

Orthodontic Perspectives

Clinical information for the orthodontic professional



Self-Ligation: The Evidence Mounts



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Paul Keel

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Message from the President

Paul Keel



Everywhere you turn these days, self-ligation seems to be the topic for discussion among orthodontic professionals. Like many topics in our market, viewpoints tend to be firmly held. Proponents profess that removing friction on the archwire has benefits for the clinician as well as the patient. Detractors argue that self-ligation is just another way to freshen up traditional appliances. But whether you find yourself on the supporter or skeptic side of the debate, you would probably concede that self-ligation is an unmistakable trend in the industry.

Looking around the industry, I am struck by the multitude of ways to create a self-ligating bracket – design differences that have a substantial effect on your ability to plan, treat and finish a case. Of course, we’re fans of our SmartClip™ Self-Ligating Bracket design. SmartClip and Clarity™ SL Self-Ligating Brackets incorporate a Nitinol clip mechanism that is unique in the industry. Joined by a true-twin design similar to traditional brackets, 3M Unitek self-ligating brackets give you a range of treatment benefits and options that we believe are not available with other brackets, self-ligating or traditional. Some of these advantages are discussed in this issue.

These are exciting times for orthodontics. I want to thank you for your interest in delving deeper into the self-ligation discussion and for looking to 3M for innovative solutions to help you and your patients throughout the treatment process. Watch for additional new products over the coming months designed to make the process even easier.

Best,

Paul ■

New Orthodontic Textbook on SmartClip™ Appliances

A significant and comprehensive new text has been written by Dr. Hugo Trevisi (Presidente Prudente, Brazil) entitled *SmartClip™ Self-Ligating Appliance System – Concept and Biomechanics*. Extensively illustrated including case presentations, the more than 250 page text includes an historical overview of orthodontic fixed appliances, discussion of the integration of the SmartClip Appliance System and the MBT™ Versatile+ Appliance System, Customized Bracket Positioning, Sliding Mechanics and Occlusion in Orthodontics.



In a Foreword to the book, Dr. Richard McLaughlin states: “This impressive text is a comprehensive presentation of his [Dr. Trevisi’s] work and his successful integration of the MBT [Versatile+ Appliance] System approach with self-ligating mechanics. The results are excellent.” The publisher states that the book “guides the reader towards the best possible results for the orthodontic patient...”

The text is published by Mosby/Elsevier and is available through 3M Unitek (ref 014-508). ■

3M Acquires Major Brazilian Ortho Products Manufacturer

3M has announced it has acquired Abzil Industria e Comercio Ltda., a major manufacturer of orthodontic products based in Sao Paulo, Brazil. Abzil is the second largest manufacturer in Brazil's orthodontic market and the company's brackets, bands, tubes and wires are widely recognized as some of the highest quality orthodontic products available in the country.

"Abzil's strong brand and product portfolio complement our full line of orthodontic solutions and will allow us to better serve customers in Brazil and beyond," said Paul Keel, president, 3M Unitek. "We see strong technical and sales synergies as well as manufacturing opportunities with Abzil," added Luigi Faltoni, managing director, 3M Brazil.

Abzil employs approximately 300 people at its operations in Sao Jose do Rio Preto, Sao Paulo, Brazil. ■



3M to Acquire Lingualcare Inc., Maker of iBraces™ System

3M has announced that it will acquire Lingualcare Inc., a Dallas-based orthodontic technology and services company offering the iBraces™ System, a customized, lingual orthodontic solution.



The demand for effective and aesthetic orthodontic solutions is increasing steadily. Because lingual braces are bonded on the tongue side of the teeth, they are truly invisible, making them the most aesthetic orthodontic solution available.

In addition, lingual braces are more effective at moving teeth than other invisible solutions such as clear aligners, which can be removed by the patient and therefore rely on patient compliance.

"Lingualcare brings the newest generation of lingual braces, along with sophisticated digital tools to make treatment easier for doctors and patients. Lingualcare nicely complements 3M's full line of orthodontic solutions and further broadens both our aesthetic and digital orthodontic platforms," said Paul Keel, president, 3M Unitek.

Lingualcare's iBraces are customized to the patient's tooth anatomy through a proprietary process to create braces that are lower profile and more comfortable



than traditional lingual braces. "We are excited by the opportunity to strengthen and enhance the iBraces customer experience with the support of 3M's sales, service and technologies," said Lea Nesbit, CEO, Lingualcare.

Founded in 2002, Lingualcare's new approach to straightening teeth uses proprietary technology to offer state-of-the-art orthodontic treatment. iBraces is the only 100-percent customized invisible fixed appliance system on the market today. Supporting the highest standard of care, iBraces are designed to ensure optimal patient comfort and deliver individualized clinical results. The acquisition will be completed during the fourth quarter of 2007. ■



Smart Things to Know About the SmartClip™ Self-Ligating Appliance System

by Anoop Sondhi, DDS, MS



Dr. Anoop Sondhi received his dental degree from the Indiana University School of Dentistry, and his post-graduate certificate and M.S. in Orthodontics from the University of Illinois in 1977. Following his graduation, he was on the graduate faculty of the Department of Orthodontics at Indiana University. During his full-time academic appointment at Indiana University, he maintained a part-time private practice. Since 1988, he has been in full-time private practice in Indianapolis, and continues as a Visiting Professor for several graduate programs in orthodontics. He has presented seminars and continuing education courses to several dental and orthodontic organizations in the United States, and has been invited to give courses in Canada, Central America, South America, Europe, the Far East, South Africa, Australia and New Zealand.

In his orthodontic practice, Dr. Sondhi devotes a significant amount of his work to the development of effective and efficient treatment systems, indirect bonding, interceptive treatment of complex malocclusions, and the orthodontic management of temporomandibular disorders. In addition, he teaches courses on practice management, office organization, and staff management. Dr. Sondhi has also served as a consultant to the American Journal of Orthodontics and Dentofacial Orthopedics.

With the steady, and seemingly inexorable, march from ligation to self-ligation in the clinical practice of orthodontics, orthodontists are mastering a new body of knowledge to harness the many advantages that self-ligation brings to our practices.

The management of the appliance is not the only thing that is different; we also find changes in the management of the patient, and the logistics of the practice. Having treated patients for almost 2-1/2 years with the SmartClip™ Appliance System, I am finding that this self-ligation technology, and the thought process that accompanies it, have an impact on our diagnosis and treatment planning, chair time, archwire sequencing, and overall clinical efficiency.

We are starting to see a substantial improvement in treatment efficiency, with a substantial savings in treatment time for us, and a reduction in inconvenience to patients. It is already evident that oral hygiene management is easier with self-ligated appliances, given the absence of elastic ligatures, and the cumulative effects of all these advances made a powerful and persuasive argument in favor of the SmartClip system.

In the process of treating my patients, and increasing my understanding of the differences in technique that come into play, I have begun to accumulate some “Clinical Pearls” (Do’s and Don’ts) that have proved to be quite valuable. I would like to share some of these with you, and will emphasize the following in this article:

- Bracket Placement
- Indirect Bonding
- Archwire Sequencing
- The Sondhi .012 Super Duper Contact Opening Archwire
- Rotation Control

- Finishing Archwires
- Modifying Your Systems
- Variable Prescriptions
- Clarity™ SL Self-Ligating Appliances

Bracket Placement

In trying to find instruments that would permit proper placement of the bracket on the tooth, I found that the instruments that I had traditionally utilized with ligated brackets were not particularly useful. In a ligated system, of course, the instrument can be inserted completely into the bracket slot. This is obviously undesirable with the SmartClip bracket because we would not want to engage the clip. That said, it remained necessary to engage enough of the bracket slot to permit proper mesiodistal and vertical positioning of the bracket.

Having tried many different instruments, the one that I have found to be the most effective is an instrument called a Tarno. It is probably referred to by other names, and is basically a plastic filling instrument used in operative dentistry (Figures 1A and B). Figures 1C, D and E demonstrate, from different perspectives, the manner in which this instrument engages the bracket slot for adequate control, without inserting itself into the clip. If you have any interest in this, the instrument is called a Plastic Filling Instrument PFI-3, and you may obtain it by contacting Paul Cotter at pcotter@indy.rr.com, or (317) 709-9410. The instrument is made by Peerless International, and I obtain it through Mr. Cotter. A word of caution. Other plastic filling instruments of similar appearance are made by the same company but the blade thickness is either too much or too little. PFI-3 is the one that fits the bracket the best.

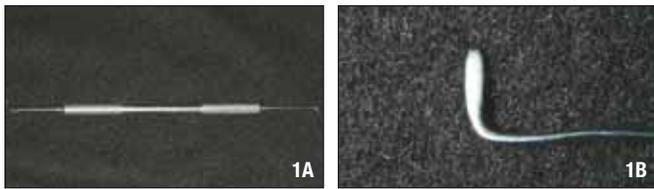


Figure 1A-B: Plastic filling instrument

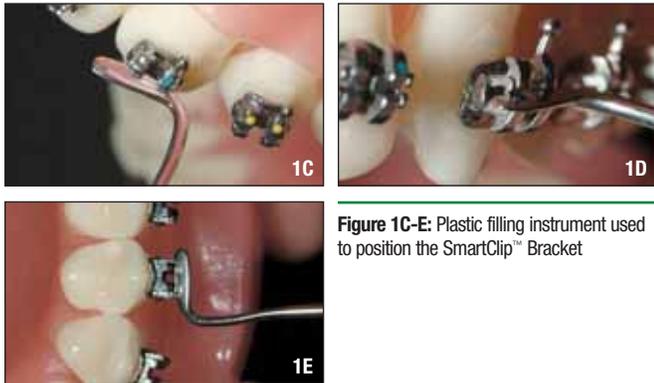


Figure 1C-E: Plastic filling instrument used to position the SmartClip™ Bracket

Indirect Bonding

We have been indirect bonding the SmartClip brackets for the past 2-1/2 years, and the existing indirect bonding technique works well. The only change that we have had to make emanated from our concern that the Nitinol clip may prove difficult to tease out of the Bioplast inner tray. For that reason, we are now recommending that a small drop of Alcote be placed on the bracket (Figure 2) prior to the formation of the tray. The Alcote dries on the clip wings, and tray removal has proved to be quite simple.



Figure 2: Placing Alcote on the bracket before the indirect bonding tray is fabricated

Archwire Sequencing

There is a general tendency, when treating with ligated edgewise appliances, to progress to stiffer and larger archwires as rapidly as possible. Some of this is driven by a desire to obtain 3rd order control earlier in the process, and sometimes to facilitate the use of inter-arch elastics. While those are all appropriate and laudable reasons, the fact remains that we must continue to remember that it actually takes very little force to move a tooth. Consequently, the temptation to progress to stiffer and larger archwires, when treating with the SmartClip system, should be resisted. There are two profound reasons for this.

It behooves us to remember that any self-ligating bracket, and certainly this is true of the SmartClip bracket, is in essence a “binary” bracket. I use that term because there really is no such thing as partial engagement of an archwire into a self-ligating bracket slot. The archwire is either in or

out. For that reason, if one proceeds to larger or stiffer archwires early in the process, while some of the teeth are still slightly displaced, engaging and disengaging the archwire simply requires more work, and is certainly not pleasant for the patient. All such movements should be accomplished with lighter archwires, and we recommend that you avoid going to larger steel archwires until preliminary alignment has been achieved. Further, it is necessary to work out all rotations prior to placing a rectangular archwire.

Putting labio-lingual steps in a rectangular steel archwire, and then trying to engage it into the SmartClip bracket, is not recommended. In Figure 3, it is easy to see that the maxillary lateral incisors were not completely de-rotated. Proceeding from a round to rectangular wire was, therefore, inadvisable. Indeed, a close look reveals that the archwire is not completely seated in the distal wing, and the rotation would remain uncorrected. This is not a problem with the bracket, it is a problem with the way it was used. The rotation corrections should have been completed with a round archwire, an .016 round in an .018 x .025 slot, or .020 round in an .022 x .028 slot, before proceeding to a rectangular archwire.



Figure 3: Incomplete rotation correction of maxillary lateral incisors

This brings us to another fallacy, and potential source for difficulty. The bracket clearly has the advantage of being ligated on an as-needed basis. That is certainly one of the features that make it stand out from other competing self-ligating brackets. However, it is inadvisable to try and flex the .025 dimension of a steel archwire into a tooth that is still slightly rotated. In fact, practitioners may convince themselves that the rotation may correct because they ligated that wing, but a closer look (Figure 4) reveals that the archwire is still not completely seated in the clip.



Figure 4: Archwire not completely seated in the distal wings of maxillary lateral incisor brackets

My point here is not that selective use of ligatures is inadvisable. In fact, I have described the ability to ligate on an as-needed basis as equivalent to having a turbo-charger in your car’s engine. When you are simply coasting down the highway, the turbo-charger is dormant, and unnecessary. However, when you need to step on the gas to pass someone, the turbo-charger will kick in on an as-needed basis. That is not a bad way to view how ligatures come into play, on a selective basis, with the SmartClip bracket.

My point in drawing your attention to this is simply to re-emphasize the “binary” nature of the bracket, and to emphasize that trying to force an archwire that the bracket is not yet ready for is likely to be counter-productive. The problem in Figure 4 is not with the bracket or with the ligation – the archwire selected is simply too stiff. The rule to remember here is that if the wire is difficult to insert, it is probably too big or too heavy a wire. That is why I have found the .014 x .025 Nitinol archwire to be a terrific transitional archwire from the round to the rectangular series with the SmartClip system (Figure 5).



Figure 5: .014 x .025 Nitinol archwire package

The Sondhi .012 Super Duper Contact Opening Archwire!

I have previously pointed out that rotation control with the SmartClip appliance system requires a different thought process than does rotation control with a ligated appliance. To reiterate, that is simply because the archwire will not be pushed into the base of the slot. Figure 6 demonstrates why going to an .016 x .025 Nitinol archwire was inadvisable with the mandibular left lateral incisor still rotated, with its mesial contact point overlapping the distal surface of the mandibular left central incisor.



Figure 6: Mandibular left lateral incisor rotation makes the selection of an .016 x .025 archwire inadvisable

We have found it extremely effective to use a simple .012 steel archwire with a vertical loop to literally “pop” open the contacts in order to facilitate rotation corrections. The archwire is demonstrated in Figure 7A-E, and the process for constructing it is as follows. We take a simple .012 preformed steel archwire, and lay it into the bracket slots. The archwire is then marked on the mesial of the molar tubes, and a simple vertical loop approximately 4mm long is then bent with bird beak pliers.

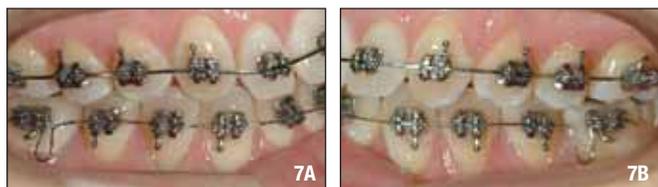


Figure 7A-E: Example of an .012 steel archwire with vertical loop



Figure 7A-E: Continued



Depending on the amount of activation desired, the loop can be anywhere between 1 and 2mm wide. When this archwire is then inserted back into the individual SmartClip brackets, the vertical loop will be lightly compressed. Yes, I know, the force level would be astonishingly low with a simple vertical loop in an .012 steel archwire, and this is a good time to remind everyone of two things. First, we have come to recognize that extremely light forces are very effective in causing tooth movement. Second, please keep in mind that there is virtually no friction in the system, and that the .012 archwire will slide with great ease through the bracket slots to effect the opening of the contact.

After that, one can go into an .016 steel or .014 x .025 Nitinol archwire, and easily achieve the rotation correction. I consider this archwire invaluable in managing treatment with the SmartClip appliance.

Rotation Control

Rotational deficiencies are inherent in **any** self-ligating bracket. This is because the process of ligation literally slams the archwire into the base of the slot, and there is no such forcible seating of the archwire in a self-ligating bracket. The very process of engaging and disengaging the self-ligating mechanism requires a certain clearance between the wire and the self-ligating mechanism. Brackets from different manufacturers have tolerances that range from .027 to .030 inches, so even an archwire with a depth of .025 will allow some rotational “slop”. The SmartClip bracket has a depth of .0275 on all brackets except the mandibular incisors, where the depth is milled to a tighter tolerance of .027 for better rotation control.

Slight off-center positioning of SmartClip brackets is helpful in rotational control. In effect, if a tooth is rotated, we do not recommend placing the bracket precisely the way you would with a ligated bracket. The bracket should be placed another .5mm toward the rotation (Figure 8). This will automatically overcome the problem of rotation control. Indeed, placing brackets on rotated teeth precisely the way you would in a ligated system is one of the reasons behind the claim from some practitioners that rotation control with self-ligation is poor. If it is not possible to bias the placement of the bracket towards the side of the

rotation, usually because of the positions of overlapping teeth, then care must be taken to reposition those brackets as early in treatment as possible. I also find that it is beneficial to accomplish any planned interproximal reshaping of the teeth earlier in the treatment process.



Figure 8: Off-center positioning for rotational control

It is advisable to resist the temptation to engage a light archwire into every bracket slot, no matter how rotated the tooth. It is substantially better to engage the archwires selectively for severe rotations, and to engage the second clip after some preliminary rotation has been achieved. Forcing the archwire will increase the risk of plastic deformation of the archwire, and thereby inhibit the rotation correction from occurring. If, for example, the distal wing of a bracket engages relatively easily, the mesial wing should either be left alone, or lightly tied towards the archwire with a ligature. This, of course, is easily accomplished with the SmartClip bracket because it is basically a twin edgewise bracket, and either one of the wings can be ligated selectively.

Finishing Archwires

It has long been understood, and well accepted, that accurate bracket placement is of paramount importance in realizing the efficiency of a pre-adjusted appliance. If you thought that was true with ligated appliances, consider it a cardinal rule in treatment with the SmartClip system.

I have already mentioned that bracket repositioning should be done as early as feasible. Once you are in your finishing rectangular steel archwires, it is undesirable to place steps and offsets in the archwire, and to then try and re-engage it through the clip. The insertion process will simply not be easy with rectangular steel wires. For that reason, as well as a desire to use lighter forces, I now find myself doing most of my finishing in Beta III Titanium archwires. In the .018 x .025 slot, an .016 x .025 Beta III Titanium finishing wire gives excellent control, and allows for minor adjustments without making the insertion and removal process difficult. In an .022 x .028 slot, the .019 x .025 Beta III Titanium wire is equally user friendly (Figure 9). I have used inter-arch elastics with Beta III Titanium archwires, and not experienced any loss of control, or untoward consequences. Some finishing elastics are extremely effective in light archwires during the final few weeks of treatment.



Figure 9: .019 x .025 Beta III Titanium archwire package

Modify Your Systems

It is increasingly evident that the efficiency generated with self-ligating appliances allows us to sequence treatment more efficiently, and also decreases the chair time once the initial learning curve is over. As interesting as this technical innovation is, I am increasingly convinced that doctors sometimes are unable to embrace such new technologies, even though they may provide quantum leaps in efficiency. This is due to the fact that the increase in clinical efficiency upsets the equilibrium in our offices. We are, in effect, unable to modify our management systems to take advantage of the enhanced efficiency, partly because it involves having to change the behavior of entrenched staff members.

For example, I have encountered doctors and business office staff who are afraid that patients will demand a reduction in fees if treatment is concluded earlier, or more efficiently. I find such reasoning to be quite peculiar. I really can't remember the last time that an airline flight arrived ahead of schedule, and the passengers demanded some money back because, obviously, the airline used less jet fuel! Indeed, the captain will generally come on the PA system and brag about having arrived ahead of time, and the passengers uniformly appreciate that. The hang-ups about this, my fellow orthodontists, do not come from the patients – they come from us. We have to be prepared to implement our own paradigm shift, and the patients will be entirely happy to have their treatment completed in a more efficacious manner.

Variable Prescriptions

For well over the last 3 decades, following the incorporation of pre-adjusted appliances under the tutelage of Dr. Andrews, different prescriptions have been developed and promoted. These prescriptions have been based on a number of factors, not the least of which is the practitioner's philosophy of occlusion, the subjective assessment of aesthetic outcomes, and sometimes the functional elements of the temporomandibular joints as they relate to occlusal function.

Regardless of the differences between the prescriptions and schools of thought, and the differences are occasionally profound, there has always been one central theme. The prescription was always *the* prescription, to be used on every patient, be it a Class II Division 1 malocclusion, a Class III malocclusion, a skeletal openbite, or a simple Class I non-extraction case. Given our understanding, and the technology available at the time, that made perfect sense. We must, however, now embrace the understanding that there are several factors that affect the finished position of

the tooth, not the least of which is the starting position of the tooth unless, of course, a full-sized finishing archwire is used. I believe it is fair for me to say that the overwhelming majority of orthodontic practitioners no longer use full-sized finishing archwires anyway, not to mention that the insertion of a full-sized finishing archwire into a self-ligating bracket would become close to impossible. Given all that, it behooves us to consider that the day and age of Variable Prescription Modules has arrived in orthodontics.

We have been working on this project for some time now, and a simple illustration of the logic that I am proposing can be demonstrated by contrasting the two types of incisor alignments frequently encountered in Class II Division 2 malocclusions. Figure 10A demonstrates a Class II Division 2 malocclusion with the classic configuration of the maxillary central and lateral incisors. Figure 10B demonstrates a different presentation of the Class II Division 2 malocclusion, with all four maxillary incisors inclined lingually.

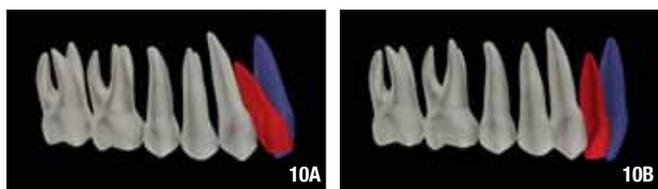


Figure 10A-B: Two types of Class II Division 2 malocclusions

In the second of these two scenarios, it is obvious that the practitioner would probably want to use a lateral incisor bracket with relatively high torque built into it, in order to express the 3rd order control that would be needed. However, in the previous Class II Division 2 presentation, with the flared maxillary lateral incisors, a high torque bracket would hardly be desirable. Indeed, in both instances, the practitioner may choose a higher torque central incisor bracket, perhaps with 22° of lingual root torque, but would certainly want to use a lower torque lateral incisor bracket when the starting position of the tooth had a significant labial inclination. It is appropriate then, to question the logic of using the same lateral incisor bracket each time, which is what all static prescriptions have either demanded or required. By the same token, the axial inclinations in the mandibular anterior segment would obviously be somewhat different if the patient started with a Class II Division 1 malocclusion and extremely flared mandibular incisors, or a Class III malocclusion with retroclined incisors that would need to be decompensated. In that scenario as well, it would be desirable to have either higher torque or lower torque brackets, given the specifics of the correction desired by the clinician.

There are many different manifestations and examples that can be cited, of course, but it becomes quickly apparent that the majority of the differences would be in the anterior segment. The finished positions of the maxillary and mandibular molars do not really differ significantly when

we are in the finishing stages of a Class II or Class III correction. For that reason, we have established the high and the low ends of the expressed torque values that are likely to be clinically effective, recognizing that the teeth must, at all times, be contained within the cortical bone.

Figures 11A, B and C show the high, medium, and low torque ends of the spectrum. Figure 12 shows the extremes of labio-lingual root torque in the mandibular anterior segment, keeping in mind the earlier admonition to stay within the confines of the cortical bone.

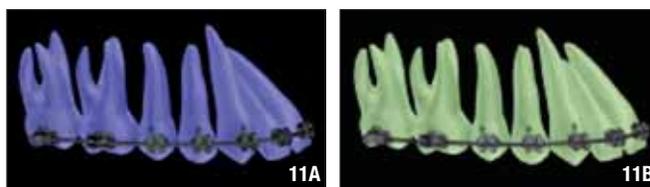


Figure 11A-C: A: High torque prescription; B: Medium torque prescription; C: Low torque prescription



Figure 12: Extremes of labio-lingual root torque

This is, I must emphasize, a work in progress. Although it is clear that such appliances are not fully developed or available to the practitioner, I believe it is appropriate for our profession to start embracing the concept of Variable Prescription Modules for high, medium, and low torque cases. I have previously written about atypical bracket placement for high angle, standard, and low angle cases, and this will be a terrific extension of that concept. Over the span of the next year or so, we expect to complete our development and testing of the different prescription modules, and I look forward to sharing that data with you once our work is complete.

Clarity™ SL Self-Ligating Appliances

The latest addition to the SmartClip system comes in the form of Clarity™ SL Self-Ligating Brackets. The Clarity™ Bracket has a long and distinguished record in orthodontic practice now, and was innovative in its incorporation of a metal slot into an aesthetic bracket, thereby amalgamating two positive attributes that were important in orthodontic practice. The Clarity SL bracket simply incorporates a third attribute, in that the only significant disadvantage with aesthetic brackets has been the need to use clear elastic ligatures, which would invariably discolor over time. The incorporation of self-ligating clips obviously eliminates that disadvantage.

We are currently treating several patients with the Clarity SL brackets (Figures 13A and B), and have found no significant difference in wire insertion and removal when compared to the SmartClip brackets. As we finish these cases, of course, the bracket will be tested across the entire spectrum of orthodontic applications. I do, however, want to emphasize the added

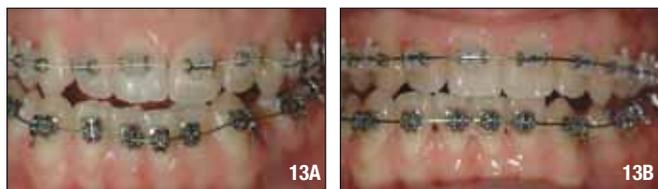


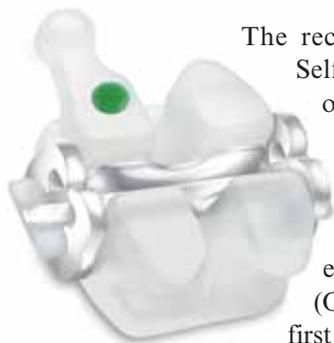
Figure 13A-B: Two patients currently being treated with Clarity™ SL Brackets

advantages we will realize when we couple an aesthetic self-ligating bracket like the Clarity SL bracket with the variable prescription modules I have outlined in a preceding paragraph. I will look forward to reporting on these cases in the near future.

Conclusions

As mentioned at the start of this article, the incorporation of self-ligating brackets required the mastering of a new body of knowledge. I have tried to share some of our “clinical pearls” with my colleagues, with the intent and hope that it will facilitate the use of the SmartClip system, and allow you and your patients to enjoy the remarkable efficiency that this technology brings to our practices. ■

Clinical Progress Check: Clarity™ SL Self-Ligating Appliances During Leveling and Aligning



The recent introduction of Clarity™ SL Self-Ligating Appliances has given orthodontists a new option for treating patients. The Clarity SL bracket is the only fully passive, self-ligating aesthetic bracket with a true-twin design. In our previous edition of *Orthodontic Perspectives* (OP), we asked doctors to give their first impressions of Clarity SL brackets.

In this article we ask doctors to share their experiences on the performance of Clarity SL appliances during leveling and alignment.



Dr. Alain Souchet, Mulhouse, France, has more than fifteen years of experience with self-ligating braces and enjoys working with Clarity SL braces. “It is very easy and quick to engage and remove the archwire. For traditional brackets, we change the clear elastics every four weeks. This is a long appointment for the patient to keep their mouth open. The Clarity SL bracket appointments are shorter (5 minutes) and every 12 weeks. I want to use Clarity SL braces for all of my child and adult patients.”

In his practice, bond strength is an important requirement for any type of bracket. Dr. Souchet believes that, “Clarity SL brackets have very good bond strength. Current cases (using Clarity SL brackets) have not experienced any bond failures.”

“The Clarity SL bracket appointments are shorter (5 minutes) and every 12 weeks.”

– Dr. Alain Souchet

When asked about sliding and friction, Dr. Souchet saw no difference between Clarity SL brackets and metal self-ligating brackets. “The sliding of Clarity SL brackets is similar to SmartClip brackets. I think it is better than all of the ceramic brackets on the market.”



Dr. Gary Weinberger, Plainview, NY, agrees that Clarity SL brackets have met and exceeded his expectations. Clarity SL brackets allow him to selectively use tie wings in various scenarios and the biomechanical response has been similar to what he is accustomed to treating.

“Clarity SL brackets are working well to date. The more important benefits are the ability to selectively use tie-wings and the end to discoloration in the presence of an elastomeric. We are quite pleased with the product and we made a decision to make Clarity SL brackets our preferred upper appliance choice; no more metal braces.”

“...we made a decision to make Clarity SL brackets our preferred upper appliance choice...”

– Dr. Gary Weinberger



Dr. Charles Rodrigue, Sainte-Foy, Québec, Canada, is also pleased with the performance of Clarity SL brackets. “The initial alignment with Clarity SL braces, given there is space for the teeth to align, is simply phenomenal. The correction of rotations has performed well. Also, the frictionless environment has proven to be efficient in correcting the crowding.”

continued on next page

True twin edgewise design and the self-ligating clip mechanism are two distinguishing characteristics of the Clarity SL bracket. Dr. Rodrigue is now into six to eight months of patient treatment with Clarity SL brackets, and has not had a single breakage in the brackets. “I find it very easy to insert wire. One remarkable aspect of the bracket is the absence of tie-wing breakage; because Clarity SL brackets reduce the clinical need to induce stress on this part of the brackets.”

One defining feature of Clarity SL and SmartClip brackets is their true twin edgewise design.

He remarks, “There is no doubt in my mind that working with the Clarity SL brackets is much easier and saves a great amount of chair time when compared to regular brackets.”

“...Clarity SL brackets reduce the clinical need to induce stress on this part of the brackets.”

– Dr. Charles Rodrigue



Bond strength, selective tie-wing engagement and self-ligating aesthetics are only a few of the benefits from the new Clarity SL brackets. **Dr. Robert Miller**, Culpeper, VA, has found even more positive returns from the new 3M Unitek system. “The bond reliability of the Clarity SL bracket is extremely strong, since the base is an improved contour. Similar to SmartClip™ Self-Ligating Appliances, initial leveling is much faster than traditional twin braces. Clarity SL braces work well in all stages of treatment.”

Not only do Clarity SL braces have the same Nitinol clip as SmartClip braces, but Dr. Miller finds that Clarity SL brackets allow the wire to slide as well as metal self-ligating brackets. “There is no difference in using the same wire sequence as SmartClip braces.”

“...Clarity SL allows the wire to slide as well as metal self-ligating brackets.”

– Dr. Robert Miller



In the early stages of treatment, many orthodontists have to deal with moderate to excessive crowding. **Dr. J. Kendall Dillehay**, Wichita, KS, is pleased with Clarity SL braces because, “with mild crowding, the teeth move much quicker than with the standard bracket.” During bracket placement, Dr. Dillehay utilizes the vertical slot of the Clarity SL brackets. He finds that these brackets “perform well with the correction of rotations.”

Dr. Dillehay believes 3M’s new aesthetic brackets bring added efficiency to his office. “Not having ligature ties makes the brackets easier to clean around, not as noticeable and makes the archwires easier to change. This shortens treatment time with less (and faster) visits.”

“Not having ligature ties makes the brackets easier to clean around, not as noticeable and makes the archwires easier to change.”

– Dr. J. Kendall Dillehay



In the leveling and aligning phase, **Dr. Michael Sostmann**, Hannover, Germany, has seen no difference between the sliding of Clarity SL brackets versus metal self-ligating brackets. “All of my expectations have been exceeded.”

Good oral hygiene is a crucial component for successful orthodontic treatment. When Dr. Sostmann was asked about Clarity SL braces, he responded, “Clarity SL provides several advantages over other brackets; often coated ligatures are too soft and strong brushing can remove the coating. Clarity SL braces are more hygienic and aesthetic.” Dr. Sostmann finds the aesthetic braces to have a “nice surface, good handling and functional clips that work well.”

“...nice surface, good handling and functional clips that work well.”

– Dr. Michael Sostmann



Removing stain-prone ligatures has made life a little easier for **Dr. Tom Munholland**, Aurora, CO. “The three biggest advantages for Clarity SL brackets are: easier to work with than traditionally ligated ceramic brackets, more hygienic and more aesthetic.” Dr. Munholland is impressed with the progress of the Clarity SL brackets. “We have found the initial stages for both leveling and rotations to be remarkably more efficient with the Clarity SL brackets.”

Dr. Munholland echoes other doctors’ comments about the benefits of the Clarity SL bracket tie-wings. He has used the tie-wings to ligate the bracket to augment rotation control. “It has been very helpful and it a great plus over other self-ligating systems.

“The three biggest advantages are: easier to work with than traditionally ligated ceramic brackets, more hygienic and more aesthetic.”

– Dr. Tom Munholland

[Kacie Bauzon, U.S. Marketing Manager for 3M Unitek compiled the information in this article for *Orthodontic Perspectives*. Note: Individual results will vary. – editor] ■

From “Plan B” to “Plan A”: Using Forsus™ Class II Correctors as a Regular Mode of Treatment

by Lisa Alvetro, DDS



After receiving her DDS summa cum laude from Ohio State University, Dr. Lisa Alvetro completed her orthodontic residency at Case Western Reserve University. She has had a successful practice in Sidney, Ohio, for 13 years where she strives to maintain current on the latest orthodontic trends and developments in the field. The Forsus Class II Device plays an integral role in her practice’s objectives of treatment efficiency and patient satisfaction as a regular mode of treatment. Dr. Alvetro is presently on the staff at Case Western Reserve University teaching Practice Management.

Like many orthodontic practices, we continue to find the lives of our patients’ becoming busier and more complicated. They need excellent results in the most time efficient and cost effective manner. Their parents also want treatment to be as convenient as possible for their children. Our solution to these challenges has been to incorporate the Forsus™ Appliance into our initial treatment plan for many of our patients.

There was a time in my practice when fixed Class II correction appliances were incorporated into treatment only after more compliance-dependent methods failed. Now, as a part of the initial treatment plan, the Forsus appliance provides the compliance-free benefits of a fixed device in a design that is easy to install and reliable in a variety of applications. Treatment protocol for cases that require Class II correction, maxillary distalization to increase maxillary arch length, and extraction with maxillary anchorage needs now include the Forsus appliance.

Every orthodontist realizes that their most valuable asset is chair time. Extended treatment time means increased use of chair time. So there is a productivity aspect to this approach as well: the most efficient and cost effective method of using Forsus is to use it as a part of your initial treatment plan. If you wait until a patient has demonstrated a lack of compliance prior to initiating the use of Forsus, you have already wasted valuable chair and treatment time.

Forsus Correctors in Class II Correction with Patient Comfort in Mind

We have found patient acceptance of the Forsus appliance at initial consultation excellent. Often the parents are relieved to know that the appliance works automatically, independent of patient cooperation. They also appreciate that, although the appliance is not indestructible, it is

extremely durable. As their orthodontist, I appreciate the predictability of the appliance which allows me to accurately gauge their treatment time.

In our office we have experienced an ease in patient acceptance due to an increase in patient comfort. This increase in comfort can be attributed to what can be referred to as a “first bicuspid hook up.” With this attachment technique, the bulge or cheek irritation seen near the commissure of the lips is no longer an issue. To install it this way we attach the push rods distal to the mandibular first bicuspid. Clinically, this technique does not appear to have any significant effect on the horizontal and vertical components of force. The comparison below shows the push rods distal to the mandibular first bicuspid and mandibular cuspid with the first bicuspid providing a favorable direction for Class II correction. (Fig. 1-2)



Figure 1: Rod placed distal to mandibular 1st bicuspid using Forsus™ EZ Modules in the maxillary arch



Figure 2: Rod placed distal to mandibular cuspid using Forsus™ EZ Modules in the maxillary arch

As part of our installation we have incorporated the use of an Elastomeric Ligature with a Guard (3M Unitek# 406-429) turned on its side. It is placed facing distal on the first bicuspid bracket and under the archwire to act as a bumper. A mandibular .019 x .025 stainless steel archwire is then placed and cinched down distal to the molars. The bicuspid is tied with a steel ligature after the mandibular

archwire wire is in place. The guard acts as a stress breaker protecting the bicuspid from the sliding rod and decreases the risk of bond failure of the bicuspid bracket. (Fig. 3-4)



Figure 3: Elastomeric ligature with Guard



Figure 4: Push rod distal to 1st bicuspid with Guard under archwire

When attaching the push rod distal to the first bicuspids, some modification of the rod may be necessary to achieve the correct amount of activation. This occurs most often in patients with small mandibles or in patients who are significantly mandibular retrognathic. Rod modification requires removing the stop on the push rod using an abrasive wheel. This allows the Forsus spring to move completely down to the recurve in the rod. One must then trim the push rod to size, so that it does not extend beyond the end of the Forsus spring, when the spring is compressed and activated. (Fig. 5-6)

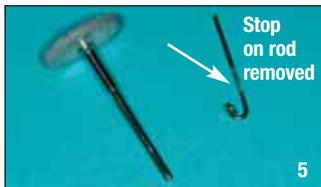


Figure 5: Heatless Mizzy wheel used to remove stop



Figure 6: Checking rod length after modification

Aside from patient comfort, a clinical bonus of the “first bicuspid hook up” appears to be an increase in the ability to control mandibular incisor position. Flaring of the incisors may be reduced by the addition of the first bicuspids into the anterior anchorage unit. This is particularly helpful in mandibular retrognathic patients where you want to minimize mandibular incisor movement and maximize mandibular repositioning. In the following case the incisor angulation is maintained during Class II correction. The patient wore Forsus springs bilaterally placed distal to the first bicuspids for 5 months out of a 24 month treatment to correct her malocclusion. (Fig. 7-12)

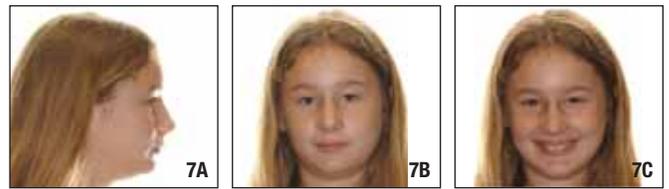


Figure 7A-H: Pre-treatment



Figure 8A-H: Post-treatment

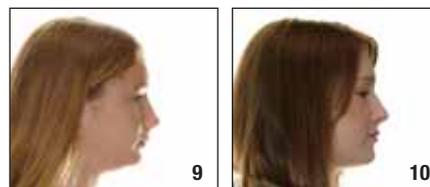


Figure 9-10: 9: Pre-treatment; 10: Post-treatment

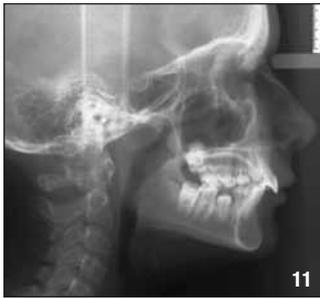


Figure 11: Pre-treatment cephalometric film



Figure 12: Post-treatment cephalometric film

Forsus Correctors in Maxillary Molar Distalization to Increase Arch Length

We have found the Forsus appliance to be an effective way to achieve molar distalization when an increase in arch length is needed. Before, we may have considered extraction of the maxillary first bicuspid to create space for the erupting cuspids. Or we may have needed to extract the maxillary second molars in order to distalize the maxillary buccal segment. Now we can predictably distalize and create space even when the second molars are fully erupted. Also, by leaving the Forsus appliance attached, we can easily hold the space and distalized molar position.

Following distalization, our Forsus springs become our anchorage when a reciprocal force is applied. During retraction of the buccal segments we no longer have to struggle with relapse of the maxillary molar position and space loss. We have eliminated the need to place transpalatal or nance holding arches to maintain molar position.

Our technique for distalizing molars uses the standard mandibular “first bicuspid” hook up but utilizes a smaller dimension maxillary archwire than typically used. Usually a .016 x .022 stainless steel or .016 stainless steel in a .022 slot is placed as the archwire. We want the archwire to be passive in the maxillary molars to allow as much distal movement, as quickly as possible. The maxillary molars are tied independent of the remaining dentition, allowing them to move distally from the rest of the maxillary buccal segment. The maxillary archwire needs to be replaced at every other appointment to avoid backing off the end of the archwire. Once a slight over correction is achieved, the remaining buccal segment is retracted using NiTi coil springs attached at the molar to the bicuspid. The buccal segment can also be retracted by simply chaining the bicuspid back to the molars. The Forsus appliance remains in place until the first bicuspid is retracted to a Class I position. (Fig. 13-18)



Figure 13A-H: Pre-treatment with blocked out, ectopically erupting maxillary right and left cuspids



Figure 14A-H: Post-treatment: Forsus™ Appliance for 7 months during treatment



Figure 15: Pre-treatment with blocked out maxillary cuspid and Class II molar relationship



Figure 16: Post maxillary distalization, cuspids erupted with slight over correction of buccal segments



Figure 17: Pre-treatment with bilaterally blocked out maxillary cuspids



Figure 18: Post-treatment with maxillary cuspids in place

Forsus Correctors as Anchorage in Class II Extraction Cases

A common clinical concern is extracting bicuspid in Class II mandibular retrognathic patients. Often arch length deficiencies or incisor protrusion indicate the need for extractions. One challenge is protracting the mandibular posterior segments into the extraction site without retracting the mandibular incisors. Another is holding maxillary molar position and not losing anchorage during space closure. Both of these events can significantly increase overjet and work against correction of the malocclusion.

We have found the Forsus appliance an effective way to hold or distalize the maxillary molars while maintaining mandibular incisor position during space closure. Our treatment protocol requires a standard maxillary set up. In the mandibular arch, the push rods are placed distal to the cuspids instead of the first bicuspid as in our “first bicuspid hook up.” The mandibular cuspid and 1st bicuspid are ligated together with a steel ligature under a .019 x .022 stainless steel archwire. A NiTi closed coil spring with eyelets connects the molar to the bicuspid to slide the molars forward. (Fig. 19)



Figure 19: Mandibular appliance configuration with NiTi closed coil spring in place to protract molars. Push rod will support incisor position during space closure.

This patient was significantly mandibular retrognathic. The mandibular arch length deficiency combined with the incisor protrusion indicated that extractions would be necessary. After initial leveling and aligning, Forsus appliances were placed as described above. Four months after Forsus placement the mandibular extraction space was closed and the buccal occlusion overcorrected due to maxillary molar distalization. (Fig. 20-25)



Figure 20A-H: Pre-treatment



Figure 21: Pre-treatment cephalometric film



Figure 22A-H: Forsus springs were removed after 4 months of wear. Mandibular extraction spaces are closed, maxillary molar over corrected, maxillary cuspids retracted and maxillary and mandibular incisors are in contact.



Figure 23: Progress cephalometric film after Forsus appliance removal



Figure 24: Pre-treatment mandibular occlusal



Figure 25: Mandibular extraction spaces closed with incisor position held by Forsus appliance push rod

After mandibular space closure, the Forsus appliance is removed and treatment continues by placing the NiTi closed coil springs in the maxillary arch to finish maxillary

space closure and establish molar occlusion. If additional maxillary anchorage is needed the Forsus appliance can remain in place during maxillary space closure. (Fig. 26)



Figure 26: Closing remaining maxillary extraction space after Forsus appliance is removed. Over correction in molar relation was obtained while closing mandibular extraction space and maintaining mandibular incisor position.

In our office, as we treat more and more cases using the Forsus appliance we are continually impressed by the amount of correction we can achieve with limited effort on our part and on the part of our patients. If you are not currently using Forsus correctors in your practice, it is well worth the commitment to try this appliance. If you currently are using Forsus correctors, I challenge you to try new ways of using it.

My point is this: to effectively evaluate and appreciate the Forsus appliance, one must use it systematically. Decide what your criteria for use will be and then use it consistently on each patient who meets those criteria. Only then will you be able to appreciate the effectiveness and efficiency of the Forsus appliance. It is a powerful appliance that can simplify your life and the lives of your patients. ■

3M Unitek Employees Wear Clarity™ SL Braces

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From 3M Unitek president Paul Keel and Clarity brand manager Len Liptak, to inside and field sales representatives, all can speak with greater authority when you ask about the treatment experience that patients can expect. ■



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