DAFTAR ISI

1. The accuracy of bracket slot height of different orthodontic bracket products (Research)  
   Darmuslim, Erwin Siregar, Retno Widayati ................................................................. 1-6

2. The effect of stretching time and force degradation from various elastomeric chain products (Research)  
   Ahmad Syaukani, Erwin Siregar, Miesje Karmiati Purwanegara ........................................ 7-10

3. The difference between tongue dimension and anteroposterior skeletal relation viewed through lateral cephalometric radiography (Research)  
   Hilda Fitria Lubis, F. Susanto A ................................................................................. 11-13

4. The agreement between Dental Aesthetic Index (DAI) and Indikator Kebutuhan Perawatan Ortodonti (IKPO) in the assessment of orthodontic treatment need among 2-20 years-old adolescence at RSQMP-FKG UI (Research)  
   Olivia Pribadi, Faruk Hoesin, Nia Ayu Ismaniati ............................................................ 14-18

5. The correlation of interincisal angle changes and the ratio of upper and lower anterior face height in class II division 1 malocclusion treated with Begg technique (Research)  
   Indra Sari, Pinandi Sri Pudyan, Sri Suwarwiti ................................................................. 19-22

6. The comparative study of shear bond strength between new and recycled ceramic bracket coated with silane (Research)  
   Agnes Sukandar, Erwin Siregar, Nada Ismah ..................................................................... 23-28

7. Relationship between cervical vertebrae maturation and dental calcification in orthodontic’s patients at RSQMP FKG USU  
   Siti Bahirrah, Nurhayati Harahap, Muslim ........................................................................ 29-32

8. Orthodontic camouflage treatment of skeletal class III malocclusion (Case Report)  
   Arya Brahmanta, Pambudi Rahardjo .................................................................................. 33-37

9. En-Masse retraction of upper and lower anterior teeth on bimaxillary dental protrusion case (Case Report)  
   Liza Novianty, Retno Widayati .......................................................................................... 38-43

10. Orthodontic treatment of skeletal class II on growing patient by premolar extraction and cervical headgear (Case Report)  
    Irwanda Mulyaningsih, Achmad Sjafei .............................................................................. 44-48

11. Treatment of skeletal class II division 1 malocclusion using lip bumper (Case Report)  
    Fridolin Widia, Muslim Yusuf ............................................................................................ 49-53

12. Treatment of class II division 2 malocclusion with gingival recession (Case Report)  
    Malayati, Nurhayati Harahap ............................................................................................ 54-58
13. Treatment of class i malocclusion with extreme anterior open bite in adult (Case Report)  
   Tita Ratya Utari ........................................................................................................ 59-62

14. A camouflage treatment of narrow maxillary and excessive mandible arch on skeletal class III malocclusion (Case Report)  
   Mariani Bahar, Jusuf Sjamsudin ........................................................................... 63-67

15. Treatment of skeletal class II malocclusion using an activator appliance followed by the Begg technique (case report)  
   Wetit Maglayena Santiaji, Pinandi Sri Pudyani ..................................................... 68-72

16. Mandibular dental arch form differences between fourth degree polynomial and pentamorphic arch form in normal occlusion sample at FKG UNPAD  
   Yuliana, Bergman Thahar, Jono Salim, Endah Mardiati ........................................ 73-78

17. The comparison of bicarbonate concentration in saliva patient before and after wearing fixed orthodontic appliance (Research)  
   Ira Kusuma Dewi, Pambudi Rahardjo, Jusuf Sjamsudin ....................................... 79-81
ORTHODONTIC CAMOUFLAGE TREATMENT OF SKELETAL CLASS III MALOCCLUSION (Case Report)

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ABSTRACT

Background: Class III malocclusion can be defined as a skeletal facial deformity characterized by a forward mandibular position with respect to the cranial base and or the maxilla. There are three main treatment options for skeletal class III malocclusion: growth modification, orthodontic camouflage and orthognathic surgery. Purpose: This article presented a case of an adult patient with skeletal class III malocclusion treated with orthodontic camouflage treatment. Case: A female patient, 21 year old with concave facial profile complaining for the difficulty of occlusion due to anterior crossbite and openbite. Case Management: Extraction of the poor conditioned mandibular first molars to gain space for anterior segment retraction, placement of lingual arch bar to prevent anchorage loss and class III intermaxillary elastics for dentoalveolar compensation by procuring maxillary incisor and retroclining mandibular incisors (orthodontic camouflage). Conclusion: The results of this treatment indicated that orthodontic camouflage can be considered an effective therapy for correction of skeletal class III malocclusion.

Key words: class III malocclusion, orthodontic camouflage, tooth extraction, intermaxillary elastic.

INTRODUCTION

Class III malocclusion, using the Angle classification system, are characterized by a mesial position of the mandibulardental arch and malposition of the incisors with an anterior crossbite.1,2 Class III malocclusion can be classified into 2 types: pseudo class III and true Class III malocclusion. According to Gianelly, pseudo Class III involves anterior crossbite in maximum intercuspatation but in centric relation there is Class I malocclusion. Pseudo class III may be caused by interferences with mandibular closure, displacing it anteriorly. This problem is solved after removal of the interference. The true class III involves a skeletal class III pattern in centric relation.3 As mentioned by Bench, the true class III malocclusion shows a genetic trend toward extreme upward and backward condylar growth, anterior crossbite, open bite and dolicho facial pattern.4

The true class III malocclusion may also be called skeletal due to the involvement of skeletal structure, caused by maxillary retrusion, mandibular protrusion or a combination of both. The skeletal class III malocclusion is characterized by mandibular prognathism, maxillary deficiency or both. Clinically these patients exhibit a concave facial profile, a retrusive nasomaxillary area and a prominent lower third face. The lower lip is often protruded relative to the upper lip.5

Mandibular prognathism is an anomaly of development, especially of a hereditary nature, but in which such diverse factors as endocrine, occlusal, parafunctional or habits sometime intervene.1

The frequency of class III malocclusion varies from author to author and with the population studied. In majority of published studies, this appears to be less frequent type of malocclusion, with prevalence under 10%.1 Class III malocclusion is far more prevalent in Asia than in the west.2 The incidence of class III malocclusion is 2.3 – 13% among Japanese, 9.4 – 19% among Koreans and 12.8% among Chinese. In contrast, the prevalence of class III malocclusion in the United States is only about 1% of the total population and only 5% of orthodontic patients.6

The choice of treatment for skeletal class III malocclusion depends on the diagnosis, facial pattern, age, patient compliance and the severity of the malocclusion.7 There are three main treatment options for skeletal class III malocclusion: growth modification, dentoalveolar compensation (orthodontic camouflage) and orthognathic surgery. Growth modification should be commenced before the pubertal growth spurt, after this spurt only the latter two options are possible.8

Regarding the orthodontic treatment in patients at the completion of growth, the camouflage of the class III malocclusion have been presented. Sato, in 1994 proposed the Multi loop edgewise arch wire in order to reconstruct the occlusal plane. Another form of camouflage is the use of class III elastic

...
(intermaxillary), thus allowing a compensation by lingualization of the lower incisors and labialization of the upper incisors. In more severe cases certain extraction are necessary as a camouflage method. Camouflage is a therapeutic process that most of the time, through extraction and orthodontic treatment, masks the skeletal discrepancies instead of correcting them. Therefore a dentoalveolar compensation is made without correcting the basal dysplasia.

Surgical correction of class III malocclusion can be achieved by mandibular setback, maxillary advancement, or a combination of both procedures. The main skeletal changes after surgery were setback of the mandibular dentoalveolus and the uprighting of the lower incisors, whereas the skeletal base of both jaws did not show any significant changes. The setback of the dental alveolus in the mandibular anterior region contributed to the decreased ANB angle.

Skeletal class III malocclusion case is often complicated and difficult to treat. Cases or chapters related to skeletal class III malocclusion are often less discussed in orthodontic textbooks and diagnosed to treat surgically. Moreover multidisciplinary treatment approaches are avoided by patients.

The purpose of this article is to deliver a case of an adult patient with skeletal class III malocclusion, treated with extraction and intermaxillary elastic (orthodontic camouflage).

CASE REPORT

A patient a 21 year old woman, presented a skeletal class III malocclusion with anterior open bite came to the orthodontic specialist clinic Airlangga university dental hospital. She complaining about the difficulty of occlusion due to anterior crossbite and openbite . Her facial profile was concave with a protrusive lower lip and no facial asymmetry (Figure 1 a,b,c). Over jet -4 mm and over bite - 2 mm (Figure 1 e). Occlusal contact recognized as Angle class III malocclusion (Figure 1 d,f). The upper maxillary left and right first molar, lower mandibular left first molar were in the poorer condition and mandibular right molar were missing (Figure 1 d,f).

Cephalometric analysis showed a skeletal class III jaw base relationship SNA 82°; SNB 84° (prognathic mandible); ANB - 2° (class III). The facial profile was concave FH-NP 84°; NAP -6°. The upper and lower incisor were labially inclined 1-NF line 10 mm; I-NA angle 25°; I-NB line 11 mm; 1-NB angle 29°; Interincisal angle 119°. The mandibular plane angle 41° and the gonial angle was large 140°.

CASE MANAGEMENT

A patient diagnosed with Angle Class III malocclusion with anterior open bite and skeletal class III jaw base relationship.

The treatment objectives were extraction of the left mandibular first molar 36 and the bilateral maxillary first molar 16,26 because it is in poorer condition. Placement of pre - adjusted bracket (Roth) with 0.018 inch slot on upper and lower arch, followed by placement of lingual arch as an anchorage. Correction of the mandibular incisor by retraction use elastik class III. Retention using hawley retainer in both jaws.

**Figure 1.1** Facial photographs (a) front side, (b) front side smile, (c) left side, Intra oral photographs right side (d), front side (e), left side (f)

Before starting orthodontic treatment, the patient received periodontal treatment. Periodontal treatment involved oral hygiene instruction and scaling. The upper left first incisor was refered to endodontist because of poor condition caries. Bilateral mandibular lower first molar were extracted to gain space for retraction.

Firstly levelling with 0.012 inch round NiTi archwire was initiated. After leveling with a 0.016 inch NiTi arch wire, the lingual arch inserted onto the mandibular lower arch as an anchorage (Figure 2 a,b). After leveling with 0.016 inch NiTi arch wire in lower arch, retraction of the mandibular second premolar with closed coil spring, after that retraction first premolar
and retraction mandibular canines with closed coil spring. Mandibular anterior teeth retraction was started by vertical loop mechanic. A class III intermaxillary elastic was applied from the upper molar region to the mandibular anterior region for retraction with sliding mechanic (Figure 3 a, b, c).

Figure 1.2. Panoramic and cephalometric before treatment

Figure 2. Intraoral photographs (a) levelling, (b) lingual arch placement

Figure 3. Intermaxillary class III Elastic (a) right side, (b) front side, (c) left side

Treatment progress showed that upper and lower canine relation ship becomes Angle class I classification and anterior cross bite – open bite corrected.

Figure 4. Treatment progress (a) right side, (b) front side, (c) left side

The results of this treatment showed space in the upper and lower dentition were closed. The lower incisor lingually inclined and severe anterior crossbite were corrected. Acceptable occlusion achieved and the overjet and overbite come to normal. The caninus relation were Class I on the both sides (Figure 5 a, b, c). Facial photographs showed overall facial balance was improved. The lips becomes less tension on closure (Figure 5 d,e,f).

No signs or symptoms of temporomandibular dysfunction after treatment.

Figure 5. Facial photographs (a) front side, (b) front side-smile, (c) left side, Intra oral photographs right side (d), front side (e), left side (f)
Cephalometric superimposing analysis showed a normal SNA 85°, SNB 84°; ANB 1°. The facial profile was becoming straight FH-NP 83°; NAP 1°. The upper and lower incisor have been corrected I-NA line 9 mm; 30°; I-NB line 11 mm; 16°; Inter-incisal 134°. Comparing the superimposing: pretreatment and posttreatment cephalometric tracings showed maxillary and mandibular incisor crown had moved posteriorly (Figure 6).

![Figure 6.1. Cephalometric superimposing](image1)

![Figure 6.2. Panoramic and cephalometric after treatment](image2)

### Table 1. Cephalometric superimposing analysis

<table>
<thead>
<tr>
<th>Cephalometric</th>
<th>Superimposing</th>
<th>Pre</th>
<th>Post</th>
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<tbody>
<tr>
<td>Skeletal</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>1. &lt;FH-NP</td>
<td>84</td>
<td>83</td>
<td></td>
</tr>
<tr>
<td>2. &lt;N - AP</td>
<td>-6</td>
<td>1</td>
<td></td>
</tr>
<tr>
<td>3. &lt;S NA</td>
<td>82</td>
<td>85</td>
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</tr>
<tr>
<td>4. &lt;S NB</td>
<td>84</td>
<td>84</td>
<td></td>
</tr>
<tr>
<td>5. &lt; ANB</td>
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<td>1</td>
<td></td>
</tr>
<tr>
<td>DENTAL</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>1. &lt;1-NA</td>
<td>25</td>
<td>30</td>
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</tr>
<tr>
<td>2. &lt;1-NB</td>
<td>29</td>
<td>16</td>
<td></td>
</tr>
<tr>
<td>3. Inter-incisal</td>
<td>119</td>
<td>134</td>
<td></td>
</tr>
<tr>
<td>4. I-NA line (mm)</td>
<td>10</td>
<td>9</td>
<td></td>
</tr>
<tr>
<td>5. I-NB line (mm)</td>
<td>11</td>
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During retention with Hawley retainer acceptable occlusion and facial profile also maintained, indicating a stability of the occlusion (Figure 7).

![Figure 7. Retention phase with Hawley retainer](image3)

**DISCUSSION AND CONCLUSION**

Most of skeletal class III malocclusion cases are planned to be treated surgically and still considered high risk procedures, require of skilful operator and team work hence often being avoided either by orthodontists or patients. Therefore non surgical treatment or camouflage considered the most favorable choice. Extraction of lower posterior teeth followed by anterior retraction of lower anterior teeth combined with class III intermaxillary elastic would be the best treatment plan for skeletal class III malocclusion.

It is commonly believed that successful camouflage treatment for class III malocclusion can be achieved by proclination of maxillary incisors, retrusion of mandibular incisors, and downward and backward rotation of mandible. Thus, the retraction of the lower incisors and rotation of the mandible were crucial for crossbite correction. The bodily movement of the roots was important in preventing over retroclination of the lower incisors. In order to do that, lingual root torque should be applied to the lower incisors during treatment.

According to Chipman, extraction of posterior lower teeth is indicated in order to facilitate the distal movement of the anterior teeth. For this case we choose to extract the first molar lower arch because there are in the poor condition, very decayed. By extract the first molar, we can get enough space for anterior retraction due to correction anterior cross bite.

In class III malocclusion maxillary anterior teeth are protrusive and facially inclined and the maxillary dental arch takes a V shape in the anterior aspect. If there was a missing teeth or ectopic canines and palatal eruption of lateral incisors, could cause maxillary deficiency and crowding of the teeth. The mandibular anterior teeth may be upright in relation to the basal supporting bone of the mandible, or they may be
inclined linguually. In generally, this malocclusion showed a reversed horizontal overlap in incisor area.  

Orthodontic camouflage is built around the idea of displacing the teeth relative to the jaws to compensate for a jaw discrepancy. The goals of camouflage are to obtain satisfactory dental and facial esthetics. The method was developed as extraction treatment, followed by orthodontic treatment. Patients with severe crowding would not be a good candidate for camouflage treatment. Because in a patients with severe crowding, the extraction spaces will be required to achieve proper alignment of the incisors. So that the extraction spaces wouldn’t be available for controlled anteroposterior displacement.  

The strategy to camouflage a Class III malocclusion usually involves proclination of the maxillary incisors and retroclination of the mandibular incisors to improve the dental occlusion. The use of Class III elastics provided forward movement of the maxillary molars, decreasing the incisors proclination. Class III intermaxillary elastic also contributed to the correction of the overbite. This can be explained by the use of Class III elastics, there was counterclockwise rotation of the occlusal plane. Lin and Gu reported similar results and found that the relative extrusion of the mandibular incisors in relation to the maxillary molars during Class III traction of elastics seemed to contribute to the counterclockwise rotation of the occlusal plane. An increase in the interincisal angle usually means less proclination of the incisors.  

At the end of treatment, the teeth were aligned, with better interdigitation and class I canine relationship was obtained. The retraction of the mandibular occurred without loss anchorage in the posterior segment because the use of lingual arch bar. The patient main complaint about the difficulty of occlusion due to anterior crossbite, openbite and the facial profile was improved by the treatment from a concave to a straight.  

It is concluded that orthodontic camouflage can be considered as an effective therapy choice for correction skeletal class III malocclusion.

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