Reaping the Benefits of Light-Force Archwires

Many orthodontists are intrigued by self-ligation bracket systems but are uncertain about whether they should try just five cases or be more venturesome and really try the system with 30 or more cases. We started with the Damon SL System in April 2008, and after a few months of thought and observation, decided to take the venture some route and make the permanent change to Damon System 2 in September 2000. Introducing this new system into the practice wasn’t without a great amount of study, thought and, yes, some hard work along the way. Now that we’ve debonded our first Damon System 2 cases, my team and I have seen how the passivity of the Damon brackets allows light-force archwires to facilitate treatment.

Starting three to five cases doesn’t allow the clinical team to really get comfortable with opening and closing the appliance and inserting the archwires. The best advice we can offer is to start treatment on at least 30 consecutive cases of mild and moderate malocclusions. Be prepared to take photos at each visit to see the progress as you move through the treatment mechanics. Starting these cases at about the same time will allow you and your team to look forward to the next eight- to ten-week appointment rotation and be prepared for the archwire changes you’ve planned.

Remember, let the light-force archwires work for you. If it’s difficult to engage a larger wire into the bracket slot, don’t force it. Just let the current archwires work a little longer. You’ll be able to see how light-force wires work in the cases shown later.

The evolution of fixed appliances in our practice—from the Straight-Wire Appliance® to Mini-Twin™ to OrthoTIS™—in conjunction with the use of high-tech wires, such as TMA® and Copper Ni-Ti®, has shown continual improvements in our efficiencies by reducing overall treatment times and number of visits. We have also reduced the number of fixed expansion.

Dr. Terry Carlyle

Dr. Terry Carlyle is a native of Alberta, Canada, and has maintained a private orthodontic practice in Edmonton since 1979. He graduated from the University of Alberta, Faculty of Dentistry in 1973 and practiced general dentistry for two years. He returned to the graduate orthodontic program at the University of Manitoba, Faculty of Dentistry where he received his masters of science degree in oral biology and earned his specialization in orthodontics in 1979. Dr. Carlyle has also taught in both the undergraduate and graduate programs at the University of Alberta. He has presented orthodontic lectures locally and internationally on such subjects as comput- erization and practice management, the Damon bracket system and the Herbst appliance. He is a member of the Canadian Association of Orthodontists, past president, American Association of Orthodontists, and a current board member of the Pacific Coast Society of Orthodontists (PCSO). He also has membership in many other dental organizations and study clubs. Dr. Carlyle and his wife, Dawne, have three children and two grandchildren. He enjoys running in marathons, mountain and road bicycling and riding his Kawasaki cruiser motorcycle.

Terry D. Carlyle, DDS, M.Sc
Edmonton, Alberta, Canada

Cover Photograph
Canadian orthodontist, Dr. Terry Carlyle dons his tartan kilt at the Edmonton Scottish Society Hall in Edmonton, Alberta, Canada. Scottish heritage is celebrated by wearing the clan tartan on special occasions such as Robbie Burns Day in late January. Photographer: Grant Kessler

Since September 11 we’ve all seen many forms of patriotism in varying degrees. That spark of patriotism was ignited in the orthodontic community as well. Joan Garbo, consultant, distributed her October newsletter to clients around the country. In her article entitled The Hero Within, Joan suggested that her readers create contests that highlight heroes in their communities. Dr. Steve Bradford, Palm Beach Gardens, Florida, and his staff did just that and with amazing success. They invited third-, fourth- and fifth-grade students to submit essays about “The Hero in My Life.” The exciting part is that they received over 800 essays from 30 classrooms in nine schools.

In fewer than 100 words, children described their personal hero from the obvious parents and siblings to skateboarders and the men and women in the military. Teachers and principals have called the practice with thanks for giving the students the opportunity to focus on what is good and inspiring in their lives. The essay contest definitely provided a motivating outlet for positive expression and also uplifted the community. One ten-year-old wrote, “A hero does not have to save someone’s life. They can make a difference in someone’s life for the better.”

Great prizes were awarded to five lucky winners: first place a trick bike, second place a Game Boy, third place a $50 Toys R Us gift certificate, and two honorable mentions. Plus, Dr. Bradford and his staff sponsored pizza parties for each participating class. If you’d like to read the winning essays, visit Dr. Bradford’s Web site at www.orthobybradford.com.

Joan Garbo said, “What is needed right now is to find the hero within and to recognize and acknowledge the many normally unnoticed acts of strength and commitment that surround us every day.” Congratulations to Dr. Bradford and staff for helping their community acknowledge their heroes.

Jan DeCarlo, CF Editor

Dr. Steve Bradford gives the first place prize. Photo courtesy of The Jupiter Courier newspaper.
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The Damon System offers several advantages over traditional orthodontic systems. Firstly, it utilizes a self-ligating bracket system, which reduces the frictional forces experienced by the teeth, allowing for more efficient tooth movement. This results in shorter treatment times and increased patient comfort. Secondly, the Damon System employs low-friction archwires, such as the .014 Ni-Ti Align SE, which are designed to allow for more predictable and efficient tooth movement. These archwires are placed at the beginning of treatment and often remain in place throughout the course of therapy, reducing the need for frequent wire changes. Additionally, the Damon System includes a variety of expansion appliances and archwire sequences that can be tailored to the specific needs of each patient, ensuring effective and efficient treatment outcomes. Overall, the Damon System is a highly effective and efficient orthodontic treatment option that provides patients with a more comfortable and streamlined orthodontic experience.

Figure 1. The Herbst appliance is fitted on moderate to severe Class II patients to resolve vertical, A-P and transverse problems.

appliances (Hyrax type) and now use primarily the Damon System 2. As we had been tracking patient treatment times for similar cases in our other bracket systems, we found that with the Damon System we have reduced patient visits by an average of 2½ times when compared with the Orthos and four to five when compared with the Mini Twin. As many of you have observed, new wire technologies and letting the wires work over more weeks have improved the clinical process. With the passive Damon System 2, we average ten weeks between appointments in the initial two thirds of the patient’s treatment and four to six weeks in the finishing.

Each Case Dictates Archwire Sequence

Starting the initial leveling and alignment phase with a small, light archwire helps produce high treatment acceptance. We start with .014 Ni-Ti Align SE wires and let them work for eight to ten weeks, then replace them with .016 x .025 Ni-Ti Align SE wires. For those patients who don’t have many rotated or poorly angulated teeth, we can generally go from the .014 to an .016 x .025 Ni-Ti Align SE wires without difficulty. If the malocclusion is severe, we’ll replace the .014 wire with another one (if it’s taken a set) or we’ll consider an .016 Ni-Ti Align SE for another six to eight weeks. When alignment with the .014 (or .016) has resolved most rotations, our next archwire will be an .014 x .025 Ni-Ti Align SE. The .014 dimension allows comfortable correction of the rotations and the .025 dimension begins torque control. We have observed that the .014 x .025 Ni-Ti Align SE is a more comfortable wire to insert than the .016 x .025, especially if there are still significant tooth rotations and arch leveling needed.

At approximately 24 to 28 weeks, we take a new panoramic X-ray and evaluate bracket position in preparation for the main finishing wire. An .019 x .025 stainless steel. If the second molars aren’t completely leveled from the Ni-Ti series, we use an .018 x .025 stainless steel in which we place a slight amount of reverse curvature to aid in final leveling before employing an .019 x .025 stainless steel wire. In those cases where the curve of Spee is very deep, we use .019 x .025 TMA wires and place a slight reverse curvature. In such cases the resiliency of the TMA wire allows for more deflection and less chance of bond failure and discomfort for the patient.

Class II Cases Using the Damon System 2 Respond to Herbst Appliance

The majority of our moderate to severe Class II dental and skeletal patients are fitted with the stainless steel crown Herbst appliance, which allows 3-D changes so we can resolve vertical, anteroposterior and transverse problems simultaneously without depending on patient compliance. The majority of our Class II patients demonstrate mandibular skeletal retrusion or mandibular dentoalveolar retrusion and the Herbst fosters both dentoalveolar and some orthopedic changes. We can also reduce overjet, resolve anteroposterior molar relationship and improve chin profile.

In conjunction with the delivery of the Herbst (Figure 1), we routinely bond maxillary and mandibular anterior teeth with the Damon 2 and place a light archwire to start dental alignment. We use the higher torque brackets on the maxillary central incisors (+10º torque), maxillary lateral incisors (+10º) and mandibular incisors (+6º torque). Although we have reduced the number of expansion appliances we use, most Class II cases have narrow maxillary arches that can be widened by incorporating a Hyrax into the Herbst design. Mandibular dentoalveolar expansion can also be built into the Herbst appliance if needed.

With the passive Damon System 2, we can achieve rapid and predictable orthodontic alignment with light forces while initiating orthodontic movement of maxillary and mandibular teeth for a dental Class II correction or use the higher torque Damon brackets for anchorage when using the Herbst for more orthopedic effects on the mandible and maxilla. (continued on page 7)

References:
3. See these issues at ormco.com/ci

Practice Pearls from the Clinical Assistants’ Point of View

As clinical assistants, we’ve had the opportunity to see first hand the difference the Damon System 2 has made chairside. Three of the most interesting side effects of using the system are using fewer expansion appliances and performing fewer rebonds while the system itself dictates the archwire progression.

In the past, expansion appliances such as a rapid palatal expander and quadhelix were routinely used for arch expansion. But now with the Damon System, we’re seeing natural arch expansion during the progression of treatment.

Dr. Carlyle routinely has a panoramic X-ray taken mid-treatment to ensure the roots of the teeth are parallel. We’re performing fewer rebonds because the roots are in a favorable position due to the Damon brackets.

While we first began using the system, we would sometimes find that we would go to increase the archwire dimension according to the treatment plan only to discover that it wouldn’t go in easily. The slides just wouldn’t shut. Now that we’ve been using the Damon System 2 for 1½ years, we know this means that the patient isn’t ready for that size wire so we either engage the same wire we had in previously or we engage only a slightly larger wire. Either way, the appliance lets us know when the patient is ready.

We’ve gathered some pearls that you may find useful when using the Damon System:

• To reduce mucosal tissue irritation during the first few days follow-
ing bonding, recommend Tantum Oral Rinse® (Elder-Group).
• The debracketing instrument by Unitek is handy and easy to use with the Damon brackets. It assists with bracket removal in a gingival/occlusal direction.
• We use a ligature director to help guide the archwire into the slot without impinging tissue. Dental floss is also helpful to pull the wire into the slot when a tooth is severely rotated.

Carol Rayner and Tracey Milne are clinical assistants. With 21 years of dental experience, Carol has worked with Dr. Carlyle for the past 15 years. Tracey started working at Dr. Carlyle’s 1½ years ago. Both are registered dental assistants, Level II.
Treatment Coordinators’ Perspective of the Damon Bracket

While our role as treatment coordinators includes selling the Damon bracket, we find it usually sells itself once its benefits have been shown to the patient. We use the 15x demonstration model of the bracket to show the difference between a traditionally ligated bracket and a Damon bracket. We explain how teeth slide without friction along the archwire and that this gentle tooth movement minimizes tooth discomfort.

Our patients like to hear about new technology in braces, including the archwires we use. The combination of Damon brackets and high-tech archwires extends appointment intervals eight to ten weeks apart instead of every four to six weeks. Many patients ask about adding colors on the brackets or wearing clear brackets. In both situations, we remind them of the benefits of reduced friction and light-force wires that result in less discomfort and shorter treatment time. Usually shorter treatment time is the determining factor for both children and adults.

Treatment progress photos are very helpful during the new-patient consultation. We show examples of space closure, corrected rotations, reduced overbites, resolved crowding and expanded arches. Patients are amazed how quickly labially positioned canines can move into place.

Preparing patient exam packages has become easier as we see the full effects of the Damon System in the practice. Treatment plans are simpler and more straightforward because fewer fixed expansion appliances and extractions are recommended. Patients and parents have become more accepting of the suggested treatment plan. The Damon System makes it easy to answer their questions and offer a solution.

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In conjunction with the delivery of the Herbst (Figure 1), we routinely bond maxillary and mandibular anterior teeth with the Damon 2 and place a light archwire to start dental alignment. We use the higher torque brackets on the maxillary central incisors (+17° torque), maxillary lateral incisors (+10° torque) and mandibular incisors (+6° torque). Although we have reduced the number of expansion appliances we use, most Class II cases have narrow maxillary arches that can be widened by incorporating a Hyrax into the Herbst design. Mandibular dentoalveolar expansion can also be built into the Herbst appliance if needed.

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THREE CASE REVIEWS

CASE 1

PRETREATMENT
12-year 2-month-old male, Class I with mild crowding, narrow (tapered) maxillary arch and slightly proclined maxillary incisors. Minimal overbite. The patient complained, “I don’t like the look of my teeth.”

TREATMENT PLAN
Full bonding to level and align arches and correct mild crowding and rotations. Use of vertical elastics was discussed.

PROGRESS
The initial archwire placed at bonding was an .014 Ni-Ti Align SE in both arches.

At nine weeks into treatment, both wires were changed to .016 x .025 Ni-Ti Align SE. Alignment was adequate to allow insertion of this wire because of minimal rotations.

At 20 weeks into treatment, the maxillary wire was changed to an .019 x .025 TMA because of the open-bite tendency. Vertical elastics were used to close the bite.

At 36 weeks into treatment, the maxillary wire was changed to an .019 x .025 TMA and the mandibular wire to an .020 x .020 (35˚C) Copper Ni-Ti to relevel due to the recent bonding of the lower second molars.

At 40 weeks into treatment, the mandibular wire was changed to an .019 x .025 stainless steel.

At 52 weeks into treatment, the mandibular wire was changed to an .019 x .025 (35˚C) Copper Ni-Ti to finish. The .019 x .025 TMA remained in the maxilla for final detailing. The second molars were fully engaged.

POSTTREATMENT
After 14 months of treatment, the patient was debonded. Lingual retainers were placed 2-2 in the maxilla and 3-3 in the mandible for retention. With bonded retention, the patient will experience further settling of buccal segments. Today we would more likely wait until second molars are fully erupted. In this case we lost three months just waiting for these teeth to erupt.

My team and I have seen an incredible impact on our practice with Damon System 2. Our treatment results have continued to improve with each case we finish. Sometimes the changes that occur don’t seem believable. But seeing is believing and if you start 30 cases on approximately the same timetable, you’ll be able to watch the group as they move through their follow-up appointments. You and your team will become more confident as your experience grows until it’s your only appliance of choice.

We’re going to look at three mild to moderate malocclusions that demonstrate different wire progressions. You’ll notice variations in wire sequence between each patient. A common misconception is that only three archwires are routinely used during treatment with the Damon appliance system, but this isn’t always the case.

Dr. Dwight Damon on Archwire Selection

Traditionally, orthodontists have based archwire progression on the highest force level the patient could tolerate. With the Damon 2, we base archwire selection on how force levels will effect cellular biology. As Dr. Proffit indicates, “Optimum force levels ... should be just high enough to stimulate cellular activity without occluding blood vessels in the PDL.” I’ve observed that by keeping forces low throughout treatment, the alveolar bone demonstrates an amazing ability to adapt. I select archwires that foster a balance of forces between the muscles of the face and tongue. Rather than overpowering the biological system with high-force wires to drive teeth into position, we let the muscles, bone, tongue and tissue determine where the teeth should be positioned.

The Damon 2 doesn’t have a standard archwire sequence. Although I start nearly all of my cases with an .014 Ni-Ti Align SE, I determine my next archwire by the progression of the case. If it’s too difficult to place an .016 x .025 Ni-Ti Align SE, I’ll engage an .014 x .025 or, in some cases, an .016 round Ni-Ti Align SE. My criteria in archwire selection is choosing the archwire that will move the case forward using the balance of forces.

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PRETREATMENT
12-year 2-month-old male, Class I with mild crowding, narrow (tapered) maxillary arch and slightly proclined maxillary incisors. Minimal overbite. The patient complained, “I don’t like the look of my teeth.”

TREATMENT PLAN
Full bonding to level and align arches and correct mild crowding and rotations. Use of vertical elastics was discussed.

PROGRESS
The initial archwire placed at bonding was an .014 Ni-Ti Align SE in both arches. At nine weeks into treatment, both wires were changed to .016 x .025 Ni-Ti Align SE. Alignment was adequate to allow insertion of the wire because of minimal rotations. At 20 weeks into treatment, the maxillary wire was changed to an .019 x .025 TMA because of the open-bite tendency. Vertical elastics were used to close the bite. At 36 weeks into treatment, the maxillary wire was changed to an .019 x .025 TMA and the mandibular wire to an .020 x .020 (35˚C) Copper Ni-Ti to relevel due to the recent bonding of the lower second molars. At 40 weeks into treatment, the mandibular wire was changed to an .019 x .025 stainless steel. At 52 weeks into treatment, the mandibular wire was changed to an .019 x .025 (35˚C) Copper Ni-Ti to finish. The .019 x .025 TMA remained in the maxilla for final detailing. The second molars were fully engaged.

POSTTREATMENT
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Reference:
CASE 2

PRETREATMENT

20-year-old male, Class I molar position, with severe mandibular incisor crowding and congenitally absent maxillary laterals. Minimal overjet. Good alignment of maxillary arch. No TMD evident. Mild fluorosis on numerous teeth. Labial position of mandibular canines with incipient tissue recession on the labial surface. The patient's primary concern was the difficulty in cleaning his lower anteriors and the appearance of two rows of teeth in his lower jaw.

TREATMENT PLAN

Extract mandibular laterals to provide space for canines to be aligned into the arch. Band maxillary molars with 0˚ distal offset buccal tubes in order to minimize distal rotation of molars and help keep them in their present position. Supra-crestal fibrotomies around the mandibular anterior teeth and periodontal grafting on the labial surface of both cuspids were discussed. Extract impacted mandibular third and maxillary third and fourth molars. Refer for post orthodontic occlusal equilibration on anterior teeth to improve interdigitation with the canines now being positioned into the spaces of the lateral incisors.

PROGRESS

The initial archwire placed at bonding was an .014 Ni-Ti Align SE in both arches.

First visit after bonding. At eight weeks into treatment, the maxillary wire was changed to an .014 x .025 Ni-Ti Align SE because rotations were still present on some teeth. We didn’t force an .016 x .025 because we wanted to keep the forces light. The .014 was left in the mandibular brackets to continue leveling. Note: The tissue around the lower canines improved as the teeth moved vertically and lingually into the alveolus.

At 16 weeks into treatment, the mandibular wire was changed to an .014 x .025 Ni-Ti Align SE to correct rotations, continue leveling and start root torque. Mandibular canines erupted vertically. Due to bite opening, second molars weren’t bonded yet.

Fourth visit after bonding. At 28 weeks into treatment, the maxillary second molars were banded and mandibular second molars were bonded. Light 4˚ or 5˚ or 6˚ or 7˚ elastics were added to minimize bite opening (maxillary 4 mandibular 3, mandibular 4 – triangle or delta configuration). We don’t use light elastics on Ni-Ti wires to prevent unnecessary opening of the bite.

At 36 weeks into treatment, .019 x .025 TMA archwires were placed in both arches to finish the case. The TMA archwires were used for leveling the second molars, minimizing bite opening that sometimes occurs with stainless steel wires in patients with open-bite tendencies. It’s also used for artistic bends: Buccal segment “V” and anterior elastics (maxillary 2-2/mandibular 3-3) with a trapezoid configuration were used to minimize bite opening and to dock in the teeth.
CASE 2

PRETREATMENT

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At 16 weeks into treatment, the mandibular wire was changed to an .014 x .025 Ni-Ti Align SE to correct rotations, continue leveling and start root torque. Mandibular canines erupted vertically. Due to bite opening, second molars weren’t bonded yet.

Fourth visit after bonding. At 28 weeks into treatment, the maxillary second molars were banded and mandibular second molars were bonded. Light 4/5 oz Kangaroo elastics were added to minimize bite opening (maxillary 3 mandibular 3, mandibular 4 – triangle or delta configuration). We don’t use light elastics on Ni-Ti wires to prevent unnecessary opening of the bite.

At 36 weeks into treatment, .019 x .025 TMA archwires were placed in both arches to finish the case. The TMA archwires were used for leveling the second molars, minimizing bite opening that sometimes occurs with stainless steel wires in patients with openbite tendencies. It’s also used for artistic bends. Buccal segment “V” and anterior elastics (maxillary 2-2 mandibular 3-3) with a trapezoid configuration were used to minimize bite opening and to rock in the teeth.

POSTTREATMENT

Patient at debonding after 11½ months of treatment. Palatal wire retainers 2-2 were bonded in the maxilla using an .016 x .022 Bond-a-Braid (Reliance Orthodontic Products). In the mandible, an .027 TMA wire was bonded on each tooth 3-3 due to severe initial malalignment. Use of fixed permanent retention negated the need for the supra-crestal fibrotomies.

The patient displayed good tissue response around the mandibular canines to the significant vertical movement. Good overjet and overbite were established with slight occlusal reshaping on the palatal aspect of the maxillary anteriors. The lower anterior teeth were in alignment and no root resorption or crestal bond loss was noted. The patient was referred back to the general dentist for definitive occlusal evaluation and equilibration as necessary.

This case was one of our special needs patients who typically respond best to shorter treatment times. We find the Damon 2 allows us to treat faster than traditional brackets. While we prefer to treat a little longer to achieve more vertical over-bite, the patient was satisfied because he no longer had “two rows of lower front teeth.”
CASE 3

PRETREATMENT

TREATMENT PLAN
Reduce deep overbite through upper incisor retrusion and torquing and lower arch leveling. Consider periodontal grafting on the labial of the right central during or after orthodontic treatment.

PROGRESS
Initial archwire placed at bonding was an .014 Ni-Ti Align SE in each arch. Notice the posterior open bite. The lower anterior brackets acted as bite turbos to help level the arches by keeping the posterior teeth from contact during the light-wire phase.

At eight weeks into treatment, the maxillary wire was changed to an .016 x .025 Ni-Ti Align SE because of good leveling. The mandibular wire was changed to an .014 x .025 Ni-Ti Align SE because some rotational discrepancies in the lower incisor region still required further correction.

At 16 weeks into treatment, the maxillary wire was changed to an .014 x .025 Ni-Ti Align SE to pick up the maxillary second molars that were just bonded.

At 36 weeks into treatment, each wire was changed to an .016 x .025 Ni-Ti Align SE.

At 44 weeks into treatment, we inserted .019 x .025 stainless steel wires in each arch (with reverse curve that we placed into them) to continue bite opening and to finish. Elastomeric modules were used to help close space that opened up as the arches leveled and the arch forms changed.

Three weeks prior to debonding, the maxillary archwire was cut distal to lateral incisors to assist in settling the buccal segments. The patient was instructed to continually bite down, squeezing posterior teeth together. This technique helps in guiding the teeth together as the inclines of the cusps do the work. In the previous issue of Clinical Impressions, Dr. Mike Steffen advocated this technique in his use of the Damon System-2. No elastics were used during the adjusting in of the bite.

POSTTREATMENT
After 15 months of treatment, the patient was debanded. A maxillary spring retainer and bonded mandibular lingual retainer 3-3 were used for retention. The need for tissue grafting wasn’t indicated because of the improvement in the labial tissue on the lower right central. Permanent retention was advised.

Initial archwire – .014 Ni-Ti Align SE

48 weeks – Chain elastic

Initial archwire – .014 Ni-Ti Align SE
CASE 3

PRETREATMENT
11-year 6-month-old female, Class I with deep overbite. Retroclined maxillary and mandibular incisors. Moderate mandibular incisor crowding. Tissue recession of mandibular right central incisor. Another orthodontist recommended cervical headgear and bite plate for bite opening mechanics.

TREATMENT PLAN
Reduce deep overbite through upper incisor retrusion and torqueing and lower arch leveling. Consider periodontal grafting on the labial of the right central during or after orthodontic treatment.

PROGRESS
Initial archwire placed at bonding was an .014 Ni-Ti Align SE in each arch. Notice the posterior open bite. The lower anterior brackets acted as bite turbos to help level the arches by keeping the posterior teeth from contact during the light-wire phase.

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POSTTREATMENT
After 15 months of treatment, the patient was debonded. A maxillary spring retainer and bonded mandibular lingual retainer 3-3 were used for retention. The need for tissue grafting wasn’t indicated because of the improvement in the labial tissue on the lower right central. Permanent retention was advised.

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Dr. Thomas Marcel
attended Santa Clara University, where he graduated in 1981 with a bachelor of science degree in combined sciences (biology, chemistry and physics). He went on to the University of California San Francisco, where he received his dental degree and orthodontic specialty training. Dr. Marcel is a member of the American Dental Association, California Dental Association, American Association of Orthodontists and Pacific Coast Society of Orthodontists. He has published articles relating to temporomandibular joint function and mandibular movement, digital office systems and practice management. He is a guest lecturer at the University of California San Francisco and the University of North Carolina orthodontic residency programs. Since 1991, Dr. Marcel has practiced orthodontics in Livermore, California, where he lives with his wife, Claire, an orthodontist practicing in Tracy, California. They have two children, Noah and Kate.

Our predecessors have advanced the state of orthodontics tremendously over the last several decades, making clinical results better and more predictable. The lessons we’ve learned from noteworthy clinical teachers such as the Tweeds, Andrews and Roths of our profession have elevated our clinical standards. Now we’re challenged not only to meet those standards but also to advance them for future generations of patients and orthodontists.

With greater public demand for orthodontic services yet fewer orthodontists to provide them, we’re now additionally challenged to provide treatment for an ever-growing number of patients who want faster treatment, fewer appointments, less discomfort and lower fees. The growing adult-patient population has unique problems such as significant tooth wear, periodontal disease and restorative concerns. Quite often adults want aesthetic appliances with greater efficiency. In other words, they want brackets that look better and work faster than their children’s.

While the challenge of our predecessors requires us to take the high road, today’s environment suggests compromise by taking the easiest and quickest route. The question we ask ourselves is how can we treat more patients and finish them predictably with better and better results?

The answer lies in the treatment efficiency we gain from a fully programmed, torque-in-base appliance used in combination with high-torque archwires. The Straight-Wire® Appliance has many features that facilitate an efficient treatment regimen. Without a doubt, archwire manipulation in the form of detailing individual teeth is one of the most time-consuming and impulsive activities for an orthodontist. A fully programmed appliance minimizes wire bending and maximizes optimal tooth movement. I feel the Straight-Wire Appliance is critical to my overall treatment efficiency.

**Typical Treatment Sequence for Nonextraction Cases**

**FIRST VISIT**

- Deliver Straight-Wire system 6-6 with an .022 slot
- Roth prescription using a light-cure adhesive such as Precise®
- Place .017 x .017 (35°) Copper Ni-Ti® archwires and partially ligate severely rotated teeth
- Schedule patient to return in two weeks for an oral hygiene/confident check when you will complete engagement of archwires with full ligature of O-rings
- I like to place an .017 x .017 Copper Ni-Ti initially on most cases because it has many favorable characteristics. It has enough flexibility to engage severely malpositioned teeth and while it doesn’t fill the .022 slot, it begins torque movement so that a larger dimension can be placed earlier. Its rectangular shape also provides some rigidity along edentulous spaces and enough force to begin arch leveling and vertical correction. I notice that patients find it more comfortable as an initial wire than an .016 Ni-Ti.

**INITIAL (LEVEL/ALIGN) PHASE: 3 VISITS – 6 MONTHS**

- Use Bite Turbos in severe deep bites
- Reposition obvious bracketing errors

**WORKING PHASE: 3 TO 6 VISITS – 6 TO 12 MONTHS**

- Bond or band second molars and reposition necessary brackets
- Place .018 x .025 Ni-Ti® archwires
- Take progress panoramic X-ray to assess root angulations at end of working phase

**FINISHING PHASE: 3 VISITS – 6 MONTHS**

- Place .017 x .025 stainless steel archwires for final settling or .019 x .025 TMA for further expression of bracket prescription

**POSTTREATMENT PHASE**

- Debond/deband
- Remount study models
- Employ gnathological tooth positioner for 3 to 6 weeks
- Deliver removable retainers, prescribing full time for one year and nights only thereafter

**Good Mechanics Help Achieve Goals**

To meet today’s challenges, I’ve constructed a set of goals that help my staff and I deliver the best care to our patients. Most of us probably have similar treatment goals that vary with education, experience and style. The most important thing is to have goals, write them down and revisit them periodically. Here are the goals I hope to achieve for every patient.

1. **Facial aesthetics:** harmonious frontal and profile proportions, optimized lip and smile aesthetics
2. **Dental aesthetics:** ideal tooth shape, size and color
3. **TMJ health and stability:** healthy condyle-fossa relationship, stable condylar morphology, normal cortical outline, physiologic muscle function
4. **Periodontal health and stability:** hard- and soft-tissue integrity, root parallelism, optimal soft-tissue color and consistency; ongoing home care
5. **Optimal occlusion (Andrews Six Keys™):** optimal interarch relationship, tooth inclinations and angulations; no spaces; no rotations and a relatively level curve of Spee
6. **Stability:** post-orthodontic dental relationships maintained in all three planes of space

**Create a Team to Deliver Mechanics**

An integral part of treatment efficiency is the utilization of the entire clinical team to successfully deliver mechanics to our patients. An experienced, highly trained clinical team who knows the orthodontist’s goals and is familiar with the standard treatment regimen is an incredible asset to the practice. Anticipation of the patient’s needs before the doctor’s assessment, improved chairside technique (i.e., an assistant’s understanding of why a bracket is being ligated improves the chance of its being done correctly) and handling patient education are some examples of how clinical assistants facilitate efficiency. A commitment to training and education for the entire staff is also extremely important.

Growing a practice and seeing more patients doesn’t mean one must abandon high clinical standards. Having a direction and goals for where patients should ideally finish, designing a simplified mechanics scheme to help reach those goals and empowering a well-trained staff are essential to meeting today’s challenges.
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The answer lies in the treatment efficiency we gain from a fully programmed, torque-in-base appliance used in combination with high-tech archwires. The Straight-Wire® Appliance has many features that facilitate an efficient treatment regimen. Without a doubt, archwire manipulation in the form of detailing individual teeth is one of the most time-consuming and imprecise activities for an orthodontist. A fully programmed appliance minimizes wire bending and maximizes optimal tooth movement. I feel the Straight-Wire® Appliance is critical to my overall treatment efficiency.

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Design Mechanics for Treatment Efficiency

After diagnostic records with articulated study models are completed and periodontal and TMJ health are assessed, we compile a problem list and formulate a treatment plan that specifically addresses how each problem will be managed. Using the features of the Straight-Wire® Appliance in conjunction with today’s high-tech archwires and auxiliary appliances such as Bite Turbos and Bite Fixers, we design mechanics to fulfill the treatment plan for each patient.

Typical Treatment Sequence for Nonextraction Cases

FIRST VISIT
• Deliver Straight-Wire® system 6-4 with an .022 slot
• Microbond/bracket placement
• Place .017 x .017 Ni-Ti® archwires and partially ligate severely rotated teeth
• Schedule patient to return in two weeks for an oral hygiene/comfort check when you will complete engagement of archwires with full ligation of O-rings
• I like to place an .017 x .017 Copper-Ni-Ti initially on most cases because it has many favorable characteristics. It has enough flexibility to engage severely malposed teeth and while it doesn’t fill the .022 slot, it begins torque movement so that a larger dimension wire can be placed earlier. Its rectangular shape also provides some rigidity along edentulous spaces and enough force to begin arch leveling and vertical correction. I notice that patients find it more comfortable as an initial wire than an .016 Ni-Ti."

INITIAL (LEVEL/ALIGN) PHASE: 3 VISITS – 6 MONTHS
• Use Bite Turbos in severe deep bites
• Reposition obvious bracketing errors
• Place .017 x .025 Ni-Ti® archwires
• Bond or band second molars and reposition necessary brackets
• Deliver removable retainers, prescribing full time and work only thereafter
• Place .018 x .025 Ni-Ti® archwires
• Take progress panoramic X-ray to assess root angulations at end of working phase

FINISHING PHASE: 3 VISITS – 6 MONTHS
• Place .017 x .025 stainless steel archwires for final settling or .019 x .025 TMA for further expression of bracket prescription

POSTTREATMENT PHASE
• Debond/deband
• Remove study models
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MAINTAINING STANDARDS in an Era of Hyperefficiency

Thomas J. Marcel, DDS
Livermore, California
First Impressions of Straight-Wire Synthesis

When I first heardOrmco was going to enhance my beloved Mini-Twin brand, I was leery. At first glance, Straight-Wire Synthesis looked very similar to the Mini-Twin, but on closer study, it revealed some interesting changes. Since I’ve bonded 150 consecutive full cases, I have all been incorporated into Synthesis. First impressions are so, if need be, I can combine appliances or reposition anyStraight-WireAppliance with a Synthesis bracket without compromising any of mystraight-wireobjectives.

Synthesis Enhancements to Straight-Wire

For me, the most dramatic Synthesis enhancement is its pad contour. When I place a Synthesis bracket, it just seems to fit the middle third of the tooth better. This is particularly noticeable with the upper cuspid bracket. The Mini-Twin upper cuspid bracket frequently contacts the tooth surface only on contralateral corners, requiring more adhesive to fill the bracket-tooth interface. Both upper and lower cuspids Synthesis brackets adapt much better to the tooth surface than the Mini-Twin.

With Straight-Wire, bracket placement is everything. Features that offer additional assistance such as the rhomboid pad help promote consistent positioning. The vertical and horizontal components of the pad nicely parallel the long axis of the crown/root and the bracket slot/tooth occlusal plane to aid in optimal bracket placement. Again, I find it most noticeable on the cuspids compared to the Mini-Twin.

The increased under-tie-wing radii and tie-wing height has won applause from my clinical team for facilitating easy ligature. They can quickly double-tie with wire or elastomer and make figure-8 ties more readily. The additional distance between the pad and the end of the tie-wing also facilitates ligature and improves access for better hygiene. It also allows the bracket to be positioned more optimally on a rotated tooth without tissue impingement.

My initial experience with Straight-Wire Synthesis has been extremely positive. The critical components of a fully programmed, torque-in-base appliance have been maintained while adding some well-thought-out design enhancements. Straight-Wire Synthesis appears to be an excellent appliance to help us elevate the standard of care and achieve treatment efficiency.

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Efficient orthodontists like mechanics that are important. No archwire has made a bigger impact on effective treatment than preformed Reverse Curve TMA with “T” Loops. Although this archwire has been around for a while, its influence on solving certain treatment problems is more significant than ever. It would be good to revisit its use and multiple functions.

Let’s take a look at the problems this archwire is designed to solve. It’s common to have the lower arch completely leveled, the upper buccal segments in a Class I, and still have a latent deep bite with spaces mesial to the upper cuspids (Figure 1). The solution is to open the bite in order to close the space. The principle in orthodontics that addresses this problem is commonly referred to as “reduce the overbite before resolving the overjet.” By honoring this principle, we close anterior spaces without compromising the buccal segment interdigitation or jamming the lower incisors. But what if you could close the space and open the bite at the same time? Even better, what if you could actively increase torque with the same wire? Better yet, what if you could increase torque while the archwire is already in place? Sound too good to be true? Well then, let me reintroduce you to the Reverse Curve TMA with “T” Loops, the versatile answer to any practice, regardless of size or therapeutic blue. It holds numerous patents with inventions on display at the Smithsonian and received a gold medal for an educational CD from the New York Film Festival. Dr. Hilgers received his D.D.S. from Loyola and his M.S. in orthodontics from Northwestern. He has been in private practice in Mission Viejo, California, for 30 years, written over 80 journal articles and lectures internationally.

Preplacement Archwire Activation

The “T” Loop in the TMA archwire could be more accurately described as an asymmetrical “T” loop because the distal extension of the loop is about one third longer than the mesial (Figure 2). It’s this asymmetrical design that allows the clinician to create a step-up from the cuspids to the incisors, effectively treating them as individual segments. The archwire comes in three different sizes: .016 x .022 (.018 slot), .017 x .025 (.018 or .022 slot) and .019 x .025 (.022 slot). It’s available with six different anterior lengths, measured from the distal of the upper lateral incisors. Its exaggerated curve of Spee acts to extrude and seat the buccal segment while aiding the intrusion of the upper incisors.

After selecting the appropriate archwire size, activate the “T” Loop by pinching the anterior portion of the loop closed (Figure 3a) and opening the distal extension of the loop (Figure 3b). This creates a step-up in the archwire from its anterior to posterior components from 1 to 5 mm, depending on the bite opening you desire (Figure 3c). The step-up between the cuspids and the incisors is transitory and serves the functional purpose of allowing the bite opening and simultaneous space closure, while avoiding the upper and lower incisor contact that would compromise movement. Once the movement is complete, the incisors are re-engaged to achieve a functional (3 mm) overbite, taking the elongated look out of the cuspids.

The preformed archwire also has an exaggerated rotation in the upper molar region, helping to maintain proper molar rotation while the upper incisors are being retracted. Using a contouring plier you can also curve the distal of the archwire slightly outward to allow easier insertion into pre-rotated molar tubes (Figure 4).

Archwire Placement

Fit the archwire into the molar tubes, engaging it first in the anterior segment, and then seat the buccal segment of the archwire into the brackets in the segment to complete the “T” Loop, which will then resemble its preactivated shape. Activate the closing function of the archwire by pulling its distal extension through the molar tubes, bending it upward, then clip off this end of the archwire, removing its previously outward-contoured portion. The vertical legs of the “T” Loop are usually activated about 2 mm to initiate the closing activity of the wire, although it’s not uncommon to wait a month for bite opening to occur before activating the horizontal or closing component of the “T” Loop.

Intraoral Torque Adjustments

A unique advantage of the Reverse Curve TMA with “T” Loops is that torque in the anterior segment can be enhanced while the archwire is completely engaged. This can be accomplished in two ways. First, you can pinch the horizontal portion at the top of the “T” Loop using a small optical plier (Figure 5a) to place a gabling torque of up to 30˚ in the anterior portion of the wire. The drawback, however, is that it also opens the base of the loop, diminishing its capacity to close anterior spaces (Figure 5b). This is beneficial when you wish to advance the upper incisors (Class II, division 2) and can even be used as the initial archwire to accomplish this objective.

The second more prudent, and yet just as effective, method of enhancing torque is to pinch the anterior...
Efficient orthodontists like mechanics that are impec-
vable. No archwire has made a bigger impact on effective
treatment than preformed Reverse Curve TMA with
“T” Loops. Although this archwire has been around for
a while, its influence on solving certain treatment
problems is more significant than ever. It would be
good to revisit its use and multiple functions.

Let’s take a look at the problems this archwire is
designed to solve. It’s common to have the lower arch
completely leveled, the upper buccal segments in a
Class I, and still have a latent deep bite with spaces
mesial to the upper cuspids (Figure 1). The solution
is to open the bite in order to close the space. The
principle in orthodontics that addresses this problem
is commonly referred to as “reduce the overbite
before resolving the overjet.” By honoring this prin-
ciple, we close anterior spaces without compromis-
ing the buccal segment interdigitation or jamming the
lower incisors.

But what if you could close the space and open the
bite at the same time? Even better, what if you could
actively increase torque with the same wire? Better
yet, what if you could increase torque while the arch-
wire is already in place? Sound too good to be true?
Well then, let me reintroduce you to the Reverse
Curved TMA with “T” Loops, the versatile answer to
problems is more significant than ever. It would be
good to revisit its use and multiple functions.

Preplacement Archwire Activation
The “T” Loop in the TMA archwire could be more
accurately described as an asymmetrical “T” loop
because the distal extension of the loop is about one-third
longer than the mesial (Figure 2). It’s this asym-
metrical design that allows the clinician to create a
step-up from the cuspids to the incisors, effectively
increasing them as individual segments. The archwire
comes in three different sizes: 0.016 x 0.022 (.018 slot),
0.017 x 0.025 (.018 or 0.022 slot) and 0.019 x 0.025 (.022
slot). It’s available with six different anterior lengths,
measured from the distal of the upper lateral incisors.
Its exaggerated curve of Spee acts to extrude and seat
the buccal segment while aiding the intrusion of the
upper incisors.

After selecting the appropriate archwire size, activate
the “T” Loop by pinching the anterior portion of the
loop closed (Figure 3a) and opening the distal exten-
sion of the loop (Figure 3b). This creates a step-up in
the archwire from its anterior to posterior components
from 1 to 5 mm, depending on the bite opening you
desire (Figure 3c). The step-up between the cuspids and
the incisors is transitory and serves the functional pur-
pose of allowing the bite opening and simultaneous
space closure, while avoiding the upper and lower inci-
sor contact that would compromise movement. Once
the movement is complete, the incisors are re-engaged
to achieve a functional (3 mm) overbite, taking the
elongated look out of the cuspids.

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vertical leg of the “T” Loop (Figure 6a) to allow the full expression of the loop for space closure. This approach for enhancing anterior torque is especially useful when using clear or ceramic brackets because it helps avoid the bracket fractures that can occur when placing active torque in the archwire.

Multifunctional Archwire Performance

Movement of the teeth to open the bite and close anterior spaces is extraordinarily rapid (see case). A complete 8 to 10 mm overbite can often be reduced in two to three months. This will allow the upper incisors to be brought into an end-to-end overbite correction. It’s important to mention again that the purpose is to close anterior spaces without impinging on the lower incisors (or their brackets), which would effectively compromise the closing moment of the archwire. Once the proper space closure and torque control of the upper incisors has been achieved, it’s usual to place a flexible type of archwire in the upper arch to finish the detailing prior to appliance removal.

My favorite wire for the finishing phase is the .016 x .022 (.018 slot) or .019 x .025 (.022 slot) Force® archwire. The Force® is a flexible, nine-strand braided superelastic archwire that can receive bends for detailing and yet is good for maintaining torque control and arch form. It’s also possible to use light, round wires for this same purpose when torque control isn’t an issue and when it’s advantageous to roll the upper teeth into a seated occlusion using vertical seating elastics. The clinician should always ligate upper cuspid to cuspid during this idealization period to avoid space opening in the upper arch as the two arches are squeezed together.

No other archwire in my armamentarium receives as much use as the Reverse Curve TMA with “T” Loops. The wire works equally well in extraction or nonextraction cases and serves to open the bite, close anterior spaces and increase torque simultaneously. This multifunctional archwire uses high technology to solve some age-old dilemmas.

Case

12-year-old female at 10 months into treatment for Class II correction. The .016 x .022 Ni-Ti archwire was replaced with an .016 x .022 Reverse Curve TMA with “T” Loop archwire to correct an 8 mm overbite. After one month, we see a one-half overbite correction and at two months it’s ideal. The patient wore the “T” Loop archwire for three months. After debonding, the patient’s final anterior occlusion shows a proper 3 mm overbite.

The CARD

Ormco’s Ultimate Adhesive Dispensing System

The CARD is designed to streamline everyday bonding procedures by combining a bracket setup tray with pre-dispensed light-cure adhesive. Underneath each foil bubble is a tooth-specific dose of Ormco’s popular Enlight light-cure adhesive, protected from premature exposure to light and air. This ensures adhesive freshness and further reduces risk of bond failure that results from early adhesive setup. The CARD is designed for a full 7-7 bonding but can be used for one arch simply by tearing along the middle perforation. The CARD can also be attached to a countertop or tray surface, reducing the need for extra hands and allowing you to concentrate on one of the most exacting procedures you perform. Best of all, The CARD is quick, clean and easy to use. Simply swipe a bracket through the adhesive and go! With The CARD, your typical bonding isn’t typical anymore.

Come to the Ormco booth in Philadelphia to try The Card or contact your local Ormco representative or Customer Care Department for information on introductory offers at (800) 854-1741.
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Alexanders Signature Line

Inspire!

Straight-Wire

The clearly superior choice

A family of proven clinical systems

Lingual

The ultimate in aesthetic appliances

Titanium Orthos2

Bringing modern technology to a light-wire, high-torque technique

Damon System 2

A 21st-century material with unsurpassed strength and reliability

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Bios
Titanium Orthos2
Damon System 2
**Why Shaq Can’t Make a Free Throw**

**Visual Cues Make the Difference in Precise Placement**

Dr. Craig Andreiko

Craig Andreiko, DDS, MS
Alta Loma, California

Los Angeles Laker Shaquille O’Neal is known for being the dominating center in the NBA. But maybe if Shaq had better visual cues, his percentage rate from the free-throw line would be higher. Whether putting the ball in the hoop or positioning brackets, success depends on the ability to incorporate visual cues to improve hand-to-eye coordination. Since most clinicians agree that precise bracket placement is the most critical determinant of efficient, predictable tooth movement and high-quality finishes, additional visual cues will increase success.

Most preprogrammed bracket systems are designed to be positioned on the tooth at the facial axis (FA) point with the plane of the archwire slot placed at a specific angle relative to the facial axis of the clinical crown (FACC) of each tooth (Figure 1). Placing brackets according to this principle achieves the most efficient and predictable tooth movement and minimizes the number of archwire bends (Figure 2). When brackets aren’t placed at the correct location, the geometry preprogrammed into the bracket won’t be properly expressed and the final tooth position will be compromised (Figure 3).

**Clinical Difficulty of Bracket Positioning**

There have been a number of approaches designed to assist in bracket positioning. One common approach has been to use a placement gauge to position brackets at the FA point. Such devices must, by definition, use fixed vertical heights (distance from incisal edge to FA point) based on a statistical norm in a sampling of patients. Using a placement gauge, the orthodontist is able to position brackets at the proportional central portion of the tooth on only those patients who precisely match the statistical norm. These patients are rare and difficult to identify. Furthermore, the placement gauge is often not easy to use on severely malposed teeth and ineffective when teeth are partially erupted or have chipped or worn incisal edges.

**Rhomboid Pad Improves Placement**

The design of the rhomboid bracket and pad has made a positive impact on the ability of the clinician to place brackets precisely. Its geometry assists in aligning it with the angle of the FACC. While this design has proven to be valuable in alleviating some of the difficulties of achieving precise clinical placement, additional visual cues would be a welcome aid. The visual incompatibility between the fixed geometry of a bracket and the fluidity of tooth morphology is a major factor in improper alignment. The rigid angles of orthodontic brackets (whether square or rhomboid) don’t lend themselves to intuitive placement because of the generally free-flowing shape of teeth. For example, in order to place appliances with improved precision, the pads could be shaped to relate to the frontal anatomy of specific teeth.

A better understanding of the overall challenge is achieved using an analogy. Try to align a rhomboid-shaped card at the exact center of your hand, a free-flowing, naturally occurring shape, much like a tooth. The difficulty in aligning dissimilar shapes is that there are too many decisions to make with too few visual cues. One must decide how to orient the rhomboid card with the possibility of error in each direction. The process becomes considerably more intuitive when one is asked to place a shape within a similar shape, such as a child’s hand centered on an adult’s hand (Figure 4). This is the basic principle behind tooth-shaped pads, which are now standard for Titanium Orthos2™ maxillary pads cuspid to cuspid. The outline of the pad mimics the outline of the tooth, providing additional visual cues to aid placement. The Titanium Orthos2 bracket clearly looks as if it belongs at the FA point (Figure 5).

Another placement issue involves the phenomenon of parallax (the apparent displacement of an object that follows a change in the position from which it is viewed). The perfect view for bracket placement is looking directly into the slot and that’s often awkward to do clinically. When the clinician uses the top of the slot as the primary reference point, the view is distorted because it sits above the surface of the tooth. This apparent bracket displacement moves...
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Titanium Orthos2 with Tooth-Shaped Pads

Ormco’s new Titanium Orthos2™ appliance incorporates tooth-shaped pads on the maxillary cuspid-to-cuspid brackets. Designed to aid in bracket placement by giving the clinician additional visual cues, Titanium Orthos2’s tooth-shaped pads can make a big difference in the overall efficiency of a practice—efficiency that extends far beyond the initial bonding appointment.

Precision Placement Means Fewer Wire Bends

Placing a bracket in the correct position during the first bonding appointment can help save time down the road. When brackets are placed accurately, fewer wire bends and repositions are necessary. Titanium Orthos2’s tooth-shaped pads help you take the guesswork out of aligning two dissimilar shapes by providing visual cues to aid placement.

Precision Placement Means Fewer Bond Failures

When you can accurately position a bracket on the tooth, you’re less likely to fiddle with it after the adhesive has begun to cure. By eliminating one of the most common reasons for bond failures, you increase your efficiency.

Precision Placement Means Timely, High-Quality Finishes

Accurate bracket placement is the most critical determinant of efficient, predictable tooth movement and high-quality finishes. The clinical performance of Titanium Orthos2 with tooth-shaped pads will allow you to deliver great functional and aesthetic results.

“My experience with the new tooth-shaped pad is that it just looks and feels right when placed in the correct position. When switching to a new bracket, there’s always a learning curve. Titanium Orthos2 with tooth-shaped pads has the shortest learning curve I’ve ever experienced.”
— Rand Bennett, DDS, MS

For more information on Titanium Orthos2 with tooth-shaped pads, contact your Ormco sales representative or Customer Care Department at (800) 854-1741.

Correcting Mild Malalignments—Easy as One, Two, Three

Randall C. Moles, DDS, MS
Racine, Wisconsin

The good news is that we live in an era when aesthetic appliances are extremely important, increasing and broadening the demand for our services. Orthodontic manufacturers have responded by providing aesthetic appliances such as clear and lingual brackets. The bad news is that this same preoccupation makes it even more difficult to choose treatment for some malalignments. One area that’s currently gaining popularity is correcting mild tooth malalignments with retainers. While too minimal to justify the cost of full appliances, the choice of limited braces or an active spring-type appliance worn on a 24-7 basis, for many patients, is simply not an acceptable alternative.

The Red, White and Blue Invisible Active Retainer System offers a solution to those adults who are just outside the normal range of other tooth-aligning appliances, such as a Hawley or spring-type, or patients who want the most simple aesthetic system possible to correct minor to intermediate tooth malalignments. In addition to being aesthetically pleasing, these retainers won’t effect the patient’s speech and are very cost effective.

The Red, White and Blue System consists of a series of three invisible active retainers. The lab fabricates them by sectioning the teeth to be corrected from work models and resetting them in progressively corrected setups. The small, incremental changes in tooth position create forces that move the teeth. The idea of creating retainers from teeth reset on a model is very similar to the fabrication of positioners dating back to 1940 and spring retainers to 1970. Each Red, White and Blue retainer has a corresponding colored dot for easy identification and is worn in that sequence.

In-Office Procedures

1. Assess necessary tooth movement and space requirements.
in the opposite direction from which it's viewed. If the pad is used for placement, parallax doesn't occur because the pad is at the surface of the tooth (Figure 6).

Two Design Characteristics Improve Cleaning and Hygiene

Tooth-shaped pads are also an improvement over current rhomboid and square-shaped pads in terms of flash cleanup and patient hygiene. It's difficult to manipulate a scaler around the corners of angular pads and tie-wing overhangs to remove flash (Figure 7a). The corners of the tooth-shaped pads are rounded and the tie-wings barely exceed the perimeter of the pad. This combination makes flash easier to see and clean. In addition, patients can more easily clean the rounded edges of the tooth-shaped pads, particularly with less interference from tie-wing overhang (Figure 7b). Better adhesive cleanup and better patient hygiene should lead to less iatrogenic decalcification.

The visual cues provided by the tooth-shaped pad are a natural complement to the features that the rhomboid bracket offers for more precise bracket placement. It's like the player setting up a shot near his sweet spot on the court. He just knows it feels right and visually sees it going through the hoop as he shoots. Just how do you think the Lakers would do if Shaq had a few more visual cues? They'd put more points on the board.

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**In-Office Procedures**

1. Assess necessary tooth movement and space requirements.
2. Create interproximal space with slenderizing as needed.
3. Take accurate impressions. Be careful of the second molar area because it's often difficult to capture and will affect the seating and retention of the retainers. In my practice, we pour our own models. When the stone is in liquid form, we're very careful to mix it until it's bubble free before pouring it into the impressions. A central occlusion wax bite is helpful to the laboratory to establish proper overbite and overjet relationships.
4. Prepare the laboratory prescription. Indicate which teeth are to be repositioned and include instructions for enamel reduction.

The prescription is similar to a spring retainer primarily designed for anterior correction; however, it's possible to make small adjustments in cuspid or even bicusp position with the Red, White and Blue System. Be careful not to overpower the appliance by
trying to provide too much rotation and space closure at one time. If you have performed enamel reduction prior to treatment, be sure to schedule the patient back as soon as possible to avoid tooth movement and poorly seated retainers. If you schedule the patient out longer, be sure to make them a temporary retainer.

**Patient Delivery**

When the system arrives from the laboratory, deliver the retainers to the patient. The Red color-coded retainer is worn first. Look for good seating of all the teeth in the appliance. If the teeth don’t seat, insert the retainers and have the patient bite down with cotton rolls between the teeth for five to ten minutes. Since the appliance will eventually seat, a slight discrepancy of .5 mm on an individual tooth is acceptable (Figure 2).

**Patient Instructions**

The appliance is worn a minimum of 23 hours a day for maximum tooth movement. While wearing the retainers, the patient should gently bite down, squeezing their teeth together to help seat them so the retainers and have the patient bite down with retainers to the patient. The Red color-coded retainer is lim-

The 'Red, White and Blue' System fills a specific need. It’s an aesthetic active retainer for the patient who requires minimal tooth alignment. They’re fabricated from a crystal clear.030 material. Each series allows approximately 1.5 to 2 mm of change, depending on the type of correction, such as space closure. With rotated or overlapping teeth, 3 mm of total correction can be achieved. It may be necessary to perform minor interproximal stripping or slenderizing for crowded or overlapping teeth. In such cases, we typically strip no more than .25 mm per contact on the models. As Dr. Moles mentions, some clinicians will slenderize teeth prior to taking impressions for work models. If not instructed on the prescription, we will slenderize the teeth during the setup as necessary. A card will be enclosed with the case identifying the location and amount of reduction. The clinician uses the card as a reference for patient tooth reduction.

**POSTTREATMENT**

Patient wore upper and lower retainers for six weeks to correct crowding. She continued to wear the Blue retainer at night for retention.

**Mild Tooth Malalignment Case**

**PRETREATMENT**

49-year-old female with post orthodontic relapse and mild shifting of lateral incisors. Patient didn’t want to wear a metal spring-type retainer and requested an aesthetic appliance.

**POSTTREATMENT**

Patient wore upper and lower retainers for six weeks to correct crowding. She continued to wear the Blue retainer at night for retention.

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For the best results when taking impressions, use a material such as Extrude® (polyvinylsiloxane) or Take One® (hydrophilic, polyvinyl) from Kerr. We’ll pour models when requested. Remember, if only one arch is involved, we will still need the opposing arch work model and a wax bite in centric occlusion.

Patients should clean retainers daily to maintain clarity and avoid staining. Rinse in tepid running water and clean stains or debris with a very soft toothbrush. To avoid damage, do not use hot water, detergents or alcohol to clean.

For more information, contact Randy Franke in Sturtevant, Wisconsin, at (800) 262-5221 or (262) 886-1050 and Liz Henrich in Enfield, Connecticut, at (800) 826-2224 or (841) 741-3745.

**Indirect Bonding Training Classes**

Would you like to do your own indirect bonding setups? AOA/Pro now offers clinical and lab indirect bonding training classes for orthodontists and/or staff. Stop by our booth in Philadelphia to discuss this unique training program.
try to provide too much rotation and space closure at one time. If you have performed enamel reduction prior to treatment, be sure to schedule the patient back as soon as possible to avoid tooth movement and poorly seated retainers. If you schedule the patient out longer, be sure to replace a temporary retainer.

**Patient Delivery**
When the system arrives from the laboratory, deliver the retainers to the patient. The Red color-coded retainer is worn first. Look for good seating of all the teeth in the appliance. If the teeth don’t seat, insert the retainers and have the patient bite down with cotton rolls between the teeth for five to ten minutes. Since the appliance will eventually seat, a slight discrepancy of 0.5 mm on an individual tooth is acceptable (Figure 2).

**Patient Instructions**
The appliance is worn a minimum of 23 hours a day for maximum tooth movement. While wearing the retainers, the patient should gently bite down, squeezing their teeth together to help seat them so the teeth will move faster. After two weeks the patient will change to the White retainer and two weeks later to the Blue one. Instruct them to call if they have any problems seating the retainers.

It’s also important for the patient to check the tightness of contacts between teeth when flossing. If the floss is tight, they should call for an appointment for you to check the contact and possibly clear it with a diamond strip (Figure 3). This is important since the force of these retainers is limited. A tight contact could stop a tooth from moving. Sometimes tooth position makes it impossible to perform enamel reduction needed for complete alignment. In this case, it may be necessary to see the patient more often to repeat this process. Occasionally, the patient may need to wear a retainer for more than two weeks if the next one won’t seat properly.

The Red, White and Blue Invisible Active Retainer System is a valuable addition to our aesthetic treatment armamentarium. It offers an extremely comfortable, aesthetic, and minimally intrusive solution to patients with mild tooth alignment problems. When a patient has already had braces and now experiences minor relapse, it’s especially gratifying to have the opportunity to offer this retainer as a simple, aesthetic alternative. As we all know, when patients are happy our practices grow.

**Mild Tooth Malalignment Case**

**PRETREATMENT**
49-year-old female with post orthodontic relapse and mild shifting of lateral incisors. Patient didn’t want to wear a metal spring-type retainer and requested an aesthetic appliance.

**POSTTREATMENT**
Patient wore upper and lower retainers for six weeks to correct crowding. She continued to wear the Blue retainer at night for retention.

The Red, White and Blue System fills a specific need. It’s an aesthetic active retainer for the patient who requires minimal tooth alignment. They’re fabricated from a crystal clear .030 material. Each series allows approximately 1.5 to 2 mm of change, depending on the type of correction, such as space closure. With rotated or overlapping teeth, 3 mm of total correction can be achieved. It may be necessary to perform minor interproximal stripping or slendizing for crowded or overlapping teeth. In such cases, we typically strip no more than 0.25 mm per contact on the models. As Dr. Moles mentions, some clinicians will slenditize teeth prior to taking impressions for work models. If not instructed on the prescription, we will slenditize the teeth during the setup as necessary. A card will be enclosed with the case identifying the location and amount of reduction. The clinician uses the card as a reference for patient tooth reduction.

For the best results when taking impressions, use a material such as Extrude® (polyvinylsiloxane) or Take One® (hydrophilic, polyvinyl from Kerr). We’ll pour models when requested.

Remember, if only one arch is involved, we will still need the opposing arch work model and a wax bite in centric occlusion.

Patients should clean retainers daily to maintain clarity and avoid staining. Rinse in tepid running water and clean stains or debris with a very soft toothbrush. To avoid damage, do not use hot water, detergents or alcohol to clean.

For more information, contact Randy Frankie in Sturtevant, Wisconsin, at (800) 262-5221 or (262) 886-1050 and Liz Henrich in Enfield, Connecticut, at (800) 826-2224 or (860) 741-5745.

**See the Red, White and Blue System at the AOA/Pro Booth.**

**LAB POINTERS**

**Figure 2.** The appliance should seat completely on all teeth and in this case is positioned over a flipper.

**Figure 3.** Tight contacts between teeth are reduced with a diamond strip.

**Paula Allen-Noble** and others on the AOA/Pro team. For information, call us at (800) 262-5221.

**e-MARA**

Whether your practice is across town or an ocean away, there are probably times when you need a Class II correction appliance ASAP. Now we can fabricate and ship your patient’s MARA on the same or next day. Using our e-MARA prescription template, you simply make a 1:1 photocopy of your patient’s model and return it to your office. The e-MARA reduces turnaround times and shipping delays for quick delivery.

**Labial/Lingual Indirect Bonding**

The success of today’s advanced bracket and wire technology can be measured by the accuracy of the initial placement. We offer indirect bonding using the latest products and techniques to make this method of bracket delivery a practical solution for today’s orthodontic practice. Labial brackets are placed according to your prescription or other popular methods. They’re returned with custom bases or adhesive ready. Ask about our never-before-on-5-6 labial setups. Our lingual service includes the CLASS, TARG and Fillion methods of bracket placement.

**Indirect Bonding Training Classes**

Would you like to do your own indirect bonding setups? AOA/Pro now offers clinical and lab indirect bonding training classes for orthodontists and/or staff. Stop by our booth in Philadelphia to discuss this unique training program.