Clinical advantages using RelyX™ Unicem 2 for bonding Incognito™ Customized Appliances

By Dr. Lars Christensen

Clinical advantages using RelyX™ Unicem 2 Automix Self-Adhesive Resin Cement for bonding customized Incognito™ Appliances

Patients electing to have orthodontic treatment with fully customized lingual appliances rightly have high expectations for their treatment. Apart from the end result, they also expect a well-performing appliance. And a key part of the appliance's performance is that there are as few as possible unscheduled appointments for emergencies.

From a practitioner's point of view, emergency appointments with lingual appliances are often the cause of additional stress when compared with emergency appointments for patients treated with labial appliances. The time required to repair a broken lingual bracket is usually significantly more than for labial appliances.

Occasionally it is not only the appliance that needs repair — after repeated problems, the patient's confidence may require fixing as well! Some patients blame themselves for the broken appliance — others the doctor. Clearly we want to minimize emergencies as much as possible.

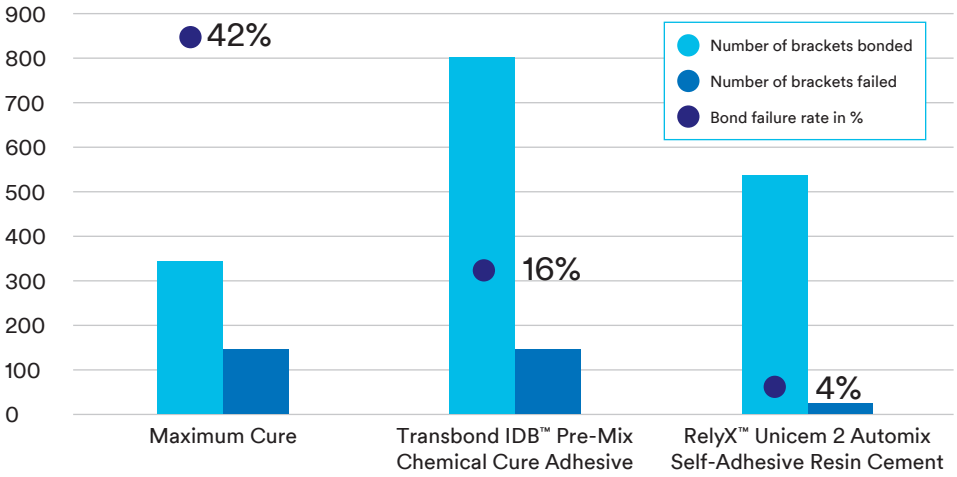
When looking at experiences in our clinic, we found in some cases that the use of unfilled or lightly filled adhesives was the cause of an unacceptably high bond failure rate. Since adopting the use of RelyX™ Unicem 2 Automix Self-Adhesive Resin Cement as our sole bonding protocol, the failure rate of brackets has reduced significantly.

A discussion of the material science reasons behind this is explained in a recent publication by Dr. Jürgen Sendelbach titled, "Lingual Bonding with RelyX Unicem 2 Resin Cement and Transbond™ IDB Pre-Mix Chemical Cure Adhesive". But from a clinical perspective, the important message is that, with RelyX Unicem 2 Cement, the high bond strength measured in the laboratory is, in my opinion, directly translated to the clinical situation.

Orthodontists are well aware that it is not always possible to directly extrapolate the results from laboratory tests to the clinic. The results from the internal audits on all of our lingual patients treated with Incognito Appliances to completion [Table 1] clearly demonstrates the significantly reduced bond failure rate, as compared with previous protocols using either Maximum Cure™ or Transbond IDB Chemical Cure Adhesive.

Table 1: The results in Table 1 / Fig 1 show completed cases in my practice.

	Maximum Cure™	Transbond™ IDB Adhesive	RelyX™ Unicem 2 Cement
Bonded	342	802	536
Failed (including repeat failures)	144	131	19
Bond failure rate %	42.10	16.33	3.54



From my personal perspective, the use of RelyX Unicem 2 Cement has several additional advantages:

- The dual cure nature makes the material flexible for different clinical situations, such as full arch bonding, individual bracket bonding and repairs
- The fact that the material is moisture tolerant is wonderful when bonding full arches on the lingual surface, where moisture control is difficult, cumbersome and sometimes very uncomfortable for patients
- The ability to use the same bonding protocol for enamel, gold and ceramic material makes the bonding procedure simpler with a resulting reduction in mistakes compared to multi-step protocols [Figure 1]
- Ability to use transparent or non-transparent trays, as material cures sufficiently for safe tray removal after six minutes

Figure 1. Patient with two plastic temporaries and two old ceramic crowns, requiring lingual appliances to create space for new restorations. Bonded in one procedure despite three different bonding surfaces.

Bonding with RelyX Unicem 2 Cement

When bonding with RelyX Unicem 2 Cement and the Incognito™ Clear Precision Tray, it is essential that the entire bonding surface is coated with the adhesive. The tray fit is excellent, so only a very thin layer of adhesive is required.

The applicator tips easily facilitate this, and because of the longer working time and because we don't need to keep the adhesive cold to achieve a good working time for the adhesive (when compared to Transbond IDB Adhesive or Maximum Cure), it is not a stressful procedure. For small brackets, such as the lower incisors, it can be helpful for the assistant to place an endo tip on the conventional tip.

In most cases we place the full tray, but if moisture control is difficult, for example, in the lower arch, or if the dental arch is very distorted, we divide the tray in two sections. We determine this when trying the tray before we apply the adhesive.

Once the brackets have been cleaned with acetone and covered with a thin layer of adhesive, the tray is then fitted with good finger support. An assistant commences the light curing according to the orthodontist's direction. We routinely cure each bracket three seconds from the occlusal before removing the hard tray and then the brackets are cured an additional three seconds mesial and distal. In cases with occlusal coverage, it is important to direct the light to cure as much of the adhesive as possible before removing the inner tray.

Excess adhesive can be removed with a scaler, and the interproximal spaces checked with dental floss. We will re-check for excess adhesive on the subsequent visit.

It is comforting for the clinician to know that the adhesive will continue to polymerize chemically under the larger bonding surfaces and on teeth with less enamel transparency because of large restorations.

Debonding

When debonding lingual appliances, there is an increased risk of detached parts of the appliance entering the airway. Care and attention before the debonding of appliances is needed to ensure that the archwire is engaged in all the brackets, and that the archwire is intact. It will then be possible to debond the brackets from the tooth surface and remove the entire appliance safely from the mouth in one piece.

The flip side of superior bond failure rates is evident at the debonding procedure. Using RelyX Unicem 2 Cement, removal of the appliances is more challenging because of the increased bond strength achieved.

The appliance removal requires careful adoption of an accurate technique. Simply grabbing the bracket with the debonding instrument and flexing is often not sufficient to cause the bracket adhesive interface to fail. Applying more pressure will often be uncomfortable for the patient and can lead to breakage of hooks or tie-wings on the brackets.

The use of different pliers to apply stress to particular bracket parts can be advantageous. For example, on molar brackets it is often most successful to apply the beaks of a ligature cutter to one of the “wings” of the bonding base. This will frequently result in a minimal distortion of the bracket, and the bracket debonds while the majority of the adhesive remains on the tooth.

I find the incisor brackets are frequently the most difficult to debond. This can be because of a combination of factors: the bonding surface is often larger than on, for example, the premolar teeth. The access is less easy and on patients with large marginal ridges [Figures 3 and 4], or shovel shaped incisors, the brackets are not infrequently quite thick in the labio-lingual dimension, which makes the bracket very stiff and unable to “flex”.

In cases where the normal debonding techniques fail, I will reduce the bonding pad with a high-speed diamond bur and water cooling until the bonding surface is sufficiently small to “flex” the bracket, to generate the adhesive failure. This is clearly a time consuming and, on occasion, cumbersome procedure. But to me, as a planned procedure, this is far outweighed by the reduction in emergency visits compared with the previous bonding protocols.

Figure 2. When debonding premolars and molars the use of a ligature cutter can be very convenient. Applying the beaks of the ligature cutter to the base and a wing of the bracket will force the bracket to flex and the cement will fail.

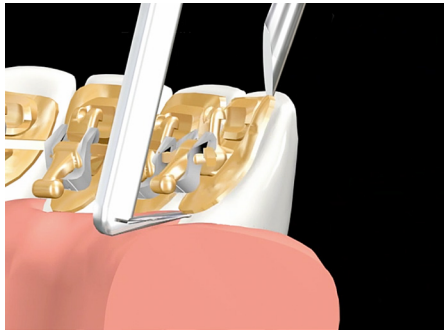


Figure 3. For incisors, the special incisor bracket removing plier is very helpful in lifting most incisor brackets off if the beaks can catch the bracket base from the incisal and gingival.

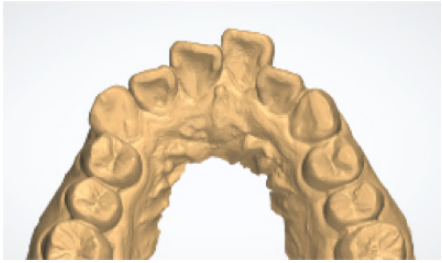


Figure 4. Shovel shaped incisors will often lead to thicker incisor bracket bases.

Figure 5. Large occlusal restorations require care and attention when debonding to ensure that the teeth remain intact.

Figure 6. Two weeks after debond the patient's teeth can be cleaned for the last remaining adhesive.

As mentioned in the article by Dr. Sendelbach, the debonding usually leaves the majority of adhesive on the tooth. This is good and bad. It is good because the risk of enamel fractures is reduced. Here we need to remember that many of our clients choosing lingual appliances may have heavily restored dentitions where there is a potential for fractures of the palatal surface of teeth with large occlusal restorations [Figure 5].

The downside is the time needed to remove the adhesive with debonding burs. In our clinic we frequently do this in two stages. We remove the majority of the visible adhesive on the day of debond and, of course, all of the adhesive if we are placing a fixed retainer on the day of debond.

After a week or two, the gingival tissues will have healed substantially [Figure 6] and it is much easier to remove the residual adhesive in a second session, while at the same time checking the compliance of the retention scheme.

Conclusion

The addition of RelyX Unicem 2 Cement as a bonding protocol has significantly reduced our bond failure rate with Incognito appliances. This greatly benefits the patient experience, as the need for unscheduled appointments is kept to a minimum — uncomfortable repairs are avoided and treatment progresses more predictably toward the end result.

From a clinical perspective, the debonding procedure is often more time consuming using the RelyX Unicem 2 Cement bonding protocol. However, the benefits greatly outweigh the disadvantages. The appliance stays in place for the duration of treatment in exactly the place it was intended, dramatically minimizing finishing procedures such as wire bending. This is a significant part of keeping our patients happy while wearing orthodontic appliances.