

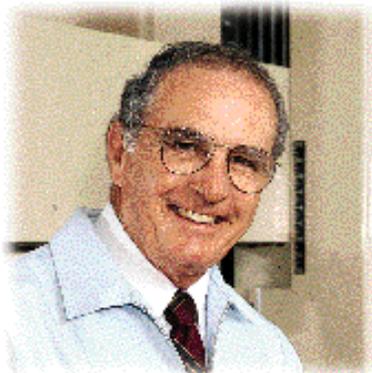
Fall 1996

Orthodontic Perspectives

Newsworthy information for the orthodontic professional

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Dr. Randy Kunik



Dr. Terry Dischinger



Mini Uni-Twin™ Bracket

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Richard P. Iverson

Richard P. Iverson
General Manager

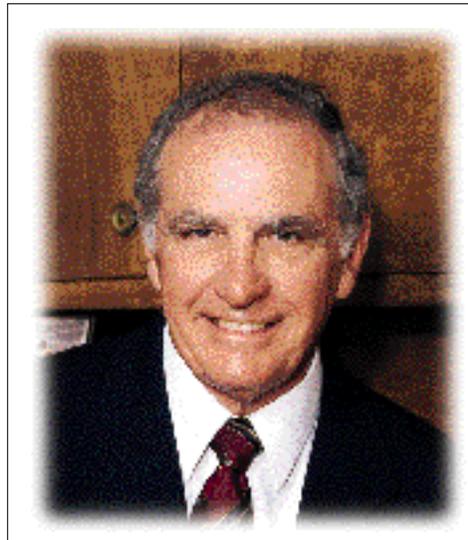
In the last issue of our newsletter, we gave the layout a face lift but more importantly changed the format to a more clinical approach with more doctor-written articles. We have had a tremendous response to the format change. In fact, the new format was so well received that many of you felt the name "NewsWire" no longer accurately reflected the new content format.

I am proud to send to you our newly re-named newsletter "Orthodontic Perspectives". Thanks to those of you that have taken the time to give us valuable feedback. Our goal is to provide you with information that will be useful in your practice and encourage any suggestions you may have. Please feel free to contact us with your suggestions of how we can continually improve the newsletter.

Thank you for helping make Orthodontic Perspectives a success!

Clinical Perspective

Technical Tips Mini Uni-Twin™ Bracket System



Tom Creekmore
Houston, TX

The Uni-Twin bracket system has been in clinical use for a little more than ten years. Many changes have been made in bracket configuration over these years, especially in the area of miniaturization in an effort to improve aesthetics. In some bracket systems these efforts changed the mechanical function between the archwire and the bracket slot.

The Uni-Twin bracket has a single bracket slot in the center of a twin bracket frame providing the increased inter-bracket distance of a single bracket for torque and tip while maintaining the same width for twin bracket rotational control. The Mini Uni-Twin bracket is

30% smaller in the occlusal / gingival height and has a lower profile. Since the bracket slot configuration / size has not changed, the clinically proven, highly efficient mechanical superiority of the bracket system also has not changed.

ARCHWIRE SELECTION

Prior to the introduction of archwires made of nickel titanium and other space age alloys orthodontic forces were controlled simply by the size of the stainless steel archwires used. Small wires produced low forces and larger wires produced greater forces. But now it's not so simple. An .018 Nitinol Super Elastic archwire (74)* produces a little less force than an .012 SS (81). An .018 x .025 Nitinol Super Elastic archwire (175) produces much less force than an .016 x .016 SS archwire (434).

The use of full size archwires and controlling forces by varying the modulus of elasticity of the archwire as advocated by Burstone in the AJO, July 1981, produces much better bracket to bracket alignment in the tipping and torquing planes and eliminates the use of intermediate sized archwires.

There are **significant clinical differences** in forces produced by .016 x .022 (597), .017 x .025 (815), .018 x .025 (967), and .021 x .025 (1535) stainless steel wires. However, these same size wires in Nitinol Super Elastic have force differences of



Fig. 1a



Fig. 1b

* Numbers in parenthesis refer to $WS = MS \times CS$, a wire stiffness comparison; where WS = Wire type, MS is material factor (dependent upon modulus) and CS is cross sectional factor (dependent on size and shape).

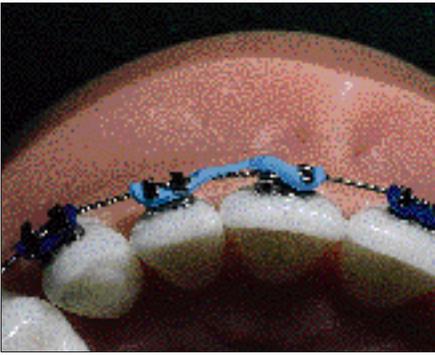


Fig. 1c



Fig. 2a



Fig. 2b



Fig. 2c

.016 x .022 (108), .017 x .025 (146), .018 x .025 (175), and .021 x .025 (279) which are equivalent to the differences between .013 and .016 stainless steel wires; **clinically insignificant differences**. So why bother with less than full sized wires? **Further reductions in forces are also realized by increasing interbracket distance through bracket selection, e.g. Mini Uni-Twin.**

STRAIGHT WIRE PRESCRIPTION:

There are many different prescriptions in clinical use today, but the major differences are in the amount of torque in the bracket slots. For example, maxillary central brackets have +7° for Andrews, +12° for Roth, +14° for Alexander, +17° and +22° Ricketts and Hilgers. These differences depend mostly on archwires vs. slot size used by the operator to achieve the same finishing torque. Andrews found the average crown torque in ideal cases to be 7°. Alexander uses .017 x .025 finishing wires in an .018 x .025 slot. This combination has about 6° torquing play, so, during retraction, the 14° bracket will deliver the central incisor crown to about 8°.

Hilger uses .016 x .022 wires in .018 slots. This combination has about 12° play resulting in the central incisor with a 22° bracket being delivered to about 10° during retraction. The actual torque values delivered will be slightly less since they do not include force diminution.

These high torque prescriptions are only effective for delivering lingual root torque not for delivering labial root torque. For depression or protraction mechanics as in many non-extraction cases. Hilger's combination would allow the centrals to tip forward to 34°

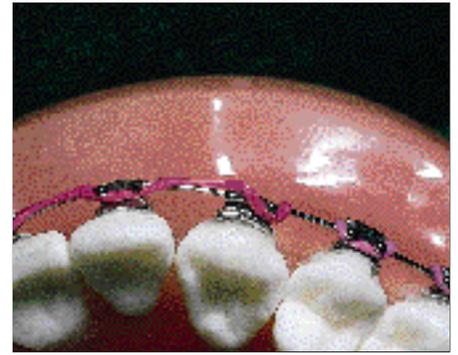


Fig. 2e

before any torque delivery. Alexander's combination would allow the centrals to tip forward to 20°. Labial root torquing bends would be absolutely necessary. Alexander increased the labial root torque to -5° on mandibular incisor brackets which would deliver them to an excellent 1° torque. However, retraction of the incisors would deliver them to -11° which is unacceptable and would require lingual root torquing bends in the archwire. Dischinger has also changed his lower incisor bracket torques to -10° to compensate for undesirable tooth movements that occur with Herbst Edgewise treatment.

These observations explain why one prescription will give different results for different malocclusions and require archwire adjustments. Adjustments can be reduced by using more than one prescription, i.e.; high torques for teeth requiring lingual root torque and low torques requiring labial root torque. While it seems prohibitive to even consider the increased inventory of having multiple prescriptions, in reality it is quite simple, especially if play is minimized by using full size archwires and the **Mini Uni-Twin bracket**.

All that is needed is a 5 to 5 inventory of Roth prescription brackets to be used for cases requiring retraction of anterior teeth as found in most extraction cases.

For non-extraction cases, or where protraction is required, add a few maxillary 3 to 3 Andrews prescription brackets and a few Alexander (-5 degree) mandibular incisor brackets. This small addition of brackets will permit customization of your straight wire prescription to fit most clinical situations.

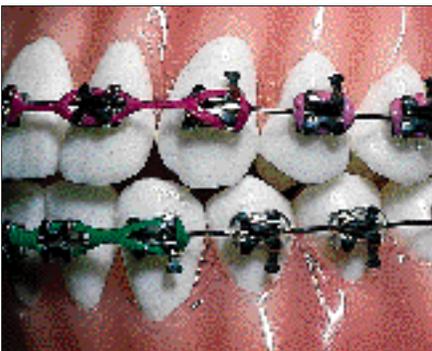


Fig. 2d

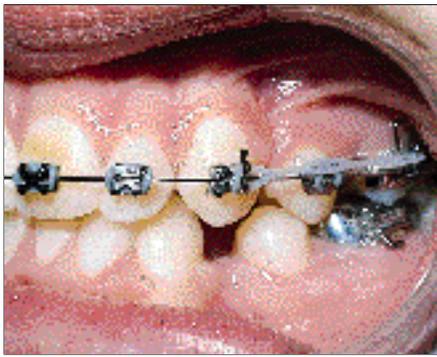


Fig. 3a



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Fig. 3b

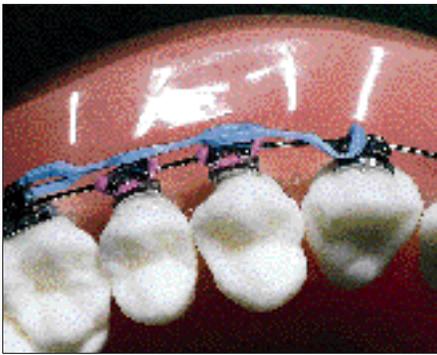


Fig. 3c

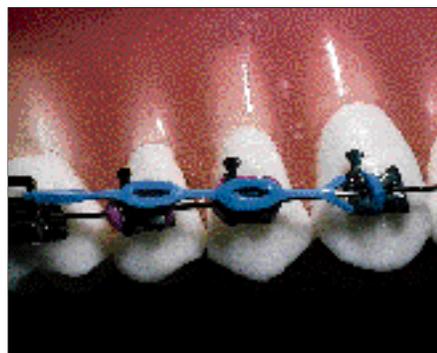


Fig. 3d

ROTATIONAL CONTROL:

Rotations of all teeth should be accomplished in the initial flexible archwires and then ligated tightly to retain the corrections throughout the remaining treatment. Should additional rotation be needed, even on rectangular archwires, this can be accomplished with AlastiK™ chains as shown. (Figs. 1a, b, c; 2a, b, c, d, e)

RETRACTION OF CANINES:

Retraction of canines is facilitated with the Mini Uni-Twin bracket by ligating the distal wings only with an AlastiK chain and extending it to the mesial hook on the molar. **The center section of the bracket holds the AlastiK chain off of the archwire eliminating the friction of the AlastiK sliding on the wire.** No other ligation of the bracket to the archwire is necessary. Undesirable distal rotation is also reduced. (Figs. 3a, b, c, d, e, f; 4a, b, c, d)

BRACKET PLACEMENT:

Orientation of the bracket is similar to any rhomboid shaped bracket. The vertical lines created by the mesial and distal surfaces of the tie-wings are aligned parallel to the long axis of the crown. The horizontal lines created by the occlusal and gingival surfaces of the tie-wings and the archwire slot will then be parallel to the incisal edges of the incisors (if not worn) and to the mesial and distal marginal ridges of the posterior teeth. These horizontal references will be parallel to the archwire plane. (Figs. 5a, b)

TIPPING CONTROL:

Tipping play depends on the mesial-distal width of the slot and the size of the slot vs. the size of the wire. Torquing



Fig. 3f

play is not influenced by the mesial-distal width of the slot, only by the size of the slot vs. the size of the wire. Torquing play is much greater than tipping play, consequently any wire that reduces torquing play to about 6° (.017 x .025 in an .018 x .025 slot) will reduce tipping play to a clinically undetectable amount even with a single width bracket slot. The vertical dimension of a rectangular wire vs. slot dimension reduces tip and torque play much more than the horizontal dimension; i.e., an .016 x .016 vs. .016 x .022 vs. .016 x .025 have much more play than .018 x .018 or .017 x .022 or .018 x .022.

ARCHWIRE SEQUENCING

Optimum archwire sequencing for standard twin bracket width appliances is not the same as optimum sequencing for Mini Uni-Twin brackets because of the difference in inter-bracket distance. Fewer wires are needed to step up to the larger, stiffer archwires used in the working and finishing stages of treatment. Twin bracket users can use their same sequencing for Mini Uni-Twin brackets and they will perceive practically no difference in efficiency except the wires may seem a little easier to engage. However, Mini Uni-Twin users who use optimum sequencing will not be able to insert their archwires in wider twin bracket systems.

Initial archwires differ for fully bracketed cases vs. partially bracketed cases as encountered with mixed dentition or permanent dentition treatment. A stiffer, bendable wire, such as an .016 rd. stainless steel with



Fig. 3e

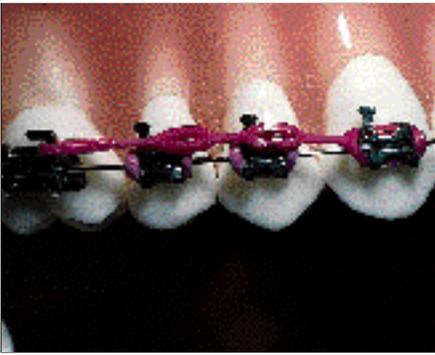


Fig. 4a



Fig. 4b



Fig. 4c

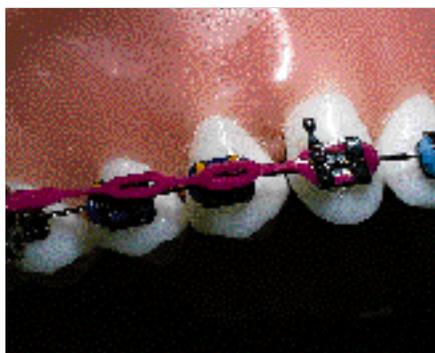


Fig. 4d

tiebacks or utility arch configuration is preferable when centrals, laterals, and molars are bracketed. Some preliminary bends may be necessary for severely malpositioned incisors. This wire is used to correct rotations. This is followed with a .017 x .022 stainless steel wire to open or hold arch length; expand, rotate and / or tip back molars; and depress and / or torque incisors. Any type extraoral anchorage can be used as needed. No other wires are needed until the next phase of treatment.

Most fully bracketed cases can be started with an .018 rd. Nitinol SE archwire and initially tied with AlastiK ligatures, which can limit the force on the teeth and may not seat the archwire fully in the slot. The wire is retied with Alastiks or wire ties until fully seated and remains in place until all of the rotations have been corrected; then move on to the next archwire.

In extraction cases, close spaces with .017 x .022 SS closing arches. After space closure use an .018 x .022 for finishing. Arch wire inventory and sequencing can be different by taking advantage of the decreased stiffness of all archwires in the tipping and torquing planes. An inventory of wires for an .018 x .025 Mini Uni-Twin appliance is .018 round and .018 x .025 Nitinol SE and in stainless steel .0155, or .0175 coaxial, .016 round, .017 x .022 both regular and closing preformed wires, and .018 x .022 for finishing. By using full size archwires and controlling force delivery with highly flexible Nitinol SE wires or braided wires at the beginning of treatment, many small round and intermediate archwires can be eliminated. These wires can easily be followed



Fig. 5b

with stronger full size or near full size stainless steel wires which minimize torque and tipping play and provide control of the posterior teeth while leveling, opening or closing arch length, using inter- arch elastics, and finishing.

GINGIVAL OFFSET BICUSPIDS

Mini Uni-Twin bicuspid brackets with torques of -17° , and -22° are available on gingivally offset bicuspid bases for better retention with -11° to follow. Lower bicuspid brackets can be placed more gingival to reduce breakage from occlusion, and, at the same time, improve the inter-cuspidation of the bicuspids during finishing. The torque increases about 4-5 $^\circ$ per 1/2 mm more gingival positioning of the bracket.

Bicuspid brackets with -11 and -17 degrees of torque for first and second bicuspids positioned 1/2 mm more gingival will deliver about the same torque as brackets with -17 and -22 degrees torque.

The optimum next generation straight wire appliance is .018 x .025 Mini Uni-Twin system and posterior attachments to fit your philosophy of treatment. Roth prescription with additional Andrews prescription maxillary cuspid to cuspid brackets, Alexander prescription mandibular incisor brackets, and 11 degree mandibular bicuspid brackets.

Inventory of archwires includes .0155 or .0175 coaxial, .016, .017 x .022 and .018 x .022 in stainless steel and .018 and .018 x .025 Nitinol Super Elastic wires.



Fig. 5a

• Clinical Perspective

An Interview With Dr. Terry Dischinger



Terry Dischinger, DDS
Lake Oswego, OR

Dr. Terry Dischinger conducts seminars in Atlanta, GA and Newport Beach, CA as well as a hands-on limited attendance course given in his Lake Oswego, Oregon office.

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Editor: Dr. Dischinger, currently you use the Herbst Appliance as an integral part of your Edgewise System. Can you expound upon the benefits of the Fixed Edgewise Herbst™ Technique?

Dr. Dischinger: First and foremost the Fixed Edgewise Herbst technique is not dependent upon patient cooperation to be effective. One of the main reasons why I started using the Herbst in the first place, was to finish those Class II cases where compliance was usually a factor. There are many other advantages to using the Edgewise Herbst Appliance. In fact, we can do a great deal of dental correction while correcting the Class II. In essence, we have the case pretty much leveled and aligned while we are correcting the Class II. In normal edgewise treatment you have to level and align before you can correct the overjet. Another important aspect of the Fixed Edgewise Herbst treatment approach is that I feel as McNamara does, that 90% of all Class II's are retrusive mandibles, con-

sequently, I direct my treatment approach accordingly. Loma Linda University Orthodontic Department has studied a number of our cases. We submitted 65 cases from which 24 cases were selected that met the criteria. In that study they found that when treatment was completed with our Edgewise Herbst approach, there was very little tooth movement and the Class II correction was due to skeletal mandibular change. This research is very exciting to me.

Another very important aspect of The Edgewise Herbst Appliance is that when you use special torque edgewise brackets along with the appliance you **control the incisors**. I was listening to tapes by Bass at the AAO in San Francisco and he mentions that with his appliance he gets more mandibular growth than what Pancherz showed with his Herbst appliance. He felt the reason for more growth was because he controlled the torque on the incisors so he could get the best Class II correction, and proper position of the mandible. It is interesting also to note that Pancherz at the San Francisco AAO convention talked about the use of edgewise brackets. When he reintroduced the Herbst appliance he did not use brackets, but now feels brackets are important to control the incisors during Class II correction. By using maxillary brackets the upper arch may be tied together as one unit to prevent the distalization of the molars, which maintains the repositioning of the mandible. We feel, from our clinical experience, that this is important to getting the maximum orthopedic effect from the appliance. If you do desire to move the molars distally then do not tie back the appliance. The archwire will keep the molar upright as it distalizes, but the mandible does not stay forward achieving the maximum orthopedic effect from the appliance.

Editor: Dr. Dischinger, can you explain your use of the special upper and lower anterior torque values that you use in conjunction with your Edgewise Herbst Therapy?

Dr. Dischinger: The tendency with the Herbst appliance as with many functional appliances is that the upper incisors tend to become too upright. I feel that the key to Class II correction is getting a good cuspid relationship.

If you get the upper incisors upright without the proper torque then you cannot get a good cuspid relationship. Ricketts advocates extra torque on the maxillary incisors so that you can get the mandible and the cuspids in a good position. We use extra torque on the maxillary incisors of +22° on the centrals and +14° on the laterals. This extra torque in my .022 slot system helps offset tendency of the Herbst treatment to "rabbit" the upper incisors during Class II correction. The opposite tends to happen to the mandibular incisors. The Herbst appliance tends to dump these teeth forward. We use a special -10° torque lower anterior bracket in order to keep the lower incisors upright during Herbst therapy. Tweed advocated the tipping back of the lower arch so that when Class II elastics are placed the lower arch would come back forward without tipping the incisors forward. The teeth do not know what kind of forces are being placed on them, Herbst or elastics. This is where the -10° bracket really enhances my control of the mandibular incisors.

The mandibular incisor brackets and the placement of the mandibular archwire slot on the Herbst allows the opening or the closing of the bite during Class II correction. In the open bite situation I would like to have as much anterior overlap in the incisors at the completion of Herbst therapy as possi-

ble to prevent the tongue from thrusting between the teeth when swallowing. Counter force or reverse curve archwires to close the bite are very effective in achieving the anterior overbite.

In deep overbite cases, I would like to intrude the mandibular incisors during Herbst therapy, so when the Herbst is removed there is only posterior contact, not anterior tooth contact.

I feel the anterior tooth contact causes relapse with the muscles pulling the mandible back to avoid the contact. The placement of the archwire slot down low beneath the axle on the mandibular Herbst and placement of a .019 x .025 heat activated wire allows the mandibular incisors to be leveled during Herbst therapy. In open bite cases the mandibular archwire slot is placed above the axle to aid in the bite closure.

First and foremost the Fixed Edgewise Herbst technique is not dependent upon patient cooperation to be effective.

Editor: Dr. Dischinger, could you please explain your typical wire progression when using the Mini Uni-Twin Appliance in conjunction with your Herbst Therapy?

Dr. Dischinger: Almost always our initial archwire while the Herbst appliance is in place with the Mini Uni-Twin brackets is to place a thermal activated .019 x .025 nickel titanium archwire. The combination of current archwire technology and the increased interbracket distance of the Mini Uni-Twin design allows us to gain torque control immediately without any adverse patient response. If we have a severely crowded case we might go to a braided rectangular or a round nickel titanium archwire. At least 70% of the time our initial wire is a .019 x .025 heat activated nickel titanium. There are some that might feel that we need to use extra torque because we do not completely

fill the slot, and that may be true, but what we find is that when we use the extra torque brackets and the .019 x .025 wire we can get proper engagement of the archwire into the slot while still controlling the torque. There is another plus to using this system, most of the time we do not have to change the archwire during Herbst appliance therapy. This approach has proven to be very efficient for our office.

Editor: Do you feel that the functional design of the Mini Uni-Twin appliance allows you to maximize your archwire progression?

Dr. Dischinger: I went to a number of other companies when I wanted to get the -10° torque lower incisors and it was difficult for me to get anybody to make it. Unitek agreed to make

the bracket for me and when the bracket came, it was a Mini Uni-Twin design. When we placed the special -10° torque lower anterior brack-

ets we could not believe how quickly the rotations were corrected. So we changed the rest of our metal brackets to the Mini Uni-Twin. I do feel the interbracket distance does play a role, especially with the wires that are available today. The nice thing about the Mini Uni-Twin design is that you have the control of a twin bracket with the benefits of the single slot concept. I had tried the Alexander type brackets and always had trouble using those brackets with my treatment technique. When using a single wing it is difficult for me to get it on the tooth properly and also a challenge to activate the wings to get the rotations out. I just found that the Mini Uni-Twin solved all those problems and I still have the control that I want with a twin bracket.

Editor: Speaking about efficiencies in the way that you treat your patients and the materials that you use in your

office, please explain the normal treatment time with The Fixed Edgewise Herbst technique?

Dr. Dischinger: The length of time that the Herbst Appliance is in place to correct a Class II depends on the severity of the case when you start. The more severe the longer the Herbst has to be in place to correct the problem. The average treatment time in the Loma Linda Study was nine months; we had one patient of nineteen months that skewed the average treatment time. I am always asked; How long do you keep the appliance on? The way we determine that in our office is we activate the appliance 4mm every ten weeks until we get the case into an over-corrected position. Our normal over-corrected position is the maxillary cuspid is in an end to end relationship with the lower first bicuspid. If the case is an open bite, severe Class II, or older adolescent then we are going to activate to overcorrect a full tooth so that the relationship we see is the maxillary cuspid in a full tooth overcorrection in relationship to the lower cuspid. We activate 4mm every ten weeks until we get to the over-corrected position and then ten weeks after we get to the over-corrected position we take a tomogram. We take corrected tomograms of all our Herbst patients before we start treatment and before we take the Herbst off. Even though they're over-corrected, the condyle needs to be centered in the glenoid fossa. We can usually expect rebound and relapse, I feel this occurs orthopaedically as well as dentally, hence the need for over-correction. There are different schools of thought on how one should over-correct using the Herbst appliance. When I first started using the Herbst some of the research by Wieslander stated that there was 2.3mm of post treatment relapse after the Herbst was removed. This translates to about one half a tooth based on the width of the cuspid. This is how I began to treat my cases using the over-correction treatment approach.

I saw that most of these cases were quite stable, but still I was not satisfied with the results of some of the

more severe cases like open bites and later teens. I determined we needed some more over-correction to gain the stability that we desired. This is how we developed the technique that we have used consistently now for fifteen years. The use of the tomogram is a critical component of my treatment approach.

Editor: What percentage of your patients are treated with a Fixed Edgewise Herbst technique?

Dr. Dischinger: We use the Herbst Appliance to correct all Class II's. That doesn't mean that all Class II's in my eyes are mandibular deficient. You can also use this appliance as a headgear to distalize the maxillary molars and then retract maxillary incisors, if you feel that you have a maxillary protrusion. So it's an appliance we use that doesn't require compliance to correct the Class II.

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Depending on what we want to do with the teeth, we can do it with this appliance. So we can look at where we want to put our maxillary incisors based on our cephalogram, move our molars into position, achieve proper incisor position, and then we feel we can move the mandible to that position. This is the way the appliance is used in our office to correct Class II's. We are set up so that it is easier for us to use this appliance than any other Class II correction device. The quality of the results, the efficiency of our entire system, and the elimination of the compliance factor has proven to me to be the best that I can offer my patients. This is so important in today's world as we know 70% to 80% of mothers are working outside of the home.

When they come home, a majority of these parents would rather not deal with activating appliances or monitoring headgear compliance with their children. They have entrusted me to get the problem solved with the utmost efficiency and care. This treatment approach assists me greatly in delivering on this promise.

• Clinical Perspective

Practice And Appliance Efficiency – An Integration



*Randy Kunik, DDS
Austin, TX*

As with any successful orthodontic practice one of the first items that businesses provide their staffs and patients are the goals and values of that business. In today's jargon we refer to this as a Mission Statement. As I began my private orthodontic practice five years ago I developed our concept of a mission statement to include the highest level of service and to provide the best orthodontic results with a high level of predictability. Not unlike other practices these concepts are the backbone to success and the real work comes in implementation and follow through. In the early years it was relatively easy to spend a great deal of time with my patients and understand their questions and concerns for their overall dental health. Our office has an emphasis on personalized service. Routine coordination of hygiene appointments with referring dentists, minimizing risks of damage to teeth and supporting tissues by eliminating all adhesive flash after bonding, increasing interaction with staff and patients concerning oral hygiene, as well as flexibility to accommodate patient's busy schedules,

allows us to present to our patients the best possible service. This interaction allows me to keep my patients highly motivated toward a successful orthodontic result. This level of motivation is extremely critical in patient compliance psychology and is the necessary ingredient of successful treatment results where patient cooperation is required.

In order to spend the time communicating to the patient and parents the necessary information for optimal compliance and cooperation we find that utilizing the most accurate diagnosis, the most predictable treatment plan, and the most efficient appliance system is of utmost importance. Efficiency and productivity of the practice and staff are all concepts related to successful practice management and center around the overall workings of a practice. Large sums of money are invested in key practice management seminars where the issues are related to the flow of patients, scheduling, and the flow of information. This same careful consideration for efficiency and productivity needs to be applied to diagnosis, treatment planning, and the appliance that is being utilized as the work horse in any practice. Over the last five years we have refined the techniques and appliance to minimize treatment time and chair time and maximize productivity with more predictable treatment results.

This predictability is dependent upon careful patient management. New patients are often seen between 7-10 years of age and mostly placed on observation with treatment not to be initiated at this time. However, a full set of records and subsequent consultations are required to discuss short and long term goals. In most cases, optimum timing for treatment, whether extraction or non-extraction, is during the late mixed dentition period. The records provide the necessary information to determine the

overall orthodontic problem and some idea as to the appropriate starting treatment time, which I carefully communicate to the patient and parent. This initial communication and follow up at recalls allows me the opportunity to develop a unique relationship with my new patient.

An additional advantage of having early records which can be compared to the records taken just before initiating treatment is in the evaluation of this patient's skeletal and alveolar growth changes. How is this patient growing? Is the bite closing or opening? Is the ANB angle or mandibular plane angle increasing, decreasing or staying the same? Is the Class II or Class III occlusion getting worse or better or not changing? Is the crowding changing? It is the management of this patient information that provides me with the data to develop the patient's individualized treatment plan.

In many situations the anticipated treatment results are not achieved by using one preadjusted appliance prescription and straight wires. This is the result of various factors including inaccurate bracket positioning, variations in tooth structure, variations in the maxillary/mandibular relationships, tissue rebound and mechanical deficiencies of preadjusted appliances using straight wires. Inaccurate bracket placement is the greatest cause of arch wire bending. But even with perfect bracket placement there are two additional mechanical deficiencies that can require bends in the archwire. These are play between the archwire

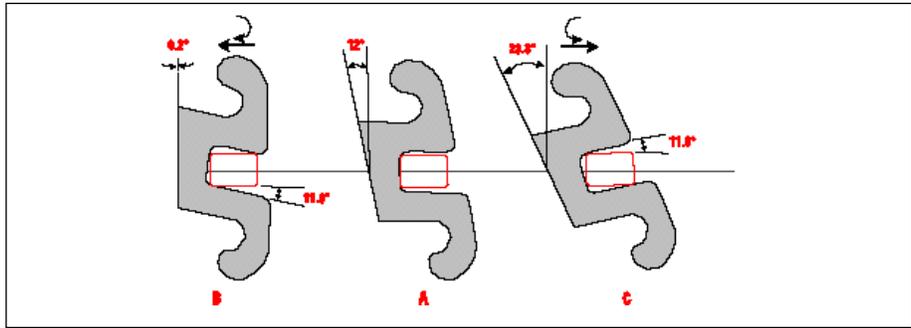


Fig. 1 Effect of torquing play. An 0.016 x 0.022-inch archwire is in an 0.018 x 0.025-inch maxillary central incisor bracket with a 12° torqued slot. Torquing play is 11.8°. A, The archwire slot is parallel to the archwire. The bonding base (the crown of the incisor) is 12° to a perpendicular to the archwire plane. B, With retraction movement, the incisor will "tuck under" until it reaches a torque of 0.2° (torque in the slot minus torquing play). At this point the archwire will begin to deliver lingual root torque. C, With protraction or depression movements, the incisor will procline until it reaches a torque of 23.8° (torque in the slot plus torquing play). At this point the archwire will begin to deliver labial root torque.

and bracket slot, and force diminution.

The greatest amount of play in a preadjusted appliance is in the torquing plane. Torquing play depends on the size of the rectangular archwire relative to the size of the rectangular slot (Table 1). Full size wires have about 3 degrees play in either direction from center. Torques of two central incisors, one tucked under and one procumbent, will end up 6 degrees apart. Full expression of the torques in the brackets will never be achieved regardless of how long the wire is left in place. (Fig 1)

Force from a deflected archwire diminishes as the teeth move and the wire straightens out. At some point the force of the wire diminishes to the minimum force required to produce tooth movement, thus movement stops before the wire straightens completely. The loss of tooth movement from force diminution

depends on the stiffness of the archwire; stiffer wires decrease the effect of force diminution. Straight nickel titanium wires are ineffective for leveling a curve of spee but the very popular reverse curved nickel titanium wires are. The reverse curve compensates for force diminution.

Play and force diminution cannot be eliminated from preadjusted appliances using straight wires, but they can be minimized by using reasonably stiff archwires, i.e; stainless steel, that closely approximate the size of the archwire slots. The amount of play plus the amount of force diminution inherent in your appliance can be added to or subtracted from the torque, tip, rotation and height parameters for each bracket to deliver the teeth to the desired positions.

After the treatment plan is formulated and tooth movements are determined actual measurements of the angulation of maxillary and mandibular central incisors relative to their archwire planes can be made on the cephalogram using an Incisor Torque Template (Creekmore Enterprises, Inc., Houston, Texas) to provide more accurate torque requirements for that patient. Once these goals are determined, increasing or decreasing bracket torque can be incorporated into the appliance prescription. Ideal bracket prescriptions for various malocclusions can be accomplished with minimal inventory.

In my particular practice I prefer to use an indirect bonding technique. The individualized prescription accompanies the impressions to the laboratory 1-2 weeks prior to appliance place-

ARCH WIRE SIZE	BRACKET SLOT SIZE	
	0.018 x 0.025 †	0.022 x 0.028 ≠
16 x 16 §	12.5°	Rotates
16 x 22	11.8°	34.3°
17 x 22	7.3°	27.9°
17 x 25	5.9°	21.0°
18 x 18	5.5°	Rotates
18 x 22	3.8°	23.1°
18 x 25	3.1°	17.7°
19 x 25		12.8°
21 x 25		5.2°
215 x 28		2.9°

Calculations based on midrange values. *Data courtesy 3M Unitek.
 † 0.018 tolerances 0.0182 to 0.0192 midrange 0.0187. ≠ 0.022 tolerances 0.0220 to 0.0230 midrange 0.0225.
 § 0.016 x 0.016 dimension actually 0.01625 x 0.01625. || 0.018 dimension actually 0.0178.

Table 1 Torquing play from parallel. Amount the archwire can rotate in the slot in either direction from a parallel position. Delivered labial or lingual root torque equals torque in the slot plus or minus play, respectively.

ment. Utilizing the capabilities of the Slot Machine, precise bracket placement according to the prescription can be delegated to my technician. With the use of indirect bonding and individualizing the bracket prescription an energy shift in labor from chair side to the lab is, in my practice, a worthwhile tradeoff. For clinicians who feel that they can achieve similar positioning results using a direct bonding technique the APC™ light-cure system provides an efficient method of bracket delivery and maximum working time for better bracket placement. In either case the critical issue of accurate bracket placement and bracket prescriptions can be addressed and satisfied.

Although we put a great deal of effort into our appliance design, that does not imply that we do not bend archwires. In our office we have chosen to use the Mini Uni-Twin appliance. We have found that this system offers us the greatest ability to better address the bracket deficiencies related to play between the archwire and slot. The appliance affords our office the distinct advantage of greater interbracket distance without compromising rotational control. Full size archwires with high modulus of elasticity are able to be used early in treatment. The play between the archwire and slot is greatly reduced; and the use of larger Nitinol SE archwires early as well as the ability to place stainless steel wires with little discomfort in the early stages of treatment, allows for greater focus to be given to the malocclusion.

I have made many choices in the type of practice I want so that it can continue to grow in the future. Most importantly, I have chosen not to sacrifice quality for quantity. I am acutely aware that the greatest reward I receive from my practice is the patient appreciation. The time I have chosen to spend getting to know my patients and help them achieve the best orthodontic result is more rewarding to me than the alternative of a less hands-on, more commercial style practice. Utilizing the Mini Uni-Twin appliance in combination with the principles of an individualized treatment and appliance design has allowed my patient relations to grow along with the growth of my practice.

• Assistant's Exchange

Selective Root Torque

*Kristin Alcantara-Pietrzyk, RDA,
Merced, CA for Dr. Lee R. Boese*

Relapse crowding of lower anterior teeth has many causes. Dr. Boese's treatment plan to enhance longer term post orthodontic treatment stability includes:

- overcorrection
- reproximation
- selective root torque
- fiberotomy
- no lower retention

While all of the above are important, the overcorrection of lower teeth with selective overtorquing of the displaced root significantly neutralizes a powerful relapse factor. Our

office has seen that a lower anterior tooth that has not been overcorrected with a selective aggressive root torque can relapse within 2 to 4 weeks after appliance removal, if lower retention is not initiated. Thus overcorrection is a critical factor.

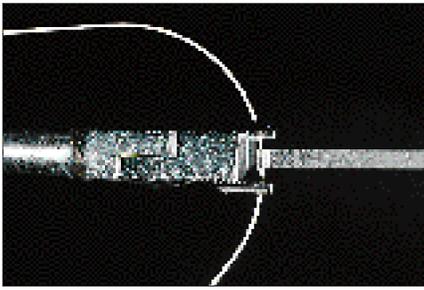
Dr. Boese's treatment plan requires early use of a .017 x .025 Nitinol Classic wire as the first rectangular wire. Subsequently, a Nitinol Classic .019 x .025 is used to displace the root. We use the Nitinol Classic because of its ability to hold a bend, particularly a torquing bend, as well as its moderate force (below that of both stainless steel and beta titanium wires).



Note palatally displaced maxillary lateral incisors which occlude against lingually displaced mandibular lateral incisors. Any post treatment lingual relapse of the maxillary lateral incisors will also contribute to relapse of the mandibular anterior segment.



Note lingually positioned roots of the mandibular left lateral incisor and maxillary right lateral incisor. Both displaced lateral incisors will require aggressive labial root torque to produce an overcorrection and thereby neutralize a significant local relapse factor.



Either .019 x .025 or .017 x .025 Nitinol Classic (standard lower form) can be selectively torqued utilizing the wide Rose Torquing Pliers along with the narrow .018 or .021 torquing key. It is important to use the wide pliers in conjunction with the narrow key to prevent wire breakage.

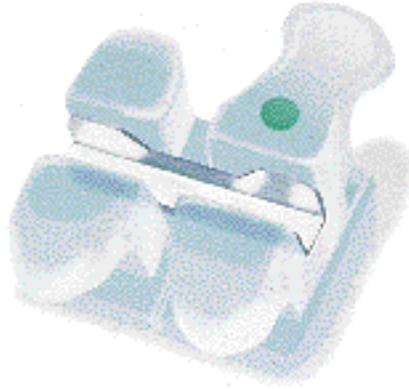
The assistants in our office are experts in placing bends in this martensitic nickel titanium wire.

- A wide jaw Rose Torquing Pliers (#804-603) is used with a narrow key (#805-022). This maximizes the wire length available which permits aggressive torquing without breaking.
- We also place a compensating lateral offset bend to prevent incisal edge rolling towards the lingual.
- We also place step up and step down bends as needed.

This root torque is done early in treatment, beginning with the first rectangular wire, which is maintained in place for at least three months to prevent relapse. The ability to place a selective torquing bend in combination with moderate wire forces and longer working range offered by the Nitinol Classic has resulted in efficient and comfortable tooth movement plus long term stability.

Recent Developments

Clarity™ Metal-Reinforced Ceramic Brackets



Now you can have it all with the new Clarity Metal-Reinforced Ceramic Brackets! They're the only metal-lined ceramic brackets offering the look your patients want, with the functionality you prefer. The Clarity ceramic brackets feature easy debonding, sliding mechanics and strength equal to metal brackets, and the superior aesthetics of ceramic.

Clarity ceramic brackets debond like metal due to the patented debonding slot and "stress concentrator" located on the base of the bracket. The debonding slot concentrates stress at this point causing the brackets to collapse under gentle pressure for consistent debonding every time.

The metal-lined archwire slot allows for sure, smooth tooth and bracket movement along the archwire with virtually no friction. Clarity ceramic brackets are built for strength. An innovative production process is used to pre-stress the brackets in much the same way that concrete is pre-stressed to withstand the rigors of day-to-day use and abuse. The metal-lined archwire slot is brazed to the ceramic bracket which gives you the "backbone" required to achieve higher torque strength.

Clarity ceramic brackets are also available with APC™ adhesive coating. An unbeatable combination of strength and beauty, Clarity brackets will forever change your perspective on ceramic bracket performance.

Victory Series™ Gold Appliance System

The Victory Series Appliance System, an advanced, completely integrated system, is now

available with 24 karat gold plating. Plated with 300 micro inches of gold, the Victory Series system is significantly brighter in appearance than competing appliance systems coated with titanium nitride. The pure, 24 karat gold plating is guaranteed to remain for the duration of the treatment and offers patients an aesthetic alternative to the steel appearance of traditional metal brackets. The Victory Series gold system features brackets, archwires and auxiliaries, including gold-colored AlastiK™ ligatures and chain and is available in APC adhesive coating.



Mini Uni-Twin™ Brackets

The Mini Uni-Twin Bracket features a new mesh base in addition to innovative design features that put you in control right from the start of treatment.

Combining the inter-bracket distance of a single width appliance with the rotational control of a twin bracket, it's designed for optimal orthodontic results. The innovative mesh bonding base is designed to match precisely to the curvature of the tooth for maximum contact and strong, consistent bonding.

The Mini Uni-Twin bracket improves tooth movement in the early stages of treatment and tooth control throughout the course of therapy. For added convenience, you can select the Mini Uni-Twin bracket with APC adhesive coating.

