

# orthodontics

## ALERT™

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## The Impact of Dental Esthetics on Quality of Life

**P**atients tend to seek out orthodontic care based on concerns about appearance. However, professionals base the need for care on objective criteria. This approach does not integrate possible changes in quality of life (QOL) and psychosocial issues related to the improvement in appearance. de Paula et al from the Federal University of Goias, Brazil, looked at the effects of malocclusion on QOL and self-image in assessing the psychosocial influence of dental esthetics on a group of adolescents.

A total of 301 students from a public school in Brazil were recruited into the study. The Dental Aesthetic Index (DAI) was used to judge malocclusion and whether treatment was required. Students filled out an abbreviated form of the Oral Health Impact Profile (OHIP), the Psychosocial Impact of Dental Aesthetics Questionnaire (PIDAQ) and the Body Satisfaction Scale (BSS). The OHIP measures the impact of oral problems (pain, discomfort, disability) in the last 6 months, while the PIDAQ assesses orthodontic-related QOL. The BSS assesses individual dissatisfaction with 16 body parts.

Based on the DAI, most students did not need treatment or required only minor treatment. However, 88% of students perceived some oral impact on QOL, and 98.3% reported psychosocial impact of dental esthetics. The DAI, OHIP and BSS scores were all correlated with the total PIDAQ score. Dental self-confidence, social impact, psychological impact and esthetic concern were all significantly related to the total PIDAQ score.

With these results, the authors demonstrated that the severity of malocclusion, oral-related QOL and body image all reflect how dental esthetics impact adolescents. These measures can therefore provide a good indication of treatment need. Clinicians should not ignore the perceived effect of malocclusion on their patients and should discuss patients' feelings about their need for treatment.

*de Paula DF Jr, Santos NCM, da Silva ÉT, et al. Psychosocial impact of dental esthetics on quality of life in adolescents. Angle Orthod 2009;79:1188-1193.*

## Treatment of Class II Malocclusions with Functional Jaw Orthopedics

The Class II Division 1 malocclusion is relatively common. Two basic treatment modalities currently exist: headgear and a fixed appliance, and functional jaw orthopedics followed by fixed appliances. Headgear has been noted in previous studies to restrict maxillary growth, while functional jaw orthopedics has been found to enhance mandibular growth. However, these studies did not examine the long-term outcomes, did not investigate the possible role of fixed appliances as adjuncts or did not perform the treatment at a prepubertal age, so that growth would occur during treatment. Baccetti et al from the University of Florence, Italy, undertook a prospective study to compare these 2 treatments in a prepubertal population.

A total of 56 children were included in this study, receiving 1 of the 2 treatment protocols, depending on the location of care. All were treated at the time of peak velocity in craniofacial growth, as determined by the cervical vertebral maturation method (CS3 and CS4). None received extractions. Patients receiving the headgear wore it 14 hours/day with fixed appliance therapy, followed by Class II elastics. Patients receiving the functional jaw orthopedics wore a

bonded Herbst appliance throughout the day and night. Three months after the mandible could no longer be manipulated posteriorly, the patient was allowed to wear the appliance part-time. Fixed appliance therapy was then started. No elastics were used in this group. Lateral cephalograms were obtained at 2 time points, at the start of therapy (T1) and 6 months after completion of the fixed appliance stage (T2). During those 6 months, retainers were worn nightly. All patients were either CS5 or CS6 at T2, demonstrating that a large majority of facial growth had occurred. For comparison, a matched historical cohort that had not received treatment for their Class II malocclusion was observed.

Both treatment groups had a success rate of 92.8%, reaching full correction of the malocclusion. The functional jaw orthopedics group demonstrated significantly greater mandibular protrusion, which was evident as a significant improvement in sagittal maxilomandibular relationships, as well as greater forward movements of the soft-tissue B-point and pogonion (Table 1). The headgear group had a tendency for greater retrusion of the maxillary incisors, and mesial and vertical movement of the mandibular molars. Both treatment groups had significantly greater mandibular protrusion than did the no-treatment group, and both

Table 1. Differences in treatment changes

Measurement	HG group (± SD)	Herbst group (± SD)	Significance
SNA (°)	-0.3 ± 2.9	-0.4 ± 1.3	NS
SNB (°)	0.4 ± 2.0	1.4 ± 1.2	*
Chin protrusion to vertical (mm)	1.2 ± 3.2	2.7 ± 2.9	*
Mandibular length (mm)	5.1 ± 2.3	5.2 ± 2.1	NS
ANB (°)	-0.7 ± 1.8	-1.9 ± 1.1	*
Wits (mm)	-0.9 ± 4.5	-2.6 ± 1.3	*
Overjet (mm)	-3.1 ± 1.4	-3.6 ± 1.5	NS
Overbite (mm)	-3.4 ± 1.6	-2.0 ± 1.5	*
Upper incisor horizontal position (mm)	-0.7 ± 2.5	-0.2 ± 1.6	NS
Soft-tissue A-point to vertical (mm)	-0.7 ± 1.4	-0.4 ± 0.9	NS
Soft-tissue B-point to vertical (mm)	0.7 ± 2.5	2.1 ± 2.6	*
Soft-tissue chin to vertical (mm)	1.1 ± 2.9	2.9 ± 3.8	*

\*p < .05. NS, not significant.

treatment protocols demonstrated successful resolution of the initial malocclusion. The headgear protocol was more successful at changing the dentoalveolar profile, while the functional jaw orthopedics protocol was more successful at making mandibular changes.

This study demonstrates that both treatment protocols are successful at Class II correction, and although they have slightly different effects, the differences are probably not clinically significant. Clinicians should feel comfortable with either treatment.

*Baccetti T, Franchi L, Stahl F. Comparison of 2 comprehensive Class II treatment protocols including the bonded Herbst and headgear appliances: a double-blind study of consecutively treated patients at puberty. Am J Orthod Dentofacial Orthop 2009;135:698.e1-698.e10.*

## Long-term Stability of Different Treatment Protocols for Class II Malocclusion

The extraction of 2 premolars is thought to be more successful than the extraction of 4 premolars in treating Class II malocclusions. However, no study has yet examined the long-term stability of either of these treatment protocols. Janson et al from the University of São Paulo, Brazil, performed a retrospective study comparing the long-term stability of 2-premolar vs 4-premolar extraction for the treatment of Class II malocclusions.

Fifty-seven records were obtained from the orthodontics department at the University of São Paulo. Each record described a patient with a Class II malocclusion, with initial and posttreatment records and models. Thirty patients had 2 maxillary premolars extracted, while 27 patients had 4 premolars extracted; all received edge-wise appliances consisting of brackets as well as cervical headgear to complete their treatment. When necessary, Class II elastics were also used. An upper Hawley retainer was used for an average of 1 year, and a lower retainer was recommended for an average of 3 years.

All patients had dental models made before treatment (T1), after treatment (T2) and at postretention (T3),

**Table 2. Changes in cephalometric measurements after treatment**

Measurement	2-premolar group ( $\pm$ SD)	4-premolar group ( $\pm$ SD)	p value
SNA ( $^{\circ}$ )	1.90 $\pm$ 1.84	0.39 $\pm$ 1.80	.002*
SNB ( $^{\circ}$ )	0.82 $\pm$ 1.47	0.31 $\pm$ 1.55	.215
ANB ( $^{\circ}$ )	1.08 $\pm$ 1.76	0.06 $\pm$ 1.55	.025*
Wits (mm)	0.77 $\pm$ 2.57	0.49 $\pm$ 2.96	.706
Overjet (mm)	0.55 $\pm$ 1.19	0.94 $\pm$ 1.31	.244
Overbite (mm)	1.04 $\pm$ 1.26	0.79 $\pm$ 1.28	.459
Molar relation (mm)	0.11 $\pm$ 0.61	0.61 $\pm$ 0.78	.038*
Canine relation (mm)	1.23 $\pm$ 1.51	1.58 $\pm$ 1.91	.447

\*Statistically significant at  $p < .05$ .

which occurred on average 9.25 years after treatment had been completed. A variety of cephalometric measurements were made for each patient at each time point, and statistical tests were performed on this data to compare posttreatment changes between the 2 groups. The treatment priority index (TPI) was also calculated on the T1 and T2 models of each patient; this provided a way of describing overjet, overbite or open bite, tooth displacement, posterior crossbite and a compilation score describing the severity of the deformity. The TPI value calculated at T1 describes the initial malocclusion, while the value calculated at T2 describes the posttreatment state and is an indicator of the success of treatment.

The patients in both groups demonstrated similar post-treatment occlusions (Table 2). The patients in the 2-premolar extraction group had a significantly greater maxillary forward displacement and greater increase in the apical-base relationship than did the patients in the 4-premolar extraction group. The patients in the 4-extraction group had a greater relapse in their molar relationship toward Class II. However, these differences were not judged to be clinically significant.

From these results, the authors concluded that 2-maxillary-premolar extractions and 4-premolar extractions provide similar long-term effects on the Class II malocclusion. Clinicians can feel confident that their patients can achieve a stable result no matter which treatment is used.

*Janson G, Leon-Salazar V, Leon-Salazar R, et al. Long-term stability of Class II malocclusion treated with 2- and 4-premolar extraction protocols. Am J Orthod Dentofacial Orthop 2009;136:154.e1-154.e10.*

## Long-term Retention of Class III Malocclusion Treatment

The treatment of Class III malocclusions is complicated by the possibility of relapse after the completion of treatment. Few articles have studied the long-term posttreatment changes after Class III therapy is finished, and fewer have examined the effects in a postpubertal population. One mode of treatment is the mandibular cervical headgear, followed by fixed appliance administration. Baccetti et al from the University of Florence, Italy, evaluated the outcomes of mandibular cervical headgear followed by fixed appliance therapy 5 years after the completion of treatment.

Twenty patients with a Class III malocclusion were treated first by the mandibular cervical headgear, then by fixed appliances. Patients were instructed to wear the headgear for 14 hours each day. Approximately 1.5 years later, the headgear was continued, and fixed appliances were started in the maxillary arch. One year after that, fixed appliances were begun in the mandibular arch. Retainers were used after the removal of the fixed appliances. Lateral films were taken 2 years after the end of treatment (T1) and 5 years after the end of treatment (T2). It was determined that all patients were CS4 to CS6 at T1 and CS6 at T2, demonstrating the completion of pubertal growth. A matched control group of 18 untreated patients, with Class III malocclusions and lateral cephalographs at the same time points, was used for comparison.

At both T1 and T2, those in the treatment group had significantly smaller values for the mandibular length, SNB angle, maxillomandibular differential and molar retention. The treatment group also had significantly larger values for the ANB angle, Wits appraisal and overjet. Additionally, members of the treatment group also had smaller values for the distance from the pogonion to the nasion perpendicular and significantly greater values for the MPA at T2. No changes from T1 to T2 were found, demonstrating a lack of relapse.

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**In the next issue:**  
Long-term effects of maxillary expansion

This study successfully demonstrated that mandibular cervical headgear-induced changes are stable in the long term. Clinicians should not ignore this potential alternative to mandibular surgery for Class III patients.

*Baccetti T, Rey D, Oberti G, et al. Long-term outcomes of Class III treatment with mandibular cervical headgear followed by fixed appliances. Angle Orthod 2009;79:828-834.*

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## Using Photographs to Identify Class III Malocclusion

Technologic advancement has led to the possibility of using video images and photographs instead of radiographic films, thus reducing unnecessary radiation exposure. Staudt and Kiliaridis from the University of Geneva, Switzerland, investigated the validity of photographs to assess Class III malocclusions.

The study included 29 men with Class III deformities and 13 men with Class I malocclusions to serve as examples of normal profiles. Profile photographs and lateral cephalograms were evaluated. Soft-tissue structures from the photographs and the cephalograms were compared with hard-tissue measurements on the films.

Soft-tissue A'N'B', A'N'Pog' and N'A/A'Pog' were highly related to hard-tissue ANB, ANPog and NA/APog, respectively. Vertically, soft- and hard-tissue lower anterior facial heights were also correlated. However, the soft-tissue variables were not able to distinguish between the maxillary or mandibular contributions to the deformity or the overall vertical pattern of the malocclusion. Most important, a soft-tissue A'N'B' angle of 6° was found to be the value below which a Class III deformity is highly suggested, with a sensitivity of 90.5% and specificity of 81.0%; this value was confirmed among a similar cohort of female patients.

This study found that certain parameters that diagnose a Class III malocclusion can be found on profile photographs. The finding of the 6° cutoff for Class III malocclusion allows the orthodontist to suggest with some certainty that a Class III deformity is present without subjecting the patient to unnecessary radiation.

*Staudt CB, Kiliaridis S. A nonradiographic approach to detect Class III skeletal discrepancies. Am J Orthod Dentofacial Orthop 2009;136:52-58.*