An Orthodontic-Retentive Approach During Prosthodontic Rehabilitation in Cleft Lip and Palate Patients: A Case Report

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The orthodontic-prosthodontic rehabilitation of an eighteen-year-old girl with a Veau Class III cleft is discussed together with an orthodontic-retentive approach which minimizes the possibility of relapse during the time required for the insertion of a prosthodontic retentive device.

The biggest challenge in severe orthodontic problems associated with cleft lip and palate is not treatment but retention. After removal of the orthodontic appliances and during the time required for final prosthodontic work, the removable acrylic prosthesis usually used for temporary retention often does not prevent relapse.

Two suggested solutions for this problem are presented in this case report.

Pre-Treatment Status

An eighteen-year-old girl with a complete unilateral cleft lip and palate came for treatment to the Hospital of IASEG in Rio de Janeiro. She had not had surgical closure of the lip until three years of age, of the hard palate until age seven, and of the soft palate until age 14. Tonsils and adenoids had been removed when she was six years old. Speech was markedly hypernasal, and there was a hearing loss in the left ear. There was no history of previous orthodontic intervention. Her orthodontic status is illustrated in Figures 1-A, B and C.

This patient had a slight class II relationship on the right side and a class III on the left side (Figure 1-C). A crossbite was present from the upper right second bicuspid to the upper left first molar with an openbite in the anterior region. Cephalometric tracings, shown in Figure 2, were as follows: SNA: 66°, SNB: 77°, ANB: −11°, Po to NB: 7 mm, and GoGn to SN: 37°

Treatment

The upper left lateral incisor, considered to be of no value either orthodontically or prosthodontically, was extracted. Three main phases of treatment were then undertaken in sequence.

Phase One was correction of the upper crossbite through expansion of the maxillary arch. For this purpose, a combination of .019 twist-flex vestibular archwire and a .045 lingual expansion arch with auxiliary expansion arms of the Harvold type were employed. Expansion, started in May, 1973, was completed five months later with the following results:
Phase Two was the achievement of good lateral occlusion by simultaneous correction of the anterior openbite, the class II relationship on the right side, and the class III relationship on the left side.

All inferior teeth except the second molars were banded and leveled. In November, 1973, .020 up and down archwires were placed, and we started class II and class III mechanics at the same time (Figure 4-C). No mandibular anchorage preparation was done prior to the class II mechanics on the upper right side. The distal movement of those teeth was achieved through the combined use of light tip-back bends and the placement of a short class II elastic (Schudy, 1973). This also closed the bite in the cuspid region.

At this point, no fistula had appeared. This information is illustrated in Figures 3-A and B and 4-A and B.

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FIGURE 1. A, B, C. Pre-treatment photographs and dental casts.
FIGURE 2. Tracing of the head film before treatment. (There was only one incisor, the left lateral, in the upper arch.)

On the upper left side, an intermaxillary class III elastic was combined with light tip-forward bends in order to move these teeth mesially. At the same time, an up and down quadrangular elastic in a class III direction closed the bite in the cuspid region. Anchorage in the inferior arch was enhanced by the placement of stop-loops mesial to the molar tubes.

Active orthodontic treatment was finished in March, 1974, after a period of 10 months. Figures 4-C–E show Phase Two banding and results.

Phase Three consisted of the orthodontic retention of these results during prosthodontic work. Two types of prosthetic appliances were selected:

1) Golden splints were placed in both upper cuspids and in the first bicuspids in order to reenforce and maintain their corrected positions.
FIGURE 3. A, B, C, D. Upper maxillary arch prior to, during, and following Phase One of treatment.

2) A partial golden clasp denture was placed as an aid in retention, esthetics, and function.

Because of their importance in prosthetic rehabilitation and their unstable positions, the upper cuspids are always cause of concern during this transitional period. Before the prosthodontic work was started, certain factors were considered to be crucial to:

1. The upper right cuspid had been moved extensively in an area of abnormal muscular forces. Thus, it was probable that it would attempt to revert to its primary position as soon as the band was removed. On the left side, a relapse of some degree would probably also occur.
2. No clasp of any removable retention appliance could hold this movement, which would logically occur in an upward and inward direction, reopening the bite.
3. Because of this, the time between the removal of the orthodontic appliances and the placing of the retentive golden splints in the cuspid area should be a brief one.
4. Because of the human, mechanical, and functional factors involved, any accidental delay during the splinting work could endanger the whole result.

In order to avoid the above problems, the bands on the teeth to be splinted were removed. During the same visit, plastic brackets were bonded (Miura, 1974) where the bands had been. The archwire was then replaced.

This procedure had the following advantages:

1) The orthodontic archwire could be kept in place for purposes of retention without removal during the taking of the necessary impressions (Figures 3-C and D and 4-F). The arch merely changed its function from an "active" to a "retentive archwire." *
2) If at any time during the prosthodontic work, it was necessary to move a tooth or a group of teeth further, the archwire and/or intermaxillary elastics could immediately be activated.
3) The dental team did not have to worry about undesirable delays during the prosthodontic procedures because the teeth were being maintained mechanically.
4) Direct bonded brackets, because of their multiple characteristics, could be employed from the beginning of treatment.

As previously noted, the prosthesis of choice was a golden clasp removable apparatus. Posterior action clasps with a connection bar at the post-damming line were used on the molars. The space between the metal structure and the palate was covered with acrylic resin. The splinted teeth were prepared for a Tinker's veneer partial crown with a shoulder on the cervical external surface for the auxiliary palatal clasps in order to prevent leverage in the anterior region.

Results

Facial photographs taken after treatment show an improved profile (Figures 5-A and B).

* In Figure 3-D, the arch was removed for esthetic reasons only.

The comparison between pre- and post-treatment head-film tracings (we didn't make superimpositions as the films were taken from different distances) revealed:

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<tr>
<td>SNB:</td>
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<td>ANB:</td>
<td>-11°</td>
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<td>Po to NB:</td>
<td>7mm</td>
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<td>GoGn to SN:</td>
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The dental casts taken immediately after prosthodontic treatment (Figures 5-C and D), illustrate laterally the correction of the right class II and left class III relationships as well as the new position of the upper cuspids. The last photograph (Figure 6) shows the situation five months later.

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References


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