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Distal Jet Modification: An Option in Distalization

Modificación del Distal Jet: una Opción en Distalización

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ABSTRACT: The objective of the present study was to describe how a distalizer can be made so that some failures existing in these devices can also be eliminated. Because such devices are easy to make and have a low cost, they are becoming a viable option for treating Class II malocclusions without extraction regardless of the patient's co-operation.

KEY WORDS: intraoral distalizing appliance, molar distalization, malocclusion, Angle Class II.

INTRODUCTION

A common strategy for correcting Class II malocclusion without extraction is to distalize the molars. Since its beginning as a speciality, Orthodontics has been depending on the patient's co-operation in using removable appliances as their absence usually leads to non-satisfactory results and increases the treatment time (Macedo & Aidar, 2001). For decades such a mechanism was put into practice by using almost exclusively extra-oral forces (Cetlin & Ten Hoeve, 1983; Kloehn, 1961).

Today, however, the lack of co-operation on the part of the patient has been constantly observed at the dentist's office as the demand for orthodontic treatments other than extra-oral appliances is increasing among adult patients (Pithon & Bernardes, 2004). Aiming to offer an acceptable and aesthetic option in the treatment of Class II malocclusions, most practitioners have been using alternative methods for distalizing the molars so that the main variable in determining effective outcomes only obtained extra-orally can be eliminated – the patient's co-operation.

One of the essentials of the Modern Orthodontics is to elaborate better and better appliances by which dental movement can be significantly achieved with minimum discomfort regardless of the patient's co-operation (Silveira *et al.,* 2001). Therefore, it has been recently recommended the use of intra-oral anchorage devices such as Magneto (Bondemark *et al*., 1994), Pendulum (Hilgers, 1992), Jones Jig (Jones & White, 1992; Runge *et al.,* 1999) and Distal Jet (Carano & Testa, 1996; Carano *et al.*, 1996; Carano & Testa, 2001; Carano *et al.*, 2002) for distalizing upper molars and correcting Class II dental malocclusion.

The Distal Jet, described by Carano & Testa (1996), is the most widely used distalizer device in Orthodontics as it provides good distalization with minimum side effects compared to others (Chiu *et al.*, 2005). However, some disadvantages regarding the Distal Jet can be mentioned, such as manufacturing difficulty (Silveira & Eto, 2004), relative anchorage loss (Chiu *et al.*, 2005), and higher cost due to specific springs used for making the device.

Aiming to solve these problems, the author of the present study describes a new device for distalizing upper molarsncharacteristics, such as easymanufacture, low cost, and better anchorage, usually favour satisfactory results.

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DEVICE DESCRIPTION

The elastic distalizer is a fixed, intra-oral distalizing device using bone-soft tissue supported anchorage, being characterised by a modified Nanceappliance which can be attached to both first and second upper pre-molars so that such teeth can be distalized. Its active component consists of a telescoping tube mechanism welded to a half-bar which is activated by a chain of elastic bands traditionally used in the sliding mechanics (Fig. 1).

INDICATIONS

Dental uni- or bilaterally incomplete Class II dentition (4 mm distalization).

Well-positioned V-L or retro-inclined upper incisors.

Favourable vertical pattern (normal or decreased).

Adult or young patients who do not co-operate.

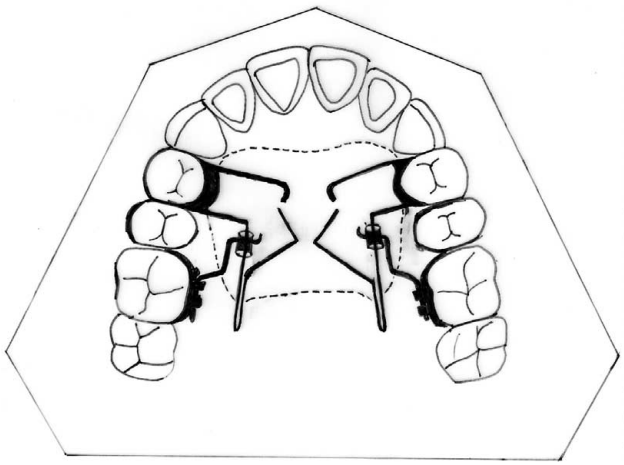

Fig.1. Esquematic design of elastics distalization.

MAKING SEQUENCE

Once deciding on which teeth will serve as anchorage and which will be distalized, bands are attached to them in order to serve as a base for making the device. It is important to emphasise that lingual tubes, which will serve as grooves, have to be welded to the bands whose teeth are to be distalized.

After attaching the bands, the upper arch will be reproduced in cast resin and the bands mounted onto it so that a model can be obtained to make the distalizer according to the original tooth positioning (Fig. 2).

Fig. 2. Mold with the bands for making Distalizador.

Initially, two segments of 0.036-inch stainless steel wire are put around the lingual face of the premolars on each side. Once positioned, the steel wire is palatally folded until forming a 90 degree angle, then it is distally folded again in parallel to the occlusal plane 10mm ahead. At this moment, a segment of telescoping tube measuring 7mm in length and 0.0045 inches in width (Fig. 3) is inserted. Next, a hook is done in order to fix the elastic, which will serve to activate the device. Such a groove should extend up to 4mm beyond the tooth to be distalized. The steel wire will be mesially folded after groove preparation is finished (Figs. 4 and 5). Once the segments are folded, they should be positioned and welded to the premolar bands (Fig. 6). Two other 0.032-inch steel wires are folded so that another hook is adjusted to the lingual tube of the molar to be distalized (half-bar). Next,the lingual tube will be moved towards the anterior region until crossing the telescoping tuben (Fig. 7) to which it will be welded (Fig. 8).

After welding the tubes (Figs 9 and 10), the next step is to perform the acrylisation of the modified Nance button (Velo *et al.,* 2007), which particularly extends more prominently to the upper palatal region in order to be less subject to remodelling (Fig. 11).

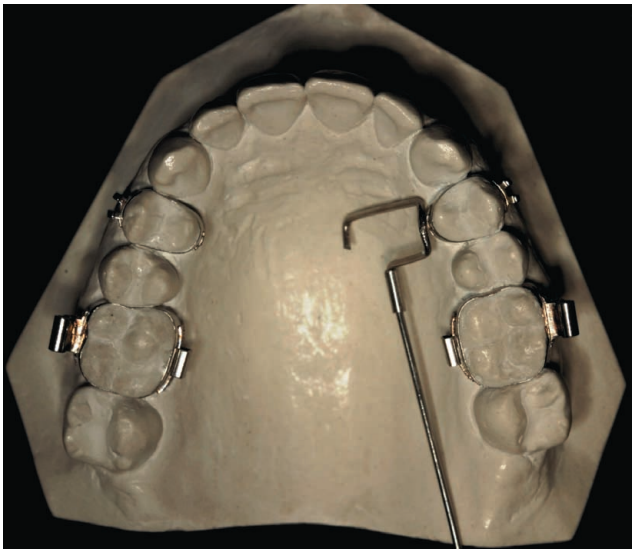

Fig. 3. Folding the first segment of the appliance.

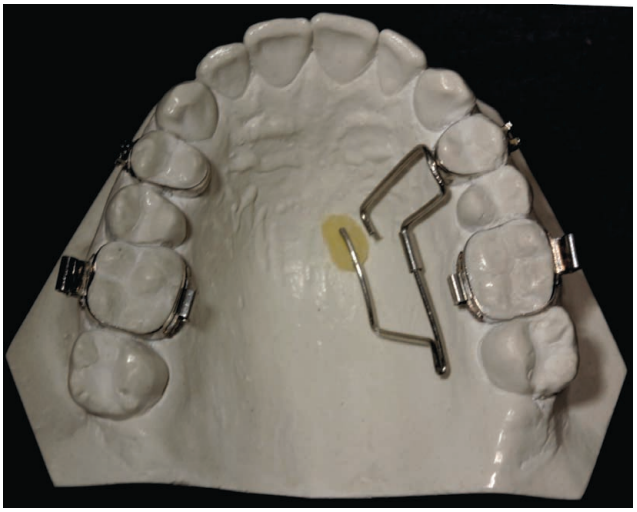

Fig. 4. Final step folding of the first segment.

Fig. 5. Front view of the folded segment with telescoping tube inside.

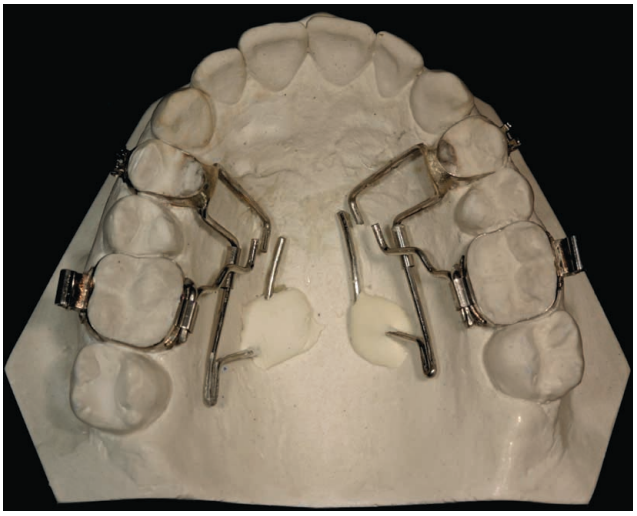

Fig. 6. First segments of wire welded to premolars.

Fig. 7. Second segment folded and positioned.

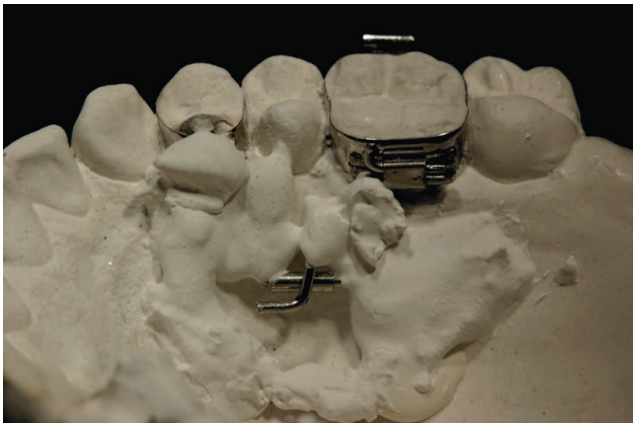

Fig. 8. Wire isolation to avoid property loss during welding.

The distalizer is activated by simply placing an elastic chain between the tips, which is enough to exert the desired force (Figs. 12 and 13).

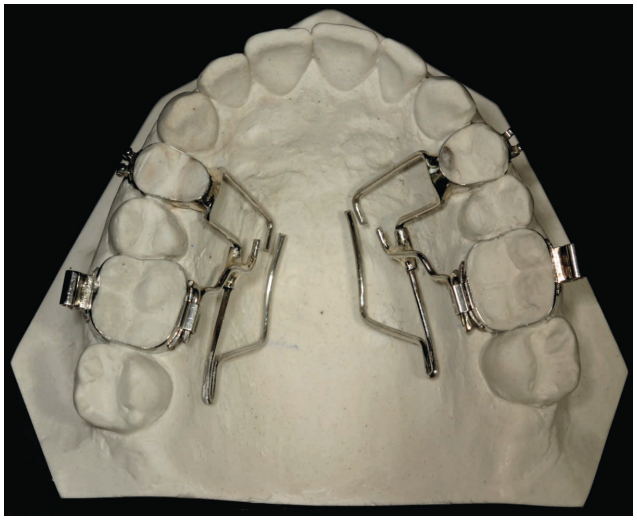

Fig. 9. Weld finished.

Fig. 10. Front view of the metallic device.

Once activated, the device will promote the molar distalization as shown in cases 1 (Fig. 14), 2 (Fig. 15) and 3 (Figs. 16 and 17). In the former, distalization consisted of two steps in which the second premolar was initially involved and then the grooves were brought near the first molar. In the latter, distalization involved the first molar directly because the second molar was absent (Fig. 15).

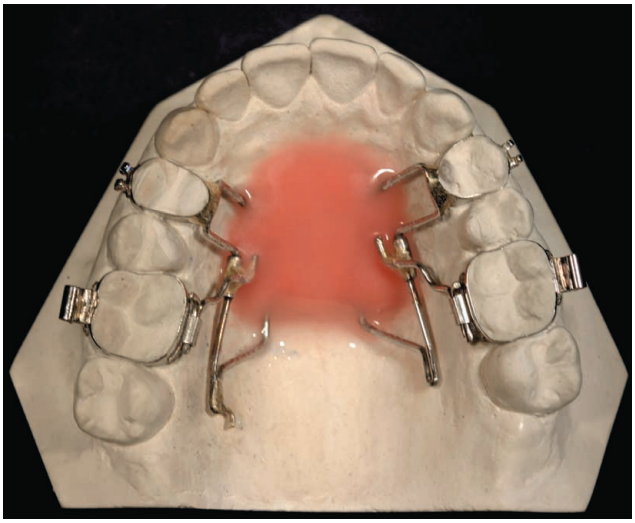

Fig. 11. Distalizer after acrylisation.

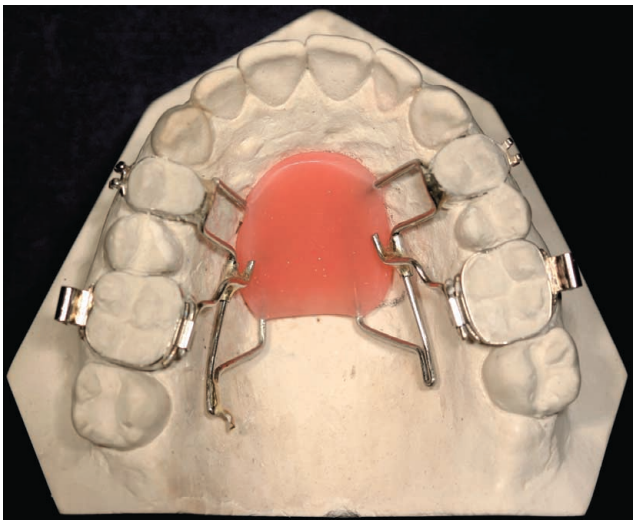

Fig. 12. Distalizer finished.

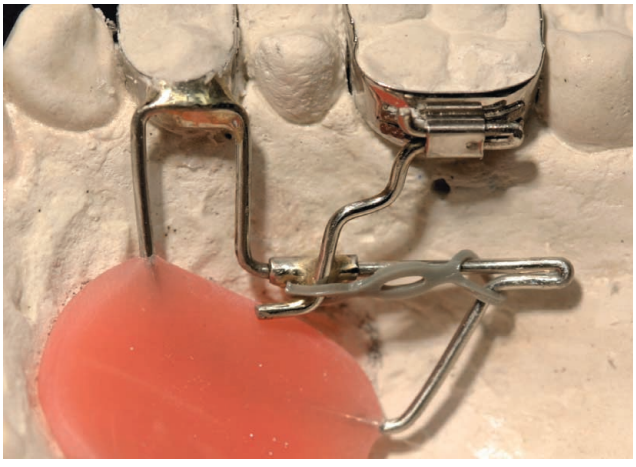

Fig. 13. Distalizer activated.

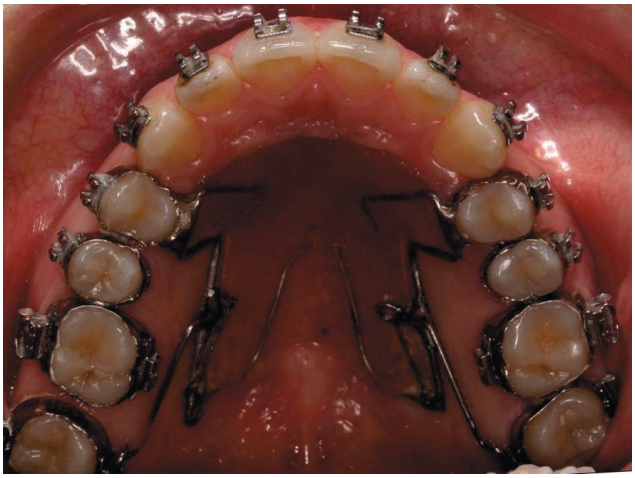

Fig. 14. Case 1 – distalization of the second molar.

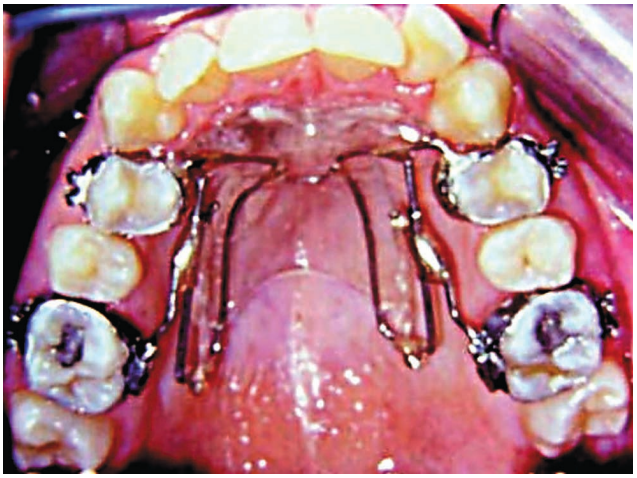

Fig. 16. Case 3 – Before distalization of the first molar.

Fig. 15. Case 2 – distalization of the first molar.

Fig. 17 Case 3 – After distalization of the first molar.

DISCUSSION

Although a minimum of co-operation from the patient is required during distalization, some studies have demonstrated that distalizing devices produce adverse effects such as distal inclination of the molar (tipping), anchorage loss, extrusion, lip protrusion, rebound effect in incisors, and clockwise rotation of the mandible with increase in the mandibular plane, which also increases the facial height (Ngantung *et al.*, 2001) .

The design of the elastic distalizer, however, minimises some of these adverse effects. Distal inclination is decreased due to both stiffness of the wire used for making the distalizing device and proximity between force and tooth's resistance centre. Anchorage is increased in comparison to that from other distalizing devices because of the modified Nance button (Velo *et al.*), whose upper palatal region receives acrylisation in order to strengthen the osseous tissue, thus minimising remodelling and osseous resorption as well.

It should be also emphasized that the existence of the Nance button in such devices, which is often of

increased size, might be of great concern regarding the mucosa beneath the appliance. Therefore, in order to both avoid accumulation of biofilm and irritation of the soft tissues, one can suggest daily cleaning with water jets by using a disposable needleless syringe in which the tip of the syringe is placed in the anterior region of the appliance, right between the acrylic base and mucosa.

The extension of the modified Nance button, which increases the device's size, and the possibility of anchorage loss, although much less if compared to other devices, are the main limitations regarding the elastic distalizer.

If both anchorage loss and incisor protrusion are reduced enough, then lips are more likely to keep their initial positioning without further aggravating the already unfavourable Class II profile (Hoffelder *et al*., 2007).

The clockwise rotate of the mandible with increase in mandibular plane, which results in an increased facial height (Ngantung et al.), probably occurs due to the molar being distalized posteriorly.

It should be emphasised that extra-oral appliances, whenever patient's co-operation exists, are undoubtedly the best treatment option available today, since all the limiting factors and disadvantages of intra-oral devices can be eliminated.

The use of orthodontic mini-implants has become a reality today, however in those cases exhibiting restrictions on the use of such devices (e.g. presence of very close roots, systemic deficiencies, resistance on the part of the patient against the placement of mini-implants, among others), a distalizing device becomes another useful strategy in the clinical orthodontics.

The elastic distalizer is a good choice when orthodontists are faced with cases of Angle Class II malocclusion in which tooth extractions would not be considered for those patients who are not co-operative in using extra-oral appliances.

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RESUMEN: El objetivo del presente estudio fue describir cómo un distalizador puede ser hecho de modo que algunos fracasos existentes en estos dispositivos también pueden ser eliminados. Debido a que estos dispositivos son fáciles de hacer y tienen un bajo costo, se están convirtiendo en una opción viable para el tratamiento de pacientes con maloclusiones clase II sin extracción independientemente de su cooperación.

PALABRAS CLAVE: aparato intraoral distalizante, distalización molar, maloclusión, clase II de Angle.

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