:♀ =- <ul style="list-style-type: none"> <li>• Gebissphase: -</li> <li>• KFO-Behandlung: keine Behandlung</li> </ul>
<b>Outcome</b>	<b>medizinischer Schaden, Nebenwirkungen bzw. Zunahme der Anomalie /Malokklusion/Dysgnathie</b> <ul style="list-style-type: none"> <li>• <b>Atmung und Luftraum (Airway space, Schlafapnoe), Schlucken und Sprechen</b></li> </ul> PRIMÄRZIELGRÖßE: malocclusion
<b>Studientyp</b>	<b>Systematisches Review</b> Review: Inkludierte Studien in Bezug auf PICO: - N=82 Review: Gesamt-Teilnehmerzahl in Bezug auf PICO: N=-

<p><b>Schlussfolgerungen der Autoren</b></p>	<p>Atypical swallowing is a complex problem, whose study has been a source of interest for decades and still remains a subject of discussion under many aspects: etiology, treatment and the association with dysfunctions and dysmorphias more or less located in the facial region.</p> <p>The relationship between the <b>presence of oral habits and the onset of disorders of the stomatognathic apparatus can be defined as biunique</b>. As atypical swallowing and the persistence of childhood oral habits can affect the proper dental-skeletal development, in the same way anatomical disorders of the stomatognathic apparatus can determine a situation of atypical swallowing with subsequent neuromuscular disorders. If the oral habit is contemporary to a misfortune, it is necessary a <b>multidisciplinary therapeutic approach</b> that solves both problems, since the persistence of the "tongue thrust" could prevent the success of the orthodontic therapy and cause relapses in the long term. With an <b>early diagnosis we can significantly improve the prognosis</b>, in fact, we get better results in terms of quality and durability with therapies that started with deciduous or primary mixed dentition. A "tongue thrust" diagnosis is less easy than the one of an anomalous tongue activity while swallowing. If it's not possible to identify the situation from the objective analysis, we can count on some instrumental methods, such as electromyography, kinesiography and sonography. Since we saw that the <b>presence of a "tongue thrust" does not necessarily imply the presence of a malocclusion</b>, there's no need for instrumental screening analysis for all the subjects in pediatric age, despite the high incidence of atypical swallowing in population. <i>Viceversa</i>, in case of patients with particular malocclusions (especially anterior open-bite, posterior cross-bite, incisors proinclination), it is advisable to verify that there's no negative influence by the tongue. If that happened, it wouldn't be possible to carry on the orthodontic therapy regardless of myofunctional rehabilitation. The planning of the most suitable therapy has necessarily to be done based on the subject's features: the presence of any oral habit, head and body posture, the degree of compliance of the patient. Any oral habit needs to be always detected precociously. If the subject is still in deciduous or primary mixed dentition, so still growing up, it is worthy to try a re-educational approach before the orthodontic one. <b>There are case reports showing that just suspending oral habits can lead to the self correction</b> of the morphological defect. On the other hand, if the <b>subject is more mature from a dental-skeletal point of view, an orthodontic operation</b> will be needed, still keeping the association with the myofunctional rehabilitation</p>
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<p><b>Zusammenfassung der Ergebnisse</b></p>	<p>Within the authors that still choose to investigate this topic, about the 86% says that atypical swallowing is a risk factor of:</p> <ul style="list-style-type: none"> <li>— <b>alterations in teeth position</b> (anterior open bite, posterior cross-bite, incisors proinclination);</li> <li>— <b>alterations in mimic and mastication muscles</b> (hyperactivity and hypotony respectively).</li> </ul> <p>We couldn't find articles that proved its influence on the growth of maxillar bones. <b>Other studies (about 14%) state that the altered morphofunctional development of the stomatognathic apparatus is not caused by atypical swallowing. Instead, the tongue posture alteration would be the result of a physical defect</b>, therefore being a compensation mechanism to overcome a preexisting structural anomaly.</p> <p>Thirty-five percent of the articles selected discussed the type of therapy to set up for an orthodontic patient with atypical swallowing. All of them assert that orthodontics, as the only treatment, is not enough to solve the problem. It would therefore be necessary <b>a multidisciplinary approach, orthodontic and myofunctional, to guarantee a long-term optimal result.</b></p> <p>Give the strong statistical association between atypical swallowing, oral breathing and, subsequently, acute otitis media, many of the selected studied were both of odontological and otolaryngological relevance (about 13%)</p> <p>Atypical swallowing is also topic of study in the gnathologic and posturologic fields (11% of the articles selected). On one hand, the percentage of subjects with <b>dysfunctions on the TMJ showing atypical swallowing as well is high</b>; on the other, there is a <b>statistic relation between altered tongue position and altered cranial posture</b>. The causal relation between these problems, though, is not investigated.</p>
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<p><b>Angaben auffälliger positiver und/oder negativer Aspekte</b></p> <p>Studiendesign</p> <p>Durchführung</p> <p>Auswertung</p> <p>Funding</p> <p><u>Interessenkonflikte</u></p> <p><u>Bias (SIGN, AMSTAR II, Einzelstudien)</u></p>	<p><i>Studiendesign: keine Registrierung a priori, keine Definition der PICOS, keine RoB-Analyse, keine Meta-Analyse</i></p> <p><i>Durchführung: nur 1 Datenbank durchsucht, keine Angaben zu Datenextraktion und Literatursichtung, keine Angaben zu den Charakteristika der Einzelstudien, nur narrative Analyse</i></p> <p><i>Auswertung: Studiendesign der Einzelstudien nicht bekannt, keine Angaben zu Alter/Geschlecht/Art der Malokklusion etc. der Teilnehmer</i></p> <p><i>Power der Studie/Patientenzahl: 82/-</i></p> <p><i>Funding: -</i></p> <p><i>Interessenkonflikte: The authors certify that there is no conflict of interest with any financial organization regarding the material discussed in the manuscript.</i></p> <p><i>Bias (SIGN/AMSTAR/EinzelstudienRoB – alle negativen Punkte aus Fragebogen auflisten):</i></p> <p><b>2. Did the report of the review contain an explicit statement that the review methods were established prior to the conduct of the review and did the report justify any significant deviations from the protocol?</b></p> <p><b>3. Did the review authors explain their selection of the study designs for inclusion in the review?</b></p> <p><b>4. Did the review authors use a comprehensive literature search strategy?</b></p> <p><b>5. Did the review authors perform study selection in duplicate?</b></p> <p><b>6. Did the review authors perform data extraction in duplicate?</b></p> <p><b>7. Did the review authors provide a list of excluded studies and justify the exclusions?</b></p> <p><b>8. Did the review authors describe the included studies in adequate detail?</b></p> <p><b>9. Did the review authors use a satisfactory technique for assessing the risk of bias (RoB) in individual studies that were included in the review?</b></p> <p><b>10. Did the review authors report on the sources of funding for the studies included in the review?</b></p> <p><b>13. Did the review authors account for RoB in individual studies when interpreting/ discussing results of the review?</b></p> <p><b>14. Did the review authors provide a satisfactory explanation for, and discussion of, any heterogeneity observed in the results of the review?</b></p> <p><i>Publikationsbias (Reviews): -</i></p>
<p><b>Schlussfolgerung des Begutachters</b></p>	<p><u>methodische Qualität:</u> Review niedrig, Einzelstudien nicht beurteilbar</p> <p><u>Klinische Aussagekraft:</u> Ein pathologisches Schluckmuster scheint dentale und skelettale Strukturen zu beeinflussen, wobei auch ein umgekehrter Zusammenhang denkbar ist. Aufgrund der fehlenden Angaben zu den Einzelstudien lassen sich keine weiteren Aussagen bzgl. einer Korrelation zwischen Malokklusion und pathologischem Schluckmuster treffen. Die Kieferorthopädie stellt einen Teil der interdisziplinären Therapie des pathologischen Schluckmusters dar.</p>
<p><b>Evidenzlevel (SIGN)</b></p>	<p><b>3</b></p>
<p><b>Qualität (RoB, SIGN /AMSTAR II)</b></p>	<p><b>Moderat ++</b></p>

# Evidenztabelle Muto, Yamazaki et al. 2008

Int. J. Oral Maxillofac. Surg. 2008; 37: 228-231  
doi:10.1053/j.ijom.2007.08.025, available online at <http://www.elsevier.com>



Clinical Paper  
Orthognathic Surgery

## A cephalometric evaluation of the pharyngeal airway space in patients with mandibular retrognathia and prognathia, and normal subjects

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T. Muto, A. Yamazaki, S. Takada: A cephalometric evaluation of the pharyngeal airway space in patients with mandibular retrognathia and prognathia, and normal subjects. Int. J. Oral Maxillofac. Surg. 2008; 37: 228-231. © 2007 International Association of Oral and Maxillofacial Surgeons. Published by Elsevier Ltd. All rights reserved.

**Abstract.** The antero-posterior diameter of the pharyngeal airway space (PAS) at the level of the soft palate and base of the tongue was assessed in age-matched females with a normal mandible ( $n = 31$ ), mandibular retrognathism ( $n = 30$ ) or mandibular prognathism ( $n = 38$ ). All subjects were examined by lateral cephalometry. Measured variables were corrected with the use of appropriate regression equations to eliminate the effects of head posture on the PAS. The corrected data showed more clear-cut differences in the PAS among the three groups than did the measured data. Pharyngeal airway diameter was largest in the group with mandibular prognathism, followed by the normal mandible and mandibular retrognathism groups. These results indicate that the antero-posterior dimension of the PAS is affected by different skeletal patterns of the mandible.

<b>Population</b>	„Malokklusion/Dysgnathie“ allg.
<i>Setting</i>	<ul style="list-style-type: none"> <li>Department of Orthodontics at the Health Sciences University Hospital (Japan)</li> </ul>
<i>Komorbidityäten</i>	
<b>Schweregrad</b>	angle SNB < 76° / angle SNB > 82° / 76° ≤ SNB ≤ 82°
<b>Einschlusskriterien</b>	Keine Angaben
<i>Bei Review: PICOS</i>	
<b>Ausschlusskriterien</b>	Keine Angaben

<p><b>Intervention</b> Versuchsgruppe</p>	<p><b>Keine Intervention</b></p> <p>VERSUCHSGRUPPE: <b>mandibular retrognathism</b></p> <p>N=30 (Anfang) / N=30 (Ende) / Alter = 22,3 ± ?? Jahre / ♂:♀ = 0:30</p> <ul style="list-style-type: none"> <li>• Gebissphase: permanentes Gebiss &lt; 18. Lebensjahr, permanentes Gebiss ≥ 18. Lebensjahr</li> <li>• KFO-Behandlung: keine Behandlung</li> </ul> <p>VERSUCHSGRUPPE: <b>mandibular prognathism</b></p> <p>N=38 (Anfang) / N=38 (Ende) / Alter = 21,7 ± ?? Jahre / ♂:♀ = 0:38</p> <ul style="list-style-type: none"> <li>• Gebissphase: permanentes Gebiss ≥ 18. Lebensjahr</li> <li>• KFO-Behandlung: keine Behandlung</li> </ul>
<p><b>Kontrolle</b> Kontrollgruppe</p>	<p><b>keine kieferorthopädische Therapie</b></p> <p>KONTROLLGRUPPE: <b>normal mandible</b></p> <p>N=31 (Anfang) / N=31 (Ende) / Alter = 23,5 ± ?? Jahre / ♂:♀ = 0:31</p> <ul style="list-style-type: none"> <li>• Gebissphase: permanentes Gebiss ≥ 18. Lebensjahr</li> <li>• KFO-Behandlung: keine Behandlung</li> </ul>
<p><b>Outcome</b></p>	<p><b>direkter oder schadenspräventiver medizinischer Nutzen bzw. Korrektur/Prävention der Anomalie/Malokklusion/Dysgnathie</b></p> <ul style="list-style-type: none"> <li>• <b>Atmung und Luftraum (Airway space, Schlafapnoe), Schlucken und Sprechen</b></li> </ul> <p>PRIMÄRZIELGRÖßE: <i>Pharyngeal airway space (PAS)</i></p> <p>SEKUNDÄRZIELGRÖßE: <i>Head posture (OPT/NSL)</i></p>
<p><b>Studientyp</b></p>	<p><b>Querschnittsstudie</b></p>
<p><b>Schlussfolgerungen der Autoren</b></p>	<p>The results indicate that the PAS–UP and PAS–TP (PAS at the base of the tongue) are more narrow and collapsible in mandibular retrognathism than in subjects with a normal mandible. Many patients with retrognathism show contact between the soft palate and tongue because of downward displacement of the tongue. In supine position the tongue is situated ventrally to the soft palate and can push the soft palate dorsally, changing the PAS7. During sleep, airway narrowing may occur as a result of posterior displacement of the soft palate<sup>16</sup>. Mandibular retrognathism may be the most important risk factor for upper airway obstruction.</p>

<p><b>Zusammenfassung der Ergebnisse</b></p>	<p><b>mandibular retrognathism VS. mandibular prognathism VS. normal mandible</b></p> <p><b>PRIMÄRZIELGRÖÙE, SEKUNDÄRZIELGRÖÙE</b> <i>The relationship between the PAS and craniofacial morphology was examined with the corrected data because the PAS was affected by head posture. PAS–UP correlated with PNS–Ba in mandibular prognathism (<math>r = 0.457</math>), uvula length in the normalmandible (<math>r = -0.522</math>) and mandibular retrognathism (<math>-0.488</math>), and facial axis in mandibular prognathism (<math>r = 0.358</math>). When the whole study group was analysed, PAS–UP correlated with uvula length (0.588) and facial axis (0.640). PAS–TP correlated with Ar–Gn in the normal mandible, SNP in mandibular prognathism, C3–Me in all three groups and facial axis in mandibular prognathism. When all subjects were analysed together, PAS–TP correlated with five variables (Ar–Gn, SNP, Go–Gn, C3–Me and facial axis). The correlation between PAS–TP and C3–Me was particularly strong (0.725). In general, a large mandible correlated with a large PAS.</i></p>
<p><b>Angaben auffälliger positiver und/oder negativer Aspekte</b></p> <p>Studiendesign</p> <p>Durchführung</p> <p>Auswertung</p> <p><u>Funding</u></p> <p><u>Interessenkonflikte</u></p> <p><u>Bias (SIGN, AMSTAR II, Einzelstudien)</u></p>	<p><i>Studiendesign: retrospektiv, kontrolliert, nicht randomisiert, keine Verblindung, Gruppenteilung anhand des Outcomes</i></p> <p><i>Durchführung: akzeptabel</i></p> <p><i>Auswertung: akzeptabel</i></p> <p><i>Power der Studie/Patientenzahl: keine Powerkalkulation, N = 99</i></p> <p><i>Funding: keine Angaben</i></p> <p><i>Interessenkonflikte: keine Angaben</i></p> <p><i>Bias (SIGN/AMSTAR/EinzelstudienRoB – alle negativen Punkte aus Fragebogen auflisten):</i></p> <ul style="list-style-type: none"> <li>- <i>Die Größe der Studienpopulation wurde nicht gerechtfertigt</i></li> <li>- <i>Keine Ein- und Ausschlusskriterien definiert</i></li> <li>- <i>Limitationen der Studie wurden nicht diskutiert</i></li> </ul>
<p><b>Schlussfolgerung des Begutachters</b></p>	<p><u>methodische Qualität:</u> akzeptabel</p> <p><u>Klinische Aussagekraft:</u> moderat (Die vorliegende Studie konnte einen signifikanten Zusammenhang zwischen der Lage des Unterkiefers und dem pharyngealen Luftweg feststellen. Die Aussagekraft ist allerdings durch die unklare Definition der untersuchten Population lediglich als moderat anzusehen.)</p>
<p><b>Evidenzlevel (SIGN)</b></p>	<p><b>3</b></p>
<p><b>Qualität (RoB, SIGN /AMSTAR II)</b></p>	<p><b>Acceptable ⊕</b></p>

# Evidenztabelle Nguyen, Bezemer et al. 1999

European Journal of Orthodontics 21 (1999) 303-317

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## A systematic review of the relationship between overjet size and traumatic dental injuries

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**SUMMARY** The aim of this study was to aggregate the risk of traumatic dental injury due to overjet using several published papers and performing a meta-analysis on the results. The 11 articles involved in this investigation were identified by a literature search of Medline (1966–1996) and Excerpta Medica (1985–1996) databases using predetermined keywords, and inclusion and exclusion criteria.

In order to assess the quality of each paper, a methodological checklist for observational studies was developed resulting in a score between 0 and 100. The relative risk of overjet, compared with a reference, was expressed as an Odds Ratio (OR). For each study, the OR was computed using the data presented and, subsequently, these ORs were pooled across studies. The effect of confounders (i.e. age, gender), which could bias the relationship between overjet and dental injury was taken into account. Furthermore, the influence of quality of the study on the pooled OR was addressed.

The average methodological score was 41. From the results, it can be concluded that children with an overjet larger than 3 mm are approximately twice as much at risk of injury to anterior teeth than children with an overjet smaller than 3 mm. The effect of overjet on the risk of dental injury is less for boys than for girls in the same overjet group. In addition, risk of injury of anterior teeth tends to increase with increasing overjet size. Furthermore, the pooled OR does not seem to be affected by the quality of the studies.

<b>Population</b> <i>Setting</i> <i>Komorbiditäten</i>	„Malokklusion/Dysgnathie“ allg.  • - (humans)
<b>Schweregrad</b>	nicht angegeben
<b>Einschlusskriterien</b> <i>Bei Review: PICOS</i>	<ul style="list-style-type: none"> <li>• Population: - (humans)</li> <li>• Intervention: keine Intervention (zur Auswertung: overjet sizes, scored in millimetres)</li> <li>• Comparison: keine Kontrollgruppe</li> <li>• Outcome: PRIMÄRZIELGRÖÖE: traumatic injury of anterior teeth.</li> <li>• Study type: -</li> </ul>
<b>Ausschlusskriterien</b>	<ol style="list-style-type: none"> <li>1. Studies with missing data (four)</li> <li>2. Studies concerning the prevalence of incisor injuries only (eight)</li> </ol>

<b>Intervention</b> Versuchsgruppe	<b>Keine Intervention</b> VERSUCHSGRUPPE: <b>overjet sizes (scored in millimetres)</b> N=- (Anfang) / N=?? (Ende) / Alter = 6-18 Jahre / ♂:♀ = - <ul style="list-style-type: none"> <li>• Gebissphase: frühes bis spätes Wechselgebiss, permanentes Gebiss &lt; 18. Lebensjahr</li> <li>• KFO-Behandlung: (Frühbehandlung, reguläre Behandlung)</li> </ul>
<b>Kontrolle</b> Kontrollgruppe	<b>Keine Kontrollgruppe</b> KONTROLLGRUPPE: <b>traumatic injury of anterior teeth</b> N=-(Anfang) / N=?? (Ende) / Alter = 6-18 Jahre / ♂:♀ = - <ul style="list-style-type: none"> <li>• Gebissphase: frühes bis spätes Wechselgebiss, permanentes Gebiss &lt; 18. Lebensjahr</li> <li>• KFO-Behandlung: keine Behandlung</li> </ul>
<b>Outcome</b>	<b>medizinischer Schaden, Nebenwirkungen bzw. Zunahme der Anomalie /Malokklusion/Dysgnathie</b> <ul style="list-style-type: none"> <li>• <b>Traumaprophylaxe (dentales Frontzahntrauma)</b></li> </ul> PRIMÄRZIELGRÖßE: traumatic injury of anterior teeth.
<b>Studientyp</b>	<b>Systematisches Review, Meta-Analyse</b> Review: Inkludierte Studien in Bezug auf PICO: - N=11 Review: Gesamt-Teilnehmerzahl in Bezug auf PICO: N=-

<p><b>Schlussfolgerungen der Autoren</b></p>	<p>Although the possibility of publication-bias cannot be excluded, it can be concluded from this study that children with an <b>overjet larger than 3 mm are approximately twice as much at risk of traumatic dental injury on anterior teeth than those with an overjet less than 3 mm</b>. The <b>effect of overjet is less for boys than for girls</b> in the same overjet group. In addition, <b>risk of an injury to anterior teeth tends to increase with increasing overjet size</b>. Surprisingly, the pooled OR does not seem to be affected by the quality of the studies. In this investigation, comprehensive pooling was not possible because of differences in the method of measurement, reporting of data, confounders involved in the study and the chosen categories of overjet size. Nevertheless, the incorporation of overjet as a malocclusion item into orthodontic treatment indices seems to be valid since the overall odds ratio is larger than 2. Although this threshold is, in fact, arbitrary, it is commonly accepted that an odds ratio of 2 is a plausible limit for occlusal abnormalities (Pullinger <i>et al.</i>, 1993).</p> <p>Concerning orthodontic treatment indices, however, many aspects regarding the relationship between overjet and traumatic dental injury still remain obscure. What is the empirically best cut-off point of overjet related to the risk? What is the risk of trauma given a certain overjet size when different ages are taken into account? What is the minimal risk at which treatment should be indicated? Should the indication for treatment be different for boys and girls? To answer these questions more studies are needed. The recommendations for the design of future studies include avoidance of changing continuous data into categorical data. Furthermore, it has to be borne in mind that age is an important factor. Concerning the sample size, power analysis can be performed preceded by determination of the clinically relevant effect of overjet to be detected (Cohen, 1992; Hallahan and Rosenthal, 1996) and finally, due to the multifactorial character of trauma, model-analysis is the statistical technique of choice.</p>
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<p><b>Zusammenfassung der Ergebnisse</b></p>	<p><b>overjet sizes (scored in millimetres) AND traumatic injury of anterior teeth</b></p> <p><b>traumatic injury of anterior teeth:</b></p> <p><i>Subgruppenanalyse: Overjet size: 3 mm and less, more than 3 mm and 6 mm and more</i></p> <p><i>Subgroup Overjet of 3 mm and less versus more than 3 mm:</i></p> <p>Table 2 and Figure 1 show the pooled result for the overjet group of 3 mm and less compared with the one of more than 3 mm, regardless of methodological quality of the study and age. The <b>pooled OR was 2.30</b> (CI = 2.04–2.58). The homogeneity test was significant (<math>P &lt; 0.001</math>), which means that the <b>ORs were heterogeneous</b>. In order to find an explanation for the heterogeneity of the ORs the following analyses were performed.</p> <p>The study of Otuyemi (1994) was excluded for further analysis since its OR differed considerably from other studies. A possible explanation for this deviation is that its data were collected only for a single age (12 years). The pooled OR of the remaining investigations was therefore 2.16 (CI = 1.91–2.44). The ORs were still heterogeneous (<math>0.01 &lt; P &lt; 0.02</math>) and shown in Table 2.</p> <p>Only pooling results of studies with an internal validity score above average (19), Table 2, resulted in a pooled OR of 2.17 (CI = 1.81–2.59). The homogeneity test remained significant (<math>0.02 &lt; P &lt; 0.05</math>). When the average of the total methodological score was used (score 41), the pooled OR of the studies scoring above this average remained almost unchanged, 2.17 (CI = 1.87–2.51). However, the homogeneity test was no longer significant (<math>0.1 &lt; P &lt; 0.2</math>), which indicates no evident heterogeneity (Table 2).</p> <p>Finally, the studies were <b>stratified by gender</b>, regardless of the methodological quality (Table 3 and Figure 2). The <b>pooled ORs were 2.90 (CI = 2.33–3.76) and 1.77 (CI = 1.41–2.20) for girls and boys</b>, respectively, with no significant heterogeneity (<math>0.1 &lt; P &lt; 0.2</math> for girls and <math>0.05 &lt; P &lt; 0.1</math> for boys).</p> <p><i>Overjet 3 mm and less versus more than 6 mm.</i> For this analysis only three studies were available (Table 4 and Figure 3). The age group was from 6 to 18 years. The <b>pooled OR was 2.63</b> (CI = 2.03–3.29) and the results incorporated in this analysis were heterogeneous (<math>0.01 &lt; P &lt; 0.02</math>).</p>
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<p><b>Angaben auffälliger positiver und/oder negativer Aspekte</b></p> <p>Studiendesign</p> <p>Durchführung</p> <p>Auswertung</p> <p>Funding</p> <p><u>Interessenkonflikte</u></p> <p><u>Bias (SIGN, AMSTAR II, Einzelstudien)</u></p>	<p><i>Studiendesign: keine Registrierung a priori, keine Definition des PICOS (außer Outcome), Meta-Analyse, Subgruppenanalyse bzgl. Geschlecht und Overjet-Messungen, keine eigentliche RoB-Analyse aber Überprüfung der methodischen Qualität der Einzelstudien</i></p> <p><i>Durchführung: keine Angaben zur Literatursichtung/ Datenextraktion, Meta-Analyse bzw. OR berücksichtigt Heterogenität/ Subgruppen, keine Angaben zum Studiendesign/ Charakteristika (außer Alter) der eingeschlossenen Einzelstudien, Berücksichtigung von Störfaktoren soweit möglich,</i></p> <p><i>Auswertung: nur Kinder und Jugendliche eingeschlossen, keine Angaben zur Messmethodik des Traumas (radiologisch, klinisch), gute Diskussion unter Berücksichtigung der Störfaktoren</i></p> <p><i>Power der Studie/Patientenzahl: 11/-</i></p> <p><i>Funding: -</i></p> <p><i>Interessenkonflikte: -</i></p> <p><i>Bias (SIGN/AMSTAR/EinzelstudienRoB – alle negativen Punkte aus Fragebogen auflisten):</i></p> <p><b>2. Did the report of the review contain an explicit statement that the review methods were established prior to the conduct of the review and did the report justify any significant deviations from the protocol?</b></p> <p><b>3. Did the review authors explain their selection of the study designs for inclusion in the review?</b></p> <p><b>5. Did the review authors perform study selection in duplicate?</b></p> <p><b>6. Did the review authors perform data extraction in duplicate?</b></p> <p><b>7. Did the review authors provide a list of excluded studies and justify the exclusions?</b></p> <p><b>8. Did the review authors describe the included studies in adequate detail?</b></p> <p><b>10. Did the review authors report on the sources of funding for the studies included in the review?</b></p> <p><b>15. If they performed quantitative synthesis did the review authors carry out an adequate investigation of publication bias (small study bias) and discuss its likely impact on the results of the review?</b></p> <p><b>16. Did the review authors report any potential sources of conflict of interest, including any funding they received for conducting the review?</b></p> <p><i>Publikationsbias (Reviews):-</i></p>
<p><b>Schlussfolgerung des Begutachters</b></p>	<p><u>methodische Qualität:</u> Review moderat, Einzelstudien moderat</p> <p><u>Klinische Aussagekraft:</u> Kinder und Jugendliche haben ein höheres Frontzahntrauma-Risiko, je größer der Overjet ausfällt. Inwieweit das Alter und andere Störfaktoren zusätzlich das Risiko beeinflussen, kann nicht gesagt werden.</p>
<p><b>Evidenzlevel (SIGN)</b></p>	<p><b>3</b></p>
<p><b>Qualität (RoB, SIGN /AMSTAR II)</b></p>	<p><b>Moderat ⊕⊕</b></p>

# Evidenztabelle Oz, Orhan et al. 2013

Journal of Orofacial Orthopedics  
 Fortschritte der Kieferorthopädie

Original article

## 2D lateral cephalometric evaluation of varying types of Class II subgroups on posterior airway space in postadolescent girls: a pilot study

## Zweidimensionale kephalometrische Auswertung der Atemwegsweiten im Rachen von postadoleszenten Mädchen mit diversen Klasse-II-Mustern: eine Pilotstudie

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### Abstract

**Aims.** The purpose of this study was to compare pharyngeal airway linear measurements of untreated skeletal Class II subjects with low-, neutral- and high-angle facial patterns and a skeletal Class I control group of postadolescent girls.

**Methods.** We enrolled 50 postadolescent girls in this study. The Class II,1 cohort included subjects presenting ANB angles greater than 4°. Subjects were categorized as belonging to one of three different rotation models: high, neutral and low angles. ANOVA and Duncan's tests were used to identify differences within and among groups ( $p < 0.05$ ).

**Results.** Pharyngeal airway measurements were significantly smaller ( $p < 0.05$ ) in the high-angle Class II group. In addition, the narrowest linear measurements of the oropharynx (ph-pph) were also smaller in the high-angle Class II group ( $p = 0.055$ ). Soft palate thickness (sp1-sp2) was significantly greater ( $p < 0.05$ ) in the low-angle Class II group.

**Conclusion.** That smaller airway measurements in only the high-angle Class II subjects were noted confirms an association between pharyngeal airway measurements and a vertical skeletal pattern. However, we could not ascertain that a sagittal jaw relationship had an effect on airway space.

<b>Population</b>	<b>Klasse-II-Anomalie</b>
<i>Setting</i>	<ul style="list-style-type: none"> <li>Datenarchive an der kieferorthopädischen Abteilung der Universität Ankara und Near East University in Lefkosa</li> </ul>
<i>Komorbiditäten</i>	
<b>Schweregrad</b>	sagittaler Frontzahnstufe $\geq 5$ mm, ANB-Winkel $> 4^\circ$

<p><b>Einschlusskriterien</b></p> <p>Bei Review: PICOS</p>	<ul style="list-style-type: none"> <li>• sagittaler Frontzahnstufe &gt;4 mm</li> <li>• ANB-Winkel &gt;4°</li> <li>• weibliche Patienten</li> <li>• spätes postpubertäres Stadium CS5/CS6</li> </ul>
<p><b>Ausschlusskriterien</b></p>	<ul style="list-style-type: none"> <li>• Nicht angelegte Zähne</li> <li>• offensichtliche faciale Symmetriedefizite</li> <li>• Syndrome</li> </ul>
<p><b>Intervention</b></p> <p>Versuchsgruppe</p>	<p><b>Keine Intervention</b></p> <p><i>Class II</i> (sagittaler Frontzahnstufe <math>\geq 5</math> mm, ANB-Winkel <math>&gt; 4^\circ</math>)</p> <p>VERSUCHSGRUPPE: <b>Class II low angle</b> (<i>SN/GoGn</i>: <math>\leq 27^\circ</math>)</p> <p>N=14 (Anfang) / N=14 (Ende) / Alter = <math>16,0 \pm 3,6</math> Jahre / ♂:♀ = 0:14</p> <ul style="list-style-type: none"> <li>• Gebissphase: permanentes Gebiss &lt; 18. Lebensjahr</li> <li>• KFO-Behandlung: keine Behandlung</li> </ul> <p>VERSUCHSGRUPPE: <b>Class II neutral</b> (<i>SN/GoGn</i>: <math>28-36^\circ</math>)</p> <p>N=12 (Anfang) / N=12 (Ende) / Alter = <math>15,6 \pm 1,5</math> Jahre / ♂:♀ = 0:12</p> <ul style="list-style-type: none"> <li>• Gebissphase: permanentes Gebiss &lt; 18. Lebensjahr</li> <li>• KFO-Behandlung: keine Behandlung</li> </ul> <p>VERSUCHSGRUPPE: <b>Class II high angle</b> (<i>SN/GoGn</i>: <math>\geq 37^\circ</math>)</p> <p>N=12 (Anfang) / N=12 (Ende) / Alter = <math>17,0 \pm 3,1</math> Jahre / ♂:♀ = 0:12</p> <ul style="list-style-type: none"> <li>• Gebissphase: permanentes Gebiss &lt; 18. Lebensjahr</li> <li>• KFO-Behandlung: keine Behandlung</li> </ul>
<p><b>Kontrolle</b></p> <p>Kontrollgruppe</p>	<p><b>keine kieferorthopädische Therapie</b></p> <p><i>Class I</i> (sagittaler Frontzahnstufe 2-4 mm, ANB-Winkel 0-4°)</p> <p>KONTROLLGRUPPE: <b>Class I controls</b></p> <p>N=12 (Anfang) / N=12 (Ende) / Alter = <math>17,0 \pm 2,0</math> Jahre / ♂:♀ = 0:12</p> <ul style="list-style-type: none"> <li>• Gebissphase: permanentes Gebiss &lt; 18. Lebensjahr</li> <li>• KFO-Behandlung: keine Behandlung</li> </ul>
<p><b>Outcome</b></p>	<p><b>direkter oder schadenspräventiver medizinischer Nutzen bzw. Korrektur/Prävention der Anomalie/Malokklusion/Dysgnathie</b></p> <ul style="list-style-type: none"> <li>• <b>Atmung und Luftraum (Airway space, Schlafapnoe), Schlucken und Sprechen</b></li> </ul> <p>PRIMÄRZIELGRÖßE: <i>FRS-Analyse (Nasopharynx (ad1-PNS, ad2-PNS, ANSPNS-PPW [mm]), Oropharynx (AA-PNS, p-pp, ph-pph [mm]), Soft palate (ANS-PNS-p [°], PNS-p, sp1-sp2 [mm]))</i></p>
<p><b>Studientyp</b></p>	<p><b>Querschnittsstudie</b></p>

<p><b>Schlussfolgerungen der Autoren</b></p>	<p>Die Befunde dieser Studie zu postadoleszenten Mädchen erbrachten eine geringere Atemwegsweite in neigungsstarken Klasse-II-Fällen. Sie bestätigen somit, dass zwischen Rachenweite und vertikalen skelettalen Wachstumsmustern ein Zusammenhang besteht. Keine Bestätigung liefern sie für einen Einfluss der sagittalen Kieferrelation auf die Atemwegsweiten, da die (anhand belastungsarmer zweidimensionaler FRS) erhobenen Strecken nur in den neigungsstarken, nicht jedoch in den neigungsschwachen und -neutralen Klasse-II-Fällen reduziert waren.</p>
<p><b>Zusammenfassung der Ergebnisse</b></p>	<p><b>Class II VS. Class I control</b></p> <p><b>PRIMÄRZIELGRÖßE</b> Die Parameter ad1-PNS und ad2-PNS lieferten in der neigungsstarken Klasse-II-Gruppe signifikant (<math>p &lt; 0,05</math>) niedrigere Werte als in den beiden anderen Klasse-II-Gruppen und in der Kontrollgruppe. Die Stärke des weichen Gaumens (sp1–sp2) lag in der neigungsschwachen Klasse-II-Gruppe signifikant (<math>p &lt; 0,05</math>) über dem Niveau der beiden anderen Klasse-II-Gruppen und der Kontrollgruppe. Der engste Bereich des Oropharynx (ph–pph) war in der neigungsstarken Klasse-II Gruppe tendenziell, aber nicht signifikant (<math>p &lt; 0,055</math>) enger als in den beiden anderen Klasse-II-Gruppen und der Kontrollgruppe. Die Messwerte für alle anderen Parameter zeigten keine signifikanten Unterschiede.</p>
<p><b>Angaben auffälliger positiver und/oder negativer Aspekte</b></p> <p>Studiendesign</p> <p>Durchführung</p> <p>Auswertung</p> <p>Funding</p> <p><u>Interessenkonflikte</u></p> <p>Bias (SIGN, AMSTAR II, Einzelstudien)</p>	<p>Studiendesign: retrospektiv, kontrolliert, nicht randomisiert, keine Verblindung, Gruppenzuteilung anhand des Outcomes</p> <p>Durchführung: akzeptabel</p> <p>Auswertung: gut</p> <p>Power der Studie/Patientenzahl: keine Powerkalkulation, N = 50</p> <p>Funding: keine Angaben</p> <p>Interessenkonflikte: On behalf of all authors, the corresponding author states that there are no conflicts of interest.</p> <p>Bias (SIGN/AMSTAR/ EinzelstudienRoB – alle negativen Punkte aus Fragebogen auflisten):</p> <ul style="list-style-type: none"> <li>- Die Größe der Studienpopulation wurde nicht gerechtfertigt</li> </ul>
<p><b>Schlussfolgerung des Begutachters</b></p>	<p><u>methodische Qualität:</u> akzeptabel</p> <p><u>Klinische Aussagekraft:</u> moderat (retrospektiv, kleine Studienpopulation)</p>
<p><b>Evidenzlevel (SIGN)</b></p>	<p>3</p>
<p><b>Qualität (RoB, SIGN /AMSTAR II)</b></p>	<p><b>Acceptable ⊕</b></p>

# Evidenztabelle Peres, Barros et al. 2008

Community Dent Oral Epidemiol 2008; 36: 117-121  
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## Does malocclusion influence the adolescent's satisfaction with appearance? A cross-sectional study nested in a Brazilian birth cohort

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**Abstract – Objectives:** To test whether malocclusion had an impact on adolescents' appearance satisfaction regardless of other physical aspects. **Methods:** A cross-sectional study nested in a birth cohort study was carried out in Pelotas, Brazil. A random sample of 900 15-year-old adolescents was selected. WHO criteria were used to define malocclusion and a questionnaire was administered including self-reported skin colour and appearance satisfaction. Dental caries were assessed. Height and weight were measured and body mass index calculated. Data concerning gender and socioeconomic characteristics were obtained from the cohort's perinatal study. Adjusted analyses including all confounding variables investigated were performed using Poisson regression with robust variance in order to identify the potential risk factors for appearance dissatisfaction. All analyses were carried out separately by gender. **Results:** The sample included 867 individuals, 54.1% men. The prevalence of moderate or severe malocclusion was 30.6% (95% CI: 26.5–34.7) among boys, and 32.8% (95% CI: 28.2–37.4) among girls ( $P = 0.524$ ). Dissatisfaction with appearance was reported by 29.8% of the boys and by 46.5% of the girls ( $P < 0.001$ ). A positive association between malocclusion and appearance dissatisfaction, controlling for other physical, dental caries and socioeconomic characteristics was observed only in girls [prevalence ratio = 1.4 (1.3–1.7)]. **Conclusions:** Malocclusion is a common condition and is positively associated with appearance dissatisfaction in adolescent girls. The effect of different types of malocclusion on appearance dissatisfaction should be the focus of further investigation.

<b>Population</b>	„Malokklusion/Dysgnathie“ allg.
Setting	<ul style="list-style-type: none"> <li>• Pelotas, Rio Grande do Sul state, Brazil</li> </ul>
Komorbiditäten	
<b>Schweregrad</b>	Keine Angaben

<b>Einschlusskriterien</b> <i>Bei Review: PICOS</i>	Keine Angaben
<b>Ausschlusskriterien</b>	Keine Angaben
<b>Intervention</b> Versuchsgruppe	<p><b>Keine Intervention</b></p> <p><b>Keine Versuchsgruppen</b></p> <p>STUDIENPOPULATION INSGESAMT: N=900 (Anfang) / N=888 (Ende) / Alter = 15 Jahre / ♂:♀ = 480:408</p> <ul style="list-style-type: none"> <li>• Gebissphase: keine Angaben</li> <li>• KFO-Behandlung: keine Behandlung</li> </ul>
<b>Kontrolle</b> Kontrollgruppe	<b>Keine Kontrollgruppen</b>
<b>Outcome</b>	<p><b>direkter oder schadenspräventiver medizinischer Nutzen bzw. Korrektur/Prävention der Anomalie/Malokklusion/Dysgnathie</b></p> <ul style="list-style-type: none"> <li>• <b>mundgesundheitsbezogene Lebensqualität (MLQ), psychische Entwicklung</b></li> </ul> <p>PRIMÄRZIELGRÖßE: <i>Occlusal status (normal occlusion, mild malocclusion, moderate/severe malocclusion; DMFT)</i></p> <p>SEKUNDÄRZIELGRÖßE: <i>Questionnaire (skin colour, appearance satisfaction)</i></p> <p>TERTIÄRZIELGRÖßE: <i>Body Mass Index (BMI)</i></p> <p>QUARTÄRZIELGRÖßE: <i>socioeconomic characteristics (family income, maternal schooling)</i></p>
<b>Studientyp</b>	<b>Querschnittsstudie</b>
<b>Schlussfolgerungen der Autoren</b>	<p>According to our results, the appearance of the teeth was found to be important for young women, showing a high impact in appearance satisfaction in girls. An association between teeth appearance satisfaction and gender has been inconsistent in the literature, with some studies reporting greater concern in women (14, 38) and others showing no association (39, 40).</p> <p>To place our results in a broader perspective, we suggest further research to investigate if correction of malocclusion provides an improvement in the individual's self-esteem and also if identifying preventable malocclusion will contribute to the adolescents' quality of life in adulthood.</p>

<p><b>Zusammenfassung der Ergebnisse</b></p>	<p><b>PRIMÄRZIELGRÖßE, SEKUNDÄRZIELGRÖßE, TERTIÄRZIELGRÖßE, QUARTÄRZIELGRÖßE</b>  <i>Overall, 37.5% of the adolescents reported dissatisfaction with their appearance, and the prevalences for boys (29.8%) and girls (46.5%) were significantly different (<math>P &lt; 0.001</math>).</i></p> <p><i>The only variable positively associated with appearance dissatisfaction was a BMI above the 85th percentile (<math>P = 0.007</math>); whilst black skin colour (<math>P = 0.076</math>), and height <math>&lt; 1.52</math> m (<math>P = 0.086</math>) exhibiting a borderline association. Malocclusion was not associated with appearance dissatisfaction among boys (<math>P = 0.318</math>).</i></p> <p><i>Among girls, malocclusion exhibited a significant association with appearance dissatisfaction (<math>P = 0.001</math>) and the variables included in the model as potential confounders were family income (<math>P = 0.041</math>), weight (<math>P = 0.158</math>), BMI (<math>P = 0.063</math>), and the decay component of DMFT (<math>P = 0.050</math>) at 15 years of age.</i></p> <p><i>A positive association was found between the presence of moderate/severe malocclusion and appearance dissatisfaction in adolescent women [<math>PR = 1.4</math> (1.3–1.7)], after adjusting for physical and socioeconomic characteristics. Table 4 showed an association between appearance dissatisfaction and the lowest family income category [<math>PR = 2.1</math> (1.1–4.1)] and a borderline association between appearance dissatisfaction and high levels of untreated dental caries [<math>PR = 1.4</math> (1.0–1.8)]. The association between appearance dissatisfaction and height at aged 15, weight at age 15 and BMI at 15 years old were not statistically significant [<math>PR = 1.2</math> (0.9–1.7), <math>PR = 1.0</math> (0.7–1.5) and <math>PR = 1.2</math> (0.9–1.7), respectively] The only statistically significant interaction was between malocclusion and high prevalence of the D component of DMFT (<math>P = 0.03</math>).</i></p>
<p><b>Angaben auffälliger positiver und/oder negativer Aspekte</b></p>	<p><i>Studiendesign: prospektiv, unkontrolliert, randomisiert, Verblindung gegen „appearance dissatisfaction“, Gruppenzuteilung anhand des Outcomes</i></p> <p><i>Durchführung: gut</i></p> <p><i>Auswertung: gut</i></p> <p><i>Power der Studie/Patientenzahl: Power: 80%; N = 888</i></p> <p><i>Funding: Karen Glazer Peres was supported by a research grant from the Brazilian National Council for Scientific and Technological Development (CNPq), grant no. 151657/ 2004-1.</i></p> <p><i>Interessenkonflikte: keine Angaben</i></p> <p><i>Bias (SIGN/AMSTAR/ EinzelstudienRoB – alle negativen Punkte aus Fragebogen auflisten):</i></p> <ul style="list-style-type: none"> <li>- no risk of bias</li> </ul>
<p><b>Schlussfolgerung des Begutachters</b></p>	<p><u>methodische Qualität:</u> gut</p> <hr/> <p><u>Klinische Aussagekraft:</u> hoch (Die Studie konnte einen signifikanten Zusammenhang zwischen der Zufriedenheit mit dem Aussehen und dem Grad der Malokklusion bei jugendlichen Mädchen feststellen. Dabei wurden Risikofaktoren wie BMI und soziodemographische Faktoren berücksichtigt)</p>
<p><b>Evidenzlevel (SIGN)</b></p>	<p><b>3</b></p>
<p><b>Qualität (RoB, SIGN /AMSTAR II)</b></p>	<p><b>High quality ⊕⊕</b></p>



# Evidenztabelle **Petti 2015**

## Dental Traumatology

Dental Traumatology 2015, 39, 1-6, doi: 10.1111/dtr.12128

### Over two hundred million injuries to anterior teeth attributable to large overjet: a meta-analysis

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**Key words:** dental trauma; tooth injury; aetiology; prevention; permanent teeth; primary teeth

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 Accepted 30 June 2014

**Abstract – Background/Aim:** The association between large overjet and traumatic dental injuries (TDIs) to anterior teeth is documented. However, observational studies are discrepant and generalizability (i.e. external validity) of meta-analyses is limited. Therefore, this meta-analysis sought to reconcile such discrepancies seeking to provide reliable risk estimates which could be generalizable at global level. **Material and Methods:** Literature search (years 1990–2014) was performed (Scopus, GOOGLE Scholar, Medline). Selected primary studies were divided into subsets: ‘primary teeth, overjet threshold 3–4 mm’ (Primary3); ‘permanent teeth, overjet threshold 3–4 mm’ (Permanent3); ‘permanent teeth, overjet threshold 6 ± 1 mm’ (Permanent6). The adjusted odds ratios (ORs) were extracted. To obtain the highest level of reliability (i.e. internal validity), the pooled OR estimates were assessed accounting for between-study heterogeneity, publication bias and confounding. Result robustness was investigated with sensitivity and subgroup analyses. **Results:** Fifty-four primary studies from Africa, America, Asia and Europe were included. The sampled individuals were children, adolescents and adults. Overall, there were >10 000 patients with TDI. The pooled OR estimates resulted 2.31 (95% confidence interval – 95CI, 1.01–5.27), 2.01 (95CI, 1.39–2.91) and 2.24 (95CI, 1.36–3.21) for Primary3, Permanent3 and Permanent6, respectively. Sensitivity and subgroup analyses corroborated these estimates. **Conclusions:** Reliability and generalizability of pooled ORs were high enough and made it possible to assess that the fraction of global TDIs attributable to large overjet is 21.6% (95CI, 9.7–34.3%) and that large overjet is co-responsible for 235 008 000 global TDI cases (95CI, 104,760,000–372,164,000). This high global burden of TDI suggests that preventive measures must be implemented in patients with large overjet.

<b>Population</b>	„Malokklusion/Dysgnathie“ allg.
<i>Setting</i>	<ul style="list-style-type: none"> <li>patients affected by any kind of TDI to anterior teeth</li> </ul>
<i>Komorbiditäten</i>	
<b>Schweregrad</b>	Nicht angegeben

<p><b>Einschlusskriterien</b> Bei Review: PICOS</p>	<ul style="list-style-type: none"> <li>• population: patients affected by any kind of TDI to anterior teeth</li> <li>• intervention: keine Intervention (zur Auswertung: increased overjet)</li> <li>• comparison: control patients were healthy or affected by control diseases, that is, diseases which were not associable with TDI</li> <li>• outcome: PRIMÄRZIELGRÖßE: any kind of TDI to anterior teeth</li> <li>• study type: cross-sectional or case-control studies</li> </ul>
<p><b>Ausschlusskriterien</b></p>	<ol style="list-style-type: none"> <li>1. Studies including TDIs to posterior teeth if TDIs to anterior teeth accounted for less than 90% of all injured teeth</li> <li>2. dental caries</li> <li>3. Duplicate studies</li> <li>4. studies with incomplete information</li> <li>5. studies which did not assess the TDI association</li> <li>6. studies which assessed multiple TDIs</li> </ol>
<p><b>Intervention</b> Versuchsgruppe</p>	<p><b>Keine Intervention</b></p> <p>VERSUCHSGRUPPE: <b>Increased overjet</b></p> <p>N=- (Anfang) / N=?? (Ende) / Alter = 0-50 Jahre / ♂:♀ = -</p> <ul style="list-style-type: none"> <li>• Gebissphase: frühes bis spätes Wechselgebiss, permanentes Gebiss &lt; und ≥ 18. Lebensjahr</li> <li>• KFO-Behandlung: (Frühbehandlung, reguläre Behandlung, Spätbehandlung)</li> </ul>
<p><b>Kontrolle</b> Kontrollgruppe</p>	<p><b>Keine Kontrollgruppe</b></p> <p>KONTROLLGRUPPE: <b>healthy or affected by control diseases, that is, diseases which were not associable with TDI</b></p> <p>N=- (Anfang) / N=?? (Ende) / Alter = 0-50 Jahre / ♂:♀ = -</p> <ul style="list-style-type: none"> <li>• Gebissphase: frühes bis spätes Wechselgebiss, permanentes Gebiss &lt; und ≥ 18. Lebensjahr</li> <li>• KFO-Behandlung: keine Behandlung</li> </ul>
<p><b>Outcome</b></p>	<p><b>medizinischer Schaden, Nebenwirkungen bzw. Zunahme der Anomalie /Malokklusion/Dysgnathie</b></p> <ul style="list-style-type: none"> <li>• <b>Traumaphylaxe (dentales Frontzahntrauma)</b></li> </ul> <p>PRIMÄRZIELGRÖßE: any kind of TDI to anterior teeth</p>
<p><b>Studientyp</b></p>	<p><b>Systematisches Review, Meta-Analyse</b></p> <p>Review: Inkludierte Studien in Bezug auf PICO: cross-sectional or case-control studies N=54</p> <p>Review: Gesamt-Teilnehmerzahl in Bezug auf PICO: N &gt; 10 000</p>

<p><b>Schlussfolgerungen der Autoren</b></p>	<p>In conclusion, the present meta-analysis of observational studies showed that <b>large overjet may double or even triple the risk for TDI to anterior primary and permanent teeth</b> and that, at global level, large overjet is partly responsible for 100–300 million TDIs. These figures do not require further comments and corroborate the idea that the global burden of TDI is very high (1, 2) and that large overjet has a significantly high impact on this figure. The reported pooled ORs help assess the patients’ risk for TDI and, therefore, to decide whether preventive measures must be taken to decrease such a risk. These measures may range from orthodontic treatment (96, 97), to mouth protection for exposed individuals at high TDI risk (98) and tutors’ counselling to increase their awareness towards their children proneness to TDI while they are playing or are at home (99). Well-designed clinical trials and good-quality systematic reviews are necessary to assess the effectiveness of these measures to decrease the risk for dental injuries in subjects with large overjet.</p>
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<p><b>Zusammenfassung der Ergebnisse</b></p>	<p><b>Increased overjet VERSUS healthy or affected by control diseases, that is, diseases which were not associable with TDI</b></p> <p><b>any kind of TDI to anterior teeth:</b></p> <p><i>Subgruppenanalyse: type of teeth under investigation &amp; overjet threshold: ‘primary teeth – overjet threshold 3–4 mm’; ‘permanent teeth – overjet threshold 3–4 mm’; ‘permanent teeth – overjet threshold 6±1 mm’.</i></p> <p><i>extent of the external validity of the pooled OR estimates. More specifically, this analysis allowed to assess, whether the estimated pooled ORs were valid for both genders, for various age categories and for populations from different countries.</i></p> <p>The high between-study heterogeneity led to use the random-effects model to estimate the pooled ORs (Appendix S2). Risk estimates uncorrected for publication bias were <b>2.72 (95% CI, 1.10–6.74) for ‘primary teeth – overjet 3–4 mm’; 2.39 (95% CI, 1.62–3.51) for ‘permanent teeth – overjet 3–4 mm’; and 2.61 (95% CI, 1.78–3.83) for ‘permanent teeth – overjet 6±1 mm’</b> (data not in Table). The same figures adjusted for publication bias were 2.31 (95% CI, 1.01–5.27) for ‘primary teeth – overjet 3–4 mm’; 2.01 (95% CI, 1.39–2.91) for ‘permanent teeth – overjet 3–4 mm’; and 2.24 (95% CI, 1.56–3.21) for ‘permanent teeth – overjet 6±1 mm’ (Table 2).</p> <p>The population attributable fraction (<b>PAF</b>) estimates were <b>21.8% and 10.2% for permanent teeth and overjet threshold 3–4 mm and 6±1 mm</b>, respectively (Table 3)</p> <p>Subgroup analyses were not performed for studies on primary teeth because they were too few to allow subgrouping.</p> <p>Gender. The pooled ORs in the group of studies with <b>Males and Females balanced did not differ significantly</b> from the pooled ORs in the group of studies with Males prevailing (Table A2-2).</p> <p>Country. The pooled ORs in the group of <b>American/European studies did not differ significantly from the pooled ORs in the group of Asian/African studies</b> (Table A2-2).</p> <p>Age. The pooled ORs in the group of studies with only <b>children and adolescents did not differ significantly from the pooled ORs in the group of studies with children, adolescents and adults</b> (Table A2-2).</p> <p>Therefore, pooled OR estimates were valid for different genders, age groups and countries.</p>
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<p><b>Angaben auffälliger positiver und/oder negativer Aspekte</b></p> <p>Studiendesign</p> <p>Durchführung</p> <p>Auswertung</p> <p>Funding</p> <p><u>Interessenkonflikte</u></p> <p><u>Bias (SIGN, AMSTAR II, Einzelstudien)</u></p>	<p><i>Studiendesign: keine Registrierung a priori, keine Eingrenzung der Population bzgl. des Alters, Meta-Analyse, keine RoB-Analyse, nur Fall-Kontroll- und Querschnittsstudien eingeschlossen</i></p> <p><i>Durchführung: Subgruppenanalyse bzgl. Dentition/ Overjet-Größe/ Geschlecht/ Alter/ Lokalisation, Literatursichtung/ Datenextraktion nicht durch zwei unabhängige Rater, keine einheitliche Methodik zur Erfassung des FZT, Studiendesign der Einzelstudien nicht genannt</i></p> <p><i>Auswertung: sinnvolle Meta-Analyse unter Berücksichtigung einiger Subgruppen/ Heterogenität, keine genaue Angabe zur Anzahl der eingeschlossenen Teilnehmer, wenig Details zu Einzelstudien, zwar viele Länder eingeschlossen – aber vornehmlich Brasilien, keine Angabe aber klinische/radiologische Beurteilung des FZT</i></p> <p><i>Power der Studie/Patientenzahl: 54/ &gt; 10.000</i></p> <p><i>Funding: -</i></p> <p><i>Interessenkonflikte: None declared.</i></p> <p><i>Bias (SIGN/AMSTAR/EinzelstudienRoB – alle negativen Punkte aus Fragebogen auflisten):</i></p> <p><b>2. Did the report of the review contain an explicit statement that the review methods were established prior to the conduct of the review and did the report justify any significant deviations from the protocol?</b></p> <p><b>3. Did the review authors explain their selection of the study designs for inclusion in the review?</b></p> <p><b>5. Did the review authors perform study selection in duplicate?</b></p> <p><b>6. Did the review authors perform data extraction in duplicate?</b></p> <p><b>7. Did the review authors provide a list of excluded studies and justify the exclusions?</b></p> <p><b>8. Did the review authors describe the included studies in adequate detail?</b></p> <p><b>9. Did the review authors use a satisfactory technique for assessing the risk of bias (RoB) in individual studies that were included in the review?</b></p> <p><b>10. Did the review authors report on the sources of funding for the studies included in the review?</b></p> <p><b>12. If meta-analysis was performed, did the review authors assess the potential impact of RoB in individual studies on the results of the meta-analysis or other evidence synthesis?</b></p> <p><b>13. Did the review authors account for RoB in individual studies when interpreting/ discussing the results of the review?</b></p> <p><i>Publikationsbias (Reviews):</i> Publication bias, a serious problem in meta-analyses of observational studies (16, 25), was carefully investigated, informally with the funnel plots, formally with the Egger’s (26) and the Peters’ (27) tests. When necessary, the pooled ORs were adjusted for publication bias using the trim and fill method (17, 25, 28)</p>
<p><b>Schlussfolgerung des Begutachters</b></p>	<p><u>methodische Qualität:</u> Review und Einzelstudien moderat</p> <p><u>Klinische Aussagekraft:</u> Ein erhöhter Overjet ist, unabhängig von der Population, signifikant mit einem erhöhten Frontzahntrauma-Risiko vergesellschaftet. Inwiefern Störfaktoren und andere Malokklusionen ebenfalls zum Risiko beitragen, kann anhand dieses Reviews nicht gesagt werden.</p>

<b>Evidenz-level (SIGN)</b>	<b>3</b>
<b>Qualität (RoB, SIGN /AMSTAR II)</b>	<b>Moderat ++</b>

# Evidenztabelle Petti et al. 1996

*Endod. Dent. Traumatol.* 1996; 12: 294-297  
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**Endodontics &  
 Dental Traumatology**  
 ISSN 0309-1002

## Traumatic injuries to anterior teeth in Italian schoolchildren: prevalence and risk factors

Petti S, Tarantini G. Traumatic injuries to anterior teeth in Italian schoolchildren: prevalence and risk factors. *Endod Dent Traumatol* 1996; 12: 294-297. © Munksgaard, 1996.

**S. Petti, G. Tarantini**

Hygiene Institute, "La Sapienza" University, Rome, Italy

**Abstract** – In the present study, the prevalence of traumatic injuries to anterior teeth in 824, 6- to 11-year-old, schoolchildren from Rome (Italy) and the relationship between injuries and predisposing factors were evaluated. Prevalence value of the study-population was 20.26%. This value is higher than those reported in surveys performed in Italian emergency dental services, but it is similar to those of retrospective studies from other countries. The highest prevalence was found among 9-year-old boys (33.69%); the M/F ratio was 1.64. The percentage of injuries with unknown cause (21.46%) was higher than that of other studies. This may be because most of injuries were slight (64.39% of injuries were enamel fractures) and it is likely that children and their parents were not worried about them, when they happened, so that they did not seek urgent dental care – this helps to explain the prevalence values of this and other retrospective studies, which are higher than those from emergency services – and, when interviewed, they did not remember the circumstances of the traumatic event. Using the Mantel-Haenszel's Odds Ratios stratified for age and sex, injuries were related to individual predisposing factors (overjet larger than 3 mm: OR=2.57, p=0.0001, short upper lip: OR=2.23, p=0.0001 and upper medial incisor protrusion: OR=3.95, p=n.s.), but not to children's trauma predisposing behaviour (OR=0.92, p=n.s.). Serious injuries, however, happened to children without predisposing factors and were caused by strong impacts, suggesting that individual risk factors may not affect these type of injuries.

<b>Population</b>	„Malokklusion/Dysgnathie“ allg.
<i>Setting</i>	<ul style="list-style-type: none"> <li>two primary schools in Rome (Italy)</li> </ul>
<i>Komorbiditäten</i>	
<b>Schweregrad</b>	Keine Angaben

<b>Einschlusskriterien</b> <i>Bei Review: PICOS</i>	Keine Angaben
<b>Ausschlusskriterien</b>	Keine Angaben
<b>Intervention</b> Versuchsgruppe	<p><b>Keine Intervention</b></p> <p><b>Keine Versuchsgruppen</b></p> <p>STUDIENPOPULATION INSGESAMT:                      N=824 (Anfang) / N=824 (Ende) / Alter = 6-11 Jahre / ♂:♀ = keine Angaben</p> <ul style="list-style-type: none"> <li>• Gebissphase: keine Angaben</li> <li>• KFO-Behandlung: keine Behandlung</li> </ul>
<b>Kontrolle</b> Kontrollgruppe	<b>Keine Kontrollgruppe</b>
<b>Outcome</b>	<p><b>direkter oder schadenspräventiver medizinischer Nutzen bzw. Korrektur/Prävention der Anomalie/Malokklusion/Dysgnathie</b></p> <ul style="list-style-type: none"> <li>• <b>Traumaprophylaxe (dentales Frontzahntrauma)</b></li> </ul> <p>PRIMÄRZIELGRÖßE: <i>Traumatic injuries on the anterior teeth (Overjet, upper lip uncoverage, upper medial incisor protrusion)</i></p> <p>SEKUNDÄRZIELGRÖßE: <i>Children's behaviour (trauma predisposition score)</i></p>
<b>Studientyp</b>	<b>Querschnittsstudie</b>
<b>Schlussfolgerungen der Autoren</b>	<p>the circumstances of the traumatic event. Using the Mantel-Haenszel's Odds Ratios stratified for age and sex, injuries were related to individual predisposing factors (overjet larger than 3 mm: OR=2.57, p=0.0001), short upper lip: OR=2.25, p=0.0001 and upper medial incisor protrusion: OR=1.95, p=n.s.), but not to children's trauma predisposing behaviour (OR=0.92, p=n.s.). Serious injuries, however, happened to children without predisposing factors and were caused by strong impacts, suggesting that individual risk factors may not affect these type of injuries.</p>



<p><b>Zusammenfassung der Ergebnisse</b></p>	<p><b>PRIMÄRZIELGRÖßE</b></p> <p>Prevalence of dental injuries was 20,26% (Table 1); 83,62% of subjects with injured teeth had one tooth involved, 14,37% two teeth involved (data not in table). The smallest percentage of children with injured teeth was found among the 8-year-olds (14,28% males and females, 16,66% males and 11,47% females), the largest among 9-year-old boys (33,69%) and 10-year-old girls (21,97%). Among all the age groups, injury prevalence shown by males was always higher than prevalence shown by females; the M/F ratio was 1,61. 62% of the involved teeth were permanent upper medial incisors, 11% were primary upper medial incisors and permanent upper lateral incisors (Fig. 1). 64,29% of all injuries were enamel fractures (Fig. 2), followed by enamel-dentin fractures (29,82%) and concussions (6,90%); serious injuries, such as root fractures, fractures with pulp exposure, intrusion or extrusions, were uncommon. The main</p> <p><b>PRIMÄRZIELGRÖßE, SEKUNDÄRZIELGRÖßE</b></p> <p>intrusions or extrusions, were uncommon. The main dental injury causes (Table 2) were plays, both indoor and outdoor plays (60%), followed by sports: both impact (8,37%) and fall favouring (7,32%) sports. Traffic accidents were uncommon - just 3 -, but they were responsible for the class 3 and the class 4 injuries. The two subjects with crown fractures and pulp exposure and the one with enamel-dentin-cementum fracture were both LU and IP negative and their OJ ranged between 3 and 4 mm (data not in table). Percentage of injuries with unknown cause was very high (21,40%); it was higher for slight injuries (25,90% of enamel fractures) than for serious injuries (14,70% of other dental injuries; chi-square corrected for continuity=2,973; p=0,09, marginally significant). Prevalence of injuries among subjects exposed to LU, IP and OJ, was higher than prevalence of non-exposed subjects, with statistically significant differences for OJ and LU (Table 3).</p> <p>In Table 4, the Mamel-Harnsref's ORs with and without stratifications, are shown. The risk of having injuries in anterior teeth in OJ and LU positive subjects was twice as high as OJ and LU negative subjects' risk, with slight reduction when adjusting by sex and by age, with statistically significant differences. The OR of IP was also high, but it was non-significant, presumably due to the small number of IP positive subjects.</p>
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<p><b>Angaben auffälliger positiver und/oder negativer Aspekte</b></p> <p>Studiendesign</p> <p>Durchführung</p> <p>Auswertung</p> <p>Funding</p> <p><u>Interessenkonflikte</u></p> <p><u>Bias (SIGN, AMSTAR II, Einzelstudien)</u></p>	<p><i>Studiendesign: retrospektiv, unkontrolliert, nicht randomisiert, keine Verblindung, Gruppenteilung anhand des Outcomes</i></p> <p><i>Durchführung: akzeptabel</i></p> <p><i>Auswertung: akzeptabel</i></p> <p><i>Power der Studie/Patientenzahl: In order to evaluate the power of each risk factor, the Mantel-Haenszel's Odds Ratios (OR) of LU, IP, OJ and TP were calculated</i></p> <table border="1" style="width: 100%; border-collapse: collapse; text-align: center;"> <thead> <tr> <th rowspan="2">Risk factor</th> <th rowspan="2">Odds Ratio</th> <th rowspan="2">95% C.I</th> <th rowspan="2">p</th> <th colspan="2">OIT stratified</th> </tr> <tr> <th>for age</th> <th>for sex</th> </tr> </thead> <tbody> <tr> <td>LU</td> <td>2.23</td> <td>1.53-3.27</td> <td>0.0001</td> <td>2.12</td> <td>2.17</td> </tr> <tr> <td>IP</td> <td>3.95</td> <td>0-4×10<sup>7</sup></td> <td>n.s.</td> <td>3.81</td> <td>3.70</td> </tr> <tr> <td>OJ</td> <td>2.57</td> <td>1.82-3.64</td> <td>0.0001</td> <td>2.49</td> <td>2.56</td> </tr> <tr> <td>TP</td> <td>0.92</td> <td>0.59-1.42</td> <td>n.s.</td> <td>0.87</td> <td>0.93</td> </tr> </tbody> </table> <p>N = 824</p> <p><i>Funding: keine Angaben</i></p> <p><i>Interessenkonflikte: keine Angaben</i></p> <p><i>Bias (SIGN/AMSTAR/EinzelstudienRoB – alle negativen Punkte aus Fragebogen auflisten):</i></p> <ul style="list-style-type: none"> <li>- Die Größe der Studienpopulation wurde nicht gerechtfertigt</li> <li>- Die Zielpopulation wurde nicht eindeutig definiert</li> <li>- Non-Responder wurden nicht ermittelt</li> <li>- Risikofaktoren wurden nur unzureichend berücksichtigt</li> <li>- Limitationen der Studie wurden nur unzureichend diskutiert</li> </ul>	Risk factor	Odds Ratio	95% C.I	p	OIT stratified		for age	for sex	LU	2.23	1.53-3.27	0.0001	2.12	2.17	IP	3.95	0-4×10 <sup>7</sup>	n.s.	3.81	3.70	OJ	2.57	1.82-3.64	0.0001	2.49	2.56	TP	0.92	0.59-1.42	n.s.	0.87	0.93
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<p><b>Schlussfolgerung des Begutachters</b></p>	<p><u>methodische Qualität:</u> akzeptabel</p> <hr/> <p><u>Klinische Aussagekraft:</u> moderat (Die Studie konnte signifikante Zusammenhänge zwischen der Prävalenz für Frontzahntraumen und vergrößertem Overjet und verkürzter Oberlippe feststellen. Da allerdings keine klaren Einschluss- und Ausschlusskriterien für die Studienpopulation festgelegt und Risikofaktoren nur unzureichend berücksichtigt wurden, ist das Ergebnis mit Vorsicht zu bewerten)</p>																																
<p><b>Evidenz-level (SIGN)</b></p>	<p><b>3</b></p>																																
<p><b>Qualität (RoB, SIGN /AMSTAR II)</b></p>	<p><b>Acceptable ⊕</b></p>																																

# Evidenztabelle Piassi, Antunes et al 2016



**Abstract**

**Background:** Malocclusion is a chronic disability that is usually remedied by orthodontic treatment which can provide the patient with a satisfactory state of oral health. **Aim:** To assess the current evidence in the literature concerning the impact of malocclusion treatment on the oral health related quality of life (OHRQoL) of children and adolescents. **Settings and Design:** Systematic review. **Materials and Methods:** Four databases (PubMed, Web of Science, Scopus and World Health Library) were searched using specified indexing terms, including a manual search for of the references listed in the studies. The articles that met the inclusion criteria were classified regarding methodological quality and risk of bias in categories of high, moderate, or low. **Results:** The systematic search produced 491 titles and abstracts, and the manual search of their references deposited another 11 articles. After excluding duplicate abstracts and applying the inclusion and exclusion criteria, 3 studies were eligible for quality assessment. Among these, 1 was classified as high methodological quality (low risk of bias) and 2 as moderate methodological quality (moderate risk of bias). These 3 articles were included in the final qualitative synthesis. **Conclusions:** Malocclusion treatment reduces the impact on children and adolescents' OHRQoL, based on evidence assessed in the literature. The level of evidence was moderate to high to detect changes in the impact after orthodontic treatment.

<b>Population</b> <i>Setting</i> <i>Komorbiditäten</i>	<p><b>„Malokklusion/Dysgnathie“ allg.</b></p> <ul style="list-style-type: none"> <li>Children and adolescents (up to age 18 years) receiving completed orthodontic treatment</li> </ul>
<b>Schweregrad</b>	Nicht angegeben
<b>Einschlusskriterien</b> <i>Bei Review: PICOS</i>	<ul style="list-style-type: none"> <li>Population: Children and adolescents (up to age 18 years) receiving completed orthodontic treatment</li> <li>Intervention: Fixed or removable appliance, or interceptive orthodontic treatment</li> <li>Comparison: pretreatment</li> <li>Outcome:                     <p>PRIMÄRZIELGRÖßE: Changes in OHRQoL from baseline (pretreatment) to posttreatment, without restriction for the follow-up posttreatment</p> </li> <li>Study type: Interventional studies, assessing the QHRQoL before and after orthodontic intervention and studies comparing groups</li> </ul> <p>Only studies with high and moderate evidence were used in this systematic review.</p>

<b>Ausschlusskriterien</b>	<ol style="list-style-type: none"> <li>1. Lack of standardized measures in assessing malocclusions and/or orthodontic treatment need;</li> <li>2. studies not used validated OHRQoL instruments;</li> <li>3. case reports, review articles, book chapters, and theses;</li> <li>4. studies in patients with medical conditions such as systemic disorders, syndromes, and craniofacial anomalies;</li> <li>5. studies that contemplated surgical treatment for malocclusion;</li> <li>6. studies that evaluated the relationship of quality of life during treatment.</li> </ol>
<b>Intervention</b> Versuchsgruppe	<p><b>Kieferorthopädische Behandlung</b></p> <p>VERSUCHSGRUPPE: <b>after orthodontic treatment</b></p> <p>N=232 (Anfang) / N=?? (Ende) / Alter = 11-15 Jahre / ♂:♀ = ?:?</p> <ul style="list-style-type: none"> <li>• Gebissphase: spätes Wechselgebiss, permanentes Gebiss &lt; 18. Lebensjahr</li> <li>• KFO-Behandlung: reguläre Behandlung</li> </ul>
<b>Kontrolle</b> Kontrollgruppe	<p><b>Keine Kontrollgruppe</b></p> <p>KONTROLLGRUPPE: <b>before orthodontic treatment</b></p> <p>N=316 (Anfang) / N=?? (Ende) / Alter = 11-15 Jahre / ♂:♀ = ?:?</p> <ul style="list-style-type: none"> <li>• Gebissphase: spätes Wechselgebiss, permanentes Gebiss &lt; 18. Lebensjahr</li> <li>• KFO-Behandlung: keine Behandlung</li> </ul>
<b>Outcome</b>	<p><b>direkter oder schadenspräventiver medizinischer Nutzen bzw. Korrektur/Prävention der Anomalie/Malokklusion/Dysgnathie, medizinischer Schaden, Nebenwirkungen bzw. Zunahme der Anomalie /Malokklusion/Dysgnathie</b></p> <ul style="list-style-type: none"> <li>• <b>mundgesundheitsbezogene Lebensqualität (MLQ), psychische Entwicklung</b></li> </ul> <p>PRIMÄRZIELGRÖÖE: Changes in OHRQoL from baseline (pretreatment) to posttreatment, without restriction for the follow-up posttreatment</p>
<b>Studientyp</b>	<p><b>Systematisches Review</b></p> <p>Review: Inkludierte Studien in Bezug auf PICO: Non randomized Interventional studies N=3</p> <p>Review: Gesamt-Teilnehmerzahl in Bezug auf PICO: N=548</p>
<b>Schlussfolgerungen der Autoren</b>	<p>Orthodontic treatment resulted in <b>significantly improved OHRQoL</b> of children and adolescents based on high to moderate scientific evidence level of methodological quality/low risk of bias.</p>

<p><b>Zusammenfassung der Ergebnisse</b></p>	<p><b>After orthodontic treatment VERSUS before orthodontic treatment</b></p> <p><b>Changes in OHRQoL from baseline (pretreatment) to posttreatment, without restriction for the follow-up posttreatment:</b> Data extraction (qualitative synthesis) from the articles selected is described in [Table 2]. The data extracted revealed the use of the OHRQoL instruments to evaluate the changes after orthodontic treatment. The questionnaires applied were: <b>Child Perceptions Questionnaire-CPQ11-14[11],[13] Oral Health Impact Profile-14,[14] parents perception questionnaire [11] and family impact scale.[11]</b> The dental indexes for malocclusion used were: Dental aesthetic index,[11],[13] peer assessment rating 11, and index of orthodontic treatment need.[14] All studies reported the time of follow-up.</p> <p>From the results and conclusion, we observed that <b>all studies [11],[13],[14] showed improvement in OHRQoL after orthodontic treatment.</b>{Table 2}</p>
<p><b>Angaben auffälliger positiver und/oder negativer Aspekte</b></p> <p>Studiendesign</p> <p>Durchführung</p> <p>Auswertung</p> <p><u>Funding</u></p> <p><u>Interessenkonflikte</u></p> <p><u>Bias (SIGN, AMSTAR II, Einzelstudien)</u></p>	<p><i>Studiendesign: keine Registrierung a priori, keine Meta-Analyse, Kontrollgruppe "pretreatment" – unbehandelte Kontrollgruppe im Studiendesign wäre besser, plausible Eingrenzung der Population bzgl. des Alters (nur Jugendliche), keine einheitliche Messmethodik für die Zielgröße vorgeschrieben, Outcome weit definiert</i></p> <p><i>Durchführung: Datenextraktion durch zwei unabhängige Rater, Literatursichtung mit überprüfter Interrater-Reliabilität, gute Diskussion unter Berücksichtigung des RoB, keine Subgruppenanalyse – z.B. bzgl. Geschlecht oder Behandlungsmechanik</i></p> <p><i>Auswertung: 2/3 Einzelstudien haben eine unbehandelte Kontrollgruppe, Kontrollgruppe größer als Versuchsgruppe, keine Angaben zur Geschlechterverteilung, z.T. unterschiedliche Messmethodiken der Einzelstudien, Studientyp der Einzelstudien nicht genau bestimmt, keine Angaben zur Art der KFO-Behandlung der Einzelstudien</i></p> <p><i>Power der Studie/Patientenzahl: 3/548</i></p> <p><i>Funding: Nil.</i></p> <p><i>Interessenkonflikte: There are no conflicts of interest.</i></p> <p><i>Bias (SIGN/AMSTAR/EinzelstudienRoB – alle negativen Punkte aus Fragebogen auflisten):</i></p> <p><b>2. Did the report of the review contain an explicit statement that the review methods were established prior to the conduct of the review and did the report justify any significant deviations from the protocol?</b></p> <p><b>3. Did the review authors explain their selection of the study designs for inclusion in the re</b></p> <p><b>9. Did the review authors use a satisfactory technique for assessing the risk of bias (RoB) in individual studies that were included in the review?</b></p> <p><b>10. Did the review authors report on the sources of funding for the studies included in the</b></p> <p><b>14. Did the review authors provide a satisfactory explanation for, and discussion of, any heterogeneity observed in the results of the review?</b></p> <p><i>Publikationsbias (Reviews): -</i></p>
<p><b>Schlussfolgerung des Begutachters</b></p>	<p><u>methodische Qualität:</u> Einzelstudien moderat, Review gut</p> <hr/> <p><u>Klinische Aussagekraft:</u> Eine kieferorthopädische Behandlung scheint bei Jugendlichen zu einer Verbesserung der mundgesundheitsbezogenen Lebensqualität zu führen. Allerdings sollten weitere Untersuchungen durchgeführt werden, die die Art der KFO-Therapie (z.B. Ex/ Non-Ex) und mögliche Subgruppen (Geschlechter, soziales Umfeld etc.) berücksichtigen.</p>

<b>Evidenz-level (SIGN)</b>	2+
<b>Qualität (RoB, SIGN /AMSTAR II)</b>	Moderat ⊕⊕

# Evidenztabelle Piassi et al. 2019

The Impact of Mixed Dentition Malocclusion on Oral Health-Related Quality of Life

## The Impact of Mixed Dentition Malocclusion on the Oral Health-Related Quality of Life for Children and Their Families: A Case-Control Study

Eliza Piassi<sup>1</sup>/ Leonardo Santos Antunes<sup>2\*</sup>/ Tereza Cristina Almeida-Gaça<sup>3\*\*\*</sup>  
Livia Azeredo Alves Antunes<sup>4\*\*\*\*</sup>

**Objective:** The aim of this study was to investigate the relation between malocclusion in mixed dentition and its impact on the oral health-related quality of life (OHRQoL) of children and their families as well to determine if there were any reported differences in OHRQoL, due to malocclusion severity. **Study design:** A total of 144 subjects, which included 70 children (aged 8-10 years) and their parents, were recruited on the basis of predetermined criteria and divided into the following groups: children with malocclusion (case group) and children without malocclusion (control group). The OHRQoL was assessed using the Child Perception Questionnaire (CPQ<sub>11-14</sub>) and the Family Impact Scale (FIS). The severity of malocclusion was assessed using the Dental Aesthetic Index. The specific types of malocclusions (anterior open bite, anterior/posterior crossbite and overjet) and their severity were considered for the statistical analyses by applying the Mann-Whitney and Kruskal-Wallis tests, respectively, with a set at  $p < 0.05$ . **Results:** The CPQ<sub>11-14</sub> and FIS scores demonstrated higher impact on OHRQoL in the case group ( $p < 0.01$ ). There were no reported differences in OHRQoL according to the dental aesthetic index severity ( $p > 0.05$ ) and no differences between specific types of malocclusion ( $p > 0.05$ ). **Conclusions:** Mixed dentition malocclusion impacted the oral-health quality of life for children and their families independently of the severity.

<b>Population</b> Setting Komorbiditäten	„Malokklusion/Dysgnathie“ allg. <ul style="list-style-type: none"><li>Interceptive Orthodontic Clinic of a public hospital, in Rio de Janeiro, Brazil</li></ul>
<b>Schweregrad</b>	Keine Angaben
<b>Einschlusskriterien</b> Bei Review: PICOS	<ul style="list-style-type: none"><li>children with the four upper and lower incisors and the four first permanent molars fully erupted</li><li>children and parents fluent in Portuguese</li><li>parents/caregivers of the children residing at the same address</li></ul>
<b>Ausschlusskriterien</b>	<ul style="list-style-type: none"><li>children who did not cooperate during the physical exam or administration of the questionnaire</li><li>children with systemic problems or psychological disorders</li><li>dental anomaly, craniofacial deformity and history of dental trauma</li><li>presence of untreated dental caries and missing teeth history of orthodontic treatment</li></ul>

<p><b>Intervention</b> Versuchsgruppe</p>	<p><b>Keine Intervention</b> <i>Dental Aesthetic Index (DAI) Score</i> ≥ 26 VERSUCHSGRUPPE: <b>Case group</b> N=82 (Anfang) / N=35 (Ende) / Alter = 8,5 ± 0,7 Jahre / ♂:♀ = 13:22</p> <ul style="list-style-type: none"> <li>• Gebissphase: frühes Wechselgebiss, spätes Wechselgebiss</li> <li>• KFO-Behandlung: keine Behandlung</li> </ul>
<p><b>Kontrolle</b> Kontrollgruppe</p>	<p><b>keine kieferorthopädische Therapie</b> <i>Dental Aesthetic Index (DAI) Score</i> ≤ 25 KONTROLLGRUPPE: <b>Control group</b> N=62 (Anfang) / N=35 (Ende) / Alter = 8,8 ± 0,7 Jahre / ♂:♀ = 14:21</p> <ul style="list-style-type: none"> <li>• Gebissphase: frühes Wechselgebiss, spätes Wechselgebiss</li> <li>• KFO-Behandlung: keine Behandlung</li> </ul>
<p><b>Outcome</b></p>	<p><b>direkter oder schadenspräventiver medizinischer Nutzen bzw. Korrektur/Prävention der Anomalie/Malokklusion/Dysgnathie</b></p> <ul style="list-style-type: none"> <li>• <b>mundgesundheitsbezogene Lebensqualität (MLQ), psychische Entwicklung</b></li> </ul> <p>PRIMÄRZIELGRÖßE: <i>Malocclusion (Dental Aesthetic Index (DAI))</i> SEKUNDÄRZIELGRÖßE: <i>Quality of life (CPQ8–10 score, FIS score)</i> TERTIÄRZIELGRÖßE: <i>sociodemographic characteristics (educational level, socioeconomic categories, age, gender)</i></p>
<p><b>Studientyp</b></p>	<p><b>Querschnittsstudie</b></p>
<p><b>Schlussfolgerungen der Autoren</b></p>	<p>Mixed dentition malocclusion impacted the oral health-related quality of life for children and their families independently of the malocclusion severity or if the children presented anterior open bite, overjet, anterior and posterior crossbite.</p>



<p><b>Zusammenfassung der Ergebnisse</b></p>	<p><b>Case group VS. Control group</b></p> <p><b>PRIMÄRZIELGRÖÙE, SEKUNDÄRZIELGRÖÙE</b> In relation to the impact on children’s OHRQoL (Table 2), there was a statistically significant difference for the total mean CPQ8-10 scores between the case (9.0 SD 6.2) and control (5.5 SD 5.6) groups (<math>p &lt; 0.01</math>). There were higher CPQ8-10 scores in the children with malocclusion (case group). Considering each subscale (domains), there were statistically significant differences in the emotional and social well-being domains, with higher scores in the case group (<math>p &lt; 0.01</math>).</p> <p>The impact on the parents’ OHRQoL also shows there was a statistically significant difference for the total mean FIS scores between the case (8.8 SD 4.8) and control (0.9 SD 2.9) groups (<math>p &lt; 0.01</math>). The parents that had children with malocclusion (case group) demonstrated higher FIS scores. Considering each domain, there was a statistically significant difference in parental emotions and parental/family activity domains, with higher scores in the case group (<math>p &lt; 0.01</math>).</p> <p>Although the total and subscales scores of CPQ8-10 and FIS varied according to the severity of malocclusion, no statistically significant difference was observed (Table 3). Considering the malocclusion subgroups (anterior open bite, anterior overjet, anterior and posterior crossbite) we did not observe any statistical significance for total and for subscale CPQ8-10 and FIS scores (Table 4).</p> <p><b>TERTIÄRZIELGRÖÙE</b> The first stage of data analysis was to test for the presence of any confounding factors. According to socio-demographic characteristics, no statistically significant differences were observed between case and control groups. These results demonstrated that the two groups (case/control) of children and parents/caregivers were similar.</p>
<p><b>Angaben auffälliger positiver und/oder negativer Aspekte</b></p>	<p>Studiendesign: prospektiv, kontrolliert, nicht randomisiert, keine Verblindung, Gruppenzuteilung anhand des Outcomes</p> <p>Durchführung: gut</p> <p>Auswertung: gut</p> <p>Power der Studie/Patientenzahl: keine Powerkalkulation, N = 70</p> <p>Funding: keine Angaben</p> <p>Interessenkonflikte: keine Angaben</p> <p>Bias (SIGN/AMSTAR/ EinzelstudienRoB – alle negativen Punkte aus Fragebogen auflisten):</p> <ul style="list-style-type: none"> <li>- Keine Information zu den Eigenschaften der Ausgangspopulation</li> <li>- Keine Verblindung von Untersuchern</li> </ul>
<p><b>Schlussfolgerung des Begutachters</b></p>	<p><u>methodische Qualität:</u> gut</p> <p><u>Klinische Aussagekraft:</u> gut (Die vorliegende Studie konnte zeigen, dass Malokklusionen im Milchgebiss signifikant die mundgesundheitsbezogene Lebensqualität von Kindern und ihren Familien beeinträchtigte)</p>
<p><b>Evidenzlevel (SIGN)</b></p>	<p>3</p>
<p><b>Qualität (RoB, SIGN /AMSTAR II)</b></p>	<p><b>Acceptable ⊕</b></p>

# Evidenztabelle Pirilä-Parkkinen et al. 2009

European Journal of Orthodontics 33 (2009) 149-157  
doi:10.1093/ejo/cjn002  
Advance Access published 23 November 2008

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## Dental arch morphology in children with sleep-disordered breathing

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**SUMMARY** The aim of the present study was to examine the effects of nocturnal breathing disorders such as obstructive sleep apnoea (OSA) and snoring on developing dental arches. The study group comprised 41 children (22 males, 19 females; mean age 7.2 years, standard deviation 1.83) with diagnosed OSA. Age- and gender-matched groups of 41 snoring and 41 non-obstructed control children were selected. Orthodontic examination was carried out and dental impressions were taken. Malocclusions were diagnosed clinically and 13 linear variables were measured from the dental casts. The differences between the dental arch measurements of the OSA, snoring, and control groups were studied using analysis of variance followed by Duncan's multiple comparison method.

Children with diagnosed OSA had a significantly increased overjet, a reduced overbite, and narrower upper and shorter lower dental arches when compared with the controls. Snoring children had similar but not as significant differences as OSA children when compared with the controls. There were more children with an anterior open bite (AOB) in the OSA group ( $P = 0.016$ ) and with a Class II or asymmetric molar relationship in the groups of OSA ( $P = 0.013$ ) and snoring ( $P = 0.004$ ) subjects compared with the non-obstructed controls. There were more subjects with mandibular crowding ( $P = 0.002$ ) and with an AOB ( $P = 0.019$ ) with an increasing obstructive apnoea-hypopnoea index (AHI).

These findings are in agreement with previous studies of the effects of increased upper airway resistance on dental arch morphology and can be explained by long-term changes in the position of the head, mandible, and tongue in order to maintain airway adequacy during sleep.

<b>Population</b>	<b>„Malokklusion/Dysgnathie“ allg.</b>
<i>Setting</i>	<ul style="list-style-type: none"> <li>referred from primary health care units to the Department of Otorhinolaryngology of Oulu University Hospital, Finland</li> </ul>
<i>Komorbiditäten</i>	
<i>Schweregrad</i>	Keine Angaben
<i>Einschlusskriterien</i>	Keine Angaben
<i>Bei Review: PICOS</i>	
<i>Ausschlusskriterien</i>	<ol style="list-style-type: none"> <li>known upper airway anomalies,</li> <li>abnormal development</li> <li>chronic infections</li> <li>asthma</li> <li>perennial allergy</li> <li>previous orthodontic treatment</li> <li>missing teeth</li> </ol>

<p><b>Intervention</b> Versuchsgruppe</p>	<p><b>Keine Intervention</b></p> <p>VERSUCHSGRUPPE: <b>OSA group</b></p> <p>N=41 (Anfang) / N=41 (Ende) / Alter = 7,2 ± 1,93 Jahre / ♂:♀ = 22:19</p> <ul style="list-style-type: none"> <li>• Gebissphase: keine Angaben</li> <li>• KFO-Behandlung: keine Behandlung</li> </ul> <p>VERSUCHSGRUPPE: <b>Snoring group</b></p> <p>N=41 (Anfang) / N=41 (Ende) / Alter = 7,2 ± 1,79 Jahre / ♂:♀ = “gender-matched”</p> <ul style="list-style-type: none"> <li>• Gebissphase: keine Angaben</li> <li>• KFO-Behandlung: keine Behandlung</li> </ul>
<p><b>Kontrolle</b> Kontrollgruppe</p>	<p><b>keine kieferorthopädische Therapie</b></p> <p><i>keine Schlafapnoe oder Schnarchen</i></p> <p>KONTROLLGRUPPE: <b>Control group</b></p> <p>N=41 (Anfang) / N=41 (Ende) / Alter = “age-matched” / ♂:♀ = “gender-matched”</p> <ul style="list-style-type: none"> <li>• Gebissphase: keine Angaben</li> <li>• KFO-Behandlung: keine Behandlung</li> </ul>
<p><b>Outcome</b></p>	<p><b>direkter oder schadenspräventiver medizinischer Nutzen bzw. Korrektur/Prävention der Anomalie/Malokklusion/Dysgnathie</b></p> <ul style="list-style-type: none"> <li>• <b>Atmung und Luftraum (Airway space, Schlafapnoe), Schlucken und Sprechen</b></li> </ul> <p>PRIMÄRZIELGRÖßE: <i>tonsillar size (Grade 1-4)</i></p> <p>SEKUNDÄRZIELGRÖßE: <i>dental cast measurements (length and breadth of the maxillary and mandibular dental arches, palatal height, overjet, overbite, intermaxillary occlusal relationship, Angle classification)</i></p> <p>TERTIÄRZIELGRÖßE: <i>Occlusal discrepancies (deep bite, open bite, crossbite, scissor bite, crowding)</i></p>
<p><b>Studientyp</b></p>	<p><b>Querschnittsstudie</b></p>
<p><b>Schlussfolgerungen der Autoren</b></p>	<p>The results indicate that disturbed nocturnal breathing has significant effects on developing dental arches, which supports previous findings. It is important that snoring children were found to have similar and significant differences in dental arch measurements when compared with the non-obstructed controls, although the differences were not as remarkable as in OSA children. The findings in dental arch dimensions can be explained by long-term postural changes of the head, mandible, and tongue as a consequence of insufficient airway capacity. Snoring and OSA lie on a continuum of obstructive breathing disorders, which explain the tendency to similar changes in dental arch development, correlating with the severity of obstruction.</p>

<p><b>Zusammenfassung der Ergebnisse</b></p>	<p><b>OSA group VS. Snoring group VS. Control group</b></p> <p><b>PRIMÄRZIELGRÖßE</b> In the OSA group 92 per cent, and in the snoring group 76 per cent, of the children had large tonsils (grade 3 or 4). There was no statistically significant relationship between AHI and tonsillar size in the groups of OSA and snoring children ( <math>P = 0.154</math>, Fisher’s exact test).</p> <p><b>SEKUNDÄRZIELGRÖßE</b> Overjet was found to be larger in the OSA (<math>P &lt; 0.05</math>) and snoring (<math>P &lt; 0.05</math>) children when compared with the controls (Table 1, Figure 2a). Overbite was significantly reduced in children with OSA when compared with the control children (<math>P &lt; 0.05</math>; Table 1, Figure 2b). Maxillary arch width was significantly smaller in the groups of OSA and snoring children than in the control group. Arch width, measured at the level of maxillary canines (W1), was decreased in the OSA (<math>P &lt; 0.01</math>) and snoring (<math>P &lt; 0.05</math>) groups when compared with the controls (Table 1, Figure 2c). Maxillary arch width was reduced at the level of first primary molars or first permanent premolars (W2) in the OSA group (<math>P &lt; 0.05</math>) when compared with the control children (Table 1). Maxillary arch width, measured at the level of second primary molars or second permanent premolars (W3), was smaller in both the OSA (<math>P &lt; 0.05</math>) and snoring (<math>P &lt; 0.05</math>) groups when compared with the controls (Table 1). Arch width, measured at the level of the maxillary first permanent molars (W4), was also decreased in the OSA children (<math>P &lt; 0.05</math>) when compared with the control children (Table 1). Lower arch length was also found to be significantly smaller in the OSA (<math>P &lt; 0.001</math>) and snoring (<math>P &lt; 0.05</math>) children than in the control subjects (Table 1, Figure 2d). There was no statistically significant difference in upper arch length, palatal height, or mandibular width between the groups. There was also a tendency for the overjet to be larger with increasing AHI ( <math>P = 0.069</math>).</p> <p><b>TERTIÄRZIELGRÖßE</b> The number of subjects with an anterior open bite (AOB) was significantly increased (<math>P = 0.016</math>) in the OSA group when compared with the controls (Table 3). The number of subjects with an AOB in the snoring group showed an increasing tendency when compared with the controls (<math>P = 0.063</math>; Table 3). The number of subjects with a Class II or asymmetric molar relationship was increased in OSA (<math>P = 0.013</math>) and snoring (<math>P = 0.004</math>) children compared with the control children (Table 3). A tendency for increasing maxillary (<math>P = 0.057</math>) and mandibular ( <math>P = 0.077</math>) crowding was seen in the OSA children when compared with the control children (Table 3). There were significant associations between mandibular crowding and AOB with AHI. There were more subjects with mandibular crowding ( <math>P = 0.002</math>) and more with an AOB ( <math>P = 0.019</math>) with increased AHI.</p>
<p><b>Angaben auffälliger positiver und/oder negativer Aspekte</b></p> <p>Studiendesign</p> <p>Durchführung</p> <p>Auswertung</p> <p>Funding</p> <p>Interessenkonflikte</p> <p>Bias (SIGN, AMSTAR II, Einzelstudien)</p>	<p>Studiendesign: prospektiv, kontrolliert, verblindet, Randomisierung in der Kontrollgruppe, Gruppenteilung anhand des Outcomes</p> <p>Durchführung: akzeptabel</p> <p>Auswertung: gut</p> <p>Power der Studie/Patientenzahl: keine Powerkalkulation, <math>N = 123</math></p> <p>Funding: The Finnish Dental Society and the Orthodontic Section of the Finnish Dental Society</p> <p>Interessenkonflikte: keine Angaben</p> <p>Bias (SIGN/AMSTAR/EinzelstudienRoB – alle negativen Punkte aus Fragebogen auflisten):</p> <ul style="list-style-type: none"> <li>- Die Größe der Studienpopulation wurde nicht gerechtfertigt</li> <li>- Risikofaktoren wurden unzureichend gemessen</li> <li>- Limitationen der Studie wurden nur unzureichend diskutiert</li> </ul>

<b>Schluss- folgerung des Begutachters</b>	<u>methodische Qualität:</u> gut
	<u>Klinische Aussagekraft:</u> moderat (Die Studie konnte einen signifikanten Zusammenhang zwischen obstruktiver Schlafapnoe, Schnarchen und der Konfiguration der Zahnbügel feststellen. Allerdings wurden Risikofaktoren wie Habits in der Studie nicht berücksichtigt. Ein kausaler Zusammenhang ist nur bedingt feststellbar)
<b>Evidenz- level (SIGN)</b>	<b>3</b>
<b>Qualität (RoB, SIGN /AMSTAR II)</b>	<b>Acceptable ⊕</b>

# Evidenztabelle Primo-Miranda et al. 2019

ORIGINAL ARTICLE

WILEY *Dental Traumatology*

## Association between occlusal characteristics and the occurrence of dental trauma in preschool children: a case-control study

Ednele Fabyene Primo-Miranda<sup>1</sup> | Maria Leticia Ramos-Jorge<sup>1</sup> | Márcio Alexandre Homem<sup>2</sup> | Débora Souto de Souza<sup>1</sup> | Amanda Dias Stetler<sup>1</sup> | Joana Ramos-Jorge<sup>2</sup> | Leandro Silva Marques<sup>1</sup>

### Abstract

**Background/Aims:** Occlusal features may increase the risk of dental trauma. The aim of the present study was to evaluate the association between occlusal characteristics and the occurrence of dental trauma in preschool children.

**Materials and Methods:** A population-based case-control study was conducted with a representative sample of 200 children 3-5 years of age enrolled at private and public preschools in the city of Diamantina, Brazil. The case and control groups were matched for gender, age and type of preschool (public or private) at a ratio of 1:1 (100 cases and 100 controls). Independent variables of interest to the study (occlusal characteristics) and potential confounders (sociodemographic characteristics, sucking habits and lip coverage) were investigated. Intra-examiner and inter-examiner kappa values were higher than 0.80 for all oral conditions evaluated. The SPSS 23.0 program was used to analyse the data. Descriptive and univariate analyses as well as simple and multiple logistic regression analyses were performed.

**Results:** The occlusal feature most strongly associated with trauma was anterior open bite (OR = 3.80; 95% CI: 1.42-10.16). Maxillary anterior crowding (OR = 2.14; 95% CI: 1.00-4.63) and overjet (OR = 1.12; 95% CI: 0.58-2.17) were associated with the occurrence of trauma independently of the confounding variables (sociodemographic characteristics, sucking habits and lip coverage), but these variables lost their significance when adjusted for other types of malocclusion. Anterior open bite remained strongly associated with dental trauma, regardless of confounding variables and other types of malocclusion.

**Conclusion:** Anterior open bite was the main variable associated with dental trauma in the preschool children analysed independently of the confounding variables and the presence of other malocclusions.

<b>Population</b>	„Malokklusion/Dysgnathie“ allg.
<i>Setting</i>	<ul style="list-style-type: none"> <li>public and private preschools in the city of Diamantina, Brazil</li> </ul>
<i>Komorbiditäten</i>	
<b>Schweregrad</b>	Keine Angaben

<b>Einschlusskriterien</b> <i>Bei Review: PICOS</i>	<ul style="list-style-type: none"> <li>Keine Angaben</li> </ul>
<b>Ausschlusskriterien</b>	<ul style="list-style-type: none"> <li>behavioural problems</li> <li>undergoing orthodontic treatment</li> </ul>
<b>Intervention</b> <i>Versuchsgruppe</i>	<p><b>Keine Intervention</b></p> <p><i>dental trauma</i></p> <p>VERSUCHSGRUPPE: <b>case group</b></p> <p>N=200 (Anfang) / N=200 (Ende) / Alter = 3-5 Jahre / ♂:♀ = 90:111</p> <ul style="list-style-type: none"> <li>Gebissphase: keine Angaben</li> <li>KFO-Behandlung: keine Behandlung</li> </ul>
<b>Kontrolle</b> <i>Kontrollgruppe</i>	<p><b>keine kieferorthopädische Therapie</b></p> <p><i>no dental trauma</i></p> <p>KONTROLLGRUPPE: <b>control group</b></p> <p>N=200 (Anfang) / N=200 (Ende) / Alter = 3-5 Jahre / ♂:♀ = 86:113</p> <ul style="list-style-type: none"> <li>Gebissphase: keine Angaben</li> <li>KFO-Behandlung: keine Behandlung</li> </ul>
<b>Outcome</b>	<p><b>direkter oder schadenspräventiver medizinischer Nutzen bzw. Korrektur/Prävention der Anomalie/Malokklusion/Dysgnathie</b></p> <ul style="list-style-type: none"> <li><b>Traumaprophylaxe (dentales Frontzahntrauma)</b></li> </ul> <p>PRIMÄRZIELGRÖßE: <i>Dental trauma (enamel fracture, enamel and dentin fracture, complicated crown fracture, extrusive luxation, lateral luxation, intrusive luxation, avulsion, discoloration of the dental crown)</i></p> <p>SEKUNDÄRZIELGRÖßE: <i>Occlusal characteristics (anterior and posterior crossbite, dental crowding and arch shape, maxillary anterior overjet, anterior open bite)</i></p> <p>TERTIÄRZIELGRÖßE: <i>Lip coverage (Lip coverage)</i></p> <p>QUARTÄRZIELGRÖßE: <i>socioeconomic questionnaire (gender and age, primary caregiver, mother's marital status, parents' schooling, monthly per capita income, daytime and nighttime bruxism, sucking habits, pacifier use and digit sucking)</i></p>
<b>Studientyp</b>	<b>Querschnittsstudie</b>
<b>Schlussfolgerungen der Autoren</b>	Anterior open bite was strongly associated with dental trauma in the primary dentition independently of confounding variables and other types of malocclusion. Prospective cohort studies are needed to investigate this association further.

<p><b>Zusammenfassung der Ergebnisse</b></p>	<p><b>case group VS. control group</b></p> <p><b>PRIMÄRZIELGRÖÙE, SEKUNDÄRZIELGRÖÙE, TERTIÄRZIELGRÖÙE, QUARTÄRZIELGRÖÙE</b>  <i>Each occlusal characteristic selected (main independent variables) was analysed in five models as follows: Model 1: unadjusted; Model 2: adjusted for per capita income; Model 3: adjusted for per capita income and pacifier and bottle habits; Model 4: Adjusted for per capita income, sucking habits and lip seal; and Model 5: adjusted for per capita income, sucking habits, lip seal and occlusal characteristics (arch shape, maxillary anterior crowding, overjet and anterior open bite).</i></p> <p><i>The chi-squared test revealed statistically significant associations between the outcome (dental trauma) and maxillary anterior crowding (P = 0.024), anterior open bite (P = 0.001), overjet (P = 0.001) and lip coverage (P = 0.001).</i></p> <p><i>In the simple and multiple logistic regression models, open bite remained significantly associated with the outcome in all five adjustment models (OR = 3.80; 95% CI: 1.42-10.16). Maxillary anterior crowding (OR = 2.14, 95% CI: 1.00-4.63) and overjet (OR = 1.12, 95% CI: 0.58-2.17) lost their significance in Model 5, when the variables were also adjusted for other occlusal characteristics (arch shape, maxillary anterior crowding, overjet and anterior open bite).</i></p>
<p><b>Angaben auffälliger positiver und/oder negativer Aspekte</b></p> <p>Studiendesign                  Durchführung                  Auswertung                  Funding                  Interessenkonflikte                  Bias (SIGN, AMSTAR II, Einzelstudien)</p>	<p><i>Studiendesign: prospektiv, randomisiert, kontrolliert, nicht verblindet, Gruppenzuteilung anhand des Outcomes</i></p> <p><i>Durchführung: gut</i></p> <p><i>Auswertung: sehr gut</i></p> <p><i>Power der Studie/Patientenzahl: 90% test power, N = 400</i></p> <p><i>Funding: This study was sponsored by the Brazilian development agencies: Conselho Nacional de Desenvolvimento Científico e Tecnológico (CNPq), Fundação de Amparo à Pesquisa do Estado de Minas Gerais (Fapemig) and Coordenação de Aperfeiçoamento de Pessoal de Nível Superior (CAPES).</i></p> <p><i>Interessenkonflikte: The authors confirm that they have no conflict of interest.</i></p> <p><i>Bias (SIGN/AMSTAR/EinzelstudienRoB – alle negativen Punkte aus Fragebogen auflisten):</i></p> <ul style="list-style-type: none"> <li>- Keine eindeutige Definition von Einschluss- und Ausschlusskriterien</li> <li>- Keine Information zu den Merkmale der Ausgangspopulation</li> <li>- Keine Verblindung des Untersuchers</li> </ul>
<p><b>Schlussfolgerung des Begutachters</b></p>	<p><u>methodische Qualität:</u> gut</p> <hr/> <p><u>Klinische Aussagekraft:</u> hoch (Es konnte eine signifikante Relation zwischen offenem Biss und erhöhtem Frontzahntraumarisiko festgestellt werden, Störfaktor wurden hierbei in der statistischen Analyse berücksichtigt)</p>
<p><b>Evidenz-level (SIGN)</b></p>	<p><b>3</b></p>
<p><b>Qualität (RoB, SIGN /AMSTAR II)</b></p>	<p><b>Acceptable ⊕</b></p>



# Evidenztable Sauer et al. 2012

Journal of Orofacial Orthopedics  
 Fortschritte der Kieferorthopädie

Original article

## Childhood obstructive sleep apnea syndrome: an interdisciplinary approach

A prospective epidemiological study of 4,318 five-and-a-half-year-old children

## Obstruktives Schlaf-Apnoe-Syndrom im Kindesalter: ein interdisziplinärer Ansatz

Eine prospektive epidemiologische Studie an 4318 Fünfeinhalbjährigen

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### Abstract

Population-representative data on sleep disorders in children is scarce.

**Background and objectives.** The aim of this epidemiological study was to determine the prevalence of various sleep-related breathing disorders (SRBD) and any correlations with occlusion and jaw abnormalities in preschool children.

**Materials and methods.** The study material consisted of 4,318 children (5.5 years old) whose parents completed the Pediatric Sleep Questionnaire (PSQ); 60 out of 140 children (6.3 ± 0.78 years old) with a positive questionnaire score (> 0.13) were examined by an orthodontist and ENT specialist. From this cohort, 15 children who presented a dental occlusion and jaw abnormality but no indication for surgical resection of adenotonsillar tissue underwent polysomnography in a sleep laboratory.

**Results.** According to the PSQ, 1.3% of the 5.5-year-olds showed evidence of a SRBD. Boys were affected significantly more frequently. Lack of concentration, hyperactivity, morning fatigue, mouth breathing, loud snoring, and breathing interruptions were indicators of SRBD. The SRBD children more frequently presented with jaw abnormalities such as mandibular retrognathia, lateral cross-bite, and increased overjet. The SRBD cohort showed a higher rate of orofacial dysfunctions. Adenotonsillar hyperplasia still played a significant role in the development of SRBD.

**Conclusion.** In contrast to previous reports in the literature, the frequency of SRBD in our group of 5- to 6-year-olds was lower.

<b>Population</b>	„Malokklusion/Dysgnathie“ all.
<i>Setting</i>	
<i>Komorbiditäten</i>	
<i>Schweregrad</i>	Keine Angaben

<b>Einschlusskriterien</b> <i>Bei Review: PICOS</i>	Einschlusskriterien für <u>weiterführende Polysomnographie</u> : PSQ-Score > 0,33 und eine vorhandene Okklusions- und Kieferanomalie (Angle-Klasse II $\geq$ 0,5 Prämolarenbreite, sagittale Frontzahnstufe $\geq$ 4 mm, frontal offener Biss $\geq$ 3 mm, Angle-Klasse III, traumatischer Tiefbiss, frontaler und lateraler Kreuzbiss, frontaler und lateraler Kopfbiss)
<b>Ausschlusskriterien</b>	Ausschlusskriterien waren allgemeine akute Infektionen zum Zeitpunkt der Untersuchung, Lippen-Kiefer-Gaumen-Spalten, Epilepsie, Mittelgesichtshypoplasien und das Vorliegen eines erforderlichen HNO-Eingriffs.
<b>Intervention</b> Versuchsgruppe	<b>Keine Intervention</b> <b>Keine Versuchsgruppen</b> STUDIENPOPULATION INSGESAMT: N= 4318 (Anfang) / N= 4271 (Ende) / Alter = 5,5 $\pm$ 0,21 Jahre / ♂:♀ = 49,94%:50,06% <ul style="list-style-type: none"> <li>• Gebissphase: keine Angaben</li> <li>• KFO-Behandlung: keine Behandlung</li> </ul>
<b>Kontrolle</b> Kontrollgruppe	<b>Keine Kontrollgruppe</b>
<b>Outcome</b>	<b>direkter oder schadenspräventiver medizinischer Nutzen bzw. Korrektur/Prävention der Anomalie/Malokklusion/Dysgnathie</b> <ul style="list-style-type: none"> <li>• <b>Atmung und Luftraum (Airway space, Schlafapnoe), Schlucken und Sprechen</b></li> </ul> PRIMÄRZIELGRÖÖE: <i>Schlaffragebogen (PSQ Score)</i> SEKUNDÄRZIELGRÖÖE: <i>Adenoide und Tonsillen (Schweregrad der Hyperplasie)</i> TERTIÄRZIELGRÖÖE: <i>Overjet und Overbite (Overjet und Overbite)</i> QUARTÄRZIELGRÖÖE: <i>Habits (Daumenlutschen, Nuckelflasche, Beruhigungssauger)</i> QUINTÄRZIELGRÖÖE: <i>kardiorespiratorische Polysomnographie (ausschlaggebendes Diagnostikkriterium für OSAS galt der OAH)</i>
<b>Studientyp</b>	<b>Querschnittsstudie</b>

<p><b>Schlussfolgerungen der Autoren</b></p>	<p>Unter Berücksichtigung der durch die Dropout-Rate gegebenen Limitationen der Interpretierbarkeit, ergibt sich für die vorliegende repräsentative Datenerhebung an Vorschulkindern</p> <p>Folgendes:</p> <ul style="list-style-type: none"> <li>– 3,3% der 5- bis 6-Jährigen weisen laut validiertem PSQ ein Risiko für SBAS auf. Dies liegt unter den Werten der Literatur, in der vorselektierte Kohorten untersucht wurden.</li> <li>– Das männliche Geschlecht ist statistisch signifikant häufiger von SBAS betroffen.</li> <li>– Häufigste Hinweise, Fragebögen zur Früherkennung eines solchen Krankheitsbildes zufolge, sind Konzentrationsschwächen, Hyperaktivität, morgendliche Unausgeruhtheit, Mundatmung und lautes Schnarchen. Die Prävalenz beobachteter Atemaussetzer ist im Vergleich zu gesunden Kindern um den Faktor 7,5 erhöht.</li> <li>– Die SBAS-Kohorte zeigte eine erhöhte Prävalenz an Okklusions- und Kieferanomalien. Dabei dominierten drei spezifische Malokklusionen: die mandibuläre Retrognathie, der laterale Kreuzbiss und die vergrößerte sagittale Frontzahnstufe.</li> <li>– Bei Probanden mit SBAS und mit OSAS wurden häufiger die drei oben genannten Malokklusionen festgestellt, was mit Angaben in der Literatur übereinstimmt.</li> <li>– Die Prävalenz von Dysfunktionen, wie offene Mundhaltung oder Sigmatismus addentalis und interdentalis, war bei Kindern mit SBAS erhöht.</li> <li>– Adenotonsilläre Hyperplasien sind als wichtige Ursache für SBAS anzusehen.</li> <li>– Über die Hälfte der Kinder mit OSAS schnarchten in der Schlaflabornacht, was als Hinweis auf eine schlafbezogene Funktionsstörung gewertet werden kann.</li> <li>– Anders als nach der Literatur erwartet konnte der PSQScore den Schweregrad des OSAS nicht vorhersagen.</li> <li>– Die Eignung des PSQ zur Früherkennung von SBAS bei 5- bis 6-Jährigen kann aufgrund der geringen Zahl der Probanden mit polysomnographisch verifiziertem OSAS nicht abschließend beantwortet werden. Die Prognose war bei 9 von 15 Probanden korrekt.</li> <li>– Da Kinder mit SBAS neben anderen, auch schon früh charakteristischen Gesichtsmerkmalen, wie offene Mundhaltung (z. B. durch adenotonsilläre Hyperplasie), spezifische Malokklusionen (z. B. mandibuläre Retrognathie) und dolichofaziales Schädelwachstum, typische Tagesauffälligkeiten wie Hyperaktivität aufweisen, ist es sinnvoll, ihre Problematiken inter- und transdisziplinär zu betrachten: nicht nur aus Sicht der Fachrichtungen HNO und Pädiatrie, sondern auch aus der Perspektive der Kieferorthopädie und der Allgemeinzahnmedizin.</li> </ul>
<p><b>Zusammenfassung der Ergebnisse</b></p>	<p><b>PRIMÄRZIELGRÖßE</b> Ergebnisse basieren damit auf 4271 Probanden. Von diesen zeigten 140 einen positiven PSQ-Score &gt; 0,33, die SBAS-Prävalenz betrug dementsprechend 3,3%. Bei der ausgeglichenen Geschlechterverteilung der Gesamtkohorte (50/50) zeigten 4,15% (n = 88) der Jungen und 2,46% (n = 52) der Mädchen Hinweise auf eine SBAS. Eine bivariate Analyse (exakter zweiseitiger Fisher-Test) zeigte, dass Jungen häufiger an SBAS leiden (p = 0,003).</p> <p>Die für SBAS typischen Verhaltensauffälligkeiten waren im Vergleich zur Gesamtprobandenanzahl häufiger: Unaufmerksamkeit (Spalte 17) war bei der Kohorte mit einem Score &gt; 0,33 um den Faktor 10,0 häufiger, Hyperaktivität (Spalte 20) um den Faktor 6,9 (Tabelle 2).</p>

	<p><b>SEKUNDÄRZIELGRÖßE</b> In der HNO-ärztlichen Untersuchung zeigten 95% (n = 57) der Probanden einen auffälligen Befund. N = 16 (26,7%) hatten eine behinderte Nasenatmung, n = 12 (20%) Allergien, n = 10 (16,7%) einen Paukenerguss und n = 8 (13,3%) ein Paukenröhrchen. Die für die Schlafproblematik entscheidende Tonsillengröße wurde bei n = 23 (39%) als normal, bei n = 18 (30%) als hyperplastisch und bei n = 2 (3%) als massiv hyperplastisch gewertet. Die Tonsillen waren bereits bei n = 6 (10%) entfernt, bei n = 11 (18%) wurde eine Tonsillektomie empfohlen. Außerdem zeigten n = 10 (17%) normal große Adenoide, n = 12 (20%) hyperplastische Adenoide und zwei der Kinder (3%) massiv hyperplastische Adenoide. Bei n = 23 (38%) war bereits eine Adenotomie durchgeführt und bei n = 13 (22%) eine Empfehlung zu einem derartigen Eingriff ausgesprochen worden. Bei n = 17 (28%) der untersuchten Kinder wurde eine operative Verkleinerung der Adenoide und Tonsillen angeraten, n = 43 (72%) waren nicht davon betroffen.</p> <p><b>TERTIÄRZIELGRÖßE</b> Okklusionsanomalien hatten 70% (n = 42) der Kinder. Am häufigsten bestand die Klasse II bei einem Drittel der Probanden. Eine Distalokklusion von <math>&lt; \frac{1}{2}</math> einer Prämolarenbreite hatten 10%, 18,3% eine Distalokklusion von einer <math>\frac{1}{2}</math> Prämolarenbreite und 5% von einer Prämolarenbreite. Eine vergrößerte sagittale Frontzahnstufe zeigten etwa ein Fünftel der Kinder (21,7%), davon 10% eine sagittale Schneidekantendistanz von 4–5 mm und 11,7% von <math>&gt; 6</math> mm. Der ebenfalls im Frontzahnbereich gelagerte offene Biss fand sich bei 10% der Kinder mit SBAS. Der frontale Kopfbiss trat bei drei Kindern auf. Im Seitenzahnbereich lagen bei diesen 16,7% seitliche Kreuzbisse und 10% seitliche Kopfbisse vor. Eine Klasse III wiesen zwei der Kinder auf (Abbildung 4).</p> <p>Die Ergebnisse zeigen eine singuläre statistisch signifikante Korrelation (<math>p = 0,034</math>) zwischen hohen PSQ-Scores und frontalen Kopfbissen.</p> <p><b>QUARTÄRZIELGRÖßE</b> Einen Habit zeigten 25% (n = 15) der Kinder, davon lutschten n = 9 (15%) noch am Daumen, n = 4 (6,7%) am Schnuller, während je einer an der Flasche oder an „Sonstigem“ (z. B. mehreren Fingern) nuckelte. Die Prävalenz von Dysfunktionen war mit 86,7% (n = 52) sehr hoch. N = 33 (55%) zeigten eine Mundatmung, n = 26 (43,3%) eine offene Mundhaltung und n = 24 (40%) elterlich beobachteten Bruxismus. Das viszerale Schluckmuster war bei 13 (21,7%) vorhanden. Eine Zungenfehlhaltung wurde bei n = 10 (16,7%) verzeichnet, wobei auch noch n = 15 (25%) einen Sigmatismus addentalis und n = 11 (18,3%) einen Sigmatismus interdentalis zeigten.</p> <p><b>QUINTÄRZIELGRÖßE</b> Die kardiorespiratorische Polysomnographie der 15 Probanden ergab, dass zwei Kinder (13,3%) an leichtgradigem, fünf (33,3%) an mittelgradigem und zwei (13,3%) an schwergradigem OSAS litten. Sechs Kinder (40%) zeigten keine eindeutigen diagnostischen Hinweise auf ein OSAS. Die 15 Probanden zeigten einen durchschnittlichen OAHl von 5,93/h und einen durchschnittlichen AHI von 8,43/h.</p>
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<p><b>Angaben auffälliger positiver und/oder negativer Aspekte</b></p> <p>Studiendesign</p> <p>Durchführung</p> <p>Auswertung</p> <p>Funding</p> <p><u>Interessenkonflikte</u></p> <p><u>Bias (SIGN, AMSTAR II, Einzelstudien)</u></p>	<p><i>Studiendesign: prospektiv, nicht randomisiert, unkontrolliert, nicht verblindet, Gruppenzuteilung anhand des Outcomes</i></p> <p><i>Durchführung: gut</i></p> <p><i>Auswertung: akzeptabel</i></p> <p><i>Power der Studie/Patientenzahl: keine Powerkalkulation, N = 4318</i></p> <p><i>Funding: Wir bedanken uns bei [...] der Fördergemeinschaft der Universität Witten/Herdecke.</i></p> <p><i>Interessenkonflikte: Die korrespondierende Autorin gibt für sich und ihre Koautoren an, dass kein Interessenkonflikt besteht.</i></p> <p><i>Bias (SIGN/AMSTAR/EinzelstudienRoB – alle negativen Punkte aus Fragebogen auflisten):</i></p> <ul style="list-style-type: none"> <li>- <i>Limitationen der Studie wurden unzureichend diskutiert</i></li> </ul>
<p><b>Schlussfolgerung des Begutachters</b></p>	<p><u>methodische Qualität:</u> gut</p> <hr/> <p><u>Klinische Aussagekraft:</u> moderat (Die vorliegende epidemiologische Studie gibt einen guten Überblick über das Auftreten von schlafbezogenen Atmungsstörungen bei Kindern und Jugendlichen, allerdings ist die klinische Aussagekraft aufgrund der geringen Anzahl statistisch signifikanter Ergebnisse lediglich moderat)</p>
<p><b>Evidenz-level (SIGN)</b></p>	<p><b>3</b></p>
<p><b>Qualität (RoB, SIGN /AMSTAR II)</b></p>	<p><b>Acceptable ⊕</b></p>

# Evidenztabelle Schatz et al. 2013



## Prevalence of traumatic injuries to permanent dentition and its association with overjet in a Swiss child population

**Abstract – Objective:** Dental trauma is a very common issue in dentistry and its occurrence has been related to many factors. The aim of this study was to evaluate the prevalence of traumatic dental injuries in the permanent dentition among Swiss children and its association with overjet. **Material and methods:** A sample of 1900 children aged 6–13 years was prospectively evaluated to determine the number and types of injuries, the influence of overjet on the risk of suffering trauma and the relationships between trauma, age, gender and life conditions. **Results:** The observed prevalence of trauma was higher for boys, with a slight risk increase with age and a peak frequency at the age of 10 years. Most of the injuries (91.2%) involved the upper front teeth; 87.2% of all injuries were hard tissue injuries (enamel or dentin fractures), and 12.8% only subluxation and luxation injuries. Children with an overjet of 6 mm or more had a four times higher risk of suffering trauma, compared with those with less overjet. **Conclusion:** This cross-sectional study confirmed most of the results from earlier studies dealing with epidemiological factors of dental injuries to the permanent dentition. Of all the variables analysed, overjet stood out as the most significant risk factor; an increased overjet of 6 mm or more had a major impact on the risk of trauma, which would speak in favour of early orthodontic correction of an increased overjet to reduce the prevalence of dental trauma.

<b>Population</b> <i>Setting</i> <i>Komorbiditäten</i>	„Malokklusion/Dysgnathie“ allg. <ul style="list-style-type: none"><li>• 8 schweizer Schulen in und um Genf</li></ul>
<b>Schweregrad</b>	Overjet > 6 mm
<b>Einschlusskriterien</b> <i>Bei Review: PICOS</i>	<ul style="list-style-type: none"><li>• children aged 6–13 years</li></ul>
<b>Ausschlusskriterien</b>	Keine Angaben

<p><b>Intervention</b> Versuchsgruppe</p>	<p><b>Keine Intervention</b> <b>Keine Versuchsgruppen</b> STUDIENPOPULATION INSGESAMT: N=1900 (Anfang) / N=1898 (Ende) / Alter = 6-13 Jahre / ♂:♀ = 1000:900</p> <ul style="list-style-type: none"> <li>• Gebissphase: keine Angaben (Trauma nur bei bleibenden Zähnen)</li> <li>• KFO-Behandlung: keine Behandlung</li> </ul>
<p><b>Kontrolle</b> Kontrollgruppe</p>	<p><b>Keine Kontrollgruppe</b></p>
<p><b>Outcome</b></p>	<p><b>direkter oder schadenspräventiver medizinischer Nutzen bzw. Korrektur/Prävention der Anomalie/Malokklusion/Dysgnathie</b></p> <ul style="list-style-type: none"> <li>• <b>Traumaprophylaxe (dentales Frontzahntrauma)</b></li> </ul> <p>PRIMÄRZIELGRÖßE: <i>Overjet (Overjet [mm])</i>          SEKUNDÄRZIELGRÖßE: <i>Type of dental injuries (NIDR index)</i>          TERTIÄRZIELGRÖßE: <i>Patient history, name, age, sex, living conditions and grade level (Patient history, name, age, sex, living conditions (urban or suburban areas) and grade level)</i></p>
<p><b>Studientyp</b></p>	<p><b>Querschnittsstudie</b></p>
<p><b>Schlussfolgerungen der Autoren</b></p>	<p>Of the variables studied, only an overjet of 6 mm or more showed a significant impact on the risk of dental trauma: this result confirms the hypothesis that early orthodontic overjet correction in patients with occlusal risk factors may reduce the prevalence of dental trauma.</p>

<p><b>Zusammenfassung der Ergebnisse</b></p>	<p><b>Patient history, name, age, sex, living conditions (urban or suburban areas) and grade level</b></p> <p><b>SEKUNDÄRZIELGRÖßE</b> A total of 272 children (14.3%) among the 1898 subjects examined during our study showed clinical signs of previous dental injuries. The observed prevalence was higher in boys (16.1%) than in girls (12.1%): a logistic regression model showed that boys had a 1.35 (95% CI: 1.04–1.78, <math>P = 0.025</math>) times higher risk of trauma compared with girls, when age was taken into account in the model. The frequency of subjects with incisor trauma did not show any difference when environmental conditions of living were considered, that is, in an urban or suburban area. A statistically significant difference was only observed between two specific urban (Cayla) and suburban (Onex) schools: at Cayla, more traumas than expected were observed, while at Onex, the traumas were much less frequent than expected (<math>\chi^2=19.4</math>, <math>df = 7</math>, <math>P = 0.007</math>) (Table 1). The figures for age repartition were similar for boys and girls, and the results showed a slight risk increase for traumas with age (Table 2). The largest number of injuries for boys and girls were found between the ages of 9–12 years, with a peak frequency of 30.5% at the age of 11 years. The 272 subjects with traumatized teeth have been grouped, based on the location of the trauma. The grouping showed that 91.2% of the injuries involved the upper front teeth, while 8.5% involved the lower front teeth and 0.4% other areas of the denture (Table 3). Single traumatized incisors were found in 74.6% of the sample, while only three patients had three or more injured teeth. Very few patients (2.6%) had injuries affecting incisors of the maxillary and mandibular arches at the same time. As many as 39.4% of the recorded injuries were enamel fractures, 48.1% were combined enamel/dentin fractures, while subluxations and luxation injuries accounted for only 12.9% of the traumas. There were no patients with injuries combining hard tissues and luxation injuries at the same time. The age of the patient at the time of injury had a significant impact on the type of trauma experienced by the children, with hard tissue injuries affecting more older patients compared with luxation injuries (<math>F = 2.88</math>, <math>df = 3</math>, <math>P = 0.036</math>)</p> <p><b>Overjet</b></p> <p><b>SEKUNDÄRZIELGRÖßE</b> Children with an overjet of 6 mm or larger were more prone to traumatic injuries (<math>\chi^2 = 3.4</math>, <math>df = 1</math>, <math>P &lt; 0.001</math>): they had a 4.03 (95% CI: 2.79–5.81) times higher risk of sustaining trauma than those who did not have an overjet of 6 mm or more. Although an increased OJ had significant effects on the risk of trauma, it did not have any effect on the type of trauma experienced by the children (<math>\chi^2 = 3.4</math>, <math>df = 3</math>, <math>P = 0.33</math>)</p>
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<p><b>Angaben auffälliger positiver und/oder negativer Aspekte</b></p> <p>Studiendesign</p> <p>Durchführung</p> <p>Auswertung</p> <p>Funding</p> <p><u>Interessenkonflikte</u></p> <p><u>Bias (SIGN, AMSTAR II, Einzelstudien)</u></p>	<p><i>Studiendesign: prospektiv, randomisiert, unkontrolliert, nicht verblindet, Gruppenteilung anhand des Outcomes</i></p> <p><i>Durchführung: gut</i></p> <p><i>Auswertung: gut</i></p> <p><i>Power der Studie/Patientenzahl: keine Powerkalkulation, N = 1898</i></p> <p><i>Funding: The project was supported by a grant from the Swiss National Fund for Scientific Research (grant No. 59485)</i></p> <p><i>Interessenkonflikte: keine Angaben</i></p> <p><i>Bias (SIGN/AMSTAR/EinzelstudienRoB – alle negativen Punkte aus Fragebogen auflisten):</i></p> <ul style="list-style-type: none"> <li>- <i>Limitationen der Studie wurden kaum diskutiert</i></li> <li>- <i>Es wurde kein Ethikvotum eingeholt, allerdings wurden lediglich Routineuntersuchungen durchgeführt</i></li> </ul>
<p><b>Schlussfolgerung des Begutachters</b></p>	<p><u>methodische Qualität:</u> gut</p> <hr/> <p><u>Klinische Aussagekraft:</u> gut (Die vorliegende Studie konnte anhand einer großen Studienpopulation zeigen, dass ein vergrößerter Overjet ab 6 mm einen Risikofaktor für die Entstehung eines Zahntraumas darstellt)</p>
<p><b>Evidenz-level (SIGN)</b></p>	<p><b>3</b></p>
<p><b>Qualität (RoB, SIGN /AMSTAR II)</b></p>	<p><b>High quality ⊕⊕</b></p>

# Evidenztabelle **Seehra et al. 2013**

European Journal of Orthodontics 37 (2013) 441–447  
doi:10.1093/ejo/cjt011  
Advance Access publication 24 July 2013

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## Interceptive orthodontic treatment in bullied adolescents and its impact on self-esteem and oral-health-related quality of life

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**SUMMARY** The aim of this follow-up study was to measure the self-reported frequency and severity of bullying in orthodontic patients previously identified as being bullied, who have commenced interceptive orthodontic treatment, and to investigate the effect on an individual's self-esteem and oral-health-related quality of life (OHRQoL). Forty-three adolescents previously identified as being bullied due to the presence of a malocclusion were invited to take part in a follow-up study following commencement of orthodontic treatment at three UK Hospitals. Validated questionnaires were used to assess the self-reported frequency and severity of bullying, self-esteem and OHRQoL. The participation rate at follow-up was 63 per cent. Following commencement of orthodontic treatment, 21 (78 per cent) participants reported they were currently no longer being bullied due to the presence of their malocclusion. In comparison to their pre-treatment scores, participants reported fewer functional limitations ( $P = 0.013$ ), decreased emotional ( $P < 0.001$ ) and social impact ( $P < 0.001$ ), and improved overall oral health ( $P = 0.03$ ) and OHRQoL ( $P = 0.002$ ). In addition, an improvement in functional limitations ( $P = 0.021$ ), emotional ( $P = 0.008$ ), social impact ( $P = 0.008$ ) and OHRQoL ( $P = 0.02$ ) was reported by participants who were no longer being bullied in comparison to those who continued to report bullying. There appears to be no effect on an individual's self-esteem. Orthodontic treatment may have a positive effect on adolescents experiencing bullying related to their malocclusion and their OHRQoL.

<b>Population</b>	<b>Malokklusion allgemein</b>
<i>Setting</i> <i>Komorbiditäten</i>	<ul style="list-style-type: none"> <li>Adolescents who had previously been identified as bullied due to the presence of a malocclusion (Seehra et al., 2011) were invited to take part in this follow-up study</li> <li>orthodontic new patient clinics at Kent and Canterbury Hospital, William Harvey Hospital and Guy's campus of King's College London Dental Institute</li> </ul>
<i>Schweregrad</i>	Keine Angaben
<i>Einschluss-kriterien</i> <i>Bei Review: PICOS</i>	Keine Angaben
<i>Ausschluss-kriterien</i>	Keine Angaben

<p><b>Intervention</b> Versuchsgruppe</p>	<p><b>Keine Intervention</b> <b>Keine Versuchsgruppen</b> STUDIENPOPULATION INSGESAMT: N=27 (Anfang) / N=27 (Ende) / Alter = 14,6 ± 1,5 Jahre / ♂:♀ = 13:14</p> <ul style="list-style-type: none"> <li>• Gebissphase: permanentes Gebiss</li> <li>• KFO-Behandlung: keine Behandlung</li> </ul>
<p><b>Kontrolle</b> Kontrollgruppe</p>	<p><b>Keine Kontrollgruppe</b></p>
<p><b>Outcome</b></p>	<p><b>direkter oder schadenspräventiver medizinischer Nutzen bzw. Korrektur/Prävention der Anomalie/Malokklusion/Dysgnathie</b></p> <ul style="list-style-type: none"> <li>• <b>mundgesundheitsbezogene Lebensqualität (MLQ), psychische Entwicklung</b></li> </ul> <p>PRIMÄRZIELGRÖßE: <i>prevalence, type and severity of bullying were assessed using the Olweus Bully/Victim Questionnaire</i></p> <p>SEKUNDÄRZIELGRÖßE: <i>Harter's Self Perception Profile for Children measures specific domains of self-esteem (scholastic competence, social acceptance, athletic competence, physical appearance, behavioural conduct and general domain of self-worth)</i></p>
<p><b>Studientyp</b></p>	<p><b>Querschnittsstudie</b></p>
<p><b>Schlussfolgerungen der Autoren</b></p>	<p>Within the study limitations, interceptive orthodontic treatment insigated in adolescents who are being bullied due to the presence of a malocclusion may have a positive impact on their OHRQoL and may experience less bullying related to their malocclusion.</p>
<p><b>Zusammenfassung der Ergebnisse</b></p>	<p>Following commencement of orthodontic treatment, 21 (78 per cent) participants reported they were currently no longer being bullied due to the presence of their malocclusion. In comparison to their pre-treatment scores, participants reported fewer functional limitations (P = 0.013), decreased emotional (P &lt; 0.001) and social impact (P &lt; 0.001), and improved overall oral health (P = 0.03) and OHRQoL (P = 0.002). In addition, an improvement in functional limitations (P = 0.021), emotional (P = 0.008), social impact (P = 0.008) and OHRQoL (P = 0.02) was reported by participants who were no longer being bullied in comparison to those who continued to report bullying. There appears to be no effect on an individual's self-esteem. Orthodontic treatment may have a positive effect on adolescents experiencing bullying related to their malocclusion and their OHRQoL.</p>

<p><b>Angaben auffälliger positiver und/oder negativer Aspekte</b></p> <p>Studiendesign Durchführung Auswertung Funding <u>Interessenkonflikte</u> <u>Bias (SIGN, AMSTAR II, Einzelstudien)</u></p>	<ul style="list-style-type: none"> <li>geringe Fallzahl</li> </ul> <p><i>Durchführung: gut</i></p> <p><i>Auswertung: gut</i></p> <p><i>Power der Studie/Patientenzahl: etwas gering</i></p> <p><i>Funding: This work was supported by the European Orthodontic Society Houston research Grant</i></p> <p><i>Interessenkonflikte: nicht angegeben</i></p>
<p><b>Schlussfolgerung des Begutachters</b></p>	<p><u>methodische Qualität:</u> akzeptabel</p> <hr/> <p><u>Klinische Aussagekraft:</u> gut</p>
<p><b>Evidenzlevel (SIGN)</b></p>	<p>3</p>
<p><b>Qualität (RoB, SIGN /AMSTAR II)</b></p>	<p><b>Akzeptabel ⊕</b></p>

# Evidenztabelle Seehra et al. 2011

Journal of Orthodontics, Vol. 38, 2011, 247-254

## SCIENTIFIC SECTION

### Bullying in orthodontic patients and its relationship to malocclusion, self-esteem and oral health-related quality of life

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**Objective:** To measure the self-reported frequency and severity of bullying amongst patients referred for orthodontic treatment and to investigate whether there is a relationship between levels of self-reported bullying, malocclusion and need for orthodontic treatment and an individual's self-esteem and oral health-related quality of life (OHRQoL).

**Design and setting:** Cross-sectional study of an adolescent group referred for orthodontic assessment at three UK hospitals.

**Subjects and methods:** Three hundred and thirty-six participants aged between 10 and 14 years were recruited. Validated questionnaires were used to measure the self-reported frequency and severity of bullying, self-esteem and OHRQoL. Orthodontic treatment need was assessed using IOTN.

**Results:** The prevalence of bullying was 12.8%. Being bullied was significantly associated with Class II Division 1 incisor relationship ( $P=0.041$ ), increased overbite ( $P=0.023$ ), increased overjet ( $P=0.001$ ) and a high need for orthodontic treatment assessed using AC IOTN ( $P=0.014$ ). Bullied participants also reported lower levels of social competence ( $P<0.001$ ), athletic competence ( $P<0.001$ ), physical appearance related self-esteem ( $P<0.001$ ) and general self-esteem ( $P<0.001$ ). Higher levels of oral symptoms ( $P=0.032$ ), functional limitations ( $P<0.001$ ), emotional ( $P<0.001$ ) and social impact ( $P<0.001$ ) from their oral condition, resulting in a negative impact on overall OHRQoL ( $P<0.001$ ), were also reported.

**Conclusion:** Significant relationships exist between bullying and certain occlusal traits, self-esteem and OHRQoL.

**Key words:** Bullying, self-esteem, oral health-related quality of life, malocclusion

<b>Population</b>	„Malokklusion/Dysgnathie“ allg.
<i>Setting</i>	<ul style="list-style-type: none"> <li>orthodontic new patient clinics at Kent and Canterbury Hospital, William Harvey Hospital and Guy's campus of King's College London Dental Institute</li> </ul>
<i>Komorbiditäten</i>	
<b>Schweregrad</b>	Keine Angaben
<b>Einschlusskriterien</b>	Keine Angaben
<i>Bei Review: PICOS</i>	
<b>Ausschlusskriterien</b>	Keine Angaben

<b>Intervention</b> Versuchsgruppe	<p><b>Keine Intervention</b></p> <p><b>Keine Versuchsgruppen</b></p> <p>STUDIENPOPULATION INSGESAMT:</p> <p>N=336 (Anfang) / N=336 (Ende) / Alter = 12,2 ± 1,2 Jahre / ♂:♀ = 201:133</p> <ul style="list-style-type: none"> <li>• Gebissphase: keine Angaben</li> <li>• KFO-Behandlung: keine Behandlung</li> </ul>
<b>Kontrolle</b> Kontrollgruppe	<p><b>Keine Kontrollgruppe</b></p>
<b>Outcome</b>	<p><b>direkter oder schadenspräventiver medizinischer Nutzen bzw. Korrektur/Prävention der Anomalie/Malokklusion/Dysgnathie</b></p> <ul style="list-style-type: none"> <li>• <b>mundgesundheitsbezogene Lebensqualität (MLQ), psychische Entwicklung</b></li> </ul> <p>PRIMÄRZIELGRÖßE: <i>Bullying status (levels of bullying)</i></p> <p>SEKUNDÄRZIELGRÖßE: <i>Self Perception (scholastic competence, social acceptance, athletic competence, physical appearance, behavioural conduct and general domain of self-worth)</i></p> <p>TERTIÄRZIELGRÖßE: <i>OHRQoL (oral symptoms, functional limitation, emotional impact and social impact)</i></p> <p>QUARTÄRZIELGRÖßE: <i>Orthodontic treatment need (IOTN DHC, IOTN AC)</i></p>
<b>Studientyp</b>	<p><b>Querschnittsstudie</b></p>
<b>Schlussfolgerungen der Autoren</b>	<ol style="list-style-type: none"> <li>1. A significant relationship exists between an individual being bullied, the presence of malocclusion and poor self-esteem and OHRQoL.</li> <li>2. Occlusal traits associated with being bullied are: Class II Division 1 incisor relationship and an increased overjet and overbite.</li> <li>3. Individuals who are bullied due to the presence of a malocclusion have a higher need for orthodontic treatment as assessed by the AC of IOTN.</li> </ol>
<b>Zusammenfassung der Ergebnisse</b>	<p><b>PRIMÄRZIELGRÖßE</b> <i>Forty-three participants (12.8%) identified that they had been bullied at school, two or three times a month or more in the last 2 months (Question 4 of the Olweus questionnaire), and were therefore classified in the context of this study as being bullied. Table 2 compares the socio-demographic characteristics of participants who were bullied and those who did not report being bullied. There were no significant differences between the two groups.</i></p> <p><b>PRIMÄRZIELGRÖßE, QUARTÄRZIELGRÖßE</b> <i>Bullied participants (Table 3) were significantly more likely to have a Class II Division 1 incisor relationship (P=0.041) with an increased overjet (&gt;4 mm) (P=0.001), increased overbite (P=0.023), and a higher need for orthodontic treatment when assessed using the AC of IOTN (P=0.014).</i></p> <p><b>PRIMÄRZIELGRÖßE, TERTIÄRZIELGRÖßE</b> <i>Bullied participants report higher levels of oral symptoms (P=0.032), functional limitations (P&lt;0.001), emotional (P&lt;0.001) and social impact (P&lt;0.001) from their oral condition, resulting in negative impact on overall OHRQoL (P&lt;0.001).</i></p> <p><b>PRIMÄRZIELGRÖßE, SEKUNDÄRZIELGRÖßE</b> <i>Bullied participants report lower levels of social competence (P&lt;0.001), athletic competence (P&lt;0.001), physical appearance-related self-esteem (P&lt;0.001) and general self-esteem (P&lt;0.001) compared to non-bullied participants</i></p>

<p><b>Angaben auffälliger positiver und/oder negativer Aspekte</b></p> <p>Studiendesign</p> <p>Durchführung</p> <p>Auswertung</p> <p>Funding</p> <p><u>Interessenkonflikte</u></p> <p><u>Bias (SIGN, AMSTAR II, Einzelstudien)</u></p>	<p><i>Studiendesign: prospektiv, unkontrolliert, nicht randomisiert, verblindet, Gruppenzuteilung anhand des Outcomes</i></p> <p><i>Durchführung: gut</i></p> <p><i>Auswertung: gut</i></p> <p><i>Power der Studie/Patientenzahl: power of 80% at the 5% significance level, N = 336</i></p> <p><i>Funding: European Orthodontic Society</i></p> <p><i>Interessenkonflikte: keine Angaben</i></p> <p><i>Bias (SIGN/AMSTAR/EinzelstudienRoB – alle negativen Punkte aus Fragebogen auflisten):</i></p> <ul style="list-style-type: none"> <li>- <i>Non-responders wurden nicht kategorisiert</i></li> </ul>
<p><b>Schlussfolgerung des Begutachters</b></p>	<p><u>methodische Qualität:</u> gut</p> <p><u>Klinische Aussagekraft:</u> gut (Risikofaktoren wurden Berücksichtigt, die Größe der Studienpopulation gerechtfertigt, es konnte ein signifikanter Zusammenhang zwischen Klasse II Malokklusionen und Mobbing festgestellt werden)</p>
<p><b>Evidenzlevel (SIGN)</b></p>	<p><b>3</b></p>
<p><b>Qualität (RoB, SIGN /AMSTAR II)</b></p>	<p><b>Acceptable ⊕</b></p>

# Evidenztabelle Sierwald et al. 2015

## Association of overjet and overbite with esthetic impairments of oral health-related quality of life

## Zusammenhang von Overjet und Overbite mit ästhetischen Beeinträchtigungen der mundgesundheitsbezogenen Lebensqualität

Ira Sierwald<sup>1</sup> · Mike T. John<sup>1</sup> · Oliver Schierz<sup>2</sup> · Paul-Georg Jost-Brinkmann<sup>1</sup> · Daniel R. Reissmann<sup>2,4</sup>

### Abstract

**Objective.** Esthetics is an important part of quality of life and a frequent reason for orthodontic treatment demand. It was the aim of this study to investigate whether esthetic impairments, related to overjet and overbite, can be assessed with an established oral health-related quality of life instrument.

**Materials and methods.** Data from 1968 participants (age: 14–90 years; 69.8% female) from three German surveys were analyzed. Esthetic impairments of oral health-related quality of life were measured with four questions of the Oral Health Impact profile (OHIP), which comprise esthetic aspects of oral health-related quality of life. Higher values represent greater esthetic impairment (sum score: 0–16). Overbite and overjet values were categorized (<−1 mm, 0–1 mm, 2–3 mm, 4–5 mm, ≥6 mm). The specific impact of each category on esthetic impairment, in relation to the reference category (2–3 mm), was calculated in linear regression analyses. The type of relationship and the specific impact of overbite and overjet were evaluated in regression analyses with fractional polynomials.

**Results.** Overbite ranged from −5 to 15 mm (mean: 3.2 mm) and overjet from −7 to 19 mm (mean: 3.1 mm). Both an increase and a decrease in overjet, in relation to the reference category, resulted in more esthetic-related oral health-related quality of life impair-


<b>Population</b> <i>Setting</i> <i>Komorbiditäten</i>	„Malokklusion/Dysgnathie“ allg.  • Deutschland, Schweiz
<b>Schweregrad</b>	Overjet / Overbite > oder < 2-3 mm
<b>Einschlusskriterien</b>  <i>Bei Review: PICOS</i>	Keine Angaben
<b>Ausschlusskriterien</b>	Keine Angaben



<p><b>Intervention</b> Versuchsgruppe</p>	<p><b>Keine Intervention</b> <b>Keine Versuchsgruppen</b> Studienpopulation insgesamt: N=1968 (Anfang) / N=?? (Ende) / Alter = 42,6 ± 17,5 Jahre / ♂:♀ = 539:1375</p> <ul style="list-style-type: none"> <li>• Gebissphase: permanentes Gebiss ≥ 18. Lebensjahr</li> <li>• KFO-Behandlung: keine Behandlung</li> </ul>
<p><b>Kontrolle</b> Kontrollgruppe</p>	<p><b>Keine Kontrollgruppe</b></p>
<p><b>Outcome</b></p>	<p><b>direkter oder schadenspräventiver medizinischer Nutzen bzw. Korrektur/Prävention der Anomalie/Malokklusion/Dysgnathie</b></p> <ul style="list-style-type: none"> <li>• <b>mundgesundheitsbezogene Lebensqualität (MLQ), psychische Entwicklung</b></li> </ul> <p>PRIMÄRZIELGRÖßE: <i>mundgesundheitsbezogene Lebensqualität (OHIP-Summenwert)</i> SEKUNDÄRZIELGRÖßE: <i>Overbite und Overjet (Overbite / Overjet [mm])</i></p>
<p><b>Studientyp</b></p>	<p><b>Querschnittsstudie</b></p>
<p><b>Schlussfolgerungen der Autoren</b></p>	<p>Sowohl eine Vergrößerung als auch eine Verringerung des Overjets gegenüber dem Referenzbereich bzw. dem Durchschnittswert stehen im Zusammenhang mit einer ästhetischen Beeinträchtigung der mundgesundheitsbezogenen Lebensqualität. Sehr wahrscheinlich ist dieser Effekt bei starken Abweichungen klinisch relevant. Der Overbite zeigt dagegen über einen weiten Bereich seiner Ausprägung (negativ als auch positiv) keinen wesentlichen Einfluss auf die mundgesundheitsbezogene Lebensqualität.</p>
<p><b>Zusammenfassung der Ergebnisse</b></p>	<p><b>PRIMÄRZIELGRÖßE VS. SEKUNDÄRZIELGRÖßE</b> <i>In Bezug auf die vier einzelnen Ästhetikfragen war die Häufigkeit von "oft" oder "sehr oft" wahrgenommenen Beeinträchtigungen der Ästhetik insgesamt gering und betrug für jeden der erfassten Aspekte jeweils weniger als 10%.</i></p> <p><i>Die Häufigkeiten unterschieden sich für keine der vier Ästhetikfragen signifikant zwischen den Overbite-Kategorien (alle P &gt;0,05; Tab. 2). Demgegenüber zeigte sich für die Overjet-Kategorien bis auf eine Kategorie bei einer Frage (Zahn nicht gesund ausgesehen) ein vergleichbares Muster mit den geringsten Häufigkeiten für die Referenzkategorie (2–3 mm) und höheren Häufigkeiten mit zunehmendem Abstand von der Referenzkategorie. Die höchsten Werte lagen bei der Overjet-Kategorie ≤-1 mm für die Frage Aussehen beeinträchtigt (15,4%) und bei der Overjet-Kategorie ≥6 mm für die Fragen Unbehagen wegen Aussehen (12,9%), Zahn nicht gesund ausgesehen (12,1%) und Lächeln vermieden (11,1%) vor.</i></p> <p><i>Für einen vergrößerten Overjet war der Unterschied des Summenwerts der vier Ästhetikfragen gegenüber der Referenzkategorie sowohl für die Kategorie 4–5 mm als auch für ≥6 mm statistisch signifikant, während für die Kategorien mit verringertem Overjet kein signifikanter Effekt nachgewiesen werden konnte. Für die Overjet-Kategorie ≥6 mm bestand durchschnittlich fast ein ganzer OHIP-Punkt mehr für den Summenwert der vier Ästhetikfragen (Interquartilbereich in der Studie: 0–4 OHIP-Punkte), was einer signifikanten Beeinträchtigung der Ästhetik entspricht.</i></p>

<p><b>Angaben auffälliger positiver und/oder negativer Aspekte</b></p> <p>Studiendesign</p> <p>Durchführung</p> <p>Auswertung</p> <p>Funding</p> <p><u>Interessenkonflikte</u></p> <p><u>Bias (SIGN, AMSTAR II, Einzelstudien)</u></p>	<p><i>Studiendesign: retrospektiv, Randomisierung nur bezüglich der Erhebung innerhalb der Allgemeinbevölkerung (n=163), unkontrolliert, Gruppenzuweisung anhand des Outcomes</i></p> <p><i>Durchführung: akzeptabel</i></p> <p><i>Auswertung: gut</i></p> <p><i>Power der Studie/Patientenzahl: keine Powerkalkulation, N = 1968</i></p> <p><i>Funding: German Federal Ministry of Education and Research (BMBF; 01 EZ 1022), German Research Foundation (DFG; RE 3289/2-1)</i></p> <p><i>Interessenkonflikte: Ira Sierwald, Mike T. John, Oliver Schierz, Paul-Georg Jost-Brinkmann, and Daniel R. Reissmann state that there are no conflicts of interest.</i></p> <p><i>Bias (SIGN/AMSTAR/EinzelstudienRoB – alle negativen Punkte aus Fragebogen auflisten):</i></p> <ul style="list-style-type: none"> <li>- <i>Risikofaktoren wurden unzureichend gemessen (insbesondere das Risiko der CMD-Patienten auf das Ergebnis der mundgesundheitsbezogene Lebensqualität)</i></li> <li>- <i>Methodik wurde stellenweise nicht detailliert genug beschrieben (Def. der Messpunkte für Overbite und Overjet)</i></li> </ul>
<p><b>Schlussfolgerung des Begutachters</b></p>	<p><u>methodische Qualität:</u> akzeptabel</p> <p><u>Klinische Aussagekraft:</u> moderat</p>
<p><b>Evidenzlevel (SIGN)</b></p>	<p><b>3</b></p>
<p><b>Qualität (RoB, SIGN /AMSTAR II)</b></p>	<p><b>Acceptable ⊕</b></p>

# Evidenztabelle Siluvai et al. 2015



**Malocclusion and Related Quality of Life Among  
13- to 19-year-old Students in Mysore City –  
A Cross-sectional Study**

Sibyl Siluvai<sup>a</sup>/Nandita Kshetrimayum<sup>a</sup>/Chavva V.K. Reddy<sup>b</sup>/Sunitha Siddanna<sup>c</sup>/  
Maurya Manjunath<sup>d</sup>/Sushma Rudraswamy<sup>d</sup>

**Purpose:** To assess malocclusion and related quality of life among 13- to 19-year-old students in Mysore City.

**Materials and Methods:** A total of 900 students aged 13–19 years selected based on multistage stratified random sampling were included in this cross-sectional study. A pre-designed format was used to record the sociodemographic details, oral hygiene practices, personal habits, malocclusion and oral health related quality of life. Malocclusion was assessed using Dental Aesthetic Index (DAI) and quality of life using Oral Health Impact Profile-14 (OHIP-14). Further, the association between malocclusion and related quality of life was assessed.

**Results:** Normal or slight malocclusion was seen in 79.2% (n = 713). Definite malocclusion was seen in 12.8%, severe malocclusion in 5.7% and handicapping malocclusion in 2.3% of the subjects. The overall prevalence of malocclusion was found to be 20.8%. Out of the 900 study subjects 46.8% (n = 419) reported that malocclusion had some impact on their oral health related quality of life. The results of logistic regression demonstrated that those with malocclusion experienced a significant impact on quality of life (OR = 16.07, CI = 9.17–28.17).

**Conclusion:** Malocclusion has an impact on the oral health related quality of life among 13- to 19-year-old students in Mysore City.

**Key words:** adolescents, Dental Aesthetic Index, dental aesthetics, Oral Health Impact Profile

Oral Health Prev Dent 2015;13:135-141  
doi: 10.3290/J.ohpd.12139 Submitted for publication: 26.02.12; accepted for publication: 26.05.12

<b>Population</b> <i>Setting</i> <i>Komorbiditäten</i>	<p>„Malokklusion/Dysgnathie“ allg.</p> <ul style="list-style-type: none"> <li>• Mysore city, Karnataka, India</li> </ul>
<b>Schweregrad</b>	Keine Angaben
<b>Einschlusskriterien</b> <i>Bei Review: PICOS</i>	<ul style="list-style-type: none"> <li>• students aged 13–19 years</li> </ul>
<b>Ausschlusskriterien</b>	<ul style="list-style-type: none"> <li>• undergoing orthodontic treatment or had been orthodontically treated</li> <li>• mixed dentition</li> <li>• severely discoloured teeth</li> <li>• history of systemic diseases and were under any medication</li> </ul>

<p><b>Intervention</b> Versuchsgruppe</p>	<p><b>Keine Intervention</b> Keine Versuchsgruppen Studienpopulation insgesamt: N=?? (Anfang) / N=?? (Ende) / Alter = ?? ± ?? Jahre / ♂:♀ = ??:?  <ul style="list-style-type: none"> <li>• Gebissphase: ???</li> <li>• KFO-Behandlung: ???</li> </ul> </p>
<p><b>Kontrolle</b> Kontrollgruppe</p>	<p><b>Kategorie aus Einschlusskriterien</b> KONTROLLGRUPPE: <b>Bezeichnung</b> N= 900 (Anfang) / N=?? (Ende) / Alter = 13-19 Jahre / ♂:♀ = “gender-matched”  <ul style="list-style-type: none"> <li>• Gebissphase: keine Angaben</li> <li>• KFO-Behandlung: keine Angaben</li> </ul> </p>
<p><b>Outcome</b></p>	<p><b>direkter oder schadenspräventiver medizinischer Nutzen bzw. Korrektur/Prävention der Anomalie/Malokklusion/Dysgnathie</b></p> <ul style="list-style-type: none"> <li>• <b>mundgesundheitsbezogene Lebensqualität (MLQ), psychische Entwicklung</b></li> </ul> <p>PRIMÄRZIELGRÖßE: <i>Socioeconomic status (low, upper low, lower middle, upper middle, upper SES)</i>          SEKUNDÄRZIELGRÖßE: <i>malocclusion (Dental Aesthetic Index)</i>          TERTIÄRZIELGRÖßE: <i>oral health related quality of life (OHIP-14 score)</i>          QUARTÄRZIELGRÖßE: <i>Oral hygiene practices (Frequency of brushing, Cleaning of teeth, Material used for cleaning, Brushing method)</i>          QUINTÄRZIELGRÖßE: <i>Personal habits (smoking, alcohol, pan chewing)</i></p>
<p><b>Studientyp</b></p>	<p><b>Querschnittsstudie</b></p>
<p><b>Schlussfolgerungen der Autoren</b></p>	<p>Within the limitations of the study – i.e. the Dental Aesthetic Index does not take into consideration traits such as centre-line discrepancy (which can also affect aesthetics), OHIP-14 is not used in particular to assess the impact due to malocclusion and dental caries was not taken into account – it can be concluded that malocclusion has an impact on the oral health related quality of life among 13- to 19-year-old students. Therefore, in planning new oral health initiatives, public health services should include malocclusions which have shown considerable impact on quality of life. This is especially relevant among adolescents who are more concerned about facial aesthetics. The cross-sectional studies (the predominant study design) in which these instruments have been used so far do not indicate whether the instruments are sensitive to changes brought about by new events of oral disease or provision of dental care. Hence, it is also necessary to evaluate the performance of oral health related quality of life instruments in longitudinal and interventional studies.</p>

<p><b>Zusammenfassung der Ergebnisse</b></p>	<p><b>PRIMÄRZIELGRÖßE</b> Out of the total 900 students, 41.3% (n = 372) had a low SES, 10.2% (n = 92) had upper low, 3.6% (n = 32) lower middle SES, 23.6% (n = 219) had upper middle SES and 20.6% (n = 185) had an upper socioeconomic status.</p> <p><b>SEKUNDÄRZIELGRÖßE</b> Normal or slight malocclusion was seen in 79.2% (n = 713), definite malocclusion was seen in 12.8%, severe malocclusion in 5.7% and handicapping malocclusion in 2.3% of the subjects. Subjects with definite, severe and handicapping conditions were considered to have malocclusion. The overall prevalence of malocclusion was found to be 20.8%.</p> <p><b>TERTIÄRZIELGRÖßE</b> Out of the 900 study subjects, 46.6% (n = 419) reported that malocclusion had some impact on their oral health related quality of life.</p> <p>A statistically significant association was found between OHIP-14 scores and age groups (p &lt; 0.002), gender (p &lt; 0.00), fractured teeth in the anterior region (p &lt; 0.002), satisfaction with smile (p &lt; 0.001) and past dental visit (p &lt; 0.001).</p> <p>A significant association was found between malocclusion and impact on quality of life when the variables age, gender, fractured teeth in the anterior region, satisfaction with smile and past dental visits were controlled</p>
<p><b>Angaben auffälliger positiver und/oder negativer Aspekte</b></p> <p>Studiendesign</p> <p>Durchführung</p> <p>Auswertung</p> <p>Funding</p> <p><u>Interessenkonflikte</u></p> <p><u>Bias (SIGN, AMSTAR II, Einzelstudien)</u></p>	<p>Studiendesign: prospektiv, randomisiert, unkontrolliert, nicht verblindet, Gruppenzuteilung anhand des Outcomes</p> <p>Durchführung: akzeptabel</p> <p>Auswertung: akzeptabel</p> <p>Power der Studie/Patientenzahl: power of the study was 80%, N = 900</p> <p>Funding: keine Angaben</p> <p>Interessenkonflikte: keine Angaben</p> <p>Bias (SIGN/AMSTAR/EinzelstudienRoB – alle negativen Punkte aus Fragebogen auflisten):</p> <ul style="list-style-type: none"> <li>- Methodik stellenweise unzureichend beschrieben</li> <li>- Die Ergebnisse wurden nicht vollständig beschrieben</li> <li>- Limitationen der Studie wurden unzureichend diskutiert</li> </ul>
<p><b>Schlussfolgerung des Begutachters</b></p>	<p><u>methodische Qualität:</u> akzeptabel</p> <p><u>Klinische Aussagekraft:</u> moderat</p>
<p><b>Evidenzlevel (SIGN)</b></p>	<p>3</p>
<p><b>Qualität (RoB, SIGN /AMSTAR II)</b></p>	<p>Acceptable ⊕</p>

# Evidenztabelle Silvola et al. 2020

## Original article

### Gender-specific associations of malocclusion traits with oral health-related quality of life in a Finnish adult population

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\*These authors contributed equally to this study.

#### Summary

**Aim:** The aim of this cross-sectional study was to investigate gender-specific associations of different malocclusion traits with oral health-related quality of life (OHRQoL) among Finnish adults. **Material and methods:** The study material comprised 1885 subjects from the Northern Finland Birth Cohort 1966. A clinical oral examination including registration of occlusion was carried out in connection with a 46-year follow-up examination. The 14-item Oral Health Impact Profile (OHIP-14) was used to measure OHRQoL. Subgroups with increased/decreased overjet, deep bite, open bite, lateral crossbite, and scissor bite were selected for further analysis. Subjects with normal occlusion were selected to form the normal occlusion group. Differences between subgroups and the normal occlusion group were evaluated for both genders separately. Education, number of teeth, caries, and orthodontic treatment history were chosen as confounding variables. Multivariate Poisson regression analyses were conducted to assess the effect of independent variables on OHRQoL. **Results:** After adjustments, decreased overjet, open bite, and scissor bite were associated with higher OHIP severity in women ( $P < 0.01$ ). In men, deep bite was associated with higher OHIP severity ( $P = 0.007$ ). Different malocclusion traits had associations with some OHIP dimension either in men or women. Orthodontic treatment history had a positive effect on OHRQoL in both genders. **Conclusion:** The associations of malocclusion traits with OHRQoL differed between genders, with women reporting more impacts. Deviations from normal occlusion were generally found to have a negative impact on OHRQoL, but most of the adults with malocclusion seem to adapt to their condition.

<b>Population</b>	„Malokklusion/Dysgnathie“ allg.
<i>Setting</i>	• Northern Finland Birth Cohort 1966
<i>Komorbiditäten</i>	

<b>Schweregrad</b>	<ul style="list-style-type: none"> <li>• decreased overjet (overjet <math>\leq 0</math> mm), increased overjet (overjet <math>\geq 7</math> mm)</li> <li>• open bite (overbite <math>&lt; 0</math> mm), deep bite (overbite <math>\geq 7</math> mm)</li> <li>• lateral crossbite, scissor bite</li> <li>• normal occlusion</li> </ul>
<b>Einschlusskriterien</b> <i>Bei Review: PICOS</i>	Keine Angaben
<b>Ausschlusskriterien</b>	Keine Angaben
<b>Intervention</b> Versuchsgruppe	<p><b>Keine Intervention</b></p> <p>VERSUCHSGRUPPE: <b>males</b></p> <p>N=882 (Anfang) / N=882 (Ende) / Alter = <math>46 \pm ??</math> Jahre / ♂:♀ = 882:0</p> <ul style="list-style-type: none"> <li>• Gebissphase: permanentes Gebiss <math>\geq 18</math>. Lebensjahr</li> <li>• KFO-Behandlung: keine Behandlung</li> </ul> <p>VERSUCHSGRUPPE: <b>females</b></p> <p>N=1003 (Anfang) / N=1003 (Ende) / Alter = <math>46 \pm ??</math> Jahre / ♂:♀ = 0:1003</p> <ul style="list-style-type: none"> <li>• Gebissphase: permanentes Gebiss <math>\geq 18</math>. Lebensjahr</li> <li>• KFO-Behandlung: keine Behandlung</li> </ul>
<b>Kontrolle</b> Kontrollgruppe	<b>Keine Kontrollgruppe</b>
<b>Outcome</b>	<p><b>direkter oder schadenspräventiver medizinischer Nutzen bzw. Korrektur/Prävention der Anomalie/Malokklusion/Dysgnathie</b></p> <ul style="list-style-type: none"> <li>• <b>mundgesundheitsbezogene Lebensqualität (MLQ), psychische Entwicklung</b></li> </ul> <p>PRIMÄRZIELGRÖÖE: <i>Oral Health Impact Profile (OHIP-14 severity score)</i></p> <p>SEKUNDÄRZIELGRÖÖE: <i>malocclusion (Overjet, Overbite, lateral crossbite, scissor bite)</i></p>
<b>Studientyp</b>	<b>Querschnittsstudie</b>
<b>Schlussfolgerungen der Autoren</b>	<ol style="list-style-type: none"> <li>1. Malocclusions were found to have a negative influence on OHRQoL in Finnish adult population, different malocclusions having influence on different aspects of a subject's well-being.</li> <li>2. The influence of different malocclusion traits on OHRQoL varied between genders.</li> <li>3. It seems that women experience harm from decreased overjet, vertical malocclusions, and scissor bite, most significantly open bite.</li> <li>4. In men, increased overjet, deep bite, and crossbite were associated with lower OHRQoL at population level.</li> </ol>

<p><b>Zusammenfassung der Ergebnisse</b></p>	<p><b>male VS. female</b></p> <p><b>PRIMÄRZIELGRÖßE</b> Mean total OHIP-14 severity score for the total study population (n = 1885) was 3.82 (CI 3.57–4.07). Females reported more oral impacts compared to males, the mean OHIP-14 severity scores being 4.20 and 3.39, respectively (P = 0.001).</p> <p><b>PRIMÄRZIELGRÖßE, SEKUNDÄRZIELGRÖßE</b> Decreased overjet was associated with functional limitation among men (P = 0.009), and there was a tendency for a higher handicap score among women (P = 0.018). Women with open bite reported lower OHRQoL in total OHIP severity, functional limitation, psychological discomfort, physical disability, psychological disability, and social disability (P &lt; 0.01). Women with deep bite had higher handicap scores (P &lt; 0.001) compared to the normal occlusion group. Scissor bite was associated with higher physical disability (P = 0.001) and handicap (P = 0.004) in women, but no significant associations were found between scissor bite and OHIP in men.</p> <p>In the final models, a statistically significant association of increased overjet with higher psychological disability was found among men (RR = 1.67). In women, decreased overjet was associated with higher OHIP severity (RR = 1.34) and handicap (RR = 2.20). Deep bite was associated with higher OHIP severity in men (RR = 1.23) and with functional limitation in women (RR = 2.02). Women with open bite reported significantly higher OHIP severity (RR = 2.89), functional limitation (RR = 6.80), physical pain (RR = 2.17), psychological discomfort (RR = 2.55), and physical (RR = 4.22), psychological (RR = 3.23) and social disability (RR = 6.66). Crossbite was associated with functional limitation (RR = 1.53) and psychological disability in men (RR = 1.29). Women with scissor bite had higher OHIP severity (RR = 1.42), functional limitation (RR = 1.83), psychological discomfort (RR=1.32), physical (RR = 2.42), psychological (RR = 1.40) and social disability (RR = 2.26) and handicap (RR = 1.90).</p> <p>Men with open bite reported lower OHIP severity (RR = 0.51) and psychological disability (RR = 0.53), indicating better OHRQoL. Women with increased overjet or crossbite had lower OHIP severity (RR = 0.69, RR = 0.80, respectively), physical pain (RR = 0.67, RR = 0.79, respectively) and physical disability (RR = 0.36, RR = 0.60, respectively). In both genders, orthodontic treatment history was associated with better OHRQoL, the associations being statistically significant in men in OHIP severity (RR = 0.79), functional limitation (RR = 0.56) and physical pain (RR = 0.83) and in women in social disability (RR = 0.67).</p>
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<p><b>Angaben auffälliger positiver und/oder negativer Aspekte</b></p> <p>Studiendesign</p> <p>Durchführung</p> <p>Auswertung</p> <p>Funding</p> <p><u>Interessenkonflikte</u></p> <p><u>Bias (SIGN, AMSTAR II, Einzelstudien)</u></p>	<p><i>Studiendesign: prospektiv, unkontrolliert, nicht randomisiert, Gruppen anhand des Outcomes zugeteilt</i></p> <p><i>Durchführung: gut</i></p> <p><i>Auswertung: gut</i></p> <p><i>Power der Studie/Patientenzahl: keine Powerkalkulation, N = 1885</i></p> <p><i>Funding: Emil Aaltonen Foundation and Medical Research Center Oulu (to A.S.); Finnish Cultural Foundation's Lapland Regional Fund (to L.N.). Northern Finland Birth Cohort 1966 (NFBC1966) received financial support from University of Oulu (24000692), Oulu University Hospital (24301140), and ERDF European Regional Development Fund (539/2010 A31592).</i></p> <p><i>Interessenkonflikte: None to declare.</i></p> <p><i>Bias (SIGN/AMSTAR/EinzelstudienRoB – alle negativen Punkte aus Fragebogen auflisten):</i></p> <ul style="list-style-type: none"> <li>- No risk of bias</li> </ul>
<p><b>Schlussfolgerung des Begutachters</b></p>	<p><u>methodische Qualität:</u> gut</p> <p><u>Klinische Aussagekraft:</u> moderat (Die Studie zeigt, dass Malokklusionen negativen Einfluss auf die OHRQoL haben. Dabei haben unterschiedliche Formen der Malokklusion Einfluss auf unterschiedliche Aspekte des Wohlbefindens. Zwischen Männern und Frauen gibt es diesbezüglich ebenfalls signifikante Unterschiede. Eine durchgeführte kieferorthopädische Behandlung scheint die durchschnittliche OHRQoL verbessert zu haben, allerdings ist diese Aussage aufgrund des Studiendesigns sehr vorsichtig zu betrachten)</p>
<p><b>Evidenzlevel (SIGN)</b></p>	<p><b>3</b></p>
<p><b>Qualität (RoB, SIGN /AMSTAR II)</b></p>	<p><b>Acceptable ⊕</b></p>

# Evidenztabelle Soares, Magno et al. 2018

Received: 1 May 2018 | Revised: 9 September 2018 | Accepted: 9 September 2018

DOI: 10.1111/ort.12409



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ORIGINAL ARTICLE


Dental Traumatology

## Risk factors for traumatic dental injuries in the Brazilian population: A critical review

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**Abstract**

**Background/Aims:** Strategies for the prevention of traumatic dental injuries (TDI) should consider the risk factors involved for each population studied. The aim of this study was to perform a critical review regarding the risk factors for TDI in the Brazilian population.

**Materials and Methods:** A systematic literature search was performed in the MEDLINE, Scopus, Web of Science, Lilacs, and SBO databases using MeSH terms, synonyms, and keywords, with no language or date restrictions. In the first step, all relevant studies identified, regardless of the type of statistical analysis performed, were grouped according to their geographic location. In a second step, the studies using Andriessen's criteria to classify the injuries and multivariate analysis to identify the risk factors for TDI in Brazilian subjects were included for data extraction.

**Results:** The search strategy initially identified 3373 articles. However, only 108 articles assessed TDI with predisposing factors and were included in the first step. From those, 28 were deemed eligible for inclusion in the second step. No consensus related to the relationship between gender and TDI in the primary dentition was achieved. Nonetheless, males were found to be more prone to trauma in the permanent dentition. Overjet, inadequate lip sealing and anterior open bite increased the risk for TDI, both in primary and permanent dentitions. Social environment was related to trauma only in primary dentition. For permanent dentition, dental caries, obesity, binge drinking, and drug use were identified as considerable risk factors for TDI.

**Conclusion:** The risk factors for TDI in the Brazilian population are similar to those found worldwide. However, some differences can be observed, such as gender and socioeconomic indicators as predisposing factors.

**KEYWORDS:**  
 Brazil, predisposing factor, traumatic dental injuries

<b>Population</b> <i>Setting</i> <i>Komorbiditäten</i>	<b>„Malokklusion/Dysgnathie“ allg.</b> <ul style="list-style-type: none"> <li>• Brazilian population</li> </ul>
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<b>Schweregrad</b>	Nicht angegeben
<b>Einschlusskriterien</b> <i>Bei Review: PICOS</i>	<ul style="list-style-type: none"> <li>• Population: Brazilian population</li> <li>• Intervention: keine Intervention (zur Auswertung: risk factors for TDI – LL-relevant: nur oral factors)</li> <li>• Comparison: keine Kontrollgruppe (zur Auswertung: traumatic dental injury TDI)</li> <li>• Outcome: PRIMÄRZIELGRÖßE: traumatic dental injury TDI</li> <li>• Study type: -</li> </ul>
<b>Ausschlusskriterien</b>	<ol style="list-style-type: none"> <li>1. Case reports, case series, descriptive studies, review articles, opinion articles, letters</li> <li>2. articles that did not study TDI in Brazilians</li> <li>3. articles that did not assess predisposing factors for TDI</li> </ol>
<b>Intervention</b> Versuchsgruppe	<p><b>Keine Intervention</b></p> <p>VERSUCHSGRUPPE: Oral risk factors for TDI</p> <p>N=18922 (Anfang) / N=?? (Ende) / Alter = 0-19 Jahre / ♂:♀ = -</p> <ul style="list-style-type: none"> <li>• Gebissphase: frühes bis spätes Wechselgebiss, permanentes Gebiss &lt; und ≥ 18. Lebensjahr</li> <li>• KFO-Behandlung: (Früh-, reguläre, Spätbehandlung)</li> </ul>
<b>Kontrolle</b> Kontrollgruppe	<p><b>Keine Kontrollgruppe</b></p> <p>KONTROLLGRUPPE: traumatic dental injury TDI</p> <p>N=18922 (Anfang) / N=?? (Ende) / Alter = 0-19 Jahre / ♂:♀ = -</p> <ul style="list-style-type: none"> <li>• Gebissphase: frühes bis spätes Wechselgebiss, permanentes Gebiss &lt; und ≥ 18. Lebensjahr</li> <li>• KFO-Behandlung: keine Behandlung</li> </ul>
<b>Outcome</b>	<p><b>medizinischer Schaden, Nebenwirkungen bzw. Zunahme der Anomalie /Malokklusion/Dysgnathie</b></p> <ul style="list-style-type: none"> <li>• <b>Traumaprophylaxe (dentales Frontzahntrauma)</b></li> </ul> <p>PRIMÄRZIELGRÖßE: traumatic dental injury TDI</p>
<b>Studientyp</b>	<p><b>Systematisches Review</b></p> <p>Review: Inkludierte Studien in Bezug auf PICO: - N = 20 (gesamtes Review N = 28)</p> <p>Review: Gesamt-Teilnehmerzahl in Bezug auf PICO: N=18.922 für 20 Studien</p>

<p><b>Schlussfolgerungen der Autoren</b></p>	<p>Studies on potential risk factors for dental trauma in Brazil are concentrated in the southeastern, southern, and northeastern regions of the country and therefore do not provide a highly comprehensive perception of the situation for the whole country. The risk factors for TDI in the Brazilian population are similar to those found worldwide. As studies in other countries also indicate, <b>oral characteristics were considered risk factors for trauma, regardless of the type of tooth evaluated.</b> Furthermore, with regard to permanent teeth, males are at a greater risk of trauma. However, some differences between the Brazilian and other populations can be observed, such as the predisposition of gender and socioeconomic indicators in the primary dentition. More multicenter studies are required in different regions of Brazil to obtain a better understanding of the risk factors associated with dental trauma in the Brazilian population.</p>
<p><b>Zusammenfassung der Ergebnisse</b></p>	<p><b>Oral risk factors for TDI AND traumatic dental injury TDI</b></p> <p><b>traumatic dental injury TDI:</b> Table 2 includes the studies that assessed the primary dentition. <b>In general, children presenting oral features such as accentuated overjet, inadequate lip sealing, and anterior open bite were more likely to suffer trauma</b> as compared with those without those characteristics.</p> <p>Table 3 includes studies that evaluated the <b>permanent dentition</b>. Behavioral factors such as obesity, binge drinking, and drug use as well as <b>individual oral characteristics including accentuated overjet and inadequate lip coverage</b> were also associated with dental trauma.</p>

<p><b>Angaben auffälliger positiver und/oder negativer Aspekte</b></p> <p>Studiendesign Durchführung Auswertung Funding <u>Interessenkonflikte</u> <u>Bias (SIGN, AMSTAR II, Einzelstudien)</u></p>	<p><i>Studiendesign: keine Registrierung a priori, Studientyp nicht definiert, keine Meta-Analyse, keine RoB-Analyse, keine Überprüfung der methodischen Qualität der Einzelstudien</i></p> <p><i>Durchführung: Literatursichtung durch zwei unabhängige Rater, Studiendesign der Einzelstudien nicht genannt, Diskussion eher oberflächlich, keine Subgruppen-/Heterogenitätsanalysen</i></p> <p><i>Auswertung: keine Angaben zur Geschlechterverteilung, keine Angaben zur Messmethodik – weder FZT (klinisch, radiologisch) noch Malokklusion</i></p> <p><i>Power der Studie/Patientenzahl: 20/ 18.922 LL-relevant</i></p> <p><i>Funding: This study was financed in part by the Coordenação de aper- feioamento de pessoal de Nível Superior - Brasil- (CAPES) - Finance code 001. This study is part of the PhD thesis of the first author.</i></p> <p><i>Interessenkonflikte: The authors confirm that they have no conflict of interest.</i></p> <p><i>Bias (SIGN/AMSTAR/EinzelstudienRoB – alle negativen Punkte aus Fragebogen auflisten):</i></p> <p><b>2. Did the report of the review contain an explicit statement that the review methods were established prior to the conduct of the review and did the report justify any significant deviations from the protocol?</b></p> <p><b>3. Did the review authors explain their selection of the study designs for inclusion in the re</b></p> <p><b>6. Did the review authors perform data extraction in duplicate?</b></p> <p><b>7. Did the review authors provide a list of excluded studies and justify the exclusions?</b></p> <p><b>8. Did the review authors describe the included studies in adequate detail?</b></p> <p><b>9. Did the review authors use a satisfactory technique for assessing the risk of bias (RoB) in individual studies that were included in the review?</b></p> <p><b>10. Did the review authors report on the sources of funding for the studies included in the</b></p> <p><b>13. Did the review authors account for RoB in individual studies when interpreting/ discuss results of the review?</b></p> <p><b>14. Did the review authors provide a satisfactory explanation for, and discussion of, any heterogeneity observed in the results of the review?</b></p> <p><i>Publikationsbias (Reviews): -</i></p>
<p><b>Schlussfolgerung des Begutachters</b></p>	<p><u>methodische Qualität:</u> Review niedrig, Einzelstudien n.b.</p> <p><u>Klinische Aussagekraft:</u> Innerhalb der brasilianischen Bevölkerung scheint für Kinder und Jugendliche ein erhöhtes Traumarisiko zu bestehen, wenn – neben diversen anderen Faktoren - Malokklusionen vorliegen. Welche Arten dies genau sind und ab welchem Ausmaß sie die Entstehung eines Traumas begünstigen, kann jedoch nicht gesagt werden.</p>
<p><b>Evidenzlevel (SIGN)</b></p>	<p><b>3</b></p>
<p><b>Qualität (RoB, SIGN /AMSTAR II)</b></p>	<p><b>Moderat ++</b></p>

# Evidenztabelle Sonnesen et al. 2008

European Journal of Orthodontics 33 (2008) 471-487  
doi:10.1080/03051820701681444  
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## Temporomandibular disorders and psychological status in adult patients with a deep bite

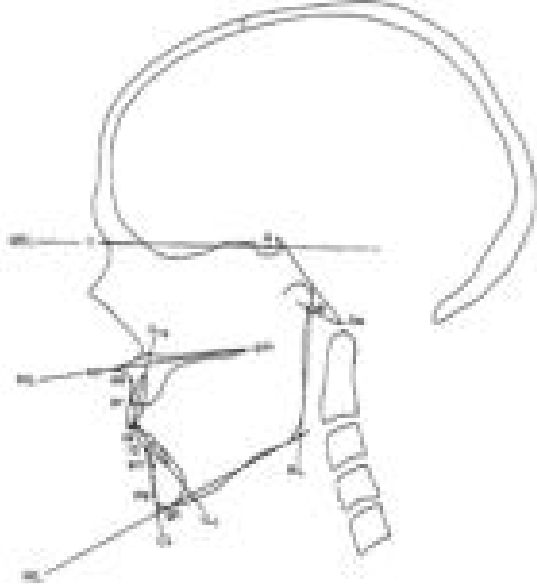
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**SUMMARY:** Temporomandibular disorders (TMDs) and psychological status were examined in adult patients with a deep bite and compared with an adult age- and gender-matched control group with neutral occlusion. The deep bite group consisted of 20 females (mean age 30.3 years) and 10 males (mean age 33.1 years). The control group comprised 20 females (mean age 29.4 years) and 10 males (mean age 34.2 years). TMD examination, according to the Research Diagnostic Criteria for TMD (RDC/TMD), cephalometric lateral radiographs, registration of occlusion, and bite force were performed. To test the mean differences between craniofacial morphology, bite force, the occurrence of RDC/TMD diagnostic groups, and headache between the two groups, unpaired *t*-test, Fisher's exact test, Mann-Whitney *U*-test, and multiple logistic regression analyses were performed.

Deep bite patients more frequently reported nocturnal and diurnal clenching ( $P < 0.01$ ), an uncomfortable bite ( $P < 0.001$ ), jaw stiffness ( $P < 0.05$ ), and 'ringing' in the ears ( $P < 0.001$ ) than the controls. Headache ( $P < 0.001$ ), muscle disorders ( $P < 0.001$ ), disc displacement ( $P < 0.05$ ), and other joint disorders ( $P < 0.05$ ) occurred significantly more often in the deep bite group compared with the controls. Somatization scores were significantly higher in the deep bite group compared with the controls ( $P < 0.001$ ). Headache, muscle disorders, disc displacement, and other joint disorders were significantly associated with a number of craniofacial dimensions and psychological factors ( $R$  between 0.32 and 0.72;  $P < 0.05$  and odds ratio (OR) from 0.45 to 7.46;  $P < 0.05$ ). These findings suggest that a deep bite, in particular with retroclined upper incisors, can represent a risk factor for TMD.

<b>Population</b> <i>Setting</i> <i>Komorbiditäten</i>	<b>vertikale Anomalie</b> <ul style="list-style-type: none"><li>School of Dentistry, University of Aarhus, Denmark</li></ul>
<b>Schweregrad</b>	Overbite > 5 mm
<b>Einschlusskriterien</b> <i>Bei Review: PICOS</i>	<ul style="list-style-type: none"><li>deep bite (deep bite group; Overbite &gt; 5mm)</li></ul>
<b>Ausschlusskriterien</b>	<ul style="list-style-type: none"><li>craniofacial anomalies</li><li>systemic muscle or joint disorders</li></ul>
<b>Intervention</b> <i>Versuchsgruppe</i>	<b>Keine Intervention</b> <b>VERSUCHSGRUPPE: deep bite group</b> N=30 (Anfang) / N=30 (Ende) / Alter = 33,1 ♂, 30,3 ♀ / ♂:♀ = 10:20 <ul style="list-style-type: none"><li>Gebissphase: permanentes Gebiss ≥ 18. Lebensjahr</li><li>KFO-Behandlung: keine Behandlung</li></ul>

<p><b>Kontrolle</b> Kontrollgruppe</p>	<p><b>keine kieferorthopädische Therapie</b> KONTROLLGRUPPE: <b>control group</b> N=30 (Anfang) / N=30 (Ende) / Alter = 34,2 ♂, 29,4 ♀ / ♂:♀ = 10:20</p> <ul style="list-style-type: none"> <li>• Gebissphase: permanentes Gebiss ≥ 18. Lebensjahr</li> <li>• KFO-Behandlung: keine Behandlung</li> </ul>
<p><b>Outcome</b></p>	<p><b>direkter oder schadenspräventiver medizinischer Nutzen bzw. Korrektur/Prävention der Anomalie/Malokklusion/Dysgnathie</b></p> <ul style="list-style-type: none"> <li>• <b>Okklusion, Kaufunktion, Funktion</b></li> <li>• <b>mundgesundheitsbezogene Lebensqualität (MLQ), psychische Entwicklung</b></li> </ul> <p>PRIMÄRZIELGRÖßE: <i>TMD examination (questionnaire, clinical examination according to the RDC/TMD axis I and II; tension-type headache)</i></p> <p>SEKUNDÄRZIELGRÖßE: <i>Craniofacial morphology (16 variables representing the craniofacial morphology)</i></p>  <p>Figure 1. Reference points and lines according to Salomon and Tallgren (2014).</p> <p>TERTIÄRZIELGRÖßE: <i>Registration of occlusion (Overbite, number of teeth in contact in the intercuspal position)</i></p> <p>QUARTÄRZIELGRÖßE: <i>Registration of bite force (bite force at the first mandibular molars on each side by means of a pressure transducer)</i></p>
<p><b>Studientyp</b></p>	<p><b>Querschnittsstudie</b></p>

<p><b>Schlussfolgerungen der Autoren</b></p>	<p>The present study showed that the occurrence of TMD and psychological status appeared to be significantly different in the deep bite group compared with the control group. Headache and muscle disorders, disc displacement, and other joint disorders diagnosed according to RDC/ TMD occurred significantly more often in the deep bite group compared with the controls. Furthermore, somatization scores were higher in the deep bite group compared with the controls when using the SCL-90. Headache, muscle disorders, disc displacement, and other joint disorders were significantly associated with a number of craniofacial dimensions and psychological factors. These findings suggest that in patients with a deep bite referred for orthodontic treatment, and in particular in subjects with a deep bite with retroclined upper incisors, these malocclusions can represent a risk factor for TMD.</p>
<p><b>Zusammenfassung der Ergebnisse</b></p>	<p><b>deep bite group VS. control group</b></p> <p><b>PRIMÄRZIELGRÖßE</b> Significant differences in self-reported TMD-related symptoms were found between the groups ( Table 2 ). Nocturnal and diurnal grinding was reported significantly more often in the deep bite group than in the control group ( <math>P = 0.003</math> and <math>P = 0.010</math>, respectively). Jaw ache or stiffness in the morning occurred significantly more often in the deep bite group compared with the control group ( <math>P = 0.050</math>) and a feeling of an uncomfortable bite or unusual bite occurred significantly more often in the deep bite group ( <math>P &lt; 0.001</math>). Furthermore, ringing in the ears occurred significantly more often in the deep bite group compared with the controls ( <math>P &lt; 0.001</math>). No significant gender-related differences were found for any of the self-reported symptoms. According to the RDC/TMD axis I diagnosis ( Table 3 ), myofascial pain occurred significantly more often in the deep bite group than in the controls ( <math>P &lt; 0.001</math>). In addition, disc displacement and arthralgia occurred significantly more often in the deep bite group ( <math>P = 0.042</math>; <math>P = 0.011</math>) compared with the controls. No significant gender-related differences were found. According to the RDC/TMD axis II profile ( Table 4 ), somatization scores were significantly higher in the deep bite group than in the controls ( <math>P &lt; 0.001</math>). No significant gender-related differences were found. Tension-type headache ( Table 2 ) occurred significantly more often in the deep bite group than in the controls ( <math>P &lt; 0.001</math>). In females, 70 per cent had episodic tension-type headache and 5 per cent chronic tension-type headache. No chronic tension-type headache occurred in the males, and no significant gender-related differences were found.</p> <p><b>SEKUNDÄRZIELGRÖßE</b> There were significant differences between the groups in sagittal craniofacial morphology, with a larger sagittal jaw relationship ( <math>ss - n - sm</math>, <math>P = 0.036</math>) and horizontal overjet ( <math>P &lt; 0.001</math>) and a smaller maxillary dentoalveolar prognathia ( <math>pr - n - ss</math>, <math>P = 0.003</math>) in the deep bite group compared with the control group ( Table 1 ). Significant differences between groups were also seen in the vertical craniofacial morphology as a larger beta angle ( <math>P = 0.010</math>) and overbite ( <math>P = 0.000</math>) and a smaller vertical jaw relationship ( <math>NL - ML</math>, <math>P = 0.001</math>), inclination of the mandible ( <math>NSL - ML</math>, <math>P = 0.009</math>), jaw angle ( <math>P = 0.014</math>), and upper and lower incisor inclination ( <math>Ils - nl</math>, <math>P = 0.000</math> and <math>Ili - ml</math>, <math>P = 0.005</math>, respectively) in the deep bite group compared with the control group. Few significant gender-related differences were found ( Table 5 ). The maxillary inclination ( <math>NSL - NL</math>, <math>P = 0.037</math>) was larger in females than in males, while mandibular prognathia ( <math>s - n - pg</math>, <math>P = 0.026</math>) and beta angle ( <math>P = 0.024</math>) were smaller in females than in males.</p> <p><b>TERTIÄR- UND QUARTÄRZIELGRÖßE</b> No significant differences in bite force or in the number of teeth in contact were found between the groups ( Table 5 ), but bite force was significantly higher in males than in females ( <math>P = 0.001</math>, Table 5 ).</p>



<p><b>Angaben auffälliger positiver und/oder negativer Aspekte</b></p> <p>Studiendesign Durchführung Auswertung Funding <u>Interessenkonflikte</u> <u>Bias (SIGN, AMSTAR II, Einzelstudien)</u></p>	<p><i>Studiendesign: prospektiv, kontrolliert, nicht randomisiert, nicht verblindet</i></p> <p><i>Durchführung: gut</i></p> <p><i>Auswertung: gut</i></p> <p><i>Power der Studie/Patientenzahl: keine Powerkalkulation, N = 60</i></p> <p><i>Funding: Aarhus University Research Foundation (E-2003-SUN-1-151)</i></p> <p><i>Interessenkonflikte: keine Angaben</i></p> <p><i>Bias (SIGN/AMSTAR/EinzelstudienRoB – alle negativen Punkte aus Fragebogen auflisten):</i></p> <ul style="list-style-type: none"> <li>- keine Diskussion der Limitationen der Studie</li> </ul>
<p><b>Schlussfolgerung des Begutachters</b></p>	<p><u>methodische Qualität: gut</u></p> <hr/> <p><u>Klinische Aussagekraft:</u> moderat (die Studie deutet darauf hin, dass der tiefe Biss einen Risikofaktor für die Entstehung von CMD darstellt, kann allerdings aufgrund des Studiendesigns nicht sämtliche Risikofaktoren ausschließen, die das Ergebnis verfälschen können)</p>
<p><b>Evidenzlevel (SIGN)</b></p>	<p><b>3</b></p>
<p><b>Qualität (RoB, SIGN /AMSTAR II)</b></p>	<p><b>Acceptable ⊕</b></p>

## Evidenztabelle Suzuki, Shimazaki et al 2018

### Gastric emptying rate before and after orthodontic treatment examined with the [<sup>13</sup>C] breath test: A pilot study

Junpei Suzuki, Kazuo Shimazaki, Serina Koike, and Takashi Ono  
Tokyo, Japan

**Introduction:** Orthodontic patients with malocclusion have significantly lower masticatory and gastrointestinal digestive function than persons with normal occlusion. Although several studies have suggested that masticatory function is improved after orthodontic treatment, the relationship between such improvement and change in gastrointestinal symptoms has not been quantitatively evaluated. In this study, we aimed to investigate the change in masticatory function and the gastric emptying rate in patients with malocclusion, before and after orthodontic treatment. **Methods:** Seven women with malocclusion, before (pretreatment group) and after orthodontic treatment (posttreatment group), and 7 healthy dentate female volunteers (control group) underwent a <sup>13</sup>C-acetate breath test (<sup>13</sup>CO<sub>2</sub>) with a liquid meal and the color changeable gum test, along with completing the frequency scale for symptoms of gastroesophageal reflux and a questionnaire on food intake. Between-group differences were evaluated. **Results:** The pretreatment group had significantly longer maximum <sup>13</sup>CO<sub>2</sub> exhalation time and lower masticatory function, quantified using a higher red-color value on the gum test and the questionnaire on food intake, than did the posttreatment and control groups. No significant differences were identified between the posttreatment and the control groups. **Conclusions:** We provide evidence of improvement of masticatory function after orthodontic treatment, which was associated with a faster rate of gastric emptying. (Am J Orthod Dentofacial Orthop 2018;153:347-54)

<b>Population</b>	„Malokklusion/Dysgnathie“ allg. Women with malocclusion, before (pretreatment group) and after orthodontic treatment (posttreatment group), and healthy dentate female volunteers (control group) underwent a 13C-acetate breath test.
<b>Schweregrad</b>	keine Angabe
<b>Einschlusskriterien</b>	18 to 39 years old; normal body mass index (BMI); chief complaint of malocclusion, with a need for orthodontic treatment; no cleft lip or palate, or other craniofacial syndrome; no history of abdominal surgery; no use of medications, including gastrointestinal prokinetic agents, calcium antagonists, and selective serotonin reuptake inhibitors; absence of a current disease; no habitual heavy smoking or alcohol consumption; no current or possible pregnancy
<b>Ausschlusskriterien</b>	keine Angabe

<p><b>Intervention</b> Versuchsgruppe</p>	<p><b>kieferorthopädische Behandlung</b></p> <p><i>Outcome variables were measured in the malocclusion group before the orthodontic treatment (pretreatment) and at 1 month after the end of active orthodontic treatment (posttreatment), with a duration of active orthodontic treatment of 28 6 6.1 months.</i></p> <p>VERSUCHSGRUPPE: <b>orthodontic treatment</b></p> <p>N=7 (Anfang) / N=7 (Ende) / Alter = 26,7 ± 5,7 Jahre / ♂:♀ = 0:7</p> <ul style="list-style-type: none"> <li>• Gebissphase: permanentes Gebiss ≥18 Lebensjahr</li> <li>• KFO-Behandlung: Spätbehandlung</li> </ul>
<p><b>Kontrolle</b> Kontrollgruppe</p>	<p><b>keine kieferorthopädische Therapie</b></p> <p>KONTROLLGRUPPE: <b>untreated</b></p> <p>N=7 (Anfang) / N=7 (Ende) / Alter = 20,0 ± 2,9 Jahre / ♂:♀ = 0:7</p> <ul style="list-style-type: none"> <li>• Gebissphase: permanentes Gebiss ≥18 Lebensjahr</li> <li>• KFO-Behandlung: keine Behandlung</li> </ul>
<p><b>Outcome</b></p>	<p><b>direkter oder schadenspräventiver medizinischer Nutzen bzw. Korrektur/Prävention der Anomalie/Malokklusion/Dysgnathie</b></p> <ul style="list-style-type: none"> <li>• <b>kein spezifisches Outcome</b></li> </ul> <p>PRIMÄRZIELGRÖßE: <i>Gastric emptying ([13C]-labeled acetate breath test)</i></p> <p>SEKUNDÄRZIELGRÖßE: <i>Masticatory function (colorchangeable chewing gum)</i></p>
<p><b>Studientyp</b></p>	<p><b>Beobachtungsstudie (Kohortenstudie oder Fall-Kontroll-Studie)</b></p>
<p><b>Schlussfolgerungen der Autoren</b></p>	<p>We provide evidence of improvement in masticatory function in subjects with malocclusion with an increase in gastric emptying rate after orthodontic treatment.</p>
<p><b>Zusammenfassung der Ergebnisse</b></p>	<p><b>GRUPPE orthodontic treatment VS. GRUPPE untreated</b></p> <p><b>PRIMÄRZIELGRÖßE</b> <i>Maximum excretion time was significantly longer in the pretreatment group (median, 50 minutes; range, 40-70 minutes) than in the control group (median, 40 minutes; range, 35-50 minutes; P = 0.049), with no difference between the control group and the posttreatment group (median, 40 minutes; range, 30-50 minutes; P =0.623; Fig 1).</i></p> <p><b>SEKUNDÄRZIELGRÖßE</b> <i>The a*value was significantly lower for the pretreatment group (median, 16.3; range, 6.4-18.8) than the control group (median, 20; range, 17.8-27.0; P = 0.024), with no significant difference between the control group and the posttreatment group (median, 21; range, 14.8-26.7; P = 0.833; Fig 4).</i></p>
<p><b>Angaben auffälliger positiver und/oder negativer Aspekte</b></p>	<p><i>Pilotstudie mit kleiner Fallzahl zur Evaluation der Magenentleerung bei Patienten mit Malokklusion und gesunden Patienten. Aufgrund dessen, keine Powerkalkulation. Keine Angaben von gescreenten Patienten. Es wurde sich auf Grund von Vorbefunden nur auf Frauen beschränkt. Keine Angabe von Konfidenzintervallen.</i></p>
<p><b>Schlussfolgerung des Begutachters</b></p>	<p><u>methodische Qualität:</u> gut</p> <p><u>Klinische Aussagekraft:</u> Eine Verbesserung der Kaufunktion nach einer kieferorthopädischen Behandlung führt zu einer schnelleren Magenentleerung</p>

<b>Evidenz-level (SIGN)</b>	<b>2+</b>
<b>Qualität</b>	<b>Acceptable ⊕</b>

# Evidenztabelle Takemoto et al. 2011

Original Article

## Pharyngeal airway in children with prognathism and normal occlusion

Yoshihiko Takemoto<sup>1</sup>; Issai Saitoh<sup>2</sup>; Tomonori Iwasaki<sup>3</sup>; Emi Inada<sup>4</sup>; Chiaki Yamada<sup>5</sup>; Yoko Iwase<sup>6</sup>; Miyuki Shinkai<sup>7</sup>; Ryuzo Kanomi<sup>8</sup>; Haruaki Hayasaki<sup>9</sup>; Youichi Yamasaki<sup>9</sup>

**ABSTRACT**

**Objective:** To test the hypothesis that there is no difference in the pharyngeal airway width and the position of the maxillofacial skeleton between prognathic and normal children.

**Materials and Methods:** Twenty-five girls with prognathism (mean, 7.9 ± 0.9 years old) and 15 girls with normal occlusion (mean, 8.4 ± 1.5 years) participated in this study. On each girl's lateral cephalogram, the coordinates of all points were marked and systematically digitized using a mechanical three-dimensional digitizing system. An independent-groups *M*-test was used to detect significant upper and lower pharyngeal width differences between the two groups. Correlations between the horizontal positions of each point and upper and lower pharyngeal widths were examined.

**Results:** Prognathic girls had a significantly wider lower pharyngeal airway compared with those with normal occlusion (*P* = .01). Furthermore, the horizontal coordinate of *Ar* was significantly positively correlated with lower pharyngeal airway width in both groups of girls.

**Conclusions:** The hypothesis is rejected. The mandible in prognathic girls tends to be positioned more anteriorly, resulting in a wider lower pharyngeal airway. (*Angle Orthod.* 2011;81:75–80.)

<b>Population</b> <i>Setting</i> <i>Komorbiditäten</i>	<b>Klasse-III-Anomalie (inkl. LKG)</b> <ul style="list-style-type: none"> <li>Himeji-City, Hyogo-Prefecture, Japan und Kagoshima city, Kagoshima prefecture, Japan</li> </ul>
<b>Schweregrad</b>	> 3 Inzisivi mit negativem Overjet
<b>Einschlusskriterien</b> <i>Bei Review: PICOS</i>	<ul style="list-style-type: none"> <li>Japanese girls with mixed dentition</li> </ul>
<b>Ausschlusskriterien</b>	Keine Angaben
<b>Intervention</b> <i>Versuchsgruppe</i>	<b>Keine Intervention</b> <b>VERSUCHSGRUPPE: Prognathism</b> N=25 (Anfang) / N=25 (Ende) / Alter = 7,9 ± 0,9 Jahre / ♂:♀ = 0:25 <ul style="list-style-type: none"> <li>Gebissphase: keine Angaben</li> <li>KFO-Behandlung: keine Angaben</li> </ul>

<b>Kontrolle</b> Kontrollgruppe	<p><b>keine kieferorthopädische Therapie</b></p> <p>KONTROLLGRUPPE: <b>Normal Occlusion</b></p> <p>N=15 (Anfang) / N=15 (Ende) / Alter = 8,4 ± 1,5 Jahre / ♂:♀ = 0:15</p> <ul style="list-style-type: none"> <li>• Gebissphase: keine Angaben</li> <li>• KFO-Behandlung: keine Angaben</li> </ul>
<b>Outcome</b>	<p><b>direkter oder schadenspräventiver medizinischer Nutzen bzw. Korrektur/Prävention der Anomalie/Malokklusion/Dysgnathie</b></p> <ul style="list-style-type: none"> <li>• <b>Atmung und Luftraum (Airway space, Schlafapnoe), Schlucken und Sprechen</b></li> </ul> <p>PRIMÄRZIELGRÖßE: <i>Upper pharyngeal width (27 soft tissue points, width [mm])</i></p> <p>SEKUNDÄRZIELGRÖßE: <i>Lower pharyngeal width (27 soft tissue points, width [mm])</i></p>
<b>Studientyp</b>	<b>Querschnittsstudie</b>
<b>Schlussfolgerungen der Autoren</b>	<ol style="list-style-type: none"> <li>1. Prognathic girls had a significantly wider lower pharyngeal airway compared with the airways in girls with normal occlusion.</li> <li>2. More anterior positioning of the mandible of 7- and 8- year-old children resulted in a wider lower pharyngeal airway.</li> </ol>
<b>Zusammenfassung der Ergebnisse</b>	<p><b>Prognathism VS. Normal Occlusion</b></p> <p><b>PRIMÄRZIELGRÖßE</b> <i>There was no significant difference in upper pharyngeal width.</i></p> <p><b>SEKUNDÄRZIELGRÖßE</b> <i>The lower pharyngeal width of prognathic girls was significantly larger than that of girls with normal occlusion (P = .01). A significant positive correlation was found between the horizontal coordinate of Ar and the lower pharyngeal airway width in both the normalocclusion and prognathic girls.</i></p>
<b>Angaben auffälliger positiver und/oder negativer Aspekte</b>	<p><i>Studiendesign: prospektiv, kontrolliert, keine Randomisierung</i></p> <p><i>Durchführung: akzeptable Durchführung Auswertung: akzeptable Durchführung</i></p> <p><i>Power der Studie/Patientenzahl: keine Powerkalkulation, N = 40</i></p> <p><i>Funding: keine Angaben Interessenkonflikte: keine Angaben</i></p> <p><i>Bias (SIGN/AMSTAR/ EinzelstudienRoB – alle negativen Punkte aus Fragebogen auflisten):</i></p> <ul style="list-style-type: none"> <li>• <i>Limitationen der Studie wurden nicht diskutiert</i></li> </ul>
<b>Schlussfolgerung des Begutachters</b>	<p><u>methodische Qualität:</u> akzeptabel</p> <hr/> <p><u>Klinische Aussagekraft:</u> moderat (viele Störfaktoren, die das Ergebnis der Studie beeinflussen können; Es wurden nur Mädchen einer spezifischen ethnischen Gruppe untersucht)</p>
<b>Evidenz-level (SIGN)</b>	<b>3</b>
<b>Qualität (RoB, SIGN /AMSTAR II)</b>	<b>Acceptable ⊕</b>

# Evidenztable Toro et al. 2006

*European Journal of Orthodontics* 33 (2006) 112-118  
doi:10.1080/03051820600551988  
Advance online publication 4 December 2006

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## Masticatory performance in children and adolescents with Class I and II malocclusions

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Departments of Orthodontics, <sup>a</sup>Instituto de Ciencias de la Salud, CES, Medellín, Colombia and <sup>\*\*</sup>Baylor College of Dentistry, The Texas A&M University System Health Science Center, Dallas, Texas, USA

**SUMMARY** It is not fully understood whether masticatory performance is compromised in individuals with the more common forms of malocclusion (i.e. Class I and Class II). The aim of this prospective investigation was to establish the relationships between masticatory performance, malocclusion (type and severity), age, body size and gender, in children and adolescents. A total of 335 individuals were examined at the average ages of 8, 9, 12 and 15 years. Each subject's occlusal status was described by Angle classification and by the Peer Assessment Ratio (PAR) index. Masticatory performance was quantified by the median particle size (MPS) and the broadness of particle distribution using artificial food.

Masticatory performance improved significantly with age. The 8-year-old children were less able to break down the food particles (MPS 4.20 mm<sup>2</sup>) than the 15-year-olds (MPS 3.24 mm<sup>2</sup>). Analysis of covariance showed that age differences in performance are related to an increase in body size. There were statistically significant differences in masticatory performance between children with normal occlusion and those with a Class I malocclusion; no differences were found between normal occlusion and Class II malocclusion. Gender differences did not explain the variation in masticatory performance.

It is concluded that occlusal indices are not reliable predictors of masticatory performance. Traditional descriptors of malocclusion type and severity apparently cannot explain most of the variation in masticatory performance in children and adolescents.

<b>Population</b> <i>Setting</i> <i>Komorbiditäten</i>	<b>„Malokklusion/Dysgnathie“ allg.</b>  <ul style="list-style-type: none"> <li>two private schools in different areas of Medellín, Colombia</li> </ul>
<b>Schweregrad</b>	Keine Angaben
<b>Einschluss-kriterien</b> <i>Bei Review: PICOS</i>	<ul style="list-style-type: none"> <li>self-selected on the basis of willingness to participate</li> </ul>
<b>Ausschluss-kriterien</b>	<ul style="list-style-type: none"> <li>congenitally missing teeth</li> <li>signs or symptoms of temporomandibular dysfunction</li> <li>history of previous orthodontic treatment</li> <li>tooth with more than two-thirds of its occlusal surface restored</li> </ul>

<p><b>Intervention</b> Versuchsgruppe</p>	<p><b>Keine Intervention</b> VERSUCHSGRUPPEN:</p> <table border="1"> <thead> <tr> <th>Age</th> <th>Gender</th> <th>Normal occlusion</th> <th>Class I malocclusion</th> <th>Class II malocclusion</th> <th>Total</th> </tr> </thead> <tbody> <tr> <td rowspan="2">6</td> <td>Male</td> <td>30</td> <td>18</td> <td>10</td> <td>58</td> </tr> <tr> <td>Female</td> <td>10</td> <td>6</td> <td>3</td> <td>19</td> </tr> <tr> <td rowspan="2">9</td> <td>Male</td> <td>22</td> <td>19</td> <td>20</td> <td>61</td> </tr> <tr> <td>Female</td> <td>15</td> <td>11</td> <td>12</td> <td>38</td> </tr> <tr> <td rowspan="2">12</td> <td>Male</td> <td>13</td> <td>18</td> <td>17</td> <td>48</td> </tr> <tr> <td>Female</td> <td>10</td> <td>12</td> <td>2</td> <td>24</td> </tr> <tr> <td rowspan="2">15</td> <td>Male</td> <td>21</td> <td>21</td> <td>15</td> <td>57</td> </tr> <tr> <td>Female</td> <td>18</td> <td>7</td> <td>5</td> <td>30</td> </tr> <tr> <td>Total</td> <td></td> <td>139</td> <td>112</td> <td>84</td> <td>335</td> </tr> </tbody> </table> <ul style="list-style-type: none"> <li>• Gebissphase: keine Angaben</li> <li>• KFO-Behandlung: keine Angaben</li> </ul>	Age	Gender	Normal occlusion	Class I malocclusion	Class II malocclusion	Total	6	Male	30	18	10	58	Female	10	6	3	19	9	Male	22	19	20	61	Female	15	11	12	38	12	Male	13	18	17	48	Female	10	12	2	24	15	Male	21	21	15	57	Female	18	7	5	30	Total		139	112	84	335
Age	Gender	Normal occlusion	Class I malocclusion	Class II malocclusion	Total																																																				
6	Male	30	18	10	58																																																				
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Total		139	112	84	335																																																				
<p><b>Kontrolle</b> Kontrollgruppe</p>	<p><b>keine kieferorthopädische Therapie</b> KONTROLLGRUPPE: <b>keine Kontrollgruppe</b></p>																																																								
<p><b>Outcome</b></p>	<p><b>direkter oder schadenspräventiver medizinischer Nutzen bzw. Korrektur/Prävention der Anomalie/Malokklusion/Dysgnathie</b></p> <ul style="list-style-type: none"> <li>• <b>Okklusion, Kaufunktion, Funktion</b></li> </ul> <p>PRIMÄRZIELGRÖßE: <i>Peer Assessment Rating (PAR) index (11 weighted components of malocclusion)</i></p> <p>SEKUNDÄRZIELGRÖßE: <i>Anthropometric assessments (Standing and sitting height, BMI, Bizygomatic width, bigonial width, face height, total face height, Cephalic index, Arm circumference, Subscapular and tricipital skinfolds)</i></p> <p>TERTIÄRZIELGRÖßE: <i>Median particle size and broadness of the distribution (weight percentage of particles)</i></p>																																																								
<p><b>Studientyp</b></p>	<p><b>Querschnittsstudie</b></p>																																																								
<p><b>Schlussfolgerungen der Autoren</b></p>	<ol style="list-style-type: none"> <li>1. Age and associated increases in body size are among the most important factors related to individual differences in masticatory performance.</li> <li>2. Age changes in masticatory performance are partially related to dental maturation.</li> <li>3. There are no gender differences in masticatory performance of 6- to 15-year-old children and adolescents.</li> <li>4. Children with Class I malocclusions do not break down foods as well as those with normal occlusion; children with severe Class I malocclusion cannot break down foods as well as those with less severe Class I malocclusion.</li> </ol>																																																								



<p><b>Zusammenfassung der Ergebnisse</b></p>	<p><b>PRIMÄRZIELGRÖßE</b> Descriptive statistics for MPS, BPD, CCD and the PAR index are presented in Tables 3 and 4 , respectively. Analyses of variance showed significant age, gender, and molar occlusion effects ( Table 5a ).</p> <p>Children with normal occlusion had significantly smaller MPS and significantly wider distributions of particles than children with Class I malocclusions. In contrast, no significant differences in masticatory performance between children with normal and Class II malocclusions were found. A post hoc power analysis showed that the differences between normal and Class II malocclusion subjects could not be ruled out. While there were no gender differences in MPS or BPD, females had a significantly longer ( ≈ 60 ms) chewing cycle duration than males.</p> <p><b>SEKUNDÄRZIELGRÖßE</b> Prior to correction for body height, the anthropometric measurements showed low but statistically significant negative correlations with MPS, BPD and CCD. Height showed the strongest relationship with the performance measurements. Tricipital skinfold thickness and the cephalic index were not significantly correlated with MPS, BPD or CCD. BMI and subscapular skinfold thickness were not related to CCD. After controlling for height, none of the correlations between masticatory performance and anthropometric measurements were statistically significant.</p> <p>PAR index and gender, showed that height explained significant amounts of variation for MPS and BPD, but not for CCD ( Table 5b ). After controlling for height, the age group effects identified in the analyses of variance were no longer statistically significant. The PAR index was related to MPS and BPD among children with normal and Class I malocclusions, but not in children with Class II malocclusions. Again, only masticatory cycle duration showed significant gender differences.</p> <p><b>TERTIÄRZIELGRÖßE</b> Descriptive statistics for MPS, BPD, CCD and the PAR index are presented in Tables 3 and 4 , respectively. Analyses of variance showed significant age, gender, and molar occlusion effects ( Table 5a ).</p> <p>Children with normal occlusion had significantly smaller MPS and significantly wider distributions of particles than children with Class I malocclusions. In contrast, no significant differences in masticatory performance between children with normal and Class II malocclusions were found. A post hoc power analysis showed that the differences between normal and Class II malocclusion subjects could not be ruled out. While there were no gender differences in MPS or BPD, females had a significantly longer ( ≈ 60 ms) chewing cycle duration than males.</p>
<p><b>Angaben auffälliger positiver und/oder negativer Aspekte</b></p> <p>Studiendesign</p> <p>Durchführung</p> <p>Auswertung</p> <p>Funding</p> <p><u>Interessenkonflikte</u></p> <p><u>Bias (SIGN, AMSTAR II, Einzelstudien)</u></p>	<p>Studiendesign: prospektiv, unkontrolliert, keine Randomisierung, Gruppenzuteilung anhand des Outcomes</p> <p>Durchführung: gute Durchführung</p> <p>Auswertung: gute Auswertung</p> <p>Power der Studie/Patientenzahl: keine Powerkalkulation, N = 335</p> <p>Funding: This research was partially supported by Instituto colombiano para el desarrollo de la ciencia y la tecnología, Colciencias, Grant #1228 – 04 – 11856, Contrato: 177-2002.</p> <p>Interessenkonflikte: keine Angaben</p> <p>Bias (SIGN/AMSTAR/EinzelstudienRoB – alle negativen Punkte aus Fragebogen auflisten):</p> <ul style="list-style-type: none"> <li>- Limitationen der Studie wurden nur sehr oberflächlich diskutiert</li> </ul>

<b>Schluss- folgerung des Begutachters</b>	<u>methodische Qualität:</u> moderat
	<u>Klinische Aussagekraft:</u> moderat (viele Störfaktoren, die das Ergebnis der Studie beeinflussen können)
<b>Evidenz- level (SIGN)</b>	<b>3</b>
<b>Qualität (RoB, SIGN /AMSTAR II)</b>	<b>Acceptable ⊕</b>

# Evidenztabelle **Trawitzki et al. 2010**

*Int. J. Oral Maxillofac. Surg.* 2010; 39: 853-856  
 doi:10.1016/j.ijom.2009.05.006, available online at <http://www.elsevier.com/locate/ijom>



Clinical Paper  
 Orthognathic Surgery

## Masticatory muscle function three years after surgical correction of class III dentofacial deformity

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<sup>1</sup>Department of Ophthalmology, Otorhinolaryngology and Head and Neck Surgery, Faculty of Medicine of Ribeirão Preto, University of São Paulo, Ribeirão Preto, SP, Brazil; <sup>2</sup>Department of Internal Medicine, Faculty of Medicine of Ribeirão Preto, University of São Paulo, Ribeirão Preto, SP, Brazil; <sup>3</sup>Department of Neurology, Psychiatry and Medical Psychology, Faculty of Medicine of Ribeirão Preto, University of São Paulo, Ribeirão Preto, SP, Brazil

L. V. V. Trawitzki, R. O. Denton, F. V. Mello-Filho, W. Marques Jr. Masticatory muscle function three years after surgical correction of class III dentofacial deformity. *Int. J. Oral Maxillofac. Surg.* 2010; 39: 853-856. © 2009 International Association of Oral and Maxillofacial Surgeons. Published by Elsevier Ltd. All rights reserved.

**Abstract.** Individuals with dentofacial deformities have masticatory muscle changes. The objective of the present study was to determine the effect of interdisciplinary treatment in patients with dentofacial deformities regarding electromyographic activity (EMG) of masticatory muscles three years after surgical correction. Thirteen patients with class III dentofacial deformities were studied, considered as group P1 (before surgery) and group P3 (3 years to 3 years and 8 months after surgery). Fifteen individuals with no changes in facial morphology or dental occlusion were studied as controls. The participants underwent EMG examination of the temporal and masseter muscles during mastication and biting. Evaluation of the amplitude interval of EMG activity revealed a difference between P1 and P3 and no difference between P3 and the control group. In contrast, evaluation of root mean square revealed that, in general, P3 values were higher only when compared with P1 and differed from the control group. There was an improvement in the EMG activity of the masticatory muscles, mainly observed in the masseter muscle, with values close to those of the control group in one of the analyses.

<b>Population</b>	<b>Klasse-III-Anomalie</b>
<i>Setting</i>	<ul style="list-style-type: none"> <li>characterized by mandibular prognathism and/or maxillary deficiency</li> </ul>
<i>Komorbiditäten</i>	
<b>Schweregrad</b>	-

<p><b>Einschlusskriterien</b> <i>Bei Review: PICOS</i></p>	<p>Interventionsgruppe: Klasse III Kontrollgruppe: natural dentition, with no alterations of facial morphology or dental occlusion and no signs or symptoms of temporomandibular joint dysfunction</p>
<p><b>Ausschlusskriterien</b></p>	<p>-</p>
<p><b>Intervention</b> Versuchsgruppe</p>	<p><b>kieferorthopädisch-kieferchirurgische Kombinationsbehandlung</b> <i>Beschreibung der Intervention</i> VERSUCHSGRUPPE: <b>orthognathic surgery</b> N=13 (Anfang) / N=13 (Ende) / Alter = 22/27 Jahre / ♂:♀ = 3:10</p> <ul style="list-style-type: none"> <li>• Gebissphase: permanentes Gebiss</li> <li>• KFO-Behandlung: Spätbehandlung</li> </ul>
<p><b>Kontrolle</b> Kontrollgruppe</p>	<p><b>keine kieferorthopädische Therapie</b> KONTROLLGRUPPE: <b>control group</b> N=15 (Anfang) / N=15 (Ende) / Alter = 21/24 Jahre / ♂:♀ = 4:11</p> <ul style="list-style-type: none"> <li>• Gebissphase: permanentes Gebiss</li> <li>• KFO-Behandlung: keine Behandlung</li> </ul>
<p><b>Outcome</b></p>	<p><b>direkter oder schadenspräventiver medizinischer Nutzen bzw. Korrektur/Prävention der Anomalie/Malokklusion/Dysgnathie</b></p> <ul style="list-style-type: none"> <li>• <b>Okklusion, Kaufunktion, Funktion</b></li> </ul> <p>PRIMÄRZIELGRÖßE: <i>bilateral EMG activity of the temporal (T) and masseter (M) muscles during right mastication (RMA) and left mastication (LMA) of mint-flavored Trident1 chewing gum</i></p>
<p><b>Studientyp</b></p>	<p><b>Beobachtungsstudie (Kohorten- oder Fall-Kontroll-Studie)</b></p>
<p><b>Schlussfolgerungen der Autoren</b></p>	<p>The present study revealed that there was an improvement in the EMG activity of the masticatory muscles in patients with class III dentofacial deformity with the treatment proposed, mainly observed in the M muscle, with EMG values being equal to CG values in one analysis. Greater instability was observed in the T muscle.</p>

<p><b>Zusammenfassung der Ergebnisse</b></p>	<p><b>GRUPPE Intervention VS. GRUPPE Kontrolle</b></p> <p><b>PRIMÄRZIELGRÖßE</b> Comparison of CG and P3 revealed a significant difference in EMG activity for both muscles in the different situations, except for the M muscle during right RMa (right side, of balance), LMa (left side, of work) and biting (left side).</p> <p>Table 7. Median bilateral values of the amplitude interval (AI) of EMG activity (in <math>\mu V</math>) of the temporal (T) and masseter (M) muscles in mastication (MaB) and MaL) and biting for groups CG, P1 and P3.</p> <table border="1"> <thead> <tr> <th rowspan="3"></th> <th colspan="4">MaB</th> <th colspan="4">MaL</th> <th colspan="4">Biting</th> </tr> <tr> <th colspan="2">T</th> <th colspan="2">M</th> <th colspan="2">T</th> <th colspan="2">M</th> <th colspan="2">T</th> <th colspan="2">M</th> </tr> <tr> <th>L</th> <th>R</th> <th>L</th> <th>R</th> <th>L</th> <th>R</th> <th>L</th> <th>R</th> <th>L</th> <th>R</th> <th>L</th> <th>R</th> </tr> </thead> <tbody> <tr> <td>CG</td> <td>2240</td> <td>1670</td> <td>1490</td> <td>870</td> <td>2380</td> <td>2640</td> <td>1900</td> <td>680</td> <td>2780</td> <td>3200</td> <td>1800</td> <td>1760</td> </tr> <tr> <td>P1</td> <td>1720</td> <td>1640</td> <td>1120</td> <td>740</td> <td>1980</td> <td>2340</td> <td>1380</td> <td>600</td> <td>2240</td> <td>2340</td> <td>1320</td> <td>1640</td> </tr> <tr> <td>P3</td> <td>700</td> <td>640</td> <td>480</td> <td>340</td> <td>660</td> <td>640</td> <td>480</td> <td>260</td> <td>1000</td> <td>1080</td> <td>440</td> <td>720</td> </tr> </tbody> </table> <p>Table 8. Median bilateral values of root mean square (RMS) of EMG activity (in <math>\mu V</math>) of the temporal (T) and masseter (M) muscles in mastication (MaB) and MaL) and biting for groups CG, P1 and P3.</p> <table border="1"> <thead> <tr> <th rowspan="3"></th> <th colspan="4">MaB</th> <th colspan="4">MaL</th> <th colspan="4">Biting</th> </tr> <tr> <th colspan="2">T</th> <th colspan="2">M</th> <th colspan="2">T</th> <th colspan="2">M</th> <th colspan="2">T</th> <th colspan="2">M</th> </tr> <tr> <th>L</th> <th>R</th> <th>L</th> <th>R</th> <th>L</th> <th>R</th> <th>L</th> <th>R</th> <th>L</th> <th>R</th> <th>L</th> <th>R</th> </tr> </thead> <tbody> <tr> <td>CG</td> <td>1474</td> <td>743</td> <td>580</td> <td>174</td> <td>923</td> <td>1406</td> <td>315</td> <td>292</td> <td>861</td> <td>1449</td> <td>231</td> <td>600</td> </tr> <tr> <td>P1</td> <td>740</td> <td>314</td> <td>307</td> <td>157</td> <td>480</td> <td>633</td> <td>349</td> <td>348</td> <td>395</td> <td>790</td> <td>347</td> <td>345</td> </tr> <tr> <td>P3</td> <td>336</td> <td>251</td> <td>131</td> <td>39</td> <td>262</td> <td>397</td> <td>73</td> <td>124</td> <td>311</td> <td>459</td> <td>107</td> <td>260</td> </tr> </tbody> </table>		MaB				MaL				Biting				T		M		T		M		T		M		L	R	L	R	L	R	L	R	L	R	L	R	CG	2240	1670	1490	870	2380	2640	1900	680	2780	3200	1800	1760	P1	1720	1640	1120	740	1980	2340	1380	600	2240	2340	1320	1640	P3	700	640	480	340	660	640	480	260	1000	1080	440	720		MaB				MaL				Biting				T		M		T		M		T		M		L	R	L	R	L	R	L	R	L	R	L	R	CG	1474	743	580	174	923	1406	315	292	861	1449	231	600	P1	740	314	307	157	480	633	349	348	395	790	347	345	P3	336	251	131	39	262	397	73	124	311	459	107	260
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# Evidenztabelle **Tristão et al. 2020**

Tristão et al. *Progress in Orthodontics* (2020) 21:26  
<https://doi.org/10.1186/s40310-020-00523-7>

Progress in Orthodontics

REVIEW

Open Access

## Is there a relationship between malocclusion and *bullying*? A systematic review



Sylvia Karla P. C. Tristão<sup>1</sup>, Marcela B. Magno<sup>1</sup>, Andriela Yaz Braga Pinior<sup>1</sup>, Itana F. O. Christowam<sup>1</sup>, Daniele Mastrosini T. P. Ferreira<sup>2</sup>, Lucianne-Coppe Maia<sup>1</sup>  and Ivete Pomarico Ribeiro de Souza<sup>1</sup>

### Abstract

**Background:** Malocclusion is a highly prevalent public health problem, and several studies have shown its negative correlation with quality of life, self-esteem, and social perceptions. However, its association with bullying is still controversial.

**Objectives:** To evaluate the relationship between malocclusion and bullying in children and adolescents.

**Search methods:** The databases used for the electronic researches were PubMed, Scopus, Lilacs/BBO, Web of Science, and Cochrane Library. Grey literature was reviewed through Open Grey literature with no language or date restrictions. Selection criteria, based on the PECO strategy, were considered eligible observational studies that included schoolchildren or adolescents (P) with malocclusion (E), compared to those with normal occlusion (C), in which the relationship between malocclusion and bullying was determined (O).

**Data collection and analysis:** Risk of bias evaluation was made for the qualitative synthesis by the Fowkes and Fulton criteria. Data regarding the age of participants and types of malocclusion and of bullying were extracted among other reported data. The quality of the evidence analyzed was evaluated through the GRADE approach.

**Results:** From 2744 articles identified in databases, nine met the eligibility criteria and were included in present systematic review, of which two studies were judged with methodological soundness. The quality of the evidence was classified as very low due to very serious problems for "risk of bias" and "other considerations" and serious problems of "indirectness". The age of participants ranged from 9 to 34 years considering a cohort study, with a bullying recalling perspective. Malocclusion was both evaluated by researchers and self-reported by participants addressing dentofacial characteristics mostly related to the incisors relationship. All studies evaluated the verbal type of bullying, while 3 also considered physical type. Both types were reported as related to malocclusion, although the results showed that extreme maxillary overjet (> 4 mm, > 6 mm, > 9 mm), extreme deep overbite, and fusing space between anterior teeth or missing teeth were the types of malocclusion with the strongest relations to bullying.

**Conclusions:** With very low certainty of evidence, the results of this systematic review suggest that conspicuous extreme malocclusion may be related to the occurrence of bullying among children and adolescents.

**Keywords:** Malocclusion, Bullying, Child, Adolescent

<b>Population</b>	„Malokklusion/Dysgnathie“ allg.
<i>Setting</i>	<ul style="list-style-type: none"> <li>schoolchildren or adolescents</li> </ul>
<i>Komorbiditäten</i>	
<b>Schweregrad</b>	Nicht angegeben

<p><b>Einschlusskriterien</b></p> <p>Bei Review: PICOS</p>	<ul style="list-style-type: none"> <li>• population: schoolchildren or adolescents</li> <li>• intervention: keine Intervention (zur Auswertung: malocclusion)</li> <li>• comparison: keine Kontrollgruppe (zur Auswertung: normal occlusion)</li> <li>• outcome: PRIMÄRZIELGRÖßE: bullying</li> <li>• study type: observational studies</li> </ul>
<p><b>Ausschlusskriterien</b></p>	<ol style="list-style-type: none"> <li>1. reviews of the literature, letters to the editor, case reports</li> <li>2. studies with other outcomes</li> <li>3. studies that did not report on the relationship between bullying and malocclusion on schoolchildren or adolescents</li> <li>4. studies that did not provide a normal occlusion control group</li> </ol>
<p><b>Intervention</b></p> <p>Versuchsgruppe</p>	<p><b>Keine Intervention</b></p> <p>VERSUCHSGRUPPE: <b>Malocclusion</b></p> <p>N=4953 (Anfang) / N=?? (Ende) / Alter = 9-34 Jahre / ♂:♀ = -</p> <ul style="list-style-type: none"> <li>• Gebissphase: Ruhephase, spätes Wechselgebiss, permanentes Gebiss &lt; und ≥ 18. Lebensjahr</li> <li>• KFO-Behandlung: (Früh-, reguläre, Spätbehandlung)</li> </ul>
<p><b>Kontrolle</b></p> <p>Kontrollgruppe</p>	<p><b>Keine Kontrollgruppe</b></p> <p>KONTROLLGRUPPE: <b>normal occlusion</b></p> <p>N=4935 (Anfang) / N=?? (Ende) / Alter = 9-34 Jahre / ♂:♀ = -</p> <ul style="list-style-type: none"> <li>• Gebissphase: Ruhephase, spätes Wechselgebiss, permanentes Gebiss &lt; und ≥ 18. Lebensjahr</li> <li>• KFO-Behandlung: keine Behandlung</li> </ul>
<p><b>Outcome</b></p>	<p><b>medizinischer Schaden, Nebenwirkungen bzw. Zunahme der Anomalie /Malokklusion/Dysgnathie</b></p> <ul style="list-style-type: none"> <li>• <b>mundgesundheitsbezogene Lebensqualität (MLQ), psychische Entwicklung</b></li> </ul> <p>PRIMÄRZIELGRÖßE: bullying</p>
<p><b>Studientyp</b></p>	<p><b>Systematisches Review</b></p> <p>Review: Inkludierte Studien in Bezug auf PICO: N = 9 (1 cohort, 8 cross-sectional studies)</p> <p>Review: Gesamt-Teilnehmerzahl in Bezug auf PICO: N=4953</p>
<p><b>Schlussfolgerungen der Autoren</b></p>	<p>Despite the very low quality of evidence, the results of this systematic review suggest that conspicuous extreme <b>malocclusion may be related to the occurrence of bullying among children and adolescents.</b></p>

<p><b>Zusammenfassung der Ergebnisse</b></p>	<p><b>Malocclusion VERSUS normal occlusion</b></p> <p><b>Bullying:</b> Based on the outcomes of the studies included in the present systematic review, <b>prevalence of malocclusion/ need for treatment was high</b>, ranging from 56 [24] to 96% [16]. Most studies [15, 16, 21–23, 25] concluded that malocclusion is related with bullying, while Agel et al. [17] and Rwakatema et al. [24] and Julca-Ching et al. [26] concluded that bullying is not related with malocclusion. <b>Some variables influenced these outcomes, such as the type of malocclusion and the evaluated IOTN component.</b> According to Sheera et al. [16], the <b>aesthetic component (AC) is significantly more associated with bullying than are the dental health component (DHC), overjet, and overbite.</b></p> <p>Among the nine studies included in the systematic review, five [16, 22, 23, 25, 26] reported no difference between gender and regarding bullying, three [17, 21, 24] did not provide any information about it, and only one study [15] reported that boys experience more bullying than do girls.</p> <p>Overall, this systematic review results suggest that children and adolescents with conspicuous malocclusion, such as extreme maxillary overjet (&gt; 4 mm, &gt; 6 mm, &gt; 9 mm), extreme deep overbite, and having space between anterior teeth or missing teeth, would be bullied more often than those with normal occlusion.</p>
<p><b>Angaben auffälliger positiver und/oder negativer Aspekte</b></p> <p>Studiendesign</p> <p>Durchführung</p> <p>Auswertung</p> <p><u>Funding</u></p> <p><u>Interessenkonflikte</u></p> <p><u>Bias (SIGN, AMSTAR II, Einzelstudien)</u></p>	<p><i>Studiendesign: PROSPERO-Registrierung a priori, keine Kontrollgruppe/ Intervention im Sinne einer KFO-Behandlung, GRADE und RoB-Analyse durchgeführt, keine Meta-Analyse, Messmethodik für Intervention und Outcome nicht definiert</i></p> <p><i>Durchführung: Literatursichtung durch drei/ RoB-Analyse/ GRADE durch zwei unabhängige Rater, hauptsächlich Querschnittsstudien eingeschlossen, untersuchte Malokklusion der Einzelstudien genannt</i></p> <p><i>Auswertung: unterschiedliche Fragebögen zur Erhebung der Zielgröße "bullying", verschiedene Indizes/Methoden zur Bestimmung des Ausmaßes der Malokklusion, Population spiegelt weltweite Bevölkerung wider, Heterogenität/ Störfaktoren in der Diskussion berücksichtigt</i></p> <p><i>Power der Studie/Patientenzahl: 9/4953</i></p> <p><i>Funding: It was partially supported by Foundation for Research Support of the State of Rio de Janeiro – FAPERJ, grant numbers E-26/202.334/2019 (MBM) and E-26/ 202-399/2017 (AVBP), E-26/202-400/2017 (AVBP) and E-26/203.017/2017 (IPRS).</i></p> <p><i>Interessenkonflikte: The authors declare that they have no competing interests.</i></p> <p><i>Bias (SIGN/AMSTAR/EinzelstudienRoB – alle negativen Punkte aus Fragebogen auflisten):</i></p> <p><b>3. Did the review authors explain their selection of the study designs for inclusion in the review?</b></p> <p><b>6. Did the review authors perform data extraction in duplicate?</b></p> <p><b>10. Did the review authors report on the sources of funding for the studies included in the</b></p> <p><b>13. Did the review authors account for RoB in individual studies when interpreting/ discuss results of the review?</b></p> <p><i>Publikationsbias (Reviews): GRADE - The criterion "publication bias" was judged to be "undetected" since the search was done in white and gray databases, with no date or language limitation.</i></p>
<p><b>Schluss-</b></p>	<p><u>methodische Qualität:</u> Review moderat, Einzelstudien niedrig</p>



<b>folgerung des Begutachters</b>	<u>Klinische Aussagekraft:</u> Jugendliche und Kinder, die ein gewisses Maß an Malokklusion aufweisen, scheinen sich subjektiv einem Mobbing ausgesetzt zu fühlen. Gewisse Formen der Malokklusion wie prominente Inzisiven, stehen vermutlich häufiger im Zusammenhang mit Mobbing, allerdings können aufgrund des geringen Datenumfanges diesbzgl. keine näheren Aussagen getroffen werden.
<b>Evidenz- level (SIGN)</b>	<b>3</b>
<b>Qualität (RoB, SIGN /AMSTAR II)</b>	<b>Moderat ⊕⊕</b>

# Evidenztabelle Van Lierde et al. 2015

## ORIGINAL ARTICLE

### Articulation and oromyofunctional behavior in children seeking orthodontic treatment

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**OBJECTIVES:** The purpose of this controlled study is to document articulation and oromyofunctional behavior in children seeking orthodontic treatment. In addition, relations between malocclusions, articulation, and oromyofunctional behavior are studied.

**MATERIALS AND METHODS:** The study included 56 children seeking orthodontic treatment. The control group, consisting of 54 subjects matched for age and gender, did not undergo orthodontic intervention. To determine the impact of the occlusion on speech, the Oral Health Impact Profile was used. Speech characteristics, intelligibility and several lip and tongue functions were analyzed using consensus evaluations.

**RESULTS:** A significant impact of the occlusion on speech and more articulation disorders for /s, n, l, t/ were found in the subjects seeking orthodontic treatment. Several other phenomena were seen more often in this group, namely more impaired lip positioning during swallowing, impaired tongue function at rest, mouth breathing, open mouth posture, lip sucking/biting, anterior tongue position at rest, and tongue thrust. Moreover, all children with a tongue thrust showed an anterior tongue position at rest.

**CONCLUSIONS:** Children seeking orthodontics have articulatory and oromyofunctional disorders. To what extent a combined orthodontic and logopaedic treatment can result in optimal oral health (i.e. perfect dentofacial unit with perfect articulation) is subject for further multidisciplinary research.

<b>Population</b> <i>Setting</i> <i>Komorbiditäten</i>	<b>„Malokklusion/Dysgnathie“ allg.</b> <ul style="list-style-type: none"> <li>• Department of Orthodontics at the Ghent University, Belgium</li> </ul>
<i>Schweregrad</i>	Keine Angaben
<i>Einschlusskriterien</i> <i>Bei Review: PICOS</i>	<ul style="list-style-type: none"> <li>• native speakers of Flemish</li> <li>• attended regular schools</li> </ul>

<b>Ausschlusskriterien</b>	<ul style="list-style-type: none"> <li>• craniofacial anomalies</li> <li>• ear, nose, throat, or neurological pathologies</li> </ul>
<b>Intervention</b> Versuchsgruppe	<p><b>keine Intervention</b></p> <p>VERSUCHSGRUPPE: <b>seeking orthodontic treatment</b></p> <p>N=60 (Anfang) / N=56 (Ende) / Alter = 10,2 (7-12) Jahre / ♂:♀ = 24:32</p> <ul style="list-style-type: none"> <li>• Gebissphase: frühes Wechselgebiss, spätes Wechselgebiss, permanentes Gebiss &lt;18. Lebensjahr</li> <li>• KFO-Behandlung: keine Angaben</li> </ul>
<b>Kontrolle</b> Kontrollgruppe	<p><b>keine kieferorthopädische Therapie</b></p> <p>KONTROLLGRUPPE: <b>control</b></p> <p>N=54 (Anfang) / N=54 (Ende) / Alter = 9,3 (6-12) Jahre / ♂:♀ = 25:29</p> <ul style="list-style-type: none"> <li>• Gebissphase: Milchgebiss, frühes Wechselgebiss, spätes Wechselgebiss, permanentes Gebiss &lt;18. Lebensjahr</li> <li>• KFO-Behandlung: keine Angaben</li> </ul>
<b>Outcome</b>	<p><b>direkter oder schadenspräventiver medizinischer Nutzen bzw. Korrektur/Prävention der Anomalie/Malokklusion/Dysgnathie</b></p> <ul style="list-style-type: none"> <li>• <b>Atmung und Luftraum (Airway space, Schlafapnoe), Schlucken und Sprechen</b></li> </ul> <p>PRIMÄRZIELGRÖßE: <i>Oral health impact profile (OHIP-14 score)</i></p> <p>SEKUNDÄRZIELGRÖßE: <i>Articulation and speech intelligibility (ordinal scale with four levels)</i></p> <p>TERTIÄRZIELGRÖßE: <i>Oromyofunctional assessment (three-point rating scale)</i></p>
<b>Studientyp</b>	<b>Querschnittsstudie</b>
<b>Schlussfolgerungen der Autoren</b>	<ol style="list-style-type: none"> <li>1. children with a mean age of 10 years seeking orthodontic treatment experience an impact of the occlusion on speech</li> <li>2. Speech intelligibility in this group is normal; however, speech is characterized by disorders of specific alveolars (/s/,/n/,/l/,/t/)</li> <li>3. The most striking phonetic disorder is the addental production of sounds, that is, articulating sounds with the tongue tip against the central incisors instead of the upper alveolus.</li> <li>4. Both orthodontists, speech-language pathologists, and ENT specialists must be aware of the presence of these disorders affecting oral health self-perception</li> </ol>

<p><b>Zusammenfassung der Ergebnisse</b></p>	<p><b>seeking orthodontic treatment VERSUS control</b></p> <p><b>PRIMÄRZIELGRÖßE</b> <i>The mean total OHIP score for the subjects seeking orthodontic treatment was 1.05 (s.d.: 1.15 range: 0–4). The mean total OHIP score for the control subjects was 0.4 (s.d.: 0.71 range: 0–1). The Mann–Whitney U-test showed a significantly increased impact of the occlusion on speech (<math>P = 0.001</math>) in the subjects seeking orthodontic treatment in comparison with the control subjects. No gender- and age-related differences in OHIP outcome were found.</i></p> <p><b>SEKUNDÄRZIELGRÖßE</b> <i>Phonetic articulation disorders of/s/,/n/,/l/,/t/,/d/,/p/,/b/, and/m/were found in the subjects seeking orthodontic treatment, with disorders of/s/,/n/,/l/, and/t/occurring significantly more often. The Mann–Whitney U-test revealed that children in the orthodontic group produced more phonetic disorders per child (<math>P &lt; 0.001</math>) (mean number of phonetic disorders/child: 2.3 sounds, s.d.: 1.92, range: 0–5) in comparison with children without orthodontics (mean number of phonetic disorders/child: 0.9 sounds, s.d.: 1.51, range: 0–5). Normal speech intelligibility (100% consensus evaluation) was seen in both groups.</i></p> <p><b>TERTIÄRZIELGRÖßE</b> <i>Significantly more children seeking orthodontic treatment showed an impaired lip position during swallowing (<math>P = 0.006</math>) and an impaired tongue function at rest (<math>P &lt; 0.001</math>) in comparison with the control group children. Lip function at rest (<math>P = 0.243</math>), lip closure (<math>P = 1.00</math>), dispersion of the corners of the mouth (<math>P = 0.082</math>), and lip protrusion (<math>P = 0.896</math>) did not differ significantly in both groups. Moreover, no significant differences were found for tongue protrusion (<math>P = 0.618</math>), tongue retraction (<math>P = 1.000</math>), tongue lifting/depression (<math>P = 0.482/P = 0.676</math>), and lateral movements of the tongue (<math>P = 0.266</math>) between both groups. A Fisher’s exact test revealed a significant association between anterior tongue position at rest and tongue thrust or visceral swallowing pattern (<math>P &lt; 0.01</math>). All children with a tongue thrust had an anterior tongue position at rest. No significant link was found between anterior tongue position at rest and persistent sucking behavior (<math>P = 0.780</math>).</i></p> <p><i>Significantly more control group children showed pacifier sucking (<math>P = 0.026</math>) in comparison with the children seeking orthodontic treatment. The latter group of children showed significantly more lip incompetence during breathing (<math>P = 0.002</math>), habitual open mouth posture (<math>P &lt; 0.001</math>), lip sucking/biting (<math>P = 0.002</math>), anterior tongue position at rest (<math>P &lt; 0.01</math>), and tongue thrust (<math>P = 0.03</math>) in comparison with the control group. No significant differences between both groups were found for thumb/finger sucking, drooling, bruxism, and nail biting. The children seeking orthodontic treatment (mean number of oral habits: 3.3, s.d.: 1.84, range: 0–7) showed significantly more (<math>P &lt; 0.001</math>) oral habits than children in the control group (mean number of oral habits: 1.4, s.d.: 1.44, range: 0–5). The Mann–Whitney U-test revealed significantly more distortions of the alveolars and unphysiologic (anterior) tongue position at rest (<math>P = 0.024</math>) and significantly more distortions of the bilabials and a disordered lip function during swallowing (<math>P &lt; 0.001</math>) in children seeking orthodontic treatment. Children with anterior tongue position at rest (<math>P = 0.003</math>) or tongue thrust (<math>P = 0.005</math>) produced significantly more phonetic articulation disorders. Fisher’s exact test showed a significant relation between the presence of an anterior open bite and sucking behavior (<math>P = 0.045</math>), anterior open bite and tongue thrust (<math>P = 0.018</math>), and deep bite and tongue thrust (<math>P = 0.041</math>). No significant relation between the type of malocclusion and the type of phonetic articulation disorder was found</i></p>
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<p><b>Angaben auffälliger positiver und/oder negativer Aspekte</b></p> <p>Studiendesign Durchführung Auswertung Funding <u>Interessenkonflikte</u> <u>Bias (SIGN, AMSTAR II, Einzelstudien)</u></p>	<p><i>Studiendesign: kontrolliert, Randomisierung nur in Kontrollgruppe, keine Angaben zum Schweregrad der Malokklusionen</i></p> <p><i>Durchführung: gute Durchführung</i></p> <p><i>Auswertung: Artikulation und Sprachverständlichkeit verblindet ausgewertet durch zwei Logopäden</i></p> <p><i>Power der Studie/Patientenzahl: keine Powerkalkulation, N = 110</i></p> <p><i>Funding: keine Angaben</i></p> <p><i>Interessenkonflikte: keine Angaben</i></p> <p><i>Bias (SIGN/AMSTAR/EinzelstudienRoB – alle negativen Punkte aus Fragebogen auflisten):</i> --</p>
<p><b>Schlussfolgerung des Begutachters</b></p>	<p><u>methodische Qualität:</u> gut</p> <p><u>Klinische Aussagekraft:</u> moderat (viele Störfaktoren, die das Ergebnis der Studie beeinflussen können)</p>
<p><b>Evidenzlevel (SIGN)</b></p>	<p>3</p>
<p><b>Qualität (RoB, SIGN /AMSTAR II)</b></p>	<p><b>Acceptable ⊕</b></p>

# Evidenztabelle Vázquez-Casas et al. 2020

Journal section: Orthodontics  
 Publication Type: Research

doi:10.4171/jvol.36833  
<https://doi.org/10.4171/jvol.36833>

## Prevalence of sleep-related breathing disorders in children with malocclusion

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### Abstract

**Background:** The paediatric population has a high incidence of sleep-related breathing disorders (SRBD). A notable risk factor is the presence of craniofacial abnormalities. The objective of the study was therefore to survey the prevalence of SRBD in patients presenting for interceptive treatment.

**Material and Methods:** Prospective study with a sample of 249 healthy patients. The "Paediatric Sleep Questionnaire" and "Sleep Disturbance Scale for Children" were completed by the children's parents and the results were evaluated. All patients had their medical records reviewed and underwent orthodontic diagnosis by oral examination, as well as dental cast and cephalometric analysis. Finally, we compared the results of the pre- and post-treatment questionnaires of 50 patients in the sample.

**Results:** Based on the results of the questionnaires, 22.8% of the study sample had SRBD. No statistically significant correlation was found between SRBD and the anthropometric characteristics and occlusal variables assessed. According to the cast analysis, patients with SRBD had a smaller maxillary width ( $p < 0.003$ ), and according to the cephalometric study, less overbite ( $p < 0.003$ ). Furthermore, the prevalence of SRBD was higher among patients with a history of adenotonsillectomy ( $p < 0.02$ ). Comparison of the results of pre- and post-treatment questionnaires revealed significant differences after orthodontic treatment ( $p = 0.0005$ ).

**Conclusions:** It is necessary to identify the presence of SRBD in orthodontic patients given its high prevalence. Patients with SRBD have a smaller maxillary width and less overbite.

<b>Population</b>	<b>„Malokklusion/Dysgnathie“ allg.</b>
<i>Setting</i>	<ul style="list-style-type: none"> <li>orthodontic department of Sant Joan de Déu Hospital</li> </ul>
<i>Komorbiditäten</i>	<ul style="list-style-type: none"> <li>keine Angaben</li> </ul>
<b>Schweregrad</b>	Keine Angaben
<b>Einschlusskriterien</b>	Keine Angaben
<i>Bei Review: PICOS</i>	
<b>Ausschlusskriterien</b>	Patients with craniofacial malformations and/or respiratory and neurological disease were excluded from the study

<b>Intervention</b> Versuchsgruppe	<p><b>kieferorthopädische Behandlung</b> <i>Interceptive orthodontic treatment</i></p> <p><b>Keine Gruppen</b></p> <p>N=249 (Anfang) / N=50 (Ende) / Alter = 8,52 ± 1,3 Jahre / ♂:♀ = 126:123</p> <ul style="list-style-type: none"> <li>• Gebissphase: keine Angaben</li> <li>• KFO-Behandlung: keine Angaben</li> </ul>
<b>Kontrolle</b> Kontrollgruppe	<p><b>kieferorthopädische Behandlung</b> <i>Interceptive orthodontic treatment</i></p> <p><b>Keine Gruppen</b></p> <p>N=249 (Anfang) / N=50 (Ende) / Alter = 8,52 ± 1,3 Jahre / ♂:♀ = 126:123</p> <ul style="list-style-type: none"> <li>• Gebissphase: keine Angaben</li> <li>• KFO-Behandlung: keine Angaben</li> </ul>
<b>Outcome</b>	<p><b>direkter oder schadenspräventiver medizinischer Nutzen bzw. Korrektur/Prävention der Anomalie/Malokklusion/Dysgnathie</b></p> <ul style="list-style-type: none"> <li>• prevalence of sleep-related breathing disorders (SRBD)</li> <li>• the correlation between the onset of SRBD and dentofacial characteristics</li> <li>• Compare the results of pre- vs. post-orthodontic treatment questionnaires</li> </ul> <p>PRIMÄRZIELGRÖßE: <i>sleep-related breathing disorders (SRBD) (Pediatric Sleep Questionnaire (PSQ), Sleep disturbance scale for children (SDSC))</i></p> <p>SEKUNDÄRZIELGRÖßE: <i>adenotonsillectomy prior to orthodontic treatment (JA / NEIN)</i></p> <p>TERTIÄRZIELGRÖßE: <i>body mass index (BMI)</i></p> <p>QUARTÄRZIELGRÖßE: <i>Dento-facial parameters</i></p>
<b>Studientyp</b>	<b>Querschnittsstudie</b>
<b>Schlussfolgerungen der Autoren</b>	<ol style="list-style-type: none"> <li>1. It is necessary to identify the presence of SRBD in orthodontic patients, given its high prevalence.</li> <li>2. Patients with SRBD have a smaller maxillary width and less overbite.</li> <li>3. Larger studies are needed to determine the influence of orthodontic treatment in patients with sleep-related breathing disorders.</li> </ol>

<p><b>Zusammenfassung der Ergebnisse</b></p>	<p><b>Keine Gruppen</b></p> <p><b>sleep-related breathing disorders (SRBD):</b> <i>After calculating the scores of the questionnaires, an average prevalence of SRBD of 22.8% (56.3 patients) was obtained for the study sample.</i></p> <p><b>adenotonsillectomy prior to orthodontic treatment</b> <i>A total of 15% of the sample had previously undergone surgery for adenoidectomy or tonsillectomy or both at the same time. The results of the questionnaires were analysed according to the patient’s history of surgery, showing a significantly higher incidence of SRBD in previously operated vs. non-operated patients.</i></p> <p><b>body mass index (BMI)</b> <i>Meanwhile, 69% of the sample had a normal BMI and analysis of the relationship between nutritional status and the presence of SRBB showed no statistically significant differences.</i></p> <p><b>Dento-facial parameters</b> <i>The results of the questionnaires revealed no statistically significant differences with regard to molar occlusion. It was found that 63.5% of the sample had a crossbite, with no statistically significant differences observed between questionnaire results. Furthermore, 24.5% had an open bite, with no differences observed between questionnaire results. In the cross-model analysis (Tables 2,3), the only statistically significant difference observed was maxillary width (mx FA) according to the SDSC.R (<math>p &lt; 0.00</math>); in the PSQ, the value approached significance (<math>p &lt; 0.06</math>), with a smaller maxillary width in the group with respiratory sleep disorders. The correlation between questionnaire results and skeletal discrepancy in the patients was also assessed, with no statistically significant relationship observed for any of the variables. The same results were obtained when assessing the growth pattern. Overjet in the patients was contrasted with questionnaire results, showing no statistically significant differences. However, according to the SDSC.R, statistically significant differences were observed for overbite, which decreased as the risk of SRBD increased. Comparison of the questionnaire results of 50 patients before and after orthodontic treatment showed no changes for PSQ, unlike for SDSC and SDSC.R.</i></p>
<p><b>Angaben auffälliger positiver und/oder negativer Aspekte</b></p> <p>Studiendesign</p> <p>Durchführung</p> <p>Auswertung</p> <p><u>Funding</u></p> <p><u>Interessenkonflikte</u></p> <p><u>Bias (SIGN, AMSTAR II, Einzelstudien)</u></p>	<p><i>Studiendesign: prospektiv, nicht randomisiert, unkontrolliert, Gruppenbildung anhand des Outcomes</i></p> <p><i>Durchführung: gute Durchführung</i></p> <p><i>Auswertung: gute Auswertung</i></p> <p><i>Power der Studie/Patientenzahl: keine Powerkalkulation, 249 Patienten (50 Patienten haben die kieferorthopädische Behandlung im Untersuchungszeitraum beendet)</i></p> <p><i>Funding: keine Angaben</i></p> <p><i>Interessenkonflikte: nein</i></p> <p><i>Bias (SIGN/AMSTAR/EinzelstudienRoB – alle negativen Punkte aus Fragebogen auflisten):</i></p> <p><i>Publikationsbias (Reviews):</i></p> <ul style="list-style-type: none"> <li>- <i>Nicht verblindet</i></li> <li>- <i>Schlafbezogene Atmungsstörungen wurden anhand von Fragebögen (Pediatric Sleep Questionnaire, Sleep disturbance scale for children) ermittelt</i></li> <li>- <i>Keine Kontrollgruppe, Gruppenbildung anhand des Outcomes</i></li> </ul>



<b>Schlussfolgerung des Begutachters</b>	<u>methodische Qualität</u> : akzeptabel
	<u>Klinische Aussagekraft</u> : In der untersuchten Population wurde eine Prävalenz von 22.8% für das Auftreten von schlafbezogenen Atmungsstörungen ermittelt. Ein signifikanter Zusammenhang zu einer schmalen transversalen Breite des OK und verringerten Overbite konnte festgestellt werden. Die Befragung von 50 Patienten nach erfolgter kieferorthopädischer Behandlung zeigte keine Veränderung in der Beantwortung der Fragebögen ( <i>Pediatric Sleep Questionnaire, Sleep disturbance scale for children</i> ).
<b>Evidenzlevel (SIGN)</b>	3
<b>Qualität (RoB, SIGN /AMSTAR II)</b>	Acceptable ⊕

# Evidenztabelle Zheng et al. 2015

Zheng et al. *BMC Oral Health* (2015) 15:148  
DOI 10.1186/s12903-015-0130-7



## RESEARCH ARTICLE

## Open Access



# Assessing changes in quality of life using the Oral Health Impact Profile (OHIP) in patients with different classifications of malocclusion during comprehensive orthodontic treatment

De-Hua Zheng<sup>1\*</sup>, Xu-Xia Wang<sup>2†</sup>, Yu-Ran Su<sup>3</sup>, Shu-Ya Zhao<sup>4</sup>, Chao Xu<sup>5</sup>, Chao Kong<sup>6</sup> and Jun Zhang<sup>7</sup>

### Abstract

**Background:** The objectives of this study were to investigate changes in OHIP-QoL among patients with different classifications of malocclusion during comprehensive orthodontic treatment.

**Methods:** Clinical data were collected from 81 patients (aged 15 to 24) who had undergone comprehensive orthodontic treatment. Participants were classified 3 groups: Class I (n = 35), II (n = 32) and III (n = 14) by Angle classification. OHIP-QoL was assessed using the Oral Health Impact Profile (OHIP-14). All subjects were examined and interviewed at baseline (T0), after alignment and leveling (T1), after correction of molar relationship and space closure (T2), after finishing (T3). Friedman 2-way analysis of variance (ANOVA) and Wilcoxon signed rank tests were used to compare the relative changes of OHIP-QoL among the different time points. A Bonferroni correction with  $P < 0.005$  was used to declare significance.

**Results:** Significant reductions were observed in all seven OHIP-14 domains of three groups except for social disability ( $P > 0.005$ ) in class I and class II, Handicap in class II and class III ( $P > 0.005$ ). Class I patients showed significant changes for psychological disability and psychological discomfort domain at T1, functional limitation, physical pain at T2. Class II patients showed a significant benefit in all domains except physical pain and functional limitation. Class III patients showed significant changes in the physical pain, functional disability, and physical disability domains at T1.

**Conclusions:** The impact of comprehensive orthodontic treatment on patients' OHIP-QoL do not follow the same pattern among patients with different malocclusion. Class II patients benefits the most from the stage of space closure, while class I patients benefits the first stage (alignment and leveling) of treatment in psychological disability and psychological discomfort domains.

**Keywords:** Oral health-related quality of life, Orthodontic treatment, Patient assessment

<p><b>Population</b> Setting Komorbiditäten</p>	<p><b>„Malokklusion/Dysgnathie“ allg.</b></p> <ul style="list-style-type: none"> <li>• Department of orthodontics at Stomatology Affiliated Hospital of Shan Dong University</li> <li>• unklar</li> </ul>
<p><b>Schweregrad</b></p>	<p>Class I, II and III patients</p>
<p><b>Einschlusskriterien</b></p>	<ul style="list-style-type: none"> <li>• non growing patients (aged 15 and older)</li> <li>• need for comprehensive fixed orthodontic treatment</li> </ul>
<p><b>Ausschlusskriterien</b></p>	<ul style="list-style-type: none"> <li>• cognitive disorders or chronic medical conditions</li> <li>• previously received any type of orthodontic treatment</li> <li>• craniofacial anomalies such as cleft lip and palate, dental caries, or periodontal diseases, syndromes, facial deformities due to trauma or congenital malformation</li> <li>• patients who were proposed to receive other types of orthodontic appliances aside from conventional labial appliance treatment (ie, lingual orthodontic appliance or Invisalign)</li> </ul>
<p><b>Intervention</b> Versuchsgruppe</p>	<p><b>kieferorthopädische Behandlung</b></p> <p>The baseline data (T0) of 81 subjects were finished before banding and bonding of comprehensive orthodontic treatment. In subsequent research, subjects were monitored at various times during comprehensive orthodontic therapy: 1 after alignment and leveling (T1), after correction of molar relationship and space closure (T2), after finishing (T3)</p> <p><b>VERSUCHSGRUPPE: Class I</b></p> <p>N=43 (Anfang) / N=39 (Ende) / Alter = 15-25 Jahre / ♂:♀ = 17:18</p> <ul style="list-style-type: none"> <li>• Gebissphase: bleibendes Gebiss</li> <li>• KFO-Behandlung: relieving denture crowding by extraction of 4 first premolars</li> </ul> <p><b>VERSUCHSGRUPPE: Class II</b></p> <p>N=42 (Anfang) / N=37 (Ende) / Alter = 15-25 Jahre / ♂:♀ = 15:17</p> <ul style="list-style-type: none"> <li>• Gebissphase: bleibendes Gebiss</li> <li>• KFO-Behandlung: Microscrew implants were used for the retraction of maxillary anterior and intrusion of the incisors. Extraction of the upper first premolars and lower first premolars were carried out for the purpose of camouflaging the anteroposterior skeletal discrepancy and obtaining a harmonious facial profile.</li> </ul> <p><b>VERSUCHSGRUPPE: Class III</b></p> <p>N=14 (Anfang) / N=14 (Ende) / Alter = 15-25 Jahre / ♂:♀ = 8:6</p> <ul style="list-style-type: none"> <li>• Gebissphase: bleibendes Gebiss</li> <li>• KFO-Behandlung: Mandibular and maxillary third molars were extracted before treatment, if presented. All of the participants were treated with MEAW and long Class III elastics from the upper second molar.</li> </ul>
<p><b>Kontrolle</b> Kontrollgruppe</p>	<p><b>keine</b></p>

<p><b>Outcome</b></p>	<p><b>direkter oder schadenspräventiver medizinischer Nutzen bzw. Korrektur/Prävention der Anomalie/Malokklusion/Dysgnathie</b></p> <ul style="list-style-type: none"> <li>• <b>changes in quality of life</b></li> </ul> <p>PRIMÄRZIELGRÖßE: Oral Health Impact Profile (OHIP-14)</p>
<p><b>Studientyp</b></p>	<p><b>Querschnittsstudie</b></p>
<p><b>Schlussfolgerungen der Autoren</b></p>	<p>1. The impact of comprehensive orthodontic treatment on patients' OHRQoL do not follow the same pattern among patients with different malocclusion.                  2. With respect to psychological discomfort and psychological disability domains, class II patients benefits the most from the stage of space closure, while class I patients benefits in the first stage (alignment and leveling) during treatment.                  3. Comprehensive orthodontic treatment have little effect on patients' social interaction anxiety, but improved occlusion and facial aesthetics do improve patients' functional capacity and psychological well-being.</p>
<p><b>Zusammenfassung der Ergebnisse</b></p>	<p><b>Class I VS. Class I</b>                  Significant reductions were observed in all seven OHIP-14 domains of three groups except for social disability (<math>P &gt; 0.005</math>) in class I. Class I patients showed significant changes for psychological disability and psychological discomfort domain at T1, functional limitation, physical pain at T2.  <b>Class II VS. Class II</b>                  Significant reductions were observed in all seven OHIP-14 domains of three groups except for social disability and Handicap in class II (<math>P &gt; 0.005</math>). Class II patients showed significant changes in the physical pain, functional disability, and physical disability domains at T1.  <b>Class III VS. Class III</b>                  Significant reductions were observed in all seven OHIP-14 domains of three groups except for Handicap in class III (<math>P &gt; 0.005</math>). Class III patients showed a significant benefit in all domains except physical pain and functional limitation.</p>
<p><b>Angaben auffälliger positiver und/oder negativer Aspekte</b></p> <p>Studiendesign                  Durchführung                  Auswertung                  Funding                  Interessenkonflikte                  Bias (SIGN)</p>	<p><i>Studiendesign:</i> keine Kontrollgruppe, keine Randomisierung, keine Interrater-Reliabilität bestimmt</p> <p><i>Durchführung:</i> Die Ausfallrate an Studienteilnehmern betrug 10%</p> <p><i>Auswertung:</i> Power-Analyse zu jedem Primäroucome durchgeführt, keine Angaben zum Schweregrad der Anomalien in den jeweiligen Versuchsguppen. Insgesamt lässt die Studie jedoch erkennen, dass eine Verbesserung der Lebensqualität durch kieferorthopädische Behandlung bei unterschiedlichen Malokklusionen auch unterschiedlich ausgeprägt ist.</p> <p><i>Funding:</i> National Natural Science Foundation of China (Grant No.81371180)</p> <p><i>Interessenkonflikte:</i> keine</p> <p><i>Bias (SIGN):</i> keine ITT-, nur PP-Analyse</p>
<p><b>Schluss-</b></p>	<p><u>methodische Qualität:</u> insgesamt akzeptabel</p>

<p><b>folgerung des Begutachters</b></p>	<p><u>Klinische Aussagekraft:</u> Eine kieferorthopädische Therapie an ausgewachsenen Patienten führt insgesamt zu einer Verbesserung der Lebensqualität.</p> <p>Der Einfluss einer kieferorthopädischen Behandlung auf die Lebensqualität äußert sich allerdings abhängig von der therapierten Malokklusion in unterschiedlicher Form.</p> <p>So profitieren Klasse II Patienten in Bezug auf das psychologische Wohlbefinden insbesondere von der Phase des Lückenschlusses.</p> <p>Klasse I Patienten geben vor allem in der initialen Nivellierungsphase eine Verbesserung der Lebensqualität an.</p> <p>Die kieferorthopädische Behandlung selbst scheint kaum Einfluss auf die soziale Interaktionsfähigkeit der Patienten zu haben, während vor allem funktionelle Aspekte und das psychologische Wohlbefinden verbessert werden.</p>
<p><b>Evidenz- level (SIGN)</b></p>	<p><b>3</b></p>
<p><b>Qualität (RoB, SIGN)</b></p>	<p><b>Acceptable ⊕</b></p>

# Evidenztabelle Zhou, Wang et al. 2014

Zhou et al. BMC Oral Health 2014, 14:66  
<http://www.biomedcentral.com/1471-2875/14/66>



RESEARCH ARTICLE

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## The impact of orthodontic treatment on the quality of life a systematic review

Yu Zhou<sup>1</sup>, Yi Wang<sup>1</sup>, XuYing Wang<sup>1</sup>, Gerald Volter<sup>2</sup> and RongDang Hu<sup>1\*</sup>

### Abstract

**Background:** Although a great number of specific quality of life measures have been developed to analyze the impact of wearing fixed appliances, there is still a paucity of systematic appraisal of the consequences of orthodontics on quality of life. To assess the current evidence of the relationship between orthodontic treatment and quality of life.

**Methods:** Four electronic databases were searched for articles concerning the impact of orthodontic treatment on quality of life published between January 1960 and December 2013. Electronic searches were supplemented by manual searches and reference linkages. Eligible literature was reviewed and assessed by methodologic quality as well as by analytic results.

**Results:** From 204 reviewed articles, 11 met the inclusion criteria and used standardized health related quality of life and orthodontic assessment measures. The majority of studies (7/11) were conducted among child/adolescent populations. Eight of the papers were categorized as level 1 or 2 evidence based on the criteria of the Oxford Centre for Evidence-Based Medicine. An observed association between quality of life and orthodontic treatment was generally detected irrespective of how they were assessed. However, the strength of the association could be described as modest at best. Key findings and future research considerations are described in the review.

**Conclusions:** Findings of this review suggest that there is an association (albeit modest) between orthodontic treatment and quality of life. There is a need for further studies of their relationship, particularly studies that employ standardized assessment methods so that outcomes are uniform and thus amenable to meta-analysis.

**Keywords:** Malocclusion, Orthodontic treatment, Quality of life, Oral health-related quality of life

<b>Population</b>	„Malokklusion/Dysgnathie“ allg.
<i>Setting</i> <i>Komorbiditäten</i>	<ul style="list-style-type: none"> <li>patients receiving orthodontic treatment (and non-orthodontic treatment: nicht LL-relevant, wenn als Vergleich)</li> </ul>
<b>Schweregrad</b>	Nicht angegeben

<p><b>Einschlusskriterien</b></p> <p>Bei Review: PICO</p>	<ul style="list-style-type: none"> <li>Population: patients receiving orthodontic treatment (and non-orthodontic treatment: nicht LL-relevant, wenn als Vergleich)</li> <li>Intervention: Fixed or removable appliance, or interceptive orthodontic treatment</li> <li>Comparison: pre-treatment</li> <li>Outcome: PRIMÄRZIELGRÖÖE: Changes in oral health–related quality of life (OHRQoL) from baseline (pre-treatment) to follow-up at least 1 month.</li> <li>Study type: -</li> </ul>
<p><b>Ausschlusskriterien</b></p>	<ol style="list-style-type: none"> <li>lack of standardized measures in assessing QoL, HRQoL or OHRQoL</li> <li>lack of effective statistical analyses</li> <li>case reports and review papers</li> </ol>
<p><b>Intervention</b></p> <p>Versuchsgruppe</p>	<p><b>kieferorthopädische Behandlung</b></p> <p>VERSUCHSGRUPPE: <b>orthodontic treatment</b></p> <p>N=4855 (Anfang)/ N=?? (Ende)/ Alter=11-36? (1 Studie: “16 and older”) Jahre / ♂:♀ = ?:? </p> <ul style="list-style-type: none"> <li>Gebissphase: spätes Wechselgebiss, permanentes Gebiss &lt; und ≥ 18. Lebensjahr</li> <li>KFO-Behandlung: reguläre Behandlung, Spätbehandlung</li> </ul>
<p><b>Kontrolle</b></p> <p>Kontrollgruppe</p>	<p><b>Keine Kontrollgruppe</b></p> <p>KONTROLLGRUPPE: <b>pre-treatment</b></p> <p>N=4855 (Anfang) / N=?? (Ende) / Alter = 11-36? Jahre / ♂:♀ = ?:? </p> <ul style="list-style-type: none"> <li>Gebissphase: spätes Wechselgebiss, permanentes Gebiss &lt; und ≥ 18. Lebensjahr</li> <li>KFO-Behandlung: keine Behandlung</li> </ul>
<p><b>Outcome</b></p>	<p><b>direkter oder schadenspräventiver medizinischer Nutzen bzw. Korrektur/Prävention der Anomalie/Malokklusion/Dysgnathie, medizinischer Schaden, Nebenwirkungen bzw. Zunahme der Anomalie /Malokklusion/Dysgnathie</b></p> <ul style="list-style-type: none"> <li><b>mundgesundheitsbezogene Lebensqualität (MLQ), psychische Entwicklung</b></li> </ul> <p>PRIMÄRZIELGRÖÖE: Changes in oral health–related quality of life (OHRQoL) from baseline (pre-treatment) to follow-up at least 1 month.</p>
<p><b>Studientyp</b></p>	<p><b>Systematisches Review</b></p> <p>Review: Inkludierte Studien in Bezug auf PICO: 6 cohort studies, 4 cross-sectional, 1 case-control with randomized sample type N=11</p> <p>Review: Gesamt-Teilnehmerzahl in Bezug auf PICO: N=4855</p>
<p><b>Schlussfolgerungen der Autoren</b></p>	<p>In literature there is a growing interest in the relationship between orthodontic treatment and HRQoL and it suggests that <b>orthodontics can moderately improve the OHR-QoL of patients</b>. In future, however, there is still a need to determine appropriate assessment methods of orthodontic treatment and of quality of life (QoL, HRQoL, and/ orOHRQoL measures) to enable meta-analysis of their relationship.</p>

<p><b>Zusammenfassung der Ergebnisse</b></p>	<p><b>orthodontic treatment VERSUS pre-treatment</b></p> <p><b>Changes in oral health–related quality of life (OHRQoL) from baseline (pre-treatment) to follow-up at least 1 month: a majority of studies indicated a correlation between orthodontic treatment and QoL no matter what measurement was applied.</b> The cross-sectional studies revealed that orthodontic treatment resulted in a decrease in QoL scores. Whereas the longitudinal studies indicated that with ongoing orthodontic treatment, <b>the QoL score may increase a few weeks after initial orthodontic</b> appliance placement. QoL might even be improved during the late stages of treatment (Table 2).</p> <p>Most studies reported that patients were considerably <b>compromised in terms of their overall OHRQoL until approximately 1 month after appliance</b> insertion. The severity of the compromised condition in terms of overall OHRQoL was greatest at 1 week with the reported impact on physical pain, psychological discomfort, and physical disability. <b>Patients’ OHRQoL was better after they completed orthodontic treatment than it was before or during treatment.</b> Only one study [17] reported worse OHRQoL compared with a control group with no malocclusion and not wearing a fixed appliance.</p> <p>In this systematic review, we included both short (3/11) and long-term follow-up (6/11) studies so as to assess changes during and after orthodontic treatment. From the <b>short-term</b> results, Man [13] found that changes in OHR-QoL occur after fixed orthodontic appliance therapy. Compared with pretreatment, a patient’s OHRQoL is frequently <b>worse during treatment</b> (oral symptoms, functional limitations), although it is better in some aspects (emotional well-being). The period of greatest change in OHRQoL occurs during the first month of treatment. Ling Aihua [19] and Eduardo [21] found similar results indicating that orthodontic treatment does affect patients' OHR-QoL, the impact being more serious in the first month of treatment. The <b>longitudinal data</b> [7,11,14-16,18] on pre and post-orthodontic treatment showed that both children and adult patients who received orthodontics had <b>significantly better oral health-related quality of life scores in the retention phase, after treatment completion, compared to non-treated subjects.</b> Zhijian [15] also found that the greatest deterioration in OHRQoL occurs in the early phase of treatment; the detrimental effects on OHRQoL are reduced with ongoing treatment. Daniela [14] found that fixed orthodontic treatment in Brazilian children resulted in significantly improved OHQoL after completing 2 years of orthodontic therapy.</p>
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<p><b>Angaben auffälliger positiver und/oder negativer Aspekte</b></p> <p>Studiendesign Durchführung Auswertung Funding <u>Interessenkonflikte</u> <u>Bias (SIGN, AMSTAR II, Einzelstudien)</u></p>	<p><i>Studiendesign: keine Registrierung a priori, Kontrollgruppe für das Review “pre-treatment”, Intervention weit gefasst (festsitzend, herausnehmbar, interzeptiv), Messmethodik nicht bestimmt, kein Studientyp gemäß PICOS definiert, keine RoB-Analyse</i></p> <p><i>Durchführung: Datenextraktion und Literatursichtung durch zwei unabhängige Rater, umfangreiche Literatursuche, keine Meta-Analyse aufgrund der Heterogenität der Methodiken der Einzelstudien, Evidenzniveau der Einzelstudien nach validierter Methodik erfasst, wenig Angaben der Einzelstudien bzgl. möglicher Störfaktoren</i></p> <p><i>Auswertung: tw Einzelstudien mit unbehandelter Kontrollgruppe, keine Angaben zur Art der KFO-Behandlung, keine Teilnehmer aus der frühen Wechselgebissphase, Studien zu short- und long-term, 4 verschiedene Messmethodiken zur Erfassung der Zielgröße, mögliche Störgrößen in der Diskussion benannt</i></p> <p><i>Power der Studie/Patientenzahl: 11/4855</i></p> <p><i>Funding: There is no support and funding source for conducting the review.</i></p> <p><i>Interessenkonflikte: The authors declare that they have no competing interests.</i></p> <p><i>Bias (SIGN/AMSTAR/EinzelstudienRoB – alle negativen Punkte aus Fragebogen auflisten):</i></p> <p><b>2. Did the report of the review contain an explicit statement that the review methods were established prior to the conduct of the review and did the report justify any significant deviations from the protocol?</b></p> <p><b>3. Did the review authors explain their selection of the study designs for inclusion in the re</b></p> <p><b>7. Did the review authors provide a list of excluded studies and justify the exclusions?</b></p> <p><b>9. Did the review authors use a satisfactory technique for assessing the risk of bias (RoB) in individual studies that were included in the review?</b></p> <p><b>10. Did the review authors report on the sources of funding for the studies included in the</b></p> <p><i>Publikationsbias (Reviews): -</i></p>
<p><b>Schlussfolgerung des Begutachters</b></p>	<p><u>methodische Qualität:</u> Review und Einzelstudien moderat</p> <p><u>Klinische Aussagekraft:</u> Eine kieferorthopädische Behandlung scheint die mundgesundheitsbezogene Lebensqualität der betroffenen Patienten zu beeinflussen: während zu Behandlungsbeginn ein negativer Effekt eintritt, überwiegt am Behandlungsende ein positiver Effekt. Allerdings sollten zukünftig die diversen Störfaktoren, beispielsweise Alter und soziales Umfeld, berücksichtigt werden.</p>
<p><b>Evidenzlevel (SIGN)</b></p>	<p><b>2+</b></p>
<p><b>Qualität (RoB, SIGN /AMSTAR II)</b></p>	<p><b>Moderat ⊕⊕</b></p>

## Evidenztabelle Zou et al. 2015



### Changes in anteroposterior position and inclination of the maxillary incisors after surgical-orthodontic treatment of skeletal class III malocclusions



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#### A B S T R A C T

**Purpose:** The purpose of this study was to evaluate and compare the anteroposterior (AP) position and inclination of the maxillary incisors in subjects with class I normal occlusion and a harmonious profile with patients with skeletal class III malocclusions, and to investigate the changes in maxillary incisor inclination and AP position after surgical-orthodontic treatment in class III patients.

**Material and methods:** Sixty-five subjects (35 female and 30 male; mean age:  $21.8 \pm 3.89$  years) with normal profiles and class I skeletal and dental patterns were selected as a control sample. Sixty-seven patients (38 female and 29 male; mean age:  $21.3 \pm 3.31$  years) with skeletal and dental class III malocclusions who sought surgical-orthodontic treatment were used as the study sample. Subjects were asked to smile and profile photographs were taken with the head in a natural position and the maxillary central incisors and the forehead in full view; cephalograms were taken and superimposed on the profile pictures according to the outline of the forehead and nose. Forehead inclination, maxillary incisor facial inclination and the AP position of the maxillary central incisor relative to the forehead (FAFFA) were measured on the integrated images and statistical analyses were performed.

**Results:** In both groups, there were no significant male/female differences in either the maxillary central incisor inclination or AP position. Female subjects had a significantly steeper forehead inclination compared with males ( $P < 0.001$ ) in both groups. After combined surgical-orthodontic treatment, the significant labial inclination ( $P < 0.001$ ) and posterior positioning ( $P < 0.001$ ) of the maxillary central incisors had been corrected to close to normal range ( $P > 0.05$ ). In the control group, 84.6% had the facial axial point (FA) of their maxillary central incisors positioned between lines through the forehead facial axis (FFA) point and the glabella. In the study group, however, 79.1% had the maxillary central incisors positioned posterior to the line through the FFA point and the difference with the control group was statistically significant ( $P < 0.001$ ). The position of the maxillary central incisors was strongly correlated with forehead inclination in the control sample ( $r^2 = 0.456$ ;  $P < 0.01$ ), but only a poor correlation was detected in the class III group ( $r^2 = 0.177$ ;  $P > 0.05$ ).

**Conclusion:** With the integrated radiograph-photograph method, the lateral cephalogram was re-oriented, which makes it possible to accurately measure the variables on profile photographs. The AP position and inclination of the maxillary central incisors relative to the forehead plays an important role in the esthetics of the profile during smiling and could be an important variable to be considered during diagnosis and treatment planning.

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<p><b>Population</b> Setting Komorbiditäten</p>	<p><b>Klasse-III-Anomalie</b></p> <ul style="list-style-type: none"> <li>• Peking University School and Hospital of Stomatology</li> <li>• from 2010 to 2013</li> </ul>
<p><b>Schweregrad</b></p>	<p>ANB angle &lt;0°</p>
<p><b>Einschlusskriterien</b> Bei Review: PICOS</p>	<p>ANB angle &lt;0°</p>
<p><b>Ausschlusskriterien</b></p>	<p>orthodontic treatment, missing (except for third molars) or malformed teeth</p>
<p><b>Intervention</b> Versuchsgruppe</p>	<p><b>kieferorthopädisch-kieferchirurgische Kombinationsbehandlung</b> VERSUCHSGRUPPE: <b>combined surgical-orthodontic treatment</b> N=67 (Anfang) / N=67 (Ende) / Alter = 21,3 ± 3,31 Jahre / ♂:♀ = 29:38</p> <ul style="list-style-type: none"> <li>• Gebissphase: permanentes Gebiss</li> <li>• KFO-Behandlung: Spätbehandlung</li> </ul>
<p><b>Kontrolle</b> Kontrollgruppe</p>	<p><b>keine kieferorthopädische Therapie</b> KONTROLLGRUPPE: <b>skeletal class I (0° &lt; ANB &lt; 4°) with minor dental crowding and a harmonious facial profile</b> N=65 (Anfang) / N=65 (Ende) / Alter = 21,8 ± 3,89 Jahre / ♂:♀ = 30:35</p> <ul style="list-style-type: none"> <li>• Gebissphase: permanentes Gebiss</li> <li>• KFO-Behandlung: keine Behandlung</li> </ul>
<p><b>Outcome</b></p>	<p><b>direkter oder schadenspräventiver medizinischer Nutzen bzw. Korrektur/Prävention der Anomalie/Malokklusion/Dysgnathie</b></p> <ul style="list-style-type: none"> <li>• <b>primäres kieferorthopäd. Behandlungsergebnis (skelettal/dentoalveolär)</b></li> <li>• <b>dentofaziale Ästhetik</b></li> </ul> <p>PRIMÄRZIELGRÖßE: <i>Forehead inclination, maxillary incisor facial inclination and the AP position of the maxillary central incisor relative to the forehead (FAFFA)</i></p>
<p><b>Studientyp</b></p>	<p><b>Beobachtungsstudie (Kohorten- oder Fall-Kontroll-Studie)</b></p>
<p><b>Schlussfolgerungen der Autoren</b></p>	<p>With the integrated radiograph-photograph method, the lateral cephalogram was reoriented, which makes it possible to accurately measure the variables on profile photographs. The AP position and inclination of the maxillary central incisors relative to the forehead plays an important role in the esthetics of the profile during smiling and could be an important variable to be considered during diagnosis and treatment planning. After combined surgical-orthodontic treatment, the class III patients show relatively normal AP maxillary incisor positions and inclination compared with the control subjects.</p>

<b>Zusammenfassung der Ergebnisse</b>	<b>GRUPPE Intervention VS. GRUPPE Kontrolle</b> <b>PRIMÄRZIELGRÖßE</b> After combined surgical-orthodontic treatment, the skeletal class III patients had significantly decreased maxillary incisor inclination ( $P < 0.01$ ) and anteriorly positioned upper incisors ( $P < 0.001$ ), which became similar to those of the control subjects ( $P > 0.05$ ). After surgical-orthodontic treatment, the position of the FA tended to be significantly further forward ( $P < 0.001$ ) and had no significant difference from that of the control group ( $P > 0.05$ ).
<b>Angaben auffälliger positiver und/oder negativer Aspekte</b>	<ul style="list-style-type: none"> <li>• <i>Error analysis performed (Bland-Altman, Dahlberg) interobserver, intraobserver</i></li> </ul> <i>Power der Studie/Patientenzahl: N= 67 / 65 (Intervention/Kontrolle)</i> <i>Funding: None.</i> <i>Interessenkonflikte: None declared.</i>
<b>Schlussfolgerung des Begutachters</b>	<u>methodische Qualität:</u> akzeptabel
	<u>Klinische Aussagekraft:</u> gut
<b>Evidenzlevel (SIGN)</b>	<b>2+</b>
<b>Qualität (RoB, SIGN /AMSTAR II)</b>	<b>Akzeptabel ⊕</b>