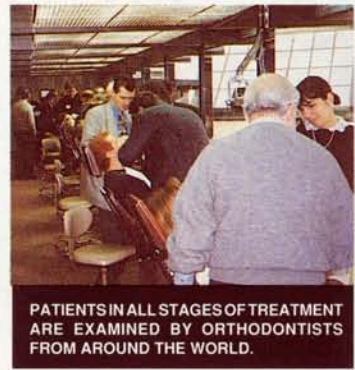


DRS. YOSHIHIRO ARIMA AND RICHARD PARKHOUSE AT PARTY GIVEN BY THE JAPANESE TIP-EDGE SOCIETY IN OSAKA.

# TIP-EDGE TODAY™

Published Quarterly by TP Orthodontics • USA



PATIENTS IN ALL STAGES OF TREATMENT ARE EXAMINED BY ORTHODONTISTS FROM AROUND THE WORLD.

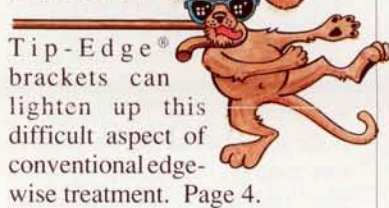
SUMMER 1993

## EDGELINES


### NOTCHES GIVE RELIEF:

 Small grooves accept Side-Winders and positioning jigs. Page 3.

### RETRACTING CANINES:

 Tip-Edge® brackets can lighten up this difficult aspect of conventional edgewise treatment. Page 4.

### BUCCAL FLARING:

 Flaring of molars buccally usually caused by excessive anchor bends. See Q's & A's, page 2.

### TIP-EDGE GRAPHIC



Tippy finds another use for notches.

# Let The Patients' Teeth Do The Walking It's The Natural Thing To Do

*The natural development of humans includes crawling before walking. There is a similarity in the development of the edgewise bracket—except it has taken nearly seventy years to change from crawling/sliding tooth movement to walking.*

The normal, comfortable way to cross a room is to walk—not to stand upright on a sled and be pulled across. The same is true for tooth movement.

"Walking" is the most physiologic and efficient means of moving teeth. This is accomplished by first tipping the crown to the desired position and second, uprighting the root apex over the crown—differential tooth movement. This is true for both the mesiodistal repositioning of canines and premolars and the labiolingual translation of central and lateral incisors.

### The Problem

However, the majority of orthodontic tooth movement today is bodily—the most difficult and anchorage demanding means of moving a tooth. Why do 80-90 percent of orthodontists move teeth bodily—dragging them in upright positions while fighting friction between the archwire and the bracket?

The answer lies in the design of the conventional edgewise archwire slot conceived over sixty years ago. In the presence of a continuous archwire, it prevents mesial or distal crown tipping which is the first "step" toward the simplest, most energy efficient means of repositioning a tooth. The second step, uprighting the root to the desired inclination, can not be taken with the archwire

in the slot except by a "forced march" driven by second order bends, closing loops, and/or extraoral force.

Therefore, the reason the majority of orthodontist don't "let their patients' teeth do the walking" is simply because edgewise brackets with conventional archwire slots, plain or preadjusted, don't give them a choice. They could not let their patients' teeth "walk" around the arch, even if they wanted to. No more than someone in a sled could benefit from the advantages of the wheel without changing his or her method of transportation. If one desires to change the way they transport their patients' teeth, they must change the hardware—change the archwire slot.

### The Solution

The Tip-Edge archwire slot eliminates the confines of the conventional slot and opens up a whole new world of edgewise orthodontics. For the first time, teeth are free to "walk" under the lightest of forces. When combined with a technique that includes moving the archwires along with the teeth during space closure, bracket/archwire friction is completely eliminated.

No tooth that is to be moved in any direction, including intrusion, should have its inclination fixed—or restricted from changing. This would delay desired

movement and require greater force—both cause undue strain on, or increase the requirements for anchorage.

With the advent of the Tip-Edge archwire slot, teeth are now free to fully express themselves (in all three dimensions) in response to the lightest of forces.

### Retraction

During retraction and subsequent uprighting in first premolar extraction cases, the maxillary canines will "walk" as shown in Figure 1A&B. Such changes in position and vertical control (solely from intraoral forces) are only possible with differential tooth movement.

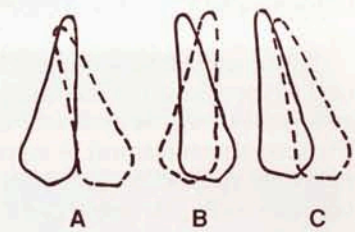


Figure 1A-C. The "walking" of a maxillary right canine distally in a first premolar extraction case; A) Distal crown tipping and intrusion, B) Root uprighting and, C) Net bodily repositioning.

The end result is the desired, bodily repositioning of the canine as seen in Figure 1C. Of course, such "walking of teeth" would not be possible or practical without the gentle, continuous root uprighting forces generated by auxiliary springs which do not distort either .022" round or .022" x .028" rectangular archwires.

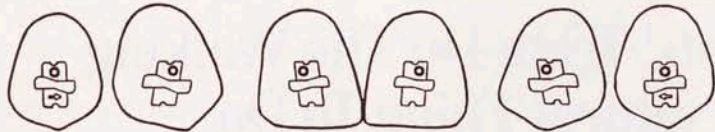
Cont. on Pg. 2

## Q's and A's

**Q.** I plan to extract the maxillary lateral incisors on a sixteen year old female due to localized bone loss around these teeth. Is there any need to wait after the extractions before closing the spaces? Any variations in the technique?

ASTORIA, ILLINOIS

**A.** Assuming there is no infection in the extraction sites, space closure can begin 1-2 weeks after the extractions. If the spaces are relatively large, you might consider switching canine brackets. That is, place the left on the right and vice versa. The Tip-Edge archwire slots will then be oriented to promote mesial crown tipping and enable ease of moving into larger archwire sizes.



When switching brackets in this manner, bond them so the occlusal and incisal edges are parallel with the plane of the archwire. Obviously the mesial and distal surfaces of the brackets will not be parallel with the long axis of the canines as in normal bracket placement. If the premolars also need to tip mesially, choose clockwise and counterclockwise brackets accordingly.

**Q.** When do you bracket and engage premolars?

MYANMAR, BURMA

**A.** The premolars are usually not bracketed or engaged until the anterior overbite has been corrected. However, in second premolar extraction cases the first premolars are generally bracketed at the start of treatment and treated as anterior teeth unless the anterior bite is extremely deep.

**Q.** Why would molars experience buccal flaring—even with an intruded .022" archwire during Stage III?

UNITED KINGDOM

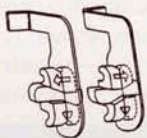
**A.** Any excessive, gingivally directed force from a round archwire to a buccal tube will cause molars to flare — in **any** stage of treatment. Actually if the force is generated by the archwire itself (not auxiliaries acting upon it), the tendency would be **greater** with a .022" archwire than with a .016" because everything else being equal, the force would be greater.

If the molar tube is occlusal to the second premolar archwire slot (and no compensating second order bend is made in the archwire), the archwire will force the molar tube gingivally and the premolar occlusally. The second premolar will be supported from moving occlusally by the first premolar and/or the canine to the mesial and, of course, the opposing teeth. The molar (if the terminal tooth on the archwire) has nothing to counteract the gingival force and tips or flares buccally. Similar buccal flaring of molars will occur if strong, localized bite opening bends are placed in archwires that engage the second premolars. This problem would be exaggerated if the archwire were .022". A properly formed, .022" archwire can withstand all the reciprocal forces from uprighting springs and a torquing auxiliary during stage three while serving as a retainer to maintain horizontal and vertical control until each tooth reaches its final axial inclination.

**Q.** It is difficult to identify clockwise and counterclockwise premolar brackets because the positioning jigs cover the directional arrows. Could a little spur be added to the middle of the jig pointing in the direction of the arrow?

PROF. ANDREW RICHARDSON, BELFAST, IRELAND

**A.** Great idea — however, spurs in the center could interfere with grasping by forceps. TP has met your challenge by bending the occlusal ends of the jigs in the direction of the extraction sites (arrows). This change is being phased into production so everyone can benefit from your idea.



## Let Patients' Teeth

Cont. from Pg. 1

### Torque

The lingual/palatal movement of anterior teeth is one of the most beneficial aspects of differential tooth movement. The lingual crown tipping as shown in Figure 2A is accomplished easily in the presence of archwires that are round in cross section and the Tip-Edge archwire slot which permits coincidental distal crown tipping of lateral and central incisors. The confines of an ordinary edgewise slot prevent such distal crown tipping thereby slowing treatment and unnecessarily taxing anchorage.

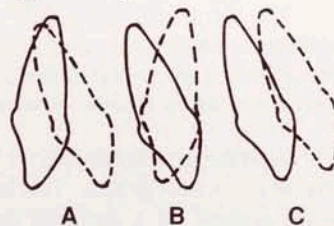


Figure 2A-C. Bodily retraction of maxillary central incisor in a four first premolar extraction case is simple when done in two steps: A) Lingual crown tipping and B) Palatal root torquing. The end result, net bodily retraction, is shown in C.

Subsequent application of palatal root torquing forces from auxiliaries, Figure 2B, completes the "second step" resulting in the bodily repositioning shown in Figure 2C. These torque forces are **not** generated by third order flexing of the main archwire. This results in stability and control of a degree never before possible with the edgewise appliance.

Auxiliaries to achieve such torque include Side-Winder or conventional uprighting springs against a .022" x .028" archwire, nickel titanium Torque Bars with .022" arches or any of the well-known torquing auxiliaries formed from round wire.

### Intrusion

Not only must teeth be free to "walk" crown first and root second for anteroposterior repositioning, but the root apices must be free to follow their paths of least resistance during intrusion. The significance of this has only come to be fully appreciated in the last few years. However, evidence of this was present in a study on

differential tooth movement done over twenty years ago.<sup>1</sup>

During bite opening the roots of the central and lateral incisors tend not only to move lingually (or labially if the crowns are inclined lingually) but also mesially Figure 3.

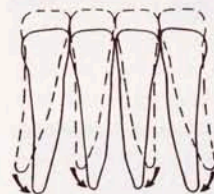
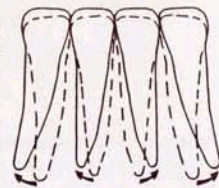


Figure 3. Roots of incisors must be free to move mesially during intrusion.

For years this change in the inclination of anterior teeth was interpreted as distal **crown** tipping. However, it also occurs in nonextraction cases (both arches) during bite opening with no spaces being created between the anteriors. Therefore, the "tipping" is obviously due to **mesial** root movement—and is absolutely essential for the rapid, physiologic intrusion of teeth.

Such movement can only occur when the bracket slot/archwire relationship permits it. If the tooth is not free to react in this manner, intrusion and, therefore, anterior bite opening will be inhibited. This in turn will delay treatment progress and/or require the use of excessive (extraoral) force that otherwise would not be necessary.

Figure 4. Roots of incisors are spread during final stage of treatment.



Once desired bite opening has been achieved, the root apices of the central and lateral incisors are moved distally or "spread" by forces generated by auxiliary springs, Figure 4. The Tip-Edge archwire slots automatically stop root uprighting to provide the desired final crown tip angles—Maxillary incisors, central 5° and lateral 9°; Mandibular incisors: central 2° and lateral 5°. The proper spreading of mandibular incisor roots, especially the laterals, is a key factor of posttreatment stability.<sup>2</sup>

The ability to walk teeth with edgewise brackets makes it pos-

# Let Patients' Teeth Cont. from Pg. 2

sible to correct anteroposterior discrepancies that might otherwise be considered candidates for orthognathic surgery, Figure 5.

Recognizing the potential offered by Tip-Edge archwire slots has begun to turn on lights in the minds of orthodontists, not only in the United States, but around the world as well. Some of the brightest spots are located in the United Kingdom, Australia, Brazil and Japan.

Orthodontists who have worked diligently to open deep bites with extraoral force or retract/upright teeth using second order bends with conventional

edgewise techniques and brackets would have cause to react like the late Peter Finch in the movie, "Network." Upon the realization that these procedures are no longer necessary and much of their efforts in the past have been spent simply to overcome the limitations

caused by the archwire slot itself, they might stand

up and shout, "I'm mad as hell and not going to take this any more." ✚

## References

<sup>1</sup> Kesling PC. Analysis of individual tooth movements. A.B.O. thesis (unpublished), 1968.  
<sup>2</sup> Williams RT. Eliminating lower retention. J Clin Orthod 1985;19:342-349.

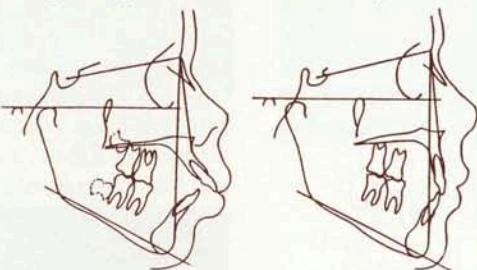
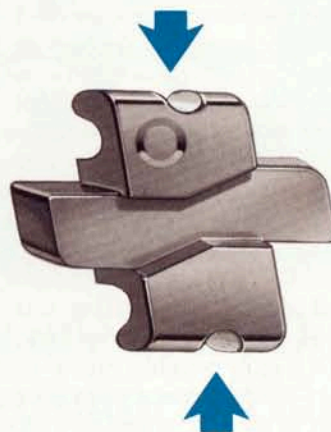


Figure 5. Before (left) and after (right) lateral head x-ray tracings showing the results of treatment with Tip-Edge brackets. No surgery or extraoral force was required for changes shown.

# Notches Serve Dual Purpose



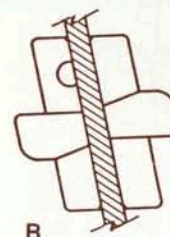
A) Incisal notch allows leg of Side-Winder spring to assume lower profile on maxillary canine bracket.



They also help stabilize and center positioning jigs to enhance more accurate long axis positioning during direct bonding. ✚

Over the past six months TP Orthodontics has phased in a minor change in the design of the Tip-Edge bracket. Slight indentations or notches have been placed in the gingival and incisal wing tips.

These notches help center the coils of Side-Winder springs and reduce the chances for occlusal interference when the legs of the springs pass over the incisal wings.



B) Notches ensure that positioning jig is parallel with the sides of brackets — especially those with considerable tip angles such as maxillary lateral incisor brackets.

## CASE REPORT

BELFAST, IRELAND

By: Professor Andrew Richardson

A 16-year old female requested treatment for spacing caused by the congenital absence of the maxillary lateral incisors. There was also a 90° rotation of the maxillary left second premolar, and rotations of both the first and second maxillary premolars. The mandibular second premolars were extracted to balance the missing teeth above and permit retraction of the mandibular incisors toward the APo line.



Occlusal view of pretreatment maxillary model showing rotations and spacing. Lateral incisors were congenitally absent.



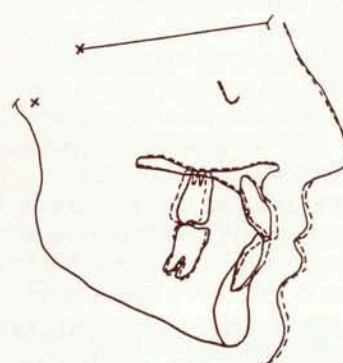
Starting .018" multistrand archwires. Neither intermaxillary elastics nor intra-arch traction were applied due to extreme flexibility of the archwires.



Midtreatment mechanics. Maxillary archwire of .018" x .022" and mandibular .020" archwire. Elastomeric module from maxillary second premolar to first molar for rotation. Root uprighting springs on selected teeth.



Posttreatment Photographs



L.M. .... Female, 16 Years  
 Class I, congenital absence; U 2,2  
 Extractions ..... LR5, LL5  
 Archwires Used ..... 5 (3U, 2L)  
 Adjustments ..... 14, Time: 18 Months  
 Retention ..... U&L Vacuum Formed

### Cephalometric Changes:

|       | Start - Dotted | Finish-Solid |
|-------|----------------|--------------|
| 1-APo | +4.5 mm        | +1.8 mm      |
| Wits  | -1.5 mm        | -2.5 mm      |
| SN-MP | 32.0°          | 32.0°        |
| ANB   | 2.7°           | 3.0°         |
| SNB   | 78.3°          | 78.0°        |
| SNA   | 81.0°          | 81.0°        |
| 1-SN  | 109.0°         | 102.0°       |

## Canine Retraction And Sliding Mechanics

Many orthodontists using conventional edgewise (plain or preadjusted) brackets are beginning to use Tip-Edge brackets on canines. Of course, they are doing this to simplify their mechanics and improve vertical control — bite opening.

The Tip-Edge archwire slot eliminates the need for second order bends to tip crowns distally. Also, it is impossible for tipped canine brackets to deflect archwires incisally — anterior bites do not deepen.

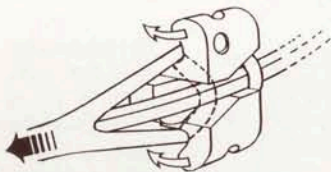


Figure 1. Applying distalizing force to a Tip-Edge bracket with the end of a chain or E-Link® can result in distolingual rotation. This is because the distal portion of the loop, which would otherwise serve as a ligature tie (dotted lines), is pulled away from the bracket permitting the undesired rotation (arrows).

Such orthodontists are accustomed to retracting canines individually because of the high degree of friction between archwires and conventional edgewise slots. They normally use relatively heavy E-Links or elastomeric chain as a power source.

If the end loop of either a chain or link is used as both a means to apply the traction force and as an elastomeric ring, rotation of the canine during retraction is quite possible, Figure 1.

This is because the distal portion of the ring, which normally presses against the archwire to prevent rotation, is stretched distally and away from the wire by the traction force.

Remember it is not necessary to apply as much force as is required with conventional edgewise brackets. The Tip-Edge slot will permit the tooth to move extremely quickly with relatively light force. This is because the tooth does not have to move bodily — it is free to tip. Also, the corners of conventional edgewise

slots that tend to drag on the archwire have been removed. Therefore friction has been reduced to such a degree it is nearly insignificant.

The recommended way to retract a maxillary right canine with minimal distolingual rotation is illustrated in Figure 2.

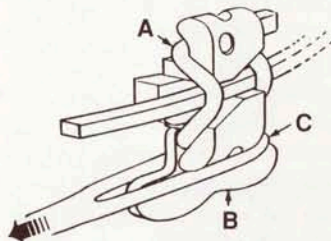


Figure 2. A) Connect the Tip-Edge bracket to the archwire with a plain elastomeric ring. B) Place a Power Pin from the incisal into the vertical slot of the canine bracket. Bend the gingival tail mesially. C) Connect the end of the E-Link or E-Chain to the head of the Power Pin — which will be incisal to the bracket. Remember — apply **very** little force. One to two ounces should be sufficient in most cases. ☘

## Tip-Edge In Brazil & Italy

Drs. Regina and Giuseppe Caponi made a presentation on Tip-Edge brackets before the VIIIth Brazilian Congress of Orthodontics which was enthusiastically received by the 1,500 orthodontists in attendance. As a result, Tip-Edge courses are now planned for Rio de Janeiro in July and Sao Paulo in August.



Drs. Giuseppe and Regina Caponi at the VIIIth Brazilian Congress of Orthodontics. The Caponis, who speak Italian as well as Portuguese, also recently presented Tip-Edge courses in Bari, Milan and Bergamo, Italy. ☘

For Subscription or  
Customer Service  
**call**  
1-800-348-8856  
219-785-2591  
Fax 219-324-3029

TP Orthodontics, Inc.  
100 Center Plaza  
LaPorte, Indiana 46350

**TIP EDGE**  
TODAY™

Bulk Rate  
U.S. Postage  
**PAID**  
La Porte, Ind.  
PERMIT NO. 79