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Tribune Article

In the Class II malocclusions, there is a group due to a dentomaxillary protrusion that may require distalization of maxillary posterior segments and avoid the extraction of upper first premolars. Cases of the same type with space problems in maxillary incisors may also require distalization of posterior segments to recover space without making extractions or protruding the incisors. (Fig. 1 & 2)

INTRODUCTION

The resolution of Class II malocclusions without severe skeletal disharmonies can be carried with a variety of appliances.

First and oldest is the extraoral traction designed by Kloehn, followed by the Wilson arch with his mechanics by modules and the Cetlin removable plate.

Other appliances are: Nitinol coil springs, pendulum appliance, Jones jig, repelling magnets, etc. They produce mainly a dental effect.

There is another group, like the Herbst appliance, Jasper jumper, Bite corrector, Forsus*, Bite Fixer*, Bite Block* etc. which have an added skeletal effect by pulling the mandible forward with a concomitant result of molar distalization.

There is a common characteristic in all of them, they distalize the maxillary molars as a single unit. There is the exception of Cetlin's plate, which advocates that distalization of maxillary molars with his removable appliance, pulls distally, in a certain degree, the second premolars by the effect of transeptal fibres.

With the mentioned appliances, after first molars have been distalized, maxillary premolars and canines have to be distalized in a sequence of movements until they get into contact with the maxillary molars. This sequence of movements takes longer treatment time and pays a token in terms of anchor-

age loss with a mesial drift of molars, into the already created space.

In this article we propose an appliance of new design, which distalizes the group of posterior teeth as a block in the same operation, from maxillary canines to molars. After distalization of buccal segments is accomplished, the case is in the position which we denominate *Class One Platform*. From this stage on, the case can be finished in an easier manner with the technique of the clinician's choice.

The Distalizer presented here could be considered a "Disposable Treatment Starter".

Class One Platform

We define the *Class One Platform* as: "The interarch relationship in which the occlusal platform comprehended between molars and canines exhibits a perfect matching intercuspitation in Class I, at the same time the Centric Relation coincides with the Centric Occlusion".

This is a clear position to which we look forward when we want avoid extractions in a Class II case (Fig. 3). The first priority of the system is to correct the posterior occlusion to a true *Class One Platform*.

The key factor to accomplish this is a combination of distal rotation, uprighting and distalization of the



maxillary molars together with premolars and canines, at the same time, as a block.

Functional requirements of the Distalizer appliance

Simplification of function has been the basic intention.

The requirements pursued for the desired function of the appliance have been:

1. Distalize posterior segments in a block.
2. Obtain a univectorial dental movement.
3. Try to eliminate the internal binding forces that appear in every successive wire activation, which appears in the conventional systems of distalization.
4. Mild uniform impulse.
5. Passive appliance exclusively activated by Class II elastics or with anchored on Temporary Anchorage Devices.

Morphology and description of the appliance

Our attention was driven to apply a natural force, with the intention to work close to a natural function.

In nature every element has an adequate design for its function. Nature imitation has given us the path for the design of a minimalist double articulated structure.

Related to its morphology, the Distalizer is a *nature objectified design*, a result of *Biomimetics*. (Fig. 4)

It is constituted of two parts:

1. The anterior segment: It has pad, which is bonded on the canine and carries a hook for insertion of Class II elastics. It is extended distally by a half-round section arm, which runs in a posterior

direction over passing the two upper premolars with a mild curve that ends in a sphere.

2. The posterior segment: Bonded on the molar, has a socket that receives the sphere or condyle. Both parts are articulated and work like the human joint of the hip.

Statistical measurements have been taken of the different sizes of teeth and the device is manufactured in different sizes.

Biomechanics

The conceptual approach to the biomechanics has been the development of a new category of orthodontic displacement, avoiding the binding effect. Teeth are treated as independent but interrelated units. Based on how teeth move spontaneously in dental arches, they are orthodontically displaced in a controlled way with a light force, but their difference and independence of response is preserved.

Biomechanically the device calls for a two parts appliance united by a joint that allows the expression of two completely different kinds of movement.

The Distalizer is attached to the upper canines and to the maxillary first molars. Both have a different position in the dental arch, which needs an individual approach for their dental displacement.

The maxillary canine requires a bodily movement along the corner of the alveolar ridge with control in the inclination of its longitudinal axis. The anterior pad portion of the device is rigidly bonded to the canine. It directs the movement without change in the angle between the arm of the device and the longitudinal axis of the cuspid.

The maxillary molar requires a combination of three movements,

- 1) a distal rotation around the palatal root,
- 2) a controlled distal displacement and



Fig. 3



Fig. 4



- 3) a body distalization with the particularity to prevent the distal inclination of the crown of the molar.

This corresponds to the posterior part of the Distalizer. (Fig. 5 & 6)

The movement of the molar is independent and qualitatively different of the movement in the cuspid. Both movements must be independent, as it is their functional environment, but at the same time they must be connected to express a simultaneous response, as a group.

The two upper premolars are orthodontically displaced between the maxillary molars and canines.

The device has been designed to perform:

1. A "free but limited" movement.
2. Correct the mesial inclination of the crown of maxillary first molars. For this purpose, the mesial arm of the Distalizer has a downward movement of 10 degrees. The posterior part has a vertical line engraved in the middle. This has to be placed coincident with the longitudinal middle axis of the molar when bonding it. (Fig. 7a & 7b).

After the crown of the upper first molars, have been uprighted, the polar cuts of the ballhead will prevent the excess of distal inclination.

3. Limit the molar over-rotation in the distal movement, (toe in). Once accomplished the adequate rotation of about 15°, the shoulder of the posterior base collisions with the arm of the device and stops the rotation. (Fig. 8).

In cases of exaggerated mesial rotation, the wide lateral opening in the buccal direction of the arm permits an easy placement.

4. Control of torque movement in the molars along the distalization by means of the polar cuts incorporated in the ball head. (Fig. 9). After the three movements: Uprighting, Over-rotation, and Control of Torque have been accomplished, the case continues with a distal pure movement to

arrive to the needs of distalization of the case in treatment. So it works as a self engineered appliance, able to adjust automatically its function as treatment is in progress.

5. It is passive when not using elastics Class II type or traction from a TAD.
6. The device is of universal use with any of the existing orthodontic techniques.

The main biomechanical characteristic lays in the "freedom of fit" of the human like joint that connects the two parts of the appliance.

The three different movements are limited by the stops incorporated in the morphology.

The collision points convert the device in a self-engineered appliance, with a predetermined sequence of movements

Indications for the Distalizer

Class II Division 1 and Class II Division 2, non extraction cases, in permanent and in mixed dentitions, symmetrical and asymmetrical. Its use is being extended to many Class I and Pseudo Class I cases with a mesial migration of maxillary molars. It is indicated as a starter of a case. Once the *Class One Platform* is achieved, the treatment complication is simplified and the case has more possibilities to be treated in a more conservative approach.

In Class II and Class I with 4 extractions proposal, in which extractions in the maxilla might have a negative impact in the nasolabial angle with a retruded upper lip, extractions can be avoided in the maxilla to accomplish a more aesthetic facial result.

It has also possibilities in the treatment of Class I cases with hypoplastic maxilla, to improve facial aesthetics, and in Class I cases with crowding in maxillary anterior segments.

Some Class III cases.



Treatment protocol

In Class II cases accepted to be treated with distalization of maxillary teeth, the only way to distalize canines to a true Class One, is through distalizing and recovering the hidden space lost distal to them.

When we work with the Distalizer, the first sign of a good treatment progress is the appearance of open spaces mesial to the upper canines and evident diastemas in the upper incisors (Fig. 10).

Strength:

6 ½ ounces, ¼ th. of an inch, heavy.
1st Month, changing for new ones every 8 hours.
8½ ounces, 1/16 th. of an inch, heavy, after 4 weeks, changing for new ones every 8 hours.

b) *High angle* cases with lighter perioral musculature.

Duration: 24 hours, except eating time.

Strength:

6 ½ ounces, ¼ th. of an inch, heavy. Changing for new ones every 8 hours (Source of anchorage Vacuum Passive aligner “Essix” style) (Fig. 11).



To consolidate the Class I and to prevent the tendency to relapse to the former distocclusion, it is of utmost importance to overcorrect the neutroclulsion of canines to a position, which we call a *Super Class One*.

It is advisable to continue the distalization process until the distal incline plane of the upper canine establishes a contact against the mesial incline plane of the lower first premolar.

POSSIBLE SOURCES OF ANCHORAGE FOR THE DISTALIZER

Once a case is selected to follow a distalizer treatment, the next decision is the source of anchorage. This can be of different types according to the needs of the case and the decision is in the hands of the orthodontist.

Use of Class II elastics

Wearing time:

a) *Low angle* cases with good perioral muscular strength.

Duration: 24 hours, except eating time.





Fig. 12a-b
Patient 15 years old, 3 months of Distalizer. Before-After Aesthetic Distalizer.

Lower Essix

The "Essix" type appliance is the preferred appliance to be used as a base of support for insertion of Class II elastics. A .04" layer of Essix material type "A" is the ideal for making it. For the insertion of Class II elastics a regular tube with a mesial hook must be bonded in the first or if possible in the second lower molar. This fits in a window previously cut in the Essix material.

Lingual Arch

It runs in contact with the lingual side of the mandibular dentition. When the case that we consider presents an ideal lower dental arch without crowding.

It is made with .036 wire and must be completely passive adapted to the inner contour of the mandibular dental arch.

The distal ends are inserted in the lingual tubes of the lower molars, run in a mesial direction in contact with the middle third of the lingual side of the crown of the premolars, and extend to an upper level above the cingulum of the canines and incisors. The lingual arch holds the Class II traction of elastics.

When second lower molars are fully erupted, it is advisable to band them, to take advantage of getting more force from elastics, a more horizontal direction of traction and better resistance of the lower arch in terms of anchorage.

Miniscrews

This is the most reliable system for holding anchorage. Mini screws are placed in the space between first and second mandibular molars.

Micro implants are best placed in the mandible through the attached gingiva for better insertion of Class II elastics. They have to be placed in the buccal area between first and second lower molars in the zone of more density of cortical bone.

Full bonding of mandibular arch

In cases that present a marked Curve of Spee or a mild crowding in the mandibular arch, which are accepted by diagnosis as non extraction cases, it is advisable to bond brackets on the lower dental arch to support the Class II elastic traction.

The source of anchorage selection is a clinical decision of the orthodontist for every particular case in terms of maintaining the anterior limit of lower incisors not to be moved forward because of anchorage loss.

Patient cooperation

The Distalizer is used in the first 3 to 6 months of treatment when compliance is best.

The simplicity as well as the fact that upper incisors are left without any appliance in the maxilla help in the acceptance.



Fig. 13a-b
Patient 16 years old, 3 months of Distalizer. Before-After. Metallic Distalizer.



The novelty of the design plus comfort of use, make it easy to receive good cooperation. The patient is stimulated by the immediate results of seeing the appearance of diastemas in upper incisors. This characteristic is informed in advance to the patient as a favourable progress of distalization and a reward for the good cooperation.

It is a good deal for the patient to cooperate and receive in exchange the benefit of avoiding the extraction of two upper premolars.

Clinical application

Before proceeding to bond the Distalizer, the measure of the size needed must be taken. Measurement is made with a pair of callipers or with an enclosed disposable ruler.

The measurement is made from the geometric midpoint of the buccal face of the first maxillary molar, to the midpoint of the maxillary canine crown.

In cases with an inaccessible high cuspid, the Distalizer can be bonded on the first premolar. This is an alternative to distalize this segment and provide space for the blocked out upper cuspid to erupt.

The bonding procedure starts in the posterior part. The sequence to follow after etching and application

of sealant is to place bonding material on the two pads of the device. The molar part is positioned in the geometrical centre of the buccal side of the molar with a thumb pressure. In this position, it is light cured. The canine pad already filled with composite allows time enough to the operator to position it correctly. After which it is light cured in a second operation. When bonding on the canine, we have to make emphasis in the convenience of bonding the anterior pad slightly advanced, on the mesial third of the vestibular surface of the crown of the canine, and not in the midline of the canine crown.

The Carriere Distalizer for Class III malocclusions

We have designed a Carriere Distalizer special for Class III cases that do not present a degree of skeletal discrepancy important enough as to require surgical approach.

Those cases can benefit from the same distalizing principle as the one presented for the Class II's.

The posterior bucal segments from the molars to lower cuspids of the mandibular dental arch are distalized, as a block with the Carriere Distalizer Class III.

For this purpose are used Class III elastics and anchorage is provided in the maxilla by three different

Fig. 14a-b
Patient 14 years Old, 4 months of Distalizer. Before-After. Metallic Distalizer.



Fig. 15a-b
Patient 32 years old, 3 months of Distalizer. Before-After. Class III case.



Fig. 16

Fig 16
New Carriere
Aesthetic Distalizer

procedures: An Essix plus buccal tubes with a mesial hook, bonded on the first or second maxillary molars, full bonding of maxillary dental arch or Mini Implants.

The morphology of the Class III Distalizer is a one-piece device in which the distal arm that runs from a molar pad to a cuspid pad in the mesial end that carries a hook for the insertion of Class III elastics.

The protocol of treatment is a first stage in which it is accomplished a distalization of the lower buccal segments to a Class One Platform.

After this procedure the case is treated as a Class I with Carriere SLB brackets, to retract and finish the case.

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Carriere Ortho 3D:

the Andoid free app and the QR code of the iPad/iPhone free app.



This app is a 3D totally interactive simulator to see the treatments in real time.

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- Winner of the International Design award Delta Gold ADI-FAD 2009 with the “Carriere Distalizer MB”.
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