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Segmental Lingual Orthodontics in Preprosthetic Cases

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Segmental lingual orthodontic treatment offers several advantages in preprosthetic cases, including esthetics, efficiency, relatively simple and comfortable mechanics, and, ultimately, the ability to retain the results with fixed prostheses. It also offers the orthodontist a simplified and abbreviated way to learn lingual bonding and treatment methods.

The technique does have some drawbacks, such as its high cost compared to traditional orthodontics and its limitation of speech–particularly in patients with macroglossia.

The treatments I perform most often with the segmental lingual technique are:

- Elimination of macro-occlusal interferences
- Correction of incisal or cuspid guidance problems
- Abutment paralleling
- Space closure
- Crossbite correction
- Eruption of severely broken teeth

Diagnosis, treatment planning, and therapy for preprosthetic patients require close coordination among the orthodontist, periodontist, and restorative dentist. Diagnostic records usually include periapical x-rays, articulator-mounted casts, and cephalometric tracings.

Although both I and the prosthodontists I work with generally prefer to use conventional fixed prosthetics, implants are considered when immovable anchorage is needed or when maxillary lateral incisors are replaced.

As in all lingual techniques, the brackets must be bonded indirectly. I use a Slot Machine for precise bracket placement.1

The following are a few applications of segmental lingual orthodontics.

Molar Anchorage

When a Goshgarian arch is used for unilateral correction of a molar crossbite, the anchorage must be increased on the opposite side. This can be done with lingual brackets and a segmented archwire (Fig. 1). Although the correction of a posterior crossbite requires 135-205g of force, the bicuspids and molars of the segmented side can offer 235-355g of anchorage.2-5

If bands are needed to hold the lingual expansion arch, esthetics can be improved by microetching the facial surfaces of the bands and bonding with tooth-shaded composite (Fig. 2).

Case 1

This patient had a missing mandibular left first molar and a mesially tipped second molar. The second molar needed to be moved distally and uprighted to allow it to act as an abutment for a future bridge.

The bicuspids and second molar were bonded lingually. A segmented .016" X .016" stainless steel archwire was placed, with a gingival step that permitted insertion into the molar tube. A nickel titanium compressed-coil spring was added between the second bicuspid and the second molar (Fig. 3).

The second archwire, which was placed within a few weeks, was a stainless steel .016" X .022" straight wire without a gingival step (Fig. 4). Because the compressed-coil spring would have rotated the distal surface of the molar facially and the mesial surface lingually, a 15° toe-in bend was placed in the distal portion of the lingual archwire. If the cusp tips of the molar had interfered with its distal movement, they could have been reduced without risk, since the tooth was eventually to be used as a fixed-bridge abutment.

At the conclusion of treatment, an alginate impression was taken. A temporary bridge, made from a vacuum-formed plastic matrix, was worn until the permanent bridge was completed (Fig. 5).

Case 2

The following treatment uprighted the mandibular left second molar and then completely closed the first molar space by bringing the second molar forward.

The bicuspids and molar were bonded lingually. The initial archwire was an .016" X .016" stainless steel segment with a large, U-shaped loop that gave the wire enough flexibility for insertion into the molar tube. Elastic chains were used to bring the molar mesially, while a 10° toe-out bend compensated for the rotation caused by the elastic chain.

The correction took three months. A fiber thread between the molars and bicuspids was used for retention (Fig. 6).

Case 3

This patient needed a maxillary bridge to widen the right lateral incisor. Lingual brackets were placed from cuspid to cuspid, and an .016" X .016" stainless steel segmented wire was used, along with a nickel titanium compressed-coil spring between the maxillary right central and lateral incisors.

Within two months, enough space was gained for the new bridge. An immediate temporary bridge was made with a prosthetic tooth embedded in a clear plastic vacuum-formed retainer (Fig. 7).

Conclusion

Segmental lingual orthodontics can only be used in malocclusions involving a minimum of teeth and requiring relatively simple movements. If a more difficult movement, such as the intrusion of a molar, is needed or a malocclusion with multiple discrepancies is present, full-arch bonded appliances must be used.

When a coil spring is used to open spaces, a moderate amount of tipback and a toe-in bend will be needed in the segmented lingual arch to counteract rotations. When elastic forces are used to close spaces, a greater amount of tipback and a toe-out bend must be placed in the lingual wire. Immediate retention with a temporary bridge or a fiber thread will prevent relapse.

If preprosthetic patients are selected carefully, the segmented lingual appliance allows short, simple, and esthetic treatment with greater patient comfort and reduced cost. □

FIGURES

Fig. 1 Transpalatal bar used for expansion, with anchorage increased on opposite side by segmented lingual archwire.

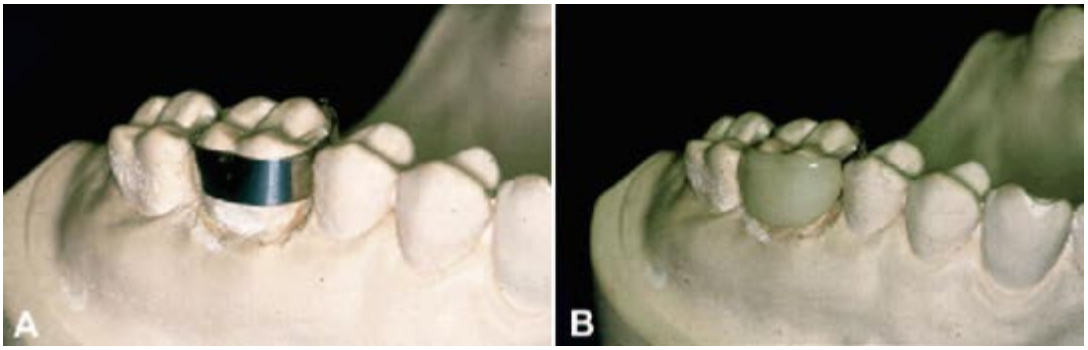

Fig. 2 Tooth-shaded acrylic bonded to labial surface of molar band for improved esthetics.

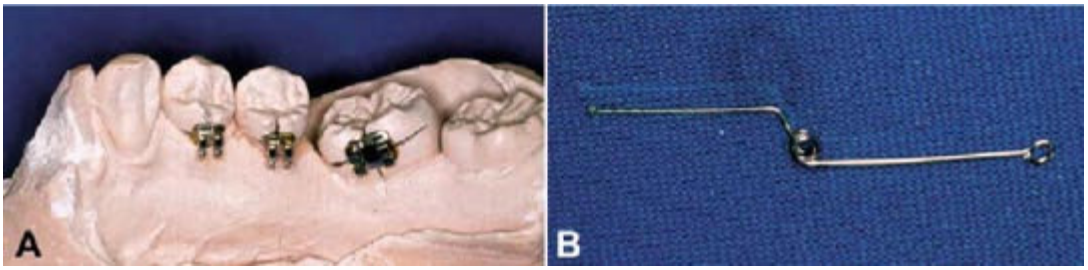

Fig. 3 Case 1. A. Lingual brackets placed on cast. B. Initial archwire with gingival step and helices for flexibility.

Fig. 4 Case 1. Second archwire without gingival step.

Fig. 5 Case 1. Vacuum-formed temporary bridge.

Fig. 6 Case 2. A. Setup of lingual appliance. B. Initial segmented archwire. C. After space closure, fiber thread used for retention.

Fig. 7 Case 3. A. Lingual archwire used to gain space for wider maxillary right lateral incisor. B. Vacuum-formed temporary bridge. C. Temporary bridge with embedded prosthetic tooth.

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FOOTNOTES

1 Trademark of Creekmore Enterprises, 1620 Fountainview, Houston, TX 77057.