Using the Pendulum and Pendex Appliances: An Interview with Dr. James Hilgers

Interviewed by Dr. Ray Bedette

Continuing our series of interviews with members of our profession who have contributed greatly to the advancement of orthodontics and dentofacial orthopedics, we present this interview with Dr. James Hilgers. The main content of the interview concerns the use of the PendulumTM and PendexTM appliance, however, even if you do not use these appliances there are some real gems to be gleaned from a conversation with Dr. Hilgers. Great thinkers have a way of crystallizing the issues that we all face.

In the future more discussions on tap with Dr. Hilgers one on high tech in the office, and one you will not want to miss regarding MSO's !

Please read and enjoy--- Ray

First of let me congratulate you, Ray,on the work that you are doing on the Internet with the *Orthodontic CYBERjournal*. It has long been my belief that a great deal of "orthodontic learning" will eventually take place on this medium. Orthodontics, being as visual as it is, is a perfect candidate for the Internet. Keep up the good work.

Thanks Jim. Getting to the heart of the topic, how long have you been using the Pendulum^{TM}/Pendex^{TM} appliance in your practice?

Well, I have actually been trying to use some type of appliance to distalize (or at least rotate) the upper molars for over twenty-five years. When I worked for Bob Ricketts, he

was the first to point out to me an obvious fact- that virtually all Class IIs have a narrowness of the upper arch (relative to the lower arch). This could be called a "arch symmetry crossbite" as it occurs when the upper arch is ahead of the lower. There is often a negative medio-lateral curve and the arch forms, molar rotations and esthetic appearance all reflect this arch form dissonance. I often tell orthodontists: "To prove this to yourself, place the beginning upper model of a Cl II malocclusion over the lower model... **in a Cl I position.** What you will see is either an end on end buccal occlusion or a frank crossbite." The conclusion should be: virtually all Cl II malocclusions need expansion. At that time (1971-75) we often used a quad-helix or "W" expander to accomplish this upper arch expansion. It is a well conceived, simple little device because it expanded the upper arch in a differential manner (i.e. expanded the anterior portion of the arch more than the posterior portion), rotated the molars and was reasonably comfortable for the patient. At times we noticed that as the upper molar rotated around its large lingual root, space was created and it moved distally slightly. What a wonderful benefit it was when part of the Class II was alleviated with this simple appliance. The Cl II correction was unpredictable, however, and often got used up when the appliance was removed unless there was anchorage to maintain it. Often, we used a headgear and started to orthopedically reduce the maxillae after using the quad-helix. I wrote several articles on this approach and it is one the basics of what we now consider *traditional* orthodontic therapy. Over time, I began to notice that despite our best efforts, compliance with the headgear began to wane and when we depended upon that as part of our treatment prescription and the patients didn't do their part, results were compromised. I would now contend that this is much of orthodontics in the United States today. We start our patients off with headgears and have them wear this appliance as long as we think they are responding. When we sense that we can no longer cajole the patient into wearing the headgear, we switch over to Class II elastics to finish the case. There are an awful lot of practices in this country that are driven by this approach. I am not being critical because I found myself doing this in the 80's and early 90's. We would sketch out a beautiful treatment plan and the patient wouldn't come close to allowing us to get there. This is the definition of insanity, I think. Doing the same thing over and over again and expecting a different result.

What other methods are you using regularly to address Class II malocclusions? Asymmetric Class II malocclusions? Do you still use a significant number of headgear?

Of course I am a big believer in headgear. What they can accomplish in many cases is without peer. Certainly, many of the things that we contribute to functional appliances are also true with appropriate headgear therapy. You would have a hard time telling the difference between a good headgear wearer and a good functional appliance wearer. The problem isn't so much does the headgear work, it's "can you the kids to make it work?" The use of headgear has dropped off a lot in my practice. I would be the first to admit that when you don't focus on a treatment modality you start to become cynical about its use and once you become cynical, this in and of itself is detrimental to cooperation. I try to select the case that needs the headgear, try to find out if I have a child that will truly comply with it and then try to get my motivational skills honed as much as possible. However, I must admit that I like taking control of a case...not always putting it in the patient's hands. Even from my very beginnings with headgear, I liked to

tie them in (Combi headgear ala Mac Armstrong). Talk about moving teeth and jaws; those experiences made me so frustrated with other patients who were supposedly wearing their headgear. Using timing devices, I knew that most of them were wearing their headgear less than one quarter the requested time, if at all. I became very accustomed to both the patient and their parent lying about appliance usage at the same time being very confrontational about how much longer they were going have their braces on.

This problem with patient compliance became worse as our practice grew, we spread appointments over longer intervals, used more auxiliary personnel, and as responsibility levels in society slowly waned. In general, you can't be a latchkey kid and be expected to promptly come home, put on your headgear, pull out your books and study, and clean out the garage in your spare time...in most cases, it just won't happen. When the mother left the home (a negative side effect of women's liberation), the driving force to comply left with her. As an aside: You generally don't motivate children, you motivate the parents. I notice that patients wear their elastics much better if the parent is threatened with extra charges. Teachers have known this for years; they just don't have the clout to do anything about it. Show me an ordered family life and I will generally show you a child that knows they had better help out. Without parental involvement the ability to develop inner discipline is sorely limited.

I am a strong advocate of the Herbst™ appliance. I am somewhat new to the appliance but at this point (about six years) but I have about 200 active Herbst™ cases in my practice. It can be used for functional and growth changes (a whole topic of its own) or in many cases, as a fixed anchorage unit to retract the upper arch to previously distalized molars.

Between the Pendulum™ and Pendex™, which do you use most often?

Actually, that depends on the specific needs of the individual problem. I strongly believe you need to know enough about your appliance therapy to pick the right device for each case. I consider the distal drivers as a family of appliances that should be used in the right cases, and often not at all. They are simply adding one more arrow to our quiver...one more appliance to use when the circumstances warrant it. There are five different distalizers that I use: (1) The Hex appliance (meant mainly for mild expansion, molar rotation, and slight distalization. (2) The Pendulum appliance (meant mainly for molar distalization but no expansion. (3) The Pendex™ appliance (4) The T-Rex appliance (4) The Phd. appliance.

How do you determine the need to expand i.e. use the Pendex™?

As I mentioned previously, almost all Class II cases need expansion; so it would be unusual for me to use just a simple Pendulum™ appliance. I guess if I were moving the upper molars distally slightly and I had a nicely rounded upper arch, I might like the simplicity and cleanliness of a Pendulum™ appliance. The amount of expansion needed is minimal (3-5 mm) but should be achieved in almost every Class II case. There is nothing worse than fighting a crossbite tendency the last 3 months of treatment. I have taken the stance that if you are going to pay for a laboratory appliance one way or the other anyway; you might as well get every thing possible out

of that appliance. If you only expand the arch 3-4 mm and only distalize the molars 3-4 mm, you've done quite a bit in most cases

If you had a reasonably cooperative Class II headgear candidate, would you go with the headgear or Pendulum™/Pendex™?

Ray, that is a great question because it goes to the heart of good diagnosis. Many orthodontists use a headgear as if its only function is to correct a Class II molar relationship. They will use the appliance until they have achieved that goal. This is a denial of the most important part of headgear wear, namely, functional and orthopedic change. A simple answer to your question would be that I treat most **dental** Class II's with distalizing appliances, most maxillary **protrusions** with headgear, and most **mandibular retrusions** with functional appliances. It was my training to believe that most Class II problems were maxillary protrusions. I have come to believe the exact opposite...that there are many more mandibular retrusions than there are maxillary protrusions. Jim McNamara was among the first to point this out to a significant audience. If I like the upper lip curl, the naso-labial angle and upper face esthetics, why try to change that? Most Class II cases are a combination of factors that lead to the final outcome. It is the clinicians job to determine what causes the Class II, how it would be ideally resolved, and then take into account the ability of that individual child to help you get you there. So, I may have a patient that would be an ideal candidate for a headgear, but if he or she is unwilling to wear it, what difference does it make? You must use mechanics that you are reasonably assured will work in that patient. I know I'm harping on this concept quite a bit here...but that is the crux of the orthodontic dilemma at the millennium.

Headgear have been shown to have significant orthopedic effect on the growing maxilla. What do you feel is the orthopedic effect of a Pendulum™/Pendex™ appliance or is it primarily an orthodontic change? If so does this alter you appliance choices? Have you or anyone that you know completed a study on these effects?

I have studied the effects of all of these appliances in great detail. I think I have a pretty good handle on what they will and won't do. In addition, last year a graduate student at the University of Michigan, Tim Bussick, won the Sicher Award for his study of the Pendulum™ appliance. His unpublished masters' thesis, entitled *A Cephalometric Evaluation of Skeletal and Dento-alveolar Changes Associated with Maxillary Molar Distalization with the Pendulum Appliance* answers many of these questions. In essence, the pendulum family of appliances only created orthodontic change....some negative, some positive. Used in the wrong type of growth pattern there will be some negative (clockwise) rotation of the mandible. This would be considered an orthopedic change in that we are changing the ***direction of*** growth of the mandible.

What stage of dentition would you consider to be ideal for this appliance? Too early? Too late?

Well, in my view there **is** a most "ideal" time to use a molar distalizer. Let me broach this subject by saying that we often forget that there is an upper "E" space too. It is usually in the 2-3 mm range on each side of the arch. The upper second bicuspid can be a very small tooth. If we did nothing more than save upper "E" space and let the

lower "E" space be consumed by forward drift of the lower molars, many Cl II malocclusions would be corrected. A simple upper Nance holding arch at the right time can do that...as many clinicians over the years have observed. Orthodontics has been called the "6 millimeter profession" and although I chafe at the description, I am acutely aware of its reality. Saving space and controlling arch length can be the name of the game. I am also a firm believer that the best anchorage units we ever use are the deciduous molars. Many orthodontists think of them as small, inconsequential teeth. They are much more than that. They have large, cow-horned shaped roots that tightly encompass the crown of an erupting bicuspid. Bussick discovered that the ideal time to distalize molars is before the second bicuspid and the second molars are completely in situ. Gianelly talks about having space between the distal of the upper first molar and the erupting second molar crowns as the ideal time to distalize upper molars. I concur with that.

As you can imagine, this treatment timing issue has a lot to do with many other facets of an orthodontic practice. For example, even though I would admit that it would be best to indirect bond every case, it is impractical to do it when multiple teeth are in the eruptive phase. That is, in order to select the perfect time to start, we diminish the ability to get all the brackets placed ideally with indirect bonding. That means that clinically astute orthodontists have good technique skills in both indirect (when all the teeth are erupted) and direct (when teeth are actively erupting) bonding techniques.

Bob Smith talks a lot about "patient banking". This means that you recall new patients until it is exactly the right time to start them. There really isn't much early treatment except for exceptional cases. This reduces patient time, burnout, and can create a very economic orthodontic environment. This generally begs the question, why don't you treat them early? The data is still coming in on this question but the work that Profitt and others are doing indicate that in most garden-variety cases, two phases of treatment is not helpful. From a functional point of view, he might say, "It's a Class II...so what?" Maybe you find solace in those who support what you think or sense, so I would have to say that the work being done by Profitt and others is very concurrent with my thinking. To be more adamant: **most cases should be treated in one phase with appropriate treatment timing.**

Too early for treatment is one end of the story. Generally you're going to have a better response with Pendex**TM** appliance if you treat earlier, especially if the appliance is borne by the deciduous teeth. The problem is, you need to hold it for a longer time. So, although you get a decidedly improved distalization, you have bought yourself a protracted use of a Nance button or other anchorage unit. That isn't to say don't do it; just do it in the context of what is ahead. If I can wait 9 months and have the ability to go into full appliances, I'll wait. I humorously extol my students: "Don't do the crime if you can't do the time."

Too late for treatment is the other end of the story. Trying to distal drive first, second, and third molars is probably not too efficient. The posterior buttress of bone in adults is so significant that I might choose upper first bicuspid extractions or some other mode of treatment rather than the distalizers. If space exists or can be made in the posterior arch (e.g. extract upper second molars and lower third molars), then distalization is still possible. A Pendulum**TM** appliance in adults is wonderful for distalizing singular molars to prepare for bridgework and other esoteric tooth movements.

One of your stated goals has been to avoid multiple stages in treatment to increase efficiency. How often do you use this appliance in the mixed dentition prior to eruption of the bicuspids? Do you then treat in stages? How do you maintain the molar change during the waiting period?

I got into early treatment very heavily in the 70's and 80's and got a lot of experience about what two-phase treatment cases looked like. When others were treating in one phase we were starting many patients very early and treating in two phases. If they walked through the door, so to speak, they got braces. I have learned that this is not what treatment efficacy is all about. I may be wrong, but most orthodontists base early treatment on time interval treatment. That is, they try to achieve their goal in a certain period of time and if they don't get there, appliances come off anyway. Now, I have no problem with the advantages of early treatment if you reach a functional, healthy result. That, however, is not what I think is done in most practices. If the Class II isn't quite corrected, the appliances are removed anyway. If the patient is not in centric relation or if the bite has been opened and there is a centric slide, that is not functional. All you've really done is create space and align the incisors. That is not good enough. It can leave the patient in a dysfunctional excessive range of function for many years. So, it is not the goals of early treatment that I take to question, but the ability of most orthodontists to achieve these goals. It is not prudent or economic, at times, to try to do so. Moreover, researchers are starting to look at efficacious treatment more. Does it really make that much difference in the ultimate result if we treat every case early? My gut feeling is "no". In most cases we just end up burning out patients. I also feel strongly that it is not functional when orthodontic appliances are on. The teeth are in a slightly different position every day, hygiene is compromised, incisal guidance is compromised...just a lot of negatives.

I would say the key to the New World in orthodontics is being an astute judge of which patients truly deserve and need early intervention and those that would be best off being treated in one phase.

One last note on that: I also understand fully that entire practices are built on the premise that early treatment is good. The practice is marketed that way. Perhaps these orthodontists truly believe that early treatment is warranted in almost every case; or, they have convinced themselves that it is. The real reason is usually more insidious, however. It is economic and keeping these patients out of other orthodontists or general dentists hands by treating early is one way to do that. I understand that quite well. I built my whole practice around that belief system. I am not even critical of that as long as the clinician is honest about why they are treating. I do question someone who thinks they are doing something they are not. The proof is not there in terms of early treatment being efficacious.

So, are you saying "Do not do early treatment"?

I'm by no means saying don't do early treatment. I am saying, "Pick your cases carefully because not doing so can be a harbinger of inefficient, uneconomic, and overburdened orthodontic therapy."

Jim, on that same subject, do you have any idea how long typical cases should take to treat given your stance on treatment efficiencies?

I am going to answer that question in a little different way, Ray. The things that defeat treatment time predictability are the intangibles such as compliance, impactions, growth response and tooth eruption. We want to take the sting out of these intangibles whenever possible. Also, if you are a detail person and take a lot of time finishing the occlusion, this can be very time consuming.

When I talk about efficiency of treatment, one would assume that means that I am interested in treating in a shorter period of time. That is true to a certain extent. If I can achieve an equal result in a shorter period of time, why not do so? However, it is more complex than that. I am more interested in treating the gross aspect of the malocclusion in the first year of treatment, giving more time at the end of treatment for details.

Let me explain. Most orthodontics is done by treating with Class II elastics at the end of treatment to finish correcting the malocclusion. In fact, many orthodontists have the patients wearing Class II elastics right up to the time of appliance removal. This is what I refer to as the "begging and pleading" phase of therapy. It is the time when all of our magnificent ideals have gone out the window and all we are doing is begging the patient to wear their elastics so that they can have some form of reasonable occlusion.

When the patient is finished with Class II elastics, you are setting yourself up for tremendous rebound. It is virtually impossible to find centric relation when the patient has been wearing Class II elastics for the last few months of treatment. Stretched ligaments, periodontal rebound, intra-capsular joint fluid buildup, bone restructuring, swallowing patterns, muscle splinting and other factors too numerous to mention work to create rebound in the corrected malocclusion. The further you have to go the greater that tendency for rebound.

Is it any wonder that patients that are finished in Cl II elastics show a slight overjet a few weeks after finishing? As the tongue starts to play in that overjet, it can increase dramatically.... sometimes to the point of dismal failure.

If we could keep this one thing in mind as a reasonable goal: no Cl II elastics the last 3 months of treatment, we have a lot more stability and success in much of our orthodontic/orthopedic correction.

Do you feel this way about all elastics?

It's O.K. to wear vertical seating elastics at the end. That doesn't usually create centric slide...but almost everything else does.

That brings us right back to my original hypothesis. I want gross antero-posterior correction of most cases out of the way in the first year (along with a little overcorrection for good measure). That is what I call hyperefficient orthodontics. It gives you the time you need at the end of treatment to detail the occlusion without having to be overly concerned with antero-posterior and arch width changes. **In reality, hyperefficient orthodontic therapy is more about quality of treatment than it is about quantity of treatment.**

Having said that, if properly diagnosed and astutely managed, most cases do work out a few months earlier. I like that; but I've never had that as my primary goal.

What do you think about the concept of seeing patients on long, 6-8 week intervals?

Good question, Ray. I credit Ron Roncone with bringing this long interval approach to modern orthodontics. When I lecture about putting patients on longer interval treatment, I always ask the audience if they have ever had a patient get lost from the practice for a year. Assuming the brackets were properly placed and continuous archwires placed, everyone is always amazed at how good the patient looks. You see, we have a tendency to overtreat most patients. We jiggle teeth, override the natural muscular anchorage, and create more discomfort for the patient. Using new superelastic archwires, we can reduce the number of patients seen daily, improve practice economies, and, more importantly, improve the quality of our result.

That is just one part of the equation, however. When we think of putting patients on long intervals, the problem is that we have a tendency to do it for everything. The key is to decide at each and every appointment what the correct treatment interval would be for the desired movement to occur. Some patients might best be seen every week for certain movements and others are seen on 10-week intervals for other movements. What we find in our practice is that, in general, patients are seen on short, quick intervals at the beginning and end of treatment and on long, drawn out treatment intervals in the middle of treatment. When I use the term long interval I mean that I don't change treatment mechanics. That does not mean that we won't have the patient into the office for hygiene instructions, changing O-rings, or the like...it simply means I keep my hands off the patient and don't go through the "over-changing-archwires routine."

I believe this concept will become more important and enhanced as time goes on. It is one of the most important technology driven changes in orthodontics and, defines, to a large extent, how orthodontics of the future will be practiced.

In the ideal case, what is your order of appliances? Do you start with the Pendulum™/Pendex™ and shift to fixed appliances or are you using both the Pendulum™/Pendex™ and fixed appliances simultaneously? Are there any other appliance combinations which you find effective?

In a case that is ideally suited to use of a molar distalizer, my main consideration is: "what kind of anchorage am I going to use to hold molar position?" I have stated quite often that I have never felt it was too difficult to distalize molars – the difficulty came in keeping them back. I have begun to use more dependable anchorage, even in the distalization phase of treatment. That typically means strapping up the upper arch early and getting into an ideal arch as soon as possible in the lower (to be able to carry Class II elastics). I have found that if I can get into at least an .016 X .022 TMA, it handles Class II elastics effectively while still allowing leveling of the lower arch.

When I remove the Pendex™ appliance, I immediately place an upper utility arch. This uses the upper incisors for immediate anchorage but also allows a catch-point for Class II elastics if they are going to be used. Also, instead of retracting the buccal segments along an archwire, I will usually free-float the buccal segment back with a light elastic chain. You would be surprised amount of space that can be closed in this

manner without undue tipping or rotation and without straining the anchorage unit. Sliding teeth along an archwire (and the friction that implies) to close space is tantamount to giving back all that has been gained in the distalizing of the molars.

Also, by that time in treatment, you are aware of the cooperation level of the patient and their probability of wearing the elastics.

What is your appointment schedule for fabrication and delivery of the appliance?

The Pendex™ can be fabricated on an upper model taken the same day as the records appointment. Since I am activating the pendulum springs after the upper molar bands are already cemented and there is no soldering, the Pendex™ can be placed at the start treatment appointment. Once the appliance has been cemented, I will instruct the patient to turn the jack-screw once a day and will see them in two weeks. At that time I will evaluate appliance comfort, appropriate expansion and put the patient on a six week interval if no more expansion is warranted. In general, I am finding that it only takes two six week interval appointments to achieve the desired distalization of the molars, depending on the individual needs of the case. I am more prone now to strap-up the upper arch earlier to achieve initial alignment and increase anchorage. That is commonly done at the first six-week interval appointment.

As the first molar distalizes, it frequently moves buccally or lingually and tips distally. What steps do you take to control this effect? Do you feel it is primarily related to the construction of the appliance (the angle of the spring arm) or the resistance to movement by the bone and/or second molar?

Well, the very nature of the pendulum springs is to bring the upper molars lingually. If the upper arch is not expanded adequately during distalization, posterior crossbite will commonly occur. Extreme buccal movement of the upper molars I have not typically seen. I believe the erratic behavior that you are referring to occurs mostly when the first molars are distally driven against second molars completely erupted. Like squeezing a grape, the tooth will take the path of least resistance. In older patients, where buttressing bone of the tuberosity comes into play, it can result in erratic, unpredictable behavior of the first molars.

I have seen designs using a second spring attaching to the second molar as well, when do you use this design?

Distal driving the upper first molar when the upper second molar is completely in situ is a very difficult proposition. If the pendulum springs are placed against the upper first molars only, the tendency is for these teeth to intrude (strong muscular patterns) or extrude (weaker muscular patterns) and to not move distally very effectively. This makes sense when you are pushing back against the buttress of an erupted second molar and an erupting third molar. I have used Pendex™ appliances with double molar springs with some success. It works almost as well to band the second molar early and extend a compressed sectional wire (.016 X .022 NiTi) between the first and second molars. This sectional wire is bowed upward (compressing it) by placing pinch-on stops at the mesial of the upper second molar tube and at the distal of the first molar tube. When this is done, single pendulum springs are quite adequate to distalize both first

and second molars.

Have you had any difficulty with encroaching upon second or third molars? Pericoronitis?

The upper molars (first, second and thirds) erupt normally in a fan shaped arrangement. That is, they erupt with the crown catching up with the root. Given time, this forward eruption pattern and inclined plane contacts upright the teeth into a slight mesial cant. The upper first molar, in particular, will settle more mesially due to its shallow distal marginal ridge. This final settling, that requires proper disto-rotation of these teeth (we sometimes call this Stollerization) locks them into their final occlusion. Many clinicians believe that it is ideal to distalize the upper first molars in a bodily fashion, surmising that this will help guard against the mesial rebound. This is almost an impossibility. If the first molar root could be moved equally along with the crown, it would often impact the erupting second molars. It is more appropriate to distalize in the same way that these teeth normally erupt. That is, with a slight distal cant of the crown. If the crown can then be held in this position, archwires, occlusion, and growth will upright these teeth over time. The key is **over time.** It is why the Pendulum™ family of appliances has been very successful at distalizing molars. There is no archwire friction, the teeth are tipped back into their normal eruptive pattern, and second and third molar eruptive cants are appreciated. Of course, if there is too much distalization of these teeth, overtipping occurs and the distal aspects of the teeth can be carried under the tissue, resulting in pericoronitis. Although I do believe in overtreating the occlusion to a super Cl I position (I like to be able to see the central groove of the lower molar when in occlusion), severe overcorrection is not warranted. It is more appropriate to be more stable in the anchorage holding the molars back and let them upright more naturally over time.

Occasionally I see a severe palatal reaction. I attribute this to embarrassment of the blood supply by a distorted acrylic palate or improper seating of the appliance as it usually occurs within the first three days of appliance placement. Do you still have any problems with this? How do you minimize this risk?

In general, there are two factors that create palatal impingement: one technical, one anatomic. On the technical side, of course it is important that the appliance be properly fabricated. All of the acrylic should be comfortably away from the highly vascular cuff of tissue around the teeth. The edges of the appliance should be rounded and not knife-edged. The acrylic should not extend forward past the third palatal rugae. One of the reasons I am partial to the traditional Pendulum™ or Pendex™ appliances is that they are not soldered to any bands and, therefore, where the acrylic touches the palate is not dependent on how the bands fit on a model or in the mouth (e.g.. T-Rex appliance). It is smart to use an acrylic you can see through and to hold the palatal portion of the appliance gently against the roof of the mouth when trying-in or cementing the appliance. That way, any undue palatal pressure can be detected immediately (blanching of the tissue) and can be ameliorated. You must remember that, in general, the palate is not the whole anchorage unit because the bicuspids super-erupt when the upper molars distalize. This is the only thing that keeps every pendulum appliance from creating a palatal reaction.

The other (and I think more critical and unpredictable factor) in tissue impingement is

anatomic. If, for some reason, the upper molars cannot be distalized, something has to give. If the molars are not moving distally (e.g.. second molars completely in place, older patients, very strong muscular patterns), the pendulum springs will continue to work themselves out by either extruding the bicuspids or burying the acrylic portion of the appliance in the palate. Ray, I can tell you that I very seldom see palatal necrosis when the appliance is properly fabricated, hygiene is reasonable, the second molars have not completely erupted, and the patient is a stronger growth pattern. A little common sense goes a long way in this problem solving arena.

Have you seen incisor displacement?

Oh, of course. It would go against the law of physics to not expect some reciprocal movement in the buccal segments and anterior teeth. Often times this reciprocal movement is even beneficial. For example, if the case is a Cl II, division 2 type and we wish to clear the lower arch for bonding or create overjet for our Herbst™ appliances, this advancement of the incisors is not a negative. If, however, we are using these types of appliances of vertical growth patterns with tendency for open bite, the results can be disastrous. That is why I'm such a fanatic about using the right type of appliances in the right cases.

In general where do you see the delivery of orthodontics going? More non-compliance appliances? Where do you see the next advances?

Well, I could say that there is a quiet revolution going on in orthodontics. I certainly know that we are starting to be more honest about treatment efficacies. I guess there have always been controversies in orthodontics but the belief system that orthodontists seemed to adopt was so ego driven by the strong personalities that we have had in orthodontics. Sometimes I think these personalities were so dominant and charismatic they could give Billy Graham a run for his money. There do not seem to be the same strong personalities in orthodontic teaching nowadays...I guess we're the kinder and gentler generation of orthodontics. You don't often see our teachers standing on the podium implying: "If you don't do it my way, there is something wrong with the way that you do orthodontics." In my view, although I appreciate and revere these personalities, that is a good sign. Orthodontics is no longer driven by the "Tweed" or "Begg" or "Ricketts" techniques. On the whole, orthodontists are becoming closer together because of technology. I think much of this is coming about because, let's face it, orthodontics is easier now than it was in the past.

Jim, we cannot thank you enough for this opportunity to "pick your brain". Your contributions to our profession are innumerable and represent the efforts of someone who can see the future. Thanks for sharing with us.