In the past five years, many devices have been introduced to correct Class II malocclusions. Although inertia and resistance to change remain, there is an avalanche of interest in noncompliance appliances – tools the orthodontist uses to get the job done without depending on cooperation from patient or parent. This definition excludes removable devices of any sort. The device must be fixed to the teeth. Because of their attachment to the teeth, noncompliance Class II devices all produce orthodontic movement, but some are designed to produce orthopedic results as well. Discussion continues in the literature regarding the site, direction and magnitude of orthopedic changes related to specific noncompliance devices, but there is sufficient evidence that some orthopedic changes occur, and there are huge numbers of obviously stable corrections of Class II malocclusions achieved with noncompliance devices. Many orthodontists have already discovered that it is worth their while to master a new treatment regimen in order to successfully complete a larger percentage of Class II corrections, with less time spent attempting to persuade a patient to comply with wearing a removable device.

Once the decision is made to use a device that can produce both orthopedic and orthodontic correction of Class IIs, the clinician must consider such practical matters as cost, simplicity of delivery, resistance to breakage, patient comfort and reliability of Class II correction. Experience with different appliances can be difficult to attain if the learning curve is formidable. The MARA appliance was developed after considerable experience with the Herbst and is presented here as a solution to many practical problems.

**Description of the MARA**

The name MARA comes from Mandibular Anterior Repositioning Appliance. It was developed to overcome the dislike that patients expressed regarding the Herbst, particularly the bulk in the lower bicuspid area. The MARA is attached to stainless steel crowns or rigid bands on the first molars (Figure 3). In addition to the normal rectangular archwire tube, the upper first molar has a large .062 square tube, into which slides an adjustable .060 square “elbow” that hangs vertically...
The lower first molar has the normal rectangular tube as well as an .059 round wire “arm” projecting buccally from the mesial (Figure 5). The upper elbow hits the lower arm and prevents occlusion unless the patient holds the lower jaw forward so that the lower arm is in front of the elbow (Figure 6A). In the occluded position, the elbow and arm shield each other and prevent irritation of the cheek (Figure 6B).

The elbows are advanced periodically by placing shims on them in order to cause more mandibular advancement (the elbows are tied in by ligatures [Figure 8]).

**Changes Produced by the MARA**

Clinical changes seen with the MARA include immediate downward and forward movement of the chin, which declines somewhat over the period of treatment as dentoalveolar changes allow the mandible to drift backward from its initial advancement. The initial posterior openbite created by the large initial advancement reduces gradually as the teeth erupt unencumbered by appliances. The Class I occlusion created by the initial advancement drifts back into partial Class II over several months, and additional advancement is usually required. When the MARAs are removed, the molars are usually in openbite due to the long-standing occlusal coverage (if crowns were used) and are easily closed with vertical elastics.

Tomographic studies demonstrate that the condyles are returned to their original positions in the fossae before removing the MARA (Figure 9). The changes produced by MARA treatment, verified by cephalometric study, include mandibular growth (resulting primarily in vertical...
cal facial changes), some restriction in maxillary forward growth, mesial lower molar movement (but not occlusal), mesial lower incisor movement (but not incisal), distal upper molar movement (but not occlusal), and distal and incisal upper incisor movement.

There are other possible explanations for these changes but, as yet, no proof. The temporomandibular fossa may remodel mesially or the temporal bone may rotate forward under the pull of ligaments (stylomandibular, temporomandibular) and muscles (posterior digastric, stylohyoid, temporalis).

**Treated Cases**

As with many other regimens, the best results have been achieved in brachyfacial cases. Case CA shows a boy who was treated for six months with palatal expansion and lip bumper, followed by full bands and MARA for 14 months, then Class II elastics for 14 months (Figure 10). The cephalometrics of case CA show the following differences from changes expected with growth:

- A-point: -1.7 mm
- Na-Me: +5.8 mm
- Mandibular length: +4.7 mm
- Facial axis: +1°
- ANB: -4.6°

Case JR shows a girl who was treated with lip bumper and MARA for 15 months and then finished with full bands for 9 months (Figure 11).

Case JB shows a boy who was treated with full bands and MARA for 12 months and then finished with full bands for 4 months (Figure 12).

**How to Use the MARA**

The appliance is available as a lab service through Allee Orthodontic Appliances (AOA), P.O. Box 725, Sturtevant, WI 53177; Phone (800) 262-5221 or (414) 886-1050. Send them upper and lower models, indexed to show the present occlusion as well as the desired
AOA - Your Exclusive Source for the MARA

The MARA has proven itself as a more patient-friendly, less expensive alternative to functional therapy. Allesee Orthodontic Appliances (AOA) has worked closely with Dr. James E. Eckhart in developing the MARA. A task force was established to test the appliance, and feedback has been overwhelmingly positive when comparing the MARA with alternatives.

AOA's shipping requirements:
• Orthodontic stone or plaster models
• Wax construction bite or scribe lines on buccal of the posteriors with mandible advancement
• AOA offers a complete inventory of crowns – simply forward anatomical models
• Use AOA's functional appliance prescription form; indicate “MARA” in the special instructions category
• Allow a 14-day turnaround time – declare a definitive placement date on each prescription form

AOA returns with the first case:
• Finished appliance seated on working models
• Torquing tool
• Spare parts, including extra elbows and bushings
• Additional mailing supplies

Contact our Customer Service Department at (800) 262-5221 or fax (414) 886-6879 to review any other questions you may have prior to forwarding your first case to AOA.

Figure 11A. Patient JR before treatment, age 9-1 (treatment was not started until age 11-4).

Figure 11B. Patient JR during MARA therapy with lip bumper in place.

Figure 11C. Patient JR after MARA and full-banded treatment, age 13-5.
My father was a high school football coach, and I started participating in organized athletics about as far back as I can remember. While I was in high school, I was on the football, baseball, basketball and track teams. In college, it was just basketball, except for baseball during my senior year. In the Army, on the US Olympic squad and during nine years in the NBA, my teamwork experience was primarily basketball. I’ve had ample opportunity to experience and witness the effects of good and not-so-good teamwork in sports.

It was no surprise to learn that the same teamwork principles that lead to success in athletics are just as valid in the practice of orthodontics. John Payne, Ormco’s professional liaison manager, recently visited my office to observe my Herbst mechanics and in doing so took note that teamwork was ubiquitous in all areas of the practice. John suggested that I share my teamwork experiences with others, so this is the first of several articles on the subject that I hope will be helpful in your practices.

In this article, I want to cover the benefits to be derived from giving full recognition to all your team members. The Dischinger team consists of 18 team players, including me, and we leave no doubt in any team member’s, patient’s or parent’s mind that we are a skilled professional team with the best interests of our patients at heart. You can tell from our logo that we take teamwork seriously (see above). Team recognition is even evident as you drive into our parking lot (Figure 1). We use the main waiting room to display professional portraits of our staff along with their certification credentials (Figures 2-4). I make it obvious to patients and parents that I take great pride in the educational and professional accomplishments of all team members.

We publish our patient/parent newsletters semiannually and always devote space to recognizing team members, as you will note in the table of contents of our recent publication (Figure 5). We’ll also be sure to devote a bit of bulletin board space to any recent personal or professional achievement (Figure 6).

Of course, nothing provides more meaningful recognition than the professional relationships that your patients observe as you work with your teammates. Be it chairside with the clinical assistant, during a consultation with the treatment coordinator or at the front desk with the front office team member, respect for the professional acumen of your teammate should always be manifest.

Seeking or sharing opinions in areas of a staff member’s specific expertise does nothing to diminish your image and adds luster to your employee’s standing in the eyes of patients and parents. Stay alert to the many opportunities that present themselves during the workday to enhance the standing of your employees.

It goes without saying that the respect and recognition that you bestow must be merited or it won’t work. And that gets into hiring,
training, motivating – all the efforts you put forth to create team players who are expert in their specific work areas. We’ll cover these areas in future articles. And, as any coffee-shop psychologist knows, an empowered, respected, and motivated team will generate a self-feeding enthusiasm that will infect patients, parents, prospective patients and anyone else within range.

In this era of technology and high-efficiency orthodontics, we, our patients and their parents enjoy the benefits of extended intervals between treatments that can range up to ten weeks. This makes it imperative that I devote the maximum time possible to each patient and parent during their visits: performing the procedures I alone can do, measuring progress, explaining what’s happening, answering questions, providing encouragement and guiding the staff. My empowered team frees me to do this by performing duties within their range of expertise that would otherwise fall on my shoulders. They also provide me with the time necessary for diagnoses, treatment planning and the other responsibilities that only I can handle.

The efficiencies and effectiveness possible in orthodontics today with two-phase treatment, refined straight-wire appliances, direct bonding and long-acting archwires can be greatly expanded with a professional teamwork approach. And a key to your team’s success is supporting it with recognition, respect and empowerment.
A Spiritual Approach to Esthetics and Function

by Julia F. de Harfin, D.D.S., Ph.D.
Buenos Aires, Argentina

The importance of esthetics in motivating patients of all ages to accept orthodontic treatment is widely recognized and is becoming increasingly relevant. In conjunction, the need for esthetic appliances is understood, accepted and responded to with a growing number of products. Esthetic brackets can be divided into two large groups based on the material from which they are manufactured: ceramic and polycarbonate, with a number of variations of each type. For me, the first group has been contraindicated because of debonding problems – frequent fracture of the enamel prisms. The wearing away of the incisal borders of opposing teeth is another consideration to keep in mind.

The appearance on the market of preadjusted polycarbonate brackets with metallic slots now enables us to provide our patients with “the best of two worlds” – the SpiritMB appliance. SpiritMB may not generate a state of rapture, but you will undoubtedly enjoy a lift in spirits from a bracket that affords outstanding esthetics without compromising function. I have not experienced discoloration, debonding is easy and SpiritMB does not wear away the cusps of the opposing teeth. With its metal slot, SpiritMB retains the ideal low-friction characteristics of metal brackets. Furthermore, it gives us complete control of the forces we select to achieve the desired tooth movement.

The SpiritMB bracket is indicated for children, adolescents, young adults and older patients. It can be used with normal patients or with those undergoing periodontal treatment – there are no contraindications. No special bonding technique is required and debonding is simple and rapid, without producing alteration to the enamel surface.

There’s no doubting the positive response of patients to esthetic appliances. A study done in a postgraduate orthodontic course at the Facultad de Odontología de la Universidad Maimonides (Buenos Aires) revealed that 75 percent of the patients preferred to pay the higher fee charged for treatment with these esthetic brackets.

Let’s take a look at three examples:

Patient #1. Sixty-five year old patient presented for the consultation upon referral from her periodontist due to progressive change in the position of the upper central incisors, producing diastemas mesial and distal to the upper right central with loss of the interdental papilla. Pretreatment intraoral photographs are shown in Figures 1-3.

Figures 4-5 show the changes produced after two months of treatment with .022 SpiritMB brackets and archwires with a low force/deflection ratio. At six months, both diastemas are completely closed and the papilla has recuperated almost 90 percent of its original form and shape (Figures 6-7). The comparison of pretreatment and posttreatment radiographs shows the very impressive bone recovery.

Dr. Julia Harfin completed her dental and orthodontic training at the University of Buenos Aires, where she later received her doctorate in 1969. She serves as professor at the Department of Orthodontics, Maimonides University. Dr. Harfin has spoken and published extensively domestically and internationally and belongs to numerous orthodontic and dental societies, including the American Association of Orthodontists and the Sociedad Argentina de Ortodoncia, where she served as president from 1990 to 1996. Currently, Dr. Harfin is president of the Asociación Latinoamericana de Ortodoncistas and the Argentine chapter of the International College of Dentists. She maintains her private practice of orthodontics in Buenos Aires, with a heavy emphasis on adult treatment.
Patient #1: Periodontist referral - sixty-five year old patient with progressive misalignment of upper incisors and loss of interdental papilla.

Pretreatment.

Figure 1. View reveals large diastema between centrals.

Figure 2. Diastema between upper central and lateral incisor is of particular concern.

Figure 3. Occlusal view.

Two months into treatment.

Figures 4-5. Note rapid closing of diastemas.

Posttreatment - Six months treatment time.

Figures 6-7. Diastemas are completely closed and papilla has largely recuperated.

Figure 8. Pretreatment X-ray.

Figure 9. Posttreatment X-ray reveals complete repair of bony defect.
taking into consideration the age of the patient (Figures 8-9).

**Patient #2.** Seventy-two year old patient presented with severe lower anterior crowding (Figures 10-11). The lower midline deviation resulted from previous orthodontic treatment that took place 30 years previously; a lower central incisor had been extracted to correct the severe anterior crowding.

After an exhaustive analysis, it was decided to correct the present crowding of 4 mm with stripping in order to normalize the lower arch without causing additional changes to the patient’s profile or to the relationships with opposing teeth. Preadjusted .022 SpiritMB brackets were used and the first step of alignment and leveling was achieved with esthetic arches with a low force to deflection ratio (Figure 12).

Figure 13 reveals the action of an open-coil spring in opening the space for the proper location of the lower central incisor. Three months later, after the alignment was completed (Figure 14), fixed retention was implemented (Figure 15). Pretreatment (Figure 16) comparison with posttreatment results (Figure 17) confirms that the age of the patient is not important in achieving an orthodontic correction when an adequate control of oral hygiene is maintained. The use of this type of polycarbonate bracket with a metallic slot enables us to select archwires with forces appropriate for the severity of the loss of periodontal attachment; consequently, we are able to obtain predictable results with patients requiring particular care.

**Patient #3.** Thirty-eight year old patient presented for the consultation worried about the relapse of orthodontic treatment that took place 15 years previously. He presented an edge-to-edge anterior relationship and lack of space for the upper left lateral and lower cuspids. The lower molars were rotated mesially, creating a Class III occlusion. Six millimeters of space were lacking for the correct location of the lower cuspids. The treatment plan called for alignment and leveling of the dental arches in order to...
Patient #3: Thirty-eight year old patient with significant relapse of treatment completed 15 years previously.

Pretreatment

Figure 18. Note misaligned lower right cuspid.

Figure 19. Lower dental midline is deviated 2 mm to the right.

Figure 20. First molars in near Class III relationship.

Figure 21. Upper occlusal view reveals space lost in relapse.

Figure 22. Severe lower arch-length deficiency is evident.

Following interproximal stripping, .022 SpiritMB brackets are bonded and 35° Copper Ni-Ti archwires are placed

Figure 23. Right side view.

Figure 24. Frontal view.

Figure 25. Left side view.

Figure 26. Upper occlusal view.

Figure 27. Lower occlusal view.
obtain a proper Class I cuspid and molar relationship without extractions. Stripping was planned to create the necessary space for proper location of all the dentition.

Figures 18-22 show the state in which the patient presented for the consultation. Preadjusted .022 SpiritMB brackets were bonded and Copper Ni-Ti® archwires were placed initially (Figures 23-27). Figures 28-30 show the results obtained following the use of short intermaxillary elastics (1/8 medium) to close and seat the occlusion. Results following 16 months of treatment are shown in Figures 31-34. The proposed objectives were reached: correct overbite and overjet; develop Class I molar and cuspid relationships; correct position of the upper left lateral and lower cusps. The treatment objectives were achieved without causing a midline discrepancy.

Conclusion
As we can observe, this type of appliance can be used for the treatment of any kind of anomaly and for patients of all ages, with or without the addition of auxiliaries, as the diagnosis and treatment plan require. With the development of the new base design (SpiritMB), you avoid the adhesion and debonding problems common with ceramic brackets. This makes the use of SpiritMB brackets very advisable for all patients choosing esthetic appliances.

SpiritMB fulfills the promise – The Best of Two Worlds – by affording great esthetics without compromising function. The low friction that makes it possible to control the forces you wish to use is of highest importance with adult patients, especially those presenting with compromised periodontal support. And when it's time for debonding, the enamel does not suffer the cracks or lines that are frequently encountered when removing ceramic brackets. With the experience of treating almost 300 patients with Spirit brackets, I have not observed any problems with discoloration or staining, a considerable advantage with respect to other brackets on the market. For these reasons I highly recommend the SpiritMB appliance for treatment of all types of malocclusions, as much in children and adolescents as in adults.
Dr. Harfin has had the opportunity to treat a large number of cases in her adult-oriented practice with the SpiritMB™ appliance and to compare it to aesthetic alternatives. She has proven to herself what orthodontists around the world have been discovering: SpiritMB uniquely affords superior aesthetics and dependable mechanical base bonding.

- **Superior aesthetics**: Advanced composite material provides excellent color stability and a natural look that blends in with the dentition.
- **Mechanical base** for dependable bonding: Bond strengths equal to those of traditional stainless steel mesh. Use the adhesive of your choice. No need for primer. Simplified debonding.
- **Tooth-friendly**: Bracket surface of advanced polymeric material will not damage enamel of opposing dentition. Mechanical base safe for debonding.
- **Precision placement**: Mini Diamond® design and exclusive Face Paint System facilitate fast, accurate bracket placement.
- **Superior mechanics**: Reinforced stainless steel slots provide the sliding characteristics of metal brackets. Mini Diamond preadjusted twin bracket design eliminates compromises in mechanics necessary with other aesthetic appliances.

SpiritMB is available in .018 and .022 in Modified Roth, High Torque and Standard Edgewise prescriptions. Order information can be found on page D of the Center Section.

**SpiritMB – Superior Aesthetics and Proven Clinical Performance**

The Alexander SpiritMB™ appliance replicates the Mini-Wick System in providing a completely preadjusted appliance that incorporates Ormco’s Diamond bracket design and Face Paint System to ensure precise bracket placement. In addition to SpiritMB’s aesthetic and clinical advantages, Alexander SpiritMB enjoys the mechanical advantage resulting from the greater interbracket distance of single brackets. The metal rotation wings** are easily adjustable and provide the superior rotational control that characterizes the Mini-Wick System.™ The wedge design of the brackets minimizes occlusal interference and bracket wear, and there is ample under-tie-wing area for easy ligating. Alexander SpiritMB is available in .018, and order information is provided on page D of the Center Section.

**Alexander SpiritMB – The First and Only Aesthetic Appliance with Metal Wings**

*U.S. Patent No. 5,622,494.
**U.S. Patent No. 5,618,175.
All-metal rapid palatal expanders (RPEs) have taken on new popularity in the last few years. This is due to the rapidly growing consensus among orthodontists that arch development is an excellent way to create space for those patients developing dental crowding. The philosophy of arch development can be divided into two topics: (1) appliance design and (2) when and what to do. This article will discuss appliance design.

I have been developing dental arches since 1977 and have used numerous appliances, both fixed and removable. One year ago I redesigned the RPE, and the new design has been so successful that I named it the “Winding Wizard” (a less ominous name the children seem to like). The design is not only comfortable for the patient, giving it high patient acceptance, but it is very efficient in developing arches.

Benefits of the Winding Wizard
1. Construction entails only two solder joints. Many commercial labs use four solder joints.
2. Elimination of two solder joints makes the appliance easier to clean.
3. The configuration of the wire leading to the first molars has multiple advantages:
   a. Adjustments possible at time of insertion.
   b. Ease of insertion (there is a small amount of movement that can take place), which the patients appreciate.
   c. Less soreness 24-48 hours post-insertion.
   d. Easier to clean.
   e. Less tipping of the molars during activation.
4. The screw (Leone 13 mm screw) can be used in almost all cases, which reduces inventory.
5. Patients who press their tongue on the appliance and place an imprint on the tongue experience fewer problems with this design.

Inserting the Winding Wizard
1. Trial fit and make necessary adjustments.
2. Microetch molar bands. I use Ormco Washbon molar bands because of their strength.
3. Remove hooks from molar tubes.

Dr. Saul Burk received his D.D.S. from the University of Maryland and his M.S. and certificate in orthodontics from Georgetown University. He was an assistant professor of orthodontics at Georgetown University for 11 years. Dr. Burk is in private practice in Gaithersburg and Olney, Maryland.
Increasing Case Starts: The Role of Consultation Surveys

by Barbara Brunner, M.A., Orange, California

If your exam-to-case-start ratio is not meeting your expectations and your attempts to discern the reason through follow-up calls have failed, you may want to consider developing a cover letter and survey that could give you greater insight into what changes you could make to increase case starts. Here are samples of a cover letter and survey you can adapt for this purpose.

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**Sample cover letter for initial examination.**

Ms. Brunner is manager of Ormco's Elite Orthodontic Management Seminar Series and Clinical Impressions Live! She holds a master's degree in organizational communication and management from Ohio University and lectures regularly around the U.S. and Canada, as well as in Australia and Asia, on practice management issues.

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**Sample consultation survey.**

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[Your Stationery Logo]

**Your Comments are Welcome**

Your comments about the experience you had with our practice during your initial examination are valuable to maintaining practice excellence. Thank you for your help.

1. Where are you in your decision about undertaking orthodontic care?  
   □ undecided  □ chose another practice  □ decided against treatment at this time

2. What were the TOP 3 things that most impressed you about...
   (LIMIT CHOICE FOR PRIORITY) ...
   (if applicable) another practice you are considering or have chosen?
   □ Recommendation of your dentist
   □ Recommendation of other patients
   □ Office hours and appointment times
   □ Value of the treatment in light of the investment
   □ Handling of insurance by doctor's office
   □ Payment plan options
   □ Affordable monthly payments
   □ Comfortable atmosphere of the practice
   □ Response to your concerns
   □ How your questions were answered
   □ How the treatment recommendation was explained
   □ Closeness to school or office
   □ Friends who are patients
   □ Doctor's clinical expertise
   □ Competency and professionalism of the staff
   □ Other ________________________________
   □ Other ________________________________
   (EASY TO SEE THEIR STRENGTHS VS YOURS)

3. Name one thing you would like to see us do differently for our subsequent patients.

4. If you have additional questions about beginning orthodontic treatment, indicate if and when you would like us to call you.
   □ Do not call  □ Please call

Preferred calling time  □ Mornings  □ Afternoons  □ Evenings

Work number ___________________  Home number ___________________

Name ________________________  (Optional) (YOU MAY GET MORE CANDID ANSWERS WITH "OPTIONAL." IT ALSO CAN CONVEY THAT YOU EXPECT NEGATIVE RESPONSES - YOUR CALL)

Thank you for contributing to our efforts to offer the highest level of orthodontic service. Each response will be considered carefully.
In orthodontics we are always searching to find new ways, improved techniques and alternative answers to treatment mechanotherapy. Conceivably, we have most of the answers already; we just have to be perceptive enough to select the appropriate strategy. The purpose of this article is to present an uncomplicated and efficient technique that provides many of the advantages of existing treatment modalities. More importantly, it also endeavors to eliminate some of their adverse features. The system is the Bi-Dimensional Orthos™ treatment. The treatment philosophy is characterized by the use of two different bracket-slot sizes of the Orthos* system within the same setup.

**Why Use Orthos?**

Treatment techniques are evolving wherein the bracket is the key to precise control. We are in the CAD-CAM age where computer-aided design and computer-aided manufacturing technology are readily available to us. The Orthos system represents a computer-aided engineering arrangement of brackets, corresponding archwires and molar tube assemblies that can be used in one coordinated scheme. The genesis of this system was the desire to create a comprehensive appliance modality that would minimize some clinical problems that are frequently encountered with existing strategies.

**Bracket Placement in Crowded Cases in the Mandibular Anterior Region**

Conventional incisor bracket profile may inhibit placement in severely crowded cases. Orthos brackets have a significantly reduced labiolingual dimension that permits positioning in even the most crowded malocclusions (Figure 1A-B).

**Bonding Difficulties with Premolars**

Failure rate in the bonding of premolars, especially second premolars, can result in frequent rebonding visits or compromised positioning during bracket placement. Limitations on location of the bonding pad result in premolar brackets that are placed too far occlusally, resulting in gingivally positioned premolars. Gingivally offset bonding pads have remedied this dilemma (Figure 2A-B).

**Mesially Rotated Maxillary Molars**

Maxillary molars prior to treatment often present with mesiolingual rotations. Treatment mechanics also tend to place a mesiolingual vector on these teeth. The prescription of the molar tube assemblies provides optimum distal rotation. Mesially rotated molars occupy more space in the arch and can prevent achievement of a consistent Class I relationship (Figure 3).

**Consistent Mandibular Anterior Root Positioning**

Ideal mandibular anterior root alignment is achieved by individualizing progressive distal tip into the mandibular anterior brackets. Uniform spreading of the roots positions the apices more consistently and results in increased stability of mandibular incisors. Filling the slots of the .018

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*Products identified as “Orthos” are distributed in Europe as “Ortho-CIS.”*
The limiting of the frictional forces provides us with a more rapid space-closing system.”

Optimal Mandibular Canine Positioning
The mandibular canines often tend to be lingually positioned during treatment and are corrected with first-order canine offset bends or in the finishing archwires. A rotation is cut into the slot of the canine brackets to position these teeth ideally. The Rotation in Slot (RIS) feature prevents this disharmony (Figure 5A-C).

Why Use Bi-Dimensional?
The Bi-Dimensional system is based on the use of two different bracket-slot sizes within the same setup. Orthos .018 incisor brackets and Orthos .022 canine and posterior brackets are incorporated into the Bi-Dimensional Orthos treatment. The two slot sizes represent a different set of distinct advantages to treatment mechanics.

The .022 system offers us more options in archwire size selection. With the use of undersized archwires, we can facilitate the free sliding of the archwire through the bracket slot. This provides a system with less friction or binding at the bracket wings. Being able to use stronger and stiffer archwires for our treatment mechanics can also be a benefit. These stiffer archwires allow us to keep teeth upright during space closure and retraction mechanics. A distinct disadvantage allows us to easily make use of this feature (Figure 4A-B).

brackets allows us to easily make use of this feature (Figure 4A-B).

The Molar Rotation
Mesially rotated molar occupies more space

CLASS II SIDE
mesially rotated molar

CLASS I SIDE

The Class II side shows mesiolingual rotation of first molar and reveals how it occupies considerably more arch length than the Class I nonrotated side.

Figure 1A. Conventional bracket wings interfere with ideal placement in cases with crowded lower incisors.

Figure 1B. Lower-profile Orthos bracket (right) minimizes the problem.

Figure 2A. Conventional bracket placed too far occlusally results in vertical discrepancy.

Figure 2B. Gingivally offset bonding pad on Orthos brackets facilitates precise positioning.

Figure 3. The Class II side shows mesiolingual rotation of first molar and reveals how it occupies considerably more arch length than the Class I nonrotated side.

Figure 4A. Conventional mandibular anterior prescription showing angular inclinations.

Figure 4B. Orthos’ individualized anterior prescription diverges roots.

Figure 5A-C. Rotation in Slot (RIS) feature prevents disharmony in mandibular canine positioning.

Figure 6. The Class II side shows mesiolingual rotation of first molar and reveals how it occupies considerably more arch length than the Class I nonrotated side.
tage is encountered when filling the bracket slot. Full-sized stainless steel rectangular archwires become markedly reduced in springiness and range, severely limiting our ability to place effective torque into them.

.022
- More wire options
- Stiffer wires
- Higher force levels
- Free sliding
- Difficult to fill the slot
- Less effective torque

The .018 system provides us with a different set of benefits. While we may have fewer choices in archwire dimensions, we can fill the bracket slot more easily. The capacity to fill the slot allows us to more fully utilize the program or prescription built into the bracket. With the introduction of preadjusted appliances, the focus has moved to customization of brackets to effect specific positioning of teeth. Previously, we relied on modifications in the archwire in the form of first-, second- and third-order bends to detail the teeth. Preadjusted appliances build corrections into the brackets to provide:
- Labiolingual positions (in-out depth of slots)
- Mesiodistal angulations (preangulated slots)
- Labiolingual inclinations (pretorqued slots)

These preprogrammed features of the orthodontic bracket can be fully appreciated only if the bracket slot is filled. We can fill the slot in both the .018 and .022 systems; however, we can certainly fill the slot in the .018 setup more easily and earlier in treatment. This provides the advantage of early torque control of anterior teeth. Torque control is essential in the precise positioning of anterior teeth and in extraction treatment during retraction. During retraction, we are applying lingual crown torque or labial root torque (Figure 6). The ability to maintain anterior torque will resist this unwanted movement. When this unwanted

Figure 5A. Mesiolingual rotations of mandibular canines.
Figure 5B. First-order archwire bends needed to correct canine rotations.
Figure 7A. Frontal view of completed treatment.
Figure 7B. Lateral view of same case shows inadequate torque of anterior teeth.
Figure 10A. Positioning gauge used on indirect stone setup model.
Figure 10B. Full setup of Orthos brackets on indirect working model.
Figure 11C-D. Right lateral view showing rapid premolar positioning.
"undertorquing" of the anteriors occurs, it may be difficult to correct in the finishing stages or may require additional treatment time (Figure 7A-B).

• Earlier torque control
• Lighter wires
• Lower force levels
• Easier to fill the slot
• Use of full-sized rectangular arches

The Bi-Dimensional system takes advantage of these differences in bracket-slot sizes. Filling the slot early in treatment with a bracket prescription that maintains maxillary anterior torque is one of the primary benefits of this system. Another advantage of filling the .018 slot is mandibular incisor control. During space closure in the mandibular arch, there is a vector that tends to lingualize the anteriors. Filling the bracket slots will preserve the positions of these teeth and minimize unwanted lingual crown torque.

The use of Class II elastics strains the position of the lower anteriors. The same mechanism helps to protect their inclination. Protraction of posterior teeth also involves the stabilization of the anterior segment, and filling the slot allows us to maintain the incisors in their correct positions. Characteristically, protraction of posterior teeth results in the overretraction of the anterior teeth. This is effectively controlled with the Bi-Dimensional system.

One of the advantages of the Begg one-point contact bracket was its ability to provide free sliding of posterior teeth during space closure. The limiting of the frictional forces provides us with a more rapid space-closing system. The Bi-Dimensional mode allows us to use an .018 archwire as the widest diameter, thus creating an .04" clearance in the .022 canine and premolar brackets. We now have a free-sliding system during canine retraction, anterior retraction or posterior protraction while simultaneously maintaining anterior torque control. This
Figure 12A. Initial .016 round 27°C Copper Ni-Ti archwire.

Figure 12B. Rapid and precise anterior alignment in ten weeks.

Figure 13. Maxillary arch forms: conventional (inside) and Orthos (outside).

Figure 14A-C. Canine retraction with .016 x .022 stainless steel archwires and superelastic Ni-Ti Extension Springs.

Figure 15. Ni-Ti Extension Springs.

Figure 16A-B. Anterior retraction with .018 x .022 stainless steel archwire and superelastic Ni-Ti Extension Springs extended from crimpable arch hooks.

Figure 16C-D. Anteriors retracted after seven weeks.

Figure 17. Crimpable arch hooks.
is like having your cake and eating it!

**Advantages of the Bi-Dimensional Orthos System**
- Torque control of anteriors throughout treatment
- Precision control of mandibular incisors
- Improved sliding mechanics

**Appliance Setup**
Orthos .018-slotted brackets are placed on the central and lateral incisors, and Orthos .022-slotted brackets are placed on the canines and premolars (Figure 8). The precision placement of brackets enables the clinician to derive the maximum benefits of the system. The brackets are customarily placed directly on the teeth. The use of the Orthos positioning gauge is recommended for accurate placement (Figure 9), or the clinician may elect to use the indirect method of bracket placement to ensure accurate bracket placement (Figure 10A-B).

**Initial Archwires**
To take full advantage of the bracket prescription, use of full-sized rectangular archwires as early as possible in treatment is recommended. With this technique, rectangular archwires can be used throughout treatment. The goal is to fill the slots of the anterior brackets to take advantage of the preprogrammed Orthos system (Figure 11A-F). Another option is starting with round wire and progressing to rectangular formatted arches (Figure 12A-B). Orthos archwire forms are unique in that they are computer-derived from skeletal analysis and are specifically designed to coordinate the maxillary and mandibular arches (Figure 13).

**Canine Retraction**
In premolar extraction cases, retraction of maxillary and mandibular canines involves the use of .016 x .022 stainless steel archwires. Anterior tooth position and torque are maintained by the .018-slotted anterior brackets. Predictable and efficient canine retraction occurs with the free sliding provided by the undersized archwire in the .022-slotted canine and premolar brackets. The canines maintain upright inclinations due to the heavy rectangular steel archwire system. A rapid and predictable rate of canine movement is facilitated by the use of nickel titanium closed-coil extension springs (Figure 14A-C). The use of superelastic Ni-Ti extension springs (Figure 15) eliminates the need to reactivate the setup on each visit, and the visits can continue to be spaced at greater time intervals. Force delivery continues to be maintained uniformly throughout the retraction phase.

**Canine Retraction Archwire Options**
- Rectangular stainless steel: .018 x .022, .018 x .025
- Rectangular titanium molybdenum: .016 x .022 TMA®, .016 x .025 TMA

**Finishing**
Filling the anterior bracket slots throughout the course of treatment should eliminate most of the detailing concerns usually present in the finishing stage. The precision of the Orthos system should provide optimal canine and premolar positioning. Finishing can be carried out in any number of ways, depending upon the specific requirements. Often no additional archwires are necessary after completion of anterior retraction.

**Finishing Archwire Options**
- Rectangular stainless steel: .018 x .022, .018 x .025
- Rectangular copper nickel titanium: .017 x .025 35°C Copper Ni-Ti
- Rectangular braided stainless steel: .017 x .025 D-Rect or Force 9®
- Rectangular braided stainless steel: .018 x .025 D-Rect or Force 9®
Figure 18. Step-by-step documentation of Bi-Dimensional case in progress.

Figure 18A. Female age 11 yrs., 2 mos. Class I with upper and lower crowding, large overjet and moderately deep overbite. Treatment plan: extraction of upper and lower 1st bicuspids; use of Bi-Dimensional Orthos setup with palatal anchorage.

Figure 18B. Initial banding and placement of .016 27°C Copper Ni-Ti archwire supplemented with transpalatal bar and Nance button for anchorage. No lower appliance placed at this point.

Figure 18C. Upper leveling and aligning completed with starting archwire. Lowers permitted to drift after extractions.

Figure 18D. Following placement of .017 x .025 35°C Copper Ni-Ti archwire in upper arch and continued drifting of lowers, uppers are now maintained with same wire while lowers are banded and an .016 35°C Copper Ni-Ti archwire is placed.

Figure 18E. Canine retraction with .016 x .022 stainless steel archwires and Ni-Ti extension springs in upper and lower arches.

Figure 18F. Anterior retraction with .018 x .022 stainless steel archwires and Ni-Ti extension springs in upper and lower arches. Note that Nance button has been removed at this point.
Summary
I have attempted to briefly present the highlights of the Bi-Dimensional Orthos treatment technique and philosophy. It would be impossible to discuss all the features and details in a single article. To demonstrate my step-by-step mechanics, I have started documenting a number of cases with intraoral photographs taken throughout treatment. Figure 18A-F presents in-progress photographs of one of these patients. In a future article, I will cover anchorage control and finishing techniques. The Orthos prescription refinements to the Bi-Dimensional technique have proven to be a definite plus. The efficient and predictable manner of tooth movement has created a less stressful and more precision-oriented approach to my treatment.

Orthos Precision Extended to Widening Range of Treatment Philosophies
As orthodontists around the world are experiencing improved arch coordination and finishing with the scientifically derived Orthos* system, proponents of different orthodontic techniques have developed adaptations of the appliance in order to incorporate Orthos precision into their treatment mechanics. Dr. Jim Hilgers' Bios system lessens dependence on full-size archwires and facilitates techniques that rely more on function and less on dominance. Bios differs from the Orthos prescription by providing increased torque in the upper incisors and mandibular posterior segment plus lingual root torque in upper and lower cuspids.

Dr. Wick Alexander selected many of the Orthos refinements in his modification of the Mini-Wick appliance, the Alexander Signature appliance. Incidentally, the empirically determined, highly popular Alexander arch form proved to be very similar in design to the Orthos arch form derived from skeletal analysis and mathematically formulated to coordinate the maxillary and mandibular arches. Both provide a beautiful, full smile without posterior dark corners while maintaining the cuspid-width integrity essential for long-term retention.

Orthos AP (Asian Prescription) was developed by the application of the scientific methodology used in developing the Orthos system to an Asian patient base. This completely coordinated appliance system minimizes many common clinical problems experienced when treating Asian patients with Caucasian-based straight wire appliances. Now, Dr. Martin Epstein has improved

*Products identified as “Orthos” are distributed in Europe as “Ortho-CIS.”

Dr. Epstein Now Offering Bi-Dimensional Orthos Courses
Dr. Martin Epstein presents two hands-on typodont courses tailored to two or three days on Bi-Dimensional Orthos treatment:
- **Bi-Dimensional Orthos Treatment (Introductory)**
- **Differential Treatment Planning with the Bi-Dimensional Orthos Appliance (Advanced)**

For information on these learning opportunities, contact Dr. Epstein.

Address: 45 Fairfield Terrace
Short Hills, NJ 07078 USA
Phone: (973) 376-3898
Fax: (718) 667-8589
e-mail: Eppieman@aol.com
initial advancement. For this to be feasible, the upper jaw must be wide enough (already expanded if necessary) and the upper incisors must not interfere with the advancement (must be intruded, unraveled and torqued). The models do not require the teeth to be separated. AOA will fit the stainless crowns to the models; fit, shape, and shim elbows to advance the case as desired; and fit a lower lingual arch if requested. They will also send extra elbows and shims for replacement parts and additional advancements; a tool to assist in torquing the elbows will also be included.

For initial orders, AOA will include a video showing how to deliver the MARA. Additional tools needed for managing the MARA are the AEZ Chastant Crown Removing Plier (Ormco #803-0610 [Figure 13]) and a small-beak three-prong (heavy duty) plier to adjust the elbows (Figure 14).

Placement of the MARA
Try on the selected crowns. If they are too loose, crimp the gingival margins. Have the patient bite end to end with the midlines on and see how much space there is for the elbows. Try the elbows in and adjust them; adjust the lower arms if necessary. Remove the crowns, sandblast their interiors and cement them. After the cement hardens, retry the elbows, make final adjustments and tie them in. These steps are all demonstrated in the AOA video. Rehearse the patient in the correct biting position, point out how good the chin looks in that position, explain that eating will return to normal in a few days and caution the patient not to make a habit of banging the elbows on the arms.

Periodic Adjustments of the MARA
Expect to see some increase in overjet and overbite between appointments (Figure 15). Add shims in order to keep the cuspids super Class I. You may need new elbows in order to add shims. Appointments are usually three to four months apart. Expect slight relapse after removal of the MARA and overcorrect in anticipation of it, just as with Herbst therapy. Get tomograms of the jaw joints after one year to see if the condyles have returned to their beginning pre-MARA positions.

Additional Advice for the MARA
- Stabilize the lower molar. Do not allow it to tip or rotate mesially.
- Make sure the upper jaw is wide enough so that when the MARA advances the
lower jaw, maxillary buccal overjet remains, because the elbows must be able to hang buccally to the lower crowns (Figure 16).

- Make sure the upper molars are rotated distally enough to allow for insertion of the elbows without interference from the bicuspids (Figure 17). Avoid banding the upper bicuspids, because the brackets will interfere with elbow insertion.
- Upper incisor decrowding, torquing and intrusion should be accomplished before the incisors are used as a reference in determining how much to advance the lower jaw (Figures 18A & B).
- Leave the distal horizontal extension of the elbow long enough so that shims can be added later and still permit you to tie back around it, but do not leave it so long that it annoys the patient’s cheek (Figure 19).
- If possible, advance the case to end-to-end incisors immediately, but not so far that the patient can bite behind the elbows when retruding the mandible.
- Keep the midlines aligned (Figure 20).
- Do not attach the MARA to deciduous molars. It can cause early exfoliation and is difficult to remove from loose teeth.
- Do not treat young children with this appliance. They lack sufficient cheek space for the elbows, break the appliances more readily and relapse too frequently. They also grow too slowly, so wait until age 11.

- Overcorrect. Even if a tomogram shows the condyle correctly positioned in the fossa, studies have shown that slight Class II relapse occurs due to resorptive remodeling on the distal wall of the fossa after the device is removed.
- Bracket as few teeth as possible to allow them to erupt into Class I during the time the MARA is in the mouth (Figure 21).

**Common Questions About the MARA**

- Why doesn’t the elbow sweep back at an angle to allow gradual engagement, rather than having a vertical leg? We tried it that way and found that patients would hold their mouths open, allowing the

continued on following page
The MARA and What to Do With It

Before Inserting the MARA

Case Selection
- Any Class II, child or adult
- High-angle cases need caution
  - Could wear neck collar at night
- Avoid young children
  - Grow too slowly
  - Insufficient room in back of mouth
  - Deciduous molars resorb
  - More appliance breakage
  - 20% or more need to be retreated

Case Preparation
- Unravel upper and lower incisor crowding first
- Upper incisors correctly positioned
  - Correct torque
  - Intrude if necessary
  - Retract if necessary
- Maxilla wide enough
- No braces on upper bicuspids
- Tomograms of TMJs before advancement
- Braces on lower anteriors unless plan to use LLA to stabilize lower molars

Lab Preparation
- Instruct lab how much to correct Class II
  - Do not jump more than 5 mm at a time or patient will be able to bite behind elbows
- Lower lingual arch or not?

Patient Preparation
- Show patient a typodont
- Discuss advantages over traditional treatment such as headgear therapy
- Place separators when doing impressions

Your Preparation
- Watch the video
- Get a crown-removing plier
- Have a small-beak three-prong (heavy duty) plier to adjust elbows

While Inserting the MARA

Appliance Adjustments
- SSCs
  - Don't trim shorter
  - Crimp gingival margins
- LLA
  - Verify width is okay
  - Should rest above incisor cingula
- Lower molar arm
  - Between 4-8 mm from upper square tube when jaw protruded
  - Not too far out into cheek
    - Can vary by bending arm
    - Can vary by rotating SSC
- Upper molar square tube
  - Rotated so elbows can be inserted
  - Between 4-8 mm from lower arms when jaw protruded

Elbows
- Advanced so incisors end-to-end
- Horizontal leg not longer than 4 mm distal extension
  - Avoids cheek sores
  - Allows shim to be added later
  - Allows tying back
  - Torqued in tight to lower molars
  - Rotated so tail does not bother cheek
  - Avoid leverage longer than 8 mm
  - Tie back with double steel ligature
  - Tuck pigtail into interior of elbow

Errors to avoid
- Don't advance elbows so far that patient can bite behind them
- Don't bend elbows down and arms up or the arms will lock above the elbows
- Keep the elbows torqued in or patient will bite the arms inside the elbows
- Don't allow the arms to protrude into the cheeks without shielding from the elbows
- Don't leave the distal end of the elbow extending longer than 4 mm or patient will get cheek sores

Instructions to Patient
- Rehearse biting
- Advise soft food until used to MARA
- Caution patient not to bang on the arms
- Show how good chin looks in mirror
- Tell patient to call you if cheek biting or pokes occur
- Give patient the MARA information handout supplied by AOA
- Tell patient to bring in parts if appliance breaks

After Inserting the MARA
- Give neck collar if high-angle dolicofacial
- Place shims to keep incisors end-to-end
  - Bite deepens and overjet returns between appointments
- See patient every three to four months
- Keep the midlines on
- Expect lower incisor spacing from LLA
- Avoid braces as much as possible
- Overcorrect, allowing for 10-20% relapse
- Get progress TMJ tomograms after one year
large square tube off a band.

**Benefits of the MARA**

- Compared to headgear: Better appearance, more comfortable, noncompliance, works 24 hours per day, no eye-damage risk, more reliable.
- Compared to removable functionals: Less bulky, noncompliance, no effect on speech, less expensive, more reliable.
- Compared to molar distalizers: Less bulky, no Nance required, more hygienic, no effect on speech, less expensive, more comfortable.
- Compared to interarch springs and Herbsts: Less visible in bicuspid area, less cheek irritation, less bulky, no connection between jaws, requires fewer braces concurrently, breakage easily repaired.

**Conclusion**

There is a learning curve involved in mastering this device, but the time spent learning will be time saved in reduced solicitation of compliance, reduced appointment frequency and fewer patient complaints. A major key to developing confidence in this appliance is in having sufficient inventory to deal with such problems as broken or lost parts, unusual anatomy, etc. AOA provides, free of charge, a torqueing tool and a supply of spare parts with the first case ordered. These components will also be available for later purchase from AOA. Dental assistants learn to apply this appliance quickly, and the video shows many subtleties, including how to tie the elbows in easily. The appliance can be ordered by the single case as a lab service from AOA. If you have questions regarding usage, call me at (310) 546-4724 or fax me at (310) 546-7751. Thanks for your interest!

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**Lecture/Course Schedule at a Glance – Through January 1999**

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<td>Joe Mayes</td>
<td>Gainesville, FL</td>
<td>U of FL Orthodontic Alumni Mtg.; Barbara Jones (352) 392-4355; Lecture—STM &amp; CBJ</td>
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| 9/13-15  | Wick Alexander    | F. Dei Marmi, Italy | Ormco Biaggini; Roberta 039 187 509575; Alexander Discipline Comprehensive
| 9/16-17  | Wick Alexander    | F. Dei Marmi, Italy | Ormco Biaggini; Roberta 039 187 509575; Alexander Discipline Advanced
| 9/18     | Wick Alexander    | F. Dei Marmi, Italy | Ormco Biaggini; Roberta 039 187 509575; Alexander Study Club
| 9/18     | Rebecca Poling    | Orange, CA        | Ormco/A; Katie (800) 854-1741, Ext. 7573; Staff Seminar—Quality Records
| 9/18-20  | Keith Isaacson    | Paris, France     | "A" Europe; Miriam 31 33 4535162; Straight-Wire Course with Practical Sessions
| 9/19     | Rebecca Poling    | Orange, CA        | Ormco/A; Katie (800) 854-1741, Ext. 7573; Staff Seminar—Quality Bonding & Banding Procedures
| 9/19     | Dwight Damon      | New York, NY      | Ormco/A; Katie (800) 854-1741, Ext. 7573; Damon SL System
| 9/23     | Joan Garbo        | Indianapolis, IN  | Ormco/A; Katie (800) 854-1741, Ext. 7573; Seminar—More Than Hired Hands
| 9/25     | Jim Hilgers       | San Francisco, CA | Ormco/A; Katie (800) 854-1741, Ext. 7573; Seminar—The Era of Hyperefficient Orthodontics
| 9/25     | Michael Marcotte  | Athens, Greece    | Panhellenic Ortho Congress; Dr. Halandsetis 30-1-623-2008; Biomechanics of Tooth Movement
| 9/25-26  | Keith Black       | Asheville, NC     | Ormco/A; Paula Allen-Noble (800) 990-3485; In-Office Herbst Training Course
| 9/25-27  | Didier Fillion     | Tubingen, Germany | Tubingen Univ; Dr. Guz 07071 29 82162; Lingual Orthodontic Typodont Course
| 10/1-2   | James McNamara    | Mexico City       | Centro Lat. Amer. de Estudios Orto.; Dr. Guiterrez 525 559 0634; Practical Approach to Early Ortho
| 10/1-3   | Wick Alexander    | Arlington, TX     | Dr. Alexander; Brenda (817) 275-3233; Advanced Course—Treating Divergent Skeletal Patterns
| 10/2     | Mayes/Allen-Noble | Rochester, NY     | Ormco/A; Katie (800) 854-1741, Ext. 7573; Seminar—Efficiency & Predictability: Use of the CB & STM
| 10/2     | Joan Garbo        | New Orleans, LA   | Ormco/A; Katie (800) 854-1741, Ext. 7573; Seminar—More Than Hired Hands
| 10/3     | Terry Dischinger  | Washington, DC    | MD Ortho Society; Duane (301) 236-0600; "Edgewise Herbst; Appliance"
| 10/3     | Dwight Damon      | London, ON, Canada | West. Ont. Study Club; Dr. Weinerberger (319) 679-7880; "The Future of Clinical Orthodontics"
| 10/7     | Joe Mayes         | Woodbridge, NJ    | NJ Ortho Alumni; Frank Bogdian (201) 436-0707; “Use of the CB & STM"
| 10/7-8   | Didier Fillion     | Vienna, Austria   | Ormco (Europe); Nicole 01 306 51 11; Lingual Orthodontic Typodont Course
| 10/8-10  | Mario Paz         | Beverly Hills, CA | Dr. Paz; Shelly (310) 278-1861; Hands-On Lingual Ortho with Typodonts & Patients
| 10/9     | Joe Mayes         | Providence, RI    | RI Study Club; Dr. Kacewicz (401) 884-6500; “Use of the CB & STM"
| 10/9     | David Sarver      | Washington, DC    | Ormco/A; Katie (800) 854-1741, Ext. 7573; Seminar—Maximizing Appliance Systems for Efficiency
| 10/9     | Jim Hilgers       | Sao Paulo, Brazil | Paulista Society of Orth; Carlos Miqui 55 11 887 5234; "The Essence of Practical Orthodontics"
| 10/9-10  | Larry Hutta       | Columbus, OH      | Ormco/A; Paula Allen-Noble (800) 990-3485; In-Office Herbst Training Course
| 10/10-12 | Luis Batres       | Sao Paulo, Brazil | Paulista Society of Orth; Carlos Miqui 55 11 887 5234; Lingual Orthodontics

*Typodonts and/or Participation

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<td>Dr. Fillion 33 1 47042793; Lingual Orthodontic Typodont Course*</td>
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<td>Biaggini Ormco Italia; 39 187 509575 (Fax 39 187 590976); Lingual Orthodontics</td>
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<td>James McNamara</td>
<td>Florence, Italy</td>
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<td>Ormco/A; Katie (800) 854-1741, Ext. 7573; Staff Seminar—Quality Bonding &amp; Banding Procedures*</td>
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<tr>
<td>12/11-12</td>
<td>Michael Marcotte</td>
<td>Munich, Germany</td>
<td>U of Munich; Prof. Rudsky-Janson 89-5-160-3235; Intro to Segmented Arch Technique*</td>
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For additional information on any course, please call the contact number shown or (international doctors) Ormco distributor.