CASE REPORT

Non Extraction Treatment of skeletal Class II using Powerscope: A Case report

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ABSTRACT

Powerscope is one of the innovations in fixed functional appliances. It is based on the concept of forward displacement of mandible with distal movement of maxilla thus reducing the class II skeletal tendency to class I, hence it is a class II corrector which is used in a treatment of mandibular retrusion by bringing about increase in mandibular length. It is a very effective appliance to be used in a non compliant patient as it is a one piece fixed appliance attached to the wires thus reducing the chances of bond failures at brackets and tubes. It brings about growth modification in skeletal class II cases by sagittal movement of the mandible. Based on the advantages of powerscope over other fixed functional appliances the following case report exhibits a case which showed significant changes in Class II malocclusion without going for an extraction approach.

KEYWORDS: Fixed Functional Appliance, Class II corrector, Patient Compliance, Growth Modification, Mandibular Retrusion.

INTRODUCTION

Class II is one of the most common malocclusion in the orthodontics of development origin resulting in imbalance between various skeletal and dentoalveolar components. It has a prevalence ranging from 15 to 30% in most populations[1] .This produces significant negative functional esthetic, psychological, and social effects on an individual. It can be broadly divided into 2 categories based on whether maxillary excess or mandibular deficiency. It may vary in severities depending on age and growth direction, which dictates the preferred clinical approach for its management. Thus treatment for the correction of skeletal Class II malocclusion will depend on what part of the craniofacial skeleton is affected and age of the patient. In general treatment for skeletal class II includes growth modification in growing individuals and surgical correction for non growing individuals.

Patients having skeletal class II malocclusion due to mandibular retrusion which report after the pubertal growth spurt are generally advised to go for fixed functional appliance treatment according to McNamara[2-4]. Various fixed functional appliances such as Herbst, Universal bite jumper, Ritto appliance, Eureka Spring, fixed twin block, Jasper jumper, and Forsus fatigue resistant device (FRD) are available depending on which will be the better choice considering the patient compliance.

One of the innovations in such kind of class II correctors is Powerscope which was developed by Dr. Andy Hayes in collaboration with American Orthodontics. Powerscope applies continuous force and brings about favorable mandibular growth, distal maxillary movement and mesial positioning of mandibular arch with providing the advantage of simple installatioan as well as patient comfort and acceptance[5-6].

This paper presents a nonextraction approach in the treatment of skeletal Class II with retropositioned mandible with division 2 pattern & deep bite using PowerScope.

CASE REPORT

A 13 year old female patient reported to the department of orthodontics & dentofacial orthopaedics at Inderprastha dental college & hospital with chief complaint of irregularly placed upper front teeth and no relevant medical history.

DIAGNOSIS

Based on clinical and cephalometric analysis, patient was diagnosed having skeletal class II with retropositioned mandible and horizontal growth pattern. Angle's class II div II malocclusion with deep bite and midline deviation by 1mm, was diagnosed. Treatment Objective was to achieve skeletal class I relationship by using fixed functional appliance (powerscope).

Figure 1. Pre Treatment (A) & Post Treatment (B) Extraoral Photographs

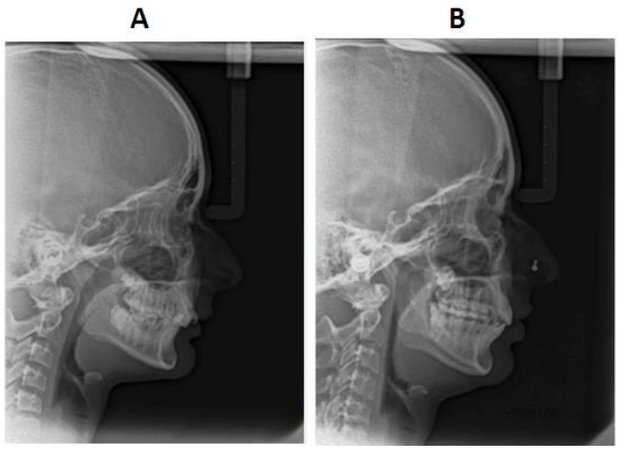

Figure 3. Pre Treatment (A) & Post Treatment (B) Lateral Cephalograms.

S.No.	Cephalometrics	Pre treatment	Post treatment
1.	SNA	80^0	80^0
2.	SNB	74^0	76^0
3.	WITTS APPRAISAL	6MM	4MM
4.	Y AXIS	62^0	62^0
5.	FMA	19^0	27^0
6.	SADDLE ANGLE	129^0	122^0
7.	MAXILLOMANDIBULAR DIFFRENCE	40	19
8.	INTERINCISAL ANGLE	147^0	124^0
9.	LI TO MANDIBULAR PLANE	7^0	15^0
10.	U1 TO FH PLANE	128^0	109^0
11.	OVERJET	1MM	2MM
12.	OVERBITE	8MM	2MM
13.	UPPER LIP TO S LINE	-3 MM	-1MM
14.	LOWER LIP TO S LINE	-5MM	-0.5MM

TABLE 1. Pretreatment(A) and Posttreatment (B) Cephalometric Values

Figure 2. Pre Treatment (A) & Post Treatment (B) Intraoral Photographs

DIAGNOSIS

Treatment progress

The treatment progressed as non extraction case with MBT (Ormco, Glendora, CA, USA) preadjusted edgewise appliance of slot size 0.022" *0.028". After completion of leveling and aligning, stabilizing archwire 19* 25 SS was placed. The time taken for leveling and alignment was 7 months. This was followed by powerscope placement for 8 months for mandibular advancement(Figure 4). The class II corrector was placed on

both the sides to correct the class II molar relationship as well as for mandibular advancement. Both upper and lower arches were consolidated as well as cinch back was given so as to prevent flaring of lower anterior teeth for which 5° lingual crown torque was also placed in lower anteriors

When the desired correction of class II was achieved, powerscope was removed in 8months from both the sides and settling class II vertical elastics were given to accentuate the achieved sagittal correction.

DISCUSSION

It is a well known fact that for successful completion of functional appliance therapy patient's compliance is of paramount importance. The fixed functional appliance, being fixed to the teeth is a most important weapon against non-compliance offered by the patientt is a well known fact that for successful completion of functional appliance therapy patient's compliance is of paramount importance. The fixed functional appliance, being fixed to the teeth is a most important weapon against non-compliance offered by the patient is a well known fact that for successful completion of functional appliance therapy patient's compliance is of paramount importance. The fixed functional appliance, being fixed to the teeth is a most important weapon against non-compliance offered by the patient.

It is a well known fact that for successful functional appliance therapy, patient compliance is of paramount importance and thus fixed functional appliance being fixed to the teeth is an effective treatment modality in a non compliant patient.

The working principle of fixed functional appliance is restriction of forward growth of maxilla, simulation of forward growth of mandible as well as it does distal movement of maxillary molars and mesial movement of mandibular molars where as other effects also include retroclination of maxillary incisors and proclination of mandibular incisors[7-8].

Abundance of literature is present on various fixed functional appliances available for skeletal class II correction but in this case powerscope was used for the same considering its advantage on other appliances[9-10]. The powerscope[11] is fixed tooth-born fixed functional appliances attached to permanent first molars, to which orthopedic forces will be applied. It has the advantage of allowing concurrent treatment with fixed orthodontic therapy and therefore efficiently normalizes the occlusion.

The advantages of powerscope includes that it is a fixed single piece appliance which comes with 1 size available for all kinds of patients suiting their class II skeletal tendency. Also it is fixed to the wire which minimizes the risk of bracket breakage thus reducing the number of appointments and delay in treatment procedure.

The appliance has ball and socket joint at two ends which allows excellent jaw movements reducing patient discomfort[12]. The powerscope armamentarium comes with with crimpable shims which allow customization of the appliance.

This case report highlights the skeletal, dental, and soft tissue changes after treatment with Power Scope appliance.

Figure 4. Placement of Powerscope

Cephalometric findings showed that mandibular growth had occurred during orthodontic treatment (Figure3, Table 1). There was 2degree reduction in ANB angle from 6degree to 4 degrees, also there was increase in mandibular length as well as Frankfort mandibular angle. Significant improvement was observed in the patient's dental esthetics, including correction of the midline deviation, achievement of ideal overbite and overjet. Fixed functional systems offer absolute advantages over removable systems. Fixed functional appliance system being designed for 24 hours daily wear, places continuous stimulus for mandibular growth.

CONCLUSIONS

Powerscope fixed functional appliance affects the skeletal and dentoalveolar craniofacial complex and is effective in normalizing the Class II malocclusion to Class I in non extraction treatment approach. It can be said that powerscope is one of the finest class II corrector for achieving outstanding and long lasting treatment results with maximum patient ease and amazing improvement in sagittal correction by forward placement of mandible.

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