Two Easy Pieces

"Low-tech" attachments can help secure aligners and extrude teeth

By James J. Hilgers, DDS, MS, and Shannon Nissen, DMD, MS

Sometimes, in this age of high-tech, we lose sight of the fact that the solutions to many of our everyday problems are low-tech. A good example of this is a series of composite-based, clear polyvinyl forms developed by Reliance Orthodontics that prove that sometimes, simple answers and simple solutions are the most rewarding.

Two kits that aid in simplifying common problems are the A²™ Attachment Aligner Kit for securing clear aligners in place and the Composite-and-Chain (C&C™) Extrusion Kit for a dependable attachment to impacted teeth.

Aligner Attachment Kit

It is virtually impossible to get effective tooth movements using clear aligners without a method of holding the aligners securely in place. This is the only viable way to achieve a complete purchase on the teeth to be moved, commonly referred to as "tracking." Orthodontists achieve a secure fit by placing different sizes and shapes of composite buttons on the labial or lingual surface of the teeth. The buttons serve as retentive ledges to hold the clear aligners down and in place. The major aligner companies often provide an auxiliary tray for placing composite retention buttons. This is fine for more complex aligner treatment, and is included in the lab cost of the materials.

But what about holding down one to three aligners that are made in the office for the purpose of very simple alignment? This is a very common problem, as many orthodontists use these simple "resets" to align a wayward tooth or two. Using the A² kit, these composite retention buttons can be placed before you take the

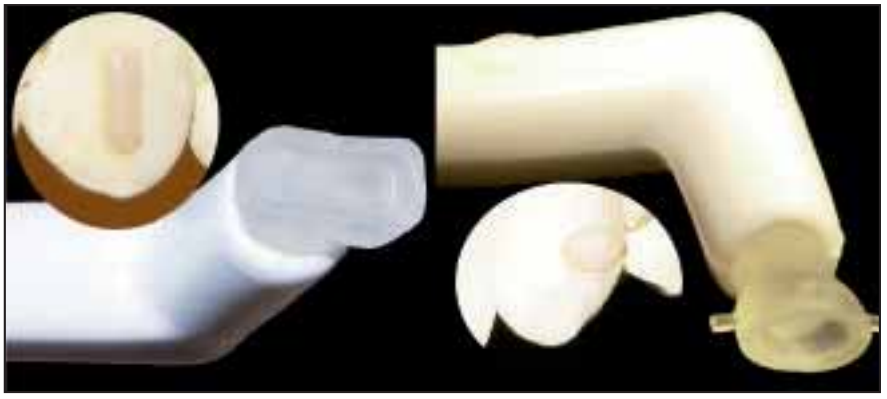

Figure 1: Two polyvinyl forms are used to create retention buttons on teeth to secure clear aligners. The trapezoidal template orients in the vertical plane, and the ovoid has small orientation wands for horizontal or vertical placement.

Figure 2: When loading the selected A² polyvinyl form with flowable composite adhesive, be careful to underfill the form slightly to avoid flash, especially on the curved, buccal surfaces of teeth.

Figure 3: These oval buttons have been placed on the teeth prior to taking alginate impression for a working model. To ensure the fine detail of the composite button, compress a small dollop of impression material around the A².

Figure 4: You can place a button for elastic traction on the outside surface of an Essix aligner by first microetching the area where the button is to be placed (A), then painting with Triad™ visible light-cured bonding agent to secure the button.

impressions for the clear aligners. The kit includes different sizes and shapes of retention buttons in clear polyvinyl forms that are carried in a placement wand.

To use the kit: 1) etch and seal the target tooth; 2) fill the polyvinyl form with composite; 3) place the form against the surface of the conditioned teeth; and 4) light-cure the button in place.

The resulting impression and plaster model of the teeth will accurately reflect the precise smoothness and shape of the molds. Figures 1 to 4 (page 48) show the techniques involved in placing A[2].

The C&C Extrusion Kit

The most common way of attaching gold extrusion chain to an impacted tooth for the purpose of extrusion is to use a bonded, mesh-based eyelet or bracket. Since the mesh base has only one contour, often it can't be placed flush against a tooth that has minimally exposed surface anatomy. This can result in a weak bond or failure, requiring a repeat of the surgical procedure to re-bond the attachment.

More importantly, when the tooth has been extruded, the eyelet or bracket must be removed. The extruded teeth are typically very sensitive, and attempts to remove the metal mesh base by pinching it can be very painful for the patient. At times, the entire metal attachment needs to be ground away, and this can be both time-consuming for the orthodontist and uncomfortable for the patient. Although the metal-mesh base attachment is effective in many cases, at times it can present difficulties for the oral surgeon or, ultimately, for the orthodontist.

The C&C Extrusion Kit makes this procedure simpler by avoiding the metal-mesh base intermediary altogether. Instead of using a metal/mesh bonding pad to secure the chain, the C&C kit uses a pod of polymerized composite, formed to the exact available anatomy of the tooth, in which the 14K gold chain is integrally embedded.

The kit includes two types of clear silicone molds that form oval (small) or rectangular (large) composite pods, depending on the surface area available to the surgeon. The translucent silicone mold allows direct exposure to a curing light and permits complete curing of the pod. The malleable walls of the silicone form allow the composite to contour to the exposed anatomy of the target tooth. The composite cures to a glassine surface so that there are no rough edges to compromise tissue healing. The enamel primer included in the kit (Assure Universal Bonding Resin) is hydrophilic, so you can get a secure bond even with slight moisture on the etched enamel surface. Because the chain is completely encapsulated in the polymerized composite, extrusion forces can be applied with less concern for bond failure.

Most importantly, once the tooth has been moved into its proper place in the dental arch, the composite pod and encapsulated chain can simply be smoothed off the tooth surface with a diamond composite removal bur. This avoids the crimping or fracturing of the attachment, which can be the source of severe patient discomfort. Figures 5 to 8 demonstrate the techniques used in placing the C&C composite pods.

These two simple kits are answers to what can be complex problems in our going-all-digital orthodontic world. **OP**

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Figure 5: A C&C polyvinyl form in a placement wand. Insert a 10-mm gold chain into the form receptacle (A) so that when flowable composite is poured into the chamber, it completely surrounds the last link of the embedded chain.

Figure 6: Using a carrying wand with a composite-loaded C&C form, the surgeon places the form against the prepared surface of the target tooth, then light-cures the composite through the clear vinyl form for 5 to 10 seconds.

Figure 7: This final attachment of the smooth-surfaced composite pod with the embedded chain securely attached to the cuspid.

Figure 8: In this case, the tissue flap was sutured over the C&C to reveal only the gold chain, which was then used to guide the target tooth into the arch. This new method of impacted tooth engagement offers ease of placement, smoothness of contour, and comfortable removal with a composite polishing bur.

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