“Pretorqued” Rectangular Archwires

By: Dr. Richard Parkhouse, Consultant Orthodontist, Glan Clwyd Hospital, WALES

With the recent introduction of pretorqued .0215" x .028" archwires (TP 381-195 maxillary, 381-196 mandibular), setting up for rectangular Stage III has suddenly become easier, quicker and more accurate. No longer should it be necessary to manipulate torque settings into the anterior segments of archwires in the majority of cases.

The passive set of the rectangular cross section is of course relevant, serving as a “reference plane” for the final torque angulations that will be achieved by the Side-Winder springs. Completion of both torque and tip are self-limiting and stop simultaneously. If the rectangular cross sectional angle is flat, parallel with the occlusal plane (referred to as a “zero torque” setting), each bracket will express the torque value built into its respective base.

Generally, a zero torque setting is appropriate. However, there are occasions with adverse skeletal discrepancies, when standard incisor torque angularizations will be inappropriate, particularly in Class III cases.

Indications for Anterior Torque Compensation

The most common indication for pretorqued archwires is deep bite problem. Here the new archwires are particularly useful in preventing unwanted incisor proclination, which can result from using vertical bite sweeps in ordinary, untorqued rectangular archwires (Figure 1-A).

The pretorque in the archwire, in this context, is compensating the bite sweep rather than the skeletal pattern. It is, in fact, lingual crown (labial root) torque which, in the anterior segments, cancels the labial crown (lingual root) torque that would otherwise result from the bite sweep (Figure 1-B). Zero torque at the front is, therefore, preserved, which will neither add nor subtract from the Tip-Edge Rx-I bracket prescription.

Advantage of Mid-Crown Bonding Positions

The amount of vertical curvature necessary in the rectangular archwire to maintain overbite reduction will, however, vary slightly with the bonding position chosen by the operator. As with pretorqued appliances in general, a mid-crown bonding position as described by Dr. L.F. Andrews is recommended, rather than a more incisal bonding height.

Bonding jigs can readily be modified by cutting off the occlusal rests. The vertical arm of the jig can be aligned with the long axis of the crown, at its midpoint, while the vertical placement, at mid-clinical crown height, can be gauged by eye (Figure 2).

The advantage of a mid-crown bonding position is that it coincides with the point of greatest crown convexity. It will, therefore, automatically produce a more consistent final torque prescription, irrespective of the size of the clinical crown. It also increases efficiency of torqueing, compared with an incisal bonding position, which is less distant from the root itself.

Pretorqued Archwires

The maxillary archwire contains 5 degrees of pretorque, the mandibular 8 degrees. Both wires are .0215" x .028" with square (not rounded) edges. The pretorque extends to the

Continued on page 2
distal of the archwires. By means of a few simple adjustment steps by the operator, it is therefore possible to accommodate to variations of tooth width and arch form without stocking a range of different sized archwires.

Centerline markings (single for maxillary, double for mandibular) appear on what will normally be the gingival surface of the maxillary archwire and the incisal surface of the mandibular (Figure 3).

In increased overbite cases, where bite sweeps are required to maintain overbite reduction, both centerline markings should, therefore, be visible to the operator when fitted. This is to ensure that neither arch will inadvertently be placed upside down. The lingual crown pretorque across the incisors thus compensates the labial crown torque that occurs in the incisor region when placing a vertical bite sweep, so preserving “zero torque.”

Of course, pretorqued archwires are not required for every case. Where anterior openbite or minimal overbite existed initially, bite sweeps will obviously not be necessary. In such instances, plain rectangular arches (TP 381-197/8) can be fitted without bite sweeps and, except in cases of severe skeletal discrepancy, no adjustment to anterior torque values will be necessary, with “zero torque” throughout.

Pretorqued Archwires

Arch Technique

Pretorqued rectangular arches (TP 381-167 to 298x458) are in crossbite.

“Pretorqued” Rectangular Archwires...

addition, to accommodate some proclamation of the maxillary incisors. For this purpose, a maxillary pretorqued archwire can also be placed upside down. In this instance, the centerline marking will not be visible to the operator on insertion. With no bite sweep, 5 degrees of proclamation will automatically be provided to the maxillary incisors (Figure 6-A). Again, the posterior segments will normally be adjusted to zero torque.

It is usually necessary to finish the mandibular incisors to a retroclined position, in order to maintain a positive overjet. A mandibular pretorqued archwire used without a bite sweep will give 8 degrees of retroclination to the mandibular incisors (Figure 6-B). All that is required is to adjust the segments distal to the hooks to zero torque, as described above.

References


Figure 5. Verifying zero torque in the buccal segment.

Figure 6-A & B. Compensating a Class III skeletal pattern, without increased overbite. A) The maxillary archwire must be fitted upside down to allow 5 degrees of maxillary incisor pronation. B) Pretorqued archwire can be fitted flat to produce 8 degrees of retroclination of the mandibular incisors.

PG 2

COVER STORY — QUESTIONS & ANSWERS

“Pretorqued” Rectangular Archwires...

Continued from page 1

Q’s and A’s

Q. When using Tip-Edge brackets and the Differential Straight-Arch Technique, are the second molars routinely banded?

A. Because of the unique Tip-Edge archwire slot, there is no need for more than one molar in each quadrant for anchorage. Usually second molars are only banded if they need leveling, rotation or are in crossbite.

Q. Is it possible to substitute an accentuated bite sweep for an anchor bend during bite opening?

A. Yes. The important thing is the distance the anterior portion of the wire is displaced gingivally from the archwire slots in the brackets. However, if the wire slides distally through the molar tubes (posterior space closure), the amount of anterior gingival displacement (bite opening forces) may become reduced. This might not be recognized as readily as when using localized, bite opening bends.

Q. In Stage III, when using a .022” x .018” nickel titanium Torque Bar, how many degrees of change in angulation can one reasonably expect and in how much time? Do you use 20° or 30° bars routinely? Is it possible to achieve 10° of torque?

A. The average rate of torque is approximately 2° per month and the 30° Torque Bar is preferred. With proper insertion it should deliver 10° of torque within six months.
CASE REPORT

This 15 year old female exhibited a Class II, Division 1 malocclusion with a Wits value of +1.5 millimeters. While the extraction of teeth was clearly required to correct her malocclusion (total discrepancy of -7.0 mm) second, rather than first, premolars were extracted to prevent flattening the profile.

Tip-Edge appliances with .016” Wilcock stainless steel archwires were placed in both arches. Zing® String was used to tip the maxillary right first premolar distally just enough to allow for alignment of the canine.

Stage II began using the original .016” Wilcock archwires with bite opening curves. At the next appointment, maxillary and mandibular .022” archwires were placed to maximize molar rotational control during final space closure.

After all extraction sites were closed, Stage III was initiated with square edged .0215”x .028” stainless steel archwires in both arches. Side-Winder springs were placed on all teeth to upright and torque them to their final inclinations.

H.K. ......................... Female, 15 Years
Extractions ......................... U55, L55
Archwires Used .................... 6 (3U, 3L)
Adjustments .............. 17, Time: 25 Months
Retention ........................ Perfector

Cephalometric Changes:

-1-APo  +1.5 mm  +1.0 mm
Wits  +1.5 mm  0.0 mm
SN-MP  32.5°  33.0°
ANB  4.5°  4.0°
SNB  79.5°  78.5°
1-SN  75.0°  74.5°
1-APo  91.0°  92.0°
Graduate Students’ Tip-Edge Course

On November 17th-18th, first year graduate students of some of the orthodontic programs that teach Tip-Edge took a course at the Orthodontic Center. Begun in 1994, these courses have proved to be an effective springboard for students to dive into Tip-Edge. Participating schools included Columbia University, Montefiore Medical Center, Saint Louis University, State University of New York at Stony Brook and University of North Carolina.

Tip-Edge in Australia

In October of 1995 Dr. R.C. Parkhouse (seated, third from left) gave an advanced course in Sydney, New South Wales. Over 40 orthodontists, including some post graduate students, attended the lectures at the Swiss Grand Hotel.

Graduate Orthodontics and Tip-Edge in Colombia, S.A.

As a way to expand new horizons, the CIEO* Military University in Bogota, Colombia has been teaching the Differential Straight-Arch® Technique for over 5 years.

The course begins with a semester which covers theory and practice. The students bond brackets on typodonts which have been set in different malocclusions and go through the three stages of the technique. The next semester the students start many Tip-Edge cases which are easily finished before they graduate because it is a three year orthodontic program.

The Tip-Edge technique is taught by Dr. Gilda Rubiano who attended a course at the Orthodontic Center in 1989 and returned for a Refresher in 1995. Chairman of the Department, Dr. Eduardo Galvis, and Dr. Guiomar Cely also assist with Tip-Edge patients in the clinic. Both attended a Tip-Edge course a few years ago. The University has many records of patients treated with the technique that prove its speed, ease and effectiveness.

*Center of Investigation and Education of Orthodontics

In October of 1995 Dr. R.C. Parkhouse (seated, third from left) gave an advanced course in Sydney, New South Wales. Over 40 orthodontists, including some post graduate students, attended the lectures at the Swiss Grand Hotel.

Graduate Orthodontics and Tip-Edge in Colombia, S.A.

As a way to expand new horizons, the CIEO* Military University in Bogota, Colombia has been teaching the Differential Straight-Arch® Technique for over 5 years.

The course begins with a semester which covers theory and practice. The students bond brackets on typodonts which have been set in different malocclusions and go through the three stages of the technique. The next semester the students start many Tip-Edge cases which are easily finished before they graduate because it is a three year orthodontic program.

The Tip-Edge technique is taught by Dr. Gilda Rubiano who attended a course at the Orthodontic Center in 1989 and returned for a Refresher in 1995. Chairman of the Department, Dr. Eduardo Galvis, and Dr. Guiomar Cely also assist with Tip-Edge patients in the clinic. Both attended a Tip-Edge course a few years ago. The University has many records of patients treated with the technique that prove its speed, ease and effectiveness.

*Center of Investigation and Education of Orthodontics