

Form meets function: Science and Technology that lead to the 3M™ Clarity™ Ultra Self-Ligating Brackets



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Armineh Khachatoorian received her B.S. in Chemistry from the University of Southern California. She joined 3M in 1997 as a Sr. Technical Service Engineer in R&D. In 2002 she became a Marketing Product Manager and helped launch the 3M™ APC™ Adhesive Coated Appliance Systems, 3M™ Ortholux™ Curing Lights, 3M™ Transbond™ Primers, and others. She is currently a Scientific Affairs Manager, working with new product launches and technical publications.

Does the Orthodontic industry need yet another labial appliance? Isn't the clear tray aligner usage growing double-digit in some countries and quickly expanding the types of malocclusions that can be treated with aligners?

The answers are “Yes” and “Yes” to both questions.

Why then, would 3M decide to launch another labial appliance right on the heels of its announcement of the 3M™ Clarity™ Aligners in the U.S.?

Interviews with orthodontists globally indicate that even as some are increasing their use of the clear tray aligners, they realize that if they had an efficient, reliable and esthetic bracket they would be able to treat more cases, with great results and perhaps even faster. A self-ligating bracket that is also fully esthetic can be a valuable tool in the hands of an orthodontist who can effectively treat any type of malocclusion, perhaps even in combination (aligner on one arch, brackets on the other arch) or in tandem with an aligner (bond brackets for initial unraveling, then aligners for finishing, or, vice versa).

Control and flexibility

Door function

In laboratory testing the doors of the 3M™ Clarity™ Ultra brackets underwent many open-close cycles to validate their reliability. The results showed that the doors survived a minimum of two times open-close cycles of a typical treatment.

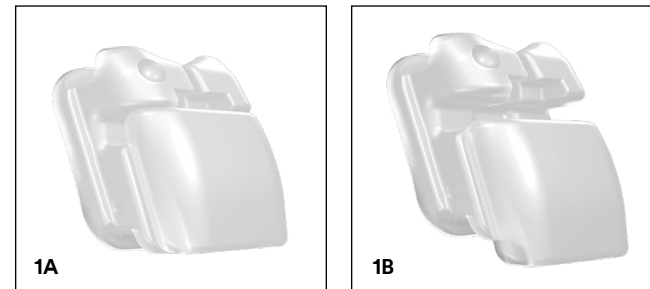


Figure 1A-B: 3M™ Clarity™ Ultra Self-Ligating Brackets.

Clarity Ultra brackets have two parts; the body and the door. The door mechanism includes a 0.007" Nitinol pin hidden within the bracket. The pin provides door resilience and stability and is hidden from view, making the bracket esthetic with no metal showing through.

The doors of the Clarity Ultra brackets are designed to provide an audible and/or tactile “click” when opened or closed. The “click” is an indication of the door opening or closing.

Closing the door

Closing the bracket doors using the open-close instrument is easy.

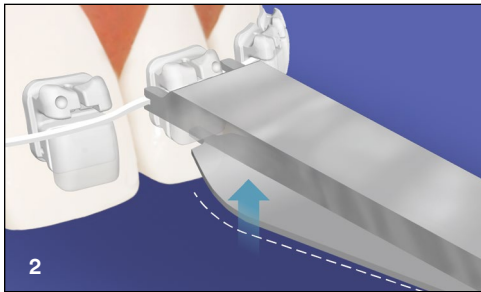


Figure 2: Closing the Clarity Ultra Bracket door.

There is a dedicated double-ended instrument for opening and closing of the Clarity Ultra brackets. The closing end of the open-close instrument has two notches and can be used to torque and seat the rectangular archwire into the slot before closing the door (Figure 2).

Opening the door

Opening the doors of the Clarity Ultra brackets using the 3M™ Unitek™ Open-Close Instrument (Figure 3A-B) is easy and simple.

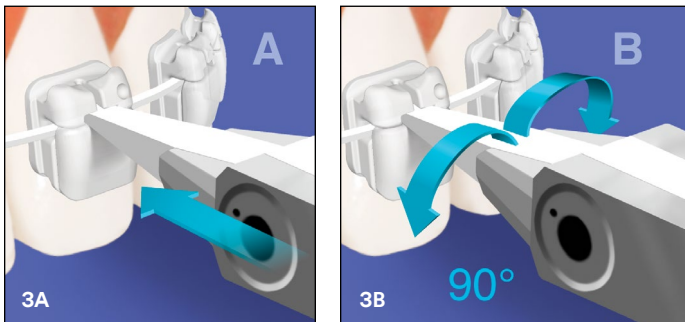


Figure 3A-B: Opening the Clarity Ultra Bracket door.

The opening end of the open-close instrument has a proprietary ceramic tip that not only resists wear but may also reduce marking the bracket compared to a metal tip. This means less frequent replacement of the instruments, as they have been designed to withstand 3,000 opening cycles.

Bonding

Clarity Ultra brackets are available precoated with the industry-recognized 3M™ APC Flash-Free Adhesive. Brackets coated with APC Flash-Free Adhesive have been shown to offer:

- Shorter chairtime during bonding appointment
- Reduction of bonding steps – reduced variability in bonding process
- Protection of tooth enamel under the bracket due to acid erosion
- No flash clean-up – reduced stress during bonding, reduced possibility of door function failure due to cured adhesive



A glass grit bonding base, with uniformly sized grains of Aluminum Oxide glass, similar to 3M™ Clarity™ Advanced Ceramic brackets was used on Clarity Ultra brackets (Figure 4).

Clarity Ultra bracket bases were designed with the same proprietary stress concentrator used in all 3M ceramic brackets.

In addition, each Clarity Ultra bracket is designed with a tooth-specific, compound contoured base, similar to Clarity Advanced brackets for a better tooth to base fit.



Figure 4: Clarity Ultra Bracket base.

Debonding

The dedicated 3M™ Unitek™ Debonding instrument for Clarity Ultra is simple to use and provides a consistent and predictable debonding method. The centering guide of the instrument is designed to fit into the center slot of the bracket, with the door in the open position and the archwire removed (Figure 5).

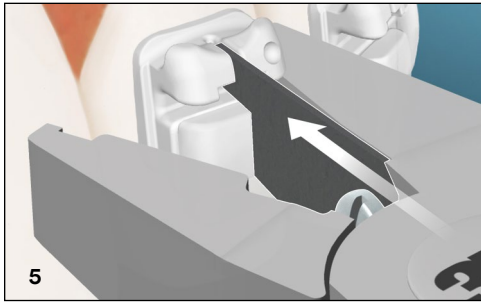


Figure 5: Debonding the Clarity™ Ultra Bracket.

A gentle squeeze followed by rocking the bracket mesial-distally while holding the grip will allow the bracket to detach and stay gripped by the instrument.

Rotation control

Clarity Ultra brackets were designed with a wide door that covers the entire mesial/distal span of the bracket. They provide rotation control without the addition of accessories.

Passive self-ligation with on-demand activation

The bracket door design of Clarity Ultra Self-Ligating Brackets allows the bracket to retain the archwire and remain passive. However, on-demand activation is possible due to tie-wings on all U/L 5x5 brackets.

The proprietary, oval-shaped under tie-wing area is also a unique and important feature. This design allows easy ligation and even double-ligation, if and when needed. The bracket can be ligated using metal or elastomeric ligatures, and when control and space closure is needed, chains can be used, even with ligatures.

Class II treatment mechanics

Hooks on the Clarity Ultra brackets are another feature that add to the versatility of the appliances (Figure 6). This is a feature that is not always available with other ceramic self-ligating appliances, causing the practitioner to have to use other auxiliaries and treatment mechanics.

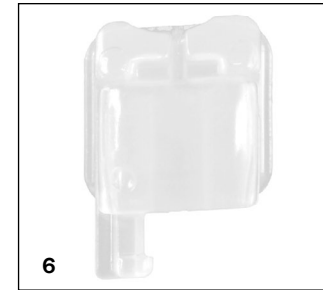


Figure 6: Clarity Ultra Bracket with hook.

All Clarity Ultra upper and lower cuspid and bicuspid brackets have hooks to allow the use of Class II elastics. Additionally, they are compatible with the 3M™ Forsus™ Class II Correctors as an option to elastics.

Esthetics

Clarity Ultra brackets are made of translucent, stain resistant ceramic for brilliant esthetics. No metal parts show through the bracket. The ceramic door covering the Clarity Ultra brackets has a smooth contoured surface designed for patient comfort.



Available in U/L, 5x5, the brackets offer a full esthetic option with all-ceramic brackets. For additional scientific content about Clarity Ultra Self-Ligating Brackets, request a white paper using this [link](#).