

CLINICAL Impressions®



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Orthodontic Finishing: A

by Thomas R. Pitts, DDS
Reno, Nevada

Orthodontics is a wonderful profession and I'm more excited about it now than I've ever been. It's more fun for me and my patients and staff, and I see it continuing to get better and better. Much of my excitement is due to the tremendous strides we've taken over the

past 15 years in developing appliance systems and techniques that offer us the ability to treat patients more efficiently and with greater patient comfort and higher quality (Case 1). This has led me to the development of a new philosophy of treatment – a philosophy that has evolved over the 30+ years that I've been practicing.

When I began my orthodontic career in 1968, my philosophy of treatment was limited to a rather narrow definition, which included ideal Class I occlusion with as much stability as possible (teeth over basil bone, not expanding the cuspids, etc.), exact tooth positioning, and good periodontal health with parallel roots. Aesthetics was important but not as important as stability. Being trained under Dr. Dick Riedel at the University of Washington meant that stability was paramount – very similar to the Tweed philosophy. I treated most Class II cases with a headgear and a lot of extractions. We saw most patients on a 4-week schedule. Treatment took an average of 24 to 40 months in 40 to 60 appointments.

By the 1980s my philosophy of treatment had broadened. I was doing more arch development and less extraction. Dentofacial orthopedics was enhanced through fixed Herbst* and other noncompliance appliances. Aesthetics and lip line

were beginning to equal and even surpass stability in importance as we studied the midface and arch form. Developing and enhancing the midface and smile became one of the more fun and challenging parts of orthodontics for me. Final tooth positioning was extremely important and we tried our best to get great finishes. By then we were seeing most patients on a 6-week interval. Full treatment time had dropped to 18 to 30 months in 25 to 50 appointments.

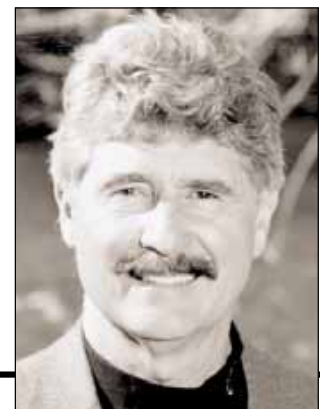
What was happening during the 1980s on the practice management front made clear to me, perhaps for the first time, the synergy between clinical and personal excellence. By 1980, I had a huge staff of 23 and we were seeing up to 110 patients per day. My staff and I were continually stressed and, by the end of most days, so exhausted that we were useless to our families. And we were starting fewer cases per month than we start today.

In the mid 1980s, I transitioned from clinical practice in Reno, Nevada, to full-time practice management consulting. In evaluating hundreds of practices throughout the United States, I saw that my experience with a stressful, loaded schedule was a pattern that was being repeated in offices around the country. With this expanded scope, I could

clearly see the tremendous cost of *clinical inefficiency* on managing an orthodontic practice and, in turn, on clinical and personal excellence. What I found was that clinical efficiency, or the lack thereof, dictates most of our management challenges. The paradox was getting a high-quality finish in a *reasonable* number of appointments.

Obviously, the more appointments it takes to treat each case, the more our workday is jammed. *Loading* is a term I use to characterize this phenomenon. It refers to any unnecessary or unplanned protocol that adds time to an appointment or adds an additional appointment to finish a case. But it's the compounding effect that is so devastating. When you load just a few visits per case, you add thousands of appointments to your schedule each year. And it takes only a few unnecessary *loads* per case to create chaos. Let's do the math. It's not uncommon for me to see doctors today add 6 to 10 unnecessary appointments per case. In a practice with 400 active patients, that equates to 2,400 to 4,000 more appointments that one should not have to deal with. The load alone takes a medium-sized practice and makes it a big practice, not in terms of revenue but in terms of activity – a practice much harder to manage. We all talk about how much emergencies *load* the schedule, but

Dr. Tom Pitts received his undergraduate dental education from the University of the Pacific, School of Dentistry and his orthodontic specialty training from the University of Washington. He served in the Army Dental Corps between 1966 and 1968 and began in private practice in Reno, Nevada, in 1970. Dr. Pitts is the founder of the well-respected Progressive Study Club and did full-time consulting in orthodontic practices around the United States for many years, returning to private practice in 1990. He lectures throughout the United States on clinical and practice management efficacy.



* Herbst is a registered trademark of Dentaureum.

New Model of Economy

the real menace are dozens of little steps that doctors take each day that are never thought of as extra. Oftentimes these additional steps are a result of things we *don't* do early in treatment that cost us a lot of time later. Individually they're just little things that we do; collectively they're a capacity stopper, a growth blocker and a threat to our health and the health of our practices.

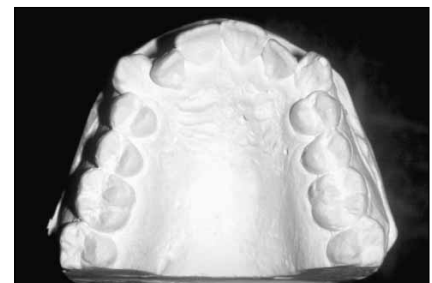
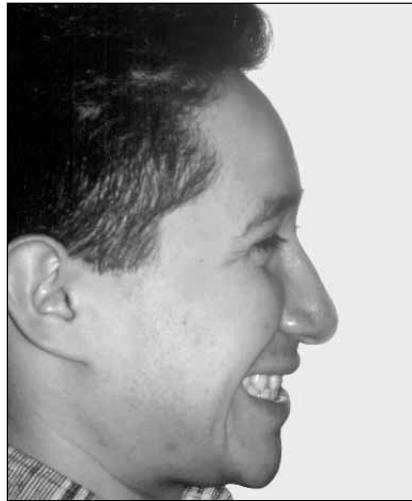
Once the cycle begins, it is exacerbated of its own accord. But if we don't load the schedule, we have more time for patients on each visit to create a better finish. When you are crazily seeing patients in a rushed manner, you often can't do everything you want to do that day, so you appoint them to return in 2 to 3 weeks. This further jams the schedule. The snowball effect has begun. Additional appointments require more staff, more space and result in more stress. They require more practice days and drive our receptionists nuts trying to figure out a schedule that works. Nearly all the practices I analyze are seeing many more patients per day than is *necessary*. Everybody suffers the consequences, including the patient.

We all know that the less time braces are on a patient's teeth, the better the periodontal response, the better the enamel health and the better it is psychologically for the patient. With an appreciable number of unnecessary appointments per case, we get into overtime treatment. If treatment is extended and the patient gets tired, our chance of producing a beautifully finished case diminishes significantly.

By the time I transitioned back into orthodontic practice from consulting in 1990, my philosophy of treatment had broadened even more. This philosophy specifically took into account the negative impact that clinical inefficiency was

continued on following page

Case 1 - Pretreatment Adult male, Class I crowded with narrow posterior arches.



case continued on page 5

having on our ability to achieve high-quality results. Efficiency, then, and even comfort had taken a higher position in the hierarchy of elements that defined quality. Because of them, I felt compelled to start doing my own research about how to increase the percentage of high-quality finishes while decreasing the time and number of appointments, especially since we were now getting the tools to make it a reality. Nickel titanium wires and springs helped decrease treatment time and increase comfort. We had the fixed Herbst therapy from Terry Dischinger (Lake Oswega, Oregon) to address Class IIs. Dwight Damon's (Spokane, Washington) passive self-ligating bracket was now being developed and I could see a phenomenal difference in what that technology could provide, dramatically dropping necessary appointments and overall treatment times while improving the response in the periodontium.

During the five years we have been using the Damon system in our practice, we have systematically identified many protocols that could be combined with others or eliminated altogether to reduce the number of appointments to finish a case and finish with beautiful results. I refer to this process as *unloading*. Through this re-engineering, we have reduced the number of visits per case by 8 to 10, saving thousands of appointments each year. With the Damon appliance, we see only 45 to 55 patients a day with a manageable staff of 9, starting approximately 40 cases each month. We treat nonextraction cases in 6 to 16 months in 6 to 14 appointments. Moreover, I feel that my finished tooth positioning is better than it's ever been. Each month we make treatment more economical in terms of saving appointments. Now, in the first decade of this new millennium, we have the tools and the experience working with these tools to create great finished results

and achieve the highest level of patient care that includes efficiency and comfort. It has allowed me to put into effect our new practice model (Figure 1). It's been such a wonderful experience using the fully programmed Damon SL bracket. I get full initial wire engagement and keep it throughout treatment. This gives me wonderful control to finish accurately and efficiently.

The Damon System: The Foundation for our New Practice Model

The Damon System is the foundation for putting our new model into practice. Dwight Damon and I had long talked about how a passive self-ligating bracket system could be highly instrumental in reducing treatment time and visits while increasing comfort as long as it did not give up any of the benefits of Straight-Wire. In fact, I like the Straight-Wire characteristics in this bracket better than any other Straight-Wire bracket I've ever used. I believe these characteristics are enhanced by the archwire slot closing to form a complete tube on each tooth (Figure 2). As I've observed other practices using the Damon technique, though, I've noticed certain ways that some practices, especially in the early stages of using the Damon system, load time and entire appointments, which we have eliminated. The most common mistakes that load appointments are protocols that are easily changed without changing overall mechanics (Figure 3). In fact, the best news about the Damon system and this new model is that employing it doesn't require any major change in the mechanics – just refinements of technique – refinements that can be used to get great finishes with enhanced patient comfort and in less time than conventional systems. It's some of these refinements of technique that I will share with you in the remainder of this article.

continued on page 6

Our New Practice Model

- Exceptional, Economical Finishing
- Fewer Appointments per Case
- Less Time per Adjustment
- Fewer Appointments per Day
- Greater Patient Comfort
- More Communication with Patient per Visit
- More Energy for Doctor and Staff
- Less Distress
- Happier, More Cooperative Patients
- Less Decalcification
- Better Bone and Tissue Response
- Better Control of Teeth (because wire is always engaged)
- Simplicity of Mechanics
- Better Periodontal Response
- Easy to Market (because patients love it)

Figure 1.



Figure 2. The Damon bracket archwire slot closes to form a complete tube, enhancing its Straight-Wire characteristics.

Most Common Mistakes that Load Appointments

- Starting Treatment Too Early
- Improper Bracket Placement
- Bond Failures
- Not Bonding Each Tooth at the Initial Appointment, Especially Second Molars
- Not Using Differential Torque on Upper Anteriors and Cuspid Brackets
- Starting with an Initial Wire Heavier than .014 Nickel Titanium
- Lack of Cooperation with Finishing Elastics
- Not Using Stainless Steel Wire to Finish
- Inadequate Staff Training on Opening/Closing Damon Brackets

Figure 3.

Case 1 - Midtreatment (continued from page 3)



4 Months into Treatment. The bite buttons on the upper centrals opened the posterior bite slightly. At this point, we repositioned 4 brackets.



10 Months into Treatment. The case is nearing its Class I finish in .019 x .025 Damon stainless steel wires and frontal and lateral finishing elastics.

Posttreatment Having reached a beautiful occlusion in only 7 appointments speaks to the unloading process.



Unloading the Schedule: Appropriate Treatment Timing

It has been my experience that most patients' attitudes about braces take a dip after 12 to 14 months of treatment. This gives us a small window of patient cooperation. If you waste appointment time, you have to work harder to keep enthusiasm and compliance at a high level. Knowing that this window is small, I prefer to start as many full-treatment cases as possible only after the second molars erupt. I do so unless there is an unusual situation such as an impacted tooth that I want to assist. If you feel you must begin treatment early, start with a partial appliance such as an expansion appliance, a lip bumper or nighttime extraoral appliance and charge for it. With an impacted tooth, you can use a partial extension from a palatal arch or a bonded molar (again, charging for it) while you are waiting for the second molars to erupt.

Accurate Bracket Placement & Bonding

If you take only one idea from this article, let it be this: make bonding and precision placement of brackets your number one doctor-time priority. There is no other aspect more critical to a quality finish than the initial placement of brackets. You only get one chance at tooth preparation and bracket placement. I consider it the most important doctor time spent in treatment. Inaccurate positioning is one of the biggest loaders of extra visits – how many depends on the number of errors, but my best guess would be a load of 2 to 10 appointments.

I spend more time in the bonding process today than I ever did, but those extra few minutes per case pay big dividends. We direct bond in our practice because I place some bracket pads underneath the gingival tissue. (Indirect bonding works well for some doctors, but I have not found it to be advantageous in our practice.) Even

if I pumice, recontour, condition and seal the arch myself, I can complete one full arch in fewer than 10 minutes. If I delegate the preliminaries and only place the brackets, it takes me 7 or fewer minutes per arch. If I take those critical 20 minutes to do all the prep work myself, I am assured that each tooth is finely prepared. I realize that I am going against so-called modern convention by performing this protocol myself and in using 4- to 6-handed dentistry, but the results warrant it, and losing bonds during treatment can load 4 to 5 appointments.

As Dwight Damon recommends, I use long cotton rolls rather than cheek retractors in the bonding process for greater patient comfort and to get a better visual field (Figure 4). I have an assistant hold the side opposite where I'm working so that no saliva touches the crown surface and I can get direct access (Figure 5). To ensure accuracy, I also recommend magnifying glasses (Figure 6) and (at the suggestion of Dr. Louis Anderson in Katy, Texas) a large 2-inch front-surface mirror while bonding (Figure 7). This mirror creates a large picture of the occlusal view of each tooth, which helps keep the occlusal part of the pad touching evenly on the labial surface of the incisors as well as making sure that the bracket is placed exactly at the height of contour and/or parallel to the central groove (Figure 8). Perfecting your placement technique is a must.

Pearl. It's a common error to have the mesial/incisal part of the bracket slightly away from the tooth, which will rotate improperly and cost appointments (Figure 9).

Direct Bond All Teeth at Initial

Bonding. Thanks to the encouragement of Dr. Mike Steffen, Edmund, Oklahoma, I bond every tooth at the initial bonding even if I'm not going to engage particular

continued on page 9



Figure 4. Long cotton rolls offer greater patient comfort and better visual field.



Figure 5. Assistant holds side opposite from where I work for better access.



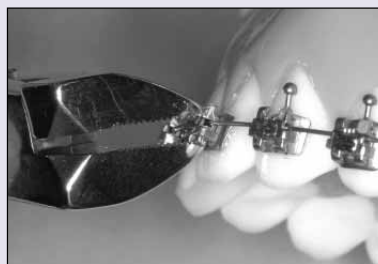
Figure 6. Magnifying glasses ensure greater accuracy when placing brackets.

Staff Member Comments...

The first thing I would recommend when you're just learning to use the Damon brackets is to be sure you can see the bracket clearly. If you understand how its parts fit together, you can tell the difference between the door of the bracket and the bracket itself, which will help you considerably. If your doctor uses magnifying glasses, borrow them when you're learning how to open and close the bracket. You can also use a typodont to practice. Of course, you know that your experience with a typodont will be a little different from what you'll experience when you open and close the bracket in a patient's mouth. After you and other staff members practice with a typodont for a while, the brackets will open and close quite easily. The brackets that will be in a patient's mouth will be a little stiffer to open and close – a good thing considering occlusal forces. Another tip: when you rebond a bracket, be sure that there is no sand left from the microetching that could jam the door. Yes, the Damon bracket is a little more intricate than a regular tie bracket, but you'll soon master it and be happy that you did.

Opening the Damon SL Bracket

The Damon SL brackets open downward. The upper brackets open toward the incisal/occlusal edge; the lower, toward the gingiva. To open, hold the Damon Opening/Closing instrument with the tips of the plier at a slight upward angle (roughly 45°) with a bottom notch of the plier resting on the bottom of the door of the bracket. When the bracket is open, its door covers the bracket housing and the wings. By angling the plier, it catches only the door. If you hold the plier at a 90° angle or straight on, the plier will catch the door and bracket housing and will not budge. Using only a light finger action, pull the door down with the plier. No wrist action is necessary.

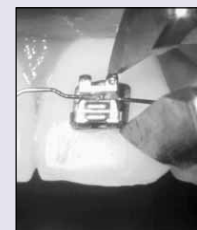


Closing the Damon SL Bracket

To close the Damon SL, do the reverse of opening it. Hold the Damon Opening/Closing instrument with the tips of the plier at a slight downward angle (roughly 45°) with a notch of the plier resting on the top of the door of the bracket. Using only a light finger action, lift the door up with the plier. No wrist action is necessary.



If the door is jammed, move your plier to the outside edge of the door, again tilting the plier downward so you don't catch the wing. Using only a light finger action, lift the door up with the plier. No wrist action is necessary. I also find it advisable to open and close the cuspid brackets at the outside edges of the door. Move back and forth from one side of the door to the other in a teeter-totter action until the slide is completely opened or closed.



Patti York has been in the dental field for 18 years, 2 years as a dental assistant and 16 years as a clinical orthodontic assistant. She also handles all ordering, tracing cephalograms and fabricating Herbst appliances for the practice.

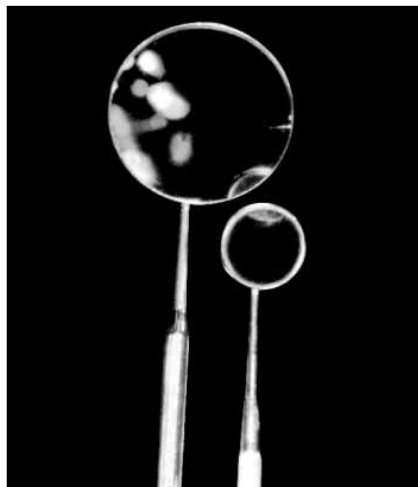


Figure 7. Comparison of large 2-inch mouth mirror versus smaller one.



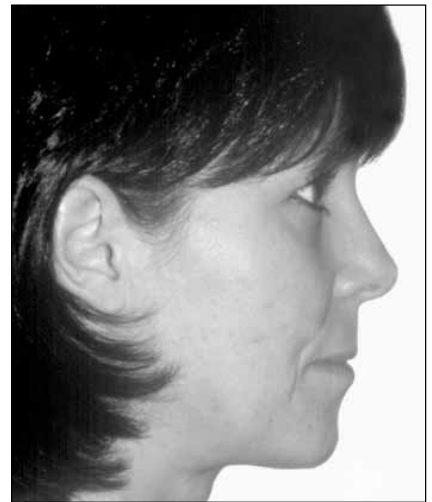
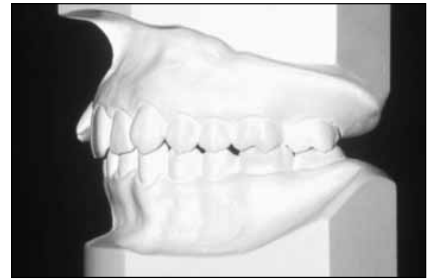
Figure 8. Large 2-inch surface mirror aids precision placement.



Figure 9. A common error is placing the mesial/incisal part of the bracket pad slightly away from the tooth, which will rotate teeth improperly.

Dr. Pitts

Case 2 - Pretreatment Adult female, Class II, division 2, with deep bite.



Midtreatment 11 Months into Treatment. The case was nearly finished at this point, but because I had initially bracketed the case 6 x 6, it took 3 more appointments and 6 more months to finish the case.



Posttreatment



This result took 18 months instead of 11 because I had not bracketed the 2nd molars initially.

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teeth at that time. Pick-up bonding costs valuable appointment time and loads the schedule. (Remember: like things at like times.) Another thing that makes treatment more comfortable for the patient and saves time is direct bonding first and second molars instead of using bands. With no separators to place, no bands to size and cement, no band spaces to account for at debanding and no debanding, we unload 1 to 2 appointments per case.

We don't extend the first wire to the second molar to preclude it from coming out of the second molar tube while the patient is chewing. We go back to the second molar at the next appointment when we get into the .016 x .025 heat-sensitive wire. If we've already bracketed the second molar, we've saved time that next visit. In an extraction case, we end all wires at the first molar until spaces are closed, then pick up the second molar with an .018 x .025 heat-sensitive wire. The bracket is there ready for us when we need it. I've found that by bonding second molars at the initial bonding, we unload at least 3 appointments overall. Case 2 demonstrates the additional time it costs to leave second molars unbracketed until later in treatment.

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Staff Member Comments...

I would encourage staff members whose doctors are considering a change to the Damon system to learn as much as they can about it, to get a real understanding of its benefits and become educated about the mechanics. We staff members, too, get set in our ways. And, heck, change is scary, but you couldn't pay our clinical staff enough money to go back to conventionally tied brackets. And when you can treat patients with less discomfort in shorter times with fewer appointments, why wouldn't you want to offer your patients these advantages? Especially when you experience what we have in not seeing the same number of periodontal problems, nor the same level of decalcification.

When you're first learning to open and close the bracket and they pop off the tooth, you may have a tendency to want to blame the bracket. Patty York already shared her foolproof techniques for opening and closing the Damon bracket. What I suggest is to remember how long it took you to learn to tie brackets. Believe me, learning to use the Damon bracket is easier and quicker,

and when you consider what you and your patient will gain in the long run, it's well worth the effort.

Those of you involved with ordering for the practice and staying within a certain budget may get hung up on the cost of the bracket, but if you step back and look at the bigger picture, factoring in the shorter treatment times and fewer visits, it doesn't take a rocket scientist to see that the "cheaper" bracket is actually more expensive in the long run.

Joni Beedle has 30 years of experience in orthodontics as a clinical assistant and treatment coordinator. She has conducted presentations on practice management and clinical efficiency to staff and doctors in the U.S. and Canada for the past 13 years.



Dr. Pitts

Case 3 - Pretreatment Adult male with a slightly anterior open bite, very narrow upper arch and a crossbite on the right side.



Midtreatment I had bonded 2nd molars from the beginning, used tongue reminders and posterior crossbite elastics for a short time. Repositioned 3 brackets after 4 months of treatment.



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Bonding with a Tight Coronoid

Process. I can generally bond 7 x 7 at one time but we find that sometimes in the upper arch, the coronoid process is tight and the mouth small, so I bond 6 x 6 and then bond the 7s separately with the jaw moved out to the side. The point is, we get all the teeth bonded at the bonding appointment.

Bonding in Deep Bites. For deep bites, using built-up composite bite buttons (usually on the upper anteriors) can unload 2+ appointments because no

pick-up bonding is necessary and leveling occurs more quickly (Figure 10 on page 12). We also use composite bite buttons on asymmetrical cases and in open bites. I attribute my introduction to bite buttons to Dr. Karl Nishimura, Tustin, California.

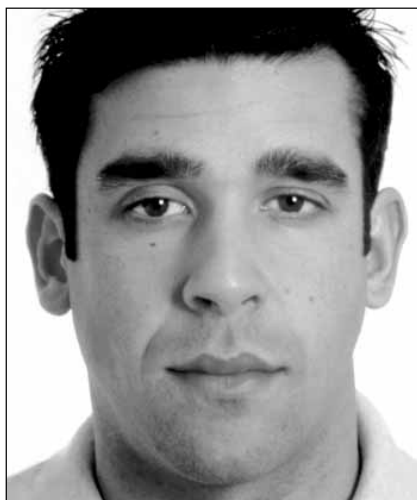
Ensure Bond Strength with Good Products and Techniques

Bond failures cost appointments and can load 2 to 6 appointments per case. It's my contention that many bond failures occur because assistants place brackets

continued on following page

"The most common mistakes that load appointments are protocols that are easily changed without changing overall mechanics."

Posttreatment Finished case in 15 months and 10 appointments.



throughout an entire arch and then wait for the doctor to reposition them before light curing. By that time, ambient light alone has begun to cure the adhesive and repositioning at that point breaks the initial polymerization that can eventually result in failure. Reclaiming the bonding procedure eliminates this problem.

I'm very excited about Ormco's new sealant and bond enhancer, Ortho Solo. Ormco has added all the right ingredients to enhance bond strength, including fluoride release and a proprietary material for quick drying. It also has glass filler that gives it structural properties and added strength. I bond 5 x 5 with Ormco's light-cure adhesive, Enlight, and I'm extremely pleased with its viscosity, strength and ease of clean up. I use a heavier light-cure adhesive (one of 3M's general dental products – P-50 universal paste) on molars. Prior to placing the adhesive on the molars, I lightly paint a multipurpose bonding primer on the pad so the adhesive can be squeezed into the mesh. I feel that this procedure gives greater bond strength to the molars, yet makes it still relatively easy to debond.

“If you take only one idea from this article, let it be this: make bonding and precision placement of brackets your number one doctor-time priority.”

Use Differential Torques to Compensate for Treatment Mechanics

I use differential torques on the upper and lower cuspid brackets, depending on the starting tooth proclination and expected treatment pressures. This keeps the canine root from bumping up against the buccal plate, which will slow treatment and elastics correction. It also looks more aesthetically pleasing to have upright canines and not too much lingual crown torque. If upper cuspids are flared labially, I use -7° torque; if toed-in, $+7^\circ$; if upright, 0° . I use two torques for the lower cuspids for the same reasons: if toed-in, $+7^\circ$; if upright, 0° . I do the same thing with upper centrals and laterals. If proclined, I use $+7^\circ$ torque on centrals

and $+3^\circ$ torque on laterals. If retroclined, I use $+12^\circ$ or $+17^\circ$ torque on centrals and $+8^\circ$ or $+10^\circ$ torque on laterals. For the same reason, I'll use -10° torque on mandibular molars. A number of our treatment mechanics, including finishing elastics, negatively affects torque on the cuspids and upper anteriors. I like to overcompensate by using these different torques at the beginning of treatment, saving many appointments when finishing. I preselect torques when working up the case so that an assistant can pull the proper torques when setting up the bonding tray. I will also add torque to the first stainless steel wire to speed movement and keep molars upright against elastic pressure.



Figure 10. Using composite bite buttons in deep bite saves 2+ appointments.



Figure 11. On a severely malaligned tooth, I place a single-wing bracket, Attract, tie in an .014 SE wire and use an active open-coil spring.

Light Forces for Arch Form, Precludes Dumping, Aids Comfort

When first using the Damon system, many doctors have a strong urge to start cases with larger archwires than is advantageous. They do so because they're used to tying in brackets with more friction. Because of the lack of friction in the Damon bracket, it is extremely important to begin with very light forces. What Dwight Damon and I found is that patients' teeth actually move more quickly with lighter wires (.012 or .014 nickel titanium wire) in the beginning stages, probably as a result of leaving more oxygen in the PDL and not overpowering the musculature of the lips and face. We see early tooth movement with these forces over the first 8 to 10 weeks and less proclination of the lower incisors during the leveling process than with conventional brackets. We also get full bracket engagement on every tooth unless it's an extremely crowded case where there's no room for a full Damon bracket. In such cases, I always bond severely malaligned teeth at the initial bonding using an Attract single-wing bracket. I then partially engage the wire into the bracket using an ultra-light active, open-coil nickel titanium spring (Figure 11). It is my rule never to use an active open-coil spring on a light wire unless the malpositioned tooth is tied into the wire; otherwise it will move the other teeth too far labially. I will then bond a full Damon bracket at the repositioning appointment. See the Damon SL Wire Progression chart (Figure 12) on page 14.

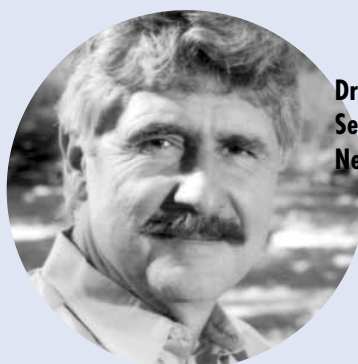
Noncompliance Appliances

I ascribe to Dr. Terry Dischinger's philosophy of getting molars to a Class I occlusion through a fixed Herbst appliance before going into full braces. If using elastics, it's critical to get patients to wear them 24/7. I instruct patients not

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Clinical Impressions Live! Continuing Education Seminar Series

A Conservative Approach To Radical Change



Drs. Tom Pitts & Dwight Damon
Sept. 15, 2000
Newport Beach, CA



Dr. Dwight Damon
November 10, 2000, Washington, D.C.
& April 23, 2001, New Orleans, LA

It used to be that, by definition, good orthodontics meant a lot of tweaking and a successful practice meant managing a large staff and seeing 100-120 patients a day.

What's so exciting about the Damon system is the opportunity it offers to establish a new model by which we define success – high-quality results with improved patient comfort in fewer appointments and shorter overall treatment times than with conventional brackets. And while it requires only minimal adjustment to traditional treatment mechanics, its advantages are many. First, there's the convenience of self-ligation that makes it a hit with staff – no more tedious tie-ins. Archwire changes take only minutes. Second, there's the use of light-force wires in a virtually friction-free system that Dr. Damon feels

allows low-force wires to operate at peak expression, thereby stimulating more biologically compatible tooth movement and promoting greater efficiency and comfort. Third, doctors around the country who use this bracket all say the same thing – that it has reshaped their referral base from dentists to patients, an enviable position to be in.

If Dr. Pitts' discussion of the Damon system has piqued your interest to learn more about it, register now for one of the three limited-attendance seminars. In these seminars you'll have the opportunity to discuss face-to-face what the Damon self-ligation system can mean to your practice. For course details and to register online, go to www.ormco.com/seminars or you may contact Meredith Brick at (800) 854-1741, Ext. 7573. 7 CEUs.

Damon SL Wire Progression

EXTRACTION

Archwire Change	MAXILLARY		MANDIBULAR	
	Size	Type	Size	Type
1	.014	Align SE	.014	Align SE
2	.016 x .025	Align SE	.016 x .025	Align SE
3	.019 x .025	Damon SS	.018/.019 x .025	Damon SS

NONEXTRACTION

Archwire Change	MAXILLARY		MANDIBULAR	
	Size	Type	Size	Type
1	.014	Align SE	.014	Align SE
2	.016 x .025	Align SE	.016 x .025	Align SE
3	.018 x .025	Align SE	.019 x .025	Align SE
4	.019 x .025	Damon SS	.018/.019 x .025	Damon SS

Figure 12.



Figure 13. Fixed springs work well when patients are lax in elastics wear.

to remove their elastics even to eat, telling them that if they don't eat with their elastics in place, it will cost them at least six months in extended treatment. If you've unloaded the schedule, you'll have additional motivational time with each patient to work toward that elastic-wear commitment.

In the final elastics stage, we turn ownership of the remaining treatment time to patients and tell them, "Johnny, the time you have remaining in braces is now up to you. Every hour that you don't wear your elastics can prolong your treatment indefinitely, so you now control how much longer you'll be in braces." Since we measure overjet each appointment, we can demonstrate to the patient their lack of compliance. If I see evidence that the patient has not been wearing the elastics, I place fixed springs (Figure 13) or a Bite Fixer as early as

the first return appointment after we've placed the elastics.

Conclusion

Our new model has given us more choices in how we manage the practice. If we want to grow the practice, we can use the time we've gained through unloading to start more patients with the existing staff and doctor time. We can choose to work fewer days and see fewer patients each day. The point is that the choice is ours.

As word gets around, more and more adults are seeking treatment to touch up malpositioned teeth and create a beautiful smile with our arch form. They are more willing than ever to go into treatment because we can get good results so quickly. We, of course, can't expedite every case the way we'd like to, but we are making giant strides in this process. Extraction cases in our practice take an average of 3 more visits than nonextraction cases. Herbst therapy takes an additional 4 appointments. Difficult impacted teeth seem to take an additional 8 visits on average. Knowing this helps us charge fees accordingly.

I take my hat off to Dr. Dwight Damon for his innovation of the Damon appliance. Quality comes first; economy second. In order to be economical, we must focus on the number of appointments to treat each case and keep tracking appointments. We must go into each treatment by beginning with the end in mind. We must visualize the beautiful finish and plan accordingly. We can't piddle around.

Also, we will not take the braces off until we've got the best finish we can get for that particular case. My hope for our profession is that case finishing is done more quickly and gets better and that practitioners can lessen the chaos, stress and confusion in their everyday lives.

Curing Lights: An Overview

by Joe H. Mayes, DDS, MSD
Lubbock, Texas

When laser technology was first developed for the dental field, I was impressed by the claims of how fast it would cure light-cured adhesives.

Despite the cost, my payback analysis (given the time-savings) warranted my buying several lights, and I urgedOrmco to consider exploring the possibility of distributing a laser light product. Since I was fairly certain of the advantage of laser technology over plasma arc technology (PAC) and conventional lights, I volunteered to test three types of lights in my practice and report my findings and recommendations. The units I tested were the LaserMed Accucure 3000,[®] the Apollo 95E[®] PAC light from DMD and the Demetron Optilux 501 prototype curing light with the special 80 watt tungsten/quartz/ halogen OptiBulb. Interestingly, after placing hundreds of brackets using each of the three types of lights in direct and indirect bonding, I can fully endorse the Demetron Optilux 501 conventional curing light. Compared with the other

Curing Light Comparison

	PAC	Laser	Optilux 501
Noise	Yes	Yes	Some
Heat	Yes	Some	None
Portability	Low	Low	High
Hand Controls	Extra \$	Extra \$	Yes
Refractory Period	Yes	No	No
Ramp Mode for Indirect	Ineffective	No	Yes
Aesthetic Curing (in seconds)	3	3	5
Metal Curing (in seconds)	5	5	8
Direct Bonding	Excellent	Excellent	Excellent
Indirect Bonding	Fair	Excellent	Excellent
Cost	\$3,500 U.S. (and up)	\$6,000 U.S. (and up)	\$1,500 U.S. (and less)

Figure 1.

options, it is reasonably priced, compatible with all light-cured adhesives, easy to manipulate, highly portable and exhibits nearly comparable curing times. See Figure 1 for my comparative analysis.

Features of Plasma Arc (PAC) Lights

The United States National Aeronautics and Space Association (NASA) developed the original plasma arc technology. This light source is fairly new to orthodontics. Two electrodes with a large voltage potential ionize a gas (xenon plasma) that emits light (Figure 2). The plasma arc bulb

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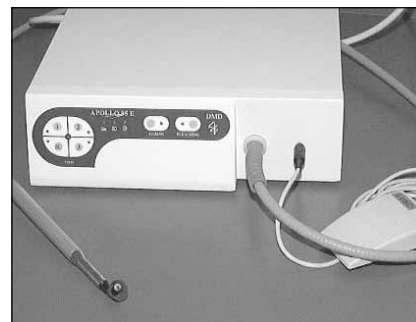


Figure 2. The Apollo 95E plasma arc curing light from DMD proves to be good for direct bonding but ineffective for indirect. Its cost is also high, beginning at \$3,500 U.S.

Dr. Joe H. Mayes, a native of Crane, Texas, received his B.S. from Texas Tech University, followed by his D.D.S., M.S.D. and certificate in orthodontics from Baylor College of Dentistry. Dr. Mayes is engaged in the private practice of orthodontics in Lubbock, Texas, and has been actively involved in new product development.

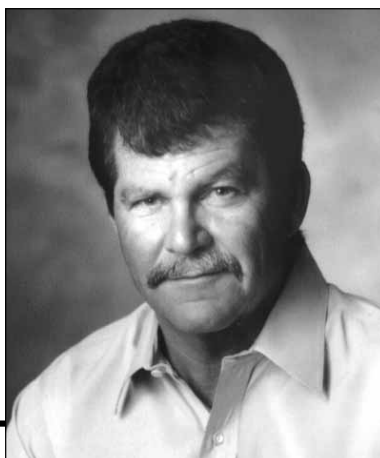




Figure 3. The LaserMed laser curing light proves to be good for both direct and indirect bonding, but the price starts at a hefty \$6,000 U.S.

generates considerable heat and therefore requires a large fan to cool it during and after each burst of light. This fan is, in part, responsible for the noise and the cumbersome size of the unit. While the fan cools, there is a delay (refractory period) before you are able to activate the light again, making the PAC light ill-suited for indirect bonding where speed in moving from bracket to bracket is paramount to efficiency.

The PAC light produces a high-intensity, limited spectrum light that is filtered to blue light in the range of 460-490 nanometers. While some PAC lights offer a step-cure mode, the starting milliwattage (mW) is too high at the initial burst of light (400+ mW), canceling the advantages of using a step-curing cycle. Most PAC lights use foot pedals

to operate, although hand controls are now available for many units at an additional cost. The hand controls require you to press a button with your index finger as you point the pen tip from the incisal/occlusal edge to initiate the cure. The pen is not as easy to operate as the gun design of conventional curing lights, but more importantly, it is difficult to sterilize. You can wipe it down with a glutaraldehyde solution, but it cannot be autoclaved and there are no protective sleeves designed to fit it. Covering it with standard protective products reduces its output. PAC lights can burn soft tissue if the tissue is left exposed to it for standard curing times recommended by adhesive manufacturers, so caution must be exhibited.

I have found that the curing time for PAC lights is 5 seconds under metal brackets and 3 seconds under clear brackets. The cost of PAC lights starts at \$3,500 U.S.

“The OptiBulb was specifically designed for curing and, unlike other halogen bulbs... will not degrade with time.”

Features of Laser Light

Argon ion lasers (light amplification by stimulated emission of radiation) emit a monochromatic coherent light in wave lengths that cover that blue light region of the visible light spectrum (457-502 nanometers) (Figure 3). Like PAC lights, laser lights require a large fan to cool their bulbs and are therefore noisy, cumber-

some and less portable than conventional curing lights, but there is no refractory time, making lasers an excellent choice for indirect bonding of multiple brackets in quick succession. In 10-second bursts, they have been shown to decrease the solubility of enamel in acid while at the same time increasing fluoride uptake. The mechanism is not clearly understood, but it could help reduce or eliminate decalcification.

Bond Failure Comparison A 6-Month Trial

Number of Bond Failures

	Direct	Indirect
PAC	1	4
Laser	0	2
501	1	2

In the study I conducted on bond failures, I used each of the lights for 20 cases of indirect bonding and 20 cases of direct bonding (400 brackets per light). The three types of lights compare favorably with one another in terms of bond failures.

Lasers emit a highly collimated beam of photons that can travel long distances without dispersing, so most lasers feature a dispersive tip to diffuse the light. The tip of the laser that comes in close contact with the bracket and self-cured adhesive is the size of a thin pen and cures by placing the pen at the incisal edge of a tooth in direct bonding. The pen and its micro-fiber tip suffer from the same sterilization problems as the PAC light, although there is a small plastic sterilizable extension available for an additional price (Figure 4). In addition, most laser curing units are activated by a foot pedal that, while effective, seems less intuitive to operate than the familiar gun design of conventional lights. Another disadvantage is that dental assistants may not be allowed to operate a laser in some states.

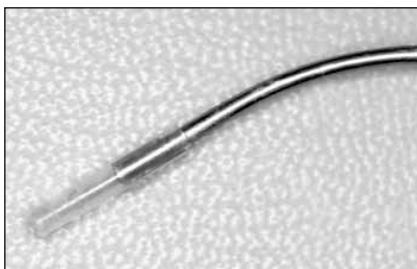


Figure 4. The LaserMed laser light is available with a sterilizable plastic extension for an additional price.

I have found that the curing time for laser lights is 5 seconds under metal brackets and 3 seconds under clear brackets. The cost of laser units starts at \$6,000 U.S.

Features of the Demetron Optilux 501 Light

The Demetron Optilux 501 curing light with its 8 mm Turbo+ light guide (Figure 5) is a conventional curing light equipped with a special curing bulb. The OptiBulb was specifically designed for curing and, unlike other quartz/halogen bulbs such as you'll find in standard 35 mm slide projectors, will not degrade with time. It is also optically focused by the light guide, providing uniformity of cure throughout the entire diameter of the tip. It emits a full-spectrum light that is filtered to a blue light with a range of 400 to 505 nanometers. This specially designed filter prevents excess heat buildup so that the unit can run continuously. Its intensity at specific wavelengths is increased for maximum absorption of the photo initiator in most light-cured adhesives, which is the reason Ormco can guarantee it to work with all light-cured adhesives on the market. Its fan is quiet and the unit quite portable – no larger than its predecessor design (the Optilux 500), which fits easily at each chair. Its distinctive gun design makes it easy to use. It cures under metal brackets in 8 seconds and under clear brackets

in 5 seconds. Its cost is approximately \$1,500 U.S. – 40% of the cost of PAC lights and 25% of the cost of laser lights.

Boost Mode for Direct Bonding and Rebonding

The Optilux 501 offers a number of output modes, including Boost and Ramp. The Boost (B) mode outputs filtered light in excess of 1,000 mW/cm² in 10-second cycles. This mode is ideal for both direct and indirect bonding and for rebonding loose brackets. I treat loose brackets much like indirect bonding. We lightly microetch the bracket, treat it with Reliance Plastic Conditioner®, and rebond it to the tooth using the same adhesive as in the initial bonding. We would, of course, have first acid-etched the tooth and used a sealant. Ormco's Ortho Solo™ is an excellent combined product, consisting of a filled sealant and bond enhancer. When indirect bonding, I do not cure the sealant before the tray is placed. In direct bonding, I cure the sealant before placing the bracket.

Ramp Mode for Indirect Bonding in the Lab

One of the chief advantages of the 501 is the Ramp (R) cure mode that ramps exponentially from 100 mW/cm² to 1,000 mW/cm² in the first 10 seconds and remains over 1,000 mW/cm² for the last 10 seconds. The lower output reduces the number of and rate at which free radicals form (which initiates the polymerization), and thus slows the initial reaction rate. This allows the composite to flow for a longer

time to accommodate the 2-5% volumetric polymerization shrinkage in the paste as it reaches the gel (hardened) state.

The ramp mode is therefore ideal for curing custom bases while doing indirect bonding in the lab, helping to reduce the microfractures that occur as the cure progresses.

Conclusion

The Demetron Optilux 501 curing light addresses virtually all the problems associated with the more expensive PAC and laser curing lights. Unlike those lights, it has the mode for any curing assignment: traditional, ramp, boost or bleach. There is no need to change technique, it cures all adhesives and the curing times are comparable. Given its price versus other curing lights, I consider it an excellent value.

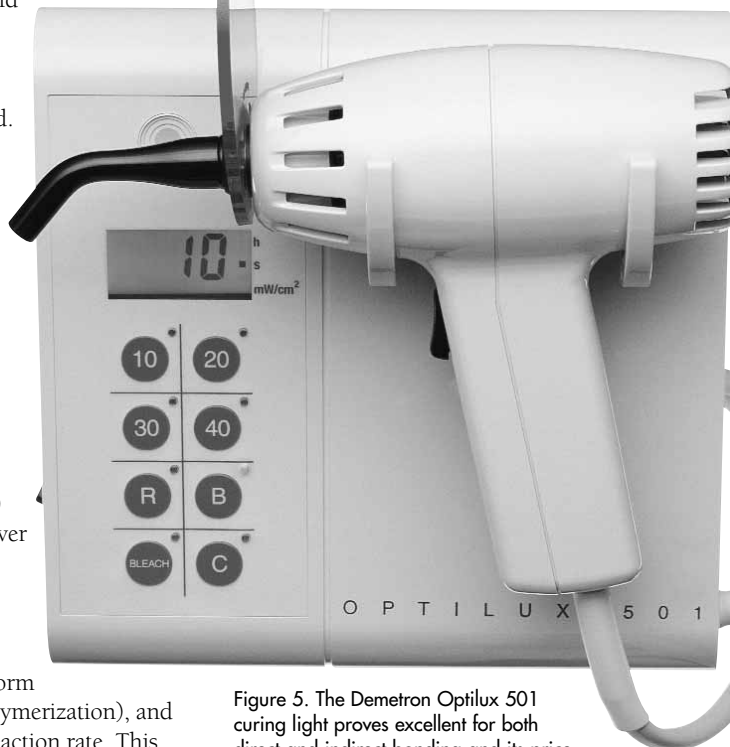


Figure 5. The Demetron Optilux 501 curing light proves excellent for both direct and indirect bonding and its price is a reasonable \$1,500 U.S. or lower.

Hyperefficient Orthodontic Treatment

by James J. Hilgers, DDS, MS, Mission Viejo, California
and Stephen G. Tracey, DDS, MS, Upland, California

The term *hyperefficient orthodontic treatment* describes a broad spectrum of technology and treatment advances that result in a highly proficient, predictable and noncompliance approach to the correction of Class II malocclusions. It relies heavily on traditional Bioprogressive principles.

When developing the Bioprogressive approach to orthodontic mechanotherapy, Dr. Robert Ricketts proposed a technique that embraces continual change and evolution. To foster understanding of this approach, Ricketts wisely proffered a set of principles to guide clinicians in treatment decisions. He did this in preference to publishing a treatment cookbook, which connotes an unacceptably rigid approach to therapy.¹ These principles are as profound and applicable today as when first advocated. The combined words *bio* and *progressive* embody his original intent – that this approach not only adhere to biological principles but also be progressive and open to scientific betterment. The maxim “*techniques change; principles remain constant*” is an apt description of the vision Ricketts first endorsed for his flexible approach to orthodontic therapy. The purpose of this article is to demonstrate how the Principles of Bioprogressive Treatment (Figure 1) are called into play in today's hyperefficient orthodontic treatment. These principles are demonstrated in two cases. See Case 1 on page 22 and Case 2 on page 24.

Principle: Any tooth can be moved in any direction with the proper application of force.

Many orthodontic disciplines focus more on what orthodontists cannot or should not do rather than on what is possible. A case in point is the strong admonition

against attempting to distalize molars. The Pendulum appliance has proven to be successful in distalizing molars in Class II malocclusion when case selection is appropriate.² In most Class II malocclusions there is also arch form incongruity between the upper and lower arches, necessitating expansion of the upper arch, ideally occurring prior to the Class II correction.³ This is true for both nonextraction and extraction Class II cases. The Pendulum appliances focus on this need for creating arch form symmetry by distalizing the molars and expanding the arch with one appliance. The latest iteration in this family of appliances is the Ph.D. appliance, a Pendulum Hyrax distalizer, that has been used to expand the upper arch and effect rapid distal movement of the upper molars, using the upper dentition for anchorage.

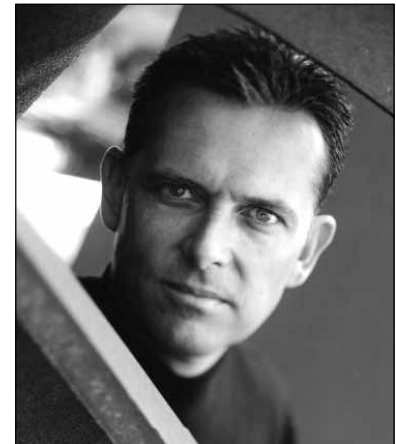
Principles of Bioprogressive Treatment

- Any tooth can be moved in any direction with the proper application of force.
- Use new technology within the bounds of time and based on proven scientific principles to further simplify and improve Bioprogressive therapy.
- Use segmental mechanics where indicated to sequentially unlock the malocclusion.
- Unlock the malocclusion in sequences that aid rather than inhibit treatment.
- Apply differential torque control throughout treatment.
- Treat overbite before treating overjet.
- Employ overcorrection in both mechanics and appliance design.

Figure 1.



Dr. Jim Hilgers focuses on ideas that can be used in any practice, regardless of size or therapeutic bias. He 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. He received his D.D.S. from Loyola and his M.S.D. and certificate 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.



Dr. Steve Tracey combines innovative yet prudent orthodontic mechanics with a belief in the limitlessness of our potential to create success. He has a practice in Upland, California, and serves as assistant professor at Loma Linda, where he earned his D.D.S. and M.S. in orthodontics and was named instructor of the year in 1995. He has published several articles and lectured in 13 countries – all while competing in the Ironman Triathlon, climbing Mt. Rainier and trekking in the Amazon.

Employing Bioprogressive Principles



Figure 2. Ph.D. immediately after cementation with .027 TMA Pendulum Springs preactivated to the palatal midline. Upper arch is fully bonded at placement.



Figure 3. Accent tubes on both molars. Even an .0175 x .0175 TMA archwire can be extended to the second molar due to wire flexibility and large tube entries.

The Ph.D. (Figure 2) is a hybrid appliance that uses an occlusally bonded Hyrax expander and .027 TMA® Pendulum Springs™ with full bracketing of the upper arch. Lingual sheaths are welded on the palatal side of a Leone Hyrax expander to attach the Pendulum Springs. The springs are activated to the midline before cementing and placed into lingual sheaths on the molars to deliver approximately 175 grams of distal pressure. The upper arch is stabilized with sectional archwires that extend from the second bicuspid to the midline, allowing the maxilla to unlock. The Hyrax jack-screw is activated slowly (1 activation per day) until adequate arch width is achieved. The amount of expansion needed can be reevaluated

and adjusted as the upper molars move distally. Although there is some forward movement of the upper arch during the molar distalizing process, that movement is negligible and is a good tradeoff for easier hygiene maintenance and the rapidity of molar distalization. It is also easily offset by the use of Class II elastics during the retraction process.

Principle: Use new technology within the bounds of time and based on proven scientific principles to further simplify and improve Bioprogressive therapy.

Ongoing evaluation of the latest preadjusted bracket and terminal tube designs is fundamental to Bioprogressive principles. Researchers continue to improve and simplify bracket prescriptions. One thing has become abundantly clear: the specific bracket prescription a clinician chooses has as much to do with the philosophy behind the mechanics used as with the analysis of static (untreated) ideal occlusions.⁴ The types and sizes of archwires used, how the malocclusion is corrected and the importance of overcorrection all play into the formula. A bracket prescription that is right for one clinician may be totally inappropriate for another.

The Bios® prescription, developed by Hilgers et al.,⁵ is the light-wire version of Orthos™* and is the result of the application of computer-assisted engineering (CAE) technology⁶ to a light-wire, high-torque technique. It represents the outcome of a total reevaluation of old assumptions about what constitutes biologically advantageous tooth movement. It reconciles the need for early torque control with the use of light-force wires that are more comfortable for the patient and elicit healthy and efficient periodontal response. With appropriate torque control throughout treatment and less dependence on full-size wires, we can rely more on function and less on dominance

mechanics to effect high-quality results. When more torque is required, it is available in the bracket system; when less torque is needed, use of smaller dimension archwires allow more play between the walls of the bracket slots and the archwires.

Terminal tubes, important to a fully coordinated bracket system, have had a tendency to be complex, oversized and cumbersome. With the advent of Accent® first and second molar tubes, these issues have been resolved.⁷ Accent buccal tubes are as small as casting technology allows and funneled (six times normal wire entry size) for easy wire placement (Figure 3). These small, nonconvertible tubes integrate placement of buccal-segment brackets (and bands, if used) with second molars. In combination with super-flexible wire alloys (e.g., Ni-Ti®, Copper Ni-Ti®), these tubes permit early engagement of all the teeth, including second molars, regardless of the extent of malalignment (Figure 4). Nonconvertibility eliminates premature cap conversion, the need to tie in the lower first molars with steel ligatures, and the vertical tie-wings that a convertible tube automatically implies.

It is contrarian to suggest that nonconvertible tubes be used on first molars, but they do have certain advantages. They do not attract as much plaque, rarely cause occlusal interference and, being funneled, are easy to use in conjunction with resilient archwires. For the practitioner who prefers to use double archwires, Accent's auxiliary (gingival) tube has also been greatly reduced in size. It has no torque or rotation (which can be set by the clinician in the archwire) and is shorter than the main archwire slot. The overslung mesial portion of the tube thereby protects the auxiliary archwire from being deformed by the forces of occlusion.

continued on following page

* Orthos is distributed in Europe as Ortho-CIS.

Drs. Hilgers & Tracey

continued from preceding page



Figure 4. Each generation of cast molar tubes increased functionality without increasing size. Bioprogressive designs (1997 left, 1985 center) and Accent (1994 right).



Figure 5. Note the vertical deflection of an .017 x .017 35°C Copper Ni-Ti wire in a high cuspid.



Figure 6. After 6 weeks, the cuspid has been erupted considerably, even with an edgewise wire.

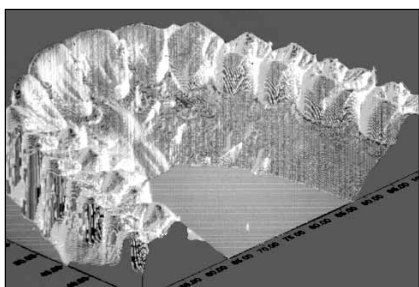


Figure 7. Computerized scan of upper arch used to digitize the Orthos arch form that coordinates anatomically based arch shape with Bios brackets and tube geometry.

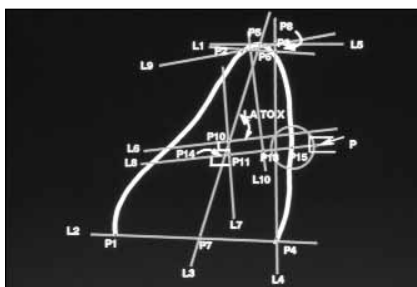


Figure 8. A schematic analysis of the positioning logic used for each tooth in developing the Bios bracket system and arch-form shapes.

Principle: Use segmental mechanics where indicated to sequentially unlock the malocclusion.

After using the Ph.D. appliance to distalize the molars into a slightly overcorrected Class I occlusion, an .016 x .016 upper utility archwire used in conjunction with Class II elastics can provide the segmental mechanics to sequentially unlock the malocclusion. This archwire serves several purposes: (1) The step-up in its arms holds the distalized molar position, using the anterior segment for anchorage. (2) It frees the upper buccal segments to be retracted to the distalized upper molars. (3) It offers a catch-point for Class II elastics that translate force back to the upper molars through the buccal arm on the utility archwire. This protocol is fundamental segmental mechanics: the upper incisors, upper buccal segments and upper molars are all being moved or stabilized as separate components.

Principle: Unlock the malocclusion in sequences that aid rather than inhibit treatment.

The first step in the sequence of protocols to unlock the malocclusion is employing the Ph.D. appliance to distalize the molars. To close the resulting space, elastomeric chain (rather than an archwire) is used to free-float the upper buccal teeth back to the distalized molars. Light forces will retract these teeth up to 7 mm with adequate control and without excessive tipping, rotation or unduly straining the anchorage. Free-floating avoids archwire friction, saves anchorage, provides rapid movement of the teeth and places posterior teeth in a Class I relationship early in treatment. Class II elastics worn to a "Z" bend in the upper utility archwire provide the needed anchorage. The alignment process in the upper arch actually begins when the upper buccal segments are in a solid Class I occlusion.

Principle: Apply differential torque control throughout treatment.

Superelastic archwires have changed the face of modern orthodontics, offering tools to deliver differential torque control as needed. Traditional orthodontic doctrine dictates beginning with round wires and finishing with edgewise wires. In certain cases, round wire leveling of the lower arch often results in a forward tipping of the lower incisors and arch expansion by lifting lower lingual cusps upward and outward. This practice has been replaced by using square or rectangular archwires that achieve torque control and yet are so flexible and have memory so constant that they can almost always be engaged at the outset of treatment, regardless of bracket placement irregularity. The archwire that typifies these characteristics is Copper Ni-Ti.⁸ The ones most commonly used at the beginning of treatment are either .017 x .017 35°C Copper Ni-Ti or .016 x .022 35°C Copper Ni-Ti (Figures 5-6). Since these archwires are activated by heat (by body temperature @35°C) and rendered flexible by being chilled before placement, individual problem areas of engagement can be resolved by chilling the wire locally with Endo-Ice®. The net result: stability of the lower arch by virtue of immediate torque control and leveling with forces that are gentle, yet effective. Use of these wires reduces the need for a utility archwire in many cases and results in longer appointment intervals, more simplicity in treatment and fewer emergencies.

Another critical component of this system is its coordinated archwires in the Orthos arch form that integrate with the bracket system, encouraging better results. Prior to the development of this arch form, most commercially available archwires were based on various clinicians' *arbitrary concepts* of the ideal arch form. Due to the influence of the brackets, the shape of the

dental arch that results from treatment with these arch forms often differs from the archwire shape that produced it. What needed to be done was to begin with an anatomically derived dental arch form and reverse engineer the brackets and archwires to produce the desired dental shape. The engineers of Orthos did just that. The Orthos arch form is unique in having been derived from skeletal and anatomical norms (Figures 7-8). Its form is constructed via CAE software (Figure 9) from those norms factoring in the geometry of the Bios brackets and terminal tubes.⁹ The result creates a harmony between anatomy, function, appliance design and arch form that was heretofore unachievable (Figures 10-11).

Principle: Treat overbite before treating overjet.

The space created by distalizing the upper molars and retracting (free-floating) the buccal segments is mesial to the upper cuspids. Upper incisors cannot typically be retracted to an ideal overbite/overjet relationship without further bite opening, especially if the lower arch is already level. A single archwire – the preformed .016 x .022 TMA asymmetrical reverse curve “T” Loop¹⁰ – allows retraction, torque control and intrusion of the upper incisors. If the upper incisors are retracted without this bite opening, there is either (1) trauma to the lower incisors, (2) forward movement of the upper buccal segments or (3) an inability to entirely close the space between the cuspid and lateral incisors. The TMA “T” Loop creates a step-up between the cuspids and laterals by opening the distal (longer) portion of the loop and closing its mesial (shorter) extension. This step-up can be from 0 to 5 mm, depending on individual need. In addition, accentuated curve of Spee built into the archwire aids in the bite-opening process and vertically seats the buccal segments.

continued on page 27



Figure 9. Computer-generated Orthos archwire production. Consistent use of the same ideal arch form throughout treatment aids in early arch-form integrity.

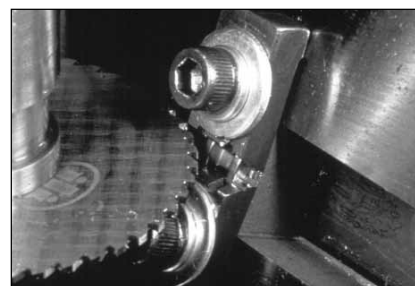


Figure 10. Individually cut bracket slot in each Bios bracket produces exacting tolerances and builds rotation in slot where indicated, reducing height and bringing the archwire closer to the central contacts of the arch.

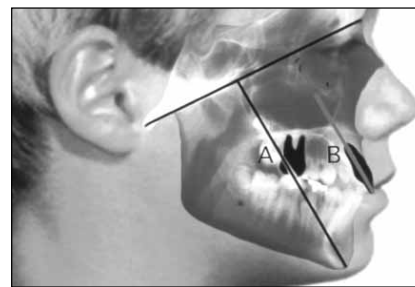
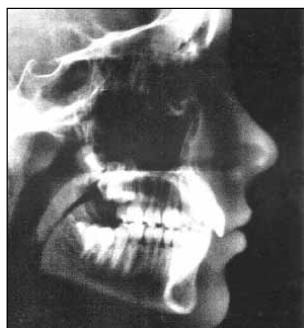
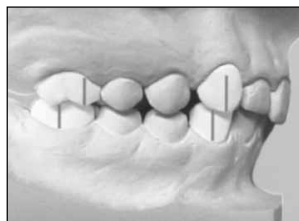


Figure 11. Individual torque is determined by facial type. To coordinate with growth, the long axis of the upper incisor should be parallel to the growth axis of the face. For example, brachy-facial types would have a more acute interincisal angle and dolichofacial types would have a more obtuse interincisal angle. The individual growth pattern is taken into account when determining active or passive torque.

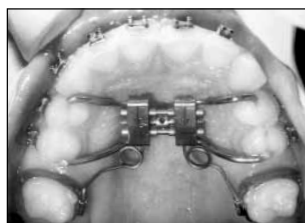
Drs. Hilgers & Tracey



Case 1 - Pretreatment Treatment Based on Biopressive Principles. Eleven-year-old female patient brachyfacial-type exhibits a mild Class II deep bite with no crowding.



Midtreatment Segmental Mechanics to Unlock Malocclusion Sequentially.



After 3 months of molar distalization with Ph.D. appliance.



Immediately following Ph.D. removal and placement of upper utility archwire to stabilize molars.



Upper utility wire being used for anchorage while free-floating buccal segments with elastomeric chain closes space resulting from molar distalization.



At placement of asymmetrical reverse curve "T" Loop closing wire to close space mesial to upper cuspids, which resulted from retracting buccal segment.



After closing with TMA asymmetrical reverse curve "T" Loop archwire for 6 weeks.



Upper arch with .016 x .022 Force 9® archwire. Lower arch with .016 x .022 TMA ideal archwire. Note step-ups maintained.



Upper arch with .016 round flexion archwire. Lower arch .016 x .022 TMA ideal archwire.

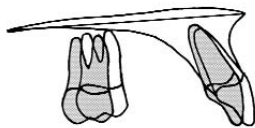
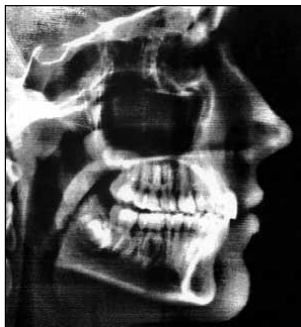


Posttreatment

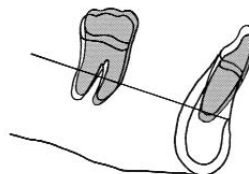


Upper arch with flattened, dead-soft .016 x .022 Bond-a-Braid™ (Reliance Orthodontics) 2-2 permanent retainer.

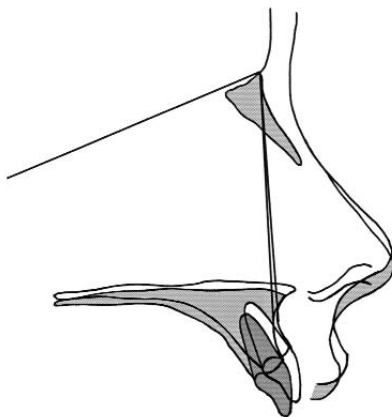
Lower arch .027 TMA® 3-3 retainer.



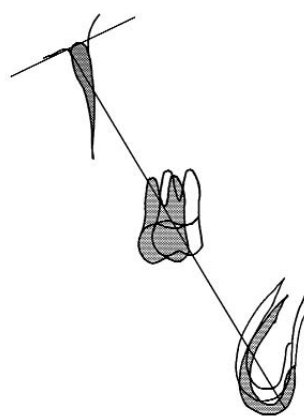
Superimposition showing maxillary dental change: superimposed at ANSPNS at incisive canal.



Superimposition showing mandibular dental change: corpus axis at pogonion.

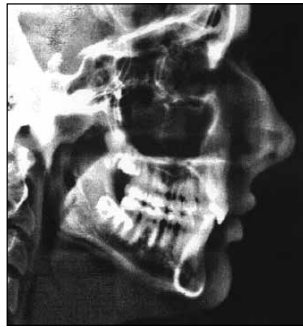


Superimposition showing maxilla (orthopedic) change: Ba-Na line at nasion.

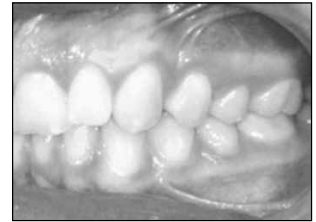
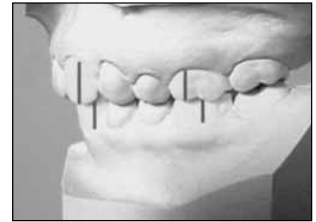


Superimposition showing mandible (orthopedic) change: Ba-Na at crossing of facial axis.

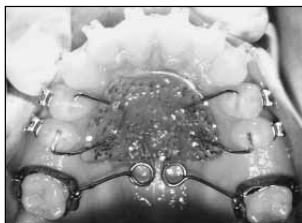
Drs. Hilgers & Tracey



Case 2 - Pretreatment Treatment Based on Bioprogressive Principles. Fifteen-year-old female patient with brachyfacial-type face exhibits a mild Class II, division 2, deep bite with mild crowding.



Midtreatment Segmental Mechanics to Unlock Malocclusion Sequentially.



After 3 months of molar distalization with the Pendulum appliance.



Molar position after distalization.



Upper utility archwire being used for anchorage while retracting (free-floating) buccal segments with Class II elastics to close space resulting from molar distalization.



Using .016 x .022 Ni-Ti archwire to level and align upper arch after retracting (free-floating) buccal segments. Using .016 x .022 TMA ideal archwire in lower arch.



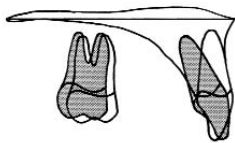
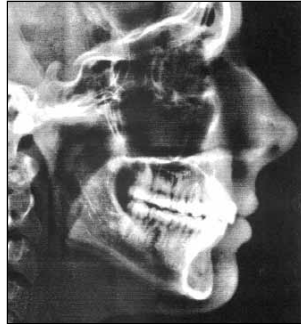
At placement of .016 x .022 TMA asymmetrical reverse curve "T" Loop closing archwire to close space mesial to upper cuspids, which resulted from retracting (free-floating) buccal segment.



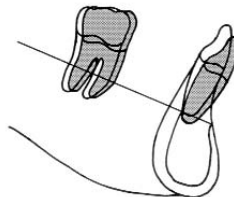
Using .0175 x .0175 TMA ideal archwire in upper arch and .016 x .022 TMA lower ideal archwires with detailing bends.



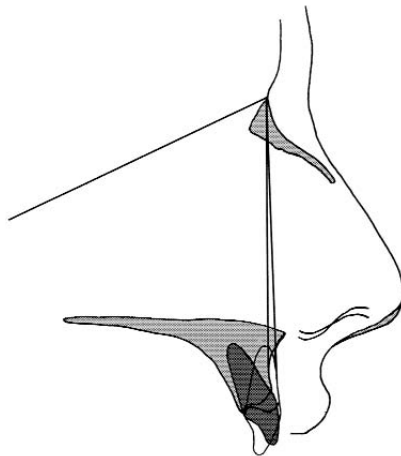
Posttreatment



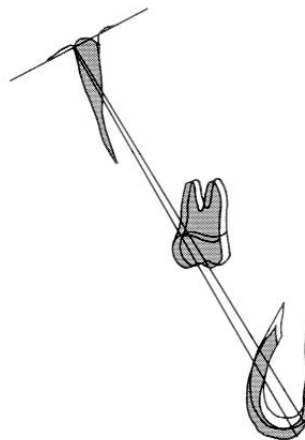
Superimposition showing maxillary dental change: ANSPNS at incisive canal.



Superimposition showing mandibular dental change: corpus axis at pogonion.



Superimposition showing maxilla (orthopedic) change: Ba-Na at crossing of facial axis.



Superimposition showing mandible (orthopedic) change: Ba-Na at crossing of facial axis.

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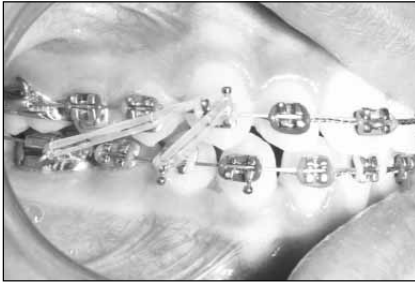


Figure 12. Class II vertical elastics foster continued Class II correction while aiding seating final occlusion. Vertical component of the elastics holds teeth in occlusion, assisting in functional settling.

"Ricketts' basic philosophy for treatment, described as his "Principles of Bioprogressive Therapy," creates a solid foundation upon which clinicians of this and future eras can continue to grow and change."

Principle: Employ overcorrection in both mechanics and appliance design.

Techniques that use the natural occlusal forces of the teeth without overriding function have definite merit. Most cases finish a little more easily when the patient's individual muscular pattern is harnessed, augmented and utilized to seat and detail the occlusion. The principle of torque control throughout treatment proposes that in most cases it is beneficial to have a torque control wire (square or rectangular) engaged during most of treatment. Flexible rectangular or round wires have a distinct advantage in finishing, however. They allow the teeth to settle vertically while maintaining arch form and other first-order adjustments. This protocol is contrary to the traditional orthodontic doctrine that dictates beginning with round wires and finishing with edgewise wires. Functional finishing would propose just the opposite in many cases; that is, begin with edgewise, finish with round or flexible archwires. It is beneficial to maintain strict torque control in one arch (usually the lower), somewhat freeing the opposite arch (usually the upper) to seat against it. This concept implies an ideal archwire (usually an .016 x .022 TMA) in the stabilizing arch and a yielding archwire (usually an .016 x .022 Force 9, an .016 x .022 Titanium Niobium FA [finishing archwire] or a light, bendable round wire) in the opposing (or moving) arch.¹¹ Functional finishing slowly and consciously turns over control of the occlusion to the muscular pattern, enhancing on it with vertical seating elastics and accommodating the overcorrection needed to finish most cases (Figure 12).

Conclusion

Ricketts' basic philosophy for treatment, described as his "Principles of Bioprogressive Therapy," creates a solid foundation upon which clinicians of this and

future eras can continue to grow and change. Two cases demonstrating these principles were shown to further elucidate how improvements in both technique and materials allow the clinician to adhere to these original principles with highly efficient mechanics. Changes in technology are the driving forces to further simplify and improve this technique. The principles that are the cornerstone of this technique are alive and well, thanks to the vision of its innovator.

References

1. Ricketts, R.M.: Bioprogressive therapy as an answer to orthodontic needs. Part I. Am. J. Orthod. Dentofac. Orthop., 70:241-268, 1969.
2. Bussick, T.J.: A cephalometric evaluation of skeletal and dentoalveolar changes associated with maxillary molar distalization with the Pendulum appliance. Unpublished Masters Thesis. University of Michigan. Ann Arbor, MI, 1997.
3. Moore, A.W.: Orthodontic treatment factors in Class II malocclusion. Am. J. Orthod. Dentofac. Orthop., 45:323, 1959.
4. Vardimon, A.D. & Lambertz, W.: Statistical evaluation of torque angles in reference to straight wire (SWA) theories. Am. J. Orthod. Dentofac. Orthop., 86:56-66, 1986.
5. Hilgers, J.J.: Bios...A bracket evolution, a systems revolution. Clinical Impressions, Vol. 5, No. 4, pp. 8-14+, 1996.
6. Andreiko, C. & Payne, M.: "The arches are like a hat box..." Clinical Impressions, Vol. 4, No. 1, pp. 2-5+, 1995.
7. Hilgers, J.J.: State-of-the-art simplicity in buccal tube design: Twelve reasons to take a giant step backward. Clinical Impressions, Vol. 5, No. 1, pp. 12-14, 1996.
8. Sachdeva, R.: Variable transformation temperature orthodontics...Copper Ni-Ti makes it a reality. Clinical Impressions, Vol. 3, No. 1, pp. 2-5+, 1994.
9. Hilgers, loc. cit.
10. Farzin-Nia, F. & Hilgers, J.J.: The asymmetrical "T" archwire. J. Clin. Orthod., 101:81-86, 1992.
11. Hilgers, J.J.: Functional finishing: The concept, the tools, the techniques. Clinical Impressions, Vol. 5, No. 3, 8-13+, 1996.

Lecture/Course Schedule at a Glance

Date	Lecturer	Location	Sponsor, Contact and Subject
6/1-2	J.M. Bonvarlet & J. Bogey	Reunion Isle	AOSM; Josiane Koskas 33 1 48 59 16 17; Adding Some Strings to Your Arches
6/1-3	B. Durand & M. Jeantet	Montpellier, France	AOSM; Josiane Koskas 33 1 48 59 16 17; TMJ Articulation – Level 2
6/1-3	Jean-Francois LeClerc	Brussels, Belgium	Fourth European Lingual Orthodontic Congress; ECCO 32-2-647-8780; The Balance of the Smile
6/5-7	Wick Alexander	St. Petersburg, Russia	Dental-Kompleks; Raissa Veronina 7 812 311 01 77; Principles of the Alexander Discipline
6/8	Wick Alexander	St. Petersburg, Russia	Dental-Kompleks; Raissa Veronina 7 812 311 01 77; Alexander Typodont Course
6/9	M. Swartz & R. Bray	Las Vegas, NV	Ormco; Meredith Brick (800) 854-1741, Ext. 7573; Bonding – The Bracket Kind & The People Kind
6/9-10	Wick Alexander	St. Petersburg, Russia	Dental-Kompleks; Raissa Veronina 7 812 311 01 77; Alexander Study Club
6/12-16	Jerry Clark	San Sabastian, Spain	Spanish Orthodontic Society; Dr. Martin Fax 34943 42 3710; Increasing Your Profit Realization
6/15-17	Multiple Speakers	Szczecin, Poland	Polish Jaw-Orthopedic Society; Pommeranian Medical Academy 48 91 4820 453; 26th Symposium
6/15-17	Wick Alexander	Kyoto, Japan	Ormco Japan; Roy Kishi 81-3-3945-0065; Principles of the Alexander Discipline
6/16	Joe Mayes	Rockport, ME	Maine Orthod. Society; Dr. Zeleniak (207) 626-3550; Lean-Thinking Orthodontics
6/18-19	Wick Alexander	Tokyo, Japan	Japan Assoc. of Adult Ortho.; Roy Kishi 81 3 3945 0065; Orthodontics Using the Alexander Discipline
6/20-21	Wick Alexander	Tokyo, Japan	Ormco Japan; Roy Kishi 81-3-3945-0065; Steps in Interdisciplinary Treatment
6/22-24	L. Hutta & J. Mayes	Worthington, OH	Ormco; Paula Allen-Noble (800) 990-3485; In-Office Comprehensive Hands-On Herbst Training*
6/23	R. Bennett & J. Garbo	Chicago, IL	Ormco; Meredith Brick (800) 854-1741, Ext. 7573; Peak Performance and Prosperity
6/29-30	Didier Fillion	St. Petersburg, Russia	Dental-Kompleks; Raissa Veronina 7 812 311 01 77; Lingual Ortho Typodont Course*
7/1	J.M. Bonvarlet & F. Bassigny	Paris, France	AOSM; Josiane Koskas 33 1 48 59 16 17; Breaking Barriers – Level 2
7/3-7	Didier Fillion	Paris, France	Didier Fillion 33 1 47 04 27 93; 2nd Session of the One-Year Program (2000)
7/4-5	Didier Fillion	Paris, France	Didier Fillion 33 1 47 04 27 93; Advanced Lingual Ortho Course
7/8-9	Dirk Wiechmann	Munich, Germany	Ormco Europe; Dirk Wiechmann 49 5 472 5062; ECO Lingual Therapy
7/21	Giuseppe Scuzzo	Berlin, Germany	Ormco Europe & Dr. Loidl; Michèle Marinesco 31 33 453 6154; Lingual for Lab Technicians
7/22-23	Giuseppe Scuzzo	Berlin, Germany	Ormco Europe & Dr. Loidl; Michèle Marinesco 31 33 453 6154; Advanced Lingual Course
7/21-22	Joe Mayes	Myrtle Beach, SC	Charlene White – Progressive Concepts; Jana Whitley (800) 445-7805; 15th Annual E. Coast Convention
7/22-24	Stuart McCrostie	Sydney, Australia	Dr. McCrostie; Maree 61-2-9489 6000; Successful Lingual Orthodontics
8/1-7	Larry & Will Andrews	San Diego, CA	Andrews Foundation (619) 224-0866; 7 Consecutive Independent Morning-Only Courses
8/4-6	Jerry Clark	Ann Arbor, MI	GORP; Dr. McNamara (734) 668-8288; Orthodontic Residents Presentation
8/25-26	Wick Alexander	Puebla, Mexico	Centro Mexicano en Estomatologia; Dr. Toledo 52 22 40 1448; Prin. of the Alex. Discipline
8/28-29	Didier Fillion	Santiago, Chili	Dr. Müller 56 2 217 1239; Lingual Ortho Typodont Course*
9/1	Terry Dischinger	Louisville, KY	KY Orthodontic Association; Dr. Johnson (502) 852-1324; Full-Face Orthopedics
9/1-2	Dirk Wiechmann	Osnabruck, Germany	Ormco Europe; Top Service 49 5 472 5062; Lingual Therapy
9/7	Terry Dischinger	Honolulu, Hawaii	Hawaiian State Orthod. Meeting; Mike Bailey (808) 245-1818; Full-Face Orthopedics
9/14-16	Wick Alexander	Arlington, TX	Ormco; Brenda Horton (817) 275-3233; Principles of the Alexander Discipline
9/15	Didier Fillion	Basel, Switzerland	Dr. Oberholzer 41 61 331 3110; Lingual Ortho Course
9/15	D. Damon & T. Pitts	Newport Beach, CA	Ormco; Meredith Brick (800) 854-1741, Ext. 7573; A Conservative Approach to Radical Change
9/15-16	Jim Hilgers	Dublin, Ireland	OISM; P. Dowling 353 1 6127303; Hyperefficient Treatment Mechanics
9/21-24	Jerry Clark	Boca Raton, FL	Southern Assoc. of Orthodontists; Sharon Hunt (800) 261-5528; SAYOS Practice Issues
9/22-24	Didier Fillion	Berlin, Germany	Dr. Neumann 49 177 2298 551; Advanced Lingual Ortho Course
9/29-10/1	Wick Alexander	Munich, Germany	Ormco Europe; Andy Bartelt 49 89 922 99190; Vertical Deficiency and Vertical Excess

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