I would like to thank Dr. Stephan Tisseront for his remarkable article and case report in the October issue of Orthodontic Perspectives: Forsus™ Class II Correctors: Is There an Age Limit? It has stimulated my willingness to share what I have learned over the last 15 years working with Class II pushing correctors.

It was back in 1996 that Dr. John P. De Vincenzo made Eureka Springs pushing Class II correctors available. The first patients I tried them on were half- to almost fully-corrected within 3 months. It was way too fast to be growth! It could only be a dento-alveolar phenomena, although the first cases were growing patients.

Consequently, I was soon using them in cases way over the growth period with amazing outcomes and very stable results (no dual-bite, no “postural orthodontics” and negligible CR-CO discrepancies).

Ten years ago, 3M Unitek launched the Forsus™ Fatigue Resistant Device. It did then, and still delivers, the same amazing results, but with significantly fewer breakages and emergencies. I use them exclusively now.

As mentioned by Dr. Tisseront, the treatment options regarding most Class II deep bite adult cases with mild to moderate crowding are: decompensation of the dental arches and mandibular surgical advancement (with or without genioplasty), or extraction of two upper premolars with a less favorable facial aesthetic outcome.

“Class II adult deep bite” is a very vague label. Periodontal status, lip seal, incisor showing, transverse dimension, tongue size, and sleep apnea, to name just a few, are among the individual data that weigh in the decision scale to elect either a combination of orthodontic treatment and maxillo-facial surgery or an alternative.

The purpose of this article is to provide additional information to support Dr. Tisseront’s article and confirm his findings that the treatment alternative employing Forsus Class II Correctors is not just a second best alternative, but THE treatment of choice in selected cases, all things and risks considered.

The following two case reports are adult Class II deep bite patients treated with the Forsus Fatigue Resistant Device without extractions and without maxillo-facial surgical procedures.

Case #1
N.M. female 38 years old. She came in for a second opinion because she declined the surgery suggested by the previous orthodontist. Chief complaint: “I am hurting myself at the palate”.

It is with reasonable confidence that I suggested a non surgical treatment with the use of the Forsus Fatigue Resistant Device.

The patient was informed and agreed that a plan “B” would involve extraction of upper 5’s or surgical advancement of the mandible (Figure 1A-L).
The treatment sequence was the following:

07-05-30: Bonding upper arch (centrals 12° torque, laterals 8° torque, Clarity™ Ceramic Brackets). Final wire size .016×.022 SS.

08-01-21: Bonding lower arch (-5° torque on incisors). Final wire size .016×.022 SS.

08-05-27: Day of Forsus™ Correctors installation. 25 mm rods on both sides. An .016×.022 SS wire was inserted on lower arch. At this time the lower Curve of Spee is not totally flattened. The Forsus Correctors will assist the levelling of the lower Curve of Spee. Compression of the springs at initial insertion: 6.0 mm×18.5 g = 111 g per side (Figure 2A-H).

08-08-17: Forsus Correctors 29 mm rods each side, compression at 6.0 mm (111 g).

08-09-30: Measured activation; down to 4.5 mm per side as some correction has taken place. Addition of Forsus Correctors Universal split crimps on each side. 1.5 mm×18.5 g = +27.75 g additional per split crimp. Activation brought back to 6.0 mm (111 g per side).

08-11-17: Forsus Correctors 32 mm rods each side, compression 8.0 mm.

09-01-29: Reactivation with the addition of split crimps totaling 148 g per side.

09-04-22: Forsus Correctors stopped when normal overbite and overjet is achieved (Figure 3A-C).

08-11-17: Forsus Correctors 32 mm rods each side, compression 8.0 mm.

09-04-22: Forsus Correctors stopped when normal overbite and overjet is achieved (Figure 3A-C).

The Class II correction is held and stabilized with a decreasing wear of Class II elastics (6 mm – ¼") light 1.8 oz, latex per side from mesial of 3’s to lower 6’s.

09-08-10: Fixed appliances removal.

Fixed lingual retainers .016 round SS on #13 to #23 and #33 to #43.

10-09-22: Insertion of occlusal splint Biteplane full coverage type on the upper arch without occlusal contacts posterior to the lower canines.¹

Active treatment time 3 years 3 months.

10-11-16: Final records; Upper incisors correction torque to occlusal plane = +30°.

Lower incisors to occlusal plane change = none.

Clockwise occlusal plane rotation: 6.2° (orig: Op/Sn = 12.2°, final: Op/Sn = 19.8°, Normal = 14.4°)² (Figure 4A-C).

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Figure 1A-L

Figure 2A-H

Figure 3A-C

Figure 4A-C
11-03-23: Control visit: Overjet = 3.1 mm Slide CR-CO = 0.4 mm. Patient very satisfied with results “The results are far beyond my expectations” (Figure 5A-M).

Case #2 LP
Female 53 years old. Chief complaint: “My teeth are crooked, my mouth and lips are going backwards, deeper and deeper”. She agreed upon a “long” 3½ year treatment involving the Forsus™ Fatigue Resistant Device. Teeth missing: #18, #24, #36, #37 and #46. Bridge on #35-#38 (Figure 6A-N).

The treatment sequence was the following:
06-08-22: Bonding upper only: Clarity™ Ceramic Brackets Standard Edgewise (0° torque, 0° ang.) brackets on #12 to #22.
07-08-16: Bonding lower teeth. (It has taken one year to decompensate the upper teeth torque = +28.5°.
08-05-13: Forsus Correctors 25 mm rod right, 29 mm rod left.
08-09-24: Class I correction achieved, stop Forsus Correctors, start Class II elastics.
Restorations done during treatment by the restorative dentist (Dr. Gilles Dulude) (Figure 7A-D).
Lingual fixed retainers .016” round SS, from #13 to #23 and from #33 to #43.
Treatment time 3 years and 10 months.
10-11-10: Final records. No clockwise rotation of the occlusal plane, Op/Sn original = 12°.
Op/Sn final = 14.40°, normal = 14.40° (Figure 8A-O, 9A-B).
11-03-24: Insertion of occlusal splint Bite Plane type, full coverage on the upper arch without occlusal contacts posterior to the lower canines.¹
Overjet = 2.7 mm, CR-CO Slide = 0.2 mm.
Patient totally satisfied, “The treatment did not seem long!”

Some Tips
Among the factors that should be taken in consideration with the pushing Class II correctors force system are:

Case Selection
Generally Class II deep bite cases are the ones that respond more favorably to this force system. They exhibit a brachyfacial type and a favorable chin component. They are often characterized by a counter-clockwise canted occlusal plane and normally positioned or retroclined lower incisors.
Class II pushing correctors are powerful clockwise occlusal plane rotators and upper arch distalizers. The less originally clockwise rotated the occlusal plane, the better the potential to correct the point A and point B to the occlusal plane relationship (Witts). Avoid, or use with extreme care, Class II pushing correctors, especially on patients who exhibit pronounced clockwise or canted occlusal plane with much vertical excess, and of course, on those with moderate to severe open bite.

Retroclined lower incisors and normal attached gingiva are positive prerequisites. As a result of using Class II pushing correctors, the lower incisors are being intruded (contributing to gingival build up) and anchored in the thick chin symphysis bone. (Use -5° prescription on lower incisors.)

The decompensation and three dimensional preparation of the dental arches before using the Class II pushing correctors

Both arches should be prepared and coordinated as in preparation for a surgery at the exception of the lower Curve of Spee. The Forsus™ Fatigue Resistant Device will assist the levelling of the lower Curve of Spee.

In Class II Div II cases, make sure the upper incisor's buccal torque is properly normalized or slightly overcorrected. A little opening of spaces mesial to the upper canines sometimes allows a good interdigitation and overcorrection of the buccal segments without anterior interferences (Figure 10). The mandibular arch should be free to move to a Class I occlusion without any interference. I avoid overcorrecting to an edge-to-edge position. This traumatic situation may initiate root resorption and unnecessary attrition.

The minute magnitude calibration of the force system

The control of the level of force delivered by an appliance is of paramount importance, not only with regard to treatment efficiency and treatment time, but also "TO MINIMIZE ANY IAOTROGENIC EFFECT OF TREATMENT FROM THE USE OF TOO HIGH FORCE." I would add, “to minimize breakages and bulky mechanics”.

The Forsus Fatigue Resistant Device can be compressed about 12.0 mm at a linear constant deflection rate of about 18.5 g/mm.

ATTENTION: THE FORCE IS NOT CONSTANT, BUT INCREASES CONSTANTLY BY 18.5 G FOR EACH MM OF COMPRESSION.

Ideally, I don’t have the Forsus springs compressed by more than 9.0 mm. Initially 5.0 mm to 8.0 mm of compression is fine, comfortable and efficient.

At each appointment, the activation of the springs compression is measured and kept between about 5.0 mm to a maximum of 8.0 mm, according to the amount of correction needed. The distance from the mesial part of the distal ring “A” to the mesial part of the spring “B” is passive at 28.0 mm and fully active at 16.0 mm for 12.0 mm of total possible compression. The distance is measured at 25.0 mm (Figure 10), so the compression is 3.0 mm. Activation of 3.0 mm to 4.0 mm is a good holding and stabilizing activation.

At about 5.0 mm to 8.0 mm of activation every two months, no upper lingual arch or RPE appliance is required to hold the upper first molars.
However, the buccal inclination of the upper first molars has to be carefully monitored. The Forsus™ Corrector activation and the lingual crown torque expressed by the archwire on the first molars have to be coordinated.

Sometimes an additional -10° to -20° of lingual crown torque at #16 and #26 level may be bent on the .016"×.022" archwire.

By no means should the maximum opening of the jaw dictate the length of the push rods and thus the entire force system. Should a patient open beyond the length of the push rods, he can easily be instructed to re-insert them back into place.

Note: If the Forsus Corrector is compressed at 7.0 mm, it exerts a distal action force on the first molar of about 130 g, and as a reaction force, an equal amount of 130 g on the archwire hook stop at the distal of the lower canine.

The Condyle to Fossae Relationship

I do not use Class II pushing correctors as functional appliances in growing and non-growing patients. In my office, every time the Forsus Springs are employed, the patient should always be able to close back in centric relation and chew on his molars. The condyles are never permanently forced out of the fossae.4 This means no activation beyond 12.0 mm.

Some Tricks

The fixed appliances I employ with the Forsus Fatigue Resistant Device can be shortly described as follows:

- Bracket size: .018”×.025”
- Wire size: .016×.022 stainless steel
- Torque prescription on #16 and #26: -14° (-14T/0° offset/3M Unitek Victory Series™ Brackets)
- Torque prescription on #32 to #42 is -5°

Please Note: To prevent the lower incisors from flaring, the usual recommendation is to fill the bracket slot with a full-size stiff archwire. This may be good mechanics, but I’ve found it is less compatible with low physiologic forces and comfort if more adjustments are performed on the archwire during and after the use of Forsus correctors.

The “elastomeric torque” delivered by an Alastik™ Easy-To-Tie Ligature (3M Unitek, #406-884, silver) tied in an X-fashion, prevents any “play” of the lingual face of the archwire (0.16”×0.22”) from the bottom of the bracket slot. This torque has been estimated at about 0.4 g-mm² (Figure 11).

When the lower incisor torque changes, it is as a block with the occlusal plane, not off of it.

I always bond upper and lower 7’s when available.

The lower wire preparation:

- Crimped hook on the loop bend between the lower 7’s and 6’s to tie the archwire back (Figure 12A)
- Temporary step down bend just about 1.0 mm distal of #33 and #43 to stabilize the crimped hook acting as a bumper to the pushing rod (Figure 12B)
- A bent forward and outward ‘S’ modified crimped stop links the rod (modified) to the archwire (Figure 12B-C)
- An elastomeric ligature to stabilize the rod “elbow” buccolingually from flipping in the cheek or rubbing against the first premolar bracket. The ‘S’ part of the crimped hook is angulated bucco-lingually as required (Figure 12B-D)

Conclusions

Some Class II, full cusp adult cases can be treated without extractions or surgical advancement of the mandible. The dentoalveolar changes induced by the Class II pushing correctors Forsus Fatigue Resistant Device are largely sufficient to achieve superb and stable results in selected cases.

Case photos provided by Dr. Michel Di Battista.

References


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