



Removable mandibular retractor: a simple and usefool tool to treat anterior crossbite

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Abstract

Pseudo Class III malocclusions clinically present with an anterior cross bite that needs to be early treated. Orthodontist must to be able to make a differential diagnosis between functional Class III malocclusions and true Class III malocclusions. Making a right diagnosis allows to plan the right treatment. A useful way to treat anterior crossbite is the removable mandibular retractor that permits the upper incisor proclination with other dental effects.Â

Introduction

Signs of a malocclusion can be evident already in deciduous dentition and its evolution will fundamentally depend on etiology, permanent dentition eruption and maxillo-facial growth. There is no doubt that anterior crossbite as expression of third skeletal classes will worsen over the years.¹⁻²

As stated by Tollaro in 2007, the face should be evaluated from profile view and from front view because rarely a malocclusion is "printed" on child's face, and this is due to the particular thickness of the soft tissues that, masking the underlying skeleton, easily hide the malocclusion, unless itâ€™s full-blown.³⁻⁴

Turpin and Di Malta proposed several classifications to differentiate the various forms of III class malocclusions.⁵⁻⁶

Turpin divides them in⁵:

â€œ Occlusal classes III malocclusion:

- A. Upper dento-alveolar retraction
- B. Lower dento-alveolar protrusion

Â

â€œ Functional classes III malocclusion:

Â Â Pseudo class III malocclusion

Â

â€œ True class III malocclusion:

- A. Small or retrusive upper maxilla
- B. Protruded jaw and retrusive upper maxilla
- C. Large or protruded jaw

Di Malta, in 2002, proposed an anatomo-physiological classification of class III malocclusions, taking into account the principal dysmorphisms:⁶

â€œ lower arch protruded but regular, or lower arch protruded and large with upper arch of normal size;

â€œ normal lower arch and dominant retrusion of upper jaw because of micrognathia or retroposition of the upper jaw;

â€œ protrusion of the lower arch with retrusion of the upper arch.

The author takes into account the functional aspect and distinguishes static kinds and kinetic kinds of malocclusion.⁶

In kinetic kinds she considers the frontal displacement determined by an occlusal obstacle that forces the subject to seek a comfortable occlusion in a more protruded position than that of centric relationship.⁶

The orthodontist should be able to perform a differential diagnosis between patients with a true mandibular protrusion (the true skeletal class III malocclusions with anatomo-genetic component) and the pseudo class III malocclusions of functional origin). The latter have a more favorable prognosis.

The use of telerradiography⁷ in deciduous dentition is indicated for the diagnosis of skeletal class III malocclusion. We must analyze SNA, SNB, ANB derived from Steiner's analysis, Wits index⁸⁻⁹, Jarabak angle¹⁰ and the relationships between structural counterparts, which are the mandibular branch (Ar-Go X3 / S-Ar) and the mandibular body (Go-Me / SN) body with their respective cranial bases.

The cephalometrically true lower basal anatomic protrusion shows mandibular excess at branch and body levels.

It presents following clinical signs: anterior cross-bite with dento-alveolar compensation, frequent association with a mono- or bilateral latero-posterior crossbite supported by a mandibular transversal excess, familiarity.

Anatomical kinds must be distinctly distinguished from functional kinds that exhibit anterior bite inversion when the patient is in centric occlusion and central or lateral maxillary incisors in palatoversion that creating anterior interference leads to the anterior sliding of the jaw; the mandible size is cephalometrically normal.

Clinically it is possible to carry out Dawson's maneuver¹¹ on the patient and bring the jaw to centric relationship to see the discrepancy between habitual occlusion and centric relationship with the possibility of reaching the head-head match of the incisors in mandibular forced retraction with a modification of the profile when passing from habitual occlusion to centric relationship. It is also important to underline the lack of familiarity.

Lingually positioned incisors¹² limit the lateral movements of the jaw and they or their antagonists suffer from a significant incisal abrasion and easily can undergo to a gingival recession.

The early correction of this kind of anterior crossbite is indicated. It, if not treated at the initial stage of development, can interfere with normal growth of the skeletal bases and may result in severe facial deformities. The treatment should be carried out as early as possible with the aim of permitting normal growth.¹³

Teeth tend to lingually erupt because of the lingual position of developing dental buds and can be trapped in that position if there is not enough space. Sometimes the incisors are involved because they diverted to a lingual eruptive pathway due to the presence of supernumerary anterior teeth or retained deciduous incisors. Anterior dental crossbites typically develop when permanent incisors erupt.

It's very important that the treatment plan focuses on managing the total space on arch.

If the development of the crossbite is diagnosed before the eruption is completed and overbite has appeared, the adjacent deciduous teeth can be extracted to provide the necessary space. In cases diagnosed after the overbite has appeared, an orthodontic appliance for correction is required. Often the inclination of the teeth provides a sufficient correction as the problem occurs due to deviated eruption paths.

In a child, a method for tilting the incisors in crossbite correction involves the use of a removable device¹⁴, limited by the lack of collaboration from the patient, lack of retention and improper activation.

Â In these clinical cases it may be useful to use a very simple retraction activator characterized by easy portability and low costs.

Methods

Aim of this review is to illustrate structure, function and dental effects of removable mandibular retractor used

for correction of anterior crossbite in pseudo Class III malocclusions.

A systematic review on principal medical databases (Pubmed, Scopus) was performed.

Review

The device is made up of a resin plaque with a vestibular arch extended to the cervical margin of the lower incisors.¹⁵

The arch must be activated so that it is positioned 2 mm in front of these teeth when the mandible is forced to the maximum retrusion.¹⁶ The arch is intended to merely work as a stop for sagittal movement of the mandible. The retractor is attached to the second deciduous molars in the upper jaw by Adam's clasps and incorporates auxiliary devices, such as an expansion screw or springs for the proclination of the upper incisors.¹⁶ The children must wear the appliance at least 14 hours a day (nighttime included) until the first evidence of a corrected anterior crossbite.¹⁶ During this period the appliance could be reactivated just to maintain the labial arch in the right position. Thereafter the children will wear the same appliance at night only.¹⁶

The protocol for its construction is based on upper and lower algin imprint, and a centric relationship wax bite of about 3 mm of thickness to determine an opening of the frontal sector.

The mandibular retraction actuator, useful for pseudo class III malocclusions, is a versatile device with a retraction arch that invites the jaw to take a more backward position but doesn't have to be very much activated because we do not want to give too much incisive retroinclination but we want to "remember to the jaw" its more posterior position. It is possible to activate the vestibular arch for lingualizing lower incisors if they are proclined and with diastema. It is advisable to use a more elastic cobalt chromium alloy to avoid fractures at the level of the loops and not to use helices because they create decubitus and interference with the labial frenulum. Upper retention takes place with Adam's clasps and ball clasps. An expansion screw can be introduced as an auxiliary component to support the transverse growth of the upper arch by making ¼ of the turn = 1 activation / week.

Tollaro described for first time the appliance in 1995 and showed its effectiveness in 1995 and 1996.¹⁶⁻¹⁷ A sample of 30 children (5.64 ± 1.01 years at the start of treatment) with treated Class III malocclusions was compared with a control group of 30 children with

untreated Class III malocclusions.¹⁷ The main significant findings in the treated group were an anterior morphogenetic rotation of the mandible as a result of an upward-forward direction of condylar growth, a more vertical orientation of the ramus and a reduced gonial angle, reduced mandibular protrusion and total length, increased maxillary protrusion, increased maxillary dentoalveolar protrusion and reduced mandibular dentoalveolar protrusion. No significant changes in the vertical craniofacial relationships and in cranial base angulation were observed. Authors said that cooperation during treatment was good in the entire group.¹⁷

Discussion

Anterior crossbite is a condition that needs to be treated early. A simple and low-cost solution can be the removable mandibular retractor. This appliance that can be successfully used in patients with anterior crossbite and pseudo class III malocclusions.

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