



MAJOR CONNECTORS

Definition

The unit of a removable partial denture that connects the various parts of the denture. Its principal functions are to provide unification and rigidity to the denture.

Functions of a Major Connector

1. Unification a major connector unit all other components of a partial denture so that the partial denture acts as one unit.
2. Stress distribution by unifying all elements of a partial denture the major connector can distribute functional loads to all abutment teeth, so that no one abutment is subjected to extreme loading. Unification of the direct retainers with the denture bases aids in distributing forces between both the teeth and the mucosa. This is particularly important in Class I and II partial dentures. In some maxillary cases, a major connector with broad palatal contact is selected. In these situations, the broad base offers additional support, distributing stress over a larger area.
3. Cross-arch Stabilization (Counter leverage) by uniting one side of the arch to the other bracing elements on one side of the arch can aid in providing stability to the other. This can aid in dissipating twisting and torquing forces.

Requirements of a Major Connector

1. Rigidity

Rigidity is necessary to ensure that the partial denture functions as one unit. If the denture flexes, stress distribution and cross arch stabilization can be compromised since different portions of the denture can move independent of the others. A major connector can be made more rigid by:

- a. using a more rigid alloy (Chrome-cobalt > gold alloys; cast > wrought metal)
- b. using a 1/2 round or 1/2 pear shaped bars (more rigid than flat bars)
- c. increasing the bulk as the length increases
- d. corrugating linguo-plate or rugae areas.

2. Non-Interference with the Soft Tissues

Major connectors should not enter into undercut areas unless tissue impingement can be avoided by changing the selected path of insertion or by using minor undercut blockout. In addition, connectors should not end on the crest of rugae or at the free gingival margin. If terminated in these areas, it is possible that movement of the connector could cause tissue impingement that could compromise blood flow. Major connectors should be placed as far from the free gingival margin as possible and practical. Where it is necessary to cross the gingival margin (i.e. with a minor connector), it should be done abruptly and perpendicular to the margin. In addition, a small amount of relief is used over the area where crossing occurs, in order to minimize impingement. Other areas of potential tissue impingement are the various hard structures such as the midpalatal suture or mandibular tori. Where it is necessary to cross these areas, relief should be used so that the connector does not fulcrum on them during movement. Soft tissue movements during function must also be allowed. Of particular importance are the mandibular lingual frenum and the maxillary movable soft palate. Before a partial denture design is finalized, the clinician should make a careful examination of the mouth to ensure the selected major connector will not interfere with any of these anatomical structures.

3. Food Impaction

This can be minimized by locating the margins of the connectors at the prescribed distance from the free gingival margin and by taking care that the presence of minor connectors, clasp arms and major connectors does not create "traps" or large concavities where food can collect.

4. Unobtrusive

The margins of the major connector should have a smooth transition from connector to tissue to minimize the obtrusiveness. All line angles and edges should be smooth and rounded. Borders should not be placed in locations where they might interfere with speech. Bulk should be reduced enough so as not to interfere with speech or appearance, yet thick enough to ensure rigidity.

MANDIBULAR MAJOR CONNECTORS

A. LINGUAL BAR

This is the most commonly used mandibular major connector. It should be used whenever possible unless there are advantages that can be obtained from another connector. Such situations are rare.

1. Shape

- Flat on tissue side
- Convex or tear-drop on tongue side (1/2 pear shape, with thin edge toward teeth)

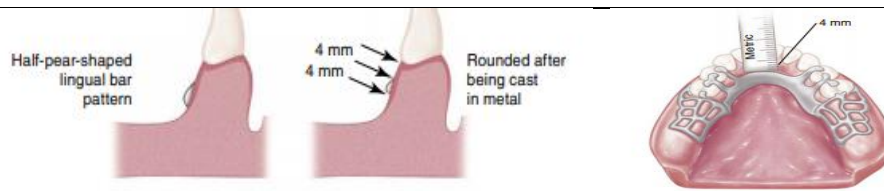
2. Size

- Occluso-gingival width = 4 to 6 mm.
- Thickness = 1.5 to 2 mm.

3. Position

- The inferior border should be as low as the lingual frenum and tissue reflections of the floor of the mouth will permit, as determined by observing functional movements of the tongue.
- The superior border should be 1.5-2.0 mm or more below the free gingival margin. For hygienic reasons the superior border should still be kept as far from the gingival margin as possible.
- In distal extension cases there will be some tissue-ward movement of the lingual bar as the denture base moves during function. If bone loss occurs over the edentulous ridges, this movement can become more pronounced and this will cause the lingual bar to impinge upon the lingual tissues. To eliminate the lingual bar from impinging the soft tissues, a wax spacer (relief) of one thickness of 30-gauge wax is placed under the major connector when it is being waxed for casting.

Note the anterior portion of the major connector moves forward as the posterior portion is loaded and rotates around the rest. If relief is not provided, impingement occurs.



B. LINGUAL PLATE (LINGUOPLATE)

The lingual plate consists of a lingual bar plus an extension over the cingula of anterior teeth. This mandibular major connector should only be considered in those rare instances where a lingual bar cannot be used. A vertical stop or rest area must be prepared at each end of the anterior segments of the lingual plate. This prevents excessive forces being directed facially by movements of the distal extension base. Any areas where the connector crosses the gingival tissue must be relieved to prevent impingement caused by the movement of the lingual plate.

Indications For the Use of A Linguoplate May Be Listed as Follows:

1. When the lingual frenum is high or the space available for a lingual bar is limited. In either instance, the superior border of a lingual bar would have to be placed too close to the gingival tissue. Irritation could be avoided only by generous relief, which might be annoying to the tongue and create an undesirable food trap. When a clinical measurement from the free gingival margins to the slightly elevated floor of the mouth is less than 8 mm, a linguoplate is indicated in lieu of a lingual bar. The use of a linguoplate permits the inferior border to be placed more superiorly without tongue and gingival irritation and without compromise of rigidity.
2. In Class I situations in which the residual ridges have undergone excessive vertical resorption. Flat residual ridges offer little resistance to the horizontal rotational tendencies of a denture. The bracing effect provided by the remaining teeth must be depended upon to resist such rotation. A correctly designed linguoplate will engage the remaining teeth to help resist horizontal rotations.
3. For stabilizing periodontally weakened teeth, splinting with a linguoplate can be of some value when used with definite rests on sound adjacent teeth. As was described previously, a cingulum bar may be used to accomplish the

same purpose because it actually represents the superior border of a linguoplate without the gingival apron. The cingulum bar accomplishes stabilization along with the other advantages of a linguoplate. However, it is frequently more objectionable to the patient's tongue and is certainly more of a food trap than is the contoured apron of a linguoplate.

4. When the future replacement of one or more incisor teeth will be facilitated by the addition of retention loops to an existing linguoplate. Mandibular incisors that are periodontally weak may thus be retained, with provisions for possible loss and future additions

C. SUBLINGUAL BAR

A modification of the lingual bar that has been demonstrated to be useful when the height of the floor of the mouth does not allow placement of the superior border of the bar at least 4 mm below the free gingival margin is the sublingual bar. The bar shape remains essentially the same as that of a lingual bar, but placement is inferior and posterior to the usual placement of a lingual bar, lying over and parallel to the anterior floor of the mouth. It is generally accepted that a sublingual bar can be used in lieu of a lingual plate if the lingual frenum does not interfere, or in the presence of an anterior lingual undercut that would require considerable blockout for a conventional lingual bar. Contraindications include interfering lingual tori, high attachment of a lingual frenum, and interference with elevation of the floor of the mouth during functional movements.

D. LINGUAL BAR WITH CONTINUOUS BAR (DOUBLE)

The connector consists of a lingual bar plus a secondary bar resting above the cingula of the anterior teeth. The secondary bar supposedly acts as an indirect retainer and performs a role in the horizontal stabilization of periodontally-involved teeth. The performance of these functions is questionable. Additionally, this major connector can create a food trap between the two bars. The use of this type of connector is not encouraged.

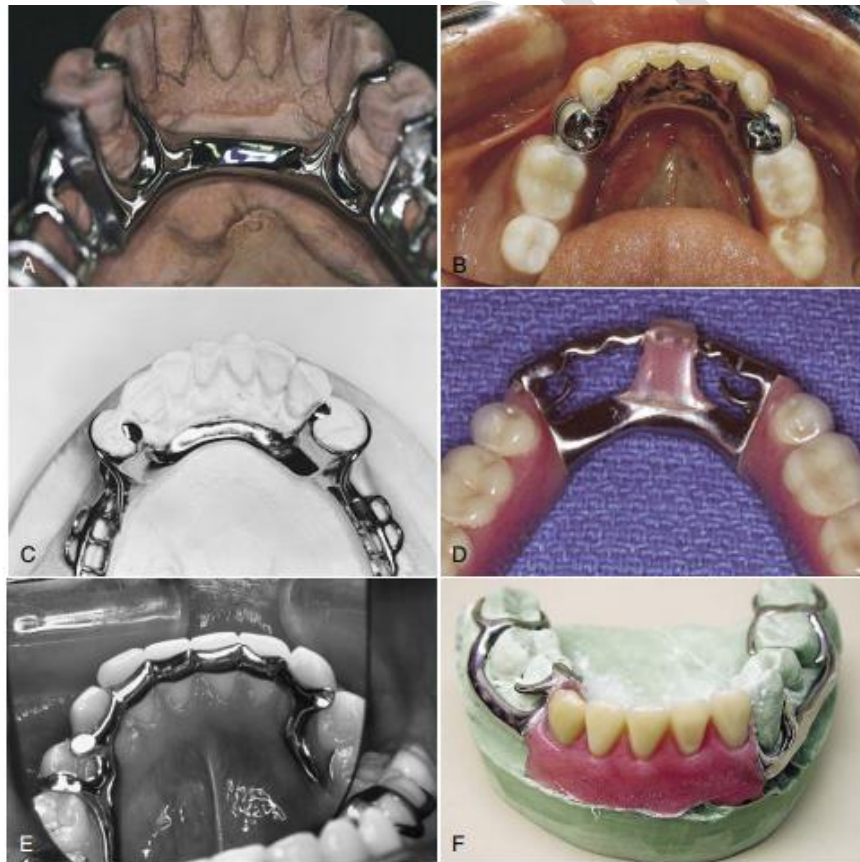
E. CINGULUM BAR (CONTINUOUS BAR)

When a linguoplate is the major connector of choice, but the axial alignment of the anterior teeth is such that excessive blockout of interproximal undercuts

must be made, a cingulum bar may be considered. A cingulum bar located on or slightly above the cingula of the anterior teeth may be added to the lingual bar or can be used independently. In addition, when wide diastemata exist between the lower anterior teeth, a continuous bar retainer may be more esthetically acceptable than a linguoplate.

F. LABIAL BAR

Where extreme lingual inclination of the remaining teeth is present and no reasonable way exists to use a lingual bar without interfering with tongue movements, a labial bar may be used. It is essentially similar to the lingual bar and the same rules apply for its use. Indications for it are extremely rare. The swing-lock design is a variation of the labial bar.



Mandibular major connectors. A, Lingual bar. B, Linguoplate. C, Sublingual bar. D, Lingual bar with continuous bar (cingulum bar). E, Cingulum bar. F, Labial bar.