THE K&R GROUP WATCHES INTENTLY AS DR. ZIEG WEBER OF SOUTH AFRICA SHOWS HIS LINGUAL TIP-EDGE CASES. MORE ABOUT THIS IN A LATER ISSUE.

TIP-EDGE® TODAY

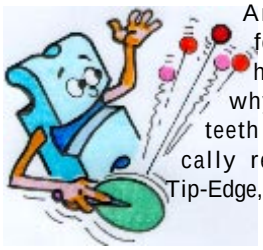
Published Quarterly In The USA

DR. DOYLE BALDRIDGE PREPARES TO BEND AN ARCHWIRE AS STUDENTS LOOK ON DURING FIRST COURSE GIVEN IN RUSSIA (PAGE 4).

FALL 1997

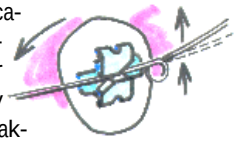
EDGELINES

RETRACTION AUTOMATIC



Analysis of force vectors helps explain why anterior teeth automatically retract with Tip-Edge, Cover Story.

"BACKWARDS" BRACKETS MAY NOT BE THE ANSWER



Switching canine brackets left for right may not solve braking problem. Q's & A's, Page 2.

HUNTING LOST OR INADEQUATE TORQUE

Eleven points are addressed that could result in reduced rates or degrees of torque, Page 3.

TIP-EDGE GRAPHIC

Tippy considers a new parking sign for "slot challenged" orthodontists.

COVER STORY

Intrusion and Retraction of Anterior Teeth

By Peter C. Kesling, D.D.S., Sc.D.

Intrusion and retraction of anterior teeth in the Differential Straight-Arch® Technique (DSAT) is unique from any other edgewise regimen. The combination of archwire and elastic forces acting within the Tip-Edge archwire slot creates tooth movements that are predictable and relatively simple to achieve.

When using other preadjusted, "straight wire" brackets, it is recommended to use high-pull headgear to retract and/or intrude maxillary anterior teeth. Extraoral force is also necessary to retract procumbent or flared mandibular anteriors.[1]

Even though Tip-Edge brackets are preadjusted with both tip and torque angles; they do not (as compared to all other straight wire brackets) tend to move the canine crowns mesially. Furthermore their unique archwire slots permit all the anterior teeth to incline distally.

Protrusive anterior teeth can routinely be expected to retract and intrude when the proper archwire and elastic forces are applied.

Force Vectors

An analysis of force vectors applied to the maxillary anterior teeth in a Class II Division 1 malocclusion was reported by Dr. Richard Hocevar over twenty years ago.[2] Slightly modified graphic representations from his article help explain the direction and magnitude of the resultant vector from archwire and elastic forces. The means of determining this resultant vector is shown in Figure 1.

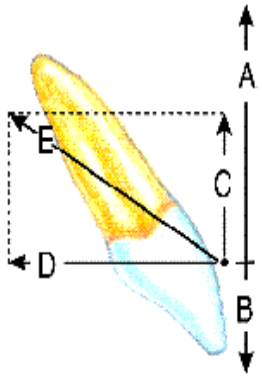


Figure 1.
A. The gingivally directed force created by bite opening bends mesial to the anchor molars and delivered to the anterior teeth by the archwire.
B. The incisally directed vertical component of the Class II intermaxillary elastic.
C. The net gingivally directed force on the anterior teeth (A minus B).
D. Horizontal component of the Class II elastic.
E. Resultant force vector of (C plus D).

Length of force vectors is proportional to force magnitude.

Vector Determines Movement

The direction and location of the force vector created by the combination of archwire and elastic forces and the inclination of the tooth determines the type and direction of movement, Figure 2.

1. If the force vector passes through the center of resistance (CR) of the tooth, the result is translation (no labiolingual rotation).

2. When the force vector passes below the CR but within the root area, the tooth intrudes while rotating to a more upright position.

3. If the vector passes through the root area above the CR, the tooth rotates tending to flare labially as it intrudes.

Of course, the same force analysis and resultant tooth movements can be applied to the mandibular teeth in the treatment of Class III malocclusions.

From the preceding diagrams it is evident that only when the resultant force vector from archwire and elastic forces passes above the center of resistance does the tooth tend to flare labially.

Please see COVER STORY next page

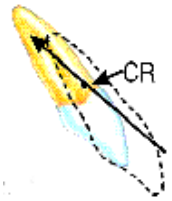
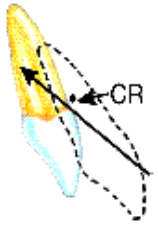


Figure 2. **1.**



2.

3.

COVER STORY

Intrusion and Retraction . . .

Tendency to Flare Automatically Controlled

Fortunately there is no reason for the operator to predetermine force vectors or the individual centers of rotation for anterior teeth before treating with the DSAT. Any tendency for maxillary or mandibular flaring is automatically checked or accommodated.

Starting archwires to correct anterior overbites and overjets through differential tooth movement have certain characteristics. These include a .016" round cross section, high tensile strength, strong anchor bends mesial to the anchor molars and expansion to counteract the tendency for narrowing of molars from extrusive forces. When placed, these archwires also have their ends bent distal to the molar tubes.

Therefore, any tendency for the central and lateral incisor crowns to flare labially will be checked by the anchor molars themselves. This is another example of differential tooth control — the potential labial tipping of anterior teeth from light forces is being prevented by the resistance created by the necessary bodily movement of the anchor molars.

Also one must remember that the forces applied to the anterior teeth are so light, 1 to 2 ounces, that such incisal flaring can also be controlled by lip pressure alone.

Space Closure Can Overcome Force Vector Flaring

In extraction cases the canines are also free to tip distally and with cuspid ties (from the canine brackets to the intermaxillary circles) tend to move the archwire distally. The loose fitting molar tubes offer no resistance and the central and lateral incisors are not only restricted from flaring, but tend to become more upright.

Anterior Flare Unavoidable in Some Cases

Of course, if the original malocclusion exhibits anterior crowding and the case is treated nonextraction, the crowns of the anterior teeth will flare regardless of the relationship between force vectors and centers of resistance. The ends of the archwire cannot prevent flaring because they will not be bent tightly against the molar tubes (to permit necessary increase in arch length) or the archwire will contain vertical loops and itself be the cause of the flaring.

Lingually Inclined Incisors Need Special Attention

The only exception to the "Laissez-Faire" approach to incisor intrusion with Tip-Edge brackets applies to lingually inclined incisors — usually mandibular.

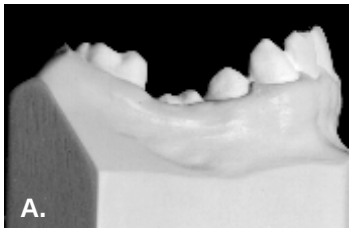
The intrusive force from the .016" initial archwire tends to "scoot" the central and lateral incisor roots labially and tip the canine crowns distally. A brief period with a rectangular mandibular archwire and Side-Winder springs can upright the six anterior teeth to permit further intrusion, Figure 3.

Less Equals More

Therefore, when properly treating with differential forces, round archwires and Tip-Edge brackets, there is no possibility of accidentally flaring the maxillary or mandibular teeth during the initial bite opening phase of treatment.

Also since the anterior teeth tend to move lingually under the resultant force vector, there is no need to retract with extraoral force. Another example of less force resulting in more control.

Figure 3.



Super-erupted and lingually inclined mandibular incisors at the beginning of treatment. Second deciduous molar is ankylosed with no succedaneous tooth below.

Place appliance appointment with .016″ Australian archwires in place. Vertical loop (stop) mesial to maxillary first molar to maintain space for unerupted canine.

After three months of treatment, anterior bite has opened but mandibular incisors remain lingually inclined. Mandibular .0215″x .028″ archwire and Side-Winder springs on the six anterior teeth for distal root positioning and labial crown torque. Maxillary .014″ nickel titanium archwire to erupt the canine — no elastics.

Three appointments later, mandibular incisors have uprighted and .016″ archwires are back in place for balance of stage one tooth movements. Maxillary central incisor band placed previously due to bonding difficulties caused by restoration. Class II intermaxillary elastics resumed.

References

1. Roth RH. Treatment mechanics for the straight wire appliance. In: Graber TM, Swain BF, ed. Orthodontics. Current principles and techniques. St. Louis: C.V. Mosby, 1985:665-716.

2. Hocevar RA. Force balance and control with the Begg technique. New Zealand Orthod. Soc. Newsletter. No. 6, July 1977.

Q's and A's

Q. Sometimes it seems Side-Winder springs cannot deliver enough power to prevent mandibular canines from tipping distally when "putting on the brakes." If I know brakes are going to be necessary at the beginning of treatment, why not switch the canine brackets left for right? Then I would not need springs to hold the canines upright.

Greenfield, MASSACHUSETTS

A. You are correct in your thinking. However, the brackets would have to be bonded carefully to have the desired final crown tip angles. They must be angled opposite to the long axis of the crowns.

Before doing this remember a little distal tipping is not uncommon during braking procedures. However, if excessive force (16 ounces instead of 6-8) is applied and/or a .016" archwire used instead of a .022", the archwire can actually be deflected incisally by the canines tipping distally. This is to be avoided as it deepens the anterior bite and opens it in the buccal segments.

Q. I love the concept of torquing with Side-Winder springs but sometimes it seems to occur too slowly — why is this and how can I speed it up?

Chicago, ILLINOIS

A. Your question is very timely. Please refer to all the points listed by Dr. Parkhouse on page three. When all else fails, consider the length of time the patient has been in stage three. First premolar extraction cases often require nine to twelve months to "torque-out." Second premolar extraction cases a bit less and even nonextraction treatment may need six to nine months for final torque angles to be expressed.

Trouble Shooting Inadequate Torque

The following reasons for inadequate or slow rates of torque with Tip-Edge brackets were prepared by Dr. Richard C. Parkhouse of Wales. It is a portion of his new, revised "Rectangular Stage Three" section for the TIP-EDGE GUIDE ©. This third printing of the 3rd Edition is expected to be completed by November 1997.

1. Incorrect bracket. Use of a bracket designated for a different tooth will express an inappropriate torque.

2. Misangled bracket. As with any straight wire appliance, angling the brackets accurately up the long axis of the tooth is essential to a perfect finish. Angling the jig toward the disto-occlusal will achieve corrected tip angulation before the bracket has self-limited. Therefore, the torque will not have been expressed.

3. Incorrect archwire. Use of an undersized rectangular archwire will reduce torque response. A Side-Winder spring needs the maximum archwire width to produce the torque effect.

4. Incorrect bonding position. Placing a bracket too far incisally or gingivally will significantly alter the final torque angulation.

5. Incomplete bracket engagement. Even a small rotation will greatly reduce the efficiency of torquing.

6. Wire ligatures. Only elastomeric ligatures should be used during stage three. Stainless steel ligatures ties will not readily change their shape to accommodate to angular changes between archwire and bracket during second and third order uprighting.

7. Tight contact points. Cinching the archwire ends too tightly will produce tight contact points which hinder or prevent the action of the Side-Winder springs.

8. Slack Side-Winders. Activation of Side-Winders, as delivered, is normally sufficient for root uprighting in the tip plane, without need for reactivation. However, the Side-Winder has to work harder to produce torque. Particularly towards the end of stage three, some "hyperactivation" of the springs on incisors may be helpful in achieving final torque definition. This can be achieved without removal of the springs from the mouth, simply by inserting the square beaks of spring forming pliers within the spring coils and giving a single squeeze, as outlined on page S3 Round-6.

9. Incorrect torque value in archwire. It is better to set the torque in the archwire to overtorque slightly rather than undertorque. The latter will allow the bracket to self-limit before the desired torque correction has been realized, no matter how active the Side-Winder.

10. Late crown movements. A Side-Winder will torque a stationary tooth to its intended prescription. If, however, a tooth crown is moved late in the torquing process, there will be a small delay while the spring retorques the root to the new crown position.

11. Tipped occlusal plane. It should be remembered that the torque-in-base torque prescription is relative to the plane of the archwire. Therefore, if the occlusal plane is allowed to rotate clockwise during treatment (usually due to inappropriate use of Class II intermaxillary elastics or too high elastic forces) a correct torque value achieved between bracket and archwire may appear as undertorqued facially.

CASE REPORT

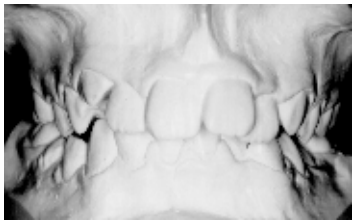
By: Professor Charles Bolender
Strasbourg, FRANCE

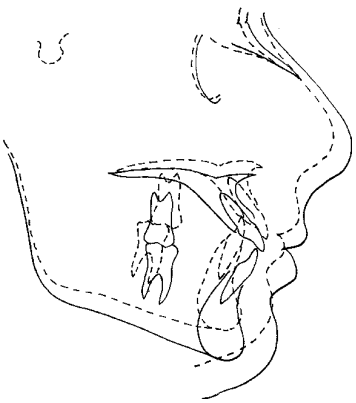
Boy of 11 years of age with a Class II Division 1 malocclusion (10 mm overjet) treatment started in mixed dentition. The mandibular incisor crowding was not important enough to justify extractions of premolars. Mandibular incisor to A-Po was -2 mm and leeway was estimated at a 3 mm level. The facial type was brachyfacial.

Lateral X-ray depicts the occlusion at the beginning of first phase of treatment with Tip-Edge brackets and quad helix to obtain expansion in the maxillary premolar area. Appliances in both arches. Class II elastics were used to achieve Class I molar and incisor occlusion without overjet.

After a 13 month interruption period with the quad helix removed, premolar brackets were bonded and the second phase began. Maxillary and mandibular .016" Australian archwires were inserted and Class II elastics worn 24 hours a day.

The duration of stage three was 3 months. Standard rectangular shiny bright archwires (.0215" x .028") were used in both arches. Side-Winders only on maxillary and mandibular lateral incisors and canines. Occasional use of Class II elastics on power pins and E-Chain to maintain good canine and incisor relations.





V.F. ..... Male, 11 Years
Class II, Division 1
Nonextraction
Tip-Edge & Quad Helix ..... 6 Months
Interruption of treatment ... 13 Months
Tip-Edge Finishing ..... 16 Months
Archwires Used 6 (3U, 3L)
Retention ..... Cuspid to cuspid, lower bonded retainer

Cephalometric Changes:

	Start-Dotted	Finish-Solid
1 A-Po	-2.0 mm	+3.0 mm
Wits	+4.0 mm	-2.0 mm
SN-MP	25.0°	28.0°
SNA	83.0°	78.0°
SNB	78.0°	79.0°
ANB	5.0°	-1.0°
1-SN	112.0°	118.0°

Tip-Edge Course Given in Far East Russia

The first Tip-Edge course ever given in the entire Russian Federation was held in May of 1997 at Khabarovsk.

The Khabarovsk Medical University presented a five day Differential Straight-Arch Technique course. Instructors included Drs. Doyle Baldridge and Wayne Logan of the U.S. and Igor Yelistratov, Chairman of Orthodontics.

Tip-Edge course Khabarovsk State Medical University. Front row, left to right, Dr. Yelistratov, Dr. Solomenko (Interpretor), Dr. Baldridge, Dr. Logan and his wife.

Dr. Baldridge first went to Khabarovsk, the regional capital, in 1994. He taught Dr. Yelistratov and the students differential tooth movement with ribbon arch (256) type brackets. This course was their first introduction to Tip-Edge brackets with each student going through all stages on a typodont.

The twenty-five students included five from the orthodontic department itself and others from throughout Russia. Two were from Siberia in the north, three from Vladivostok in the south and an instructor from a university in Moscow—which incidentally is seven time zones to the west.

The Chairman of the International Language department of the Medical University who was the interpreter translated the TIP-EDGE GUIDE into Russian. After the course, a supply of Tip-Edge brackets was left with Dr. Yelistratov for the treatment of patients at the department.

Tip-Edge Course in Jordan

Twenty-seven participants from several countries in the Middle East attended a two-day lecture course on the Tip-Edge technique in the palatial Regent Palace Hotel, Amman, Jordan. The course was given by Professor Andrew Richardson from the Queen's University of Belfast and arrangements were made by Munir Rihani of Rihani International Inc., the major supplier of TP products in the Middle East.

Jordan Orthodontic Society, Amman, Jordan — March 28-29, 1997
Prof. Andrew Richardson, center front row.

The course immediately preceded the annual meeting of the Jordanian Dental Society and was introduced by Dr. Saied Abu-Maizer, President of the Society and Dr. Riyad Al-Battikhi, President of the Jordanian Orthodontic Society.

The course, which was especially memorable for lively discussion sessions, and the Tip-Edge technique were received enthusiastically by the participants. Professor Basheer Kinaan from the dental school in Irbid is to introduce the technique in his department immediately.

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