Mandibular Major Connectors

Six types of mandibular major connectors are:
1. Lingual bar.
2. Linguoplate.
3. Sublingual bar.
4. Lingual bar with cingulum bar (continuous bar).
5. Cingulum bar (continuous bar).
6. Labial bar.

The lingual bar and the linguoplate are by far the most common major connectors used in mandibular removable partial dentures.

1- Lingual Bar

Characteristics and location:-

- Half-pear shaped with bulkiest portion inferiorly located.
- The superior border of a lingual bar connector should be tapered toward the gingival tissue superiorly with its greatest bulk at the inferior border.
- The superior border should be at located 3-4mm away from the gingival margin & more if possible to prevent blood constriction.
- The inferior border of the lingual bar should be slightly rounded. A rounded border will not impinge on the lingual tissue when the denture bases rotate inferiorly under occlusal loads.
- Inferior border located at the ascertained height of the alveolar lingual sulcus when the patient's tongue is slightly elevated.
- Frequently, additional bulk is necessary to provide rigidity, particularly when the bar is long or when a less rigid alloy is used.

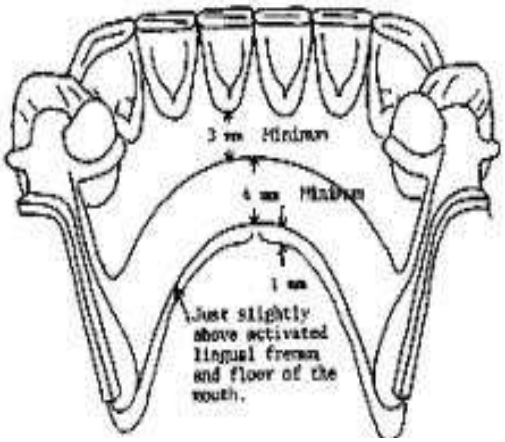

Fig.1 lingual bar (mandibular major connector)

***Two clinically acceptable methods may be used to determine the relative height of the floor of the mouth and locate the inferior border of a lingual mandibular major connector*:-**

1- The first method is to measure the height of the floor of the mouth in relation to the lingual gingival margins of adjacent teeth with a periodontal probe. When these measurements are taken, the tip of the patient's tongue should just lightly touch the vermilion border of the upper lip. Recording of these measurements permits their transfer to both diagnostic and master casts.

2- The second method is to use an individualized impression tray for which lingual borders are 3 mm short of the elevated floor of the mouth, and then to use an impression material that will permit the impression to be accurately molded. The inferior border of the planned major connector can then be located at the height of the lingual sulcus of the cast resulting from such an impression.

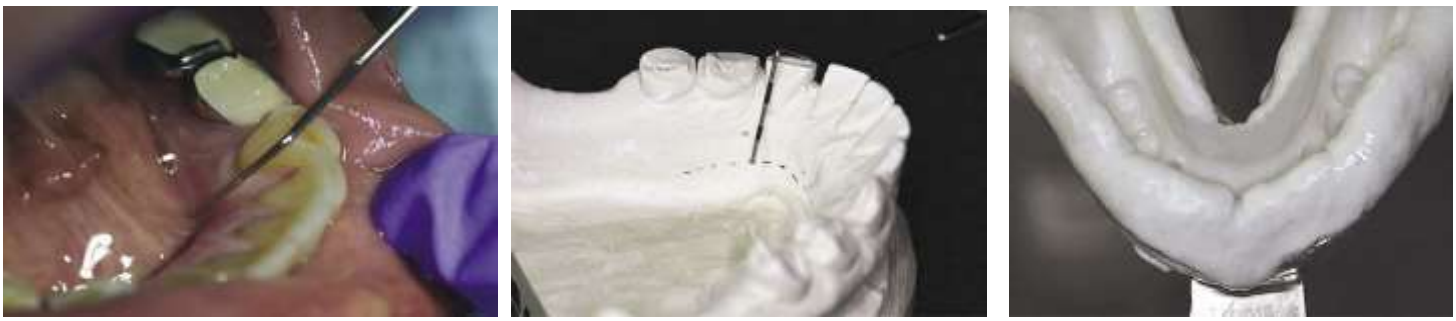

Fig.2: Determination the Height of Floor of Mouth

- **Indications:**
  - The lingual bar should be used for mandibular removable partial dentures where ***sufficient space exists*** between the slightly elevated alveolar lingual sulcus and the lingual gingival tissue (*at least 8 mm).*
  - ***Diastemas*** or open cervical embrasures of anterior teeth.
  - ***Overlapped*** *anterior teeth*.
- **Contraindications:**
  - ***Less than 8mm*** between the marginal gingival & the activated lingual frenum & floor of the mouth.
  - ***Only few remaining anterior teeth*** which must be contacted to provide a reference for fitting the framework & indirect retention. And when the future replacement of one or more incisor teeth
  - ***Lingually inclined teeth*.**
  - ***An undercut lingual alveolar ridge*** which would result in an excessive space between the bar & the mucosa.
- **Advantages:**
  - ***Covers a minimum of surface area*** of teeth & tissue therefore the potential for caries, periodontal & mucositis caused by plaque being held in contact with teeth & tissues is minimal.
  - ***Esthetic***.
- **Disadvantages:**
  - ***Less rigidity*** compared with other types.
  - ***Difficult to add*** additional prosthetic teeth to framework.

2- Linguoplate

Characteristics and location:-

- Half-pear shaped with bulkiest portion inferiorly located.
- A linguoplate should be made as thin as is technically feasible and should be contoured to follow the contours of the teeth and the embrasures.
- Thin metal apron extending superiorly to contact cingula of anterior teeth and lingual surfaces of involved posterior teeth at their height of contour.
- Apron extended interproximally to the height of contact points (closing interproximal spaces).

- Scalloped contour of apron as dictated by interproximal block out, the straight superior margin can be bulky at the cingulum region, causing tongue discomfort.

Fig.3:- lingual plate

- Superior border finished to continuous plane with contacted teeth.
- Inferior border at the ascertained height of the alveolar lingual sulcus when the patient's tongue is slightly elevated.

Fig.4:- lingual plate

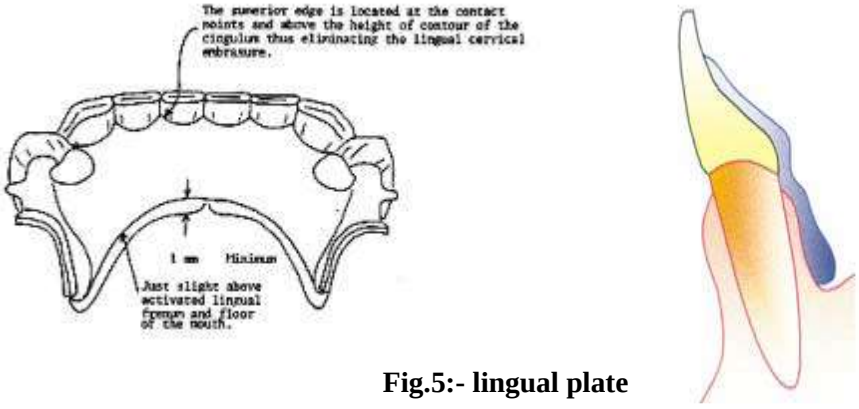

Fig.5:- lingual plate

➢ Indications:-

- When the lingual frenum is high or the space available for a lingual bar is limited (Where 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).
- When the residual ridges in ***Class I arch have undergone such vertical resorption*** that they will offer only minimal resistance to horizontal rotations of the denture through its bases.
- For using ***periodontally weakened teeth*** in group function to furnish support to the prosthesis and to help resist horizontal rotation of the distal extension type of denture.
- When the ***future replacement of one or more incisor teeth*** will be facilitated by the addition of retention loops to an existing linguoplate.

➢ Contraindications:-

- Overlapped anterior teeth, that leads to small gaps between the superior edge of the plate and the teeth.
- Lingually inclined teeth.
- Diastemas, **unless** the lingual plate can have slots in it to avoid the displayed metal (interrupted lingual).

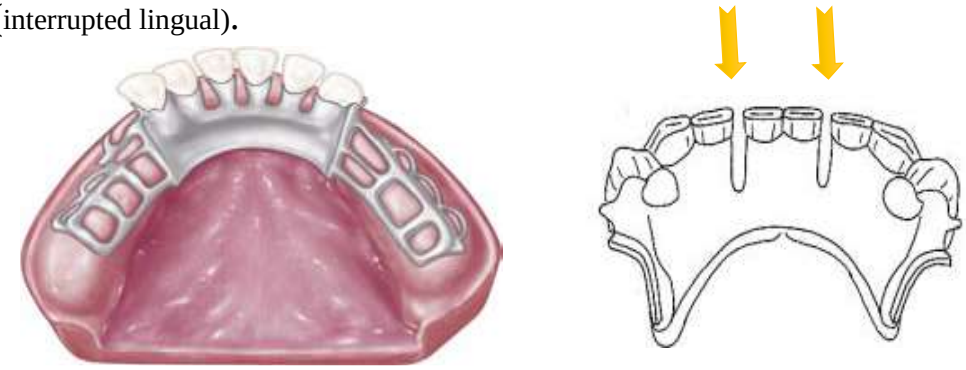

Fig.6:- interrupted lingual plate

➢ Advantages:

- Structurally simple & rigidity more than a lingual bar.
- Easy to add additional prosthetic teeth to framework.

➢ Disadvantages:

- Covers more tissue surface & teeth than lingual bar.
- May be more noticeable to patient than lingual bar.

★The upper border should follow the natural curvature of the supra-cingular surfaces of the teeth and should not be located above the middle third of the lingual surface, so that orthodontic movement is prevented during the rotation of a distal extension denture.

3- Lingual bar with continuous bar indirect retainer

➢ Characteristics

- Conventionally shaped and located same as lingual bar major connector component when possible.
- Thin, narrow (3 mm) metal strap located on cingula of anterior teeth, scalloped to follow interproximal embrasures with inferior and superior borders tapered to tooth surfaces.
- Originates bilaterally from incisal, lingual, or occlusal rests of adjacent principal abutments.

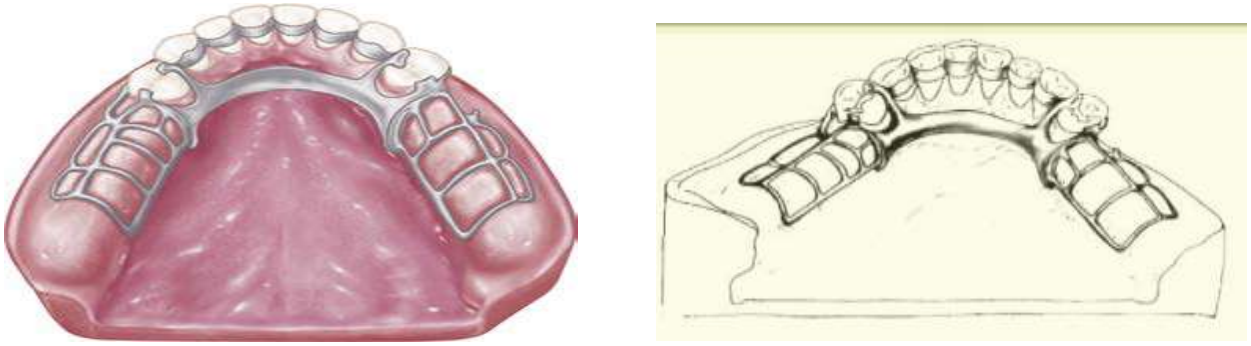

Fig.7:- Lingual bar with continuous bar

➢ *Lingual bar and cingulum bar (continuous bar) major connector. Upper portion of this major connector is located on cingula of anterior teeth. Requirement of positive support by rest seats, at least as far anteriorly as the canines, is critical. This type of major connector easily traps food and is often more objectionable to patients than a linguoplate.*

➢ Indications:

When a linguoplate is otherwise indicated but the open cervical embrasures of anterior teeth and a linguoplate would objectionably display metal in a frontal view.

- **Contraindications**:-
  - lingually inclined teeth.
  - Where a lingual bar or lingual plate will suffice.
  - When wide diastemata exist between mandibular anterior teeth

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- **Advantages**:
  - More rigid than lingual bar.
  - Covers less tooth & tissue surface than lingual plate.

- **Disadvantages**:
  - Very complex design.
  - May be objectionable to patient because there are four edges exposed to the tip of the tongue.
  - Potential food traps between two bars.

4- Cingulum Bar (Continuous Bar)

- ***Characteristics***:-
  - Thin, narrow (3 mm) metal strap located on cingula of anterior teeth, scalloped to follow interproximal embrasures with inferior and superior borders tapered to tooth surfaces.
  - Originates bilaterally from incisal, lingual, or occlusal rests of adjacent principal abutments.

- **Indications**:-
  - When a linguoplate is the major connector of choice, but the axial alignment of the anterior teeth is such that excessive block out of interproximal undercuts must be made, a cingulum bar may be considered.
  - Height of activated lingual frenum and floor of the mouth at the same level as marginal gingiva.
  - Inoperable tori or exostosis at the same level as the marginal gingiva.
  - Severely undercut lingual alveolus.

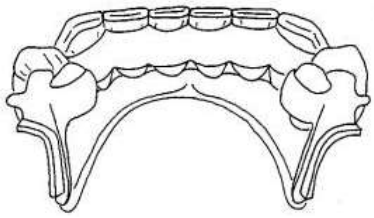


Fig.8 cingulum bar

➢ Contraindications:-

- Anterior teeth severely tilted to the lingual.
- When wide diastemas/open cervical embrasures exist between the mandibular anterior teeth and the cingulum bar would objectionably display metal in a frontal view.
- Overlapped anterior teeth.

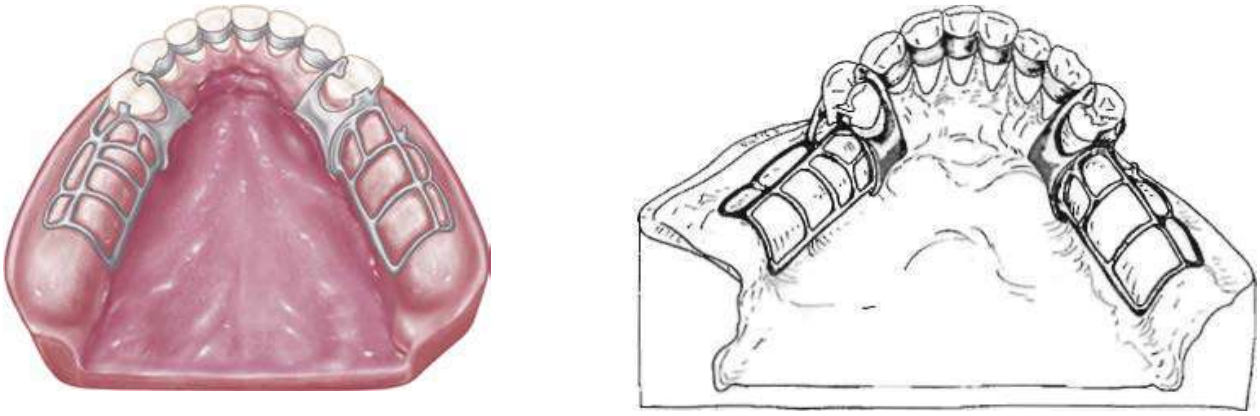
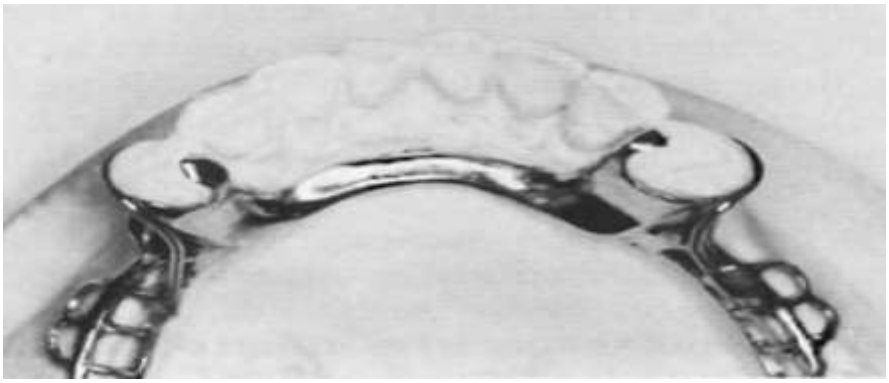


Fig.9 cingulum bar

5- Sublingual Bar

The sublingual bar is 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. The sublingual bar is essentially the same half-pear shape as a lingual bar, *except that the bulkiest portion is located to the lingual and the tapered portion is toward the labial*. The superior border of the bar should be at least 3 mm from the free gingival margin

of the teeth. The inferior border is located at the height of the alveolar lingual sulcus when the patient's tongue is slightly elevated. This necessitates a functional impression of the lingual vestibule to accurately register the height of the vestibule.



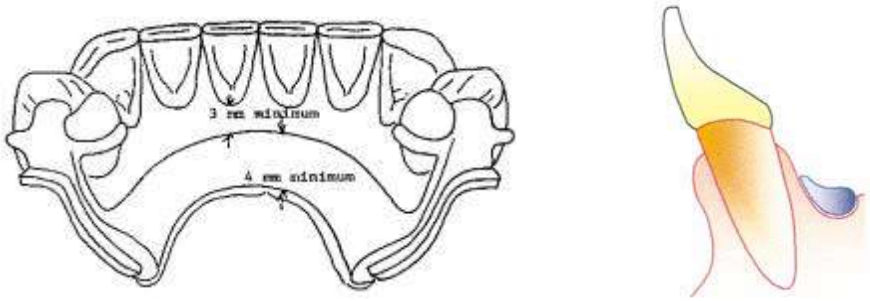


Fig.10:- sublingual bar

➢ Indications:

- The sublingual bar should be used for mandibular removable partial dentures when the height of the floor of the mouth in relation to the free gingival margins will be ***less than 6 mm***.

➢ Contraindications:

1. Interfering with lingual tori.
2. High attachment of lingual frenum.
3. Interference with elevation of the floor of the mouth during functional movements.

- **Advantages:**
  1. It doesn't contact anterior teeth or lingual alveolus.
  2. More esthetic than other lingual major connectors because of its location.
  3. More rigid than lingual bar because the metal is bulk horizontally rather than vertically.
- **Disadvantages:**
  1. Require border molded impression of floor of mouth for accurate placement of major connector.
  2. Difficult to add prosthetic teeth.
  3. Most patients prefer a lingual plate to a sublingual bar.

6- Labial bar

- **Characteristics**:-

- Half-pear shaped with bulkiest portion inferiorly located on the labial and buccal aspects of the mandible.
- Superior border tapered to soft tissue.
- Superior border located at least 4 mm inferior to labial and buccal gingival margins and more if possible.
- Inferior border located in the labial-buccal vestibule at the juncture of attached (immobile) and unattached (mobile) mucosa.

Fig. 11 labial connector

➢ Indications:

- When lingual inclinations of remaining mandibular premolar and incisor teeth cannot be corrected, preventing placement of a conventional lingual bar connector.
- When severe lingual tori cannot be removed and prevent the use of a lingual bar or lingual plate major connector.
- When severe and abrupt lingual tissue undercuts make it impractical to use a lingual bar or a lingual plate major connector.

➢ Contraindications:

1. A lingual major connector may be used.
2. Facial tori.
3. The facial alveolar ridge is undercut.
4. High facial muscle attachments which would result in less than 3mm of space between the superior edge of the labial bar & the marginal gingival of the teeth.

★ A modification to the ***linguoplate*** is the hinged continuous labial bar. This concept is incorporated in the Swing-Lock* design**, which consists of a labial or buccal bar that is connected to the major connector by a hinge at one end and a latch at the other end Support is provided by multiple rests on the remaining natural teeth**. Stabilization and reciprocation are provided by a linguoplate that contacts the remaining teeth and are supplemented by the labial bar with its retentive struts.

Fig.12:- Swing-Lock design

➢ Indication:

1. Missing key abutments: (such as, a canine).
2. Unfavorable tooth contours
3. Unfavorable soft tissue contours
4. Teeth with questionable prognoses.

➢ Contraindications:

- Poor oral hygiene or lack of motivation for plaque control by the patient.
- Presence of a shallow buccal or labial vestibule or a high frenal attachment.

Design of mandibular major connector

The following systematic approach to designing a mandibular lingual bar and linguoplate major connectors:

Step 1:- Outline the basal seat areas on the diagnostic cast.
Step 2:- Outline the inferior border of the major connector.
Step 3:- Outline the superior border of the major connector.
Step 4:- Connect the basal seat area to the inferior and superior borders of the major connector, and add minor connectors to retain the acrylic resin denture base material.