At last, a new generation of esthetic orthodontic appliances has been developed, nearly a decade after the introduction of the first ceramic bracket by 3M Unitek in 1987. Created to answer some of the earlier shortcomings experienced with traditional ceramic and plastic brackets, Clarity™ Metal-Reinforced Ceramic Brackets offer both superior esthetics and superior performance. After significant personal experience using the new Clarity bracket system in my office, it is my impression that we are seeing the dawn of a new era in esthetic orthodontic appliances.

As have most of my colleagues, I have used a variety of esthetic brackets including both monocrystalline and polycrystalline ceramic, plastic and metal reinforced plastic. Although most have performed adequately, they all have had significant drawbacks relative to metal brackets in regards to the way they functioned or debonded.

Plastic brackets were first introduced as an aesthetic alternative to metal brackets but were found to be inferior in many respects. Problems experienced with plastic brackets include low bond strength, discol-

orations, tie wing wear and deformation under load. And although reinforcement with ceramic fibers and metal archwire slots has helped somewhat, practitioners are still forced to accommodate the shortcomings of these brackets.

Ceramic brackets were introduced later, with one of the first entries into the market being the original Transcend™ Ceramic Bracket from 3M Unitek. Despite its superior strength and esthetics, the ceramic bracket has also had its own set of challenges including breakage, increased friction between the bracket and the archwire, and at times great difficulty in debonding. That is, until now.

With the introduction of Clarity metal-reinforced ceramic brackets, we now have the ability to treat even the most demanding patients esthetically without sacrificing an ounce of performance.

First of all, Clarity is a true twin bracket delivering the ultimate in rotational control. It has a sculptured, domed design that affords greater patient comfort, while still retaining in/out compatibility with 3M Unitek miniature metal brackets. The brazed metal-lined archwire slot greatly increases bracket strength, even under intense torquing forces and provides true metal on metal sliding efficiency. Torque-in-base design maintains level slot line-up. I am especially pleased that Clarity brackets have functional vertical slots which greatly enhance the mechanical capabilities of the system.

Especially innovative is the patented stress concentrator located on the base of the bracket which when combined with the vertical slot allows the brackets to be debonded with the same tools and simplicity that would be used with metal brackets. After debonding numerous cases, I can honestly say that removing Clarity brackets is easier
than removing metal brackets.

A perfect example of the advanced technology of Clarity brackets in action can be seen with my patient “Wendy.” Wendy is the wife of a professional athlete and travels for her appointments to our office in Southern California from her home in Overland Park, Kansas. Needless to say the logistics of long distance treatment demands the highest technology available.

Wendy is a Class I, bimaxillary protrusive, four bicuspid extraction case. Although she had been treated previously nonextraction, she later regretted not undergoing more extensive treatment with extractions so that she could obtain the type of profile she desired.

Esthetics were of major concern for Wendy and were addressed beautifully with the Clarity bracket. They look fabulous on her teeth and on most occasions go undetected by others.

Long distance orthodontic treatment poses a host of challenges as most practitioners can attest. In order to make this as uncomplicated as possible, for both Wendy and myself, I needed an esthetic bracket which would treat like the Miniature Twin Vertical Slot Brackets I usually use. In designing a system which would allow cuspid retraction quickly, easily, and without adjustment, I utilized two of Clarity’s most powerful features, the metal-lined archwire slot and the functional vertical slot. We are retracting all four cuspids via sliding mechanics on .016 stainless steel (.018 slots) using a somewhat ingenious vertical slot retraction system.

Typically, when retracting cuspids via sliding mechanics, the cuspid is unintentionally tipped towards the extraction space. This results from retraction force being applied at a bracket height which is by necessity positioned well away from the center of resistance of the tooth. As the tooth tips, it binds on the archwire at the corners of the bracket slot, deforming the archwire and increasing friction to such an extent that all distal movement of the cuspid ceases until uprighting can take place. Not only does this slow the distal movement of the cuspid, but defers all retraction force to the posterior teeth which results in loss of anchorage.

Additionally, when typical ceramic brackets are used, as the bracket binds on the archwire, it creates notching which further increases friction and reduces sliding efficiency. Interestingly, it has been demonstrated that by incorporating an uprighting force into a sliding mechanics retraction system, friction can be reduced by as much as 73 to 89 percent\(^1,2\). When all of this is factored in together with the long term inefficiency of elastomeric chain\(^3\), it is easy to see that an alternative retraction system is in order if appointments are to be scheduled approximately 12 weeks apart.

In order for us to attain full extraction space closure quickly, comfortably, and without adjustment, we utilize a vertical slot retraction assembly that
consists of an .018 stainless steel uprighting spring which engages the vertical slot of the cuspid anteriorly, and a stainless steel tube with an internal diameter of .020 posteriorly (Figure 1a,b,c). This stainless steel tube is affixed to the first molar via a small piece of .016 x .022 stainless steel which is spot welded to the tube and then inserted into the auxiliary tube on our first molar bands. For retraction force we use a 200gm closed Nitinol Coil Spring which delivers a constant and continuous force throughout its range of activation. As the cuspid is retracted, the uprighting spring delivers a counter-moment to the tipping force that is produced resulting in less tipping, greater translation, and subsequently, decreased friction. As the cuspid moves distally, the uprighting spring is “threaded” deeper into the steel tube such that wire never protrudes distally to cause patient discomfort (Figure 2a,b,c). Let me repeat, full extraction space closure takes place without further activation or adjustment.

Although I have successfully utilized this type of retraction system for many years now with metal vertical slot brackets, the opportunity to use it with ceramic brackets has just been realized with Clarity. Consequently, I am only able to show you initial treatment photographs, but will be sure to follow-up with a progress and/or final report. In the meantime, I highly recommend trying these fantastic new brackets which address the earlier shortcomings of ceramic alternatives, namely strength, sliding mechanics and debonding challenges.

References: