

A Lingual Arch for Intruding and Uprighting Lower Incisors

[WINSTON SENIOR, LDS, RCS, DDO, RFPS](#)

Many mechanical systems have been described for intrusion of the lower incisors. When full fixed appliances are used with a mandibular archwire that has a reverse curve of Spee, the intrusive force can be augmented with a sectional arch inserted in double buccal molar tubes. Alternatively, a Ricketts utility arch can use the first permanent molars as anchorage.

Both systems apply pressure to the labial surfaces of the lower incisors, creating a downward force vector that passes anterior to the incisors' center of resistance. This causes the crowns of the lower incisors to procline labially and the roots to impinge on the planum alveolare--the cortical bone on the posterior aspect of the symphysis (Fig. 1). An illusion is created that the incisal edges are intruding when, in fact, they are merely tipping labially.

To counteract this tendency, Ricketts advised that his sectional arch, fabricated from .016" square blue Elgiloy, should incorporate buccal root torque in the anterior bridge, so that the apices of the lower incisors would be directed through the cortical corridor and away from the planum alveolare (Fig. 2).

Many years' experience in using the Ricketts utility arch has highlighted the following disadvantages:

- λ Fabrication and adjustments call for special wire-bending skills.
- λ The buccal bridges can cause trauma to the cheeks.
- λ A buccal bridge can become unilaterally distorted from the forces of mastication, resulting in asymmetric intrusion of the lower incisors.
- λ Asymmetric distal tipping of the anchorage molars can occur.
- λ Because more intrusive force is applied to the mandibular lateral incisors than to the central incisors, the roots of the lateral incisors may impinge on those of the central incisors or the unerupted canines.

This article describes a simple lingual arch that overcomes the problems of both sectional and full arches by creating equal downward force vectors that pass behind the centers of resistance of all four lower incisors.

Appliance Design

An .036" lower lingual arch is soldered to first molar bands. Distal extensions form occlusal rests on the second molars to prevent distal tipping of the first molars as the incisors are intruded (Fig. 3).

Four elastic chains are attached to the anterior bridge of the lingual arch with a mosquito forceps (Fig. 4). If intrusion is the primary goal and the teeth are already fairly upright, the elastic chains should come off the lingual arch on the labial side (Fig. 5). If the priority is to retrocline the lower incisors, the elastics should come off on the lingual side. This will reduce the risk of the root apices impinging on the planum alveolare.

After cementation of the arch, the elastics are stretched to four lingual buttons on the lower incisors

(Fig. 6). These should be bonded as far as possible from the gingival margin to facilitate intrusion.

Case 1

A 42-year-old female presented with the chief complaint that her upper and lower incisors were becoming progressively spaced and prominent (Fig. 7). She was having difficulty making a lip seal and experiencing discomfort from lip chapping.

The upper incisors could not be retracted until the lower incisors were uprighted and intruded. Lingual buttons were bonded to the cingulae of the lower incisors and attached to a lower lingual arch, which was soldered to bands on the first molars as described above (Fig. 8). The tension on each elastic was about 40g.

After 12 months of retraction, intrusion, and palatal root torquing, the patient's appearance had improved dramatically (Fig. 9).

Case 2

A 36-year-old female presented with the chief complaint of progressive spacing of the upper incisors, associated with an increase in overjet and lower lip trapping (Fig. 10).

Buttons were bonded to the lingual aspects of the lower incisors and connected as described above to a lower lingual arch, which was soldered to bands on the first molars. Occlusal rests on the second molars were added to prevent reciprocal distal tipping of the first molars as the lower incisors were intruded (Fig. 11).

One year after retention, the patient showed a substantial improvement in facial appearance (Fig. 12). •

FIGURES

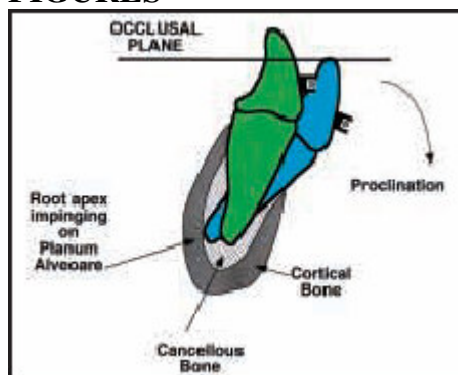


Fig. 1 Labial tipping creates illusion of incisor intrusion, but moves root apex lingually into cortical plate.

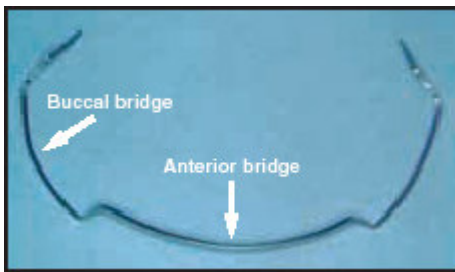


Fig. 2 Ricketts utility arch.



Fig. 3 Lingual arch made of .036" wire, with soldered first molar bands and distal extensions forming occlusal rests on second molars. Four elastic chains are attached to anterior bridge.

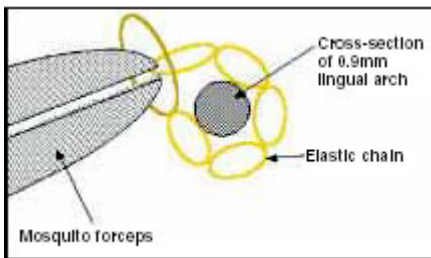


Fig. 4 Elastic chain attached to .036" (.9mm) lingual arch with mosquito forceps.

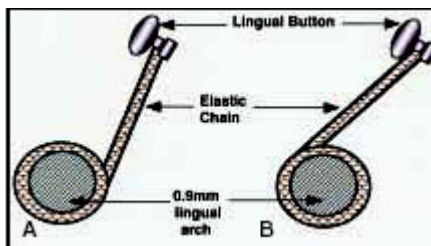


Fig. 5 A. Elastic chain comes off lingual arch on labial side, exaggerating vertical component of force. B. Elastic chain comes off lingual arch on lingual side, reducing vertical component in favor of retraction.



Fig. 6 Lingual buttons bonded approximately midway between incisal edges and gingival margins of lower incisors.



Fig. 7 Case 1. 42-year-old female with proclined upper and lower incisors and lower anterior spacing before treatment.



Fig. 8 A. Lower lingual arch attached by elastic chains (coming off lingual side) to lingual buttons. B. Finishing stages after intrusion and retraction of lower incisors. Upper incisors are being uprighted with $.016" \times .016"$ Elgiloy utility arch. Note gable bends on distal ends of buccal bridges to intrude incisors, gable bends on anterior ends of buccal bridges to upright incisors, and elastic chains to intrude canines.

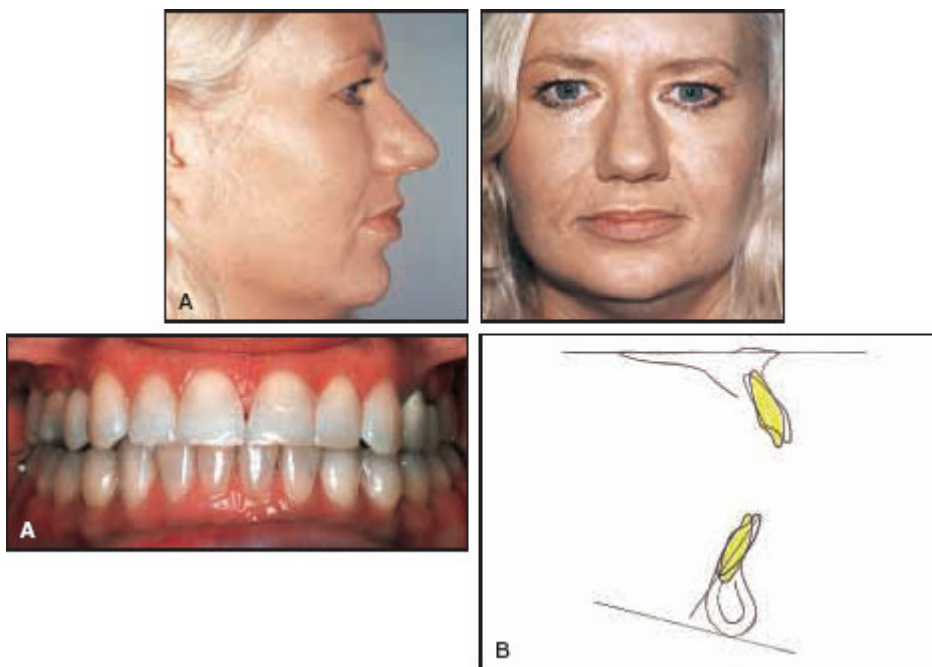


Fig. 9 Case 1. A. Patient after 12 months of treatment. Note improvement in lip profile. B. Superimposition of cephalometric tracings before and after treatment, showing uprighting of upper

incisors and labial movement and intrusion of root apices of lower incisors.



Fig. 10 Case 2. 36-year-old female with progressive spacing of upper incisors, increasing overjet, and lower lip trapping before treatment.



Fig. 11 Case 2. A. After eight weeks of intrusion by lingual chains attached to lower lingual arch (elastic chains were changed after four weeks). B. Intramaxillary traction between lower lingual arch and hooks welded to .016" x .022" blue Elgiloy maxillary archwire. Note gable bends to upright upper incisors, which are connected by continuous ligature, and elastic chain to close maxillary midline diastema.



Fig. 12 Case 2. A. Patient one year after retention. Note reduction in lip protrusion, mentalis strain, and depth of infralabial groove. B. Superimpositions of cephalometric tracings before and after treatment, showing uprighting of upper incisors and intrusion of lower incisors.

FOOTNOTES

1 RMO, Inc., P.O. Box 17085, Denver, CO 80217.