DIRECT RETAINERS

Direct retainer: that component of a removable partial denture used to retain and prevent dislodgment, consisting of a clasp assembly or precision attachment.

Requirements of a clasp assembly

All clasp assemblies must be designed so that they satisfy the following six requirements:

(1) retention, (2) support, (3) stability, (4) reciprocation, (5) encirclement, and (6) passivity.

. Retention is the quality of the clasp assembly that resists forces acting to dislodge components away from the supporting tissues. No single component of a clasp assembly is solely responsible for prosthesis retention. Rather, it *is effective design* and *accurate construction* that make the removable partial denture retentive. Each part contributes some critical feature. For example:

1. The retentive arm must be designed so that only the clasp terminus engages the prescribed undercut.

2. The accompanying rest must provide support so the clasp terminus is maintained in an optimal location.

3. The minor connector must be sufficiently rigid to ensure proper stability and function of parts of the clasp assembly.

4. The reciprocal element must contact the abutment slightly before the retentive element contacts the tooth to protect the abutment from destructive lateral forces.

5. Components must provide sufficient encirclement, otherwise retention will be lost.

6. Indirect retainers must resist forces acting to dislodge the prosthesis from its fully seated position.

Most mechanical retention is derived from the use of direct retainers (clasp assemblies) utilizing tooth undercuts.

Retention

There are two classes of mechanical retainers: intracoronal and extracoronal.

Intracoronal retainers (precision attachments) which will be discussed later.

Extracoronal retainers engage an external surface of an abutment.

There are two main classes of clasps: 1) those that approach the undercut

from above the height of contour (suprabulge retainers) and 2) those that approach the undercut from below (infrabulge retainers).

Basic Principles of Clasp Design:

the basic principle of clasp design, referred to as the principle of encirclement, means that more than 180 degrees in the greatest circumference of the tooth, passing from diverging axial surfaces to converging axial surfaces, must be engaged by the clasp assembly (Figure 1). The

engagement can occur in the form of continuous contact, such as in a circumferential clasp (Fig.1-a), or discontinuous contact,

(Fig.1- a)

(Fig.1-b)

such as in the use of a bar clasp (Fig1.-b). Both provide tooth contact

in at least three areas encircling the tooth: the occlusal rest area, the retentive clasp terminal area, and the reciprocal clasp terminal area.

In addition to encirclement, other basic principles of clasp design are as follows:

1. The occlusal rest must be designed to prevent movement of the clasp arms toward the cervical.

2. Each retentive terminal should be opposed by a reciprocal Component.

3. Clasp retainers on abutment teeth adjacent to distal extension bases should be designed so that they will avoid direct transmission of tipping and rotational forces to the abutment.

4. Unless guiding planes will positively control the path of removal and will stabilize abutments against rotational movement, retentive clasps should be bilaterally opposed (i.e., buccal retention on one side of the arch should be opposed by buccal retention on the other.

5. The amount of retention should always be the minimum necessary to resist reasonable dislodging forces.

6. Reciprocal elements of the clasp assembly should be located at the junction of the gingival and middle thirds of the crowns of abutment teeth. The terminal end of the retentive arm is optimally placed in the gingival third of the crown (Fig. 2).

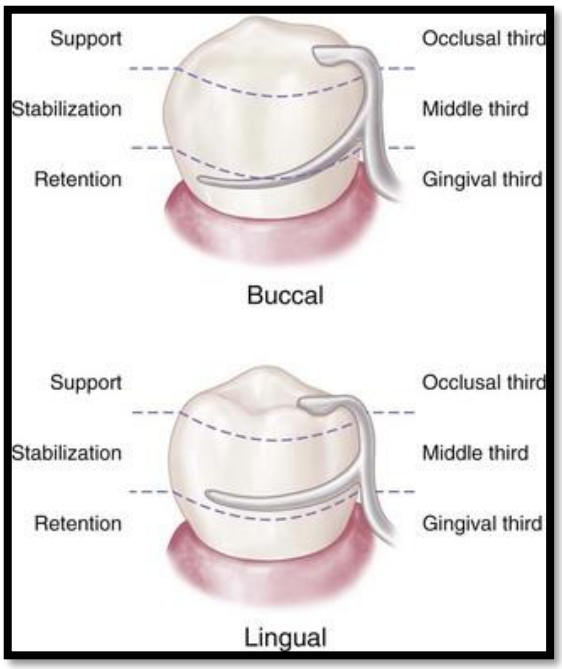


Fig.2

Amount of Retention

Clasp retention is based on resistance to deformation of the metal. For a clasp to be retentive, it must be placed in an undercut area of the tooth, it is forced to deform upon application of a vertical dislodging force

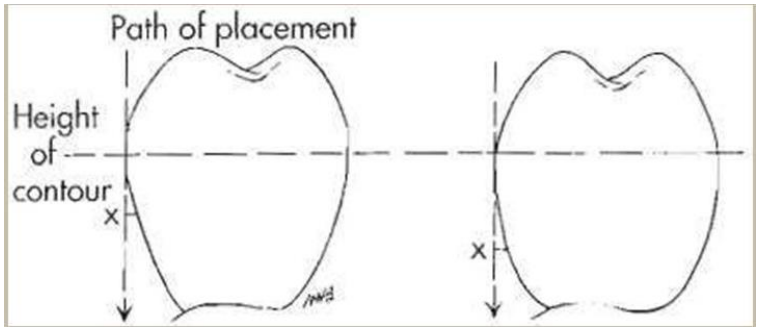
The amount of retention depends on various factors.

Tooth factors include (a) the size of the angle of cervical convergence (depth of undercut) and (b) how far the clasp terminal is placed into the angle of cervical convergence**. Prosthesis factors** include the **flexibility of the clasp arm**. Clasp flexibility is the product of clasp length (measured from its point of origin to its terminal end), clasp relative diameter. (regardless of its cross-sectional form), clasp cross-sectional form or shape (whether it is round, half-round, or some other form), and the material used in making the clasp.

Tooth factors:

Size of and Distance into the Angle of Cervical Convergence

To be retentive, a tooth must have an angle of convergence cervical to the height of contour. When it is surveyed, any single tooth will have a height of contour or an area of greatest convexity.



Any areas cervical to the height of contour may be used for the placement of retentive clasp components, whereas areas occlusal to the height of

contour may be used for the placement of nonretentive, stabilizing, or reciprocating components. so, only flexible components may be

placed gingivally to the height of contour because rigid elements would not flex over the height of contour or contact the tooth in the undercut area.

The location and depth of a tooth undercut available for retention are therefore only relative to the path of placement and removal of the partial denture.

The most suitable path of placement is generally considered to be the path of placement that will require the least amount of mouth preparation necessary to place the components of the partial denture in their ideal position o

Length of Clasp Arm

The longer the clasp arm is, the more flexible it will be, all other factors being equal.

Diameter of Clasp Arm

The greater the average diameter of a clasp arm is, the less flexible it will be.

Cross-sectional Form of the Clasp Arm

Flexibility may exist in any form, but it is limited to one direction in the case of the half-round form. The only universally flexible form is the round form, which is practically impossible to obtain by casting and polishing.

Material Used for the Clasp Arm

All cast alloys used in partial denture construction possess flexibility, their flexibility is proportionate to their bulk.

- Greater rigidity with less bulk is possible through the use of chromium-cobalt alloys.

- ❖ cast gold alloys may have greater resiliency than do cast chromium-cobalt alloys.
- ❖ the wrought-wire clasp can be used in smaller diameters to provide greater flexibility without fatigue.