Einstein observed, “The significant problems we face cannot be solved at the same level of thinking we were at when we created them.” In other words, existing challenges cannot usually be overcome without changing our level of thinking to one that is different from that which existed previously. Over the past several years, I had felt that, considering the advances in scientific technology that have taken place, there must be a way to develop a system of brackets, bands, buccal tubes and archwires that would overcome some of the challenges we face and compensations we make in treating and finishing our orthodontic cases. Recent advances in orthodontic clinical technology will now allow us to change our thinking about the way we render orthodontic treatment. Continued changes in our patients’ attitudes and perceptions will necessitate an ongoing transition in the way we provide our services in the future.

Research conducted with previously unavailable technologies by Dr. Craig Andreiko and his team at Ormco has changed conventional thinking about the design, composition and form of the various products used in our orthodontic mechanics. The use of computer-assisted engineering and digital scanning was essential to the creation of the Orthos™ technology that has been used to produce a completely coordinated system of brackets, bands, buccal tubes and archwires, more clinically accurate than anything previously available. The appliance system is based on corrected anatomical averages and is adjusted for mechanical inefficiencies inherent in all orthodontic systems. The resulting appliance geometries and archwire shapes seem to consistently optimize the occlusion. In my practice, these developments have resulted in improved clinical efficiency due to a more precise appliance and to increased coordination between bracket, band, buccal tube and archwire. As a result, I have been able to provide more efficient treatment and more convenient appointment intervals for our patients.

The objective of this article is to share some of the changes I have made in my thinking and in my clinical practice as a result of using the Orthos technology for the last 15 months and to give an early clinical impression of the efficacy of this system. My clinical experience with this new technology thus far has been exclusively with Orthos, the original product introduced. Recently, Ormco introduced Bios™, a light wire, higher torque version of the Orthos System. Also recently available is Orthos™ AP, a prescription based on Asian norms. In the future, I would expect continued improvements in the technology and the resulting appliance designs and techniques.

Initial Reaction
As new technologies have emerged, I have been reluctant to automatically change my orthodontic treatment mechanics and the ways in which I offer orthodontic services to my patients. My initial reaction to Orthos was one of skepticism – an effort...
to “reinvent the wheel” – even though I was not entirely satisfied with the clinical system I was using at the time. Orthodontists are creative enough that if necessary, they could probably straighten teeth with gutta percha and paper clips. No way was I going to purchase an entirely new orthodontic inventory and endure the concomitant expense and hassle of a new system, no matter what improvements were promised in the sales literature.

My orthodontic residency gave me an extensive exposure to a good cross section of the available appliances from the major orthodontic manufacturers. During my residency and in subsequent years of clinical practice, none of the existing appliances had delivered all that I had hoped to derive from a preadjusted appliance system of brackets, bands, buccal tubes and archwires. I have often been reluctant to use a full-size archwire because of the problems which would be introduced and the compensations I would have to make to counteract the undesired movements which were generated. I was constantly making adjustments for the limitations and lack of coordination in the various systems I employed.

So, in an extreme act of faith, I set aside my other inventory and decided to personally evaluate the Orthos System, which consists of brackets, molar assemblies, and Copper Ni-Ti™ and TMA® archwires. My initial reaction to this new orthodontic system has been very positive, as I have seen a dramatic reduction in the bedeviling problems I had been experiencing and had thought to be a frustrating but necessary part of practicing orthodontics.

A New System
It has been said that every advancement of mankind has been achieved by making things simpler through the creation of better systems. Orthos technology appears to have created a better system of brackets, bands, buccal tubes and archwires which has relegated many of my previous clinical challenges, compensations and frustrations to the past.

The Orthos Appliance System demonstrates true synergies. The more accurate bracket prescription, more efficient molar assemblies and improved archwire forms all contribute to a consistently superior clinical result. All parts of the system combine to produce improved clinical

continued on following page
We routinely figure eight or “crossover tie” all brackets with elastomeric Power O ties and rarely find it necessary to ligate with steel ligatures. We now prefer the reduced under-tie-wing area, as we experience fewer missing ties.

Analyzing the Principle Benefits of Orthos to My Practice

It has been said that “genius means little more than the faculty of perceiving in an unhabitual way.” When advances are made, we have the opportunity to reevaluate our methods of providing orthodontic services. By surveying a representative sample of our clinical patients and their parents, we found that if the quality of the clinical result is maintained, patients feel that treatment would be worth more if they could be treated in fewer visits to the office over a shorter period of time. My old paradigm or belief was that patients would perceive treatment to be worth more if they made more visits to the office. In fact, the opposite is true – less is more.

I had thought that I had to see my patients every month in order to maintain control of the case and get paid for my services. Instead, I have seen dramatic improvements in the quality of treatment progress and results, without suffering from a lack of clinical control or experi-

continued on page 6
“Rotation in slot” or “compensation in slot” results in more efficient alignment and coordination between incisors and cuspids without the need for compensating bends in the archwire. Photographs of the three cases shown above were all taken pretreatment and at the second adjustment visit six months into treatment.

The lower cuspid brackets have a “compensation” cut into the slot (CIS) to allow the lowest possible profile for lower incisor brackets. This has virtually eliminated the need for first order bends between the lateral incisor and cuspid.

I prefer Accent™ buccal tubes because they allow for easier insertion of larger wires.

The gingivally offset bicuspid brackets have been a huge benefit to my practice. I am able to place the bicuspid brackets in a more ideal position and avoid occlusal interferences. The gingival offset, in combination with Optimesh and attention to bonding technique, has resulted in reducing our average bond failure rate to less than 2.5 percent.
encing collection problems as a result of the extended intervals. A shorter treatment time provides the added benefits of reduced risks of decalcification, decay and periodontal breakdown.

Achieving a New Level of Clinical Efficiency
With any new system, there is always a learning curve involved in making the transition from initial use to proficient use of the system. For example, the smaller under-tie-wing area of the decreased-profile lower anterior brackets required a minor change in technique, as we now figure eight or “cross over” all our elastomeric ties. I rarely need to use steel ties to fully engage the archwire in the slot, and I find that the elastomeric ties are still fully effective after 10 to 12 weeks. As another example, the gingival offset of the bicuspid brackets requires the clinician to overcome the natural tendency to bond the brackets too far gingivally, which then excessively extrudes the bicusps. Both of these challenges are very quickly overcome as the clinician becomes familiar with the look and feel of the new appliances.

I should also comment that this is an “average” system. Even though Orthos is a markedly more correct average than anything heretofore available in any appliance, there is still an occasional wire to bend. But overall, I have had far fewer clinical frustrations and my patients have had far fewer inconveniences with this new system.

Clinical Improvements
Dr. Andreiko has identified a number of clinical problems which he thought would be solved by the Orthos System. The benefits which have been the most clinically significant in my practice are shown in the accompanying illustrations.

Conclusion
We know that when the pain of staying the same becomes greater than the pain of making changes, we do whatever it takes to make the necessary changes. And it is very painful to think of switching out an entire inventory, even with the promise of upgrading to a new and better system. However, as technology improves our clinical systems and as patients’ perceptions change, we will need to make transitions in how we deliver orthodontic care.

My “clinical impression” is that it has been well worth any added hassle or expense involved in making the transition from my old clinical system to a new one, especially given the improved clinical efficiency and the added convenience to my patients. I would be very reluctant to regress to using any of my previous clinical systems, and I will be much less reluctant to investigate new advances in the future.

Copper Ni-Ti wires have allowed us to schedule patients more conveniently. Patients prefer to be seen at 10- to 12-week intervals rather than monthly, and good clinical control of the case can still be maintained.

Pretreatment.

Initial bonding and placement of .016 35˚ Copper Ni-Ti archwires.

Second adjustment visit; adjustments at 12-week intervals; six months of treatment. .016 x .022 35˚ Copper Ni-Ti archwires were placed at the first adjustment visit (three months in Tx).
Dr. Craig Andreiko, who headed the Ormco R&D task force that applied computer-aided engineering technology to orthodontic appliance design in developing the Orthos System, truly incited a worldwide movement away from pre-adjusted appliances based on 1960s metrology. Orthodontists throughout the world are now realizing the clinical benefits of the first truly concurrently designed system of brackets, buccal tubes and archwire forms. The ideal bracket and buccal tube geometries, archwire shapes and bracket placements consistently optimize occlusion and compensate for the mechanical inefficiencies inherent in previous appliances.

Over 100 cases (“American norm”) were analyzed using CAE software to arrive at the anatomical averages on which Orthos is based. The resulting Orthos prescription enables the clinician to use larger wires to take full advantage of Orthos’ precision finishing accuracy without introducing the common side effects caused by filling or nearly filling the slots of imprecise appliances.

The Orthos revolution is also spreading to other disciplines and to other ethnic patient bases. Bios™ was derived from the same Orthos data base but is designed for clinicians who employ light wire, higher torque mechanics. Bios will also benefit Orthos System clinicians who prefer a higher-torqued appliance for adult and deep bite cases as well as for cases with strong musculature. This just introduced system is described (including the complete appliance prescription) on Page B of the Center Section.

Recently introduced Orthos™ AP (Asian Prescription) was developed by applying the same software program to Asian anatomical averages. Some of the design specifications of the Orthos System were still appropriate, but there were significant changes to others. As a result, Orthos AP addresses the considerable differences between the Asian dentition and those of primarily European origin to provide a highly accurate appliance for Asian patients.

For our domestic edition, order information on Orthos, Bios and Orthos AP is shown on Page H of the Center Section. For our international edition (which provides order numbers), only Bios order information is shown on Page H because of the limited space. For additional information, please contact your Ormco representative or distributor.

The Orthos™ Revolution - Overthrowing the Old Straight Wire Doctrine

Orthos Rx

Orthos AP Rx

Progressive distal root tip (angulation) built into the lower incisor brackets results in more ideal root alignment.
Dr. Larry W. White: Computer technology has helped orthodontists administratively for some time, yet it seems we haven't exploited its potential for diagnosis and treatment planning. What have you and Dr. Fiorelli done to remedy this deficit?

Prof. Melsen: I believe that there are many reasons why the possibilities of computers have not been fully exploited. Diagnosis is not always expressed in exact terms and the definition of the treatment goal has, to some extent, been considered an art which can only be simulated by the computer to a limited degree. The treatment goal in children is partly reached through growth and partly by tooth movement. Growth of the individual patient can be predicted only to a very limited degree, but when it comes to tooth movement, the computer can be used. Once the tooth movement is well defined, only one force system is correct. This can be estimat-
ed by the orthodontist, as indicated in textbooks on biomechanics, or – quicker, easier and more precisely – found by the computer.

**Dr. Fiorelli:**
I fully agree with Dr. Melsen. Computers are machines that manipulate numbers. In order to take advantage of computer technology, mathematics should be the basis of orthodontic diagnosis and treatment planning. With some exceptions, such as cephalometric analysis, this has not been the case. We have used a mathematical approach in determining the needed force system for a specific dental movement and in designing the appliance capable of delivering such a force system. It has been possible to create software that could perform all the needed calculations and display the results of the calculations graphically. In fact, these tools are called “orthodontic calculators.”

**Dr. White:**
Why did you feel that a computer program for biomechanics was necessary?

**Prof. Melsen:**
Since our first contact with Charles J. Burstone, who started giving courses on biomechanics to our postgraduate students about 20 years ago, we have put increasingly more weight on the teaching of biomechanics to our students. Realizing how difficult this is and the fact that not all schools have a strong biomechanical program, we decided that the development of this program could be a suitable way of sharing our experience gathered over decades with other schools. The interest shown by our colleagues at the teachers’ conference in San Antonio confirmed that this was a good idea.

**Dr. Fiorelli:**
I had my first contact with Prof. Melsen and her approach to biomechanics in 1985. I really had to struggle with the biomechanics, but I was happy with the clinical results. In the meantime, I developed an interest in computers and started teaching in the school of orthodontics at the University of Siena by means of the computer. The students thought biomechanics was fascinating but too hard and time-consuming to learn. I then learned that I could take advantage of the computer and related multimedia technology. As a result, we started this project in 1991.

**Dr. White:**
How easy or difficult will your program on biomechanics be to learn?

**Prof. Melsen:**
This program includes an instruction section that anyone able to read can follow, even users without any knowledge of computers. So far, we have only used the computer program in relation to the graduate teaching, but we have intentions to let the undergraduate students employ our program for their basic biomechanics course. The experience with interactive computer programs as part of the teaching tools in other areas has been very positive.

**Dr. Fiorelli:**
The software includes a teaching/learning tool and a treatment-planning tool. The use of the didactic part is very easy. The students had no problems using the program but, of course, it takes a lot of time to go through all the material contained in the electronic book. The use of this program as a teaching tool (you can project the computer image on a large screen with an LCD and an overhead projector) requires more time, as the teacher needs to have a good idea of the contents of the software in order to use the most appropriate parts when lecturing.

The second part, the treatment-planning tools (the calculators), requires a good knowledge about many of the topics discussed in the didactic part; otherwise, clinical interpretation of the calculations is almost impossible.

**Dr. White:**
Do you envision it as primarily a learning mechanism for the orthodontic novice or do you expect experienced orthodontists to benefit equally?

**continued on page 20**
It's a wonder we're not all billionaires. With so many ideas circulating about how to increase the size of our practices, it would seem that we couldn't help but succeed. Working smarter, not harder, is the first criterion for deciding which tools we should use to build the practice of our dreams. Certainly, it is pointless to increase the number of consultations until we have maximized our conversion rate. I am pleased with the conversion rate my staff and I have experienced over the past several years. For 13 years previous to that, however, our conversion rate remained consistently at 53 percent, rarely changing in spite of using many promotional ideas: T-shirts, drawings, newsletters, follow-up phone calls. Still, our success rate varied only slightly from 53 percent in those 13 years. Today, our conversion rate hovers between 85 and 98 percent. It was 96 percent in January and, although it has dropped to 80 percent, it has not done so often - not since we produced our practice promotional video, Something to Smile About.

There was a time ten years ago when I would have thought that creating a video to educate potential patients and promote my practice would have been crass and overtly commercial. Now in the days of the Web, the Net, interactive CD-ROMs and video rental stores scattered in various corners throughout our cities, producing a video to serve as an introduction to our practice simply seems in keeping with the times.

Marketing Ideas Can Come from Unusual Sources

I came to the idea of producing a video through an indirect means. With the purchase of new exercise equipment, my life was changed forever. Not because of the equipment itself and the potential it held for a leaner, meaner me, but because of the instructional video that came with the equipment. The video projected with clarity and excitement the changes I could expect in the future with the use of my new equipment. While expertly advising me about the use of the equipment, the images that the video projected were ideas with which I could really connect. I benefited more from the video than the equipment itself.

No sooner had I felt the impact of the exercise equipment video when I received one for the new car I was thinking about purchasing, then another for a washing machine (honest). I began to remember the influence public television had on me in high school and how MTV has captured the attention of American teenagers today. What better way to appeal to our prospective patients than through the medium they spend so much time using - a video. The pen may be mightier than the sword, but it is seemingly no match for a good camera angle.

What the video offers prospective patients is a feeling of being present in our office. Through it, we project the uniqueness of

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Dr. Borkowski recently fulfilled a boyhood dream of playing in the big leagues by attending the Baltimore Orioles Fantasy Camp that also allowed him to play at Camden Yards. Here he solidly connects bat to ball for a respectable base hit.
our practice. Potential patients can see how my staff and I relate to our patients and how we relate to one another. They can see the warmth we show and the fun we share – things that are more easily depicted on video than through any other medium. Through the video, our patients can get a keen understanding of how I feel about my profession and sense the urgency of my concern for the care of their children. This is not acting. It’s simply opening ourselves to our prospective patients, taking seven minutes to tell them all the things we think make us special. It becomes our promise, our commitment to our patients and their parents. Once you look at it that way, you’ll know what you want to say in your own video.

Not Making a Production Out of Production

While I knew what I wanted to say in the script, fortunately, I had Rusty Gorman’s production company to help me say it. You may employ any production company to film the raw footage in your office, but since Rusty’s crew would be working with us to produce the final piece, it made it more efficient to employ him to create the original footage.

Video production is highly technical and it helps to have a professional in whom you can trust to make it easier. Rusty is a recognized professional, having won numerous awards for his work. He is also wonderful at these particular projects because he worked with his father, Dr. Jack Gorman, for many years and has a keen sense about what we as orthodontists are trying to convey. Those of us who had the pleasure of knowing and working with Jack knew his sincerity and professionalism. Rusty not only displays these same principles in his work, but also can bring out these qualities as they are exhibited in your own practice. The sample scripts that you receive as part of the pre-production package get you started in the right direction in developing the wording and are instrumental in orchestrating the production. Rusty has an excellent ear for language and was great at helping us express certain ideas in a way that was most comfortable for us. Once filming is completed, Rusty’s crew will create the raw footage where each frame is numbered, so that when selecting scenes for the final version, it is easy to communicate. There is even a release form provided for all patients and parents to sign.

Two areas of filming stand out in my mind that make our completed video excel.

continued on following page
First is the editing Rusty managed that makes me not look the novice I am in front of a camera, but rather, the confident professional I had hoped to project. Second is Rusty's skill in interviewing our patients in a way that allowed them to give us an honest and sincere tribute. Testimonials often appear fake and, if used incorrectly, can do more harm than good. Helping our patients deliver natural testimonials is one of the best things Rusty does.

We shot our video for one and one-half days because I chose to show both offices, but it is not necessary to take this amount of time. One day should be sufficient for most practices. Shooting both offices was wise for us, I think, because my patients can readily recognize their surroundings as soon as they walk through our doors.

**Distributing the Video**

Our original plan was to send a video to each patient who called for an initial appointment. Since then, the video has taken on a distribution of its own. Now that we have had the videos in circulation for a number of years, many patients who call have already seen it. Neighbors pass it to them. Neighbors pass it to their neighbors. Mothers give it to their children. Fathers have loaned it to coworkers. We even had two different hospital administrators call to have video sent to show to their public relations committees. The committees were considering creating a video to market their institutions and were looking for a professional to pattern theirs after. Of course, we encourage this. After prospective patients tell us they want a copy of the video sent to them, they will often ask if they should bring it back to the office when they visit us. We suggest they either do so, give it to a friend or just keep it if they feel it would be helpful to them during treatment. It's surprising how that tape gets around.

**The Bottom Line:**

**Payback in Dollars and Team Spirit**

Because the video is now self-distributing, we've only had to purchase tapes for about one-third of our consultations. This has made the total cost of it much less than anticipated. Going from a 53 percent to a 90 percent success rate certainly made the investment worthwhile.

One unexpected pleasure of the whole experiment is the way it made us look at the practice. Production itself was so much fun and it brought the staff, patients and parents close together in a way we had never been before. The parents’ and patients’ praise of the staff on camera for all future patients to see continues to validate the role they play in our office and show them how important they really are. We can feel, every day, the commitment and promise we have made to our patients because we have captured it on film.
A PROFESSIONAL OPINION
An editorial forum for thought-provoking, sometimes controversial, contributions from our readership.

The Eighty/Twenty Rule

by Les O. Starnes, D.D.S., M.S.
Newport Beach, California

A friend asked how the practice was doing and after reflecting momentarily, I answered, “The best it’s ever been.” He then asked how I accounted for this, since most in my locality have not done well in recent years. My explanation was that, first, I gave up the quest of creating a large practice where assistants are assigned to individual chairs with their daily schedule of patients and are expected to do 80 percent of the treatment. I found flaws in this theoretically perfect treatment-delivery approach; the most significant is the incessant, demanding requirement to train and retain people in order to maintain a level of quality that is acceptable to me. So, I told him how I had developed a new commitment. That commitment was to eliminate everything that created patient/parent upsets. I made a list of those situations and conditions and simply committed to not allowing them to develop. A whole series of changes was necessary to meet that commitment.

It was obvious that I would need to be in absolute control of the practice. Maximum efficiency would have to exist in order to keep treatment progressing at its highest level of quality. This would require my doing most of the procedures. But, could I do the majority of the work and maintain the quantity of patients needed to support the fixed overhead? I decided there was no choice. The continual up-and-down level of quality resulting from staff turnover kept me frustrated and unhappy. The initial response to this new approach created an immediate calming effect. I still questioned my approach, because the current popular trend would indicate our future success depends on our ability to train staff and delegate duties. Here I was going in just the opposite direction. I was hiring fewer staff and they had less experience. I had less time to train and delegate, but reduced overhead and less staff turnover eliminated trauma. I felt a new-found freedom. I started thinking about achieving what I termed a “correct” practice. This means placing outcome of treatment above everything else, including the bottom line. It means a treatment plan with no flaws or unknowns; i.e., if I take all impressions and bite registrations myself, dual bites can be detected prior to establishing the treatment plan. It means completing treatment on time, which requires the utmost efficiency. To do that, bonds and brackets must be placed perfectly and archwire sequencing has to maximize progression of treatment. Suddenly, I was practicing the way I used to and wanted to but had strayed from as I sought the perfect staff. Orthodontics became exciting and fun again.

By doing 80 percent of the orthodontics, the following conditions exist:
• Fewer staff members
• Less need for experienced staff
• Staff turnover less traumatic
• Overhead reduced
• Less stress
• Fewer emergencies
• Consistent impressions
• Consistent banding
• Comprehensive & consistent archwires
• Controlled hygiene
• Treatment progression on schedule
• Treatment completion on schedule
• Treatment goals complete
• Patients happier
• Parents happier
• Staff happier
• I’m happier

The practice profile numbers that management people strive for that define a correct, perfect or ideal practice become more realistic and obtainable when you have complete control over your practice. This complete control, for me, exists when I do 80 percent and delegate 20 percent (the old 80/20 rule seems to pertain to everything).

One way to fine-tune efficiency is to buy all the products you can from one supplier. True, the cost of some items may be more than what you can find by shopping, but it costs staff time to shop. Also, the strange and/or inferior products you can get from shopping can be damaging and frustrating. Find a supplier whose primary goal is marketing quality products, then buy all items you can from them.

My practice is not large, but it doesn’t need to be in order to provide the income and lifestyle I want. An efficiently run solo practice can provide a very nice net income with a reasonable number of work days. Could it be that we are being misguided regarding the future of delivering orthodontic services? Although there are and always will be large practices (solo and multiple), the conveniently positioned neighborhood practitioner is always going to be in demand. The influences of managed care will alter this demand in urban areas, but less-dense and isolated areas will flourish, as they do now, regardless of third-party interference.

I propose we think twice about any direction of orthodontic service delivery which requires excess delegation. I see the future of our specialty being much healthier with solo (do it yourself) practices than large (delegate all you can) practices. I also propose we carefully evaluate input from the business world and how it applies to our specialty unless, of course, we deliberately want to become a business. The business world has a totally different set of values, some of which are not becoming to a profession. It seems to me that we need to reevaluate some of our recent trends. Yes, in order to survive, we have to conduct our practice as a business, but not at the expense of abandoning our obligations to each patient, for which we are trained. One defining difference between a business and a profession is that business's ultimate concern is the financial bottom line. An orthodontist's bottom line is properly focused on treatment outcome.
The Single-Appointment Preattached Cantilever Bite

by Joe H. Mayes, D.D.S., M.S.D.
Lubbock, Texas

In my original Clinical Impressions article on the Herbst appliance, “Improving Appliance Efficiency with the Cantilever Herbst,” I described a technique of delivering a bite-jumping appliance in a single visit. Since that time, an improved design has been developed that is now commercially available. No longer are solder joints or cantilever arm fractures a source of patient/doctor malcontent. The new Preattached Cantilever Bite-Jumper™ (CBJ) is as strong, easily delivered and foolproof as could be designed and engineered. It can be delivered less expensively than by having a commercial lab fabricate the appliance. It can reduce the number of patient visits as well as the frustration of a lost separator creating the need for more appointments for appliance delivery, while improving net profit during the correction of Class II malocclusions.

For many years, I have used the CBJ in my office for constant and predictable results when correcting skeletal Class IIs. My feeling is that the ‘90s are the age of “fixed functional” appliances. My philosophy is to utilize compliance-free appliances as much as possible, when available. It was this philosophy that led to the development of the CBJ.

My overall treatment goals are first, to correct the width problems (always expand first if needed), next, to correct the anteroposterior problem and then to put braces on the teeth. I place braces only on patients with Class I molar relationships without width problems; then I routinely complete banded treatment in eight to twelve months.

We like to do as much as possible at each visit and not see the patients as often. Doing as much as possible at each visit and using compliance-free appliances are welcome services to the parents and patients. We are decreasing the monitoring needs of the parents and the demands placed on growing children.

The new-patient entry process begins with the new-patient phone call. It is very important to share with the prospective new patient/parent our office philosophy of doing more at each visit and seeing patients less often. Most parents are very appreciative of not having to spend so much time in our office. When the new patient presents in our office, the treatment coordinator welcomes the patient/parents and fills out all paperwork. Next is the office tour and then seating the new patient in the exam/records room. A panoramic film and headfilm are made and a tracing and three-year growth forecast (if applicable) are produced by computer. Therefore, when I first see the patient, we are ready to diagnose the case. I evaluate the patient facially and intraorally. If the case is a skeletal Class II, I have the patient slide the lower jaw forward to super Class I. After evaluating for expansion needs, I have the patient hold the jaw in this forward position and close the lips. The parents can see the more balanced face without the characteristic roll of the lower lip. This helps them understand that the problem is a skeletal one with a deficient lower jaw. At this time, we discuss the CBJ and how it works.

Records are finished, financial arrangements are made and separators are placed. The entire new-patient exam, diagnosis,
records, financial arrangements and separators are all performed at one time, during an approximately 50- to 55-minute visit. For the lab procedure of making the lower lingual bar, an extra lower model is made from an extra pour-up of the lower record-model impression (Figure 1). Then I decide if I am going to use a soldered .045 lingual bar or a removable .032 x .032 “snug fit” lingual bar with Precision” Lingual Hinge Caps (Figures 2 & 3). I generally use the latter, as it allows four separate units if a crown should come loose (if the crowns are not trimmed, this is a rare event!) (Figure 4). More about this later.

When the patient returns and the separators have been removed, select the correct size Ormco stainless steel crown for each first molar (loose fit) (Figures 5 & 6). This allows picking the same size crowns from the CBJ kit for each tooth. The upper crown tubes are already attached to the axles. The lower crowns have the cantilevers attached and the rods are also attached to the axles. Remove the rods from the axles on the cantilever arms. Fit the crowns from the kit on the teeth (do not trim the crowns unless absolutely necessary) (Figures 7 & 8). Adjust the cantilever arms, if needed, for torque and in-and-out, as well as up-and-down dimensions, with a large three-prong plier. With the lower jaw postured forward, then measure the interaxle distance (Figures 9 & 10). From this point forward, there are two options. The first and preferable option is to utilize the original model for adapting the preformed lower lingual bar. The model is trimmed around continued on following page

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Figure 1. Extra lower model to premake lower lingual bar.

Figure 2. .045 lower lingual bar to be soldered.

Figure 3. .032 x .032 “snug fit” lower lingual bar, fixed but removable.

Figure 4. Ormco’s crowns are approximately 1 mm shorter than others and rarely need trimming.

Figures 5 & 6. Upper and lower arches with loose crowns fitted for size.

Figures 7 & 8. Upper and lower arches with crowns that have axles and tubes attached to the uppers, and cantilevers to the lowers.

Figures 9 & 10. Measure the interaxle distance in the mouth, both right and left.

Figures 11 & 12. Original lower model trimmed to allow seating of the lower crowns with cantilevers to the occlusal surface.
the lower first molar, and the crown that was fitted in the mouth is adapted to the model. Make sure the model is trimmed well enough to allow the occlusal surface of the crown to rest on the occlusal surface of the lower first molar (Figures 11 & 12). These crowns can be held in place with sticky wax.

The other option is to take a lower impression with the crowns in place (Figures 13 & 14). After this, the upper and lower crowns are removed. The rods and tubes can now be shortened to the correct length (they start at 31 mm inter-axle lengths). Simply cut off the excess millimeters (31 mm less your measured interaxle length) from the tube (Figures 15, 16 & 17). Shorten the rod so it protrudes only 2-3 mm past the axle on the upper crown.

If a soldered .045 lingual bar is to be used, utilize the original model or take a lower impression before the lower crowns with cantilevers are removed. If the lingual bar selected is the .032 x .032 “snug fit,” it is used with Precision Lingual Hinge Caps previously welded to place on the lingual of the lower molars. I suggest getting the CBJ kit with the hinge caps already attached. Usually the lower crowns come off in the impression. If not, replace the crowns in the impression and pour up in Kerr fast-set lab mounting plaster. There are two main advantages to utilizing the method of not making an impression. First, the crowns were microetched at the time of manufacture, and it is very difficult to remove the plaster from inside the crowns. Second, there is no need to waste the time or material to make the impression or the model. Remember, the only goal is to get to the position of having a model with the crowns in proper position on the teeth.

Figure 13. Lower impression with crowns and cantilevers held in place by .016 stainless steel wire.

Figure 14. Ormco’s new disposable tray works well, as the handle may be removed and the aluminum bent away from the alginate to facilitate removal.

Figure 15. Cut rods and tubes with a separating disc.

Figure 16. Round and smooth the cuts with a rubber wheel.

Figure 17. Route the opening of the tube for free movement of the rod.

Figures 18 & 19. The occlusal rests are premade – there is no right or left, but place on the lower lingual bar before making bayonet bends.

Figure 20. Occlusal rests placed on lower lingual bar and crimped to place. Note the rest is on the mesial fossa of the lower first bicuspid.

Figure 21. Bayonet bends in lower lingual bar; note bar is resting on the cingula of the lower anteriors.

Figure 22. Lower part of CBJ trial fit.

Figure 23. Crimp the mesial and distal of the crowns before cementation.

Figure 24. Shims on rods adjust the midline and posture of the mandible by advancing one or both sides.
Next, fit the model with either the pre-made .045 lingual bar and solder to place or use the premade .032 x .032 snug fit lingual bar with Precision Lingual Hinge Caps. If occlusal rests are desired, they should be slid on the lingual arch blank (Figures 18 & 19). They may be premade by tack welding and soldering a piece of .036 wire to a short (4.8 mm) piece of .045 lumen tubing. They are held in place by crimping or soldering. Either way of attaching to the lingual bar can be stabilized by bonding to the occlusal of the tooth receiving the rest. I prefer to use the mesial of the lower first bicuspid, as this area is free of any occlusal forces and doesn’t open the bite (Figure 20).

Mesiodistal stabilization is controlled by the bayonet bends (Figure 21). Place the lower assembly in the mouth and check for fit (Figure 22).

The finished appliance is ready for crimping of the mesial and distal of all the crowns and then cementing to place (Figure 23). The inside of the crowns was microetched at the time of manufacture. Cement with glass ionomer cement, attach the lower rods to the cantilever axles and do a final check for midline and advancement. Correct any discrepancies with shims on the rods (Figure 24). Attach the rods using Ceka Bond® on the screws. Use a cone-and-socket plier to loosen the screws if future adjustments are needed and unscrew them with the hex-head wrench. This prevents stripping of the socket.

Advise the patients to do most of their “chewing” with a knife and fork for a few days until they get used to the appliance. We also have the patient open wide, and if the rod comes out of the tube, we demonstrate how to guide it back together. Patients will usually take care of this because they don’t like the rods and tubes loose and flopping around in their mouths. See the instruction sheet (throw-away) we give at the delivery appointment (Figure 25).

We see these patients at three-month intervals for a year. After a year, we take transcranials to compare with the original transcranials to check for condyle position. If the condyles are seated in the original positions in the fossa, we place separators for the second molars and second bicuspid, then schedule the patient for removal of the CBj and banding/bonding.

The appliance is removed very simply. One method is to cut a hole in the occlusal of the crowns and use a Chastant Crown Removing Plier (Ormco Part No. 803-0610). (This process is not recommended if the tooth has a large restoration.) Grip the cantilever arm for the lower crowns and cut a slit in the buccal and lingual of the upper crowns for a purchase point (Figures 26 & 27). The method I usually employ for crown removal is to use a #557 high-speed bur to cut through the mesiobuccal of the lower molar crown, up over the occlusal and down the central groove (remember, we have a loose-fitting crown and therefore a good insulating layer of glass ionomer cement). The cantilever arm is

continued on page 23
A Challenging First Case

This is one of the first cases finished as of the writing of this article, although not an ideal one for illustrating the full capabilities of the Orthos System. Obviously, the Orthos brackets weren’t solely responsible for treating or finishing this case; however, they definitely contributed to what I feel was a satisfactory result.

This patient is a 35-year-old female, Class II, Div. 1, dolichofacial type with anterior open bite, maxillary protrusion, narrow maxillary arch with upper spacing, a mandibular functional shift, lower crowding and a three-unit bridge replacing a missing lower right second bicuspid.

Treatment objectives were to coordinate the maxillary and mandibular arch forms, close the open bite, reduce maxillary incisor protrusion, close upper spaces and correct the functional midline shift.

The general dentist wanted to replace the three-unit bridge because of marginal caries after orthodontic treatment was completed. The treatment plan and final result were compromised by the fact that the patient was unable to undergo orthognathic surgery.

Treatment was accomplished with the described system in conjunction with a removable maxillary Schwarz-type expansion appliance (adjusted every three days...
by the patient) worn for the first six months of treatment for 9 to 12 hours per day. Initially, Copper Ni-Ti archwires were used, followed by final TMA archwires. A series of vertical elastics in the buccal segments was worn during expansion to counteract the bite opening tendency during expansion mechanics. Appointments were scheduled 10 to 12 weeks apart over a total treatment time of 15 months.

**Dragon Slaying 101 - October 21 thru 26, 1996**

Drs. Jim Hilgers and Rand Bennett are armed and ready to present their next hands-on tactical course on slaying those monsters bedeviling your practice. The intensive course is about practical down-to-earth solutions to clinical and management problems that are confronted daily. The focus is on diagnostics, case presentation, mechanotherapy and management, with an emphasis on noncompliance therapy. “The Essence of Practical Orthodontics” is based on flexible techniques that will arm you to the teeth with good clinical ideas that can be used in any practice, any time, any place. For course information, please contact Linda at (714) 830-4101.
Prof. Melsen:
As already mentioned by Dr. Fiorelli, the program can be used at different levels. Through the interaction, different levels of information can be displayed on the monitor. The treatment planning part of the program is definitely aimed at experienced orthodontists, assisting them in appliance design (Figures 1 & 2).

Dr. White:
Does this software program consider the metallurgy of available wires in its biomechanical computations?

Prof. Melsen:
The chapter on metallurgy is a general survey (Figure 3). It does include data from a large and representative sample of wires from different companies. This chapter interacts with the appliance design part of the program in such a way that the most useful wires can be selected. Once the wire is selected and the desired force system is defined, the program can advise the clinician on the degree of bending necessary (Figures 4 & 5).

Dr. White:
Do you think this program will prove useful for planning all treatments, or should orthodontists rely on it only to derive treatment plans and biomechanics for difficult cases?

Prof. Melsen:
This type of treatment planning is cost/benefitwise not recommended for young growing patients, but for the difficult...

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Figure 1. Menu from which the orthodontist can choose when wishing to simulate a tooth movement on standard teeth in any plane of space or on a scanned-in picture as in Figure 2.

Figure 2. An example of a clinical picture with an asymmetry of the lower jaw. On this image, the anterior segment can be displaced and the necessary force system can be defined.

Figure 3. Survey of the content of the chapter on metallurgy.

Figure 4. In relation to wire selection, the system offers three possibilities. In this illustration, a wire is inserted into two brackets and the clinician indicates the deviation with respect to the other bracket (measurements can be done in the mouth). When the wire is selected, the computer calculates the force system with respect to the brackets.
nongrowing patients with special problems such as, for example, the type of patient that ruins your day. I have personally been using the program with almost all patients in my private office, which is limited to adult orthodontics. I have experienced the reduction in treatment time, both total and chair time. It is especially useful for the type of cases most orthodontists, if not all, have hanging around for a longer period and often finish as compromised cases. We have made treatment plans manually and with the computer, and we have found that the computer is more precise. Calculations are done with precision and are not based on clinical estimates (Figures 6 & 7).

**Dr. White:**
You’ve had some time to work with this program. What advantages and/or limitations have you found clinically?

**Prof. Melsen:**
Since the last part of the program was developed, where the actual patient can be scanned onto the screen, we found a tremendous advantage both in regard to precision and in saving of chair time. Finally, this part of the program is fantastic when you want to discuss treatment alternatives with your patients. The patient can follow the tooth movement on the monitor. Lately, we used the computer to design appliances for a group of patients being treated with appliances designed according to a “handmade” free body diagram. We detected error in clinical result arising from error in design of the appliance. The error could have been predicted if we had been using the computer program initially.

**Dr. Fiorelli:**
Prof. Melsen stated that the software can be a good tool in refining treatment planning, even for a very skilled clinician. I would add that it can be even more useful for somebody starting with this biomechanical approach. Treatment planning on a scientific basis can be quite complicated and needs a certain time to be acquired, but the computer can help us. This treatment planning software will dramatically reduce the difference between the treatment planning of the very skilled and the average clinician.

The possibility of scanning models and cephalometric and intraoral pictures allowed us to obtain more precise calculations with regard to the specific problems. I still see some limitations in the software. The whole process could be made more automatic – we want to add more to the analysis of anchorage problems. We could also develop artificial intelligence for analysis of the calculation results and provide a hint on appliance

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*Figure 5. The mutual position of the brackets (the teeth) is indicated by the orthodontist. When the wire is selected, the computer reports the force system and, in this case, demonstrates that the wire will be permanently deformed. In a third program, the force system is given by the orthodontist, and once the wire is chosen, the necessary bending is indicated.*

*Figures 6 (above) & 7 (above right). Cephalogram and occlusogram have been scanned into the computer and the desired movements are simulated. The necessary force system with respect to either the center of resistance (Figure 7) or the bracket is provided. The desired force can also be expressed as one vector as in Figure 6, where the incisor can be moved by one force passing upward and backward at the given perpendicular distance from the CR.*

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continued on following page
configuration. On the other hand, this step would deprive the orthodontist of an important interaction.

**Dr. White:**
Your program has been released on CD-ROM instead of floppy disks. Why did you make this adaptation? How will you handle future updates of the program?

**Dr. Fiorelli:**
A CD-ROM was necessary to contain the over 300 megabytes of the program. There are, in fact, 2,000 pictures, sound and one hour of animation and video that require a lot of space. We would have needed 200 floppy disks to store all this material. We now have prepared a small demo containing just one of the smallest of the 20 chapters of the book, and we need four floppy disks to distribute it. Future updates will be on CD-ROM as well; those who want updating to a new release will just need to substitute the old CD-ROM with the new one (we will sell these updates at a reduced price).

**Dr. White:**
With such a diagnostic and treatment planning instrument available, do you think orthodontists might forego the necessity of actually learning the basic mathematics and geometry necessary to compute appliance design?

**Prof. Melsen:**
No! Working with the program itself is a stimulus that urges the clinician to go back whenever there is something he or she does not understand. It is very easy to use the mouse. When the “hot words” are touched, the program will take you to the necessary information, so almost through a type of game, our students have been brought to a high level of knowledge of the fundamental mathematics and geometry necessary in appliance design. They don’t have to do the calculations – these can be done by the computer – but an understanding of the background is valuable and makes orthodontics more the scientific discipline we want it to be.

**Dr. White:**
What kind of effect do you expect this program to have on orthodontic education – undergraduate as well as postgraduate?

**Prof. Melsen:**
We hope this kind of program will have impact on the general knowledge of biomechanics, which I don’t think is always satisfactory within orthodontics. It also gives undergraduates a respect for orthodontics which may not always develop. The importance is also in the differentiation between the cases which can be treated satisfactorily with simple appliances like the straight-wire approach and those requiring more sophisticated mechanics.
pulled outward and upward, removing the lower part of the appliance (Figure 28).

The upper crowns are cut on the mesio-lingual, upper over the occlusal and down the central groove. I use a headgear plier (cone and socket) and work the tube to remove the crown (Figure 29). Next, desiccate the cement with air to more easily accomplish the cleaning. Removal and clean-up should take no more than five to ten minutes. Most often, cement adheres to the microetch inside of the crown, facilitating cleanup.

A major advantage to using Precision Lingual Hinge Caps is evident when a crown comes loose. If it is an upper crown, merely remove (don’t scale the tooth), clean in an ultrasonic unit and recement by placing on the rod and twisting it up to place (don’t remove the rod). If it is a lower crown, open the hinge cap on the opposite side. Do not scale the tooth. Clean the crown in an ultrasonic unit and recement with glass ionomer, using the lingual as a positioning guide to achieve the same location of the crown placement (don’t remove the rod).

At the time the photographs were taken, only the prototype cantilever arms were available. The CBJ will feature .022 tubes attached occlusal to the axles on the cantilever arms. This provides three distinct advantages:
1. If minor lower anterior crowding is present, it can be corrected while wearing the CBJ.
2. The tube allows the appliance to be adapted to Dr. Terry Dischinger’s Edgewise Bioprogressive Herbst Technique.
3. If the tube is not needed, it can be ground away or ignored, and it will have no effect on therapy.

We have found the single-appointment CBJ to be a boon to our treatment. Patients and parents don’t have to make repeated trips to the office. We don’t have the problem of separators coming out and

Implementing the CBJ™

The 20-patient CBJ Kit provides the essential components for the single-appointment Cantilever Bite Jumper™. A complete size range of laser-marked first molar crowns (seven per quadrant) is provided - 80 crowns distributed according to popular usage. Upper crowns are supplied complete with nickel-brazed axles, while all lower crowns come with nickel-brazed cantilever arms that are specifically designed for maximum strength and optimum patient comfort. Each cantilever arm has an axle with a .022 tube occlusal to it for use with bonded cases. All necessary components for 20 cases are also supplied, including rods, sleeves, Hex-Head screws and an Hex-Head Allen wrench. Hex-Head screws are used for all appliances to increase accessibility and improve performance over conventional slot-head screws.

The CBJ saves the expense of additional chair time, doctor time and staff time, and costs significantly less than using a commercial lab.

The CBJ Fit-Kit™ provides one loose crown in each of the 28 sizes for trial fitting in order to avoid having to trial fit (and possibly deform) the more expensive crowns with attachments. Prewelded Precision™ Lingual Hinge Caps are an option for the lower arch (and upper as well when TPAs or other auxiliaries are planned) to eliminate all soldering and lab work except for pouring models. If Hinge Caps are used, Snug Fit .032 x .032 wire (available in straight lengths or preformed lingual arches) is recommended for achieving an ideal fit with lingual or transpalatal arches. Peerless® M/P .022 buccal tubes are also available nickel-brazed to upper molar crowns for use in bonded cases.

Crows with attachments and Allen wrenches can be reordered separately (no minimum). Loose crowns (any mix of sizes) and other components can be reordered in packs of ten. Orders for the CBJ Kit and individual components can be placed now for June delivery. For order information, see Page H of the Center Section.

Figure 28. Removal of lower crowns after sectioning; grip cantilever arm and move buccally and occlusally.
Figure 29. Removal of upper crowns after sectioning with a high-speed 2357 bur; grip tube and move buccally and occlusally.

The CBJ is a mainstay in the “Simplified Treatment Mechanics” that have increased the profitability of my practice while significantly reducing my working days per month. More importantly, it has made a major contribution to the improved quality of care I am providing my patients with these more efficient and timely mechanics.
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