Simplified Correction of Class II Using PowerScope

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Treatment of Class II malocclusion continues to be a great challenge that orthodontists face daily in clinical practice. In order to succeed, it is very important to have the most effective tool.

One of the latest innovations in Class II treatment is called PowerScope. Manufactured by American Orthodontics, this intermaxillary Class II corrector appliance was developed to address the critical needs of the orthodontist, including patient comfort and acceptance, extensive range of motion, and simple installation.

PowerScope has a ready-to-use concept, and unlike other Class II correctors, there is no need for assembly, measuring, or appliance manipulation. This wire-to-wire device eliminates the need for gingival headgear tubes or special band assemblies, and can be used with either banded or bonded tubes.

Features and benefits

• A one-size-fits all Class II corrector for simple treatment application and easy inventory management (Fig. 1).
• It features a low profile, for an aesthetic appearance that facilitates patient acceptance.
• Its smooth and rounded-edge design provides better patient comfort.
• Its telescopic system features three parts that will not disengage during treatment, helping to avoid unnecessary emergency visits.
• No piston extends distally from the upper molars. This helps reduce ulceration.
• A nickel-titanium internal spring mechanism gives 260 grams of force for continuous activation during treatment (Fig. 2). The enclosed spring design prevents painful pinching of the cheeks and soft tissue, and helps to keep food out of the appliance.
• The ball-and-socket joint maximizes lateral mandibular movement for improved patient comfort and acceptance.
• Appliance quality was proven through extensive in-house testing at the factory that incorporated cycle testing for spring durability and degradation. The device supported more than four million cycles.

PowerScope components
The kit consists of the following components:
• Locking nut attachment. This was redesigned recently to increase durability and ease of installation. The attachment nut has a slot that is closed with the screw thread, so the screw forms a fourth surface—the inferior—to capture the wire when tightened (Fig. 3).
• Telescopic system. An 18mm telescoping mechanism.
• Hex-head screws. Situated at the upper and lower ends of the telescopic system, they are located inside a metallic cavity and it is impossible to remove them. They form a spheroidal joint that allows ample movement of the jaw. A reverse thread assembly (left-direction tightening) on the right side screw attachments avoids screw back-out during treatment. Right side of appliance has markings indicating loosening direction.
• NiTi spring. An internal spring that produces 260 grams of force.
• Crimpable shims. Available in 1mm, 2mm or 3mm, they can be used to set the initial activation, or reactivate the appliance during treatment.
• Hex-head driver: It’s allen-type to tighten the screws.

General clinical requirements for installation
Considering that the appliance is installed on the upper and lower jaw, it must be used with stainless-steel wires. The recommended caliber is .019x.025 with the slot .022, and .017x.025 with the slot .018. It is beneficial to use an omega to tie the lower arch or to make a cinch back on the last molar.

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In my experience, it is also recommended to use eight stainless-steel ligatures in all lower teeth, due to the appliance’s tendency to open spaces between the canines and first premolars. On the upper arch, if you wish to distalize the upper teeth it is better not to ligate the upper molar with other teeth.

**Appliance placement**

The appliance is placed mesial to the first molar in the maxillary arch and distal to the canine of the mandibular arch (Fig. 4). Attachment nuts do not pinch the wire when installed. On the upper arch, the system slides freely, which can facilitate molars’ distalization.

However, it may be advised to steel-tie maxillary first molars if equipped with convertible tubes to prevent possibility of auto-conversion of the tube through function. On the lower arch, the lower attachment nut has a “friction” fit due to the curvature found on the lower arch form with the transition from canine to premolar, which prevents the nut from slamming into the canines.

Depending on the teeth size and the Class II severity, it can be necessary to use spacers at the initial installation to activate the appliance.

**Step by step:**

*Editor’s note: See p. 21 for Figs. 5A-5D*

1. Engage maxillary attachment nut using the driver and place it mesial to the first molar. Ensure screw tip does not extend past attachment nut before engaging wire. It needs to be flush with attachment (Fig. 5A).

2. Let the screw with an inclination of 45° in relation to the arch, and apply a downward force on attachment (Fig. 5B). Rotate the attachment assembly onto the wire until you feel it snap into place.

3. Press down gently with the left index finger (Fig. 5C).

4. When attaching the appliance, use small turns while continually reseating with the index finger (Fig. 5D).

5. Engage mandibular attachment nut using driver and place distal to the canine onto mandibular rectangular arch wire, then tighten screw. It is important to put the finger on the upper part of the attachment nut during the installation, because it stabilizes the mechanism when tightening the screw.

**How do you determine activation and the correct shim size?**

Depending on the teeth size and the Class II severity, it can be necessary to use spacers at the initial installation to activate the appliance. Fig. 6 shows the middle tube of the device in a neutral position, and the tube in a position with total activation. Notice that in the total compression position, the middle tube shows only 1.5mm. For the appliance to generate 260 grams of force, it must be this way. Therefore, the working range of the spring is 5mm.

**How do you know if the appliance needs reactivation?**

When the patient returns for the next appointment, ask him or her to bite in maximum intercuspation, pull back the middle tube with an instrument such as a dental probe, and check how much it moved or the amount of pushrod uncovered (Fig. 7). This is the quantity that must be reactivated. Fill the gap created on the lower pushrod with shims, taking care to not over-activate and reposition the mandible.

**New visual activation indicators**

To facilitate the activation control of the spring, visual activation lines were introduced in PowerScope II (Fig. 8). This consists of three marks on the middle tube spaced 2mm apart. When patient is in maximum

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intercuspal distance and the three marks appear, it means that the spring has no activation. When two marks appear, it means that the spring has a partial activation. When the marks do not appear, it means that the spring has a full activation. As seen in Figure 9, the device was installed but is not activated. Observe how it looks after the placement of spacers.

The device can also be inserted distal of the mandibular first bicuspids, which can be useful for the patient who does not want to show the appliance.

In this case, the upper attachment nut is installed on the distal of the maxillary first molar. In this situation, if the patient has a small mouth, there is a great chance of cheek irritation. A solution could be the placement of a crimpable stop on the mesial of upper second molar tube, avoiding the distal positioning and the contact of the appliance with the patient’s cheek (Fig. 10, p. 22).

Appliance removal

Unscrew the lower mandibular screw until the attachment nut disengages from wire. Unscrew the upper maxillary screw until the attachment nut disengages from wire. Remove appliance from patient’s mouth and discard.

Indications

In the same way as other intermaxillary Class II correctors, the PowerScope primarily has a measurable dentoalveolar effect, and its aim is not to stimulate mandibular growth. The PowerScope can be used successfully in the following clinical situations:

1. As Class II mechanics.
2. In Class II cases with maxillary protrusion.
3. The correction of residual Class II after treatment with extractions.
4. For Class II subdivision treatment without extractions.
5. As anchorage after distalization of upper molars.
6. As anchorage in cases with extractions.
7. As anchorage for closing space with mesial movement of posterior teeth, in cases with agenesis of lower second bicuspids or extraction of the lower first molar.
8. The dentoalveolar compensatory treatment of jaw deficiency in adult patients.
9. As an aid in opening space for future implants for anterior upper or lower posterior teeth.

Contraindications

PowerScope is contraindicated for use with patients who have a history of severe allergic reactions to nickel, compromised periodontium, or absence of complete permanent dentition.

Clinical considerations

Each person’s biology is different, but it is reasonable for a clinician to see 1mm of correction per month if PowerScope is properly activated. However, clinical experience with Class II correctors shows that in a brachyfacial adult patient, this movement
Device installation will typically take less than five minutes for an inexperienced user. Experienced users will find that installation takes only one or two minutes and reactivation requires just 30 seconds. The removal is also quick.

Helping the patient adapt
1. Consider placing a .019x.025 stainless-steel wire at a prior appointment to the PowerScope installation. The rectangular wire can cause soreness and the patient will associate it with the PowerScope, not with the new archwire.
2. Let the installation appointment of the PowerScope be quick. If it is fast to install, the patient will have a good first impression of the appliance.
3. Pass on real expectations about the first 72 hours. The patient will likely feel some discomfort on the cheek and teeth, but soon will adapt.
4. Be clear about what the appliance is doing. It serves to correct the occlusion (teeth interdigitation), while a fixed appliance only corrects the dental alignment.

Case report
A 20-year-old woman presented with a Class II, Division 2, subdivision malocclusion with mild maxillary crowding (Fig. 11, see p. 24). Her overbite was almost 100 percent and lower midline was deviated to the left. Her condition was compounded by a left
posterior crossbite. Cephalometric analysis revealed a dolichofacial pattern and mandibular retrognathia.

After four months of leveling and alignment, PowerScope was placed (Figs. 12-13). The Class II was corrected in three months (Fig. 14) and PowerScope removed. After another three months for coordinating the arches and detailing the occlusion, fixed appliances were debonded, completing 10 months of active treatment (Fig. 15).

Conclusions

The PowerScope represents a new evolution in the use of intermaxillary Class II appliances. The clinical experience accumulated through decades of use of fixed functional appliances allowed the development of a device that can eliminate many difficulties found in the past during Class II treatment.

References