A CASE REPORT PALATAL IMPLANT FOR MOLAR DISTALIZATION

ABSTRACT

Implants obtained popularity in Orthodontics by to make easy the maximum anchorage with the minimal patient's compliance. In this context, osseointegrated implants has been frequently used as auxiliaries of orthodontic treatments, substituting in some cases inter maxillaries elastics and extra oral appliances. These implants showing as advantage a independence in opposite the patient's compliance, the anchorage possibility in periodontal loss cases, over there an esthetic improvement and the comfort propitiated, showing more expected results. This article approach the orthodontic treatment of a clinic case of Class II, division 1 malocclusion, non-extraction accomplished and with palatal implant to distalization of latter teeth.

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KEYWORDS

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INTRODUCTION

Malocclusion Class II, 1st division, is a clinical entity that can result from a combination of skeletal components (mandibular retrusion and/or maxillary protrusion) and dentoalveolar. There is a great number of alternatives for treatment of malocclusion Class II, including apparatus of extra-buccal traction, intraoral distalization, functional orthopedic appliances, intermaxillary devices and clinical procedures involving dental extraction.[1]

A recent alternative in Orthodontics consists in the installation of devices for maximum anchorage like implants. Hence, in the current practice of Dentistry, its different specialties collaborate solving cases in an interdisciplinary way. Implantology has collaborated with Orthodontics providing the anchorage for faster, effective and predictable orthodontic treatments. On the other hand, Orthodontics collaborates with Implantology with radicular movement, becoming possible the placement of implants in regions where it could not be possible. [2,3]

The use of implants for anchorage in orthodontic treatment is indicated in several situations, highlighting the cases of Class II, 1st division for distalization of molars and all the dental arch, mesialization of canines (lateral incisor agenesis), great deviations in the superior midline and teeth with periodontal issues or loss of bone support (normally in adult patients). Especially on them, the use of anchorage with implants is fundamental because the relation crown/root does not provide enough anchorage.[4-9]

Implants used for anchorage in Orthodontics can be divided into two groups: A) direct or for prosthetic reposition, when conventional implants are initially used as anchorage, and then in esthetic and functional rehabilitation at the end of the orthodontic treatment; B) indirect or exclusive for anchorage, when they are applied exclusively with orthodontic aims, normally removed at the end of treatment.[5-9]

Choose of direct implants should be done according to some criteria, because these implants are destined for posterior prosthetic rehabilitation of the patient. In this way, the localization is paramount. As the position of teeth is changed during the orthodontic treatment, the determination of the local to implant generally requires a set up that simulate the situation expected to the end of the treatment. Another important detail is about during the Orthodontic treatment: these implants are not subjected to high loads, different after the final rehabilitation, when they will have to support normal loads from the masticatory function. [4,10]

When the treatments require the resource of implants of indirect type, the requirements for the choice and placement are others. The place of insertion is chosen in

order to obtain better anchorage, with no interference of dental movement.

As the loads that will be supported are essentially the unidirectional orthodontic loads, the dimension can be more reduced than the indirect type implants.[2,5]

Among indirect implants or those exclusively for anchorage, miniscrews, the miniplates and palatal implants are detached. Miniscrews or mini implants, nowadays widely approached in the literature, present reduced dimensions when compared to the conventional implants. [3,5-7] It happens because the orthodontic loads are lower than the masticatory loads. While those lasts are of several Kg/cm^2, orthodontic loads are generally continuous, one-way and present magnitudes between 50 and 250g. Their dimensions and shapes should, however, ensure the primary stability because osseointegration are not commonly necessary to support loads inherent to the orthodontic treatment without lose the anchorage. For this reason, the wait period frequently associated to the use of implants for their integration is not necessary. The implants used in these situations should not have more than 2mm of diameter and 9 of total length. The insertion in the bone can achieve only 5mm, remaining 4mm available to apply the orthodontic systems. [5,9,10]

Despite the recent great emphasis on the miniscrews and mini plates, palatal implants still evoke doubts and questions to the Dentistry class.[11-14] Palatal implants available in the market are type subperiosteal or intraosseous implants. The subperiosteal implants as Onplant, Nobelbiocare – are designed as a titanium disk of 10 mm diameter and e 2mm of thickness. The surface is recovered with a lay of hydroxyapatite; its placement is made through a paramedian palatal incision and displacement of mucosa in a tunnel until the medium line. The implant is introduced and the incision sutured, respecting a period of osseintegration of 4 months before the second surgical stage that will expose the implant to allow making the anchorage system[7,11,12].

However, it is necessary the use of intraosseous palatal implants when is necessary a movement of more teeth. These intraosseous palatal implants may be placed in the medium sagittal region or in the paramedian palatal region (when the patient is still growing, with inter-maxillary suture is not totally mineralized). When combined with a solid palatal bar, the osseointegrated implant provides stationary orthodontic anchorage[15-20].

This clinical case report has as aim to demonstrate an alternative for treatment of malocclusion Class II, 1st division, no teeth extractions, with use of an implant and a palatal bar for anchorage and distalization of posterior teeth.

CASE REPORT

A 19 years old and 5 Months patient, female, Caucasian, found the Dentistry department of UNISUL for treatment with the main complaint “crooked teeth and crooked bite”. During the anamnesis, the patient did not report previous diseases or allergies, presented good general and buccal health state, only reporting the habit of onychophagia. In a face analysis (Figure 1) by lateral view, the patient presented slightly convex overall profile with increased nasolabial angle and normal mentolabial angle. By frontal view was possible notice the presence of slightly facial asymmetry, inferior third balanced and lip seal. During the intra buccal clinical examination was observed malocclusion Class II, 1st division, overjet of 4mm and overbite de 6mm (75%). The patient possessed moderated Spee curve, inferior medial-line diverted 2mm to the left and absence of open bite or crossbite. In the analysis of models was noticed a discrepancy of maxillary models to - 4mm and mandibular to -1mm (Figure 2).

Panoramic radiography (Figure 3) reveled absence of bone abnormality and pathologies, presence of third molars enclosed and condyles positioned correctly.Lateral cephalometric analysis (Figure 4) reveled Skeletal Class I, balanced vector of growth with superior incisives slightly vestibularized and the inferior ones well positioned.

Figure 1. Initial facial photos.

Based on the data collected, the option chosen was for correction of Class II with no extraction, through distalization of posterior teeth and use of palatal implant and palatal anchoring. It was necessary perform the extraction of the superior third molars in order to find space in the retromolar region for distalization of superior arch. Initially the alignment and flatness was carried out only on superior side, with bandage of 17, 16, 14, 24, 26 and 27, and bold of brackets of 13, 23, 15 and 25 (Figure 5).

Next, a surgical guide for the implant was confectioned and the lateral cephalometric radiograph was carried out with the guide at distinctive positions (Figure 6). Then, the patient was addressed for installation of intra-bone palatal implant.

The implant used was brand SIN, with 6mm length, 3.25mm diameter and platform of 4.1mm (Figures 7 to 11). After a waiting period of 4 months, a transpalatal arch was confectioned connecting the pre-molars to the

palatal implant, and from them was applied a load of grams for each side for distalization of 4 superior molars (Figures 12 to 17).

Cephalometric overlays proved the effectiveness of the distalization method of the palatal implant, there was no mesialization on the pre-molars supported by the palatal bar of anchorage (Figure 18).

Figure 2. Pictures of initial models.

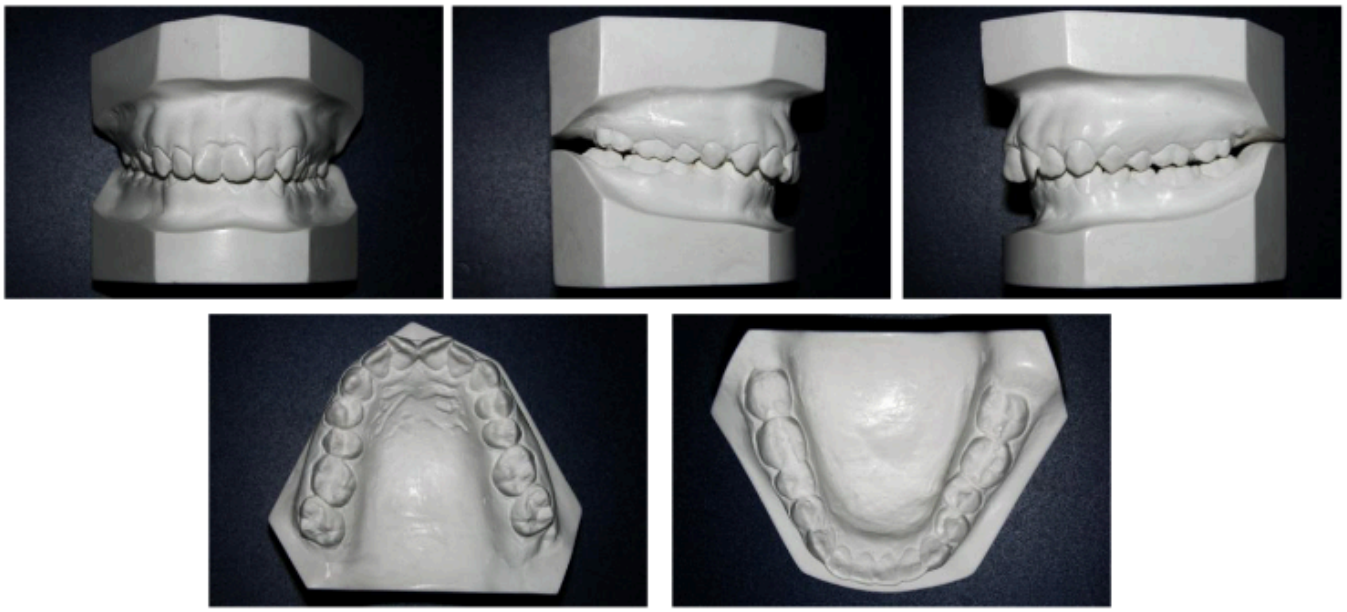


Figure 3. Initial panoramic radiograph.

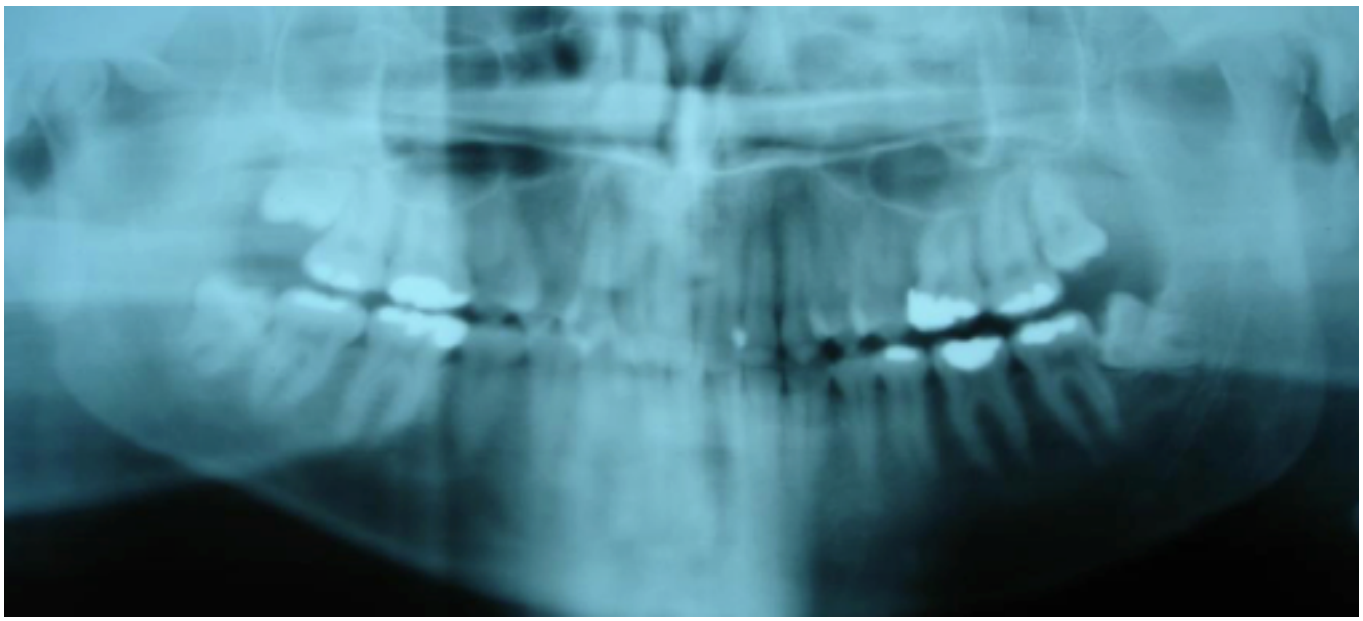
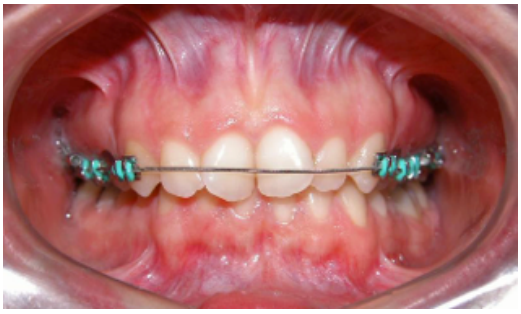
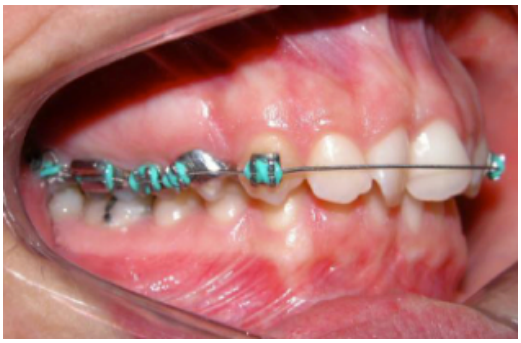


Figure 4. Lateral teleradiography.

Figure 5. Start of alignment and posterior leveling phase.





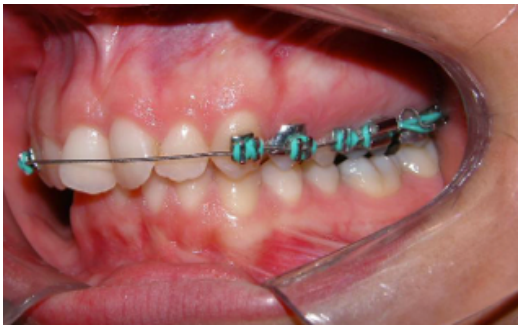


Figure 6. Surgical guide.

Figure 7. Surgical guide positioned.

Figure 8. Checking the mucosal thickness.

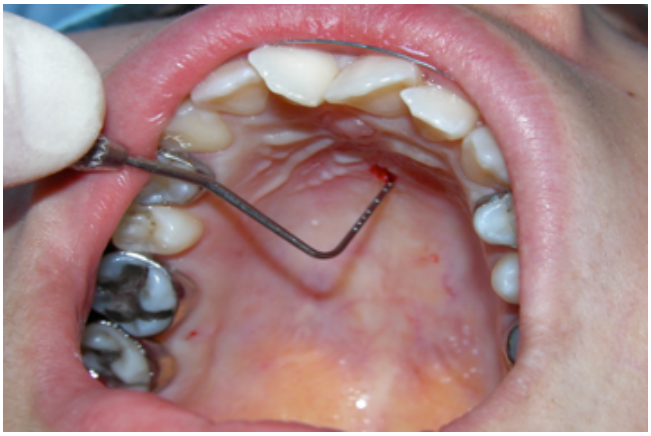


Figure 9. The same drill used for conventional implant placement.

Figure 10. Implant placement.

Figure 11. Teleradiography with implant placed.

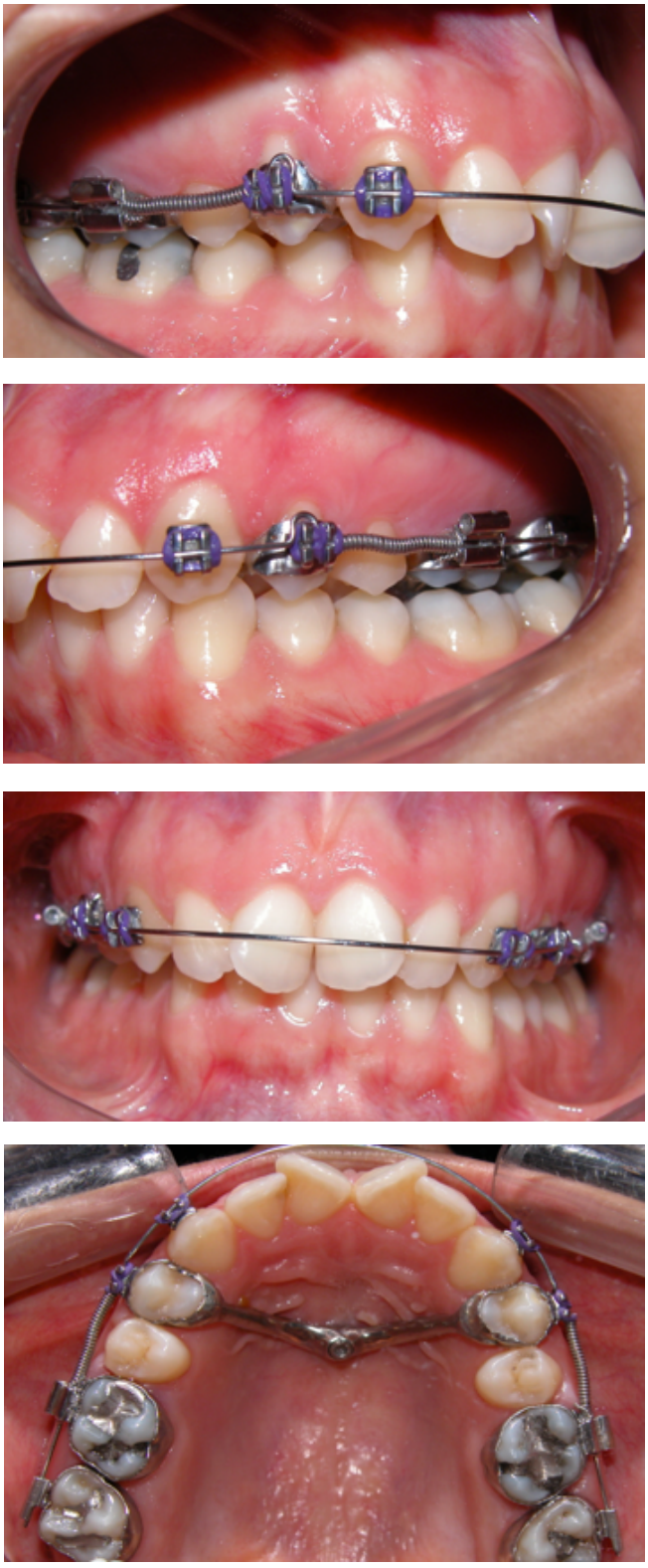
Figure 12. Manufacturing and installation of transpalatine bar.

DISCUSSION

Despite only on the last years some relevance has been observed regarding to the resources of implants in orthodontic treatments, Lincow[21] already described in 1969 the use of intra-bone blades in Orthodontics. The author affirmed that in cases of dental agenesis which will replace these teeth, the collocation of implants whenever possible is performed during the orthodontic treatment, because, further the rehabilitation of toothless zone, the implants can work as

anchor points which may contribute in an important way for orthodontic treatment. [21]

Figure 13. Mechanics to distal movement of the upper molars.



In 2009, Schatzle et al.[10] stated that orthodontic anchorage should be proportioned by little bulky systems in order to become them as comfortable as possible, biocompatible, versatile and simple to be used by Orthodontists. They added still that it should resist to orthodontic loads during the treatment. Despite the main indication is for patients with periodontal issues in which the anchorage based on natural teeth is a problem, implants have been indicated for adult patients who normally also refuse using extra buccal apparatus. The protocol for installation is generally very simple, fast and painless, and has as advantages: A) maximum anchorage, B) they do not depend on the patient, C) they substitute intra-buccal apparatus, D) they substitute Nance appliance, E) they substitute elastics, F) they have continuous use 24 hours a day, G) they reduce the treatment time, H) they are more esthetic than others anchorage systems, I) the treatments are more predictable with possibility of better results. [4,5,7,8] In the same way, they present some disadvantages: A) surgical stages that, despite simple, some patients fear them, B) high costs – reduction of time treatment may compensate costs inherent to the implant removal, C) patients still growing make necessary carefully evaluation of the area of the implant.[11,16,17]

Several studies have described and illustrated the use of osseointegrated implants placed in the palate to serve as anchoring.

After the colocation of implants and the osseointegration, they were connected to the teeth through transpalatal arches. When molar distalization is required, the transpalatal arch is connected to the first pre-molars. When the molar stabilization was necessary for premolar retraction from canines to incisives, the transpalatal arch is placed on the molars.

These works are similar to the clinical case that illustrate this article; and other authors also concluded that the implants provide the skill to establish stable or "absolute" anchoring with no cooperation of the patient.[6,11]

Figure 14. Mechanics after distal movement of the upper molars.

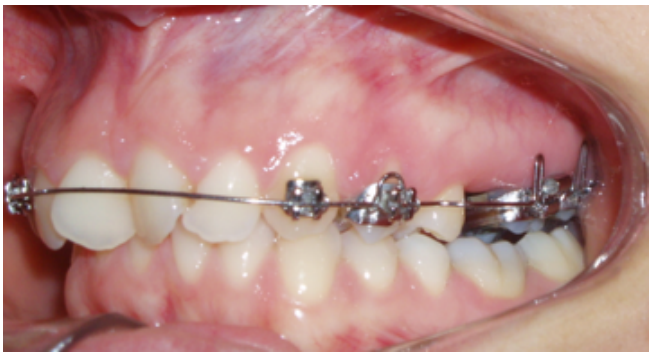
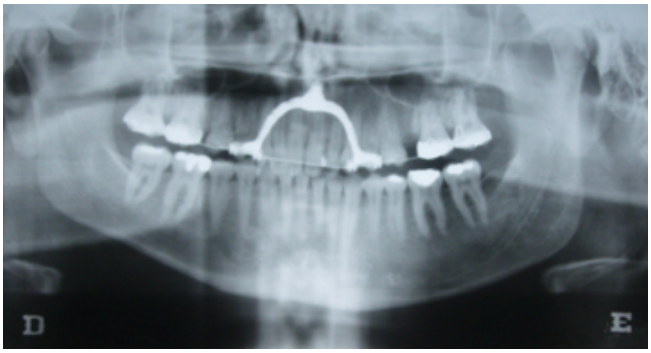


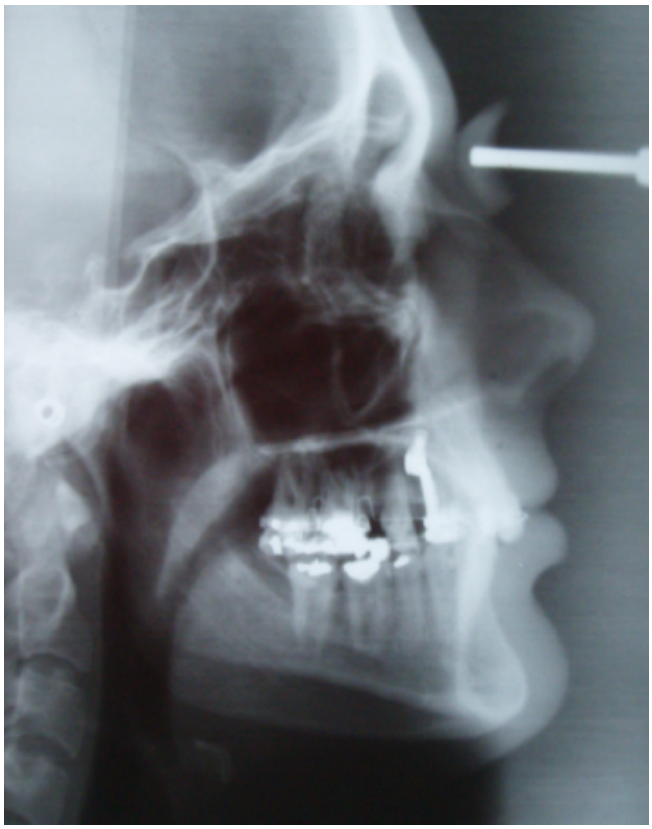
Figure 15. Transfer of palatal implant bar to the first molars.

Figure 16. Initial panoramic radiograph.



Other studies have related the use of palatal mini-implants and the rate of success of this device, using as reference the survival and the stability of them during the orthodontic treatment. The survival rate depends on the local placement, and the palatal mini-implants generally have lower failure indexes.[13,14] The failure is initially related with problems during the insertion of device.[14] Besides, there is better stability when two mini-implants splinted through hard wire. It happens because, with the union, the moment is better distributed, especially in the situations in which the activation of the apparatus generates better moments resulting in the anticlockwise in this device.[16]

Figure 17. Final teleradiography.



An analysis of finite element showed that the use of an osseintegrated system in palatal mini-implants distributes the bone stress in a better way, when compared to those without osseintegration, presenting even better performance when this is anchored in two cortical bone lays and one trabecular bone lay.[3]

Figure 18. Cephalometric superposition showing the molar distalization.

The bone height limited in the palatal area has inspired the evaluation of bone thickness on the place of the implant through lateral cephalograms and tomographies. The results of several studies suggest that bone vertical support tend to decrease laterally and posteriorly with considerable individual variation, then recommending previous radiographic evaluation.[15,17,18] These results demonstrated, therefore, that medium sagittal area of palate provides enough bone support for small implants (6-8mm of intraosseous length). No one of the patients evaluated with palatal implants presented perforation in nasal cavity.[19]

In a study comparing quantity of anterior retraction and the vertical control in two groups, one using anchorage of high tensile and inter-maxillary elastic, and another with micro implants was found that the association of retraction devices with mini-implants resulted in lower mesial movement of molars and higher quantity of anterior retraction, summing to a good vertical control[20], justifying even more its clinical use.

CONCLUSION

The resource of implants for orthodontic anchorage has been widely used for orthodontists presenting results each time more encouraging. The maximum anchorage provided and because it allows stationary anchorage 24 hours a day (on the opposite to other removal devices) let the movements being controlled and predictable. However, it requires a multidisciplinary detailed planning and with criteria to obtain better results, no risks to the patient.

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