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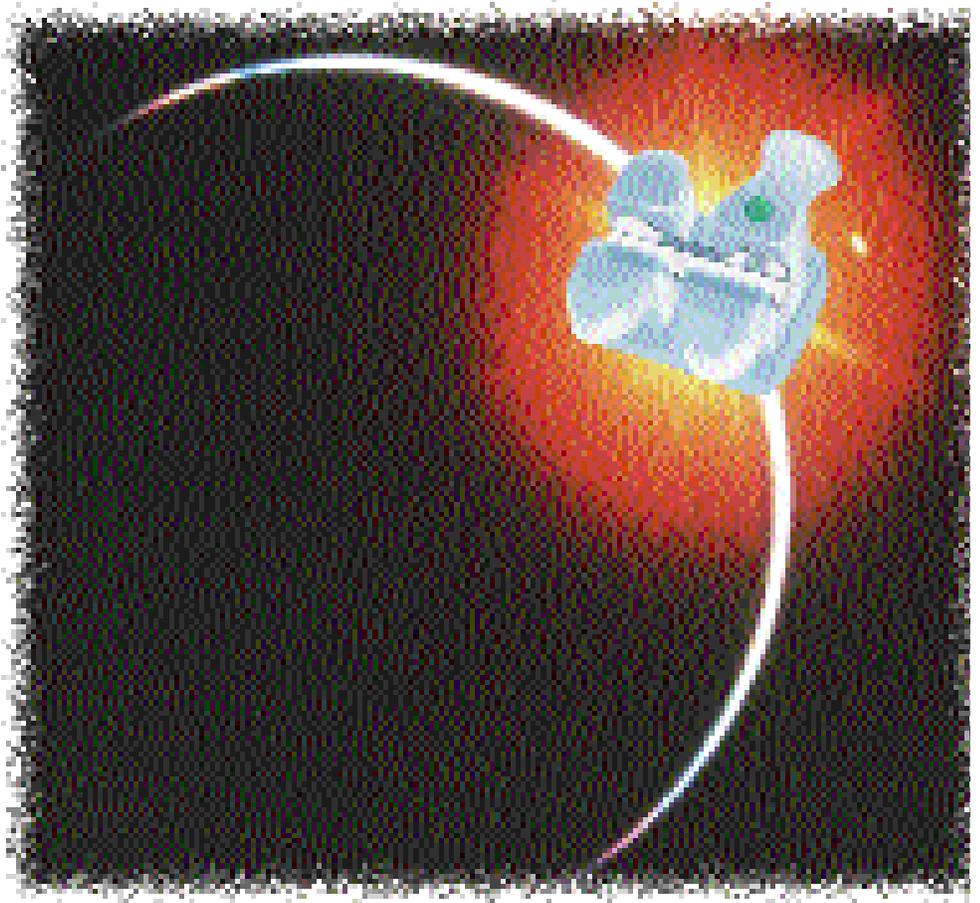
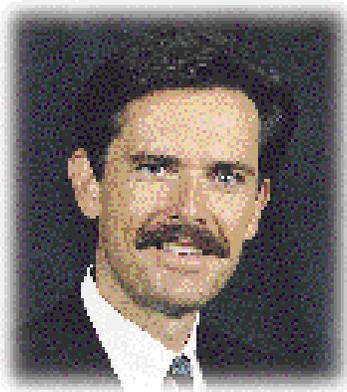
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Richard P. Iverson

*Richard P. Iverson
General Manager*

Customer response from our last issue of Orthodontic Perspectives was beyond expectations. The format change to a more clinical approach was met with enthusiasm and appreciation.

We are exceptionally proud of the innovative products covered in this issue. Our goal is to provide products which make your practice more efficient and your clinical life easier.

Again, we solicit your feedback to help use to continually improve.

• Clinical Perspective

Esthetics as Part of the Customer Driven Practice



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"Beauty in things exists in the mind which contemplates them."
- David Hume

Implementing considerations that enhance esthetics is consistent with a practice committed to customer service. The vision of developing a pure customer driven practice is predicated on identification of your customers and

their expectations. This article will illustrate the concept of esthetic excellence in treatment as an integral part of complete customer service.

OUR CUSTOMERS

The doctor/patient relationship exists on many levels. One must agree that, without patients, there can be no practice of orthodontics. Therefore, from a business standpoint, our patients (and their parents) are our customers. It is our intent to meet their desire for beauty.

We propose the notion that our referring doctors and our staff are our customers as well. While the referring doctors do not exchange fees for service, they are placing their confidence in us to provide optimal care for a patient whose trust has already been placed in them.

ESTHETICS AS CUSTOMER SERVICE

Each practice requires a doctor knowledgeable in the sciences to properly diagnose and devise a treatment plan for their patients. In reality, many of our patients view us as glorified beauticians creating beautiful smiles. Which of the two are you? A doctor, with a commitment focused on providing excellent correction of malocclusions with optimum function, or a "glorified beautician"? Clearly there is a balance in our energy spent focusing on function and esthetics. It would be a gross mistake to overlook either objective in treatment.

What follows is a brief list of some orthodontic considerations for an esthetic smile:

Incisal Aspects: The proper vertical position of the incisors and their incisal edges has been discussed repeatedly in the literature. One important characteristic often overlooked is that the incisal edges should parallel the lower lip line. (Fig. 1) Also of note, the amount of

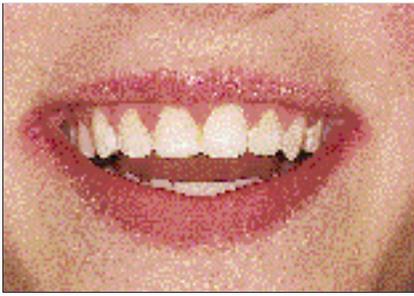


Fig. 1 A line connecting the incisal edges is straight rather than convex, hence the lack of parallelism with the lower lip.



Fig. 2 The maxillary lateral incisor brackets are placed a bit more gingival to promote relative extrusion, thereby optimizing gingival margin height.

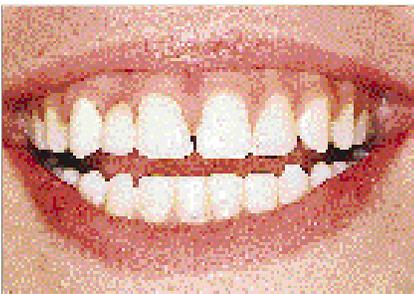


Fig. 3 The maxillary right lateral incisor pontic axial inclination is divergent rather than convergent towards the midline.



Fig. 4 Incisal embrasures are present on the maxillary left lateral incisor. An incisal embrasure is not present between the centrals and right lateral incisor due to enamel attrition.



Fig. 5 The large black triangle between the maxillary central incisors can be reduced with interproximal enamel reduction of the upper centrals and space closure and/or through archwire adjustment for root convergence.

incisors visible with a full smile decreases with age. This is an important factor in planning for intrusion/extrusion of anterior segments with orthodontics and/or surgery. Often, the incisal edges are irregular due to mammelon formation, tooth malformation, trauma and attrition. When practical, individual teeth are intruded/extruded to correct this. Each removal appointment includes a conservative "Hollywood treatment" to equilibrate such irregularity as able.

Gingival Aspects: Gingival margin height is an important element in determining a beautiful smile, particularly in patients with a high smile line. Extrusion and intrusion of incisors is again a helpful tool in obtaining their alignment (Fig. 2). When performed slowly, the supporting tissues should follow the tooth movement. Perio/ortho planning through grafts or gingivectomies can also be effective.

Interproximal Aspects: In addition to space closure, the axial surfaces of the tooth should give the appearance of convergence toward the facial midline (Fig. 3). Embrasure form is also crucial to a beautiful smile. From the incisal direction, a consideration not frequently addressed is the establishment of the interincisal embrasure by modifying the mesial and distal edge corners at removal. The lack of interincisal embrasure adds to the appearance of a more mature person as smiles tend to lose incisal embrasures from enamel attrition. (Fig. 4) From the gingival aspect, beautiful smiles have a papilla filling the interdental gingival

embrasure. Frequently, particularly in adult patients, space forms in this area which appears as a black triangle. Elimination of those black triangles can be performed by slenderizing and recontouring the crowns and closing the newly created space. (Fig. 5) This is particularly successful when crown morphology is rather tapered. Root angulation can also be manipulated as able. Occasionally, periodontal therapy can also be helpful to restore papilla height to fill the embrasure.

Facial Aspects: Finally, no smile is complete without attention to the surface appearance of the teeth. Bleaching, veneers, and crowns are recommended where indicated for interincisal stains, discolorations, and irregularities. As with all aspects of treatment, these procedures are suggested with close communication with other dental practitioners.

Esthetic Materials As Customer Service: Consistent with providing esthetic results is its execution utilizing esthetic appliances. How many patients seeking a beautiful smile prefer to use a less than esthetic appliance during treatment? Our solution has been to offer ceramic brackets and lingual appliances. Each of our patients, regardless of age, is offered the use of ceramic brackets on their maxillary anterior teeth without additional fees. As a result of not having higher fees for a more esthetic appearance, we have a sense for what patients desire. Approximately 85 percent of our patients have chosen "free" ceramic brackets, and a small percentage opt for the added expense of lingual brackets.

Our office has provided these services for the past seven years. Shortcomings of the earlier ceramic appliances have been described. We made efforts to overcome these disadvantages to utilize ceramic brackets without a compromise of treatment. This is in keeping with the notion that we are in practice to serve our patients and not ourselves. As we have made the transition from Transcend™ to Clarity™ ceramic brackets, we have

found the previous disadvantages, such as archwire friction and difficulty in debonding, appear to be eliminated. We enthusiastically support our patients who choose Clarity brackets over metal brackets, as this is consistent with our objective of excellent treatment outcomes while serving the customers.

The brief overview provided in this article is intended to stimulate interest in furthering our wonderful profession towards improving patient care. This can be enhanced by emphasizing optimal esthetic outcomes as part of our service to our customers. As we continue our education, much can be gained by critical evaluation of the works of ourselves and others to assist us in providing well functioning and esthetically pleasing smiles.

• Clinical Perspectives

A New Era In Esthetic Appliances



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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 esthetic alternative to metal brackets but were found to be inferior in many respects. Problems experienced with plastic brackets include low bond strength, discolor-

ations, 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 pro-

trusive, 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 treat-

ment 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 chain³, 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

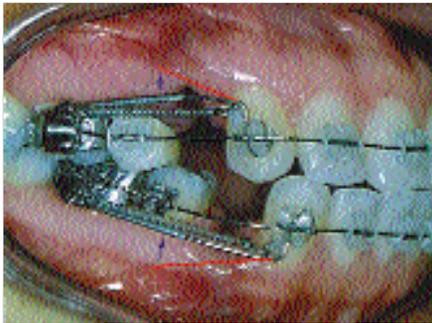


Fig. 1a

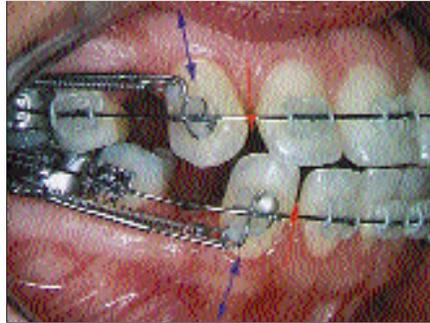


Fig. 2a

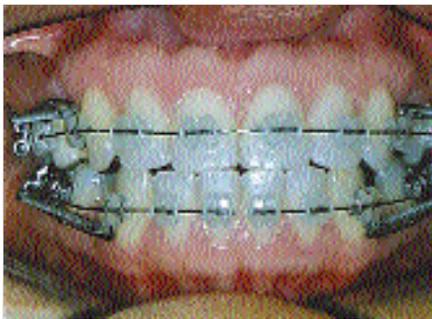


Fig. 1b



Fig. 2b

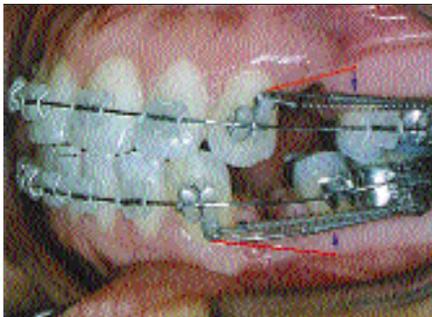


Fig. 1c



Fig. 2c

Appointment #1 - Vertical Slot retraction assemblies are placed utilizing the functional vertical slots incorporated into Clarity brackets. The uprighting force provided by the retraction assemblies, along with the metal arch wire slots, greatly reduce the amount of friction present during cuspid retraction via sliding mechanics.

Appointment #2 - 11 weeks following appointment #1 -Cuspid retraction has progressed unmonitored. Please note evidence of increased translation and decreased tipping of the cuspids during retraction. Also notable is the amount of space created between the incisors as a result of the decreased friction afforded by the metal arch wire slots. (Shortly after appointment #1, the Nitinol coil spring in the lower left quadrant became detached and was not re-attached until appointment #2. Consequently, no retraction of the lower left cuspid took place during this 11 week period.

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.

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• Clarity™ Bracket Development

A Technical Perspective



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A primary objective of orthodontic treatment is an esthetic finish to the case. Many patients are driven to seek treatment because of their desire for esthetics. Naturally these patients would prefer to maximize esthetics during treatment. Unfortunately, the performance limitations of previous esthetic appliances forced clinicians to compromise their treatment techniques. The result was inconvenience and reduced efficiency for the orthodontist. Patient satisfaction also suffered with increased treatment time and cost. The goal of developing a new esthetic bracket was straightforward: bring metal bracket performance to esthetic brackets.

Development of the Clarity bracket system was founded on two axioms: 1) understand the needs of the orthodontist and patient, 2) use advanced technology to address these needs. Information from orthodontists and assistants was critical in determining the clinical limitations of previous esthetic appliances. Through conversations with sales representatives, cus-

tomers surveys, and technical hotline calls, three key problems emerged: poor sliding efficiency, bracket breakage, and difficulties in debonding. Once these problems were understood, the latest design tools and materials technology were used to find the solutions.

IMPROVING SLIDING EFFICIENCY:

Early users of ceramic brackets noticed problems in treatment efficiency which was particularly severe in cases of space closure where sliding mechanics was used. This increase in 'friction' was shown in laboratory studies by Tanne, et al. (1991) and demonstrated clinically by Alexander (1992).

Our studies found that the problem was not pure friction, but rather galling of the relatively soft archwire material by the hard ceramic bracket. Analysis of wires used clinically showed that sharp notches were ground into the wire by the ceramic. Figure 1 is an electron micrograph of a round stainless steel wire after treatment. Rather than merely increasing the frictional resistance between the wire and the bracket, these notches form barriers that prevent the bracket from moving along the archwire. Damage was frequently found wherever ceramic and metal were in contact during treatment, and it was not limited to cases where sliding mechanics were used. The result was the treatment efficiency was hindered whenever motion was required between the archwire and the bracket. This occurs, for instance, during correction of rotations.

It is well known that harder materials will wear softer materials. The ceramic used in braces is three times as hard as the stainless steel used in archwires. Work with Prof. Robert Kusy (1995) at the University of North

Carolina has shown that the notches in archwires are caused by repetitive grinding motion between the wire and the bracket. This type of motion occurs with small movements of the tooth within the periodontal ligament. Thus the ceramic bracket acts like a file that is slowly ground into the archwire. The notch that is formed becomes a barrier that prevents further movement of the bracket along the wire.

The most straightforward solution to this problem was to eliminate contact between ceramic and the archwire. Fortunately this could be done by placing a thin stainless steel liner into the archwire slot of a ceramic bracket without a significant effect on esthetics. Liners are designed to preclude

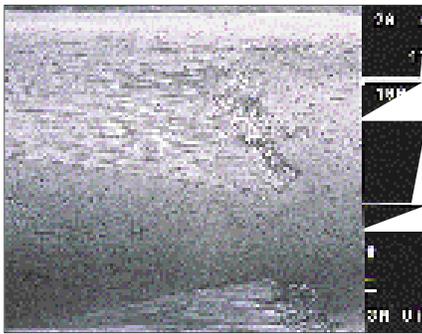


Fig. 1 Electron micrograph of a round stainless steel wire used with ceramic brackets.

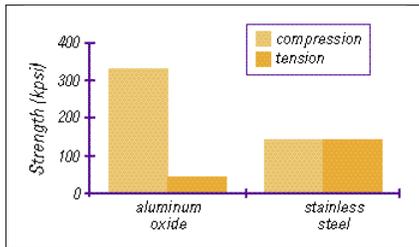


Fig. 2 Compressive and tensile strength of aluminum oxide and stainless steel.

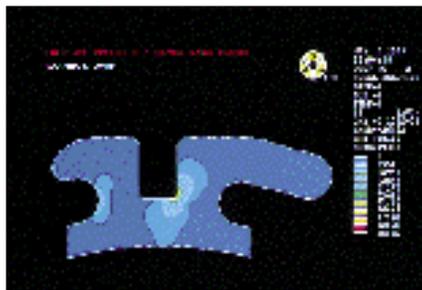


Fig. 3 Tensile stress generate by applying occlusal and torquing loads.

contact between the archwire and the ceramic. In Clarity, this liner is integrally bonded to the ceramic by using a unique braze designed specifically for joining these two materials. The result is true metal-on-metal performance, as confirmed by Dickson and Jones (1996).

REDUCING BRACKET BREAKAGE:

Bracket breakage was a major inconvenience associated with conventional ceramic brackets. This breakage tended to occur in three separate instances: during archwire tie-in, during patient use (i.e., forces of mastication) and during debonding. Each of these sources of breakage needed to be addressed separately.

The first step in eliminating breakage of ceramic appliances is to understand the mechanical properties of ceramic materials. Unlike metals, ceramics do not plastically deform under stress, rather they break catastrophically in sudden brittle failure.

Since ceramic materials are composed of rigid crystal structures, they are much more resistant to compressive stress than to tensile stress. In contrast, metals, such as stainless steel, are equally strong in both com-



Fig. 4 Pre-stressed concrete bridge span. The beam is subject to bending moments which generate tensile stresses.



Fig. 5 Section of pre-stressed concrete. Metal bars are in tension, concrete is in compression.

pressive and tensile strength. Figure 2 shows a comparison of the compressive and tensile strengths of aluminum oxide ceramic and stainless steel. Clearly the low tensile strength of ceramic is its weakness. Virtually all failures of ceramic brackets are due to tensile stresses.

Finite element analysis is the engineering tool that was used to determine how loads applied to brackets generate tensile stresses in the material. Figure 3 shows the tensile stresses that are generated by applying an occlusal load of 20 lb to the tying and a torquing moment of 8 in-oz to the archwire slot. Occlusal loads generate tensile stress in the tying undercut which results in cracks that propagate to the archwire slot and fracture the tying. Torquing loads generate tensile stress at the corner of the archwire slot which propagates cracks either through the base of the bracket or to the tying undercut.

Design efforts were focused on reducing these stresses. One method of reducing tensile stress is to bias the bracket into a state of compression. This technique has been used extensively in the construction field to reinforce concrete (Figure 4). Concrete is a classic brittle material that has a very low tensile strength. However, engineers needed to use the material in applications, such as bridge spans, that are subject to tensile stress. The result was the development of pre-stressed concrete. Figure 5 shows the structure of a beam of prestressed concrete. To make this material, steel reinforcing bars are mechanically tensioned while the concrete is poured and cured. After curing, the external forces that tension the steel bars are removed. The result is that the brittle concrete material is forced into a state of compression, while the metal reinforcing bars are left in a state of tension. As the beam is used, tensile loads applied to this composite structure must first overcome the prestressed compressive loads in the concrete before tensile stresses are seen in the concrete.

Prestressing is built into every

Clarity metal-reinforced bracket. Here, the goal is to place the ceramic adjacent to the archwire slot into compression. This increases the resistance of the bracket to torquing loads. The metal slot liner provides the opportunity to use the high tensile strength of metal for placing the ceramic into compression.

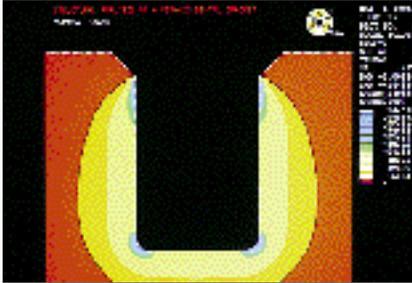


Fig. 6 Compressive stress field generated in the ceramic by the stainless steel liner.

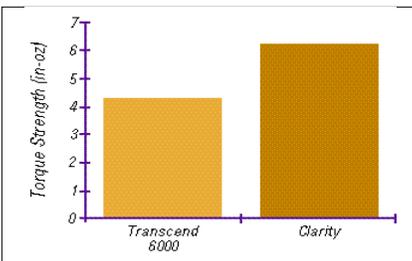


Fig. 7 Torque strength of Clarity and Transcend 6000.

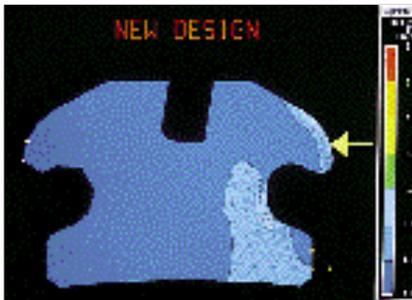


Fig. 8a Tensile stress generated in tying undercut of Transcend 6000.

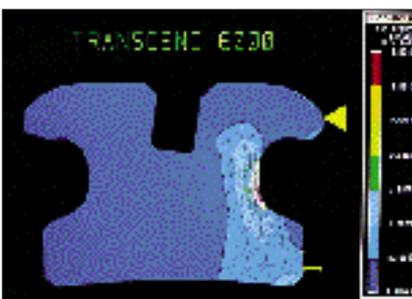


Fig. 8b Tensile stress generated in tying undercut of Clarity.

tion. The metal and ceramic are integrally joined at high temperature. The shrinkage rate on cooling is twice as great for stainless steel as for ceramic. This difference generates a compressive stress field in the ceramic as the bracket is cooled from the joining temperature. Again, finite element can be used to calculate these stresses. They are shown graphically in Figure 6. Most importantly, these stresses do increase the torquing strength of the Clarity bracket as shown in Figure 7.

Tensile stresses can also be reduced by changing the design of the bracket. This technique was used to increase the resistance of the bracket to occlusal loads, which operate on the occlusal wing of the bracket. The wing acts as a lever arm that transmits tensile stresses to the tying undercut. By reducing the labial-lingual height of the tying, the length of the lever arm that generates these stresses is reduced. The result is a decrease in tensile stress. This effect is confirmed

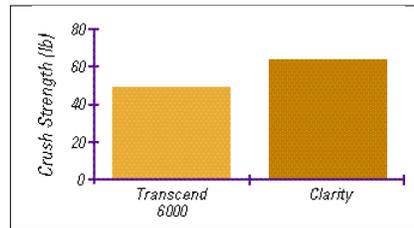


Fig. 9 Occlusal wing strength of Clarity and Transcend 6000.

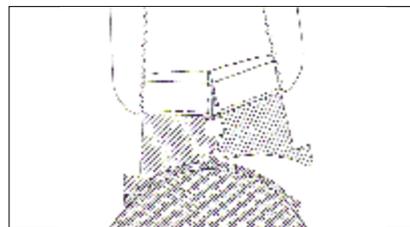


Fig. 10 Debonding the Clarity Bracket.

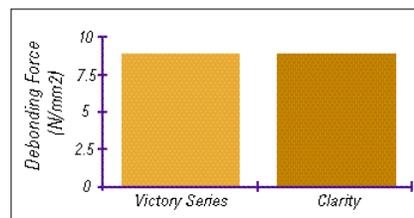


Fig. 11 Force to debond Clarity and Victory Series metal brackets.

both in the finite element analysis (Fig. 8) and in the occlusal wing strength of the Clarity bracket (Fig. 9).

METAL-LIKE DEBONDING:

Bracket debonding requires initiation of a crack in the adhesive layer. Metal brackets proclivity for deformation produces localized stresses in the adhesive layer that initiates cracks. Cracks are propagated by further deformation as the bracket is peeled from the tooth.

Conventional ceramic brackets are more difficult to debond than metal brackets because ceramic is more stiff than metal. In addition, conventional ceramic brackets are designed with thick sections to accommodate the reduced tensile strength of the ceramic. Hence, ceramic brackets are not easily deformed to initiate cracks in the adhesive. As a result, special instruments and techniques have been developed to remove conventional ceramic appliances. Although these techniques do work, they are cumbersome. Further, they often place tensile stresses on the bracket that can lead to bracket breakage.

To initiate cracks in the adhesive, Clarity brackets are designed to deform -- albeit only one time. The narrow section through the center of the bracket allows the bracket to flex when compressive forces are applied to the mesial and distal sides of the bracket. Figure 10 illustrates removal of the Clarity bracket. The squeezing force breaks the thin ceramic web. Cracks then initiate in the adhesive along the mesial and distal edges of the bracket. As these cracks propagate, the two bracket halves are rocked off the tooth. The collapsed metal liner secures the two halves of the bracket together for easy removal. The squeezing force required to remove the bracket is controlled by adjusting the thickness of the ceramic web. Bishara et al. (1996) have confirmed that Clarity brackets can be debonded with forces similar to metal brackets (Figure 11).

CLARITY INTRODUCTION:

After extensive laboratory testing to validate the concepts, it was again time to return to the customer. Focus groups were held with orthodontists to demonstrate the technical advances. At the same time, participants suggested additional design features which were incorporated into the final design. An extensive series of clinical evaluations followed to test the performance of the bracket through all stages of treatment. These evaluations confirmed that Clarity meets customer expectations for an esthetic bracket with metal bracket performance. Clarity was introduced in September 1996.

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• Assistant's Exchange

APC Bracket Efficiency

by Debbie Giere

Debbie Giere is a staff member in the office of Lina A. Johnson, D.D.S., Burke, Virginia

In years past the placement of orthodontic brackets on the tooth surface was a tedious procedure. The introduction of precoated brackets has improved the efficiency of bracket usage with several points of note.

There are many areas where errors or inconsistencies with bracket preparation and placement can occur. APC brackets have eliminated the need to both mix pastes and apply adhesives to the bracket surface. No longer is there a doubt concerning the mix or the application of the adhesive - it is uniform with no variables. The time required to select and prepare a bracket has been reduced, and therefore the process is much more efficient. Staff education and training has been simplified. Most new assistants who are unfamiliar with APC brackets almost immediately love them from the start.

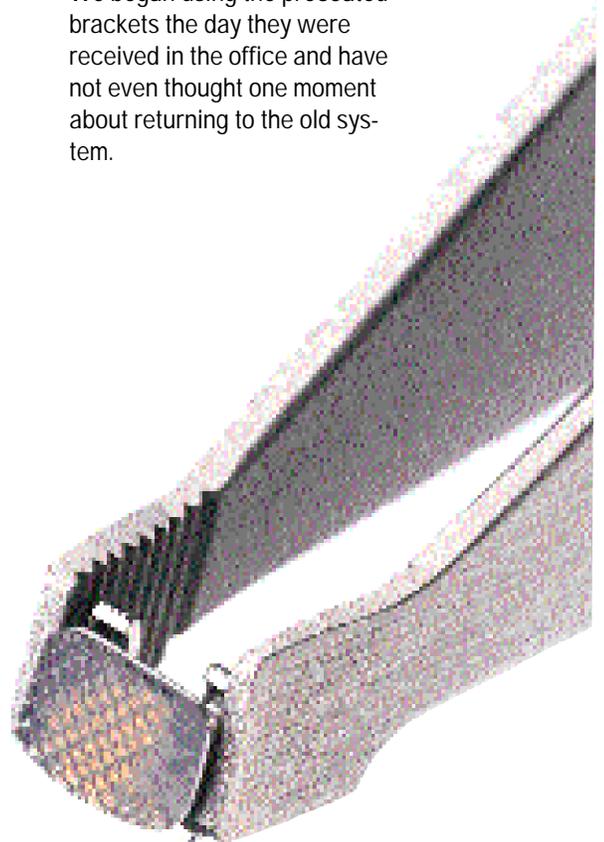
Whether placing two full arches or a simple repair of a broken bracket, the ease of patient preparation, shortened chair-time, and therefore the overall ability to maintain a planned schedule are clearly obvious. No longer does one have to dread an emergency or unexpected bracket repair.

The packaging, storing and dispensing of the brackets is terrific. Inventory control is clear, thus preventing an error involv-

ing overstocking or understocking. No longer do you have to count tiny brackets found in small plastic tubes.

From a doctor's perspective, Dr. Johnson states that there is virtually no drift or sliding upon placement of the bracket on the tooth surface as seen in the past with different adhesives. Removal of excess adhesive if needed is also relatively simple.

We began using the precoated brackets the day they were received in the office and have not even thought one moment about returning to the old system.



• Recent Developments

APC™ Adhesive Coated Brackets Now In A New Package

In an effort to provide improved quality assurance and an unprecedented shelf life of three years for APC, 3M Unitek now offers its customers a "Heat Seal" and "Amber Well."



The "Heat Seal" lid not only insures a shelf life of

three years, but also provides a tamper-evident control for the practitioner and ultimately the patient. Once the lid is opened it cannot be re-closed. The bracket's adhesive coating will remain consistently viscous and the APC system will continue to provide the most efficient bonding environment available in the marketplace today.

The "Amber Well" enables the orthodontist and staff to view the brackets prior to use. There is no need to open the package prior to bonding. Simply turn the bonding tray over to easily identify your brackets.

JCO and AJO-DO Archives now on CD-ROM

When you access AJO-DO or JCO articles, would you like:

- Fast and easy data access - saving you time?
- Full text searchability - not just journal indexes or a library abstract search?
- Space savings - throwing out old journals?



CD-ROM accessible journal archives allow for all this and more. 3M Unitek is the exclusive global distributor for all first time purchasers of the AJO-DO and JCO journal archives on CD-ROM. Upgrades for previous purchasers are also available. Both are offered in Windows (PC) and MAC versions.

The JCO (*Journal of Clinical Orthodontics*) archive covers 30 years worth of issues. And contains every figure, picture, diagram and table from this period.

The AJO-DO (*American Journal of Orthodontics and Dentofacial Orthopedics*) archive covers 17 years worth of issues. And contains every figure, picture, diagram and table from this period. Plus nearly 100 classic articles (pre-1980).

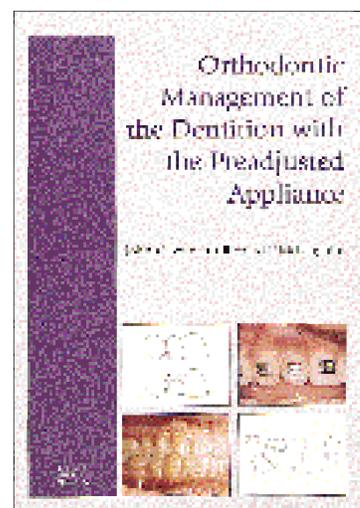
The Angle Journal CD-ROM archive will also be available soon, exclusively from 3M Unitek.

New Narrow Contoured Molar Bands

These new bands offer anatomically designed contours with the added feature of a reduced gingival/occlusal height. This results in a "softer" feel and allows full seating without the concern for gingival impingement while remaining below the marginal ridge. Also available with our micro-etched inner surface.

New Orthodontic Management Techniques

This new book, authored by Drs. McLaughlin and Bennett, gives a detailed look at their integrated approach to treatment mechanics with a tooth by tooth analysis in the management of the dentition.



Nitinol Heat Activated Archwires

Efficiency and ease-of-use are at your fingertips when you choose the new Nitinol Heat Activated Archwires. Even in the most difficult, crowded cases, wire insertion and engagement can be facilitated with ease. This complete line of archwires can offer longer working time, fewer wire changes, and ultimately shorter overall treatment time.