

# ***Principles of removable partial denture design***

## ***(Continues)***

### **Different between the removable partial denture and fixed partial denture:**

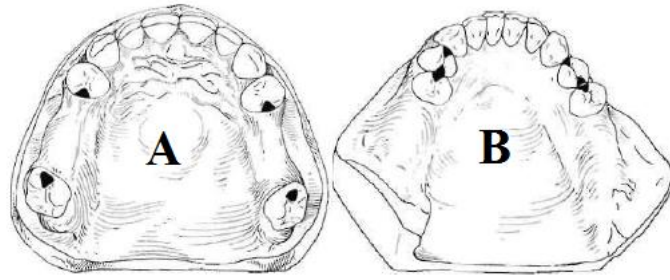
1. Fixed partial denture does not move in function, this mean that the fixed partial denture is cemented to the prepared abutment teeth not supported by clasp as in removable partial denture that the patient can easily insert and remove the removable partial denture in mouth.
2. Occlusal forces are usually directed down the long axes of the teeth in fixed partial denture since it also cemented to the abutment teeth so it considered to as a part of the natural tooth.

### **Differentiation between two main types of removable partial denture (Differentiation between tooth supported and tooth - tissue supported removable partial denture):**

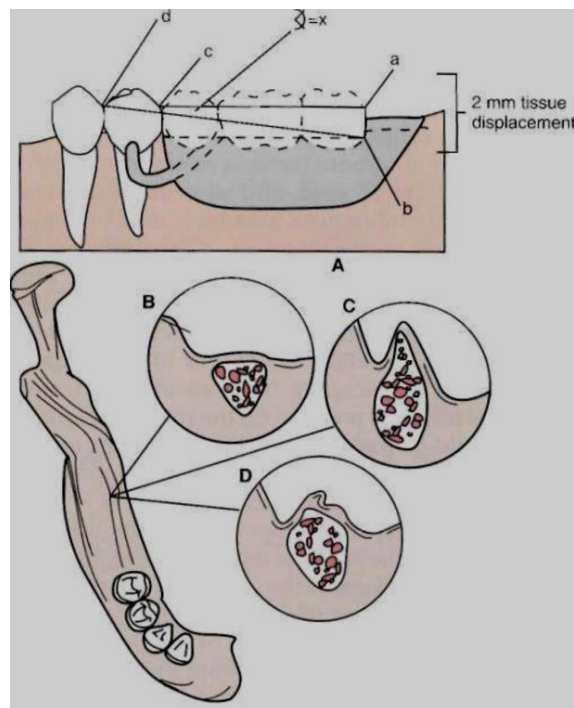
Certain points of difference are present between the Kennedy Class I and Class II types of partial dentures on the one hand and the Class III type of partial denture on the other.

#### ***1. Differences in the manner in which each is supported.***

The Class I type and the distal extension side of the Class II type derive their primary support from the tissue underlying the base and secondary support from the abutment teeth.



*(A) Kennedy Class III, mod 1, partially edentulous arch, which provides total tooth support for prosthesis. Removable partial denture made for this arch is totally supported by rests on properly prepared occlusal rest seats on four abutment teeth. (B) Kennedy Class I partially edentulous arch. Major support for denture bases must come from residual ridges, tooth support from occlusal rests being effective only at anterior portion of each base.*



*(A) The longer the edentulous area covered by the denture base, the greater the potential lever action on the abutment teeth. If extension base area is 30 mm (ac) and tissue displacement is 2 mm (ab), the amount of movement of the proximal plate on the guiding plane will be approximately 0.25 mm, (B) Flat ridge will provide good support, poor stability, (C) Sharp spiny ridge will provide poor support, poor to fair stability, (D) Displaceable tissue on ridge will provide poor support and poor stability*

## ***2. Differences in the method of impression registration and jaw record require.***

An impression registration for the fabrication of a partial denture must fulfill the following two requirements:

- ***The anatomic form*** and the relationship of the remaining teeth in the dental arch and the surrounding soft tissue must be recorded accurately so that the denture will not exert pressure on those structures beyond their physiological limits. The elastic impression materials, such as irreversible hydrocolloid (alginate), mercaptan rubber base (Thiokol), silicone impression materials (both condensation and addition reaction), and the polyethers are best suited for this purpose.
- ***The supporting form*** of the soft tissue underlying the distal extension base of the partial denture should be recorded so that firm areas are used as primary stress-bearing areas and readily displaceable tissues are not overloaded. An impression material capable of displacing tissue sufficiently to register the supporting form of the ridge will fulfill this second requirement.

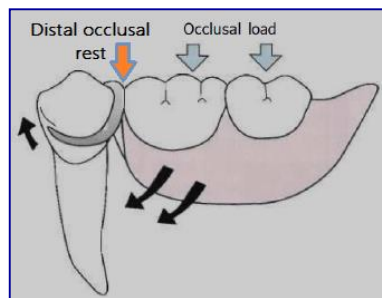
No single impression material can satisfactorily fulfill both of the previously mentioned requirements.

***3. Differences in the need for indirect retention exist in the distal extension type of partial denture***, whereas in the tooth-supported (Class III) there is no extension base to lift away from the supporting tissue, because a direct retainer on an abutment tooth secures each end of each denture base.

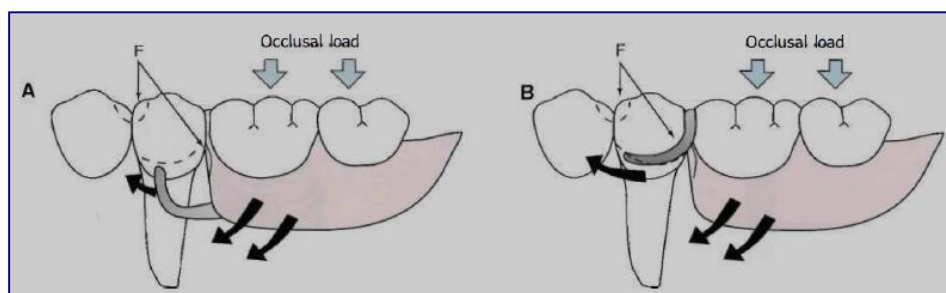
***4. Differences in the type of the base material that can be relined to compensate for tissue changes.*** Acrylic resin is generally used as a base material for distal extension bases. The Class III partial denture, on the other hand, metal bases therefore are more frequently used in tooth supported restorations, since relining is not as likely to be necessary with them.

## 5. Differences in Clasp Design

- **The tooth-supported partial denture** is retained and stabilized by a clasp at each end of each edentulous space. Cast retentive arms are generally used for this purpose. These may be either circumferential or bar clasp.
- **In the tooth-tissue supported removable partial dentures**, because of the anticipated functional movement of the distal extension base, the direct retainer adjacent to the distal extension base must be able to flex sufficiently to dissipate stresses that otherwise would be transmitted directly to the abutment tooth as leverage, in addition to that of resisting vertical displacement. A retentive clasp arm made of wrought wire can flex more readily in all directions than can the cast half-round clasp arm. Thereby, it may more effectively dissipate those stresses (combination clasp), or R.P.I. system, or stress breaker may be used.



*Design with a distal occlusal rest and wrought wire retentive clasp*



*Design with mesial occlusal rest and cast retentive arm*

## Essentials of partial denture design

Design of the partial denture framework should be systematically developed and outlined on an accurate diagnostic cast based on the following prosthesis concepts:

### ***1. Where the prosthesis is supported.***

In an entirely tooth-supported partial denture, the most ideal location for the support units (rests) is in a prepared rest seat on abutment teeth. In a tooth-tissue supported partial denture, attention to these same considerations must be given to the abutment teeth. However, equitable support must come from the edentulous ridge areas.

### ***2. How the support is connected?***

Connect the tooth and tissue support units. Designing and locating major and minor connectors.

### ***3. How the prosthesis is retained?***

The retention must be sufficient to resist reasonable dislodging forces. Retention is accomplished by mechanical retaining elements (clasps) being placed on the abutment teeth.

*The key to selecting a successful clasp design for any given situation is to choose one that will:*

- Avoid direct transmission of tipping or torquing forces to the abutment.
- A clasp design with correctly positioned component parts on abutment tooth surfaces.
- Provide retention against dislodging forces.
- Compatible tissue contour and esthetic desires of the patient.
- Location of the undercut is the most important single factor in selection of a clasp.

### ***4. How the retention and support are connected?***

If direct and indirect retainers are to function as designed, each must be rigidly attached to the major connector.

### ***5. How the edentulous base support is connected?***

It is necessary to ensure rigidity of the base material without interfering with tooth placement.