

Minor Connectors

Minor Connector: - the connecting link between the major connector or base of a RPD and the other units of the prosthesis, such as clasps, indirect retainers, and occlusal rests. *Minor connectors join the major connector with other parts of the RPD.*

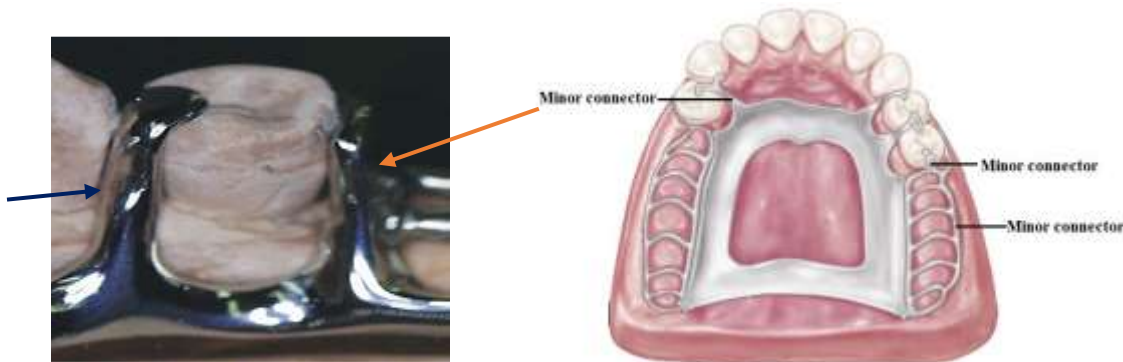


Fig.1: minor connector

Functions of minor connectors:

In addition to the main function of minor connector in joining parts, it serves other functions:

- 1. Transfers functional stress to the abutment teeth:** This is a *prosthesis-to-abutment function* of the minor connector. Occlusal forces applied to the artificial teeth are transmitted through the base to the underlying ridge tissue if that base is primarily tissue supported. Occlusal forces applied to the artificial teeth are also transferred to abutment teeth through occlusal rests. The minor connectors arising from a *rigid* major connector make possible this transfer of functional stress throughout the dental arch.
- 2. Transfers the effects of the retainers, rests, and stabilizing components throughout the prosthesis:** This is an *abutment-to-prosthesis function* of the minor connector. Thus forces applied on one portion of the denture may be resisted by other components placed elsewhere in the arch for that purpose. A stabilizing component on one side of the arch may be placed to resist horizontal forces that originate on the opposite side. This is possible only because of the transferring effect of the minor connector, which supports that stabilizing component, and the rigidity of the major connector.
- 3. Provide unification and rigidity.**

4. It might help in retention and stability of the prosthesis.
5. Through its connection to the guiding plane; it helps as a bracing element.
6. Share in the path of insertion and removal maintenance.

Forms & location of minor connector:-

1. Like the major connector, the minor connector must have **sufficient bulk to be rigid**; otherwise the transfer of functional stresses to the supporting teeth and tissue will not be effective. At the same time, *the bulk of the minor connector should not be objectionable*.
2. A minor connector contacting the axial surface of an abutment should not be **located on a convex surface**. Instead it should be located in an embrasure where it will be least noticeable to the tongue.

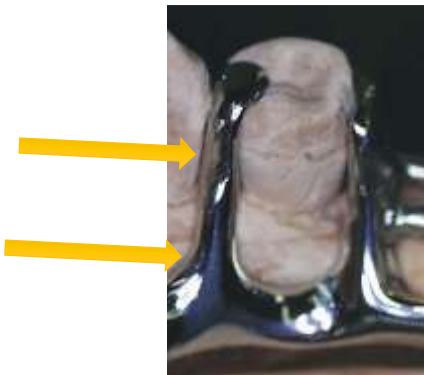


Fig2:- minor connector located in an embrasure form a right angle with the major connector

3. The minor connector should form a right angle with the major connector so that the gingival crossing should be abrupt & cover as little of the gingival tissue as possible and it is the best to transfer stress from one plane to another.
4. The minor connector should be **parallel** to long axis of the tooth.
5. When minor connector contact tooth surfaces on either sides of embrasure in which it lie, it should be **tapered** to the teeth so that the tongue encounters a smooth surface (It should be thickest toward the lingual surface, tapering toward the contact area). Sharp angles should be avoided & spaces should not exist for the trapping of food debris.



Fig3:- minor connector contact tooth surfaces on either sides of embrasure, it should be tapered

6. The deepest part of the interdental embrasure should have been blocked out *to avoid interference during placement and removal, and to avoid any wedging effect on the contacted teeth.*

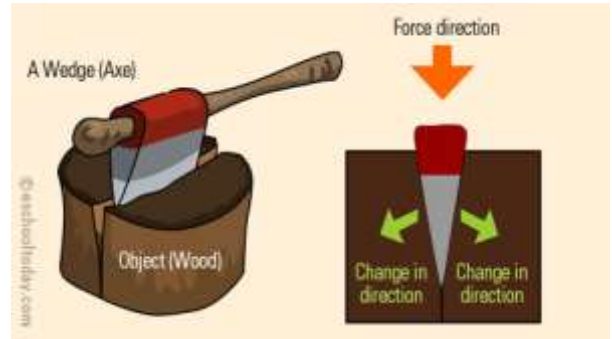
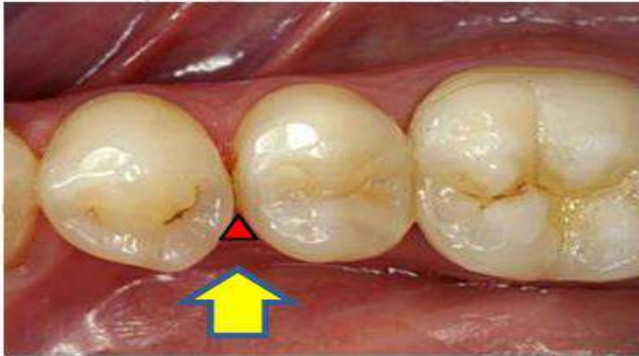


Fig4:- The deepest part of the interdental embrasure should have been blocked out

7. When an artificial tooth will be placed against a proximal minor connector. The minor connector's greatest bulk should be toward the lingual aspect of the abutment tooth. *In this way sufficient bulk is ensured with the least interference to placement of artificial teeth.*

8. The junction of the mandibular minor connector with the major connector should be strong butt type joints but without appreciable bulk. Angles formed at the junctions of the connectors ***should not be greater than 90°*** thus ensuring the most advantageous & strongest mechanical connection between the acrylic resin denture base and the major connector.

9. The minor connector for the mandibular distal extension base should extend posteriorly about ***two-thirds*** the length of the edentulous ridge and should have elements on both lingual and buccal surfaces. Such an arrangement not only will add strength to the denture base but may minimize distortion of the cured base from its inherent strains caused by processing.

10. The minor connector of maxillary distal extension denture bases should extent to **entire** length (presence of maxillary tuberosity bony area) of the residual ridge.



Fig5:- minor connector of maxillary distal extension denture bases should extent to entire length for the mandibular distal extension base should extend posterior about two thirds the length of the edentulous ridge

Types of minor connectors

There are four types of minor connectors based on *location* and *function*:

1. Proximal minor connectors.
2. Embrasure minor connectors.
3. Surface minor connectors.
4. Denture base retention mechanism.

The **denture base** is also a minor connector since it attaches the prosthetic teeth to the denture base retention minor connector and thus to the major connector.

Proximal minor connectors

Proximal minor connectors contact an abutment tooth adjacent to an edentulous space. Proximal minor connectors are usually term *proximal plates* but are sometimes call *guiding plates*.



Fig6:- proximal minor connector

The functions of proximal plates are to:

1. Contact proximal guiding planes on the teeth thus helping to determine the path of placement of the RPD.
 2. Prevent food impaction between the proximal surface of the tooth and the RPD.
 3. Provide frictional retention by contact with guiding planes on the teeth.
 4. Help reciprocate the force of the direct retainer & distribute forces (bracing).
- Proximal plates **extend** from the proximal facial line angle of the tooth to, or slightly past, the proximal lingual line angle of the tooth.
 - They are **thin** mesiodistally and taper slightly toward the occlusal (incisal).
 - They **extend** from the occlusal/ incisal of the tooth to the major connector. The junction of rests and clasp arms with proximal minor connectors, and proximal

minor connectors to major connectors are **rounded right angles**. Proximal plates extend cervically and contact the mucosa of the ridge crest for 2-3 mm.

- The part of the proximal minor connector which contacts the ridge crest is called **the FOOT of the proximal plate**.



Fig7:- proximal minor connector
Arrow (FOOT of the proximal plate)

Embrasure Minor Connectors:-

Embrasure minor connectors are located between two teeth, Embrasure minor connectors extend from the occlusal, incisal or cingulum surface of the tooth to the major connector. They join the major connector in a rounded right angle and they taper slightly toward the occlusal (incisal).

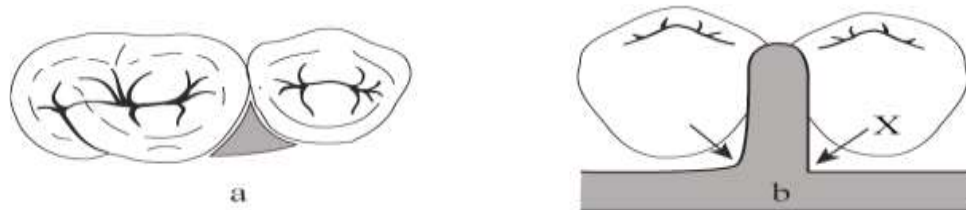


Fig8:- Embrasure minor connector

Surface minor connectors

Surface minor connectors are located on the lingual surface of incisors and canines. They connect lingual rests to the major connector. Their junction with the major connector is a rounded right angle and they taper toward the occlusal (incisal). The lateral borders extend into the proximal embrasures to hide these edges from the tongue.

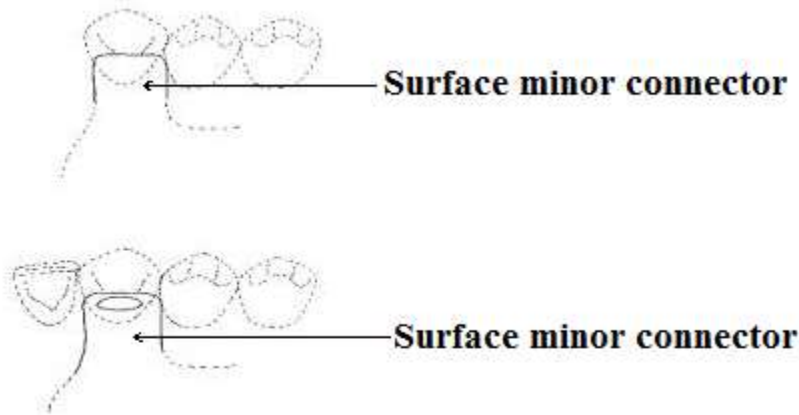


Fig9:- surface minor connector

Denture Base Retention Mechanism.

The denture base retention minor connector is the means by which the plastic denture base is mechanically attached to the framework. There are several types of denture base retention minor connectors:

- a. Retentive mesh.
- b. Retentive lattice.
- c. Retentive loops.
- d. Retentive bead.
- e. Retentive posts

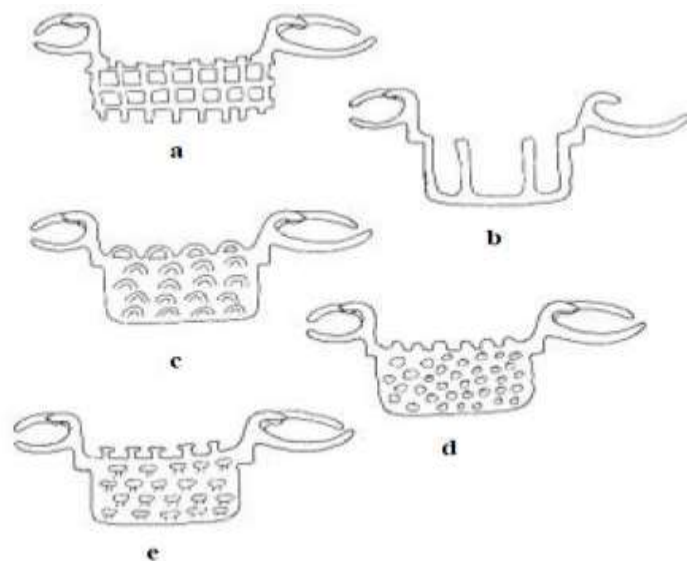


Fig10:- denture base

Finishing line

It is the junction of minor connector that join denture base to major connector.

The minor connector must be joined to the major connector in angle not greater than 90° , to ensure rigidity of acrylic denture base and to help lock the acrylic resin to the major connector. The acrylic resin denture base must join the major connector in a smooth, even fashion. Any irregularity or step between the two surfaces will irritate the tongue.

Function of finishing line:

1. A finish line creates a definite limit to the plastic of the denture base, in this way the plastic ends in a bulk of material. Thin areas of plastic are weak and subjected to fracture.
2. Undercut finishing line provides mechanical retention for the plastic denture base.
3. Finish line provides a smooth transition from the plastic base to the removable partial denture metal framework.

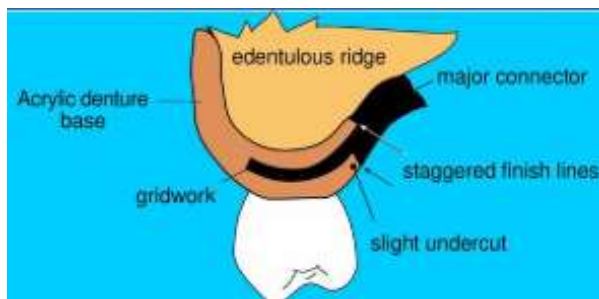


Fig11:- finishing lines minimizes the bulk of resin attaching the artificial teeth.

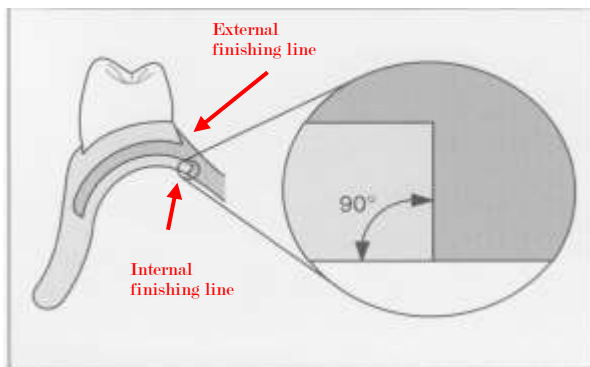


Fig12:- A butt joint should be used to join acrylic resin and metal components at the internal surface of a removable partial denture. Each finish line should display an angle of 90 degrees.

- ❖ If the finishing line is located on the outer surface of major connector, it is called ***external finishing line***. If it is located on the inner or tissue surface, it is called ***internal finishing line***.
- ❖ The internal and external finish lines are staggered by 1-2 mm so that the metal will not be thin and weakened.

- ❖ Internal finishing line formed as a result of *relief wax placed on edentulous ridges of a master cast prior to duplication*, wax will form an elevated area on the refractory cast, and the margins create internal finishing lines in the metal frame. They should be sharp and well defined.
- ❖ The medial extent of the minor connector depends on the lateral extent of the major palatal connector.
 - If the finishing line is located too far *medially*, the natural contour of the palate will be altered by the thickness of the junction and the acrylic resin supporting the artificial teeth, when the palatal contours are restored, enhancing speech and contributing to a natural feeling for the patient.
 - If the finishing line is located too far *buccally*, it will be most difficult to create a natural contour of the acrylic resin on the lingual surface of the artificial teeth.

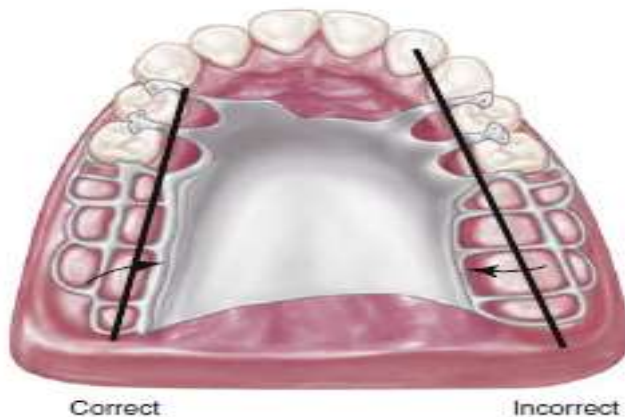


Fig13:- Junction of the major connector and the minor connector at palatal finishing lines should be located 2 mm medial from an imaginary line that would contact the lingual surfaces of missing posterior teeth. The finish line on the right is too far toward midline of the palate. The natural contours of the palate will be altered.

- Junction of major connector and minor connector at palatal finishing lines should be located **2 mm** medial from an imaginary line that would contact lingual surfaces of missing posterior teeth.
- Extension of finishing line to area of pterygomaxillary notch provides for attachment of border portion of resin base through *butt-type joint* pterygomaxillary notch.

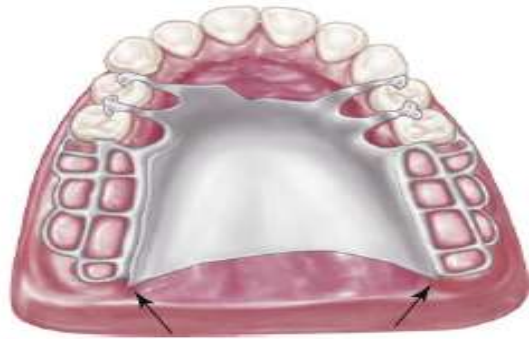


Fig14:- Extension of the finishing line to the area of the pterygomaxillary notch provides a butt-type joint for attachment of the border portion of the resin base through the pterygomaxillary notch (*arrows*).

Types of finishing line:

1. **Vertical finishing line:** It is the finishing line at the junction of ladder area and major connector in free end extension cases (Class I and Class II) in mandibular arch, and Class III or Class IV mandibular arch with labial bar major connector.

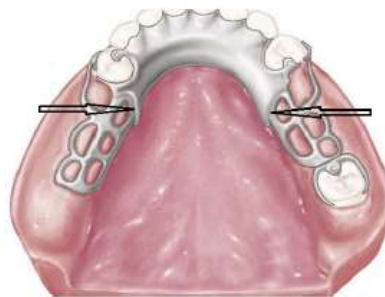


Fig15:- vertical finishing line

2. **Horizontal finishing line:** It is the junction of major connector and ladder area and it extends horizontally forming an undercut area that support acrylic resin that carrying artificial teeth, this type of finishing line is detected in all maxillary partial denture cases and in Class III and Class IV mandibular cases.



Fig16:- horizontal finishing line

Tissue stopper

Part of metal framework which covers an edentulous area & which will be used to retain the acrylic resin base (it include a projection called tissue stopper contacting the residual ridge part of the cast).

So the purposes of tissue stopper are:-

- Used to stabilize the framework during packing of the resin.
- It prevents the distortion of the framework.
- The stop gives adequate space for acrylic to flow in-between the framework and the tissue surface of the cast



Fig17:- tissue stopper