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NONEXTRACTION METHODS FOR CREATING SPACE IN ORTHODONTIC THERAPY

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Abstract

Introduction: Molar distalization is an alternative treatment method in dento-maxillary anomalies, to avoid extraction especially in low angle cases. The orthodontic literature indicates that upper molar distalization is a tipping movement, combined with mesiobuccal rotation and buccally-crown torque. The aim of the study was to analyze the advantages to create space during upper first molar distalization movement, by using different devices. We used this method in skeletal Angle Class II, dental Class II/2 malocclusion with crowding and low profile.

Methodology: The study consisted of a retrospective statistical analysis on 435 patients aged 11-13 years treated with fixed appliances (straight wire technique), between 2009-2012. The patients were divided in two groups: group A (83) who worn distalization devices and group B (352) who did not. Group B was divided in: B1 (278) with other nonextraction appliances and B2 (74) with extraction during orthodontic treatment.

Results: Upper molar distalization was successful in 45% of the cases, the values of the space being: 2,13- 2,33 mm, by tipping movement. Bodily distal upper molar movement was successfully obtained only when the rotational axis is at infinite and the compressive stress is homogeneously distributed in the periodontal ligament. The success rate depended on: eruption of the second molar, overjet and overbite size.

Conclusions:

1. Molar distalization is a challenge in orthodontic treatment and is indicated for Angle Class II, crowding and low angle (extraction makes the profile worse).
2. Molar distalization depends on the position of the second molar and this technique is not singular, but associated with multibracket appliance.

Key words: distalization, second molar, class II, extraction, fixed appliances.

Introduction

Modern orthodontic therapy attempts, whenever possible, a nonextraction treatment, with convenient means for the patient, which would allow current activities and it would not affect facial harmony (1).

In this context, molar distalization is an useful treatment method in obtaining arcade space, especially in anomalies Angle Class II/2 with accentuated retrognathic profile and hypodivergent growth pattern, cases where extraction would obviously create aesthetic facial damage (2).

The authors propose in this paper an assessment of the molar distalization method in comparison with other nonextraction therapy methods (expansion, frontal protrusion and stripping).

Methods

We conducted a retrospective statistical study on a sample of 435 patients, aged between 11-13 years, who were treated at the Orthodontic Department of the Faculty of Dentistry in Târgu Mureș in the period 2009-2012, for various malocclusions.

The initial sample was divided into two subgroups: group A - 83 patients average age 11,25 with upper or lower molar distalization. The following parameters were evaluated:

- duration of treatment;
- type of distalization;
- type of used appliance;
- obtained results.

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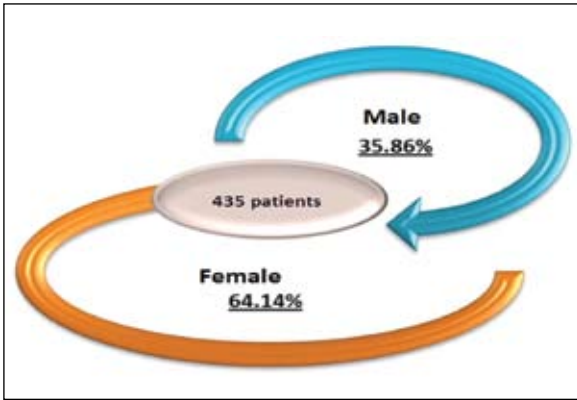


Figure 1. Cases distribution

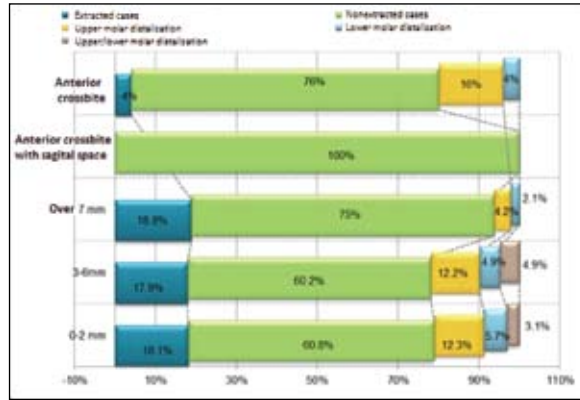


Figure 2. Correlation between overjet and distalization

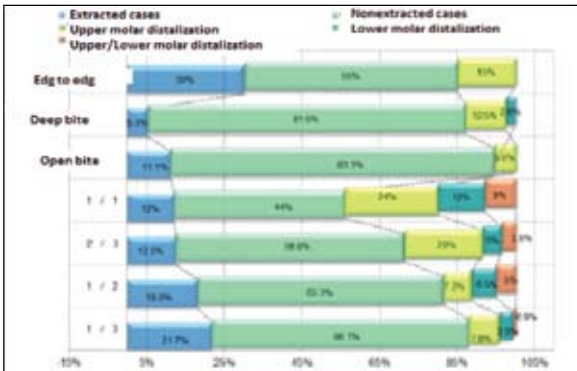


Figure 3. Correlation between overbite and distalization

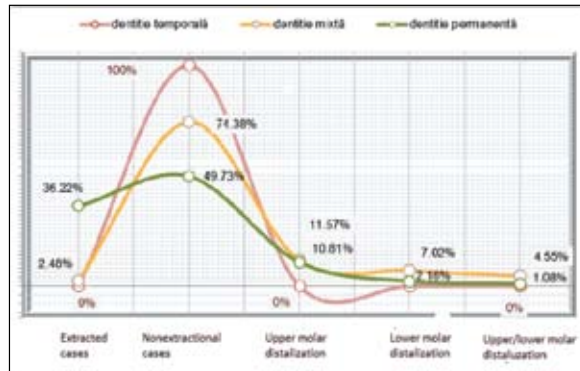


Figure 4. Correlation between molar distalization and anomalies

Group B - represented by the rest of the patients, average age 12,15 were divided in two subgroups: B1 - cases of permanent teeth extractions and B2 - nonextraction cases, treated with other methods than distalization.

Results

The distribution of cases by gender demonstrated a predominance of female patients, representing 64% of the studied group (Figure 1).

Analysis of cases depending on the type of anomaly revealed a higher frequency of Angle Class I malocclusion (56,09%), Class II represented by 35% of which 20,69% Class II/1, and 14,71% Class II/2, and Angle Class III malocclusion represented only 8,51% of the studied group (Table 1).

Table 1. The distribution of anomalies

Angle Class	No. cases	%
Angle Class I anomalies	244	56.09%
Angle Class II/1 anomalies	90	20.69%
Angle Class II/2 anomalies	64	14.71%
Angle Class III anomalies	37	8.51%
Total	435	

In group A, represented by patients with molar distalization, the distribution on the arches was the following: the upper jaw 11,26%, lower jaw 4,83% and bimaxillary: 2.99% of cases (Table 2).

Table 2. The distribution of arches

	No. cases	%
Molar distalization	83	19.08%
Upper arch	49	11.26%
Lower arch	21	4.83%
Upper and lower	13	2.99%
Total	166	

The distribution of cases from subgroup B₂ includes:

- upper expansion plate 34%;
- lower expansion plate 8%;
- maxillary disjunction (rapid palatal expander) 4%;
- functional therapy 2,5%;
- class II elastics 37%;
- lee-way-space maintenance 1,5%;
- stripping (interproximal reduction) 13%.

Correlational analysis of the type of extractional/nonextractional treatment related to overjet shows that: for overjet values between 0-2 mm,

the most frequent therapy is nonextractional (other than distalization) in 60% of cases, followed by dental extraction in 28% of cases and molar distalization in 12% of cases. The frequency with which distalization was used decreases with the growth of overjet value (Figure 2).

Correlational analysis of the type of extractional/nonextractional treatment related to overbite shows that in open bite cases the extraction treatment is more frequent and in deep bite cases the most frequent treatment is nonextraction. (expander or stripping), followed by distalization cases (Figure 3).

Our study showed an increased incidence of therapy with molar distalization in Class II/2 anomalies (28,13%), followed by Angle class I (11,07%) and class II/1 (4,44%) (Figure 4).

Regarding the type of dentition, we found that the difference in the incidence of upper molar distalization is not significant, between permanent (10,81%) and mixed dentition (11,57%), as opposed to the lower jaw, with a frequency of 7,02% in the mixed dentition and 2,16% in the permanent dentition (Figure 5).

A major issue in this kind of therapy is the timing of treatment initiation. In group A the mean age of the patients was 11,25 years and in group B the mean age was 12,15 years.

The highest chances of molar distalization success are when the second molar has not yet erupted.

Discussion

The updated data from the literature indicates that during molar distalization we obtain a distal tipping and less corporal displacement because the force application point is at a distance from the resistance center of the tooth (3,4). For bodily movement, the moment/force ratio at the molar centre of resistance must be zero, so it is necessary to reduce the moment on the molar bond using a counterbalancing couple (CBC) with effects in the vertical plane (5,6).

Bibliography

1. Proffit WR. Biomechanics and mechanics. Contemporary Orthodontics 3rd ed. St Louis: Mosby Inc; 2000:298-305.
2. Baccetti T, Franchi L, Kim LH. Effect of timing on the outcomes of 1-phase nonextraction therapy of Class II malocclusion. Am J Orthod Dentofacial Orthop. 2009;136(4):501-509.
3. Antonarakis GS, Kiliaridis S. Maxillary molar distalization with noncompliance intramaxillary appliances in Class II malocclusion. A systematic review. Angle Orthod 2008, 78(6):1133-1140.
4. Escobar SA, Tellez PA, Moncada CA, Villegas CA, Latorre CM, Oberti G. Distalization of maxillary molars with the bone supported pendulum. A clinical study. Am J Orthod Dentofacial Orthop 2007;131(4):545-549.
5. Henneman S, Von den Hoff JW, Maltha J.C. Mechanobiology of tooth movement. Eur J Orthod. 2008;30(3):299-306.

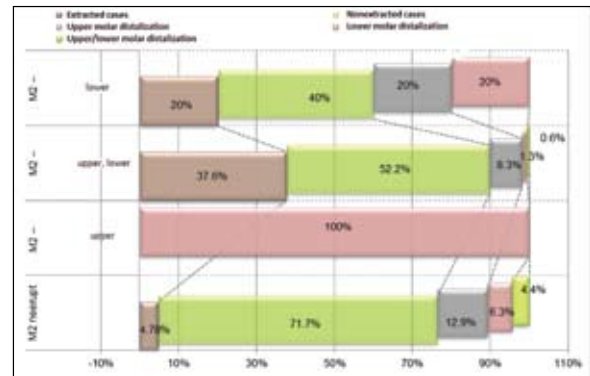


Figure 5. Correlation between type of dentition and molar distalization

In the orthodontic field it is better to have dental movement by translation (7).

But during distalization we obtain a distal tipping, is important to follow the maintenance of initial molar angulation, adding to the initial coronal tipping a root distal tipping (8).

Molar distalization is not a single orthodontic therapy, but has to be followed by fixed orthodontic treatment, which uses the obtained space for aligning the tooth and for overjet correction.

Most authors recommend that distalization appliances should be inserted on an oral part of the arch in order to be nearer to the resistance centre.

The other possibilities to have a translation movement during distalization is to put an extra-oral force (9).

Conclusions

Molar distalization is a challenge in orthodontic treatment and is indicated for Angle II Class, crowding and low angle (extraction makes the profile worse).

The rate of success in molar distalization is less than that in other nonextraction methods and sometimes this method is followed by extraction.

6. Kinzinger GSM, Fritz UB, Sander FG, Diedrich PR. Efficiency of a pendulum appliance for molar distalization related to second and third molar eruption stage. Am J Orthod Dentofacial Orthop 2004; 125(1):8-23.
7. Birte M. Biological reaction of alveolar bone to orthodontic tooth movement. The Angle Ortodontist. 1999;69(2):151-158.
8. Papadopoulou MA, Mavropoulos A, Karamouzou A. Cephalometric changes following simultaneous first and second maxillary molar distalization. J Orofac Orthop 2004;65(2):123-136.
9. Klontz H. The Extraction/nonextraction dilemma - the Class II solution. The Tweed Profile. 2006;5:25-30.
10. Korkmaz S, Fulya I, Ferdi A, Tülin A. Unilateral molar distalization with a modified slider. Eur J Orthod. 2006;28(4):361-365.

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In 1983 graduated from the Faculty of Dental Medicine (MD degree), the University of Medicine and Pharmacy Târgu-Mureş.

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She is author of more than 150 research papers and 7 books on several topics in orthodontics, pedodontics and general dentistry.

Questions

This study was:

- a. Prospective
- b. Retrospective
- c. A case presentation
- d. A case series

Regarding the participants to the study:

- a. There were more male patients
- b. Class I Angle malocclusions represented over half (50%) of all the anomalies
- c. Class II represented over half (50%) of all the anomalies
- d. Class III Angle malocclusions were over a quarter (25%) of all the anomalies

Regarding molar distalization:

- a. Almost 50% of patients presented with molar distalization
- b. The upper jaw was involved in 20% of all the patients
- c. The lower jaw was affected in 7.5% of all cases
- d. Both the upper and lower arches were affected in almost 3% of all the cases

Among the conclusions of this study:

- a. Molar distalization was successful in over half the cases;
- b. The average treatment period for molar distalization was 9 months
- c. Molar distalization has a smaller or the same chance of success in patients in whom the second molar hasn't erupted
- d. An increase in overjet is associated with the success of the treatment