CASE REPORT

Non-extraction Treatment of Class II Skeletal Malocclusion Accompanied by Protrusion Maxillary Incisors and Central Diastema

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ABSTRACT

Protruding maxillary incisors and central diastema are common aesthetic concerns. A 12-year-old and 10-month-old girl visited the orthodontic clinic at Universitas Padjadjaran Hospital, complaining of protruding maxillary incisors, which made her feel embarrassed. The diagnosis from the case report is skeletal class 2 malocclusion (ANB angle + 5°) accompanied by large overjet (9 mm), deep overbite, central diastema, mild crowding, deep spee curve, mandibular retrognathism, maxillary incisor protrusion, and proclination. A non-extraction treatment plan was formulated using a Roth prescription straight wire appliance with 0.022-inch slots. The treatment involved the use of elastic chains and arch retraction for maintenance. The orthodontic protrusion of the maxillary incisors and the central diastema were successfully corrected, much to the patient's satisfaction.
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INTRODUCTION

Mandibular retrognatia is often found in class II skeletal malocclusion cases in adolescents (1). Proclination of the upper incisor teeth and a large overjet are commonly observed in the majority of these malocclusion cases. Protruding maxillary incisors and central diastema are common aesthetic concerns.

The management of treatment itself depends on the patient's age and the severity of the accompanying dental malocclusion. Several treatment options are available for correcting skeletal Class II malocclusion, depending on the growth of the skeletal jaws and the severity of the base discrepancy in the anteroposterior and vertical directions. Fixed appliances are often the preferred choice for camouflage, particularly in patients in the early permanent dentition stage (2). In this case report, fixed appliances were used in conjunction with Class II elastics (rubber bands). The aim and objective of this case report are to demonstrate that elastics can affect orthopedic changes when used during the growth period.

CASE REPORT

A 12-year-old and 10-month-old girl visited the orthodontic clinic at Universitas Padjadjaran Hospital, expressing concerns about her protruding maxillary incisors, which caused her embarrassment. The etiology of this case is genetic for the skeleton and the presence of a high anterior labial frenulum, causing central diastema. The patient wants his teeth straightened and wishes not to have the tooth extracted.

The extraoral examination revealed a symmetrical face, potentially competent lips, and a convex facial profile. The intraoral examination showed Class I molar relationships and Class II canines on both sides. The maxillary and mandibular arches displayed slight crowding (Fig. 1). Handwrist radiographs showed the patient's growth almost complete (Handwrist Indicator 9-10) (Fig 2). Cephalometric analysis indicated a Class II malocclusion (ANB angle + 5°), mandibular retrognathism, maxillary incisor protrusion, and

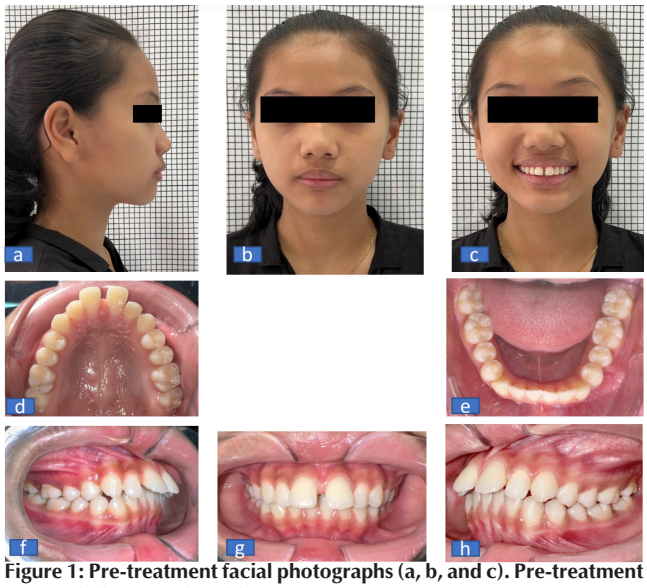


Figure 1: Pre-treatment facial photographs (a, b, and c). Pre-treatment intraoral photographs (d-h).

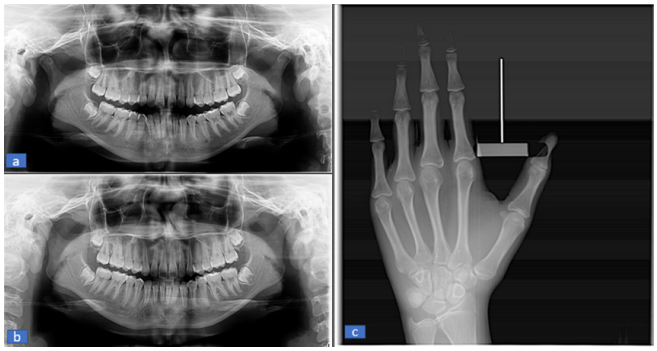
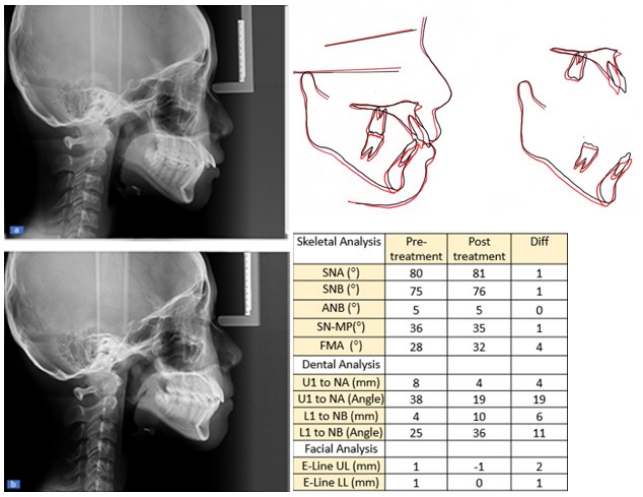


Figure 2: (a) Pre-treatment orthopantomography (b) After treatment orthopantomography (c) Radigraphy Handwrist.

proclination (Fig. 3). The patient was diagnosed with skeletal Class II malocclusion, characterized by a large overjet, deep overbite, central diastema, mild crowding, deep spee curve, mandibular retrognathism, maxillary incisor protrusion, and proclination. The patient consented to the treatment and to the publication of this case report with informed consent.

The treatment plan included non-extraction orthodontic treatment using a straight wire appliance with metal brackets, Unitex 3M 0.022-inch slots (Roth Prescription), and a comprehensive plan comprising several stages. The treatment started using 0,014 inches of NiTi in both arches, which was followed by 0.016 inches of NiTi, and then 0,018 inches of NiTi for the upper jaw and a 0.018-inch reverse curve of spee for the lower jaw to correct the deep curve; 0.016 x 0.022 NiTi and 0.016 x 0.22 stainless steel. Closing the maxillary central diastema involved using a power chain on stainless steel 0.016 x 0.022 inches for the upper jaw. Don't forget to figure eight after the central diastema is corrected to maintain it. Following the closure of the diastema, anterior retraction was carried out using Class II elastic. Class II elastics (Dentaurum, 128g 3/16 inch) are used by patients for approximately 3 months.



Skeletal Analysis	Pre-treatment	Post treatment	Diff
SNA (°)	80	81	1
SNB (°)	75	76	1
ANB (°)	5	5	0
SN-MP(°)	36	35	1
FMA (°)	28	32	4
Dental Analysis			
U1 to NA (mm)	8	4	4
U1 to NA (Angle)	38	19	19
L1 to NB (mm)	4	10	6
L1 to NB (Angle)	25	36	11
Facial Analysis			
E-Line UL (mm)	1	-1	2
E-Line LL (mm)	1	0	1

Figure. 3: (a) Pre-treatment lateral cephalogram (b) After treatment lateral cephalogram. Pre-treatment (black) and after-treatment (red) cephalometric tracings superimposed on the anterior cranial base (left) show normal growth, and a improved facial profile. All upper teeth are retracted as shown by maxillary superimposition. Superimposition of the mandible shows that flattening of the curve of Spee is accomplished by intrusion and proclination of the anterior teeth (top right). Cephalometric analysis (button right).

RESULT

Cephalometrically, the upper incisors' angle and distance to the NA line decreased, while the lower incisor position increased. The orthodontic protrusion of the maxillary incisors and the central diastema was corrected, achieving a normal overjet, normal overbite, and good interdigitation. The overjet reduction was predominantly due to the favourable proclination of the lower incisors in this patient (Fig. 3). The patient achieved a balanced profile with an aesthetic and pleasing smile (Fig. 4). A frenectomy is performed before debonding with the aim of reducing the risk of diastema

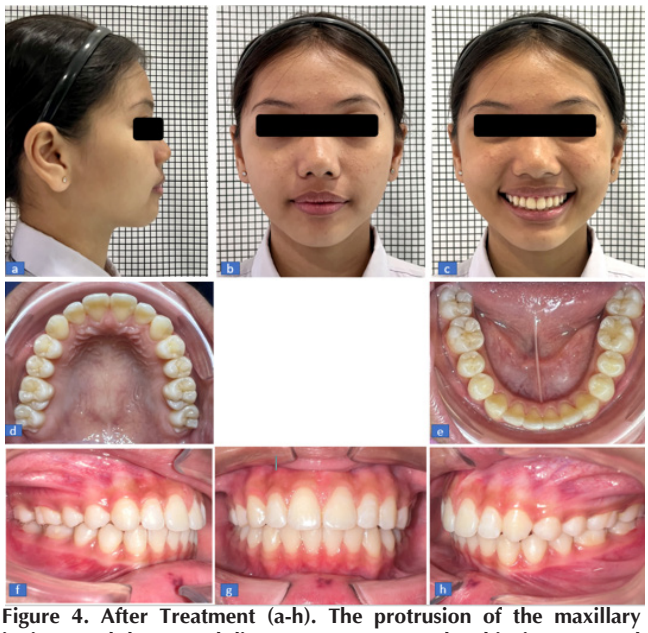


Figure 4. After Treatment (a-h). The protrusion of the maxillary incisors and the central diastema was corrected, achieving a normal overjet, normal overbite, and good interdigitation.

relapse. Post-debonding, she will be fitted with Hawley's removable retainers for both upper and lower arches, which she is instructed to wear to maintain the results of her completed fixed orthodontic treatment.

DISCUSSION

According to Samir Bishara's book, orthodontic treatment for Class II skeletal malocclusion cases without tooth extraction is a rare form of dental camouflage treatment (3). To perform orthodontic treatment in such cases, certain considerations must be taken into account. The skeletal anomaly must not be severe, and the relationship of the first molar must not exceed half a unit. Sufficient space is required in such cases to retract incisor teeth and reduce the significant overjet, while the lower jaw may require protraction of teeth to achieve a normal occlusion of posterior teeth. In this case, there is enough space to retract the incisors posteriorly to achieve a normal overjet, so extraction is not necessary. Radiographs of the hand wrist show the patient's growth is almost complete but there is still approximately 5-10% growth remaining. Therefore, functional orthopedic devices are not used in this treatment. Camouflage is selected in this case.

Orthodontic treatment using a 'fixed appliance' with a combination of Class II elastics in this case has proven to yield favorable results. This is attributed to the fact that the patient still has remaining teeth growth. The use of Class II elastics has also successfully brought about significant changes in the profile, as evidenced in a case report on Class II Division I malocclusion by Manni, Lupini, and Cozzani, where noteworthy changes occurred in the Sn-PG angle, AN-PG angle, and overjet (4). Another case report by Mayank, Rahunath, and Alekya, focusing on the use of Class II elastics in adolescent patients with skeletal Class II malocclusion, also yielded satisfactory results (5).

The magnitude of force applied using elastics must be tailored to each case. The use of a gauge meter is essential for accurately measuring force. A force of 100 grams (3- 4 oz) per side is the magnitude required to move a single tooth, while moving multiple teeth may require around 300 grams per side. In this case, a precise force of 300 grams is applied. The effectiveness of using elastics is highly influenced by the patient's cooperation. Communication between the doctor and the patient is crucial to motivate the patient in using elastics. The method of removing and applying elastics should also be demonstrated to the patient to avoid any mistakes. The duration of use per day and how often they are changed are important aspects. According to Bishara's book, optimal elastic usage is 24 hours a day, changed 2-3 times a day. To prevent excessive tooth extrusion, the typical duration for elastic usage is 3-6 months (3).

CONCLUSION

The success of the correction of class II skeletal malocclusion with a class II elastic combination fixed appliance depends on the patient's age and the severity of the underlying malocclusion. Good cooperation is required between the dentist and patient during treatment.

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