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Correction of class II molar by molar distalization with pendulum appliance: A case report

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Abstract

Angle's Class II malocclusion with non- extraction method generally requires distal movement of the maxillary dentition, mesial movement of the mandibular dentition, or a combination of the two. A 14 year old female came with chief complaint of irregularly placed teeth. On clinical examination and analysis of relevant records, she was diagnosed as an Angle's Class II malocclusion, severely crowded maxillary arch with labially placed canines. She received non-extraction treatment that included bilateral maxillary molar distalization with the Hilgers pendulum appliance.

Keywords: Class II malocclusion, distalization, pendulum appliance

Introduction

Soon after the practitioners recognized that orthodontic treatment can influence the patient's profile and esthetics, the extraction of teeth in orthodontics has been a matter of debate. Recent studies of extraction vs nonextraction treatment have focused on the profile effects of these treatments [1].

Angle's Class II malocclusion generally requires maxillary dentition distal movement, mandibular dentition mesial movement, or a combination of the two [2]. The development and application of intramaxillary intraoral appliances for molar distalization in Class II malocclusion has been made possible by advances in biomechanics, technology, and materials that have enabled the delivery of light and constant forces over a wide range of deactivation [3]. Clinically the use of intra arch devices is typically regarded as simple and effective. Hilgers first introduced the Pendulum Appliance as an important component of this intra arch system in 1992 [4]. Many variations have emerged since then, and clinical applications of the pendulum appliance have yielded positive results. The Pendulum appliance is simple, non-compliant, easy to make in the dental lab, and simple to use. The distalization of molars with the Pendulum appliance in Class II subdivision malocclusion is described in this case report.

Case report



Fig 1: Extraoral Pretreatment Photographs

A 14-year female presented with the chief complaint of irregularly placed upper front teeth. No relevant medical history was present. On clinical examination, no abnormality was detected with temporomandibular joint. Her facial form was mesoprosopic and symmetric, with a convex soft tissue profile (Figure 1). Intraorally she had retroclined upper incisors with labially placed upper canines. Crowding was

present in maxillary and mandibular arch. She had class II molar relation on right side and end-on on left side, canine relation was end-on on both side and incisors were in class I relation with an overjet of 2mm. Upper and lower midline was shifted to right side by 2 mm with respect to facial midline (Figure 2).



Fig 2: Intraoral Pretreatment Photographs

Treatment Objectives

Treatment objectives were to relieve crowding in upper and lower arch, correct class II molar relation and end-on canine relation and correction of dental midline correction with respect to facial midline.

Treatment Plan

The treatment plan included distalization of upper posterior tooth segments with a pendulum appliance to create space for canine alignment, relieve crowding, and achieve optimal overjet and overbite.

Treatment Progress

Treatment was started with the maxillary first molars banding followed by alginate impression for the fabrication of the pendulum appliance. After the fabrication of the appliance, it was cemented with the desired activation as suggested by Hilgers.

Preactivation and placement

Pendulum springs can be activated intraorally, it is much more efficient to preactivate them before appliance placement. The springs should be bent parallel to the midline of the palate (or perpendicular to the body of the appliance). About one-third of the pressure is lost during placement, and the remaining pressure is easily tolerated by the patient. The

molar bands are cemented in place without the springs engaged, and the appliance's anterior portion is then cemented in place.



Fig 3: Placement of Pendulum Appliance

Activation was kept less on left side as compared to right because of end on molar relation on left (Figure 3). The molar started moving distally. At the end of four months, the molars showed a distal movement. Molar distalization phase continued for 6 months till Class I molar relation with some overcorrection was achieved (Figure 4).



Fig 4: Molar distalization after 6 months

Discussion

Correct diagnosis and treatment planning are utmost important for successful treatment results. The present case required asymmetrical movement of the molars because of end on molar relation on left side. According to the findings of this case study, the pendulum appliance is an effective and dependable method for distalizing maxillary molars. The appliance's main advantages are its low reliance on patient compliance, ease of fabrication, the ability to correct minor transverse and vertical molar positions by adjusting the springs, and, last but not least, patient acceptance. With the addition of a U-loop in the spring, Hilgers' pendulum appliance can affect favourable mesiobuccal rotation as well as bodily movement of the first molars. This could be useful for improving the Class I molar relationship and yielding more space.

The patient's second molar had also erupted. Influence of second molar on the distal movement of the first molar remains a matter of debate. According to some authors, the presence of a second molar lengthens treatment time^[5], causes molar tipping, and causes anterior anchorage loss^[6]. On the contrary, some authors claim that the presence and position of the second molar have no effect on the amount and type of maxillary first molar distal movement^[7-8]. Previous research has found that the pendulum appliance produces molar distalization ranging from 3.14 to 6.1 mm^[9-10].

The present case required asymmetrical movement of the molars because of end on molar relation on left side with midline discrepancy for which the use of pendulum appliance proved to be a versatile option. Modest amount of overbite correction due wedge bite opening tendency of the appliance^[11]. Treatment planning and selection of appliance is based on critical decision making. The pendulum appliance in the present case was effective in achieving the treatment goals and is considered to be the effective method in treatment of mild to moderate class II malocclusion.

Conclusion

Pendulum appliance was found to be efficient, non-invasive and non-compliant appliance for treating mild or moderate class II malocclusions through distalization of upper molars thus avoiding premolar extractions.

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