

Pseudo-Class III: Diagnosis and Simplistic Treatment

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ABSTRACT

To present a diagnostic assessment of a pseudo-Class III malocclusion and a simple approach to its treatment, using a modified quad helix appliance.

Materials and methods: A 10-year-old male patient, in the mixed dentition stage, presented with anterior crossbite, Class I skeletal base with an ANB angle of 1 degree, retroclined maxillary incisors and an anterior mandibular slide from the point of initial contact to maximum intercuspation. A modified quad helix appliance, made of 0.036" Blue Elgiloy with anterior extension arms, was fabricated and soldered to bands on the first permanent maxillary molars. The appliance was expanded 4 mm per side, to correct the malocclusion and the functional shift.

Results: After treatment, the patient presented with normal overjet and overbite, class I relation, bilaterally and an improved smile. The speech and function also improved considerably.

Keywords: Pseudo-Class III, Quad helix, Anterior glide, Mandibular shift.

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INTRODUCTION

Class III malocclusion presents a diagnostic challenge. According to Rabie,¹ the accurate diagnosis of a malocclusion is essential in determining the proper approach and timing of treatment. Individuals with a Class III malocclusion may have different combinations of skeletal and dentoalveolar components.¹ A Class III malocclusion can present as a skeletal problem and the characteristics of skeletal Class III malocclusion have been well documented.^{1,2} The skeletal components are characterized by an underdeveloped maxilla, overdeveloped mandible or a combination of both. Dentoalveolar components compensations occur in the form of proclined maxillary incisors and retroclined mandibular incisors. However, the characterization of a pseudo-Class III malocclusion is ill-defined and the dentoskeletal characteristics, especially in the mixed dentition, are unclear.¹

An essential aspect of the differential diagnosis, in Class III malocclusion, is the assessment of two criteria; dental compensations and the presence of a functional slide. Also, the clinical assessment of profile changes from postural rest position to habitual occlusion, is an additional criterion to be evaluated.

The incidence of pseudo-Class III malocclusion in a sample of 7096 Chinese children has been estimated to be 2 to 3 percent.² The importance of differentiating between true Class III and pseudo Class III, is a real test of clinical acumen. Tweed classified Class III malocclusion into two categories in which category A was defined as pseudo-Class III malocclusion with a conventionally shaped mandible.³ Moyers suggested that pseudo-Class III malocclusion was a positional malrelationship related to an acquired neuromuscular reflex.⁴

Pseudo-Class III malocclusion is identified as an anterior crossbite as a result of mandibular displacement. Different etiological factors have been suggested by Giancotti et al, for pseudo-Class III malocclusion:²

1. Dental factors:
 - Ectopic eruption of maxillary central incisors
 - Premature loss of deciduous molars
2. Functional factors:
 - Anomalies in tongue position
 - Neuromuscular features
 - Nasorespiratory or airway problems
3. Skeletal factors:
 - Minor transverse maxillary discrepancy.

Pseudo-Class III malocclusion generally involves a premature contact between the maxillary and mandibular incisors which results in a forward displacement of the mandible to permit closure into a position in which the posterior teeth

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can comfortably occlude. The upper incisors are often retroclined whereas lower incisors are normally inclined. This is in contrast to skeletal Class III cases where there are proclined maxillary incisors and retroclined mandibular incisors due to dentoalveolar compensations for an underlying skeletal dysplasia. The sagittal jaw relations in pseudo-Class III show a Class I or a mild Class III pattern. The assessment of dental relations must always be done with the mandible in centric relation.

The skeletal Class III profile remains concave in postural rest position and in habitual occlusion. Whereas, the pseudo-Class III profile is usually straight but becomes concave as the mandible shifts forward into habitual occlusion position.

Early correction of interferences in the mixed dentition stage is important to allow favorable future growth and development to occur and prevent harmful complications, such as:

- The establishment of a true Class III malocclusion
- Anterior and posterior functional crossbites
- Bruxism habits leading to possible TMJ disturbances
- Periodontal problems to mandibular incisors due to traumatic occlusion as a result of the crossbite
- Space deficiency due to retroclined incisors. Proclining of the incisors gives space for canine eruption.

The management of a pseudo-Class III malocclusion via the proclination of upper incisors and/or retroclination of lower incisors with simple fixed appliances can correct the anterior crossbite and eliminate mandibular displacement. The proclination of upper incisors, the use of Leeway space and arch width increase provide the space required for the eruption of the premolars and canines.⁵ Previous authors have used the bionator to correct pseudo-Class III malocclusion.²

CASE REPORT

This report presents the diagnostic assessment of a young case of pseudo-Class III and a simple approach to its treatment using a quad helix appliance. Although newer appliances are available, a modified quad helix with anterior extension arms, as suggested by Ricketts, was constructed and used to treat this case. The appliance brought about a quick and efficient correction by applying light continuous forces.

Case Diagnosis

A 10-year-old male patient presented in the mixed dentition and in Julian Singer Stage 1 (initiation) complaining of abnormal front tooth position. Figure 1 shows the pretreatment photographs of the patient and Figure 2 shows the initial OPG radiographic presentation. On questioning, the patient’s mother revealed a delay in the exfoliation of the maxillary deciduous incisors and, as a result, palatal eruption of permanent maxillary incisors. This suggested the likelihood of a pseudo-Class III relation due to interference from the palatally inclined maxillary incisors. This finding was further confirmed by a cephalometric analysis which showed retroclined upper incisors. The ANB of 1° indicated that the skeletal bases were Class I. Figure 3 shows

the pretreatment cephalogram taken with the teeth in maximum intercuspation.

The confirmatory diagnostic factor was the clinical assessment of the slide of the mandible from the point of initial contact, which was an edge to edge incisor relation till the point of maximum intercuspation. The mandible slid forward into a crossbite relation. However, it did not cause a significant change in the patient’s profile from rest position to habitual occlusion. Although a crossbite in the right posterior region was present, there was no detectable lateral shift and there were no signs of skeletal asymmetry, at rest or in occlusion. The patient’s speech, especially the labiodental sounds, like f, v, was altered as a result of the anterior crossbite, as was his ability to drink liquids.

To further evaluate the amount of slide present, two lateral cephalograms, one at maximum intercuspation and one at the point of initial contact, were traced and compared. Figure 4 shows the cephalogram taken at point of initial contact. The rotational component was assessed to be 2° and the sliding component was 4 mm. These were assessed using the technique described by Rakosi et al,⁶ as illustrated in Figure 5.

Treatment

A modified quad helix appliance, made of 0.036" Blue Elgiloy with anterior extension arms, was fabricated as shown in Figure 6A and soldered to the bands on the first permanent maxillary molars. The appliance was expanded 4 mm per side, as shown in Figure 6B and cemented.

To relieve the occlusion and permit crossbite correction, posterior bite-blocks made of acrylic and controlled with a stainless steel stabilizing arm, were cemented on the mandibular posterior teeth as shown in Figure 7.

In 4 months, the anterior crossbite was corrected and the posterior crossbite was overcorrected. The deciduous



Fig. 1: Pretreatment photographs showing anterior and right posterior crossbite



Fig. 2: Pretreatment OPG showing normal dental development

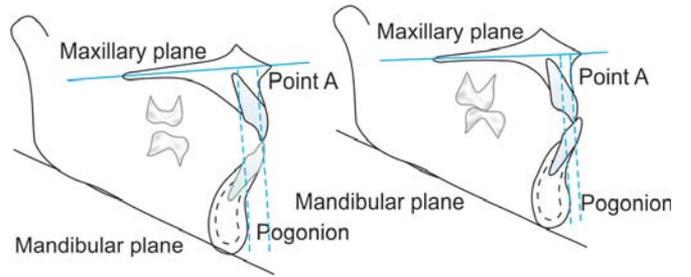


Fig. 5: Tracings for measurement of anterior glide, according to technique by Rakosi et al,⁶ the rotational component was assessed to be 2° and the sliding component was 4 mm



Fig. 3: Pretreatment lateral cephalogram in maximum intercuspation position

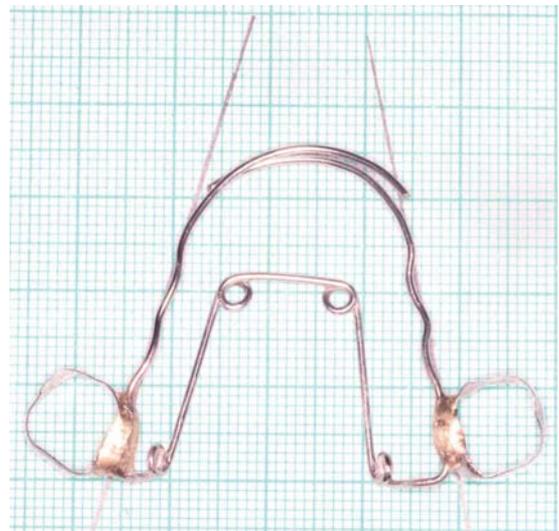


Fig. 6A: Modified quad helix with anterior extension arms



Fig. 4: Pretreatment cephalogram in position of initial contact with anterior edge to edge relation T

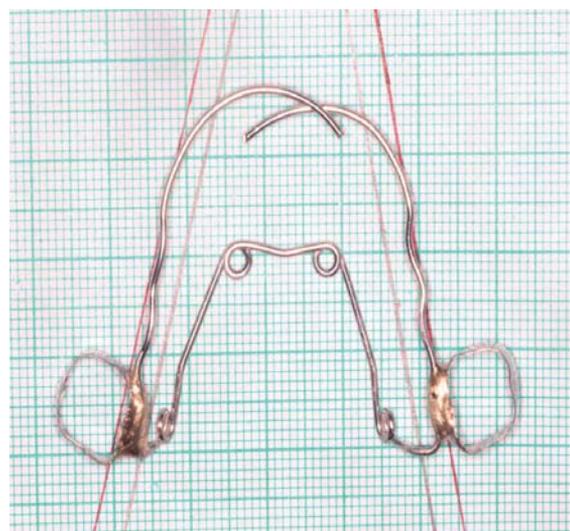


Fig. 6B: Modified quad helix with anterior extension arms activated with 4 mm expansion per side



Fig. 7: Expansion appliance cemented on upper first molars along with posterior bite blocks to relieve the occlusion



Fig. 8: Posttreatment photographs

intercanine width increased from 30 to 32 mm and the intermolar width increased from 47 to 52 mm as a result of treatment. The appliance was removed and the occlusion was allowed to settle. A satisfactory posterior and anterior occlusion was achieved in 2 months as seen in the posttreatment photographs (Fig. 8). The posttreatment cephalogram is seen in Figure 9. The total treatment duration was 6 months.

The appliance proved to be an economical alternative to various preformed expansion appliances available currently. It is easy to fabricate, requires minimal patient cooperation, is durable and does not fracture easily and causes minimal patient discomfort. Therefore, it is suggested that the quad helix, as one of the earliest appliances introduced for expansion, continues to be a versatile option for the management of pseudo-Class III problems.



Fig. 9: Posttreatment cephalogram

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