R. MOYSES DIAS DE ALMEIDA (LEFT) OF AO PAULO, BRAZIL AND DR. CHRIS KESLING ONGRATULATE EACH OTHER AT THE END OF A RECENT TIP-EDGE COURSE. DR. ALMEIDA PROVIDED SIMULTANEOUS PORTUGUESE TRANSLATION.



SPRING 2001

## **EDGELINES**

### **NATURAL CHANGES** PARALLEL TREATMENT GOAL

Study reveals that in untreated Hispanics with ideal occlusion and facial harmony, the lower incisor to A-Po line measurement reduces with age, Cover Story.

**TORQUE** FEVER-31/2° PER MONTH

Side-Winder springs deliver 19° of torque change in 51/2 months, Case Report, Page 3.



**ROBOTS** TO MOVE TEETH? Miniature

robots are predicted to manipulate periodontal fibers, Page 4.

### **TIP-EDGE GRAPHIC**

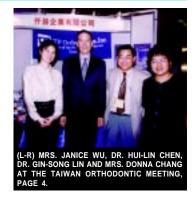


WE PREDICT

"GULLIVER" DR. E.H. ANGLE would take a long, close look at Lilliputian Tippy. Unlike many in the profession today, he would not be too big to recognize the advantages inherent in the Tip-Edge archwire slot, Literature Review, Page 2.



**Published Quarterly In The USA** 



#### **COVER STORY**

# Relationship of Hispanics' Mandibular Incisors to the A-Po Line

By Toshio Kubodera Ito, D.D.S., Ph.D., Chrisel Zarate Diaz, D.D.S., M.S. and Ricardo Medellin Fuentes, D.D.S., M.S., Toluca, Mexico

The purpose of this study was to evaluate the protrusion of the mandibular arch, measuring the anteroposterior position of the mandibular incisor, relative to the A-Po line, in a group of 192 Hispanic patients with ideal occlusion and facial harmony. The material was a lateral cephalometric headfilm tracing from each patient on which the horizontal distance from the incisal border of the mandibular incisor to the A-Po line was measured. The results were analyzed by three age groups (9 to 11, 12 to 14 and 15 to 17 years).

Some of the primary goals of orthodontic treatment are to attain and preserve optimal dental relationship as well as facial attractiveness. It is recognized that the incisal positions influence the soft tissue profile, their positions after orthodontic treatment should be such that a harmonious soft tissue profile is pro-

There are many cephalometric norms, which consider the position of the mandibular incisors. Some are based on dentocranial relations as Tweed's IMPA that relates the mandibular incisor angulation to the mandibular plane. However, Williams<sup>1</sup> feels this is not realistic because those dentocranial relations are not always attainable and furthermore the norm proposed by Tweed, was not a common denominator in all the patients with optimum facial aesthetics. Williams recognized, as did Holdaway, Ricketts and Downs, that it is not the angular attitude but the linear anteroposterior position of the mandibular incisor that influences upper and lower lip balance. This can be identified as the distance from the mandibular incisors to the A-Po line. Williams points out that to create a harmonious lip balance at the conclusion of the treatment, the tips of the mandibular incisors must be brought to predetermined (by race and sex) positions at or near the A-Po line.

Both ends of this line can migrate during treatment to new positions, point A by the relocation of maxillary incisors and Po by growth. Other applications of this measurement, according to Williams is for diagnosis. He states that the amount of dental and skeletal change required to place the incisal edge of the mandibular incisor on or near the A-Po

line will dictate whether and/ or which teeth are to be extracted.

#### Material And Methods

Sample population

Thirty-two hundred students who lived in Toluca. Mexico and in the suburbs were examined. To be included in this study they needed to fulfill the following criteria: Angle Class I (normal occlusion), no anterior crowding, good facial profile, no missing teeth and no previous orthodontic treatment.2

One hundred ninety-two subjects satisfied the inclusion criteria and were included in one of three groups of age 9 to 11 years (38 male and 32 female), 12 to 14 years (36 male and 34 female) and 15 to 17 years (18 male and 34 female).

#### Data Acquisition

A cephalometric lateral headfilm was taken of each subject. The tracings included the mandibular incisor contour and the A-Po line. This is referred to as the denture plane4 and was used as a reference to measure the position of the anterior teeth and define the protrusion of the mandibular arch. The horizontal distance from the incisal edge of the

Please see COVER STORY next page

#### **COVER STORY**

### Relationship of Hispanics'... Continued from page 1

mandibular incisor to the A-Po line was measured for each subject.

#### Results

It was observed that the protrusion of the mandibular incisor to A-Po line is reduced as the age increases—see Table 1.

With statistical analysis, no significant difference was found among the groups.

	9 to 11 Years (n=70)	12 to 14 Years (n=70)	15 to 17 Years (n=52)	Mean
Mean	+3.67 mm	+3.13 mm	+2.76 mm	+3.1 mm
Standard Deviation	+1.74 mm	+2.13 mm	+2.01 mm	

Table 1. Distance from the mandibular incisor to the A-Po line (mm).

#### Discussion

It could be determined with different cephalometric values measured in this study that in Hispanic children and adolescents the mandibular incisor retroclines as the age increases. This could be the explanation for the reduction of the distance from mandibular incisor to A-Po line. The mean of +2.76 mm is similar to the norm proposed by McNamara<sup>4</sup> (+2 to 3 mm), and, of course, coincides with the Hispanic norm of +3 to 4 mm that is used by the Kesling and Rocke Orthodontic Group (Westville, Indiana).<sup>5</sup>

#### Conclusion

It was determined that in untreated Hispanic children and adolescents with ideal occlusions and facial harmony, the mandibular incisor position as related to the denture line (A-Po) is reduced with age due partly to the retroinclination of the mandibular incisors, having an overall terminal mean of +3.1 mm.

#### References

- Williams R. The diagnostic line. Am J Orthod 1969;55:458-76.
  Kubodera T, Centeno C, Esquivel G, Lara E, y Montiel N. Estudio morfologico craneofacial en denticion mixta tardia. C.I.E.A.O., U.A.E.M.
- Kubodera T. Morphometric study on craniofacial structures of central Mexican adolescents by using cephalometric analysis. J Meikai Univ. Sch. Dent 1992;21:125-44.
- Jacobson A, Caufield PW. Introduction to radiographic cephalometry. pp.72-83
- McNamara JA, Brudon WL. Orthodontic and orthopedic treatment in the mixed dentition. Needham Press, USA, 1993.
- Kesling PC. Tip-Edge Guide and the Differential Straight-Arch Technique. 4th ed. Westville: Two Swan Advertising; 2000.

## Viva La Differenza Tooth Movement

Some exciting Tip-Edge news from Italy from Massimiliano Viotti of TP Italia.

Dr. Achille Farina is now teaching the Differential Straight-Arch Technique using Tip-Edge brackets at the University of Cagliari. Dr. Farina also recently finished an Italian version of the popular TP Tip-Edge video, which he complemented with his own treated cases. The audio is Italian, of course, but the video portion is universal in its demonstration of the versatility, efficiency and perfection possible with Tip-Edge brackets.

The University of Brescia also recently reported at the Italian Society of Orthodontists on a study of anchorage. The results achieved on typodonts indicate that the Tip-Edge archwire slot is 3 to 4 times lighter on anchorage during canine retraction than the conventional straight-wire slot. (We hope to include an abstract of this study in a future issue of TIP-EDGE TODAY).

## Dr. P. C. Kesling Authors A Thought-Provoking Article

The most recent issue of the new WORLD JOURNAL OF ORTHODONTICS contains an article by Peter Kesling—the father of Tip-Edge. The title: "The Edgewise Slot: Angle's Orthodontic Albatross," is perhaps a bit provocative but readers will find Kesling makes his point.

He has reviewed E. H. Angle's articles and texts to discover that both Angle's first (1887) and last (1925) appliances were mechanically flawed. Each, in effect, turns the very teeth to be moved into an

chor teeth. Of course, the 1925 appliance is the edgewise mechanism with brackets having horizontal archwire slots.

Also Kesling discovered that Angle (accidentally or otherwise) misled the readers of his 1900 Sixth Edition textbook. The facial photos associated with the only before and after treatment models are of two different women. Kesling suggests this may be why Angle ordered all copies returned and destroyed.









Facial photographs above were associated with E.H. Angle's *only* before and after records of an extraction case in his Sixth Edition of 1900.

The article ends with the solution to (lifting of) the Albatross by the creation of the Tip-Edge archwire slot which permits the teeth to easily move in the desired direction but resist as anchorage units in the other.

A four premolar extraction case treated in twelve months with only four archwires and seven adjustments is presented as evidence of the efficiency provided by the Tip-Edge archwire slot.

The entire article can be accessed on www.tip-edge.com.

<sup>\*</sup>Kesling, PC. The edgewise slot: Angle's orthodontic albatross. W J Orthod 2000;1:142-151.

CASE REPORT Pg 3

### CASE REPORT

An 11-year-old female presented with a Class II malocclusion and retrognathic profile. The mandibular incisors were 2 millimeters behind the A-Po line, the anterior overbite was 90 percent and the curves of Spee (upper reversed) were both excessive.

The patient, as is often the case, wanted her "braces" on as soon as possible. All indicators pointed to a nonextraction treatment plan. Since the Differential Straight-Arch® Technique was to be used, treatment began at once. No need or thought was given to waiting for second molars to erupt, placing functional appliances, palatal expansion or extraoral anchorage.

All that would be required was Tip-Edge brackets, high tensile steel archwires, elastics and Side-Winders. Progress and final photos tell the Tip-Edge story. However, total treatment time was extended approximately 6 months waiting for the mandibular second premolars to erupt.



Figure 1. Original Malocclusion.

The dental and soft tissue change during the course of treatment can be seen in the final intraoral photographs, Figure 6 and before and after treatment profile photographs, Figure 7. Cephalometric changes and treatment data are shown in Figure 8.



**Figure 2.** Place appliance appointment—beginning of stage one.



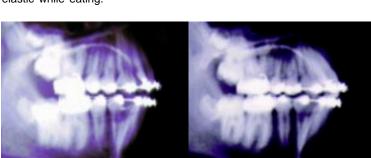
Figure 3. Ready to begin stage two. All changes created by .016" archwires and two-ounce Class II elastics



Figure 4. Rectangular stage three in both arches.

Treatment began with .016" high tensile archwires with strong bite opening bends, Figure 2. Note the maxillary canine bracket was engaged and the lateral bracket tied with a steel ligature through the vertical slot. This is preferred over using vertical or horizontal loops. It saves time, is more aesthetic, comfortable and easier for the patient to brush properly. Also anterior bite opening is improved as the central incisors are at the same level as the canines.

Seven months after treatment began the objectives of stage one have been reached, Figure 3. Bump-R-Sleeve® remains in the maxillary arch to hold space for the premolars until they can be bracketed. Vertical stops in the archwire against the mesial of the molar tubes maintain arch length for the mandibular first premolars. Note the mandibular second deciduous molars are still in place. The patient has overly twisted the Class II intermaxillary elastics. This can actually result in a loss of force. One or two twists are all that are necessary to prevent food from being caught in the elastic while eating.



**Figure 5A&B. A)** Lateral head x-ray taken at the time a maxillary .0215" x .028" archwire and Side-Winder springs were placed. **B)** Lateral head x-ray taken just prior to removal of the appliances. Note the dramatic change in the torque inclinations of the maxillary anterior teeth.

Rectangular archwires of .0215" x .028" stainless steel were used for maximum vertical and horizontal control, Figure 4. Of course, full-size archwires are also necessary for positive torque control of all teeth including molars and to prevent over uprighting from Side-Winder springs. Class II elastics are worn continuously during stage three unless or until the anterior teeth become edge-to-edge. If this occurs, night time wearing is usually prescribed.

Rectangular torquing of the maxillary anterior teeth powered by Side-Winder springs resulted in 19 degrees of change in only 5½ months, see Figure 5.



Figure 7. Before treatment (left) and after (right). Note the chin appears more prominent, yet cephalometric tracings indicate vertical growth.

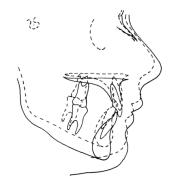
Second order forces from Side-Winder springs are automatically and gradually transformed into third order forces by the geometry of the Tip-Edge archwire slot. However, the springs remain active, delivering 80 to 90 percent of their power potentials. This is why Side-Winder generated torque is so efficient. There is no gradual degrading of torque forces to zero, as is the case with all other edgewise mechanisms and torquing auxiliaries.

Tracings reveal approximately 3½ degrees of torque per month. Torque is automatically stopped at preadjusted angles (12 degrees central and 8 degrees lateral) built into the respective bracket bases.





**Figure 6.** Final occlusion achieved with only five archwires and sixteen appointments. This is two archwires less than the seven reported in the recent study by Ramos et al.<sup>1</sup>



м.в	Female, 11 Years
Nonextraction	
Archwires Used	l 5 (3U, 2L)
Adjustments	16
Treatment Time	26 Months
Retention	Maxillary Retainer
M	andibular Spring Alignei

#### Cephalometric Changes:

_	Start-Dotted	Finish-Solid
1 A-Po	-2.0 mm	+0.5 mm
Wits	+2.0 mm	-2.0 mm
SN-MP	31.0°	33.0°
SNA	84.0°	81.0°
SNB	79.0°	78.0°
ANB	5.0°	3.0°
1-SN	94.0°	97.0°

Figure 8. Summary of treatment, including cephalometric changes and the number of adjustments, archwires and months start to finish.

## Nanorobots To Move Teeth In a Matter of Hours

The lead article "Nanodentistry" in the November 2000 issue of the JOURNAL OF THE AMERICAN DENTAL ASSOCIA-TION contemplates the effects robotic miniaturization could have on all of dentistry, including orthodontics. The author, Robert A. Freitas, Jr., predicts that within 20 years orthodontic nanorobots may be rotating, uprighting and vertically repositioning molars.

This would be done by these tiny robots directly manipulating the periodontal ligaments, gingival fibers, cementum and alveolar bone. The result would be painless tooth movement within hours-even minutes in contrast to what presently requires weeks or months.

It is hard to imagine how these nanorobots would be attached to each fiber and ligament. Subsequently, how would they be controlled, activated, deactivated and removed? It seems at this time that such activity would be classified as a rampant periodontal infection and the resulting movement related to loss of the tooth itself!

EDITOR'S NOTE: Meanwhile, the most physiologic method of tooth movement is differential and from light forces. It has been proven and is possible with Tip-Edge brackets—today.

**DUTRIGGER** Elastic Cooperation Appliance

Now there's a simple way to ensure patient cooperation.

- Very economical
- · Easy to use (engages on main archwire)



Kit of 36 Appliances

800-348-8856 www.tportho.com

## Tip-Edge In Taiwan

The Tip-Edge Study Club of Taiwan presented a table clinic at the Taiwan Association of Orthodontics conference in December of 2000. They displayed before and after treatment records of sixteen patients treated with Tip-Edge brackets. The techniques, however, were varied. Some cases were treated in the traditional manner with the Differential Straight-Arch Technique and others with MEAW (Multiloop Edgewise Arch Wire).



Members of Taiwan Tip-Edge Study Club at recent orthodontic meeting in Taipei. Dr. Hui-Lin Chen (President of the Club) is second from right.



Many of the cases shown were also included in the December issue of the THE JOUR-NAL OF TAIWAN ASSOCIATION OF ORTHODONTISTS. Of the seven articles in the journal, five were related to Tip-Edge.

The above report and photo were sent to TIP-EDGE TODAY by Oscar Kuo of Chiau Fong Enterprise Co., the distributor of TP products in Taiwan, R.O.C.

Two Swan Advertising

Eax +27 11 974 2160 Tel +27 II 392 5125 From South Africa call or tax

Fax +61 3 9349 4772 0078 7486 8 19+ 121. From Australia call or tax

Eax 219-324-3029 1627.287.912 15T LaPorte, Indiana 46350 100 Center Plaza

PERMIT NO 79 **IN STROGAL** US POSTAGE PAID **GRADNATS PRESORTED** 

moo.egbe-qij.www :auijuo sn iisia

