CHAPTER 5

MINOR CONNECTORS

A MINOR CONNECTOR is 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.[1] Minor connectors join the major connector with other parts of the RPD.[2]

FUNCTION

The function of minor connectors is to join the parts of the RPD to the major connector so that the prosthesis acts as a single unit rather than the components acting individually. This way forces applied to one part of the RPD are transmitted to other parts, and are dissipated by all teeth and tissues contacted by rigid parts of the prosthesis, rather than just by those where the force is applied. Minor connectors have other functions which are listed in the description of the various types.

TYPES

There are four types of minor connectors based on their location and function: (1) proximal, (2) embrasure, (3) surface, (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, but will be discussed in another chapter.

PROXIMAL MINOR CONNECTORS

Proximal minor connectors contact an abutment tooth adjacent to an edentulous space (Fig. 5-1). Proximal minor connectors are usually termed PROXIMAL PLATES but are sometimes call GUIDING PLATES, STRUTS and FINISHING PLATES.

DEFINITION

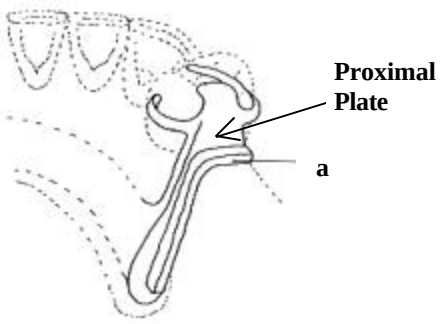


Fig. 5-1. A proximal plate, a) the foot of the proximal minor connector

The functions of proximal plates are to: (1) connect rests and clasp arms to the major connector, (2) contact proximal guiding planes on the teeth thus helping to determine the path of placement of the RPD, (3) prevent food impaction between the proximal surface of the tooth and the RPD, (4) provide a definite finish line for the junction of the denture base and major and minor connectors, (5) provide frictional retention by contact with guiding planes on the teeth, (6) help reciprocate the force of the direct retainer, (7) unite the dental arch by substituting for lost proximal tooth contacts and (8) 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 (Fig. 5-2).

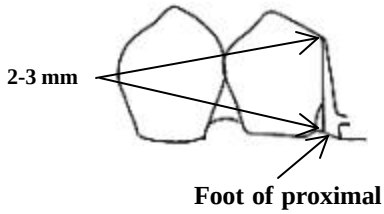


Fig. 5-2. Profile of a typical proximal plate

EMBRASURE MINOR CONNECTORS

Embrasure minor connectors are located between two teeth (Fig. 5-3). Their functions are to: (1) connect rests and clasp arms to the major connectors, (2) contact interproximal guiding planes thus helping to determine the path of placement of the RPD, (3) provide frictional retention by contact with the guiding planes on the teeth, (4) help reciprocate the force of the direct retainer, (5) unite the dental arch by substituting for lost proximal tooth contacts, and (6) distribute forces (bracing).

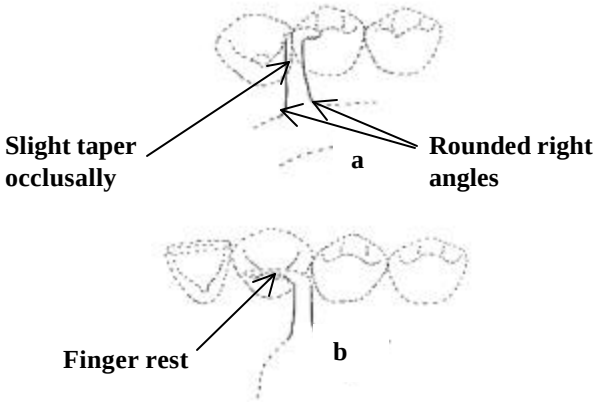


Fig. 5-3. Embrasure minor connectors, a) connecting an occlusal rest to the major connector, b) connecting a lingual cingulum rest to the major connector

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) (Fig. 5-3a).

SURFACE MINOR CONNECTORS

Surface minor connectors are located on the lingual surface of incisors and canines (Fig. 5-4). 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.

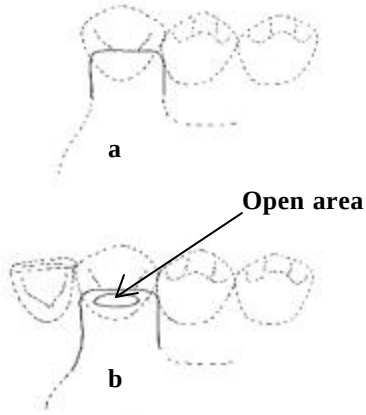


Fig. 5-4 a & b. Surface minor connector, a) closed design, b) open design

The surface minor connector may be penetrated by the tip of the lingual cingulum rest preparation. This "open" design facilitates fitting the framework and cleaning the tissue surface of the minor connector (Fig. 5-4b).

Another modification of the surface minor connector is a "finger rest" in which the rest extends from the proximal or embrasure minor connector into the rest preparation as shown in Figure 5-3b.

DENTURE BASE RETENTION MINOR CONNECTOR

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: (1) retentive mesh, (2) retentive lattice, (3) loops, (4) beads, and (5) posts (Fig. 5-5).

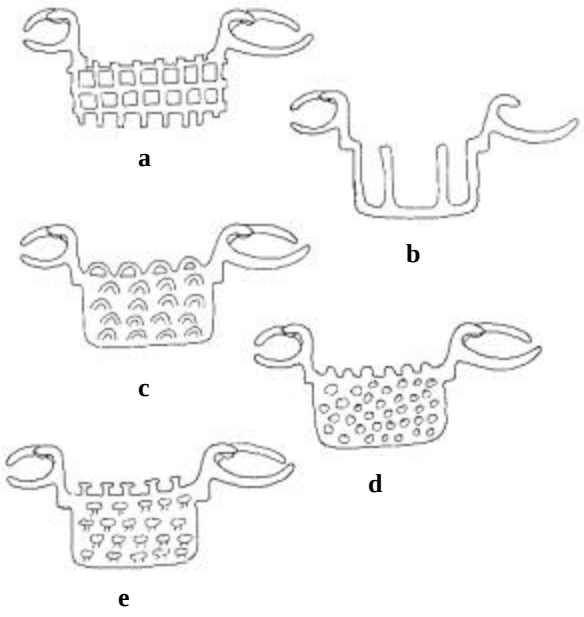


Fig. 5-5. Denture base retention minor connectors, a) retentive mesh, b) retentive lattice, c) retentive loops, d) retentive beads, e) retentive posts

Retentive mesh and retentive lattice are used when a plastic denture base will contact the edentulous ridge. Loops, beads, and posts are used with a metal base to which prosthetic teeth are attached with processed plastic.

The major difference between retentive mesh and retentive lattice is the size of the openings. Retentive mesh has small openings while retentive lattice has much larger openings.

Retentive mesh has the following advantages over retentive lattice:

1. Retentive mesh is joined to the major connector at multiple points instead of the 2 or 3 as retentive lattice.
2. Retentive mesh is not as thick as retentive lattice.
3. Retentive mesh presents soldering a wrought wire Waxing the RPD framework is easier.

Retentive lattice has the following advantages over retentive mesh:

1. Retentive lattice can be designed and located to minimally interfere with the placement of prosthetic teeth.
2. The larger openings provide space for a larger bulk of plastic which makes the plastic base stronger.[3,4]
3. The larger openings provide easier access for painting separating medium on the cast and packing the denture base plastic without incorporating voids.

Clinically the difference between retentive mesh and retentive lattice is probably insignificant. The choice of the type of denture base retention minor connector depends on the design of the framework and should be decided by the dentist, in consultation with the RPD laboratory technician, when the RPD is being designed either during diagnosis and/or treatment planning.

CHEMICAL BONDING OF PLASTIC TO RPD FRAMEWORKS

Simple mechanical attachment of plastic denture base materials to RPD frameworks has several distinct disadvantages:

1. Oral fluids and microorganisms seep between the metal and plastic surface and eventually stain, resulting in an objectionable black line at the metal-plastic interface
2. To provide mechanical retention the denture base retention minor connector must be designed with considerable bulk.

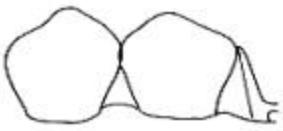
3. The flexing of the plastic denture base at the finish lines weakens the plastic resulting in fracture.

The technique of bonding plastic to metal surfaces is being introduced into RPD fabrication.[5,6] These recently developed adhesive techniques and materials, and future developments, will eliminate the disadvantage of mechanical retention of plastic only and may alter the design and fabrication of RPD denture base retention minor connectors in the near future.

RELATIONSHIP OF MINOR CONNECTORS TO THE TOOTH SURFACE

If the tooth surface is not entirely parallel to the path of placement and removal of the RPD, a space will be created between the minor connector and the tooth surface below the height of contour (Fig. 5-6). There is a difference of opinion as to how large this space should be.

a



b

c

Fig. 5-6. Variations in the space between the proximal minor connectors and the abutment tooth , a) minimum space to prevent tissue hypertrophy into the space, b) "self-cleansing" design, c) space determined by anatomy of tooth, angulation of the tooth relative to the path of placement and removal of the RPD, and limitation of the amount the tooth can be reshaped to decrease the space

Kratochvil suggest that there should be no space between the proximal minor connector, tooth and ridge to prevent hypertrophy of tissue into the space.[7] Others suggest that the space should be kept large so that it may be easily cleaned by the tongue while the RPD is in the mouth ("self-cleansing design") and thus less likely to cause periodontal damage and mucosal irritation. Actually the space is usually determined by the anatomy of the tooth, its angulation in relation to the path of placement and removal of the RPD and esthetic considerations. The dentist has little control over the size of this space unless the tooth is going to be restored with a surveyed crown. And, other factors are much more important in the success of RPD treatment than the space between the proximal plate and the tooth.

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