

A Sagittal Corrector for Angles Class II and Class III Malocclusion

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Abstract

There are number of sagittal correction appliance which came after the invasion of Headgear appliance. Now different intraoral approaches have been introduced to minimize the need for patient co-operation. The aim of this article is to go through an appliance which is used for correction of upper and lower canine and molar in treatment of Class II and Class III malocclusion and to achieve a stable Class I relation. It also analyze the advantage disadvantage and limitations of the appliance

Keywords: Intraoral appliance, Tooth movement, Distalization, Essix retainer.

Introduction

Carrière Distalizer is a fixed functional appliance mainly for Class II treatment developed by **Luis Carriere 2004** (Ortho Organizers, USA) with advanced technology. It is effective in treating Class II malocclusions without

extractions^[1,2, 3,5]. Brachyfacial patterns are difficult but it respond well than Dolichofacial types^[3,5]. Initially the appliance is introduced as a Class II corrector^[1,3].

The appliance can also be used in

- Class I cases where maxillary molars are mesially positioned
- Class I cases with premaxillary hypoplasia.
- Class III cases: A newly developed appliance, the Carriere Motion 3D Class III appliance (Henry Schein Orthodontics, Carlsbad, CA, United States of America)⁴. The Carriere Motion Three Dimensional Class III appliance which is fixed on the buccal aspect of the mandibular teeth (from the first permanent molar to the canine)^[4,7,8,20].
- Ideally appliance are used for growing patients, but adults can be treated as well^[6,23].

Class II mixed dentition case with fully erupted first molars³.

Biomechanical Objectives

It produce a rotational movement (distally) of upper first molars encircling the palatal roots when ever required. Initially appliance is passive, by engaging elastics the appliance activates^[3, 25]

- At the same time construct an identical force for the distal molar movement.
- Self sufficiently move each posterior segment, from canine to molar, as a bunch.
- put an end to wire changes and thus the deforming collateral forces that arise with every wire activation in traditional techniques.

By using Carriere class II motion appliance it showed an increase pharyngeal airway volume⁹.

A Class I molar and Class I canine relationship can be achieved, after that treatment can be finished with any technique preferred by the Orthodontist³.

Appliance Design

The Distalizer is made of stainless steel (nickel free)^[3, 5]. It is fixed to the first molar and canine.

Canine pad: The movement of the canine distally along the alveolar ridge with the help of Canine pad without tipping; there is a hook for the attachment of Class II elastics in canine pad^[3, 10]. The bar is concave anteriorly. The pad is in the mesial end of arm. It runs posteriorly over the two upper premolars³.

Molar pad: The posterior end of the arm is attached to a ball which articulates in a socket on the molar pad³. The ball and socket resemble the human hip joint for maximum freedom of movement.

This Distalizers posterior portion is fulfilled by three types of molar movement:

1. Crown uprighting, if it is mesially inclined. Once the molar has been uprighted, the articulation of the ball

within the socket put a stop to distal tipping.

2. Distal encirclement all over the palatal root. When the maxillary first molar is rotated mesially all over the palatal root, the molar occlusion may resemble Class I, while in reality it is a Class II with the canines in a cusp-to-cusp relationship. When the molar has been derotated, the shoulder of the posterior base contacts the mesial arm to prevent over rotation^[3, 12, 13].

3. Distal displacement without concurrent distal tipping of the crown.

Appliance Placement

The Distalizer is available in: 23mm, 25mm, and 27mm size. The appropriate size is determined by measuring with a caliper or Dentometer. Measurement is recorded from the buccal surface of maxillary first molar (midpoint) to the maxillary canine (midpoint). In highly placed canine and second molars, measurement is taken from the first premolar (midpoint) to the second molar (midpoint). These teeth are bonded with the appliance, other than to canine and first molar. The distalization of posterior teeth is necessary to allow the space for upper canine. Two bonding pads of the Distalizer are applied with adhesive (light cure). The teeth are etched prior to bonding. Before curing the molar attachment is correctly placed on the buccal surface at centre with thumb pressure. After that Canine pad is positioned correctly before curing³.

Source of Anchorage

Anchorage selection depends on the neuromuscular and skeletal pattern of patient in order to avoid lower incisor protrusion³.

1. Passive Lingual Arch: 0.036" wire is adapted to lingual surface of mandibular dentition from second molar to second molar^[3, 17]

2. Hamula Lingual Arch: 0.045" stainless steel wire is used which is attached to molar band with occlusal stops (mesial and distal). 0.021" X 0.025" wire is soldered

occlusally as segments to the stops. Once bands are cemented these wires are bonded to occlusal surface of premolars and molars. The edgewise wire will rests on the occlusal surfaces without any interference^[3, 12, 13].

3. Full Mandibular Fixed Appliance

For Class II elastic traction support anchorage is prepared by bonding lower brackets. It is performed in crowded mandibular arch in a non extraction case with deep curve of spee^[3, 17, 24].

4. Lower Essix Appliance: 0.040" Essix type A material is used for attaching elastics. Composite wedges are used for retention in molar and premolar region. In the lower molar region hooks are placed for engaging elastics^[3, 15, 16]

5. Miniscrews: They are used for short period at beginning of treatment. As they do not osseointegrate they can be removed easily. They are used for engaging elastics. They are placed through attached gingiva between first and second molar. For non compliant patients miniscrews are placed in zygomatic buttress as an alternative for attachment of elastics in maximum anchorage cases^[3, 14].

Patient Instructions

A 6 $\frac{1}{2}$ oz, $\frac{1}{4}$ " heavy Class II elastics is used³. Ask the patient to wear elastics all time except while having food recommended for low angle cases because perioral muscular strength will be high^[3,6]. In high angle cases timing of wearing elastics can be limited to 14 hrs including sleeping hours because of light perioral muscular strength. There can be canine extrusion during distalization due to vertical force vector. This can be corrected by following treatment. Wearing elastics during night can provide traction with horizontal vector but treatment duration is slightly increased. Patient acceptance of the appliance is good because upper incisors are left free and Essix retainer is used in lower arch. The appliance is comfortable to use. It is used in the first three to six months of treatment^[12, 13, 18].

Advantage

The Carriere appliance include its intrusion effect of maxillary molar, its ease of attachment and activation without laboratory steps, it's satisfying acceptance by the patients, the lack of need to make regular appliance activations and leaving the upper incisors free without bonding¹¹. Patient compliance is good. Simple and efficient.¹⁹

Disadvantage

- One common unwanted effect of Class II elastic use is the increase in mandibular incisor inclination
- Using elastics while chewing can lead to vertical force vectors³.
- There can be diastema followed by distalization which is an esthetic concern for the patient.
- Interfering the horizontal arm with the tongue can lead to inclination of upper premolars³

Limitations

- Dolichofacial types do not respond well than brachyfacial patterns³.
- Limited to dental and dentoalveolar structure.
- Skeletal changes is negligible²²

Conclusion

This Sagittal appliance ensures that practitioners address facial harmony of the patient. To establish a Class I platform this appliance is one among the sagittal appliance available in the market which has the potential to generate good treatment result.

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