CASE REPORT POJ 2016:8(1) 67-70

Unilateral upper molar distalization; A Case report

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Abstract

The search for new treatment modalities that avoid dental extractions has gained great importance in the practice of contemporary orthodontics. One of the conventional approaches for space regaining in the dental arches is done by using certain appliances like headgears and removable appliances, in which success used to rely heavily on patient's compliance and cooperation. Noncompliance therapies had become more popular in the correction of space discrepancies and among the effective noncompliance appliances, is the Intraoral "Keles Slider". In this case report we will show a challenging case in which a molar was distalized effectively without increasing the overjet or worsening the facial profile.

Keywords: Distalization; non-compliance; facial profile

Introduction

The search for new treatment modalities that avoid dental extractions (especially premolars) never stops and this has created a growing tendency to avoid as much as possible, any treatment that includes extractions. There are many non-extraction treatment modalities for Class II malocclusion. One of them is by converting a Class II molar relationship into that of a Class I. In order to accomplish this we must distally displace the upper first molars. Unilateral Class II molar relationship could be a result of early loss of an upper second deciduous molar on one side during the mixed dentition period. This would allow the mesial drift of the permanent first molars, which might block the eruption of some permanent teeth in the future, especially the upper canines as they are the last teeth to erupt mesial to the molars.

Successful orthodontic treatment often relies heavily on patient co-operation such as treatments involving wearing of headgear, elastics or removable appliances. Compliance with headgear is rarely optimal.[1] Clinicians have concerns about the safety of headgear to cause eye and facial tissue damage.[2] Since the use of headgear and removable appliances require considerable patient co-operation to be effective in correcting the molar relationship, research has been carried out to develop various non-compliance intraoral molar distalization methods. These treatment modalities, which have proved to be effective in subjects with a dental Class II malocclusion with mild to moderate space deficiency in the upper dental arch, include repelling magnets,[3] molar distalizing bow (MDB),[4] Ni–Ti coil springs,[5] sectional jig assembly,[6] pendulum appliance, K-loop,[7] fixed piston,[8] distal jet appliances,[9] bimetric maxillary distalizing arch[10] and intraoral bodily molar distalizer.[11]

It has been demonstrated that the maxillary molars can be distalized with the above appliances in a short period of time with continuous force, regardless of patient co-operation. However, compared with other distalization methods, the Jones jig and pendulum appliances have become increasingly popular over the last years. Mesial movement of the anchor unit, an increase in the overjet, patient discomfort and soft tissue irritation seem to be the disadvantages of these appliances. Ghosh and Nanda[12] in 1996, and Keleş et al.[11] in 2000 suggested in their studies that anchorage loss

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could possibly be reduced if the anchor unit was adequately reinforced by full palatal coverage and this was applied in the Keles Slider.

Distalization using implants and mini-screws are widely used in the present time but they have their disadvantages too. There is cost involved with these modalities and patient might reject such an option because of the surgery involved. Besides, it has certain contraindications like acute infectious processes, uncontrolled diabetes and persistent periodontal disease.

Case Report

A 13 year 2 months old male patient presented with a unilateral Class II molar relationship on the right and Class I canine and molar relationship on the left side. His E| was extracted prematurely and was not followed with a space maintainer. The 3| was infra-positioned and completely blocked out due to the space loss from the mesial migration of all the teeth distal to the canine. This was further complicated by a unilateral posterior cross-bite. Skeletally, he had a Class I tendency with normal maxillary-mandibular plane angle. He presented with a convex profile and slightly protruded upper lip. For maxillary molar distalization 'Keles Slider' was used. The appliance was composed of two molar bands and the anchorage unit was composed of a wide Nance button (Figure 1). The point of distal force application was close to the centre of resistance of the 6| and parallel to the occlusal plane. Ni-Ti coil springs were used and 200 g of distal force was applied. Nine months later the space required for the correction of the canine position was regained and the posterior cross-bite was corrected. The appliance was removed and final alignment of the teeth was achieved with fixed appliances.

Cephalometric radiographs were taken at the beginning and at the end of treatment. It was shown that both upper and lower incisors slightly proclined during the treatment. We believe that upper proclination was minimal due to the use of the wide Nance button which acted as a moderate anchorage device. The vertical facial height increased slightly due to the distalization of the upper molar. Figure 1 shows the progress of the treatment.

Figure 1: Progress of treatment with distalization appliance

Figure 2: Extra & Intra oral pre-treatment photographs

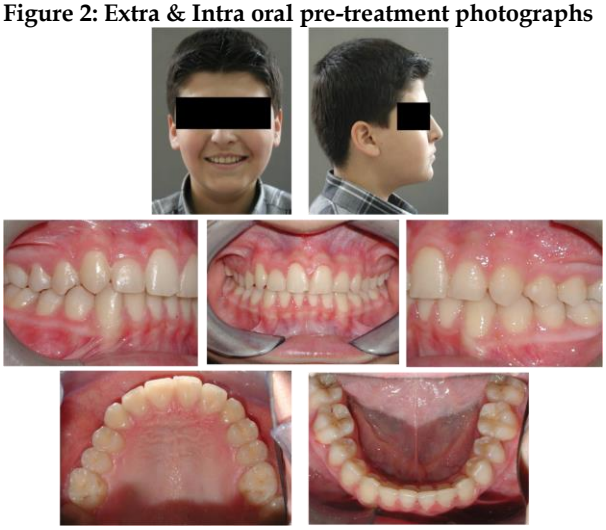

Figure 3: Extra & Intra oral post-treatment photographs

Discussion

The non-compliance intra-oral molar distalization method has been an excellent compromise for patients who are unwilling to wear headgear or to have mini screws / implants for distalization. There is always a marked individual variation in patient's response to these appliances in terms of anchorage loss and skeletal effects. For guided molar distalization, NiTi coil springs were used. The use of this titanium coil springs allowed to provide constant distal force near the centre of the resistance of molar, thus reducing the moment of force and reducing tipping of the molars to the minimal. In this case, distalization of molar occurred with minimum amount of anchorage loss. It may be due to the support taken from a wide acrylic button and the inclusion of molar on other side along with two premolar rests. In this patient we postponed braces placement until distalization started and we can see clearly that the premolars were following in a distal direction by drifting without applying any orthodontic forces on them (Figure 3).

Table I: Sagittal Cephalometric Changes

Value	Before treatment	After treatment
SNA	76	78
SNB	74	75
ANB	2	3
Witts Analysis	2	1

Table II: Vertical Cephalometric Changes

Value	Before treatment	After treatment
Go Me - SN	37	40
ANS- Me/ N-Me%	55%	56%
Jaraback %	64%	61%
Maxillary Height	63	63

Table III: Dental Cephalometric Changes

Value	Before treatment	After Treatment
Upper incisor to SN	97	100
Lower incisor to Mandibular plane	85	88
Holdaway ratio	2:2	4:3
Interincisal Angle	143	139

In the sagittal plane (Table I), molar distalization occurred at the expense of mild proclination of the maxillary anterior teeth due to reciprocal mesial force. Changes in both SNA and SNB angles were minimal, in the vertical plane (Table II), this appliance extruded the maxillary molar, thus increasing the mandibular plane angle to a mild degree

which caused the downward and backward rotation of the mandible. We must keep in mind this effect because distalization movement tends to open the bite and the more we distalize the molar, the more the bite will open. This effect is favorable in patients with deep bites, but counterproductive with open bite or hyper-divergent growth tendency. For the dental changes analysis (Table III), proclination of upper incisors was minimal, as the upper incisors to SN value increased from 97 to 100, which kept this value within the normal range. This again emphasizes the importance of the support taken from the wide acrylic button which was used.

Conclusions

At the end of second phase of treatment, Class I molar and canine relationships were achieved on both sides, posterior cross-bite was corrected, inter-incisal angle was improved with an ideal overbite and overjet relationship.

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