

Class II Correction with Power Scope Appliance: A Case Report

Rekha Sharma¹, Sonal Chowdhary², Vinni Arora³

¹Professor & Head, Department of Orthodontics, Postgraduate Institute of Dental Sciences, Rohtak

²Associate Professor, Department of Orthodontics, Postgraduate Institute of Dental Sciences, Rohtak

³Junior Resident, Department of Orthodontics, Postgraduate Institute of Dental Sciences, Rohtak

ABSTRACT

Management of class II malocclusion in adolescents by growth modulation is one of the commonly encountered scenario in clinical orthodontics. Noncompliance has been a major concern for orthodontists. This case report describes the management of class II malocclusion in young adult with Power Scope (American Orthodontics), a fixed functional appliance, that is recently innovated used for correction of Class II malocclusion and claimed to have many advantages over other fixed functional appliances.

Keywords : Power Scope, Fixed functional appliance, Class II malocclusion

INTRODUCTION

Class II malocclusion presents a major and common challenge to present day orthodontics. Among different dental and skeletal combinations that can create a Class II malocclusion, mandibular retrusion is one of the most common characteristics.¹ Functional appliance therapy plays an important role in treating such cases. Various Removable and fixed functional appliances have been reported in literature for advancement of mandible.^{2,3}

A variety of Fixed Functional appliances, that doesn't require patient compliance have been designed by different clinicians.⁴ PowerScope is a recently developed noncompliant hybrid fixed functional appliance that holds the mandible anteriorly and corrects the Class II anteroposterior discrepancy.⁵

It is delivered as a one-size-fits-all appliance pre-assembled with attachment nuts for quick and easy chair side application. The appliance is a wire-to-wire installation with attachments placed mesial to the first molar in the maxillary arch and distal to the canine of the mandibular arch. Internal NiTi spring mechanism delivers 260 gms of force for continuous activation during treatment. Appliance is low profile and less bulky for more esthetic facial appearance, smooth, rounded patient-friendly design for better patient comfort, telescopic device that does not displace or disengage during treatment; these advantages make it more patient friendly.

CLINICAL EXAMINATION AND DIAGNOSIS

A 16-year old female reported to the clinic complaining of forwardly placed upper front teeth. Extraorally, the patient had no apparent facial asymmetry, mesoprosopic facial form, convex facial profile, hypotonic lower lip. The patient had a deep mentolabial sulcus, hyperactive mentalis, low clinical FMA and positive visual treatment objective on the advancement of the mandible.

Intraorally, the patient presented in permanent dentition with Class II division 1 incisor relationship and increased overjet of 11 mm. The deep bite was increased (7 mm). Maxillary dental midline was coincident with facial midline. The molar and canine relationships were full unit Class II on both sides. The maxillary incisors were proclined and maxillary arch was mildly constricted in the anterior region. [Figure 1]

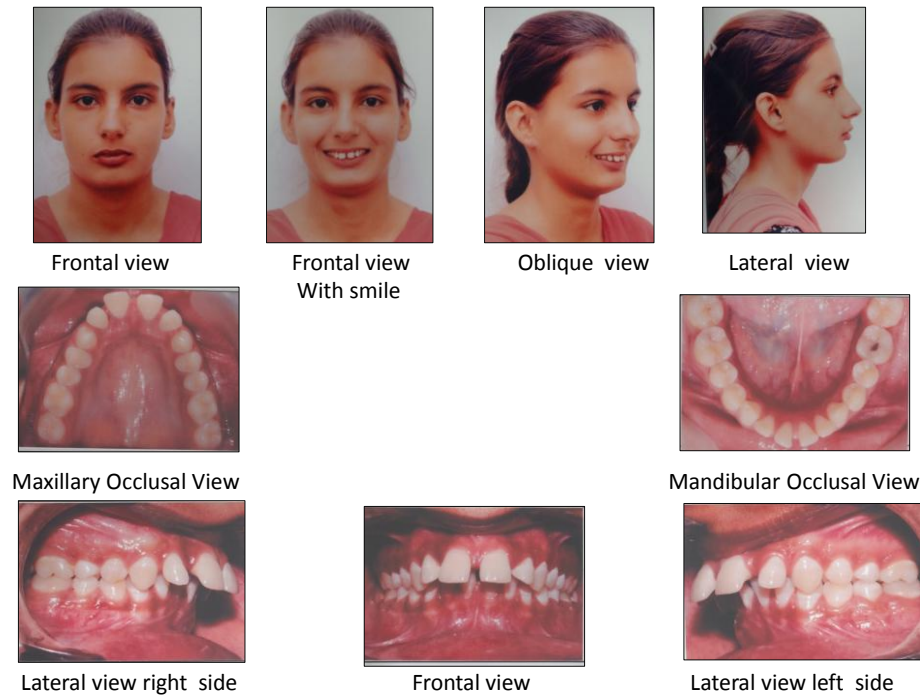


Figure 1. Pretreatment Potographs

Orthopantomogram confirmed the presence of all permanent including third molars [Figure 2].

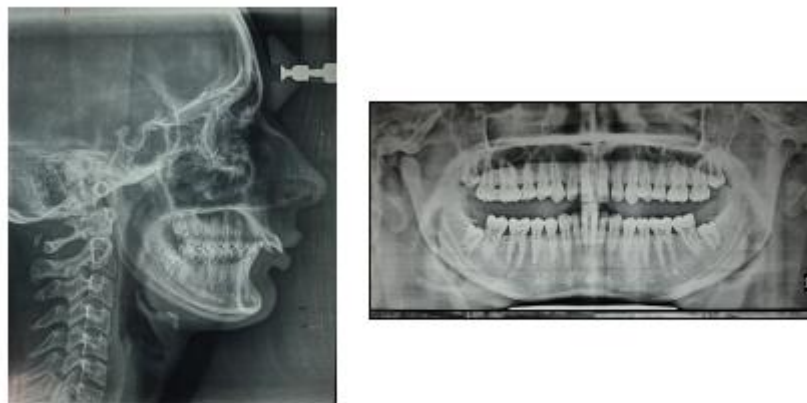


Figure 2: Pretreatment x- rays

In the cephalometric assessment, the increased ANB (6°) and wits appraisal (+6 mm) confirmed that the patient had a Class II skeletal pattern. The normal SNA and reduced SNB and SNPg indicated a normal maxilla, retrognathic mandible, and chin. SN-mandibular plane angle (27°) and Jarabak's ratio (69%) indicated a horizontal growth pattern. The upper incisors were slightly proclined, whereas the lower incisors were normally inclined [Table 1].

Treatment Objectives

- Accentuate forward growth of the mandible to improve facial profile and mandible/cranial base relationship
- Restriction of maxillary growth in Sagittal and vertical plane
- Achieve Class I incisor and buccal segment relationships without extractions
- Avoid any backward rotation of mandible

Treatment Progress

Orthodontic treatment was started with 0.022" X 0.028" Preadjusted Edgewise System. Bands were placed with a transpalatal arch in the upper jaw to minimize the anticipated side effects at the upper posterior segment. An initial

0.014-inch round nickel titanium archwire was used for leveling and alignment of both arches for 4 weeks followed by 0.016" NiTi wire for one month. Two months later, upper and lower wires were replaced with 0.016" X 0.022" NiTi and 0.017" X 0.025" stainless steel wires. Upper and lower 0.019" x0.025" stainless steel wires were placed, with lingual crown torque of 5-10° in the lower anterior segment to counteract the labial inclination of mandibular incisors due to Class II corrective forces. The mandibular archwire was consistently cinched distal to the molars. The mandible was positioned to a Class I molar relationship and PowerScope was inserted bilaterally for a period of 6 months. The appliance was inserted from the distal part of the head gear tube on the maxillary molar to the arch wire distal to mandibular canine.[Figure 3] Finishing and detailing followed for 4 months after the molar correction. The active treatment was 16 months.



Figure 3 . PowerScope Appliance

TREATMENT RESULTS

The posttreatment facial profile of the patient demonstrated noticeable improvement with improved facial esthetics and straight facial profile,. The intraoral occlusion revealed satisfactory result with bilateral Class I canine and molar relationship with good buccal interdigitation. Overjet and overbite were reduced to 2 mm and 2mm, respectively.[Figure 4]

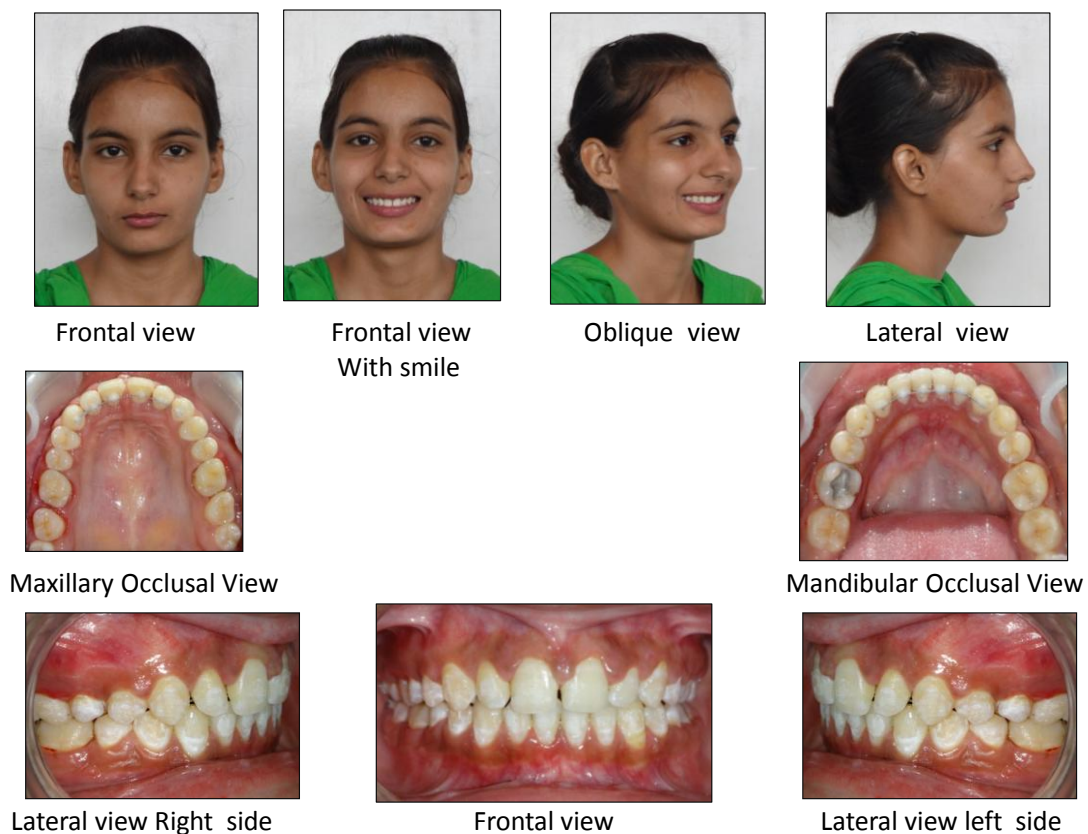


Figure 4: Post treatment photographs

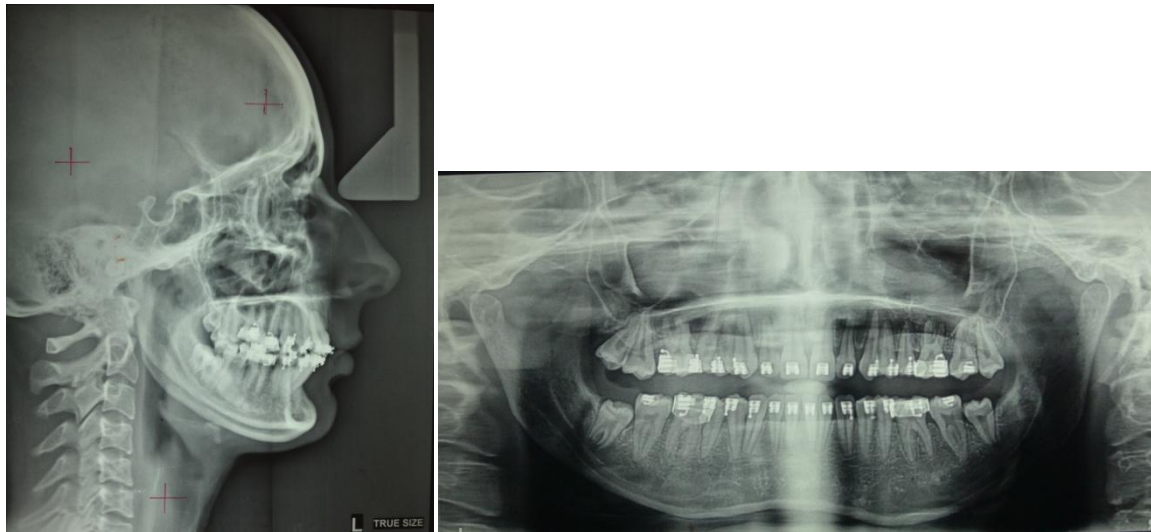


Figure 5: Post-treatment x rays

During treatment, SNA value was reduced by 1° , whereas the SNB value increased by 2° . As a consequence, the ANB value decreased by 3° toward Class I skeletal pattern. The upper incisor proclination was reduced, and lower incisor proclination was increased. [Figure 5] The effective mandibular length increased by 4 mm by forward growth of the mandible. The vertical mandibular proportions also increased during treatment [Table 1].

Table 1: Comparison of Cephalometric Findings

Parameters	Pretreatment	Post-treatment
SNA ($^{\circ}$)	82	81
SNB ($^{\circ}$)	76	73
ANB ($^{\circ}$)	6	3
1-NA ($^{\circ}$)	29	20
1-NA (mm)	5	4
1-NB ($^{\circ}$)	26	27
1-NB (mm)	5	4.5
1-1 ($^{\circ}$)	116	122
1-SN ($^{\circ}$)	112	102
GoGn-SN ($^{\circ}$)	27	29
FMA ($^{\circ}$)	23	25
IMPA ($^{\circ}$)	106	105
FMIA ($^{\circ}$)	51	50
Wits appraisal (mm)	6	4.5
Y-axis	61	62
Bjork sum	387	391

Jaraback's ratio	69	66.1
Gonial Angle	121	124

Superimposition demonstrated that both maxillary and mandibular molars were extruded and moved mesially. Nevertheless, the favorable mandibular growth significantly compensated the dental extrusion and fully expressed its forward-downward growing pattern.

DISCUSSION

Fixed appliances are welcome aids when patient compliance is declining. They can be used to treat dental or skeletal Class II malocclusions, with or without extraction therapy. The different effects of the various fixed Class II appliances have been widely described in the literature. Among fixed functional appliance, PowerScope has been added to the inventory recently by American Orthodontics.

The case discussed here was treated with Power Scope considering its advantage over the conventional ones. The Power Scope was a fixed one-piece appliance available in one size suiting all Class II patients when compared to the ones used until now. One piece concept prevented the dislodgment of the appliance on various jaw movements. Customization of the appliance was done with the help of crimpable shims supplied along with Power Scope armamentarium.

There was improvement in the soft tissue profile of the patient and the occlusion was perfected. At the end of treatment, good occlusion ensured the stability of the results.

REFERENCES

- [1]. McNamara JA Jr. Components of class II malocclusion in children 8-10 years of age. Angle Orthod 1981;51:177-202.
- [2]. Graber TM, Rakosi T, Petrovic A. Dentofacial Orthopedics with Functional Appliances. St Louis, Mo: Mosby; 1997:346–352.
- [3]. Proffit WR. Malocclusion and dentofacial deformity in contemporary society. Contemporary Orthodontics. 4th ed. St. Louis: Mosby Elsevier; 2007. p. 3-23.
- [4]. Ritto AK, Ferreira AP. Fixed functional appliances – A classification. Funct Orthod 2000;17:12-30, 32.
- [5]. Available from: <http://www.americanortho.com/powerscope.html>.