Simple Orthodontic Approach Using a Thermoformed Appliance

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Abstract

The requests of our patients, whether aesthetic or functional, can receive different responses and the practitioner’s duty is always to respond with measure. Thus, it is not always desirable to satisfy the patient with invasive therapies at prohibitive biological costs, such as the placement of ceramic elements for the sole purpose of perfecting a smile with misaligned teeth. On the other hand, orthodontics therapeutic could be the least iatrogenic way to achieve this.

If the general dental practitioner does not need to master complex orthodontic therapies, his ability to use simple orthodontic movements is necessary.

The objective of this article is to show the simplicity of implementing minor orthodontic movement through an example based on the use of a thermoformed appliance.

Keywords: Minor Tooth Movement; Interdisciplinary; Aligner; Clinical Efficiency; Orthodontics

Abbreviation

mm: millimeters

Introduction

When conditions permit, orthodontics therapy is probably one of the simplest ways to restore correct dental occlusion or improve the aesthetics of a smile at a lower biological cost.

While it is well established that complex orthodontics must be managed by a specialist, simple orthodontics that involves only a few teeth to be moved with simple movements must be mastered and used by the general dental practitioner.

Objective of the Study

Thus, the objective of this article is to show that moving a tooth can be a very simple act, easy to perform, of moderate cost and limited treatment time.
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Case Report

75-year-old patient came to consult because he was worried about the recent appearance of a slight diastema between the maxillary central incisors (Figure 1) and the outward displacement of the left incisor (Figure 2). He also felt that he lost contact with this tooth during occlusion.

The patient is eager for a simple and rapid solution which can restore the aesthetics and function of his anterior teeth but also to stop the displacement of his tooth.

During the clinical observation of the dental arches, it is noted:

- A reproducible, centered and physiological mandible in maximal intercuspal position but certainly very poorly stabilized due to the absence of all the maxillary posterior teeth from the first premolars, on each side (Figure 3).
- A Vertical Dimension of Occlusion probably correct.
- A functional anterior guide with bilateral canine function but the left central incisor, without occlusal contact, is non-functional. This incisor is moved in the labial direction; a space is created with the other central incisor, but proximal contact is maintained with the adjacent lateral incisor.
- The radiological exam of the patient shows a reduced but healthy periodontal status and the mobility of each of the teeth can always be considered physiological.

Figure 1: Recent appearance of a slight diastema between the two maxillary central incisors.
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Figure 2: Net displacement of the left central incisor; the free edges are no longer aligned.

Figure 3: Bilateral absence of posterior maxillary teeth after the first premolars.

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It is reasonable to think, in this context, that the diagnosis of a labially version of the left maxillary central incisor corresponds to a secondary migration related to a periodontal problem, and potentially, aggravated by an excess concentration of occlusal loads on the anterior teeth during function.

Discussion

Repositioning this tooth in a similar position to the adjoining teeth seems to be solution to restore aesthetics and function. However, the question of method and “way to do it” arises above all.

The patient rejects any treatment requiring a complex and visible orthodontic appliance. So, a dental displacement solution by wearing a removable and transparent removable splint is offered to him [1].

The choice is made for a thermoformed aligner splint made on setup [2].

Before starting an orthodontic treatment, setup will allow to visualize result to be achieved after simulated and desired tooth displacement. In this case, the incisor has an estimated displacement of slightly less than one millimeter between its supposed initial position and its current situation. Due to such a short displacement, only one splint made on setup in prosthesis laboratory is needed for treatment.

This splint is different from Invisalign system aligners (Align Technology, San José, California, USA) [3] which are produced on digitized models after validation by the responsible operator for dental movements step by step and with more appropriate materials but are more expensive. These professional aligners [4] are especially indicated in more complex treatments than simple movement of a single tooth.

The lingual displacement of a maxillary incisor requires to be attentive to its situation in the horizontal, as well as vertical plane; indeed, a labially displaced incisor loses its occlusal contact and can extrude. The vertical position of the incisor must be taken into account, as the simple lingual-version movement will increase the incisal overbite.

Laboratory and clinical steps required:

- Simple alginate impressions of the dental arch on which the tooth to be treated depends (Figure 4) but also antagonistic teeth in order to check if the occlusion does not constitute an obstacle to orthodontic movement. Dental cast is made with hard plaster.

- Observation of the plaster cast and conceptualization of the lingual movement to be applied to the tooth. As the incisor cannot be moved back, a very slight enamel grinding is done on each side of the crown, in order to recreate enough space to reposition it. This grinding is simulated on the plaster (Figure 5).

- To cut the plaster tooth at the base of the crown.

- To reposition it, respecting the free edges aligned both horizontally (Figure 6) and vertically in order to also apply an intrusion movement on the tooth to avoid any increase in the overbite. (Figure 7) The tooth is glued to the adjoining teeth with strong glue.

- To create the appliance by thermoforming a clear plastic sheet 0.5 millimeters thick [5] on the cast.

- To perform a light clinical coronoplasty on both sides of the dental crown, as simulated on plaster, before insertion of the ther- moplastic appliance, with a very thin rotary diamond disc [6] in mesial and also with an abrasive strip in mesial and distal. In accordance with Chudasama and Sheridan’s recommendations and without exceeding the limits [7], only 0.3 mm in mesial and...
0.1 mm in distal were removed. During insertion, the aligner does not fully insert anteriorly, and the patient feels a significant friction force on the incisor to be moved (Figure 8).

- Two weeks of aligner wear and, at least, twenty-two hours a day. Following this last step, the incisor is correctly positioned in horizontal and vertical plane, without discomfort during occlusion (Figure 9 and 10).

- The prior acceptance of a fixed metal bonded lingual retainer of the anterior teeth [8]. The patient is warned that such orthodontic treatment must be associated with prosthetic and occlusal rehabilitation of posterior dental sectors, to ensure lifelong stability.

*Figure 4: Dental cast showing vestibular displacement of the left central incisor.*

*Figure 5: Coronoplasty of both proximal surfaces on the incisor.*
Figure 6 and 7: Repositioning of the left central incisor in the horizontal and vertical plane.
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Figure 8: On the day of installation, the aligner does not fully insert at the level of the tooth to be moved.

Figure 9 and 10: Clinical repositioning of the left central incisor in the horizontal and vertical plane.

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Conclusion

The rational use of simple means can provide the patient with great services and facilitate their management. These minor orthodontic treatments must be part of the daily therapy of the dentist. A good understanding of these tools and the prior analysis of each case are essential steps before the treatment is implemented. In case of doubt, an orthodontist, a real specialist in more complex corrective treatments must be consulted.

Conflict of Interest

I declare not have any financial interest or any conflict of interest exists.

Bibliography


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