

# PLACING an Unplanned Forsus FATIGUE RESISTANT Device with the Incognito Appliance System

by Neal D. Kravitz, DMD

The Forsus Fatigue Resistant Device (3M Unitek, Monrovia, California) is a telescoping Class II appliance connected chairside from the maxillary first molar headgear tube to the mandibular labial archwire, resulting in maxillary skeletal restriction and rapid dental compensation.<sup>1,2</sup> With standard labial braces, it is commonly applied during the middle of treatment following persistent patient non-compliance with Class II directional elastics. However, when using the Incognito Appliance System featuring fully individualized computer-manufactured lingual brackets,<sup>3</sup>

the orthodontist should ideally plan to incorporate the Forsus Fatigue Resistant Device at the beginning.

What options are available if an Incognito patient has not been treatment planned for a Forsus Fatigue Resistant Device and he is non-compliant with elastic wear? This article will review the steps for incorporating the Forsus Fatigue Resistant Device with the Incognito Appliance System, and provide the clinical protocol for two techniques on placing an unplanned Forsus Fatigue Resistant Device.

## Planned Incorporation of the Forsus Fatigue Resistant Device

When preparing for a Forsus Fatigue Resistant Device at the start of treatment, I select custom lingual bands with buccal headgear tubes for the maxillary first molars in the Unitek Treatment Management Portal or TMP (Fig. 1a-c). TMP is an interactive treatment planning program and digital prescription

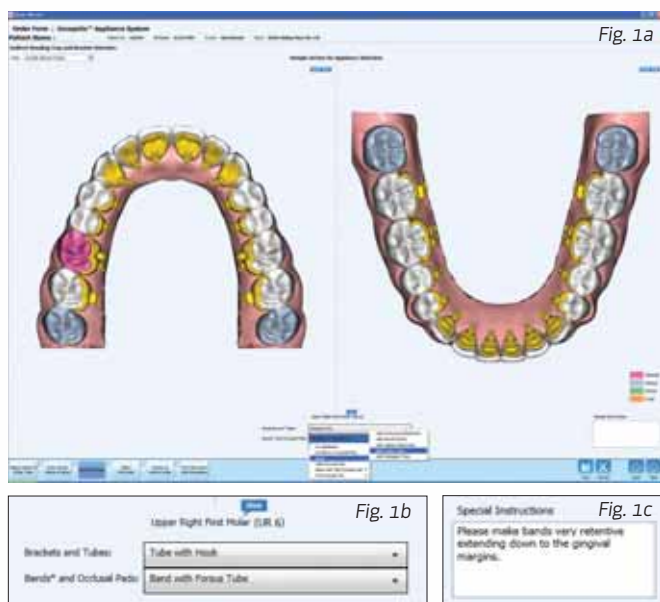


Fig. 1a

Fig. 1a: Ordering a custom lingual band with a buccal headgear tube on the Unitek Treatment Management Portal. The maxillary first molar band has been highlighted to customize the bracket-type.

Fig. 1b: A close-up view of the Unitek Treatment Management Portal. Customizing a band with a headgear tube on the buccal. I have also selected for a lingual tube with a hook to reduce the likelihood of molar derotation during distalization. Alternatively, a clinician may choose for a lingual bracket on the first molar.

Fig.1c: A close-up view of the Unitek Treatment Management Portal. I have written special instructions to the technician to extend the band to the gingival margin for added retention. This is only needed for bands on the maxillary first molars receiving the Forsus Fatigue Resistant Device.

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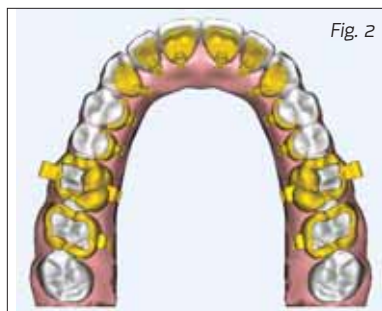


Fig. 2



Fig. 3

Fig. 2: Forsus Fatigue Resistant Device set up at Kravitz Orthodontics. Custom bands with buccal headgear tubes on the maxillary first molars. Bands on the maxillary second molars reduce the incidence of broken brackets. All tubes have hooks to allow for easy connection to a ligature or an elastic chain.

Fig. 3: Planned Forsus Fatigue Resistant Device using custom bands with buccal headgear tubes. Now, I request for the band to extend to the gingival margin for added retention. In the maxillary arch, an .016x.022 stainless-steel wire is cinched behind the second molars and tightly ligated. For a quicker alternative to steel ligation, consider placing a double elastic chain second molar to second molar with Energy Chain (Rocky Mountain Orthodontics, Denver, Colorado).



Fig. 4



Fig. 5

Fig. 4: Ordering an additional custom lingual band using the Unitek Treatment Management Portal for an unplanned Forsus Fatigue Resistant Device. Alternatively, the clinician can mail the pre-treatment plaster model or take a quadrant polyvinyl siloxane impression.

Fig. 5: Ordering an additional custom band after the patient received a large occlusal restoration on the maxillary first molar. A quadrant polyvinylsiloxane impression was taken and mailed to Incognito.

form that allows the orthodontist to work closely with the Incognito laboratory technician.<sup>4</sup> Rather than seating interproximally like traditional bands, custom lingual bands from Incognito are bonded directly and saddle over the occlusal table.

Proper design of the lingual band will help ensure a successful outcome with the Forsus Fatigue Resistant Device. On the buccal side of the band, the headgear tube will receive the Forsus

Correctors L-Pin, which is recommended over the Forsus EZ2 Module. On the lingual side, I prefer for my bands to have archwire tubes with hooks, rather than twin brackets. The lingual tubes prevent against unwanted molar derotation during distalization. The hooks on the tubes are essential as they enable connection to a steel ligature or elastic chain.

In my office, I also order custom bands on the second molars to eliminate the incidence of bracket breakage (Fig. 2). These bands also have lingual tubes and hooks. There is an additional laboratory cost of \$79.95 per band; however, I believe the reduction in emergency visits is worth the added expense.

The Forsus Fatigue Resistant Device is inserted after progressing to an .016x.022 or .018x.025 stainless-steel lingual archwire. Inserting an .018x.025 stainless lingual archwire into the .018 slot Incognito brackets is challenging; therefore, I recommend placing an .018x.025 copper-nickel-titanium archwire for a minimum of three months prior. Additionally, I will cut the distal ends of the stainless-steel archwire at a bevel to ease its insertion through the tubes. Lastly, I will cinch the wire tightly behind the second molar tube and steel ligature across the maxillary arch to prevent space opening prior to connecting the appliance (Fig. 3).

### Unplanned Incorporation of the Forsus Fatigue Resistant Device by Remaking a Saddle Band

If a patient is non-compliant with Class II directional elastics and I have not treatment planned for use of a Forsus Fatigue Resistant Device during the initial case setup, I have two options for ordering custom lingual bands with headgear tubes: The simplest option is to log back into the TMP Portal to reorder additional bands (Fig. 4). For doctors currently not using TMP, mail the maxillary pre-treatment plaster model back to Incognito requesting additional bands on the written prescription form. A new polyvinyl siloxane impression is not required unless there has been significant change in tooth morphology (Fig. 5). The new bands arrive in four to six weeks.

At the bonding appointment, I simply remove the maxillary first molar lingual brackets, prepare the tooth with 37% etchant



**Fig. 6:** Setup for an unplanned Forsus Fatigue Resistant Device. Traditional band with occlusal headgear tube on the maxillary first molar with an .016x.022 stainless-steel lingual archwire. Note that the lingual cleat on the first molar band is flattened to allow the lingual archwire to bypass. Buccally, the first molar is stabilized with an .018 segmental stainless-steel wire bonded to the second premolar. Lingually, double .010 steel ligatures connect from the second premolar bracket to the hook on the second molar tube. Ideally, the lingual archwire should be tightly cinched behind the second molar tube.

**Fig. 7:** Setup for an unplanned Forsus Fatigue Resistant Device. If the patient has mandibular lingual braces, I will bond standard ceramic brackets on the mandibular canine and first premolar and place a segmental .016x.022 stainless-steel wire to receive the Forsus push-rod. In the maxillary arch, note the segmental .018 stainless wire bonded to the maxillary second premolar and cinched behind the first molar band.

and bond the custom lingual band with either Bonding Resin A and B (Reliance Orthodontics Products, Inc., Itasca, Illinois) or Transbond IDB Pre-Mix (3M Unitek). If these bonding agents are inadequate to withstand the force level of the inter-arch nickel-titanium push spring, which produces approximately 200g of force when fully compressed,<sup>2</sup> I will rebond the band with Multi-link Automix (Ivoclar Vivadent, Amherst, New York), a strong universal cement used for bonding indirect restorations. Multi-link Automix has excellent bond strength to precious metals and is my cement of choice when rebonding broken Incognito brackets.

### Unplanned Incorporation of the Forsus Fatigue Resistant Device Using a Hybrid Technique

Alternatively, if my Incognito patient has been non-compliant with Class II directional elastics, I can place an unplanned Forsus Fatigue Resistant Device immediately with a hybrid technique using a combination of custom-lingual and a standard labial band.

Rather than bonding a custom lingual band, the hybrid technique uses a standard band with an occlusal headgear tube. Prior to cementation, it is important to flatten or remove any lingual attachments on the band. On the lingual side, the lingual archwire will bypass the maxillary first molar band and insert into the maxillary second molar tube with a tight cinch. The maxillary second premolar and second molar are anchored together lingually with double .010 steel-ligatures (Figs. 6 and 7). On the buccal side, the maxillary second premolar and maxillary first molar are anchored together with an .018 stainless-steel segmental wire. The wire is cinched behind the molar band and bonded to the second premolar with composite. The goal is to support the maxillary first molar on both the labial and lingual side.

The advantages of using the hybrid technique for placing an unplanned Forsus Fatigue Resistant Device include the appliance

can be inserted after seven days of tooth separation, reduced laboratory expense and a reduced incidence of band dislodgement.

### Discussion

Class II malocclusion is the most common malocclusion in orthodontics affecting one-third of the population.<sup>5</sup> Data from the National Health and Nutrition Examination Survey (NHANES III) indicate that 11 percent of the U.S. population has an overjet greater than 4mm.<sup>5</sup> Though Class II malocclusion can result from numerous combinations of skeletal and dental components, it is primarily attributed to a neutral maxillary position with a retrognathic mandible.<sup>6</sup>

The Forsus Fatigue Resistant Device, first described by Vogt in 2006, is a fixed functional appliance used in correcting Class II malocclusions relatively independent of patient compliance. This modern adaptation to the Eureka Spring (1997) operates as a spring-loaded Herbst, providing a combination of skeletal and dental changes in growing patients, including maxillary skeletal restriction, maxillary molar intrusion, maxillary molar distalization, mandibular molar mesialization and mandibular incisor advancement.<sup>7,8</sup>

In my office, a Forsus Fatigue Resistant Device is used primarily in adolescent patients after three appointments of non-compliance with Class II directional elastics. Alternatively, I will treatment plan at the beginning for its use in patients with more complex malocclusions, such as those with a greater than 50 percent Class II canine relationship or a Class II subdivision with significant midline deviation. For my adult orthodontic patients, particularly those with Incognito, the Forsus Fatigue Resistant Device is most commonly applied unilaterally in a Class II subdivision malocclusion after non-compliance with elastics or aversion to maxillary premolar extraction.

The primary disadvantages of the Forsus Fatigue Resistant Device include patient dissatisfaction due to cheek and lip irrita-

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tion resulting in aphthous ulceration or perleche, separation of the push-rod from the spring during wide mouth opening, debonding of the mandibular canine bracket, or breakage of the mandibular arch steel ligature resulting in canine derotation and space opening.

Conclusion

The Forsus Fatigue Resistant Device can be incorporated with the Incognito Appliance System at the start of treatment or in the middle of treatment if a patient has been non-compliant with Class II directional elastics. When placing an unplanned Forsus Fatigue Resistant Device, the clinician should consider reordering a custom lingual band using the Unitek Treatment

Management Portal or using a hybrid technique with a standard band anchored buccally to the second premolar with a segmental stainless-steel wire. ■

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Author's Bio

Dr. Neal Kravitz is a diplomate of the American Board of Orthodontics, as well as clinical faculty at Washington Hospital Center. Dr. Kravitz received his undergraduate degree from Columbia University and received a DMD at the University of Pennsylvania. Dr. Kravitz has been published in multiple orthodontic journals, books and educational materials. He lectures throughout the country and internationally on modern advancement in orthodontics, treatment planning and practice management. Dr. Kravitz currently maintains two thriving orthodontic practices in South Riding, Virginia, and White Plains, Maryland, and is a provider of the Incognito Appliance System.

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