DENTURE BASE IN RPD

Denture base: The part of a denture that rests on the foundation tissues and to which teeth are attached.

The primary function of denture base:

1. Masticatory function as the denture base transfers the occlusal stresses to the underlying supporting oral structures.
2. Esthetic or cosmetic function: this is related to reproduction of natural looking contours.
3. Stimulation of the underlying tissue by massaging action during vertical movement of the denture base under functional stresses, as this will maintain the form and health of underlying tissue.

Types of denture base according to support:

1. Tooth supported partial denture base.
2. Tooth tissue borne partial denture base.

1. Tooth supported partial denture base

In tooth supported prosthesis, the denture base is primarily a span between two abutments supporting teeth. Thus the occlusal forces are transferred directly to abutment teeth through rests; also the denture base and the supplied teeth serve to prevent horizontal migration of all of the abutment teeth in partially edentulous arch and vertical migration of teeth in opposing arch.

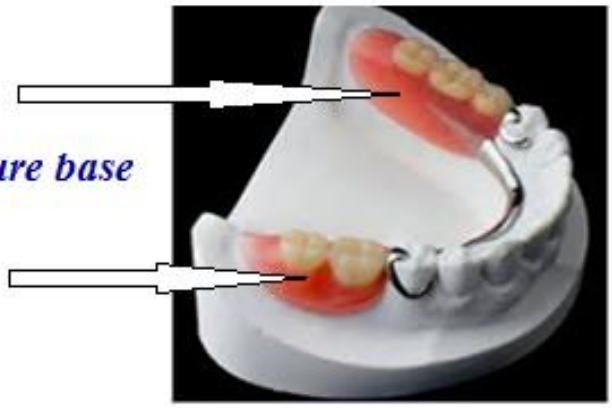
Tooth supported partial denture base

When posterior teeth only to be replace, function are of primary importance than esthetic, while when anterior teeth needed to be replaced the esthetic is of primary importance. Also of importance is elimination of undesirable food traps (oral cleanliness) and stimulation of underlying tissue.

2. Tooth tissue borne partial denture base

In distal extension partial denture, the base other than those in tooth supported modification must contribute to the support of the denture.

Tooth tissue borne partial denture base



Tooth supported partial denture base

Tooth tissue borne partial denture base

The edentulous area close to the terminal abutments is supported primarily by the occlusal rest on the abutment teeth however; farther from the abutment the support from the underlying ridges tissue becomes increasingly important.

Maximum support from the residual ridge may be obtained by:

1. Using broad denture base.

2. Using accurate denture base.

Both spread the occlusal load equitably over the entire area available for such support. This maximum support can be obtained through good impression of the distal extension ridges, also the distal extension base required relining and rebasing in future, so the material being used for tooth tissue supported partial denture should allow relining and rebasing which is not necessary in tooth borne partial denture as its supported at each end on a tooth through the rest, while the condition where relining is required where gross tissue changes (bone resorption) have been occurred beneath tooth borne base to the point that poor esthetic and food accumulation result.

Types of the denture base according to materials:

1. *Resin type (acrylic denture base).*

2. *Metal type denture base*.

1. Resin type (acrylic denture base):

Its most widely used type of denture base because of easy of fabrication and easy of attachment to metal framework. The resin denture base attached to metal framework by mechanical mean (throughout the hole present in meshes or ladder area) in addition, the resin denture base having the advantage of future relining or rebasing therefore it's of main choice in:

a. Distal extension ridges: The resin denture base is indicated for distal extension cases (Cl I and Cl II) because of the support of the denture by tissue and there will be continuous bone resorption creating a space between residual ridge and denture base, so there will be need for relining.

b. Long span ridges: In (Cl III and Cl IV) edentulous cases because of possibility of tissue changes underneath the denture base and there will be need for future relining.

c. In cases of immediate partial denture: Since after healing period there will be need for relining so that resin denture base will be needed for such cases.

2. *Metal type denture base:*

It's made of either:

a. Gold and platinum but these materials are so expensive.

b. Stainless steel or chrome cobalt that are more being in use now day.

c. Recently, the titanium being used as a denture base and in oral implant because of its excellent properties.

The metal type denture base has the ability to stimulate the underlying tissues that will maintain the integrity of the bone by preventing osseous tissue resorption, but it principle disadvantage its difficulty to reline in future, therefore the metal type denture base will be indicated in:

- Short span (tooth borne removable partial denture).
- When there is no enough space for artificial teeth (inadequate intermaxillary space) because of over eruption of opposing teeth.

Over erupted upper 2nd premolar and 1st molar

Anterior artificial teeth attached to metal denture base

Advantages of metal denture base:

1. Accuracy and permanency of form: The metal alloys take accurate form and don't permit changes by internal factors (internal strains that may be released later to cause distortion are not present). Because of accuracy, the metal base provides an intimacy of contact that contributes considerably to the retention of denture prosthesis. Permanence of form of the cast base is also ensured because of its resistance to abrasion from denture cleaning agents.

2. Comparative tissue response: Clinical observation have demonstrated that the inherent cleanliness of the cast metal base contributes to maintain the health of oral tissues when compared with acrylic resin base, this is may be due to greater density and bacteriostatic activity contributed by ionization and oxidation of metal base, while acrylic resin tends to accumulates mucineous deposits, bacteria may accumulate and producing harmful enzymes to underlying tissues.

3. Thermal conductivity: Temperature changes are transmitted through the metal base to the underlying tissues, thereby helping to maintain the health of these tissues, while acrylic denture base has an insulating properties that prevents interchange of temperature between denture base and underlying tissues, therefore the metal denture base gives more natural feeling from resin denture base.

4. Weight and bulk: Metal alloys may be casted much thinner than acrylic resin and still have adequate strength and rigidity; therefore, the metal denture base will be less weight and bulk than the resin denture base.

Disadvantages of metal denture base:

1. Difficult to reline and rebase.

2. Expensive.

3. The error that occur in posterior palatal seal area (post dam) can't be corrected with metal denture base, while if same error occurred in resin denture base ***repostdaming*** is the choice for this problem.

Design consideration of denture base:

1. Support: Maximum support from denture base depending on limiting anatomical structures and their movement during function and on accuracy of denture base.
2. Esthetic and stimulation of underlying tissues.
3. Whether we have a free end extension or bounded saddle edentulous cases.
4. Type of metal alloy being used in fabrication of denture base.
5. Thickness required of denture base.

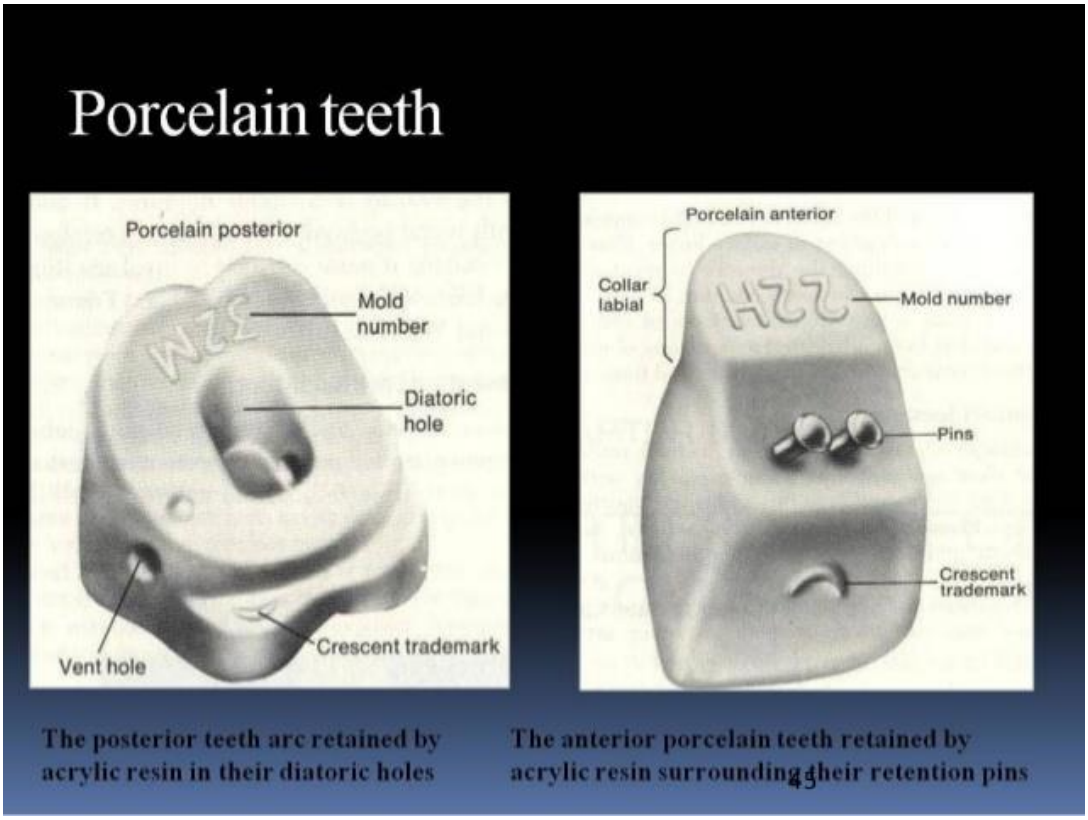
Periodontal consideration of denture base design:

1. It should be of optimal extension and thickness to reduce stresses on abutment teeth.
2. It should not impinge on gingival tissue.
3. It should expose the gingival tissue (relief in area that not involved in periodontal disease).

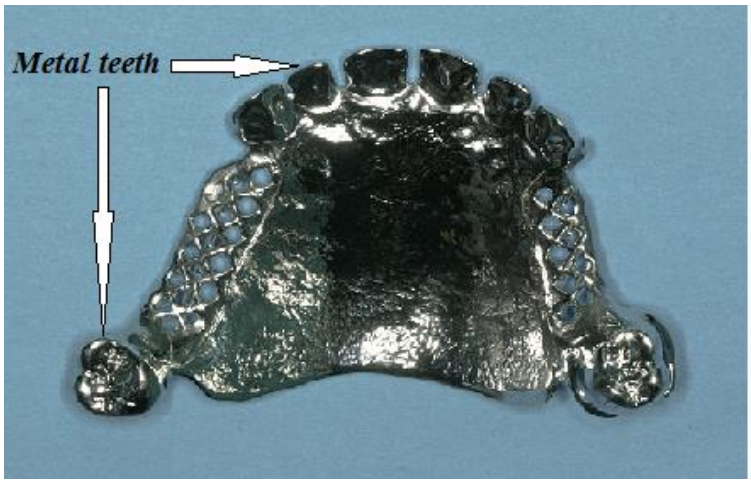
Types of artificial teeth:

1. ***Acrylic teeth:*** Artificial teeth that have been made of acrylic resin, it has the ability to be attached chemically to denture base.

2. Porcelain teeth: Is made of feildspathic porcelain material, its attached to denture base by mechanical mean, either by pin that will be processed in denture base and a hole is presenting the base of the tooth allowing its attachment by cementation.



3. Metal teeth: Some cases the anterior or posterior teeth may be processed as part of the denture base by casting procedure this is indicated in cases of limited intermaxillary spaces.




Partial dentures with metal teeth

Modified poly-ether-ether-ketone (PEEK):

A new material in prosthodontics. Comparing to the metals used in dentistry.

1. An alternative material for the fabrication of distal extension removable dental prosthesis (RDP) frameworks.
2. This material can be used for patients allergic to metals, or who dislike the metallic taste, the weight, and the unpleasant metal display of the denture framework and retentive clasps.
3. A biocompatible, nonallergic, rigid material, with flexibility comparable to bone, high polishing and low absorption properties, lowplaque affinity, and good wear resistance.
4. Can be constructed either via CAD/CAM manufacturing or via the conventional lost wax technique.