Dr. William Vogt has maintained a solo practice in orthodontics in Easton, Pennsylvania since 1987. He has developed a special interest in nickel-titanium, spring technology and bioengineering. Orthodontically, his special interest is in Class II mechanics. He has lectured internationally and he also holds patents on Class II correction devices, including patents on Forsus brand products from 3M Unitek. He received his DDS from Temple University School of Dentistry in 1981, and earned a postdoctoral certificate in Orthodontics in 1983 from the University at Buffalo (SUNY).

3M Unitek has recently introduced a new shorter size push rod for use with the Forsus Fatigue Resistant Device. At first glance this may seem like a minor advancement for the Forsus springs. However, this small push rod can contribute to a major change in the way you use the Forsus springs in your practice.

The obvious benefit to a smaller push rod is that it allows you to fit Forsus springs in more patients, those patients with small mouths and in extraction cases. However, the major benefit is that it helps you to completely change the way you install the springs.

Instead of attaching the mandibular portion of the push rod behind the mandibular canine I am now routinely installing the Forsus spring distal to the mandibular first premolar. The benefits of hooking up the push rod distal to the mandibular first premolar include:

- Better patient comfort.
- Better patient appearance while wearing the Forsus device.
- Better force vectors for treating most Class II patients.

Therefore I recommend attaching the push rod distal to the first premolar in the majority of your patients. This mode of installation will be facilitated by the new extra small, size 22 mm push rod, in many cases.

**The 22 mm Push Rod**

Previously there had been 4 ready to use sizes available, a 25 mm, 29 mm, 32 mm and a 35 mm. In addition there is a size 38 mm push rod that is totally customizable in length.

The new 22 mm push rod is essentially a shorter push rod with no stop placed on it (Figure 1). This allows the push rod to enter the spring all the way until the spring hits the curved portion of the push rod. The curve in effect is the stop (Figure 2).

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**Figure 1:** Top size 25 mm push rod. Bottom size 22 mm push rod.

**Figure 2:** Size 22 mm push rod has no built in stop allowing insertion into the spring all the way to the curve in the mesial end.
Installation Behind the Mandibular First Premolar

Better Patient Comfort
The Forsus™ Appliance push rod sometimes tends to flip up at the mesial end when it is hooked up distal to the mandibular canine (Figure 3A-B). The natural shape of the arch is a curve but the shape of the Forsus spring is straight. In order for the Forsus device to attach to the mandibular archwire when the patient’s mouth is closed and the Forsus spring is running in the same plane as the archwire, the Forsus device has to reach around the curve of the mandibular arch. This leads it to flip up, which occasionally contributes to patient discomfort in the area labial to the mandibular canines.

When hooking the device up distal to the mandibular first premolars the use of a shorter push rod makes the whole Forsus appliance more compact. Since it is more compact it no longer has to reach around the arch to attach to the mandibular archwire. Instead, it can run in more of a straight line (Figure 4A-B).

Better Patient Appearance
Since the Forsus spring lies flatter, there is no longer a telltale bulge in the cheek area caused by the curve in the push rod (Figure 5). The patients like this much better than wearing a Herbst® appliance or Headgear. In fact, we have found that when it is hooked up one tooth further back it no longer shows when the patient opens their mouth therefore it actually is less conspicuous than wearing Class II elastics (Figures 5A-B, 6A-B).

Better Force Vectors
I have always liked placing the push rod attachment distal to the first premolar in open bite tendency cases, if possible, to take advantage of a more vertical force vector on the maxillary molars (Figure 7). This short hook up results in less intrusion of the mandibular incisors and results in more maxillary first molar intrusion. This can be a real plus in helping to close anterior open bites.

Figure 3A: The mesial end of the push rod sometimes flips up when attached distal to the mandibular canines.

Figure 3B: Side View.

Figure 4A: Shorter push rod attached to the archwire. The Forsus™ Appliance does not have to reach around the arch as far.

Figure 4B: Shorter push rod pulls in the push rod without pushing out the spring. This allows the Forsus™ Appliance to lie flatter in the buccal vestibule.

Figure 5A: No Forsus™ Appliance.

Figure 5B: With a Forsus™ Appliance installed. No bulge in cheeks.

Figure 6A: Class II elastics show.

Figure 6B: Forsus™ Springs do not show.

Figure 7: Push rod attached distal to the mandibular first premolar. This configuration increases the amount of vertical intrusive force on the maxillary first molar.
Even in patients who do not have an open bite tendency there is an advantage to a little maxillary molar intrusion because this helps rotate the occlusal plane in a clockwise direction. This tipping of the occlusal plane results in the mandibular teeth moving forward relative to the maxillary teeth, which in turn helps correct the occlusion from Class II into Class I (Figure 8).

The Forsus™ EZ2 Module has been a nice improvement to the Forsus System. The EZ module made the insertion of the appliance incredibly easy and has eliminated one of the more difficult steps in Forsus appliance removal, the unbending and removal of the L-pin. Now the EZ2 module has increased the durability. All in all, using either the new Forsus EZ module or EZ2 module has resulted in a huge time savings for both appliance insertion and removal.

However, I have found that the Forsus EZ and EZ2 modules have different force vectors compared to those of the Forsus appliance hooked up with the L-pin. This occurs because the Forsus EZ and EZ2 modules place the distal of the spring module more to the occlusal than the L-pin. This results in a very horizontal force relative to the original L-pin hook up (Figure 9).

The slight vertical force vector is regained by attaching the mesial of the Forsus appliance push rod distal to the mandibular first premolar. In addition to increasing the intrusion of the maxillary first molar this hook up places the mandibular attachment closer to the center of resistance for the mandibular arch. This results in less lower incisor intrusion and flaring and less bite opening (Figure 10).

Conclusion

I highly recommend you include the new shorter push rods in your practice and utilize them to place the Forsus appliance distal to the mandibular first premolars. Your patients will be more comfortable, and they will appreciate the fact that you have not detrimentally altered their appearance while wearing the device. You will have better control of your force vectors and will be even more pleased with the final results. I know you, your staff and your patients will enjoy the expanded versatility that these new extra short push rods bring to the Forsus appliance.

Clinical Tip

Because the size 22 mm push rod has no stop, it takes as many as three crimpable stops to activate it. Therefore, I routinely use the KX Module-tie method of activation that was developed by Dr. Robert Miller when I use the size 22.