

# Fixed Retention Following Cleft Palate Orthodontics<sup>1</sup>

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Retention, following orthodontic intervention in cleft palate patients, can be a dual orthodontic—prosthodontic responsibility. Because of hypoplastic and missing teeth or residual palatal defects, a new and more intricate prosthetic appliance may be necessitated after active orthodontic treatment has been completed. These fixed or removable replacements, often constructed by the prosthodontist, must also retain the realigned maxillary arch.

It should be recognized that the same anatomical and physiological impairments which complicate active orthodontic treatment may also pose problems in retention. Scar tissue contracture, lack of bony support, abnormal tongue position, and missing teeth influence final arch stabilization. Retention may be established in several ways including autogenous bone grafting.

However, the purpose of this paper is to consider the need for maintenance of the orthodontically established arch by means of either fixed or removable retentive appliances.

Both approaches have advantages from the prosthetic viewpoint. A removable appliance is more adaptable: It can be relined, it is easier to try in and adjust, lip contour is more readily established, and pontic length can be

controlled. Nevertheless, few would argue that fixed retention, when indicated, is more desirable. In addition to the benefits of a fixed appliance, stabilization of the segments is more permanently achieved. However, little has been written concerning the use of fixed retention.<sup>1</sup>

The following factors should be considered prior to selection of the mode of retention:

1. *The age of the patient and the size of the pulp chamber.*

The earliest age at which fixed retention can be safely undertaken is fifteen to sixteen years. With younger patients full crown preparations must be modified and a "shoulderless" type of preparation employed. Retention grooves or pins should be used with discretion.

2. *The arch alignment and arrangement of the teeth.*

Only minimal changes in contour, alignment, and lip support can be achieved with anterior bridgework. The positioning of teeth adjacent to the cleft area in moderate infraocclusion may actually aid the crown and bridge prosthodontist. Contour can be established without the crowns appearing bulky. Furthermore, it will be necessary to remove less tooth structure, and greater anatomical crown length will be available for retention. When considering a removable appliance, however, a minimal collapse may be an esthetic disadvantage, since this type of restoration must follow the established arch contour.

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3. *The presence of defects which dictate the use of a removable prosthesis.*

Soft or hard palate inadequacies, large residual alveolar defects, or major changes in lip contour usually require a removable appliance. Fixed stabilization may also be constructed, but provision should be made for the accompanying removable appliance.

When fixed retention is the method of choice, the crown and bridge technique is usually modified from that normally employed for the noncleft patient. Multiple abutments, joined in one solid bridge, are required to stabilize the lateral segments and counteract the collapsing effect of the cicatricial lip and palate tissues.

The porcelain-gold ceramco type of construction is excellent for durability, but it does have certain limitations. A minimum of  $\frac{3}{4}$  mm thickness over the labial and proximal surfaces is necessary for esthetics and strength. With minimal preparations these restorations appear bulky in younger patients. Additionally, this porcelain has an opacity which is especially evident in the lighter shades and cannot be eliminated.

The following case reports illustrate the use of fixed retention for the replacement of missing teeth and the stabilization of the realigned arches.

Case No. 1

R. A.: Age nineteen. Bilateral cleft lip and palate; multiple surgical procedures on lip and palate (Figure 1).

This patient received active orthodontic treatment for two years beginning when he was twelve years of age. The restricted maxillary arch, including the anterior crossbite, was corrected. Following active treatment, the orthodontist established retention with a removable full palatal appliance

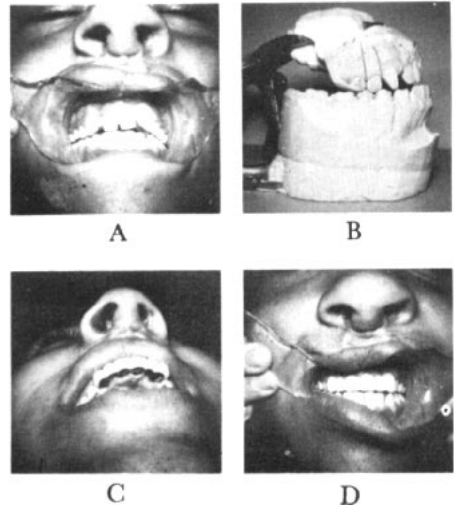


Fig. 1

which also replaced the missing lateral incisors.

The patient did not cooperate in retention. The lateral incisors were lost from the appliance allowing the central incisors to move laterally. At eighteen years of age he completely discontinued wearing the appliance, and the 2-3 mm anterior crossbite developed (A and B).

When the patient was nineteen years of age he was referred for a prosthetic consultation. The patient was adamant in refusing further orthodontic treatment. It was decided to utilize the central incisors as intermediary piers in a six unit anterior porcelain-gold bridge. The centrals and cuspids were prepared for full crown abutments. Lateral incisors were created, and the labial alignment was so established that an incisal edge contact was achieved (C and D).

Case No. 2

N. R.: Age sixteen. Right unilateral cleft lip and palate; three surgical procedures on lip and palate (Figure 2).

This patient had two periods of ac-

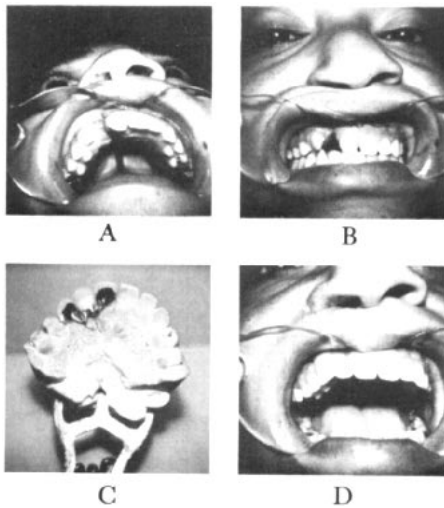


Fig. 2

tive orthodontics; one in the mixed dentition and the other in the permanent dentition. Following completion of the second period of orthodontics when he was thirteen years of age, retention was secured with a removable appliance which also replaced the missing right lateral incisor.

At sixteen years of age the patient was referred for consultation regarding fixed crown and bridge retention. Note the slight lingual and gingival collapse in the cleft area, the hypoplastic right central incisor, and the spacing between the anterior teeth (A and B).

Because the patient had been in retention for three years and was essentially caries free, a three unit loop bridge was constructed rather than the customary multiple abutment type of fixed retention. To harmonize with the existing anterior spacing, 14 gauge gold palatal loops were employed as connectors with the pontic (C). The final esthetic result was excellent (D).

#### Case No. 3

M. W. D.: Age twenty. Bilateral cleft lip and palate; multiple surgical

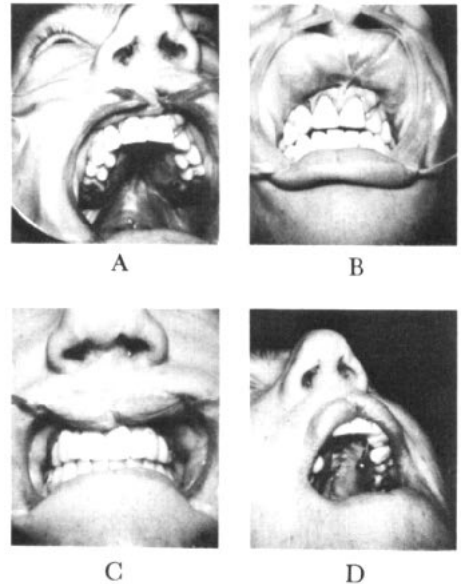


Fig. 3

procedures on lip and palate (Figure 3).

This patient received three intensive periods of orthodontic intervention. The first was during the mixed dentition; the second, in the permanent dentition, was completed at age fourteen; and the third, a one-year treatment period, was completed at age twenty. This last period was necessitated by a misunderstanding between the patient and his plastic surgeon with the result that the movable retainer was not worn subsequent to a secondary lip procedure. During this interval there was a general maxillary collapse with the cuspids retruding into the cleft area. After completion of this phase of orthodontic treatment (A and B), the patient was referred for construction of fixed crown and bridge retention.

Examination revealed two jacketed central incisors located in a slightly mobile premaxillary segment. The realigned cuspids approximated the centrals and the lateral incisors were missing.

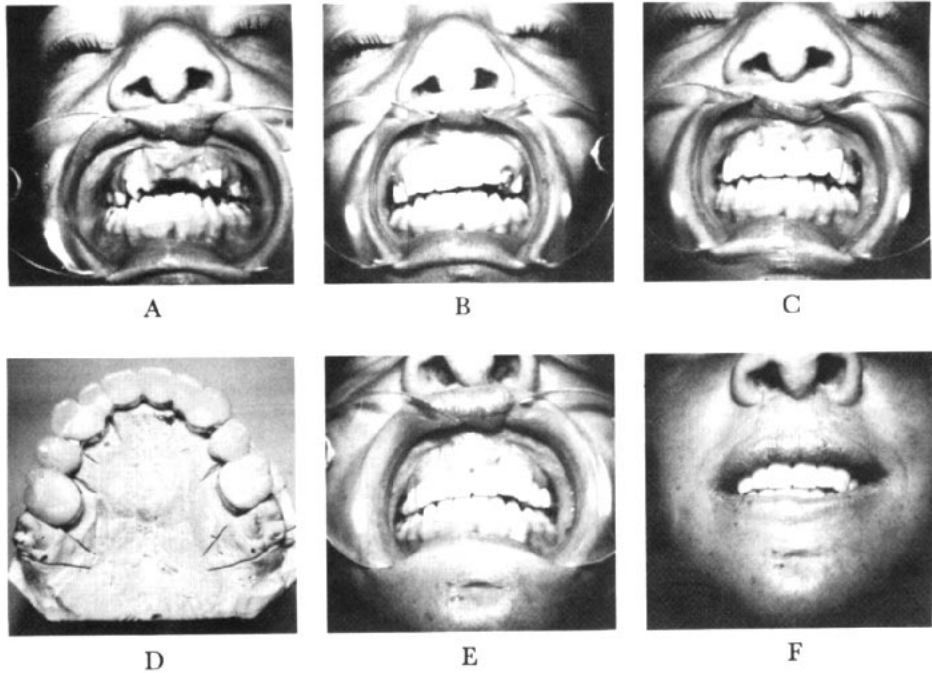


Fig. 4

The centrals, cuspids and first premolars were prepared for full crowns and an eight unit bridge fabricated (C).

In order to keep the cuspids from intruding out of the bridge, self-threading pins were inserted at right angles through the lingual surface (D). In construction, gold was carried over the cingulum in areas where pins were to be placed. After the pins were inserted, they were trimmed to reestablish normal lingual contour.

#### Case No. 4

J. D.: Age eighteen. Bilateral cleft lip and palate; multiple surgical procedures on lip and palate (Figure 4).

When the patient was thirteen years of age, eight malformed, malposed and supernumerary teeth were removed, and an immediate temporary appliance was placed. Following healing (A), the six remaining maxillary teeth were

used to retain an upper removable overlay partial (B). At seventeen years of age the mandibular teeth were orthodontically realigned. Discrepancies in occlusion (B) necessitated either a remaking of the overlay partial or the use of a fixed bridge restoration. There were no speech or palatal defects which would require a removable prosthetic appliance.

In order to test the feasibility of a fixed prosthesis, an inexpensive removable appliance was constructed (C) with the artificial teeth positioned as they would be aligned in the fixed prosthesis. The original treatment plan called for opening the bite, but the temporary appliance demonstrated that the anterior pontic length would be objectionably long. The temporary appliance also provided a basis for evaluating the final esthetic result which could be expected from a fixed prosthesis. Such a "pre-evaluation" was

helpful to the patient, her family, and the plastic surgeon in their decisions regarding the expediency of such treatment.

A ten unit, one-piece bridge was constructed (D) with premolars converted to cuspids, improving the occlusion and esthetics (E and F).

#### SUMMARY

Retention, following cleft palate orthodontics, can be a dual orthodontic-prosthetic responsibility. Both specialties should understand the indications for the specific type of approach

and the methods which can be utilized. In the past, retention has been accomplished primarily with removable appliances. However, in selected instances fixed crown and bridge retention may be the treatment of choice.

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#### REFERENCE

1. Bohn, A.: Retention Constructions Following Harvold's Method of Repositioning of the Maxillary Complex in Cleft Palate Cases. *J. Europ. Orthodont. Soc.*, 219-221, 1951.