Bioprogressive Simplified, Part 2: The Linear Dynamic System

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Bioprogressive therapy has been a staple of orthodontics for more than 20 years. Its originators, Drs. Robert Ricketts and Ruel Bench, combined contemporary edgewise mechanics with solid diagnostic principles and an innovative approach to sectional mechanics.

Straightwire systems, which originated at about the same time, had the advantage of being easier to teach and to learn--but they did not solve the limitations of all continuous archwire philosophies. In other words, a "locked-in" malocclusion remained a "locked-in" malocclusion, even with preadjusted brackets.

The advantage of Bioprogressive therapy was--and remains--its flexibility. Even if 50-60% of all cases can be treated with relatively simple straight wires and continuous arch mechanics, we are ail familiar with the treatment delays and frustrations involved in the bite that won't open, the midline that won't correct, the buccal segment that won't seat, the interferences that can be created by the appliance itself. It is in these cases that the flexibility of Bioprogressive therapy is sorely needed.

The objective of this series is to further simplify the Bioprogressive principle of progressively unlocking the malocclusion. If you use double or triple buccal tubes on upper or lower molars, you can adapt some of these ideas to your current approach.

Treatment Goals

End-of-treatment goals should be dynamic, not based on statistical norms. Through designed overcorrection, we can harness physiologic rebound as a positive, guiding force in final settling. This kind of overcorrected result can be called an ideal orthodontic occlusion--one that will settle after positioner treatment, retention, and normal physiologic rebound into an ideal occlusion and thereafter into a normal occlusion (Fig. 13). The orthodontist's goal cannot be to maintain an ideal occlusion for the rest of the patient's life. A realistic goal is to accept small post-treatment changes that still result in a healthy overall oral environment.

The most important considerations for appliance design include:

1. Type and severity of the original malocclusion. In a Class II case, the mesially rotated upper molar, mesially tipped lower molar, forward buccal segments, and tapered upper arch all tend to rebound. This should be compensated for by overcorrection in the appliance.

2. General approach to mechanics. An extraction approach tends to contract the arches (detorque). A nonextraction approach is more likely to expand (torque) all teeth. A segmental approach has a greater tendency to detorque, especially in extraction cases, than does a continuous arch approach, and compensation should be built in.

3. Size of final arches. For each .001" tolerance between archwire and slot, as much as 4° of torquing effectiveness is lost. Torquing is effective only when a full-size continuous archwire is left in the slot for a reasonable time. When smaller final arches are used for flexibility, the discrepancy between archwire and slot should be compensated for by exaggerated built-in torque in certain areas.

4. Timing of torque control. Conventional Bioprogressive therapy dictates torque control from the start. It is more efficient to bring the tooth directly to its overtreated goal than to wait until the final phases of treatment. Early setup of the posterior occlusion provides the framework for proper buccal and anterior tooth positions.

5. Need for overcorrection. Each tooth has an overcorrected position that best allows for final settling. Some of these positions relate to mechanics, others to rebound.

6. Bracket placement. The accuracy of bracket placement, the compensations for occlusal interferences, and the adaptability of the bracket bases all affect final tooth positions, especially with direct bonding.

My desire to build all these features into an appliance that worked clinically led to the Linear Dynamic system. The original system was designed with Ormco engineers in 1979, using features allowed by casting technology to improve the function and comfort of the double and triple buccal tubes. Recent advances in metallurgy and casting processes have created a miniaturized generation of the Linear Dynamic system.

Concern for esthetics in the anterior region directed our attention to the possibility of reducing all bracket wall and tie-wing thicknesses to the minimum permitted by function. To do so without impairing structural integrity required a change to a 17-4 grade of stainless steel, which has more than three times the yield strength of the standard 303 grade. New manufacturing methods were devised for this stronger and harder metal. The result was a 30% smaller bracket that is stronger than its full-size counterpart. In addition to the visual improvement in the maxillary arch, we reduced bracket interferences in the mandibular arch.

In the molar region, a 20% size reduction was accomplished with improved tolerances from a refined casting method. The Linear Dynamic double and triple buccal tubes in use today provide fewer interferences and greater patient comfort.

Linear Dynamic System

Straightwire appliance bracket and tube design are often based on norms from untreated cases or perfectly treated orthodontic cases--with inadequate consideration of treatment mechanics, planned overcorrections, and the natural settling of the dentition after treatment.

In determining properly overcorrected tooth positions, I believe in the precept "begin with the end in mind".

Many clinicians believe the area to observe most closely in the detailing phase is the upper cuspid fit with the lower cuspid-bicuspid embrasure. However, this fit cannot be achieved without first setting up the posterior occlusion by rotating the upper first molar. In turn, it is difficult to rotate the upper first molar without first rotating and uprighting the lower first molar. Therefore, *the key to a Class I buccal segment is the proper positioning of the lower first molars* (Fig. 14). Simply put, the objective of the Linear Dynamic system is to allow the dentition to be moved directly toward final positions by establishing a mandibular occlusal table as early in treatment as possible.

We are all familiar with the ability of certain teeth to drift into desired locations after they are moved--and just as familiar with the inability of other teeth to drift into desired locations. An understanding of the physiologic rebound that is most likely to occur after orthodontic treatment allows the clinician to make decisions about tooth locations when detailing a case.

To describe the Linear Dynamic system and its relationship to physiologic rebound, I will discuss these criteria for each tooth:

Ideal orthodontic tooth position.
Anticipated rebound and required overcorrection.
Appliance design features that contribute to patient comfort, clinical simplicity, and optimum utility.

The arrows in the malocclusion drawings refer to the general tendencies of tooth positions in Class II malocclusions. The ideal orthodontic occlusion arrows refer to the directions of tooth movements obtained through appliance design and mechanotherapy. The ideal occlusion arrows refer to the tendencies of tooth movements to occur or recur during settling.

Mandibular First Molars (Fig. 15)

	Torque	Tip	Rotation	Thickness
Main slot	– 27°	– 5°	12° distal	Thinnest
Auxiliary slot	0°	– 5°	0°	

In an ideal final position, the mandibular first molar would be tipped back about 5° to the occlusal plane. It is common for the upper first molar to settle into a slight mesial tip with the distobuccal cusp slightly past the plane of occlusion. This needs little orthodontic attention other than Class I distal overcorrection, because the distal marginal ridge on the upper first molar is shallower than the mesial marginal ridge, allowing for this settling effect.

To achieve a satisfactory distal rotation of the upper first molar--and, for that matter, of the upper second molar--the lower first molar must be rotated distally more than one would expect. The contact between the lower first and second molars is unique. Because of the settling of the upper first molar to the mesial, there should be a slight opening in the contact point between the lower first and second molars to allow the distobuccal cusp of the upper first molar to seat (Fig. 16).

Two mechanical factors act to bring the lower first molar back toward a mesial rotation: the pull of Class II elastics and the forces used to retract anterior teeth. These factors should be counterbalanced by a slight over-rotation of the lower first molar so that, when viewed from the occlusal, the distobuccal cusp is rotated partially through the mesial marginal ridge of the lower second molar (Fig. 17).

Normally, the lower first molar will rotate slightly back to the mesial and tip mesially, depending on upper molar position and the muscle and inclined plane function.

In Class II deep bite cases, the lower first and second molars erupt tipped to the mesial, deepening the curve of Spee. If both teeth are uprighted distally, the plane of occlusion will then allow proper settling of the upper posterior buccal segments. If the lower first molar is left mesially rotated, when the upper first molar is moved distally and rotated, the inclined plane effect of the lower molar's distobuccal cusp will tend to rotate the upper molar mesially and reestablish the Class II (Fig. 18).

In other words, the lower molar will settle mesially to the extent that the upper molar allows. When the lower first molar settles farther than parallel to the occlusal plane, the curve of Spee deepens and the deep bite tends to recur. Tweed found it possible to tip the lower buccal segments quite far distally, after which the physiologic rebound tended to upright them.

The design of the double buccal tube for the lower first molar is of paramount importance (Fig. 19). The main archwire torque should be sufficient to maintain anchorage created by the natural root position against the cortical bone of the external oblique ridge.

The auxiliary tube should not be torqued, so that a 90° bend of the auxiliary archwire will avoid the soft tissue. If this tube were torqued, it would require compensatory bends to keep the utility arch off the gingival tissue around the lower first molar. The buccal offset of the auxiliary tube keeps the auxiliary and main arch mechanics in different planes of space.

A slight distal crown tip of 5° uprights the lower molars to allow distal seating of the upper first molar and counteract the forces of retraction mechanics and elastics.

The 12° distal rotation in the main arch slot coordinates with a 15° maxillary molar rotation to avoid conflicting inclined planes and eliminate the need for bicuspid and molar offsets.

Other features are a low-profile wedge-shaped tie wing, positive convertibility with a flush brazed cap, a mesiogingival hook for comfort and ease of ligation, and a smoothly curved buccal contour.

Maxillary First Molars (Fig. 20)

	Torque	Tip	Rotation	Thickness
Main slot	-10°	0°	15° distal	Thinnest
Auxiliary slot	0°	0°	0°	

The upper first molar is rotated 15° distally, so that a line drawn through its distobuccal cusp would point at the distal of the opposite cuspid (Fig. 21). This rotation uses the shortest distance across the trapezoidal molar, which ensures the shortest arch length in the upper buccal segment, and allows seating of the upper cuspids.

The roots of the upper first molars (and of the entire upper buccal segments) should be inclined slightly to the lingual (Fig. 22), so that the forces of occlusion will then be directed across the heavy cortical bone of the palate and back through the buttress of the key ridge. There is a slight distal root tip as the upper first molars settle into a normal Class I occlusion.

The 15° distal offset is required by several factors. First, the tooth morphology requires some offset for a linear archwire. Second, the archwire leads away from the tooth mesiodistally, and the tube's built-in rotation must be neutral to allow proper rotation. Third, most Class II cases have mesially rotated upper first molars that require compensation with an overcorrected distal rotation. Fourth, mechanics in Class II and III cases often involve forces that rotate the upper molar mesiolingually. Fifth, a few degrees of offset is lost because of archwire/slot differential.

The upper first molar triple tube incorporates several features (Fig. 23). The entire upper buccal segment should have 10° of buccal root torque to compensate for the occlusogingival curvature of the crowns of these teeth. The auxiliary tube, which is offset to the buccal to avoid tissue impingement, has 0° torque and 0° rotation. This allows for selective torque and rotation of the upper first molar with initial utility arches, and it helps in placement of auxiliary arches. The auxiliary tube can be used as the main arch slot in upper first bicuspid extraction cases where mesial rotation of the molar is desired.

The headgear tube, although more efficient mechanically when placed to the gingival, is placed to the occlusal for improved hygiene, easier insertion of the headgear, and avoiding interference with the nearby gingivally bent archwires.

Second Molars (Fig. 24)

	Torque	Tip	Rotation	Thickness
Main slot	-10°	0°	12° distal	Thinnest
Mandibular	-27°	-5°	12° distal	Thinnest

In most Class II cases, the lower second molar erupts with a decided mesial crown tip. If not corrected orthodontically, this can be one of the first areas of occlusal interference, often causing disarticulation of the condyle. The lower second molar should be tipped distally during treatment because it will settle mesially as the distobuccal cusp of the upper first molar settles into the lower first and second molar embrasure.

The upper second molar, when tipped back slightly and overcorrected in its Class I position, will settle in much the same way as the upper first molar. The upper first, second, and third molars erupt in a fan-shaped pattern with the crowns tipped distally. As the lower arch comes in contact with each sequentially erupting tooth, the forward-growing mandible, the inclines of the mandibular teeth, and the musculature act to "block in" the upper molars and allow them to settle in the most functional position. This simply requires the lower arch to be positioned properly.

The same cast tube is used for both maxillary and mandibular second molars. The only difference is in the amount of torque, which corresponds with that of the first molars to allow proper positioning.

Curved buccal surfaces, both occlusogingivally and mesiodistally, minimize tissue irritation in the confined space of the second molars. Both molar tubes have small elastic hooks (Fig. 25).

Mandibular Second Bicuspids (Fig. 26)

Torque	Tip	Thickness
– 17°	0°	Thin

The lower second bicuspids are among the last teeth to erupt and therefore among the last to be banded or bonded. Bracket position must be accounted for in the leveling process--particularly because the lower first molar is going to be tipped back slightly, leaving a slight vertical embrasure break during active treatment in its mesial contact with the lower second bicuspid.

We prefer to band this tooth, not only because the bracket must be placed gingivally to keep it up in occlusion, but also because the bolus of food during chewing concentrates in the area of the lower second bicuspid and first molar. In addition, it is especially difficult to bond the tooth gingivally in younger patients.

The lower second bicuspid should have buccal root torque symmetrical with the lower first and second molars, because their main cortical bone support is through the external oblique ridge.

The bracket should have a wedge shape to minimize interference with the upper bicuspids, and the bracket base should be as thin as possible to accentuate the buccal offset of the lower first molar. In extraction cases it is helpful to have a 5° mesial tip for root paralleling.

Mandibular First Bicuspids (Fig. 27)

Torque	Tip	Thickness
– 11°	0°	Thin

This is the transition tooth of the lower arch: it functions as both an anterior and a posterior tooth. It is supported equally by the last extension of the external oblique ridge and by the planum alveolare of the anterior symphysis.

The buccal cusp seats in the distal fossa of the upper first bicuspid, allowing the lower first bicuspid to act as a posterior tooth and to function as a masticator.

Equally important, it functions as an anterior tooth by playing a role in cuspid guidance--which does not simply mean the upper cuspid guiding off the lower cuspid, but rather the synergistic articulation of several teeth to disarticulate the balancing side occlusion. The upper cuspid occludes with the lower first bicuspid, the lower cuspid, and often the distal aspect of the lower lateral incisor.

Root support of the lower first bicuspid is mainly from the lingual (Fig. 28). (Root support of the lower second bicuspid is mainly from the buccal.) Even so, there must be buccal root torque in the bracket to passively accommodate the greater buccal crown curvature. Wedge-shaped brackets prevent occlusal interferences.

Mandibular Cuspids (Fig. 29)

Torque	Tip	Thickness
7°	5°	Thin

The lower cuspid's distobuccal incline articulates with the mesiolingual incline of the upper cuspid to create the primary guidance for disarticulation of the balancing side occlusion. Therefore, the labial surface would ideally be angled slightly outward--implying a lingual root torque.

The root of the lower cuspid should contact the lingual planum alveolare, which is the bony buttress supporting disarticulation. Such a position is difficult to create if the lower cuspid root is vertical or supported primarily from the labial (0° to -10°).

Lingual root torque is also advantageous mechanically as the lower cuspid is moved mesially or distally. This is especially true in extraction cases, because all consolidation mechanics have a tendency to detorque both arches.

In its in-out relationship with the incisors, the lower cuspid contact should be no more than .5mm lingual to the lower lateral incisor, allowing for lingual movement of the cuspid should this contact break after retention. If the contact does break, as much as 5mm of arch length can be lost after retention without any apparent disruption of the lower incisor contacts. However, should the lower cuspid break to the labial and the lower incisors collapse to the lingual, even slight crowding will produce obvious contact breaks.

If a bracket of the same thickness were used on both the lower cuspid and the lower lateral incisor, the cuspids would be inset 1mm or more to the lingual (Fig. 30). Because the lower cuspid is thicker labiolingually, the lower incisor bracket must be thickened and the lower cuspid bracket thinned as much as possible. Still, a cuspid outset is often needed in the final archwires.

In the vertical plane, the lower cuspid should be bracketed slightly gingivally to keep it in contact with the upper cuspid. It should be noted that the entire lower buccal segment is bracketed or banded somewhat gingivally to reduce the curve of Spee and allow a more positive upward seating of the buccal segments.

Mandibular Incisors (Fig. 31)

Torque	Tip	Thickness
– 1°	0°	Thick

The lower lateral incisor also plays a role in cuspid guidance. The incisal edge has a short mesial incline and a long, sloping distal incline. The distal incline prevents excessive wear on the incisal edge when the lower arch moves to the working side in cuspid guidance disarticulation. It also allows for a slight distal root tip of the lower lateral incisor, which enhances its stability after orthodontic movement.

The ideal torque of the lower incisor--as with the upper incisor--varies with facial type. However, a torque of -1° allows enough flexibility for increase or decrease in torque as required by dolichofacial or brachyfacial types.

Bracket height should be somewhat incisal in deep bite cases to assist in bite opening and intrusion. In conjunction with the gingival bracket placement in the buccal segments, this helps level a deep curve of Spee.

To maintain the proper in-out relationship with the lower cuspids and prevent interference with the upper incisors, the bracket slot should be deep and the bracket thin at the incisal edge. An incisal bevel is used to create these dimensions.

Maxillary Bicuspids (Fig. 32)

Torque	Tip	Thickness
– 7°	0°	Thin

Ricketts called the upper second bicuspid the "key to occlusion" because of its importance in the seating of the upper buccal segments. If the distal marginal ridge of the upper second bicuspid is not seated against the mesiobuccal cusp of the lower first molar, it is difficult to establish an anterior Class I relationship.

Bands and bonds should be seated somewhat gingivally on the upper bicuspids to help in seating, in leveling the upper curve of Spee, and in resolving the disparity in bracket heights between the anterior and posterior segments.

As with the maxillary first molar, buccal root torque assures that the roots can be slightly to the lingual and supported by the dense cortical bone of the palate--particularly when expansion is part of the treatment mechanics. A mesial root tip of -5° in extraction cases facilitates root paralleling.

Wedge-shaped brackets have raised gingival tie wings (to minimize gingival trauma with short clinical crowns) and lowered occlusal tie wings (to avoid dislodgment from chewing).

Thick-based brackets have not been found necessary for second bicuspids in nonextraction cases, because distal rotation of the molar places its mesiobuccal cusp more buccal to the second bicuspid.

Maxillary Cuspids (Fig. 33)

Torque	Tip	Thickness
7°	10°	Thin

Consistent with a 134° intercanine angle, the upper cuspid should be torqued slightly to the lingual (Fig. 34). This is a common point of controversy, along with the torque on the lower cuspid.

From the esthetic standpoint, the labial inclination of the upper cuspids is important in supporting the corners of the mouth and the caninus complex. If the upper cuspid root is vertically inclined and the labial surface curves lingually, this esthetic support is lost. It may not be as evident in nonextraction cases, where expansion occurs and the tooth is tipped outward, but it is obvious in extraction cases, where the upper anterior segments are tipped lingually.

In addition, there is a mechanical tendency to detorque the upper cuspids as they are retracted in extraction cases. Because the dense cortical plate surrounding the upper cuspids is particularly corrugated (especially in adults), it is difficult to retract the cuspids without impacting the root on the labial plate. It is mechanically more efficient to keep the root of the cuspid in the cortical trough when moving it distally.

Finally, the relationship between the upper lateral incisor and the upper cuspid is influenced by their relative torque. The torque differential between the two segments (14° to 7°) should be kept to a minimum to maintain integrity of the labial surface contours.

A rhomboid-shaped Diamond bracket permits accurately repeating bracket angulation along the cuspid long axis. The crown long axis--easily determined along the prominent buccal developmental ridge--is used as the reproducible landmark, and the slanted tie wings are placed parallel to this axis.

Maxillary Incisors (Fig. 35)

	Torque	Tip	Thickness
Lateral	14°	8°	Standard
Central	22°	5°	Standard

Lingual root torque that some clinicians might deem excessive is necessary to achieve an interincisal angle of 126° (Fig. 36). Not all cases should be torqued to such an angle, but this built-in torque permits it when a full-size edgewise archwire is engaged. I believe it is easier to reduce torque with undersized or round wires than to bend more torque into the wire.

The more brachyfacial the case, the more torque is needed. Dolichofacial types, which are often extraction cases, need the torque to prevent dumping during space closure. Therefore, accentuation of lingual root torque is appropriate in most cases.

Both the upper central and lateral incisor brackets have standard thicknesses, for two reasons. First, the initial area of interference when distally overcorrecting the upper buccal segments is the upper lateral incisor (Fig. 37). The system adds to this interference if the tooth is inset by using a bracket thicker than on the central incisor. It is better to keep the upper lateral incisor flush with the central incisor during the overcorrection process and then tuck in the lateral incisor during the retention phase. Second, to maintain a good contact point with the upper cuspid, the upper lateral incisor bracket should be slightly thicker than the upper cuspid bracket.

The rhomboid-shaped Diamond bracket tie wings describe the crown long axis anatomy and generally parallel the incisal edges of both upper incisors. Like the lower incisors, the upper incisors should have brackets placed slightly incisally to take advantage of the differential bracket heights on the posterior teeth.

Figures

Fig. 13 A.Class II division 2 deep bite malocclusion. B.Overcorrected occlusion with appliances in place. C.Immediately after debanding with buccal segment override. D. Final functional settling of occlusion two weeks post-treatment.

Fig. 13 A. Class II, division 2 deep-bite malocclusion. B. Overcorrected rotation, with appliances in place. C. Immediately after debanding, with buccal segment override. D. Final functional settling of occlusion two weeks post-tretment.

Fig. 14 Ideal final cuspid position Is dictated by proper upper first molar rotation torque and angulation— in turn dictated by proper lower first molar rotation torque and angulation.

Fig. 14 Ideal final cuspid position is dictated by proper upper first molar rotation, torque, and angulation--in turn dictated by proper lower first molar rotation, torque, and angulation.

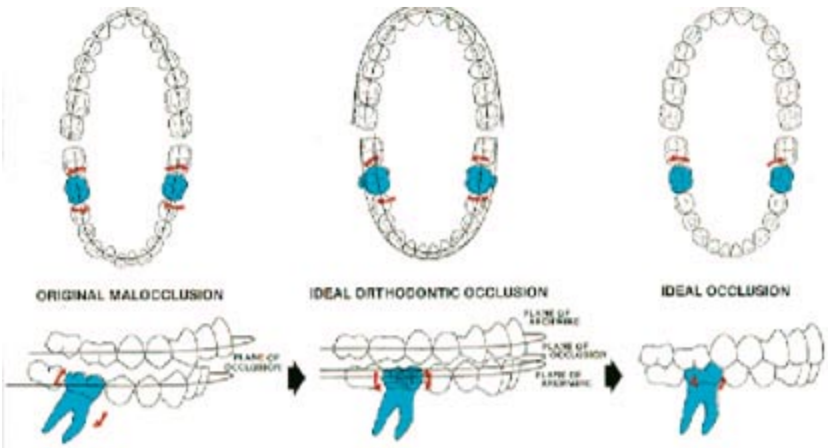

Fig. 15 Mandibular first molars.

Fig. 16 Ideal functional seating of upper first molar shows slight distal root tip, with distobuccal cusp seated into embrasure of lower first and second molars. This can only be achieved when lower first molar is tipped slightly to distal and second molar slightly to mesial.

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Fig. 17 Ideal distal rotation of lower first and second molars with appliances in place. Distobuccal cusp of first molar is rotated one third of distance through mesial marginal ridge of second molar. Lower first molar will settle upward and outward slightly upon appliance removal.

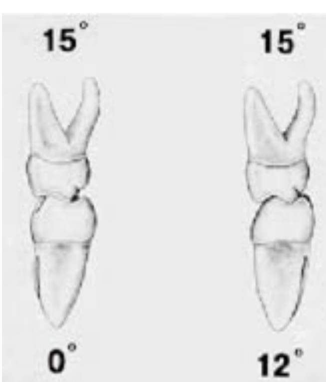

Fig. 18 When lower first molar Is not rotated distally (left) there is an opening in inclined plane relationship between upper and lower molars, tending to bring upper molar back into mesial rotation.

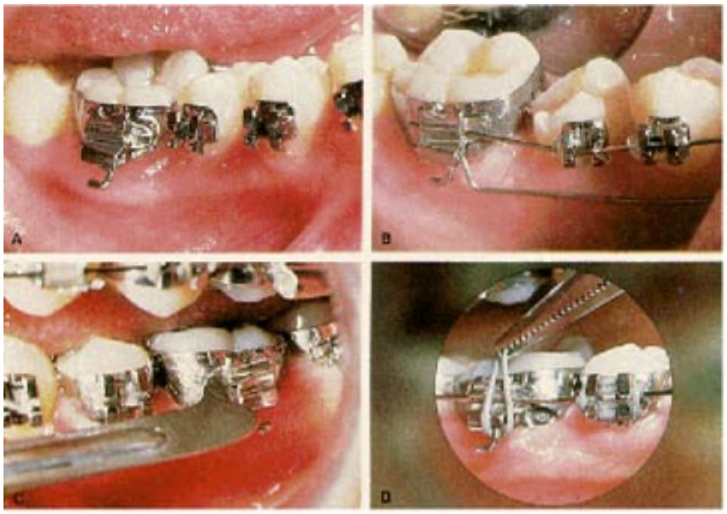

Fig. 19 Peerless cast tubes feature: A. Anatomical occlusal tie wing cutout and 20 percent smaller profile to reduce occlusal interferences and improve patient comfort. B. Gingival auxiliary tube with funneled entrance, offset to buccal without torque or distal offset, to allow easier utility arch placement. C. Positive security of flushmounted, brazed main arch cover(easily removed wlth special instrument). D. Mesiogingival hook that remains in place after main slot conversion, avoids soft tissue irritation, and aids rapid ligation.

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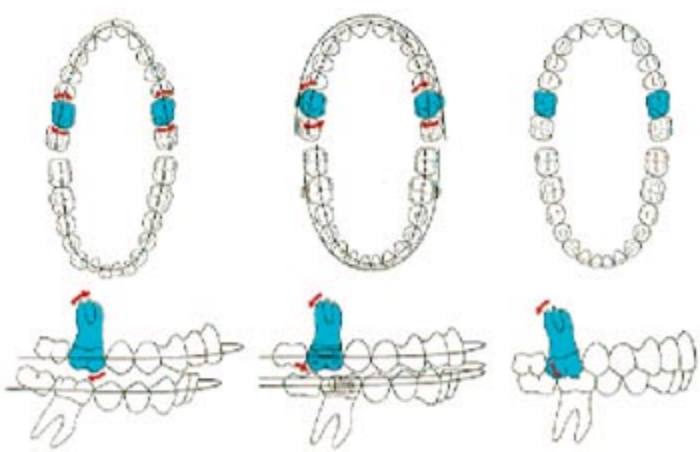

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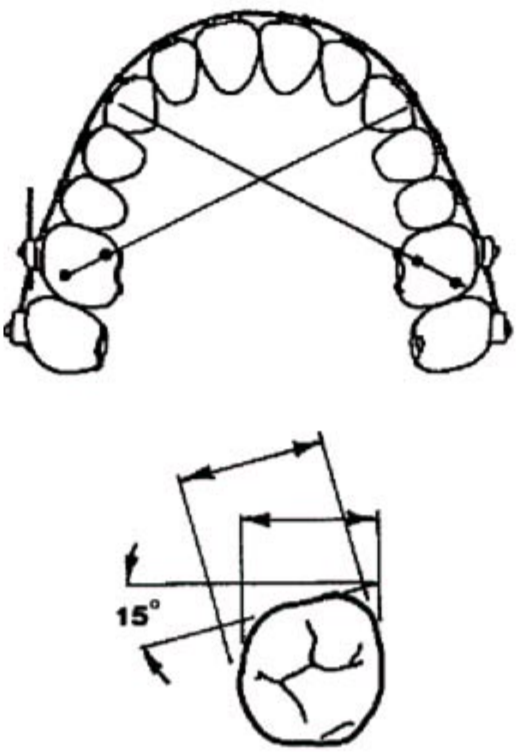

Fig. 21 When upper molar is properly rotated (15° distal), line drawn through distobuccal cusp and mesiolingual cusp will point at distal of opposite cuspid. In extraction cases, line should point at mesial of opposite cuspid.

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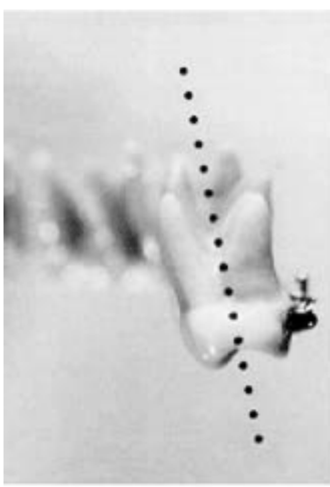

Fig. 22 Lingual root position with straight wire and buccal root torque in terminal tube. Even though roots of upper buccal segment should be inclined lingually, buccal root torque must be placed in upper buccal segments to allow for exaggerated buccal curvature of these teeth.

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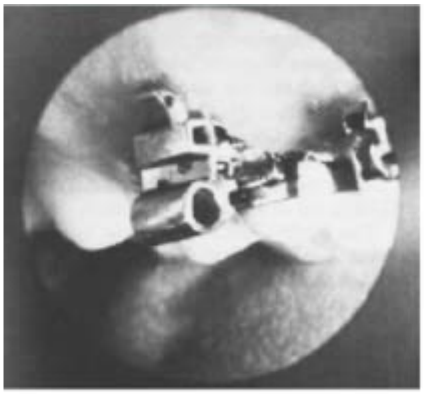

Fig. 23 Peerless cast tubes are especially useful in cases of minimal crown height. Reduced size and offset auxiliary tube and hook allow accurate placement and access to headgear tube and both slots.

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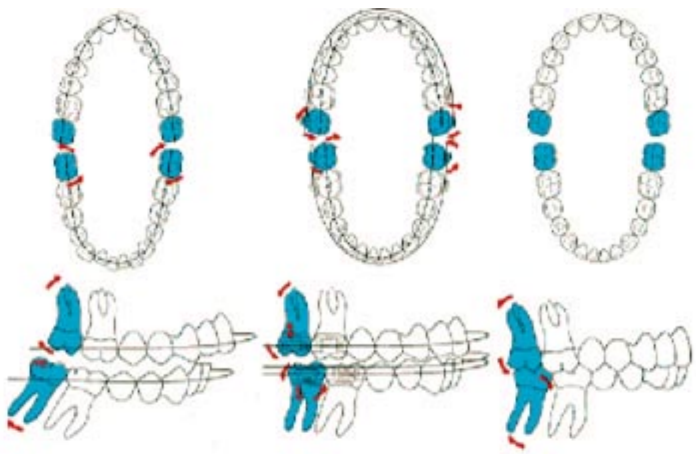

Fig. 24 Second molars.

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Fig. 25 Second molar tubes with buccal elastic hooks are rounded and miniaturized for patient comfort.

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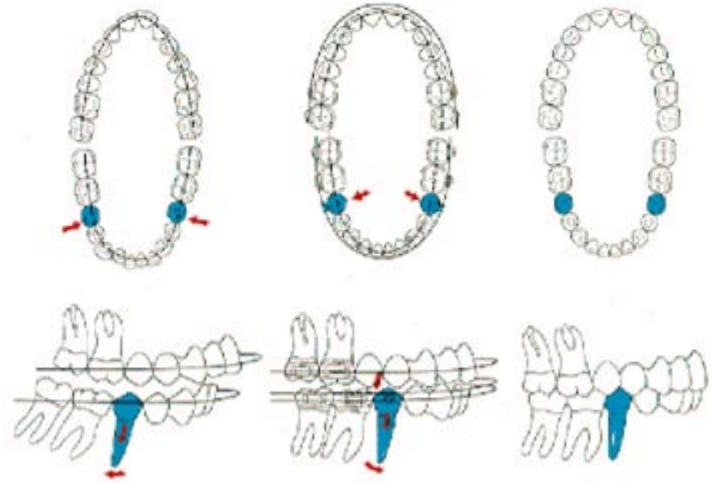

Fig. 26 Mandibular second bicuspids.
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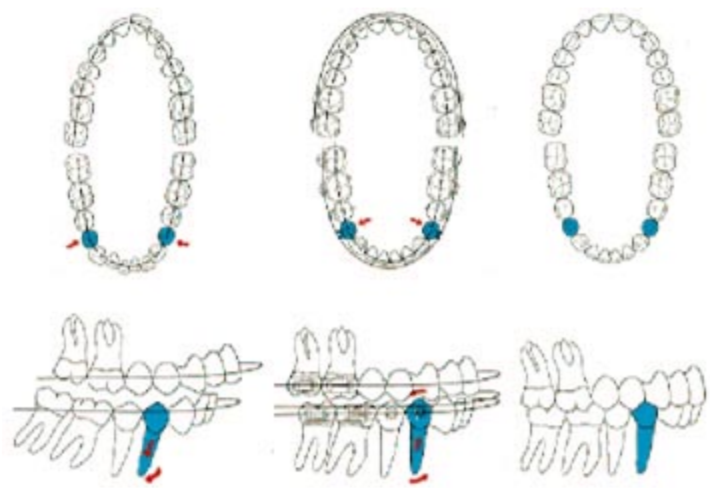

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Fig. 28 Posterior teeth are mainly supported by cortical bone extension of external oblique ridge. Torque changes at lower first bicuspid (which functions as both anterior and posterior tooth); anterior segment is supported mainly by dense bone of lingual planum alveolare.
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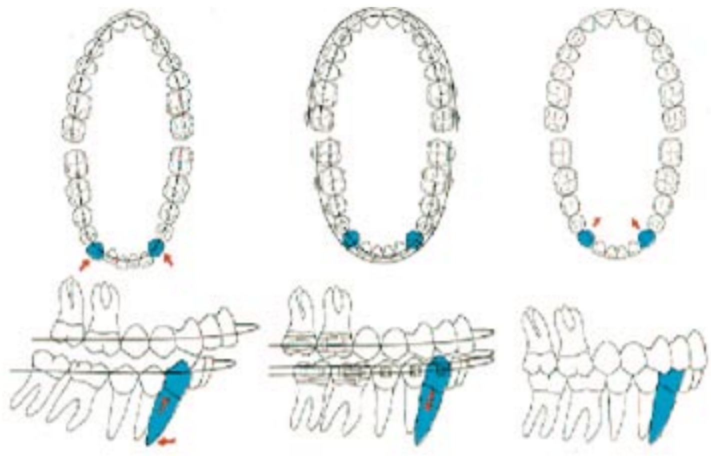

Fig. 29 Mandibular cuspids.

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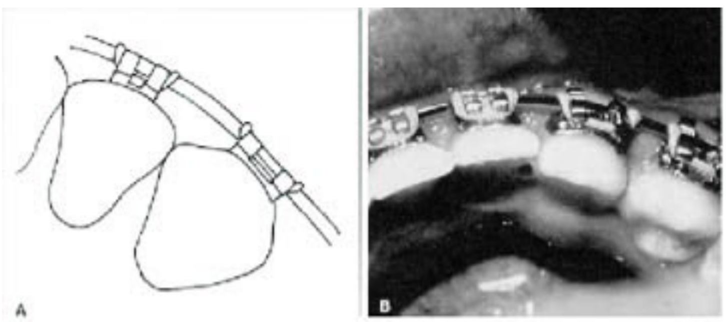

Fig. 30 A. Difference in labiolingual thickness between lower lateral Incisor and lower cuspid. B. If brackets have same thickness lower cuspids are excessively inset.

Fig. 30 A. Difference in labiolingual thickness between lower lateral incisor and lower cuspid. B. If brackets have same thickness, lower cuspids are excessively inset.

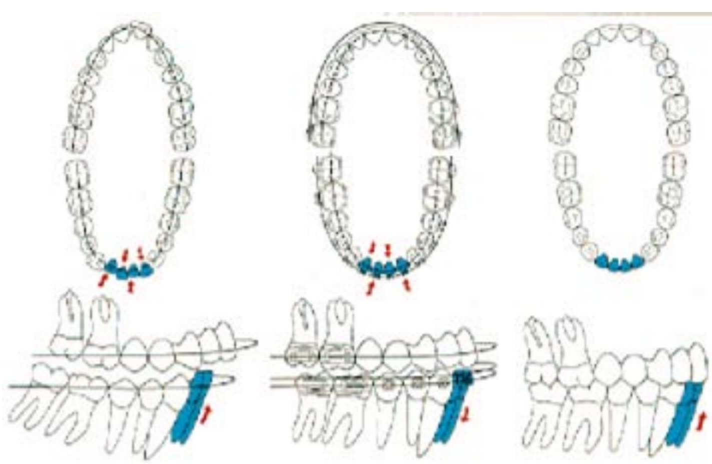

Fig. 31 Mandibular Incisors.

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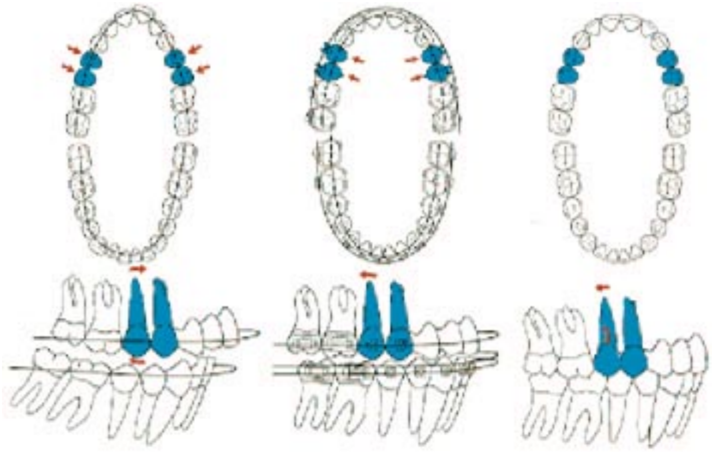

Fig. 32 Maxillary bicuspids.

Fig. 32 Maxillary bicuspids.

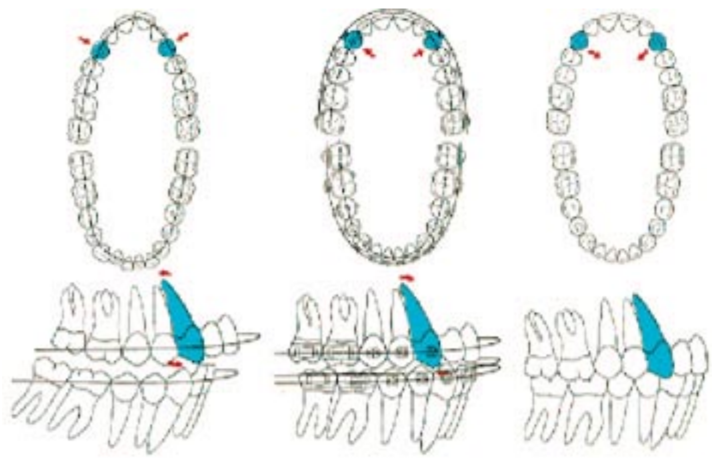

Fig. 33 Maxillary cuspids.

Fig. 33 Maxillary cuspids.

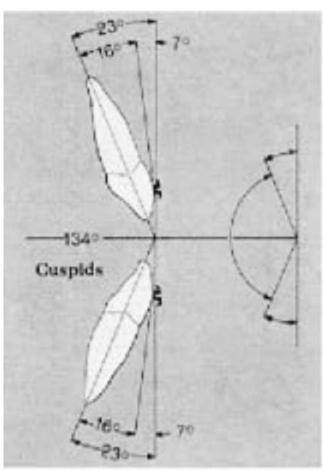

Fig. 34 Lingual root torque Is necessary to achieve ideal Intercanine angle of 134° and compensate for labial curvature of upper and lower cuspids.

Fig. 34 Lingual root torque is necessary to achieve ideal interincisal angle of 134° and compensate for labial curvature of upper and lower cuspids.

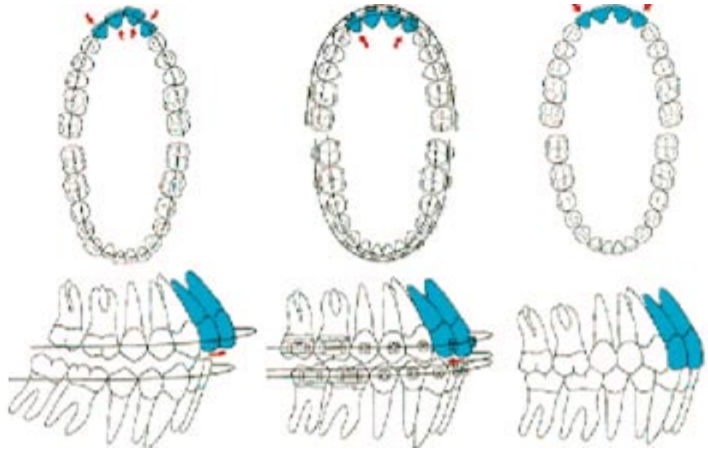

Fig. 35 Maxillary incisors.

Fig. 36 With full size archwire engaged active torque brings all upper roots Into support by dense lingual cortical bone of palate.

Fig. 36 With full-size archwire engaged, active torque brings all upper roots into support by dense lingual cortical bone of palate.

Fig. 37 Insetting upper lateral incisor early in treatment results in incisal interference when overcorrection of buccal segments is attempted. Using bracket base with standard thickness on upper lateral incisor allows for such overcorrection.

Fig. 37 Insetting upper lateral incisor early in treatment results in incisal interference when overcorrection of buccal segments is attempted. Using bracket base with standard thickness on upper lateral incisor allows for such overcorrection.

Footnotes

1. Bioprogressive is a trademark of Rocky Mountain Orthodontics, Denver.

2. Linear Dynamic, Peerless, and Diamond are trademarks of Ormco Corporation, Glendora, CA.