

Prosthetic Dentistry

PARTIAL DENTURE : 5. COMPONENTS

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Component parts of Chrome Cobalt Removable Partial Denture

Major connectors:

Are the components of R.P.D. that connect the parts of the prosthesis located on one side of the arch to those on the opposite side.

Major connectors are either bars or plates, the difference between them is in the amount of tissue covers. Plates are broad and thin where bar are bulky and narrow.

Design:

Major connectors should be designed and located with the following guidelines in mind:

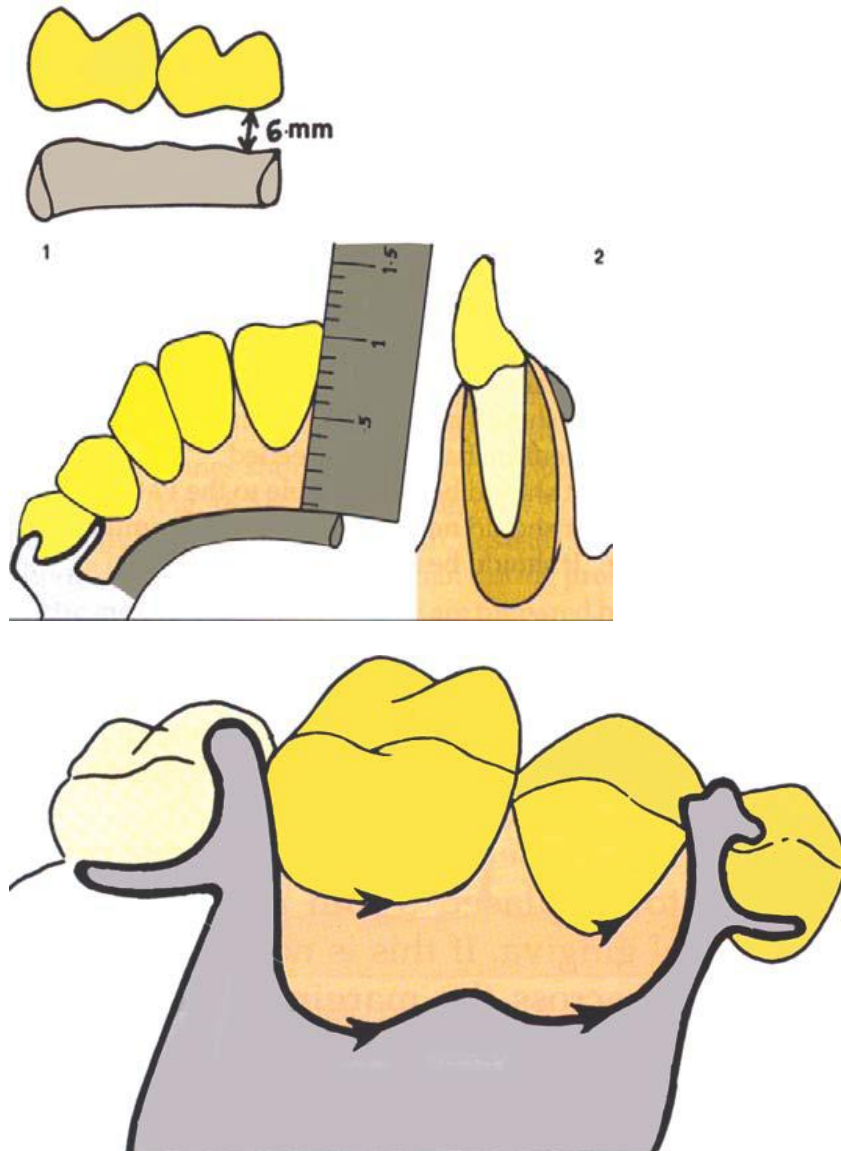
1- Major connectors should be free of movable tissue.

2- Impingement of gingival tissue should be avoided. Bony and soft tissue prominences should be avoided during placement and removal.

4- Relief should be provided beneath a major connector to prevent its settling into areas of possible interference, such as inoperable tori or elevated median palatal sutures.

5- Major connectors should be located and/or relieved to prevent impingement of tissue because the distal extension denture rotates in function. Relief from gingival margin should be provided. For maxillary major connector (6-8 mm) and for mandibular major connector (3-4 mm).

6. the borders of the major connector should run parallel to the gingival margins of remaining natural teeth.



Characteristics (requirements) of major connector contributing to health and well-being:

- 1- Made from materials that are compatible with oral tissue**
- 2- Is rigid and provides cross-arch stability through the principle of broad distribution of stress.**
- 3- Does not interfere with and is not irritating to the tongue.**
- 4- Does not substantially alter the natural contour of the lingual surface of the mandibular alveolar ridge or of the palatal vault.**
- 5- Does not impinge on oral tissue when the restoration is placed, removed, or rotated in function.**

6- Covers no more tissue than is absolutely necessary.

7- Does not contribute to the retention or trapping of food particles.

8- Has support from other elements of the framework to minimize rotation tendencies in function.

9- Contributes to the support of the prosthesis.

Maxillary major connectors:

Six basic types of maxillary major connectors are considered:

1- Single palatal strap.

2- Combination anterior and posterior palatal strap-type connector.

3- Palatal plate-type connector.

4- U-shaped palatal connector.

5- Single palatal bar.

6- Anterior-posterior palatal bars.

1- Single palatal strap:



Bilateral tooth-supported prosthesis, even those with short edentulous spaces, are effectively connected with a single, broad palatal strap connector, particularly when

the edentulous areas are located posteriorly. Its width should confine within the boundaries of supported rests. Such a connector can be made rigid without objectionable bulk and interference with the tongue. It is less objectionable by patients because it could be made wide and thin, and it helps to distribute the force of stress over a wide area.

Indications:

1- Class III or Class III, modification 1 partially edentulous arch (short edentulous span).

Contraindications:

1- Tooth-tissue supported partial dentures (Class I and Class II).

2- Present of palatal tori.

3- Extremely long tooth supported edentulous space.

2- Combination anterior and posterior palatal strap-type connector:



Structurally, This is a rigid palatal major connector. The anterior and posterior palatal strap combination may be used in almost any

maxillary partial denture design. A posterior palatal strap should be flat and a minimum of 8 mm wide. Posterior palatal connectors should be located as far posteriorly as possible to avoid interferences with the tongue but anterior to the line formed by the junction of the hard and soft palates. The anterior connector may be extended anteriorly to support anterior tooth replacement if there is anterior missing area.

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, forming a square or rectangular frame. Each component braces the others against possible torque and flexure; therefore, it is the least flexible type of these types of major connectors.

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.

Indications:

- 1- Class III or Class III, modification 1 particularly edentulous arch with long span edentulous space or spaces.**
- 2- Class I and II arches in which excellent abutment and residual ridge support exists, and direct retention can be made adequate without the need for indirect retention.**
- 3- Long edentulous spans in Class II, modification 1 arches.**
- 4- Class IV arches in which anterior teeth must be replaced with a removable partial denture.**

4- Inoperable palatal tori that do not extend posteriorly to the junction of the hard and soft palates.

Contraindications:

When there is an inoperable maxillary torus that extends posteriorly to the junction of the hard and soft palate.

3- Palatal plate-type connector:



It is also called anatomic replica palatal major connector. It is a thin, broad, contoured palatal coverage used as a maxillary major connector and covering one half or more of the hard palate. It has uniform thickness and strength by reason of their corrugated contours. Through the use of electrolytic polishing, uniformity of thickness can be maintained, and the anatomical contours of the palate are faithfully reproduced in the finished denture.

Advantages of the anatomic replica palatal major connector:

1- It permits the making of a uniformly thin metal plate that reproduces faithfully the anatomic contours of the patient's own palate. Its uniform thinness and the thermal conductivity of the metal are designed to make the palatal plate more readily

acceptable to the tongue and underlying tissue.

2- The corrugation in the anatomic replica adds strength to the casting; thus a thinner casting with adequate rigidity can be made.

3- Surface irregularities are intentional rather than accidental; therefore, electrolytic polishing is all that is needed. The original uniform thickness of the plastic pattern is thus maintained.

4- By intimate contact, interfacial surface tension between metal and tissue provides the prosthesis with greater retention. Retention must be adequate to resist the pull of sticky foods, the action of moving border tissue against the denture, the forces of gravity, and the more violent forces of coughing and sneezing.

Forms of palatal plate major connector:

1- It may be used as a plate of varying width that covers the area between two or more edentulous areas, as a complete (full coverage palatal plate) or partial (posterior palatal plate) cast plate that extends posteriorly to the junction of the hard and soft palates.

2- It also may be used in the form of an anterior palatal connector with a provision for extending an acrylic resin denture base posteriorly.

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. The palatal plate major

connector should be relieved when possible in about 6 mm away from the gingival margin.

Indications:

1- In Class I partial edentulous arch with one to four premolars and some or anterior teeth remaining.

2- Class II arch with a large posterior modification space and some missing anterior teeth.

3- When the last remaining abutment tooth on either side of Class I arch is the canine or first premolar tooth. In this case the use of complete or full coverage palatal major connector is essential to avoid much stress applied to few remaining teeth.

4- Class III partially edentulous arch where poor condition of remaining anterior teeth and the other remaining teeth few in number,

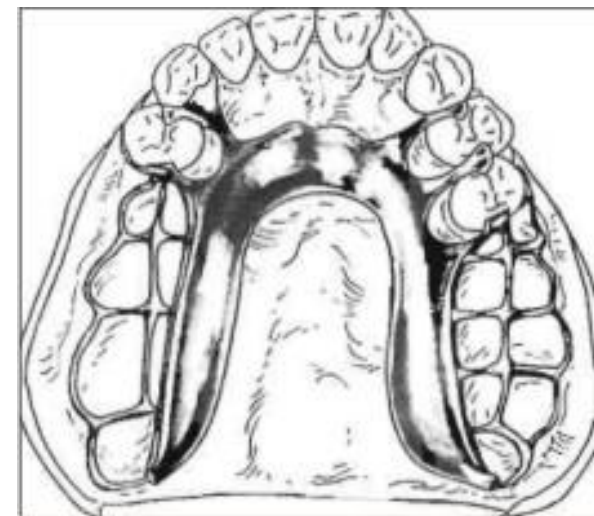
where the retention is mainly depending on the broad wide coverage of the palate.

5- Patient with cleft palate to close any air passages between nasal and oral cavity.

6- When few or all anterior teeth remain and when the residual ridges have undergone excessive vertical resorption.

7- In the absence of a palatal torus.

5-U-shaped palatal connector (Horse shoe palatal connector):



U-shaped palatal connector is the least desirable of maxillary major connectors. It should never be used arbitrarily.

Indications:

- 1- When a large inoperable palatal torus exists.**
- 2- Occasionally when several anterior teeth are to be replaced.**

Disadvantages:

- 1- Its lack of rigidity (compared with other designs) can allow lateral flexure under occlusal forces, which may induce torque or direct lateral force to abutment teeth.**
- 2- The design fails to provide good support characteristics and may permit impingement of underlying tissue when subjected to occlusal loading.**

3- Bulk to enhance rigidity results in increased thickness in areas that are a hindrance to the tongue.

Many maxillary partial dentures have failed for no other reason than the flexibility of a U-shaped major connector. To be rigid, the U-shaped palatal connector must have bulk where the tongue needs the most freedom, which is the rugae area. Without sufficient bulk, the U-shaped design leads to increased flexibility and movement at the open ends. In distal extension partial dentures, when tooth support posterior to the edentulous area is non-existent, movement is particularly noticeable and is traumatic to the residual ridge.

The U-shaped major connector can be made more rigid by:

- 1- Providing multiple tooth support through definite rests.**

2- The wider the coverage of a U-shaped major connector, the more it resembles a palatal-type connector with its several advantages. But when used as narrow U design, the necessary rigidity is usually lacking.

Common error in the design of a U-shaped connector: It is the proximity to, or actual contact with, gingival tissue.

The principle that the borders of major connectors should be either:

- a- Supported by rests in prepared rest seats.**
- b- Should be located well away from gingival tissue (6 mm) away from gingival margin.**

If the U-shaped connectors fail to do so, it will lead to gingival irritation and periodontal damage to the tissue adjacent to the remaining teeth.

5- Single palatal bar:



To differentiate between a palatal bar and a palatal strap, a palatal connector component of less than 8 mm in width is referred to as a bar. For a single palatal bar to have the necessary rigidity for cross-arch distribution of stress, it must have concentrated bulk. For a single palatal bar to be effective, it must be rigid enough to provide support and cross-arch stabilization and must be centrally

located between the halves of the denture. Mechanically, this practice may be sound enough. However, from the standpoint of patient comfort and alteration of palatal contour, it is highly objectionable. A partial denture made with a single palatal bar is often either too thin and flexible or too bulky and objectionable to the patient's tongue. The decision to use a single palatal bar instead of a strap should be based on:

- a- The size of the denture bearing areas that are connected.
- b- Whether a single connector located between them would be rigid without objectionable bulk.

Indication:

In tooth borne unilateral or bilateral spaces for cross arch stabilization.

6- Combination anterior and posterior palatal bar-type connector (Ring design):



Structurally, this combination of major connectors exhibits many of the same disadvantages as the single palatal bar. To be sufficiently rigid and to provide the needed support and stability, these connectors could be too bulky and could

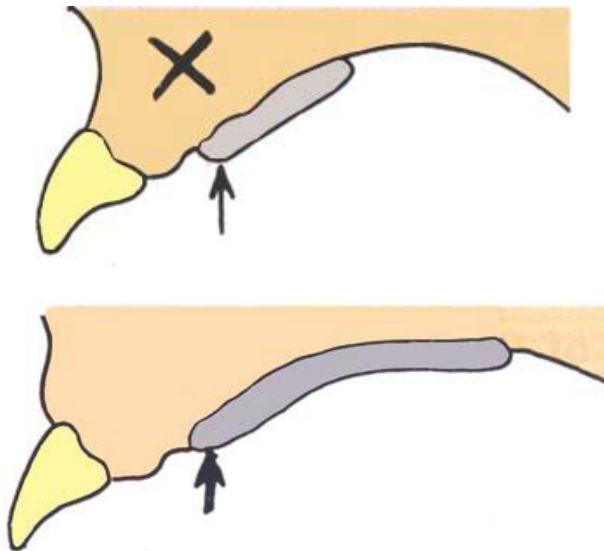
interfere with tongue function and speech. The anterior bar is a flat bar located as far posteriorly as possible to avoid rugae area coverage and tongue interferences. It should be 6 mm away from the gingival margin. The posterior bar is half oval in section located as far posteriorly as possible but still entirely placed on the hard palate.

Indication:

It may be used in any partial denture design. It should be made bulky thus it will be objectionable by patient.

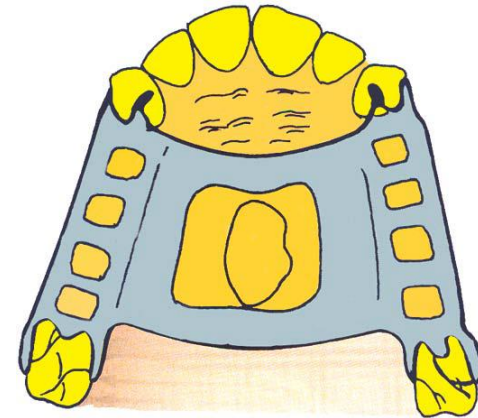
Design of maxillary major connectors and the influence of intra oral morphology:

The anterior border of the maxillary major connector should end in the valley of the rugae and it should be designed such that it never lies on the crest of the rugae. It is better to avoid covering the rugae area in order to prevent any discomfort during speech.



The major connector should not extend over bony prominences like tori. Relief is given for

a small tori, surgical excision is done for a large one.



A beading (rounded thick border) should be given to the posterior margin of the maxillary major connectors to provide a seal with the soft tissue in their margins. The beading will slightly displace the soft tissue when the denture is in position and hence prevent the entry of small food particles between the denture and the soft tissues