

Maxillary Major Connectors

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Special Structural Requirements for Maxillary Major Connectors:

Beading: All maxillary major connectors should display minor elevations at those borders that contact the palatal soft tissues (Fig. 1). The elevations are termed *bead lines* and are intended to slightly displace the adjacent soft tissues. This displacement produces a 1) mechanical seal and prevents food particles from collecting under the major connector. In addition, 2) these elevations provide excellent visual finish lines for technicians who finish and polish removable partial denture frameworks.

Bead lines are created by carving shallow channels on the surface of a maxillary master cast before duplication in investment material. These lines are best prepared with a small spoon excavator or round bur rotating at slow speed. Each channel should have a width and depth of 0.5 to 1.0 mm. The depth of the beading should be reduced in areas of thin tissue coverage such as the midpalatine raphe or a palatal torus.

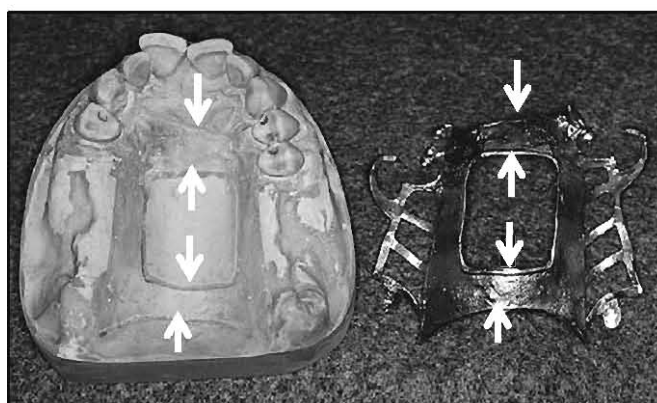


Figure 1: Maxillary major connector bead lines (arrows)

Relief should not be used under a maxillary major connector except in the presence of a palatal torus or a prominent median suture line. The intimate contact between the palatal soft tissues and the metal connector enhances the retention and stability of the denture.

Types of Maxillary Major Connector:

There are six types of maxillary major connectors used in RPD therapy:

1. Single palatal bar
2. Single palatal strap
3. Anterior-posterior palatal bars
4. U-shaped palatal connector
5. Combination anterior and posterior palatal strap–type connector
6. Palatal plate-type connector

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1. Single Palatal Bar

The palatal bar is a narrow half oval with its thickest point at the center (Fig. 2). If used, the palatal bar should be limited to short-span Class III applications (replacing one or two teeth on each side of the arch). In addition, the palatal bar should not be placed anterior to the second premolar position; otherwise its bulk may produce noticeable discomfort and alteration of speech.

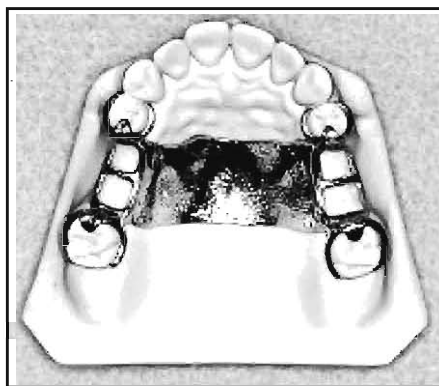


Figure 2: Single palatal bar major connector

2. Single Palatal Strap

The palatal strap consists of a wide band of metal with a thin cross-sectional dimension (Fig. 3). The anteroposterior dimension of a palatal strap major connector should not be less than 8 mm to avoid compromise of its rigidity (Fig. 4).

Figure 3: Single palatal strap-type major connector.



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Figure 4: The anteroposterior dimension of a palatal strap major connector should never be less than 8 mm.

Disadvantages of the palatal strap: In some cases, a patient may complain of excessive palatal coverage. Frequently, this complaint can be traced to improper positioning of the strap borders. Therefore, the anterior border of the major connector should be positioned posterior to the palatal rugae if possible. If this is not possible, the anterior border should be terminated on the posterior slopes of prominent rugae. The posterior border of the major connector should be positioned anterior to the junction of the hard and soft palates.

Note: To differentiate between a palatal bar and a palatal strap, a palatal connector component less than 8 mm in width is referred to as a bar.

3. Combination Anterior and Posterior Palatal Bar-type Connectors

Structurally, this combination of major connectors (Fig. 5) exhibits many of the same disadvantages as the single palatal bar. To be sufficiently rigid and to provide support and stability, these connectors could be too bulky and could interfere with tongue function.

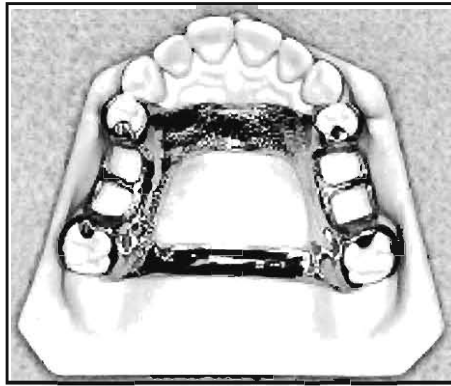


Figure 5: Combination Anterior and Posterior Palatal Bar-type Connectors

The main advantage of an anteroposterior palatal bar is its rigidity. The anteroposterior palatal bar minimizes soft tissue coverage, yet provides exceptional resistance to deformation.

The disadvantages of the anteroposterior palatal bar is frequently uncomfortable. The bulk and contour of the connector may be bothersome to the tongue and may interfere with phonetics.

As a general rule, the anteroposterior palatal bar should not be considered the first choice for a maxillary major connector. It should be selected only after other choices have been considered and eliminated.

3. Combination Anterior and Posterior Palatal Strap-type Connector

The anterior-posterior palatal strap provides maximum rigidity and minimum bulk. It may be used in almost any maxillary partial denture design. The posterior palatal strap should be flat and a minimum of 8 mm wide (Fig. 6). Posterior palatal connectors should be located as far posterior as possible to avoid interference with the tongue but anterior to the junction of the hard and soft palates. The only condition that prevents their use is an inoperable maxillary torus that extends posterior to the soft palate.

The strength of this major connector design lies in the fact that the anterior and posterior components are joined together by longitudinal connectors on either side, which form a square or rectangular frame (Fig. 7). Each component braces the others against possible torque and flexure. Flexure is practically nonexistent in such a design.

The open area in the palatal region should be at least 20 x 15 mm. Otherwise, another type of major connector should be chosen

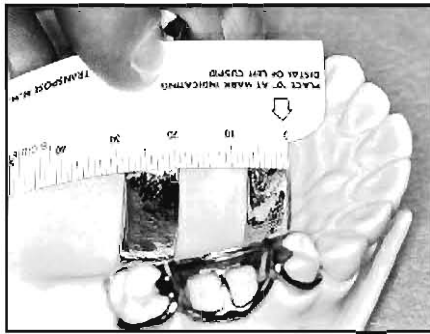


Figure 6: Both the anterior and posterior straps of an anteroposterior palatal strap major connector should be at least 8 mm in width



Figure 7: Anterior-posterior palatal strap-type major connector.

The combination anterior-posterior connector design may be used with any Kennedy class of partially edentulous arch. It is used most frequently in Classes II and IV, whereas the single wide palatal strap is used more frequently in Class III situations. The palatal plate-type or complete coverage connector is used most frequently in Class I situations.

All maxillary major connectors should cross the midline at a right angle rather than on a diagonal. It has been suggested that the tongue will accept symmetrically placed components far more readily than those placed without regard for symmetry.

Characteristics and Location:

1. Rectangle shaped and open in center portion.
2. Relatively broad (8 to 10 mm) anterior and posterior palatal straps.
3. Narrow lateral palatal straps (7 to 9 mm) parallel to curve of arch; minimum of 6 mm from gingival crevices of remaining teeth.
4. Anterior palatal strap: anterior border not placed farther anteriorly than anterior rests and never closer than 6 mm to lingual gingival crevices; follows the valleys of the rugae at right angles to the median palatal suture. Posterior border, if in rugae area, follows valleys of rugae at right angles to the median palatal suture.
5. Posterior palatal connector: posterior border located at junction of hard and soft palates and at right angles to median palatal suture and extended to hamular notch area(s) on distal extension side(s).
6. Anatomic replica or matte surface.

4. Palatal Plate–type Connector

The complete palatal plate is particularly indicated when maximum tissue support is required. In particular it should be the major connector of choice in long distal extension cases or where six or less anterior teeth remain. It should be selected where the primary abutments are periodontally involved, requiring maximum stress distribution. Where the edentulous areas are covered with flabby tissue or where there is a shallow palatal vault this connector also provides greater stability and stress distributing characteristics. The full palatal plate is usually not used in the presence of torus palatinus.

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The words palatal plate are used to designate any thin, broad, contoured palatal coverage used as a maxillary major connector and covering one half or more of the hard palate (Fig. 8). This type is also named anatomic replica palatal major connector.



Figure 8: Palatal major connector covering two thirds of the palate.

The palatal plate may be used: 1) As a plate of varying width that covers the area between two or more edentulous areas, as a partial (Fig.8) or complete cast plate that extends posterior to the junction of the hard and soft palates (Fig. 9). Or 2) As an anterior palatal connector with a provision for extending an acrylic resin denture base in a posterior direction and this can be used when future relining is anticipated (Fig. 10).

The palatal plate should be located anterior to the posterior palatal seal area. The maxillary complete denture's typical posterior palatal seal is not necessary with a maxillary partial denture's palatal plate because of the accuracy and stability of the cast metal.

Figure 9: Complete coverage palatal major connector



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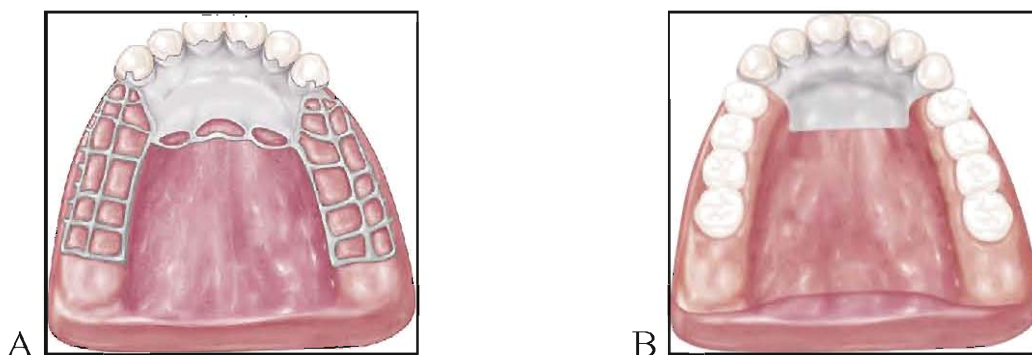


Figure 10: A, Palatal plate major connector with provisions for attaching the full-coverage resin denture base. B, Completed removable partial denture with resin base.

5. U-Shaped Palatal Connector (Horseshoe connector)

From both the patient's standpoint and a mechanical standpoint, the U-shaped palatal connector is the least desirable of maxillary major connectors.

The horseshoe connector consists of a thin band of metal running along the lingual surfaces of the remaining teeth and extending onto the palatal tissues for 6 to 8 mm (Fig.11). The medial borders of this connector should be placed at the junction of the horizontal and vertical slopes of the palate. Rigidity can be increased by extending the borders slightly onto the horizontal surfaces of the hard palate. The connector should display symmetry and should extend to the same height on both sides. All borders of the connector should be gently curved and smooth.



Figure (11): U-shaped palatal major connector

In the presence of a prominent median suture line or an inoperable torus, this major connector may offer distinct advantages. The horseshoe connector may be designed to avoid bony prominences without sacrificing vertical support.

The U- shaped Palatal Connector (Fig. 11) should never be used arbitrarily and may be indicated when a large inoperable palatal torus exists, and occasionally when several anterior teeth are to be replaced.

The following are the principal **objections** to use of the U-shaped connector that may lead to failure of many maxillary partial dentures:

1. Its lack of rigidity can allow lateral flexure under occlusal forces, which may induce torque or direct lateral force to abutment teeth.
2. Doesn't provide good support and may impinge underlying tissue when subjected to occlusal loading.
3. Increase in thickness, at the rugae area, to enhance rigidity may interfere with the freedom of the tongue.

A U-shaped major connector may be made more rigid with multiple tooth supported rests and a wider coverage of the major connector.

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