

Case Report

Management of Class II Malocclusion with PowerScope Appliance: Report of Two Cases

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ABSTRACT

Aim: Present case reports are presented with the aim to describe the treatment of skeletal Class II problem with a non-extraction approach using a fixed functional appliance.

Summary: Fixed functional appliance therapy has recently been gaining immense popularity for correction of skeletal class II malocclusion. The PowerScope appliance is one of the newest fixed functional appliances introduced. It offers the advantages of ease in appliance installation, giving predictable results, being used in noncompliant patients, less prone to appliance breakage and failure, shortens the duration of treatment and utilizes the residual growth. Above all, it is patient friendly such that it does not restrict jaw movements and there is no associated tissue impingement. This article includes case reports of patients with a skeletal class II malocclusion who were treated using the PowerScope appliance providing fine results.

Keywords: Class II malocclusion, Fixed functional appliance, PowerScope appliance.

INTRODUCTION

Skeletal Class II malocclusion is most recurrently occurring malocclusion in a growing patient chiefly as a consequence of mandibular retrusion.¹ Either small size of the mandible or posterior placement of condyle in glenoid fossa is accountable for the retrusion. Age and the severity are the key factor in management of this malocclusion; consequently a large number of appliances were designed to redirect mandibular growth by forward positioning of the mandible. An assortment of treatment approaches involving

removable and/or fixed appliances with/without extractions have been described during the last decades.

One of the most recent innovations in Class II treatment is called PowerScope. Dr. Andy Hayes worked in conjunction with American Orthodontics to develop PowerScope and played a key role in the improvements found in the PowerScope appliance. Manufactured by American Orthodontics, this intermaxillary Class II corrector appliance was developed to address the critical needs of the orthodontist, including patient comfort and extensive range of motion, and simple installation. PowerScope has a ready-to-use concept, and unlike other Class II correctors,²⁻⁴ there is no need for assembly, measuring, or appliance manipulation.

The kit consists of the following components:

- Locking nut attachment.
- Telescopic system.
- Hex-head screws.
- NiTi spring.
- Crimpable shims

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CASE 1

A 18-year-old male patient presented with a chief complaint of forwardly placed upper anterior teeth. On clinical examination the patient exhibited an athletic built, mesomorphic body type, mesoprosopic facial form, convex profile, posterior facial divergence, reduced lower facial height, competent lips and posteriorly divergent and retrusive mandible recessive chin.

Intra oral examination displayed that the maxillary and mandibular arch form exhibited "V" shape with severe curve of spee in mandibular dentition with Class II molar relation on both sides and Class II canine relation on both sides; scissor bite was present with respect to 24,25. Also 80% overbite, 13 mm overjet, proclined upper central incisors. Upper and lower dental midline were coincident. Radiograph examination revealed Class II skeletal pattern with ANB angle 6° , horizontally directed growth, retrusive mandible and skeletal deep bite. The panoramic radiograph showed the presence of all permanent teeth except 18 and 28.

Treatment objectives: To improve facial profile, achieve adequate overjet and overbite relations, improve smile aesthetics, and to obtain Class I canine and molar relation without extracting teeth. Levelling of curve of spee is required in mandibular arch with the maintenance of inter-canine and inter-premolar widths.

Treatment plan: A non-extraction approach was undertaken. MBT 0.022×0.028" brackets was selected and fixed functional appliance PowerScope was used after the levelling and aligning stage to address skeletal problem thus utilizing the remaining growth.

Treatment progress: A non-extraction approach using MBT 0.022×0.028" slot preadjusted appliance was planned. Normal sequences of wires was followed from 0.012", 0.014", 0.016" Niti to rectangular 0.016×0.022" Niti and SS wire to achieve levelling and alignment for 8 months; which was followed by 0.017×0.025" SS and working 0.019×0.025" SS wire in both the arches. PowerScope appliance was used for correction as shown in [Fig. 1(a) & (b)]. A 5° labial root torque was given in mandibular archwire to prevent the flaring of the lower anterior. Definite change was

seen in the patient's esthetics [Fig.2(a) & (b)] as well as substantial improvement in the patients profile was noted after the mandibular advancement (Fig.3(a)&(b)]. Since the appliance was anchored onto the orthodontic wire, no debonding of lower canine bracket/upper buccal tube was observed during the treatment with PowerScope appliance.



Figure 1: PowerScope appliance



Figure 2: Pre-treatment frontal view & profile



Figure 3: Post-treatment frontal view & profile

CASE 2

A 20 year old post-pubertal female presented with the chief complaint of forwardly placed upper front teeth. Clinical examination revealed athletic built, mesocephalic shape of head, mesoprosopic facial form, lip incompetence, everted lower lip, convex profile, flat mandibular plane, average clinical FMA angle and positive VTO .

Intra oral examination displayed that the maxillary and mandibular arch form exhibited "U" shape with severe curve of spee in mandibular dentition. The patient had a Angle's Class II malocclusion with end on molar relation on both side, end-on canine relationship on both sides; scissor bite was present with respect to 14,24 and 15,25. Also 100% overbite, 9 mm overjet with proclined upper central incisors. Upper and lower dental midline were coincident. Radiograph examination revealed Class II skeletal pattern with ANB angle 6°, horizontally directed growth, retrusive mandible and skeletal deep bite. The panoramic radiograph showed the presence of all permanent teeth.

Treatment objectives: To improve facial profile, achieve adequate overjet and overbite relations, improve smile aesthetics, and to obtain Class I canine and molar relation without extracting teeth. Levelling of curve of spee is required in mandibular arch with the maintenance of inter-canine and inter-premolar widths.

Treatment plan: A non-extraction approach was undertaken. MBT 0.022×0.028" brackets was selected and fixed functional appliance PowerScope was used after the levelling and aligning stage to address skeletal problem thus utilizing the remaining growth.

Treatment progress: MBT 0.022×0.028" preadjusted appliance was placed to level and align both arches. After five months, the levelling and alignment was achieved. 0.019" × 0.025" stainless steel working archwires was placed. 5° of lingual root torque was given in lower anterior to prevent the flaring of lower anterior, the PowerScope was placed (Fig. 4) to improve the mandibular retrognathism and achieve Class I molar relation. After eleven months, the PowerScope appliance was removed and was followed by finishing and detailing and retention period. A substantial improvement in the patients



Figure 4: PowerScope appliance



Figure 5: Pre-treatment frontal view & profile



Figure 6: Post-treatment frontal view & profile

esthetics (Fig. 5) including her profile was noted after the mandibular advancement (Fig. 6). Since the appliance was anchored onto the orthodontic wire, no debonding of lower canine bracket/upper buccal tube was observed during the treatment with PowerScope appliance.

DISCUSSION

On completion of treatment, the patient's facial profile was enhanced from convex to an orthognathic profile because of the soft-tissue modifications and the mandibular advancement thus, marking a major improvement in the esthetics overall. Fixed functional systems offer absolute advantages over removable systems.

Fixed functional appliance system being designed for 24 hours daily wear, there is a continuous stimulus for mandibular growth. Also, their compact, concise and small size design permitting better adaptation to functions such as a mastication, swallowing, speech and breathing.⁵

Features and benefits of the appliance

- A one-size-fits all Class II corrector for simple treatment application and easy inventory management.
- It features a low profile, for an aesthetic appearance that facilitates patient acceptance.
- Its smooth and rounded-edge design provides better patient comfort.⁶
- Its telescopic system features three parts that will not disengage during treatment, helping to avoid unnecessary emergency visits.
- A nickel-titanium internal spring mechanism gives 260 grams of force for continuous activation during treatment. The enclosed spring design prevents painful pinching of the cheeks and soft tissue,³ and helps to keep food out of the appliance.
- The ball-and-socket joint maximizes lateral mandibular movement for improved patient comfort and acceptance.
- Only care to be taken by patient—soft diet intake, to keep PowerScope clean and not to miss scheduled appointments.

CONCLUSION

To conclude, PowerScope proved to be a superior cost-effective appliance in treating Class II

skeletal malocclusion. It is also promising to treat this type of malocclusion with minimal effort.

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Conflict of interest : None reported

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