Lec#: 1

Introduction to removable partial denture

Removable partial denture

Is a prosthesis that replaces some teeth in a partially dentate arch, and can be removed from the mouth and replaced at will; it is either acrylic type or metallic type (cobalt/chrome).

Why do we have to make a removable partial denture?

1. To fill the empty space.
2. For esthetic reason.
3. For proper function and occlusion, in order to be able to masticate food properly.
4. To prevent extrusion of opposing teeth (super-eruption), and migration or tilting of adjacent teeth.
5. It will act as a form of stimulation for underlying ridge and mucosa (prevent disuse atrophy).
6. To restore the phonetic problems associated with loss of teeth especially anterior teeth.
7. For proper balance of muscular relationship, as well as, esthetic and function (support facial musculature, and facial proportion).
8. Loss of teeth usually presents a case of deviation from the normal state, and to correct such condition, replacement of missing teeth is usually needed.

Causes of teeth loss

1. The main cause of teeth loss in young patient (about 35 years old) is usually caries attacking the enamel and dentine.

2. After the age of 35 years old the cause is usually related to periodontal diseases, due to progressive degeneration of the connective tissue of the periodontium and because of highly calcified teeth, bacteria may not be able to penetrate the tooth from above, what usually happens is that the bacteria goes downward causing mobility of teeth.
3. Another important cause for the loss of teeth is accidents, such as receiving a blow, or falling on them.

Treatment options for missing teeth:

1- Dental Implant
2- Fixed partial denture
3- Removable partial denture

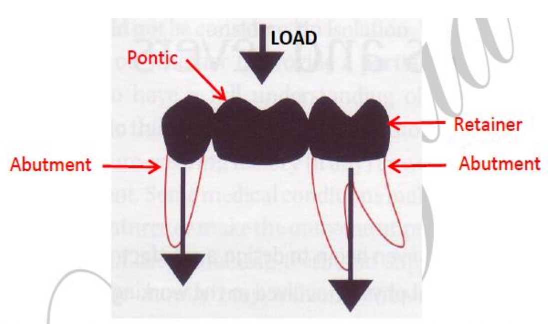
Fixed Partial denture (fixed bridge)

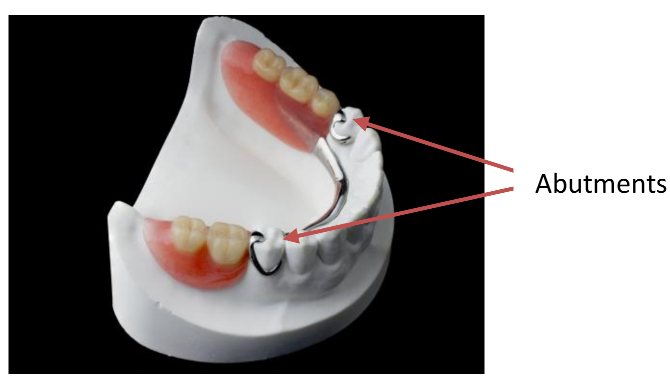
A partial denture that is luted or otherwise securely retained to natural teeth, tooth roots, and /or dental implant that furnish the primary support and retention for the prosthesis.

Indications of fixed partial denture

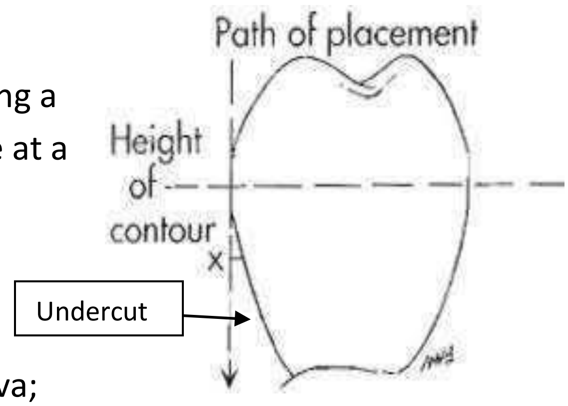
1. Unilateral bounded edentulous span.
2. Class IV Kennedy with normal loss of bone.
3. Modification area located anteriorly with class I and class II Kennedy classification for simplify the design of removable partial denture.

Some definitions related to prosthodontics





Abutment is a tooth, a portion of a tooth, or a portion of an implant that serves to support and/or retain prosthesis.



Height of contour is defined as a line encircling a tooth, designating its greatest circumference at a selected position determined by a dental surveyor.

Undercut is that portion of a tooth that lies between the height of contour and the gingiva; when it is used in reference to other oral structures, undercut means the contour or cross section of a residual ridge or dental arch that would prevent the placement of a denture.

Guiding planes are two or more vertically parallel surfaces of abutment teeth shaped to direct prosthesis during placement and removal.

Nesbit denture is a unilateral removable partial denture design.

Indications of removable partial dentures:

1- Distal extension situations (free end situation).
2- Long span tooth- bounded edentulous area.
3- Need for bilateral stabilization.
4- Excessive loss of the residual ridge.
5- Unusually sound abutment teeth.
6- If the prognosis of remaining teeth are questionable.
7- After recent extraction.
8- Economic consideration.

Disadvantages of removable partial dentures

1- Strain on the abutment teeth often is caused by improper tooth preparation, clasp design, and/or loss of tissue support under distal extension partial denture bases.

2- Clasps can be unesthetic, particularly when they are placed on visible tooth surfaces.
3- Caries may develop beneath clasp components, especially if the patient fails to keep the prosthesis and the abutments clean.

Types of edentulous arches:

1- Bounded saddle: where we have two abutment teeth on either side of the edentulous space, treated by either fixed or removable partial denture.
2- Free End saddle: where there is only on abutment tooth at an end of the edentulous space, treated is only by a removable partial denture.

Components of removable partial denture:

1- Major connectors
2- Minor connectors
3- Rests
4- Direct retainers
5- Stabilizing or reciprocal components (as parts of a clasp assembly)
6- Indirect retainers (if the prosthesis has distal extension bases)
7- One or more bases each support one to several replacement teeth

The End

Best Wishes

Lec#: 2

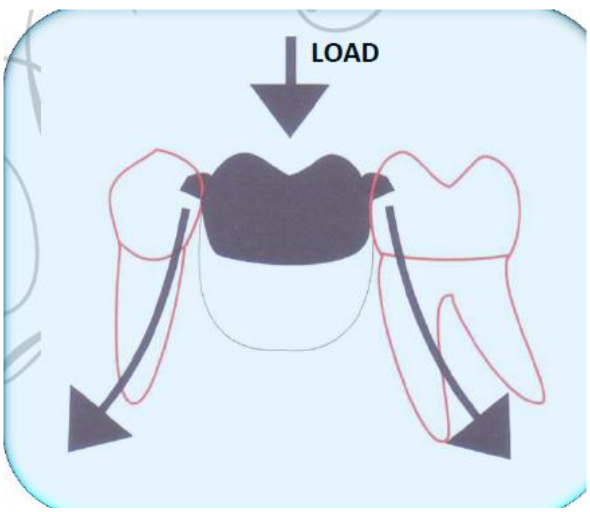
Classification of partially edentulous arches

1. Classification by support:

a. Class I Tooth supported.
b. Class II Tissue supported.
c. Class III Tooth and Tissue supported.

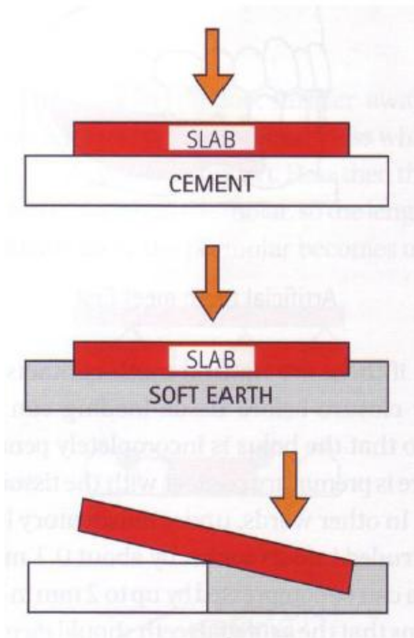
Tooth supported:

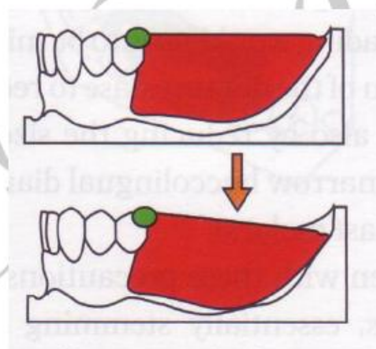
For partially edentulous patients the prosthetic options available include natural tooth-supported fixed partial dentures, removable partial dentures, and implant-supported fixed partial dentures.



Tooth and tissue supported

For removable partial dentures that do not have the benefit of natural tooth support at each end of the replacement teeth (the extension base removable partial denture), it is necessary that the residual ridge be used to assist in the functional stability of the prosthesis.





Kennedy classification:

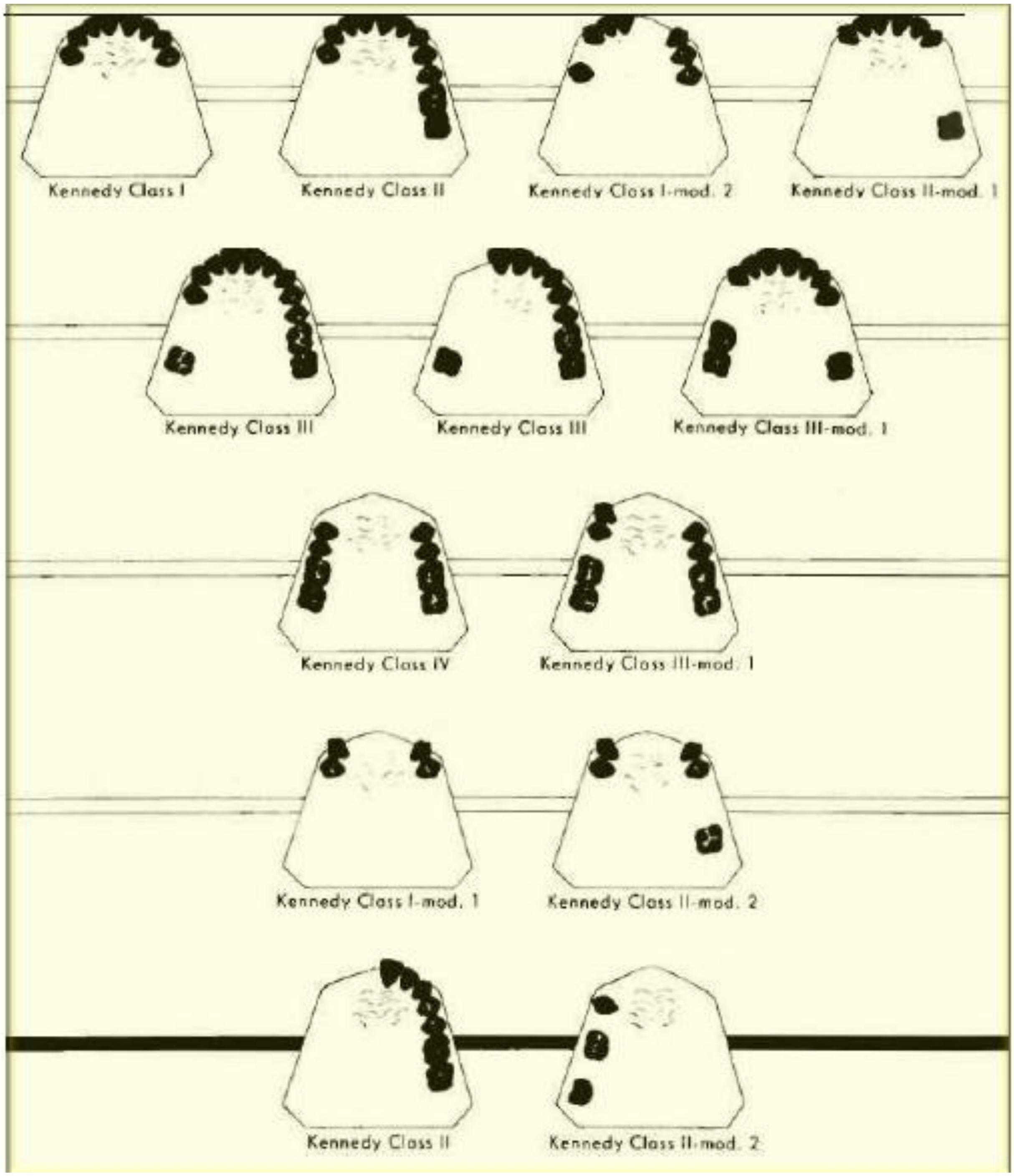
The Kennedy method of classification was originally proposed by Dr. Edward Kennedy in 1925.

Class I: Bilateral edentulous areas located posterior to the natural teeth.

Class II: Unilateral edentulous area located posterior to the remaining natural teeth.

Class III: Unilateral edentulous area with natural teeth remaining both anterior and posterior to it.

Class IV: Single, but bilateral (crossing the midline), edentulous area located anterior to the remaining natural teeth.


Kennedy Class I
Kennedy Class II
Kennedy Class I-mod. 2
Kennedy Class II-mod. 1
Kennedy Class III
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Kennedy Class III-mod. 1
Kennedy Class IV
Kennedy Class III-mod. 1
Kennedy Class I-mod. 1
Kennedy Class II-mod. 2
Kennedy Class II
Kennedy Class II-mod. 2

APPLEGATE'S RULES FOR APPLYING THE KENNEDY CLASSIFICATION

(Rules Governing the Application of the Kennedy Method)

Rule 1: Classification should follow rather than precede any extractions of teeth that might alter the original classification.

Rule 2: If a third molar is missing and not to be replaced, it is not considered in the classification.

Rule 3: If a third molar is present and is to be used as an abutment, it is considered in the classification.

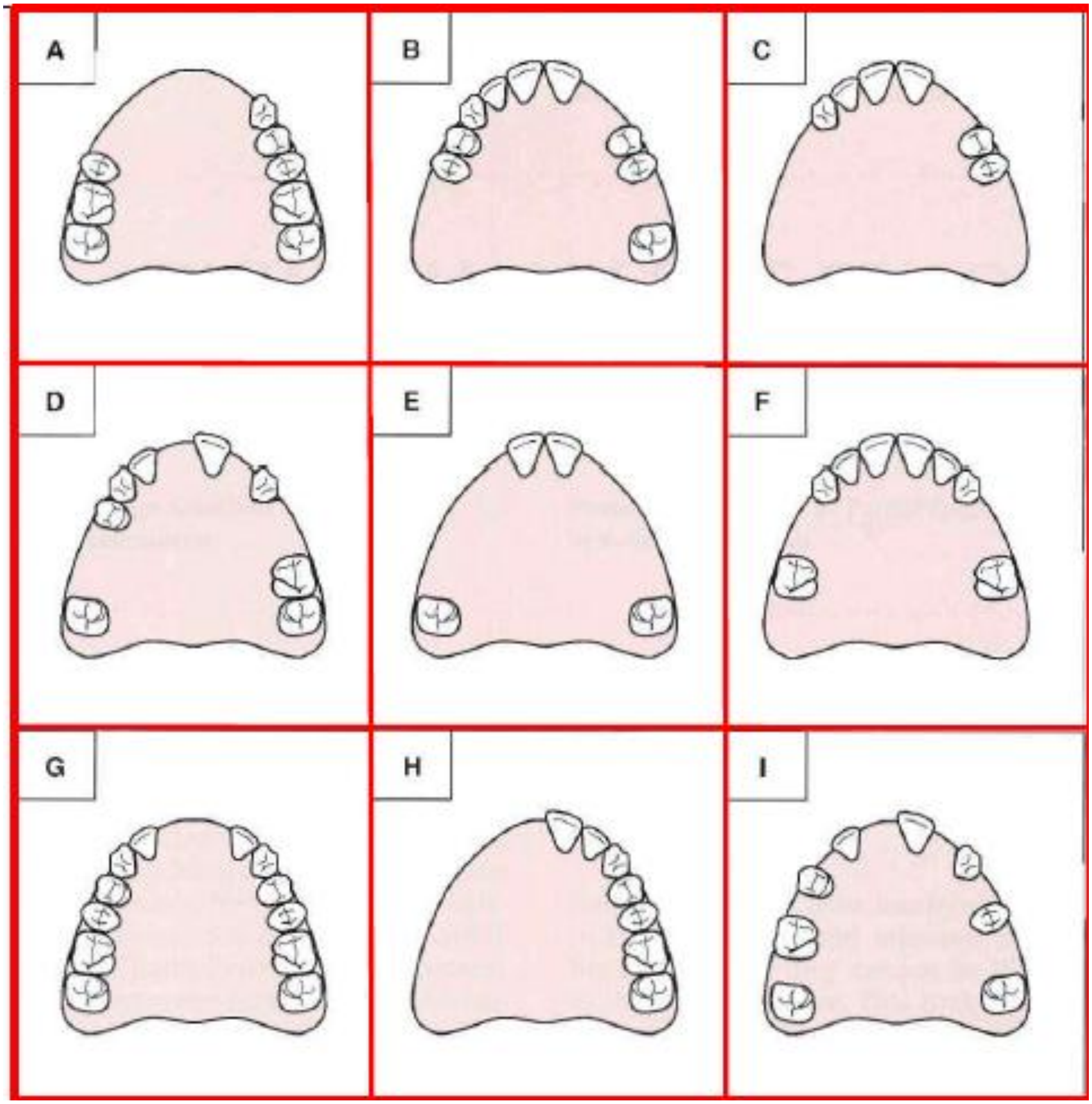
Rule 4: If a second molar is missing and is not to be replaced, it is not considered in the classification (e.g. if the opposing second molar is likewise missing and is not to be replaced).

Rule 5: The most posterior edentulous area (or areas) always determines the classification.

Rule 6: Edentulous areas other than those determining the classification are referred to as modification and are designed by their number.

Rule 7: The extent of the modification is not considered, only the number of additional edentulous areas.

Rule 8: There can be no modification areas in Class IV arches.



The End

Best Wishes

Six Phases of partial denture service

Bushra Mohammed Ali Al-Ameen

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Six Phases of partial denture service

- 1- Education of patient.
- 2- Diagnosis, Treatment Planning, Design, Treatment Sequencing, and Mouth Preparation.
- 3- Support for Distal Extension Denture Bases.
- 4- Establishment and Verification of Occlusal Relations and Tooth Arrangements.
- 5- Initial Placement Procedures.
- 6- Periodic Recall.

1- Education of patient.

- It is the process of informing a patient about a health matter to secure informed consent, patient cooperation, and a high level of patient compliance.
- The dentist and the patient share responsibility for the ultimate success of a removable partial denture.
- Patient education should begin at the initial contact with the patient and continue throughout treatment.

1- Education of patient.

- Motivation and instruction to the patient for proper oral hygiene measures, the patient should understand that removable partial denture will cause periodontal problems, caries so the partial denture is not supply to the patient unless the oral hygiene is satisfactory.
- A patient will not usually retain all the information presented in the oral educational instructions. For this reason, patients should be given written suggestions to reinforce the oral presentations.

2- Diagnosis, Treatment Planning, Design, Treatment Sequencing, and Mouth Preparation.

Diagnosis:

- It is the act or process of deciding the nature, location, and causes of a diseased condition by examination and careful investigation of the facts.
- Diagnosis for prosthodontic care requires the use of general diagnostic skills and accumulation of knowledge from other aspects of dentistry and its support sciences.

2- Diagnosis, Treatment Planning, Design, Treatment Sequencing, and Mouth Preparation.

Treatment Plan:

- It is the sequence of procedures planned for the treatment of a patient after diagnosis according to the needs (In simple wards it is a problem solving techniques).
- It is a consideration of all of the diagnostic findings (systemic and local), which influence the surgical preparations of the mouth, impression making, maxillomandibular relation records, occlusion to be developed, form and material of the teeth, the denture base material, and instructions in the use and care of dentures.

2- Diagnosis, Treatment Planning, Design, Treatment Sequencing, and Mouth Preparation.

Treatment Plan:

- It is matching the possible treatment options with patient needs and symmetrically arranging the treatment in order of priority but in keeping with logical or technically necessary sequences.
- The process requires a broad knowledge of treatment possibilities and detailed knowledge of patient needs and wants determined by careful diagnosis.
- It involves careful analysis of the problem, breaking to components, as possible; generating a list of possible components solutions are implemented.

2- Diagnosis, Treatment Planning, Design, Treatment Sequencing, and Mouth Preparation.

Treatment Plan:

✓ <u>The four categories of mouth preparation are</u>

- 1- Periodontal preparation.
- 2- Tissue conditioning.
- 3- Abutment teeth preparation.
- 4- Oral surgical preparation.

3- Support for Distal Extension Denture Bases

✓ FACTORS INFLUENCING THE SUPPORT OF DISTAL EXTENSION BASE

1- Contour and quality of the residual ridge.

2- Extent of residual ridge coverage by the denture base.

3- Type and accuracy of the impression registration.

4- Accuracy of the fit of the denture base.

5- Design of the removable partial denture framework.

6- Total occlusal load applied.

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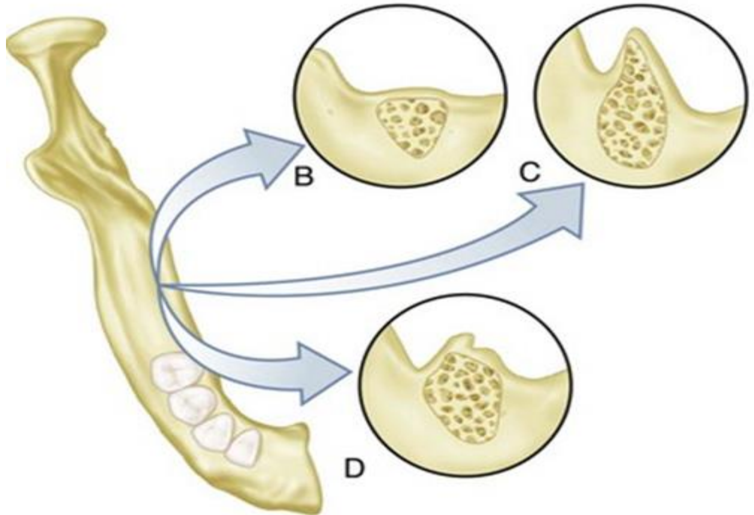

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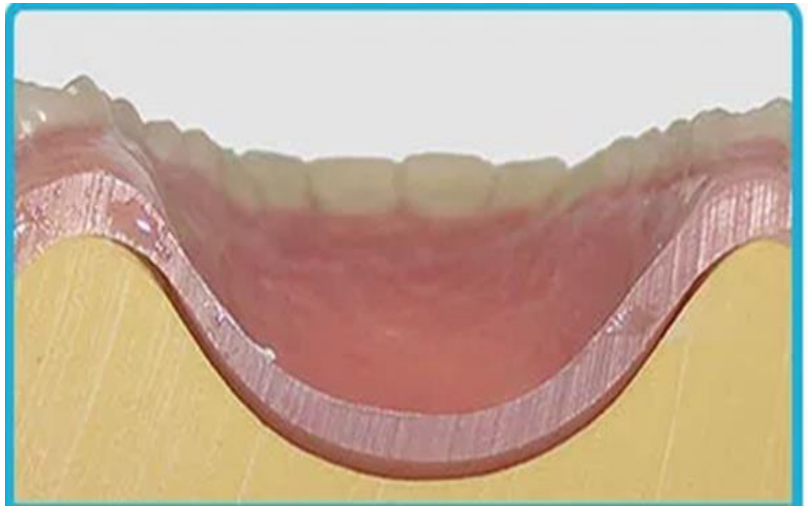

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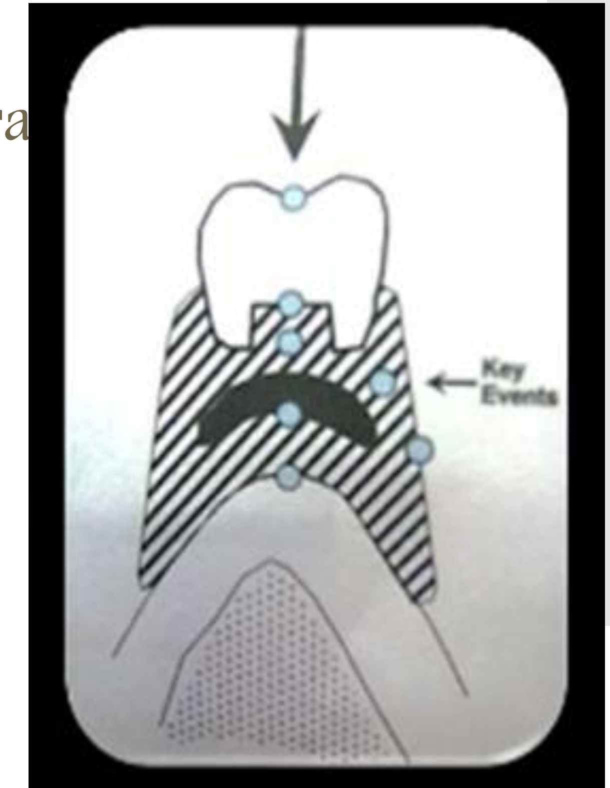

4- Establishment and Verification of Occlusal Relations and Tooth Arrangements

✓ The establishment of satisfactory occlusion for the partial denture patient should include the following:

1- Analysis of the existing occlusion.

2- Correction of existing occlusal disharmony.

3- Recording of centric relation.

4- Recording of eccentric jaw relations.

5- Correction of occlusal discrepancies that created in processing the denture.

4- Establishment and Verification of Occlusal Relations and Tooth Arrangements

✓ Methods for establishing occlusal relationships:

1- Direct opposition of casts.

2- Interocclusal records with posterior teeth remaining.

3- Occlusal relations using occlusion rims on record bases.

4- Jaw relation records made entirely on occlusion rims.

5- Establishing occlusion by the recording of occlusal pathways.

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5- Establishing occlusion by the recording of occlusal pathways.

5- Initial Placement Procedures

- The fifth phase of treatment occurs when the patient is given possession of the removable prosthesis. It seems that minute changes in the planned occlusal relationships occur during processing of the dentures.
- Not only must occlusal harmony be ensured before the patient is given possession of the dentures, but also the processed bases must be reasonably perfected to fit the basal seats.
- It must also be ascertained that the patient understands the suggestions and recommendations given by the dentist for care of the dentures and oral structures.

6- Periodic Recall

- Periodic reevaluation of the patient is critical for early recognition of changes in the oral structures to allow steps to be taken to maintain oral health.
- These examinations must monitor:

1- The condition of the oral tissue.

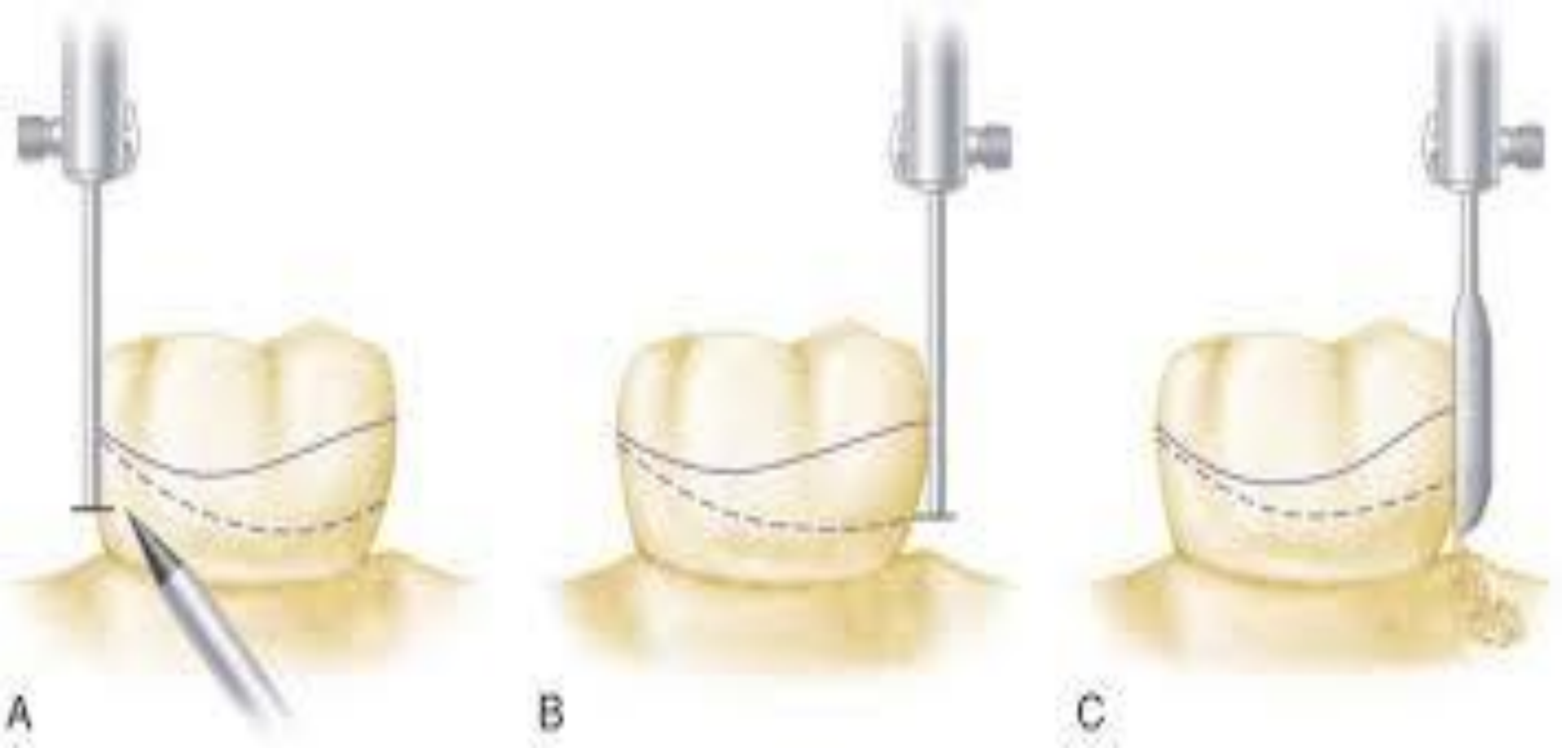
2- The response to the tooth restorations, and the prosthesis.

3- The patient's acceptance.

4- The patient's commitment to maintain oral hygiene.

- Although a 6-month recall period is adequate for most patients, a more frequent evaluation may be required for some.


No Shortcuts to Success



Dental Surveyor

BUSHRA MOHAMMED ALI AL-AMEEN

B,D,S,. M,SC.(PROS)

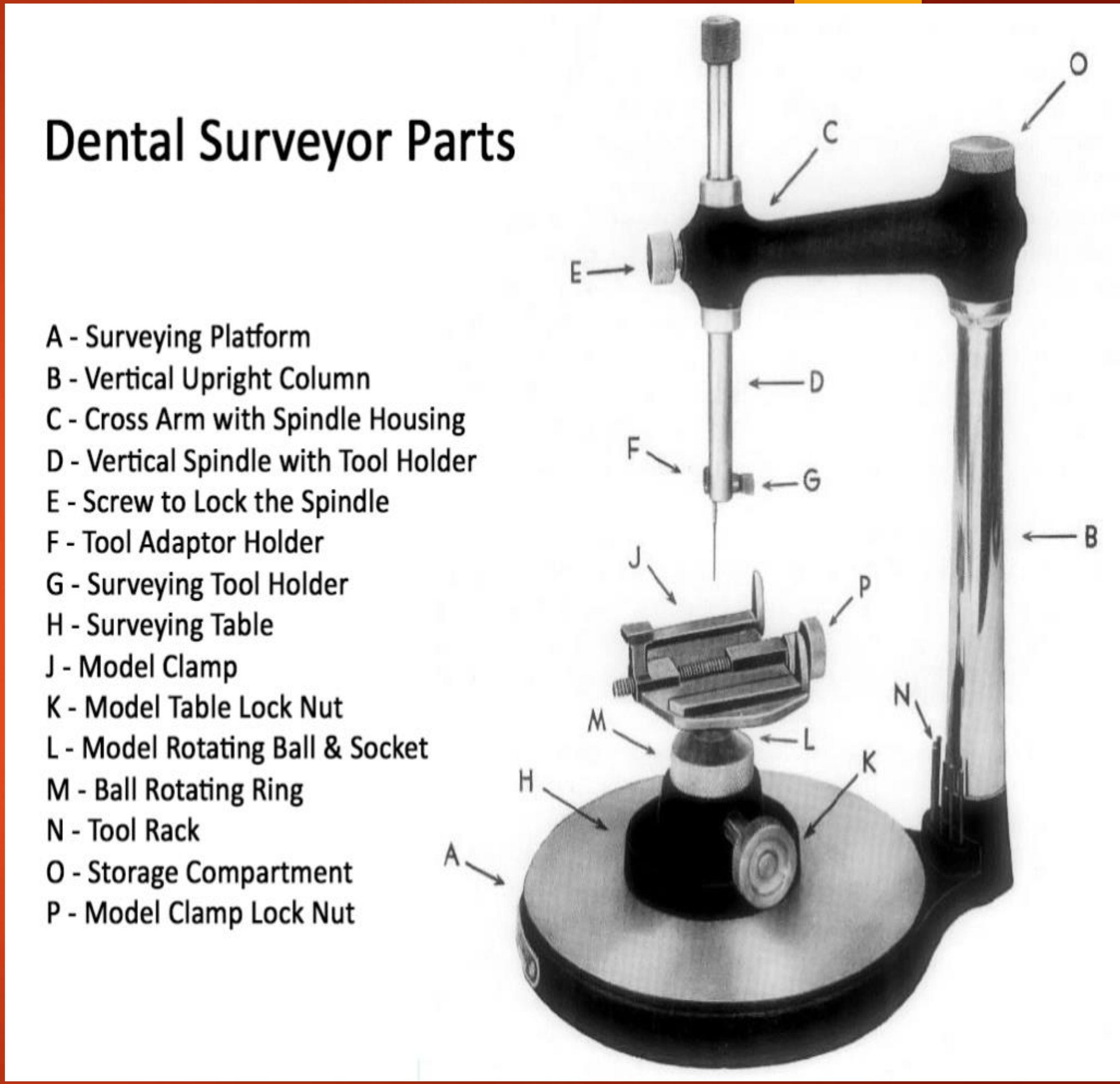
Dental Surveyor

- It is an instrument used to determine the relative parallelism of two or more surfaces of the teeth or other parts of the cast of a dental arch.

Parts of dental surveyor

1. Platform on which the base is moved.
2. Vertical arm that supports superstructure.
3. Horizontal arm from which surveying tool suspends.
4. Table to which the cast is attached.
5. Base on which the table swivels.
6. Mandrel for holding special tools.
7. Survey tools:

I. Analyzing rod
II. Carbon marker
III. Undercut gauge
IV. Wax trimmer



Survey tools:

The tools which are used for surveying are:

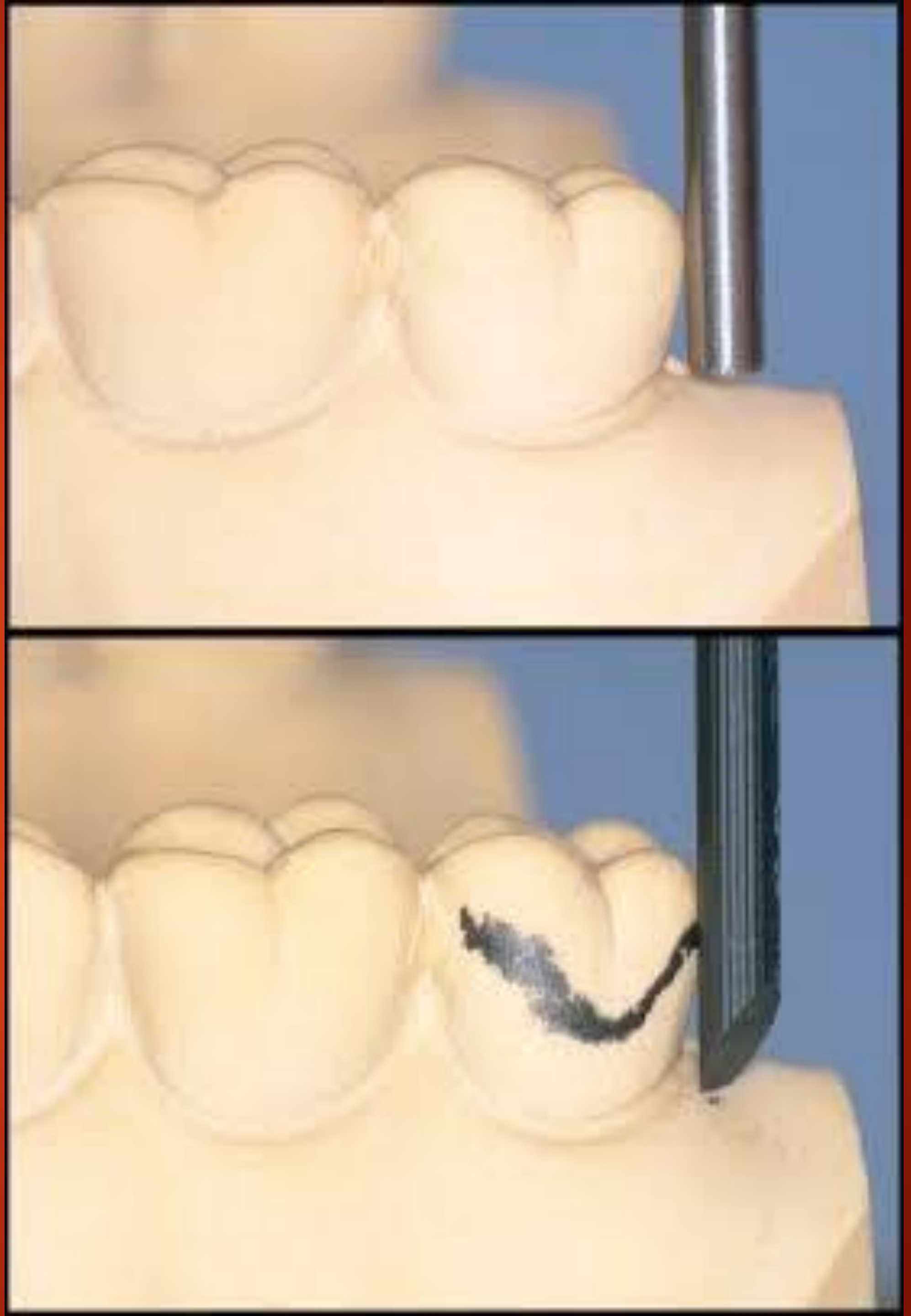
- **Analyzing rod:**

It is a rigid metal rod used for diagnostic purposes in the selection of the path of placement and to determine the undercut areas prior to scribing the height of contour with the carbon marker.

- **Carbon marker:**

It is used for the actual marking of the survey line on the cast. A metal

shield is used to protect it from breakage.



Survey tools:

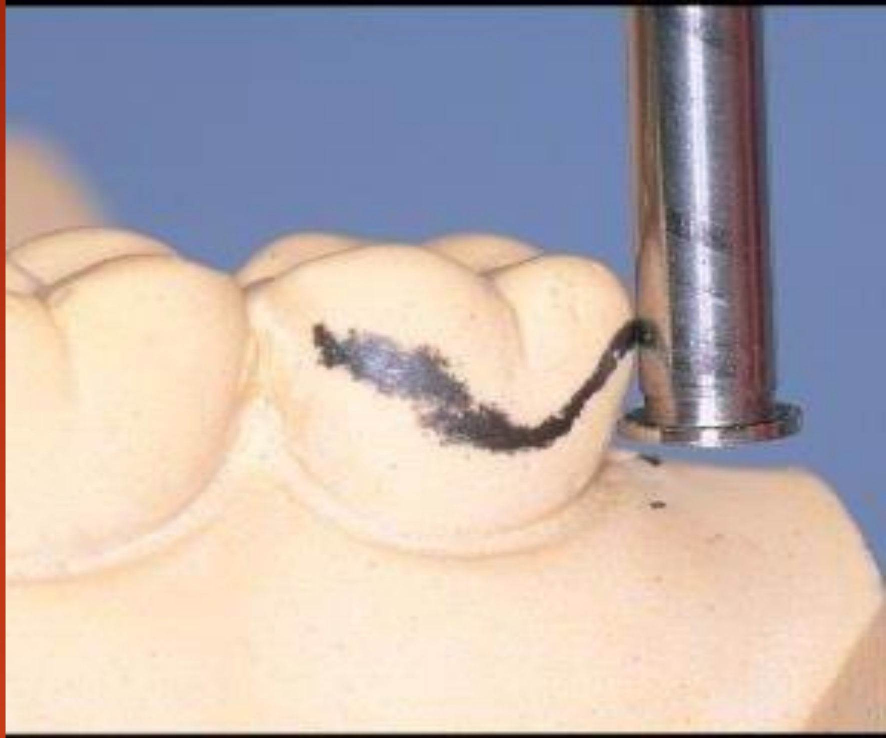
The tools which are used for surveying are:

- Undercut gauge

They are used to measure the extent of the undercut on abutment teeth that are being used for clasp retention.

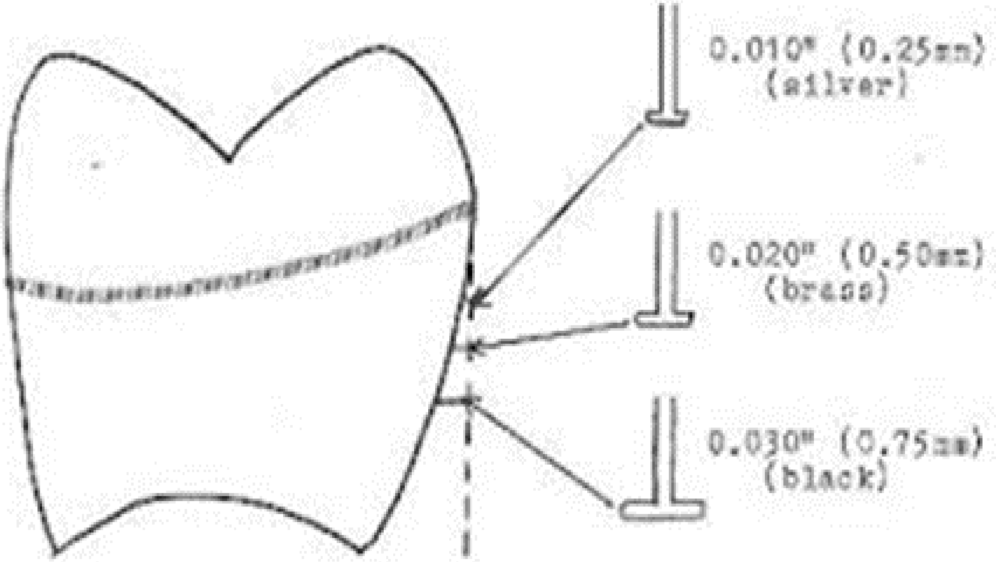
- Wax trimmer

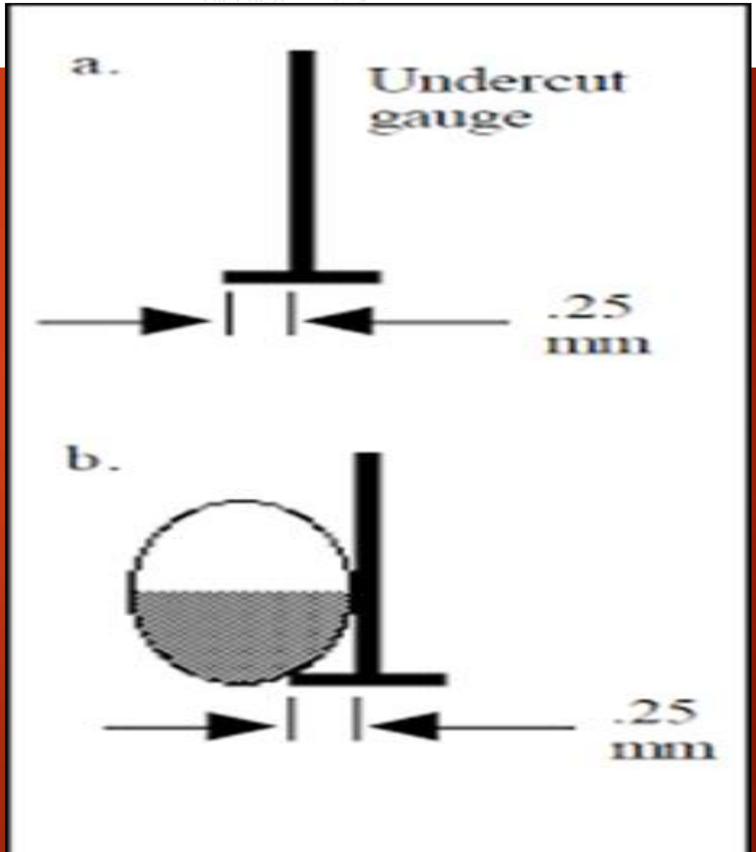
It is used to trim excess wax that may be inserted into those undercut area which are to be obliterated to obtain the proper form of the wax pattern.



SURVEYING TOOLS

- Analysing Rod
- Carbon Marke
- Undercut Gaug
- Wax Trimmer





Description of dental surveyor

- The most widely used surveyors are the **Ney** and the **Jelenko.**
- The principal parts of the Jelenko surveyor are essentially the same as those for the Ney surveyor except that the **Jelenko arm swivels**, whereas the **Ney arm is fixed**, and by loosening the nut at the top of the vertical arm, the horizontal arm may be made to swivel. The objective of this feature, originally designed to permit freedom of movement of the arm in a horizontal plane rather than to depend entirely on the horizontal movement of the cast.
- For those who prefer to move the cast only in a horizontal relationship to a fixed vertical arm, the nut may be tightened and the horizontal arm used in a fixed position.

Description of dental surveyor

- Another difference between the Ney and Jelenko surveyors is that the **vertical arm on the Ney surveyor is retained by friction** within a fixed bearing. The shaft may be moved up or down within this bearing, but it remains in any vertical position until again moved. The shaft may be fixed in any vertical position desired by tightening a setscrew.
- In contrast, **the vertical arm of the Jelenko surveyor is spring mounted** and returns to the top position when it is released. It must be held down against spring tension when it is in use.

Ney v/s jelenko

- **Ney**
- Horizontal arm: fixed.
- Vertical arm: retained by friction.
- The shaft remains in any vertical position until again it is moved.
- Cast table is moved around surveyor platform.

Ney surveyor is widely used because of its simplicity and durability.

- **Jelenko**
- Horizontal arm: movable.
- Vertical arm: spring mounted.
- Vertical arm when released return to its original position.
- Cast table is fixed with the magnet in the surveyor platform.

Jelenko surveyor

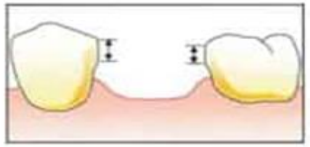
Objectives of surveying

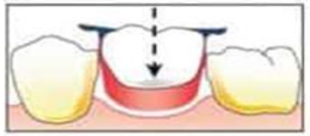
1. To determine the most desirable path of placement that will eliminate or minimize interference to placement and removal.

2. To identify proximal tooth surfaces those are made parallel to act as guiding planes during placement and removal.

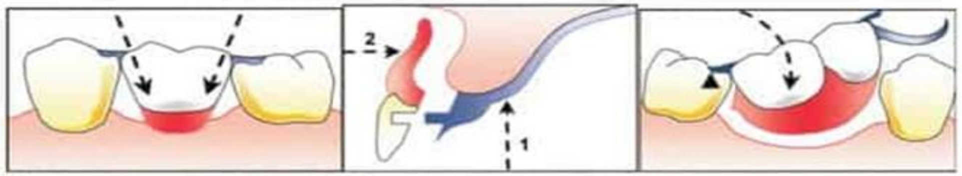
3. To locate and measure areas of the teeth that may be used for retention.

4. To determine whether tooth and bony areas of interference will need to be eliminated surgically or by selecting a different path of placement.





single path of insertion



Multiple paths of insertion

Tooth Undercuts

Soft Tissues or Bony Undercuts (lingual side)

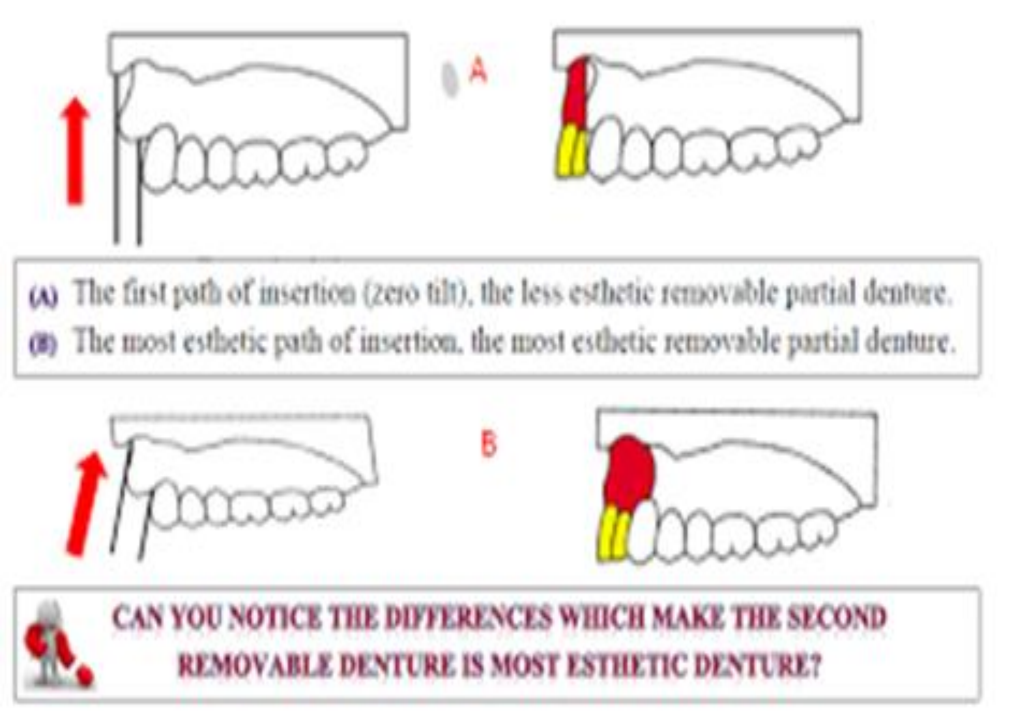
Objectives of surveying

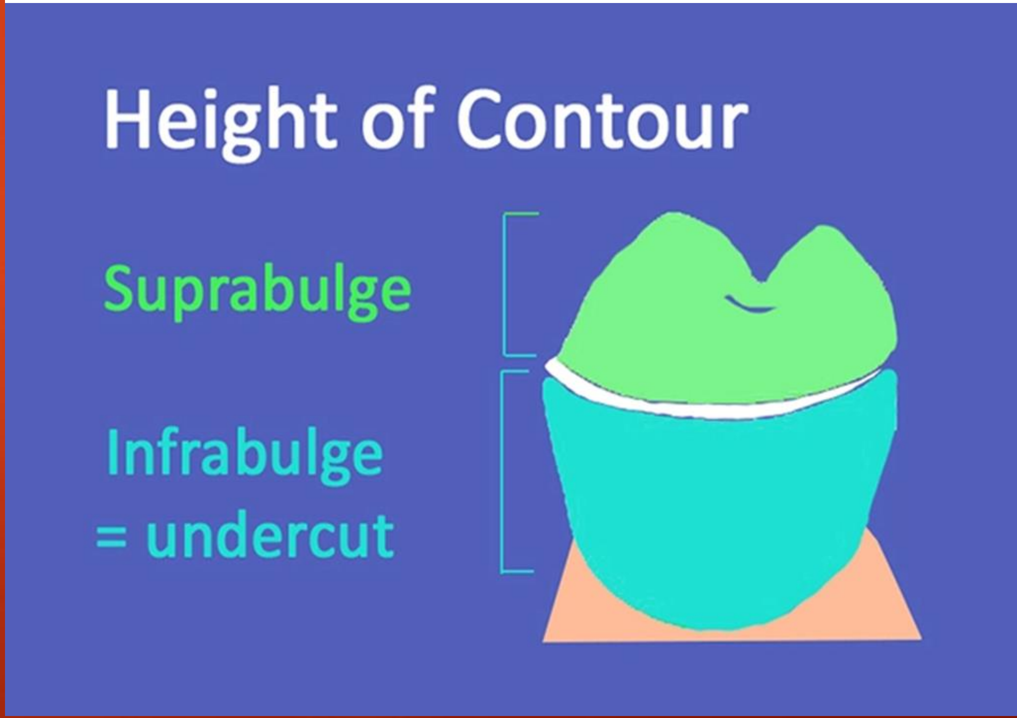
5. To determine the most suitable path of placement that will permit locating retainers and artificial teeth to the best esthetic advantage.

6. To permit an accurate charting of the mouth preparation to be made.

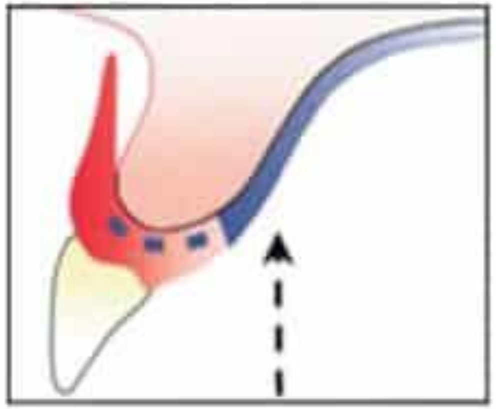
7. To delineate the height of contour on abutment teeth and to locate areas of undesirable tooth undercuts, to be avoided, eliminated, or blocked out.

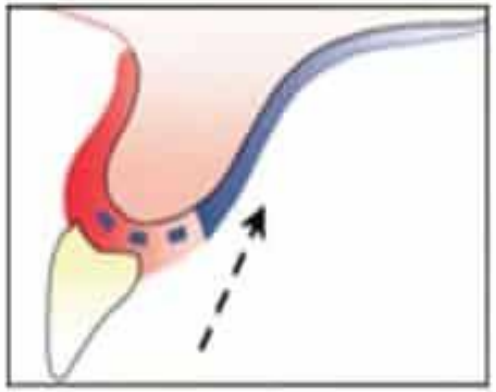
8. To record the cast position in relation to the selected path of placement for future reference.





Interference



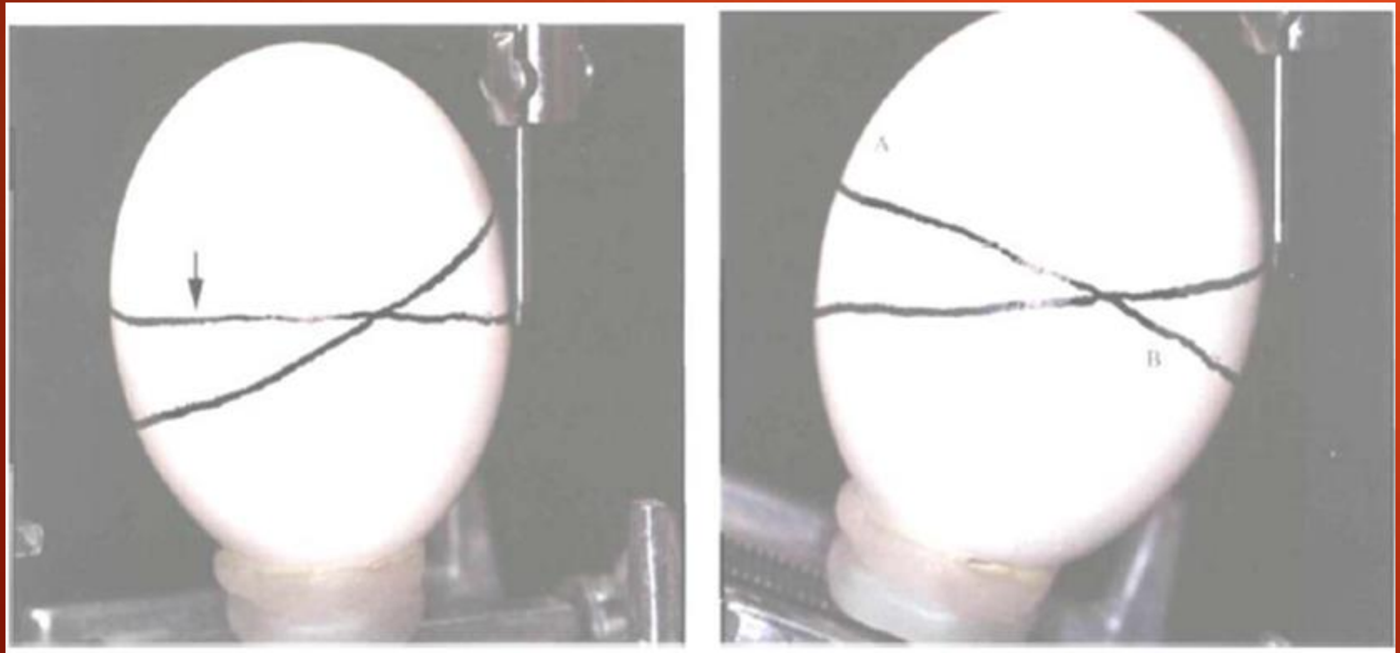


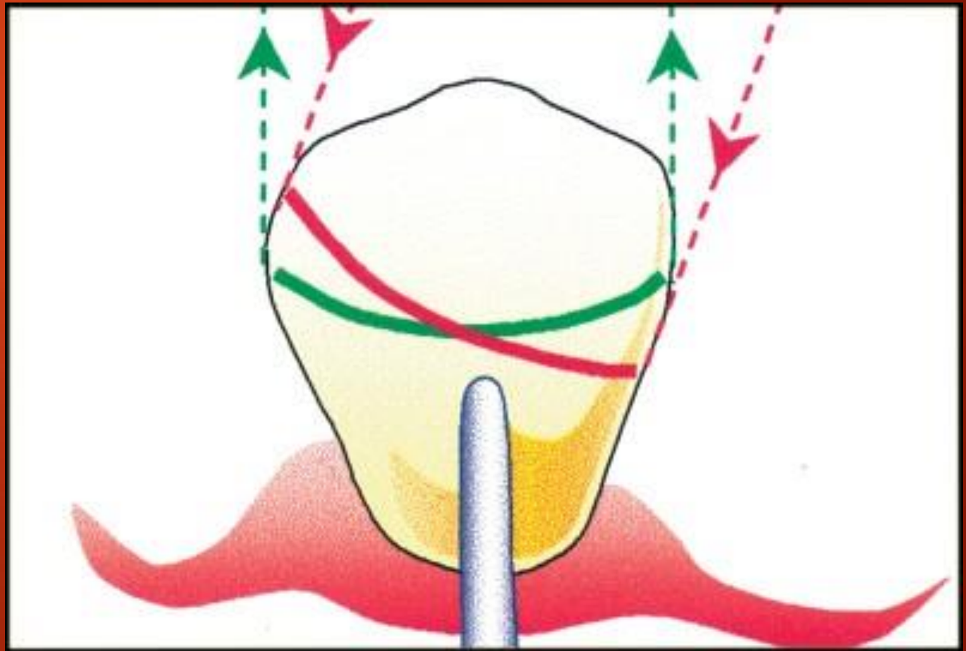
Principles of surveying

- Surveying a tooth consisted of **locating accurately the height of its maximum contour in relation to the plane in which the cast is positioned.**
- Whenever possible, cast should be surveyed with the occlusal **plane parallel to the base of the surveyor** so that the path of insertion is vertical to the occlusal plane.
- The fact that the majority of the natural teeth crowns are bulbous in shape (have a suprabulge area); this suprabulge point could occur anywhere between the occlusal surface and the gingival margin. When a vertical arm is brought into contact with the convex surface, they will contact only at one point that is the point of maximum convexity. When this surface is rotated, and is still in contact with the vertical arm, an imaginary line will be traced at the greatest circumference, when we substituted this vertical analyzing rod with a carbon marker then an actual line will be produced at the level of the maximum tooth bulge, this line is called survey line.

Principles of surveying

- The area of a tooth occlusal to the survey line is a non-undercut area, while the area gingival to the survey line is undercut area. When a tooth is tilted or rotated in relation to the analyzing rod, another survey line will be traced, as result, the extent of non-undercut area and the undercut area are consequently changed. That means that the survey line can vary according to the angle formed by contact of the vertical analyzing rod with the tooth surface. Alteration of undercut area can be done by anterior and posterior tilting of dental cast.





Principles of surveying

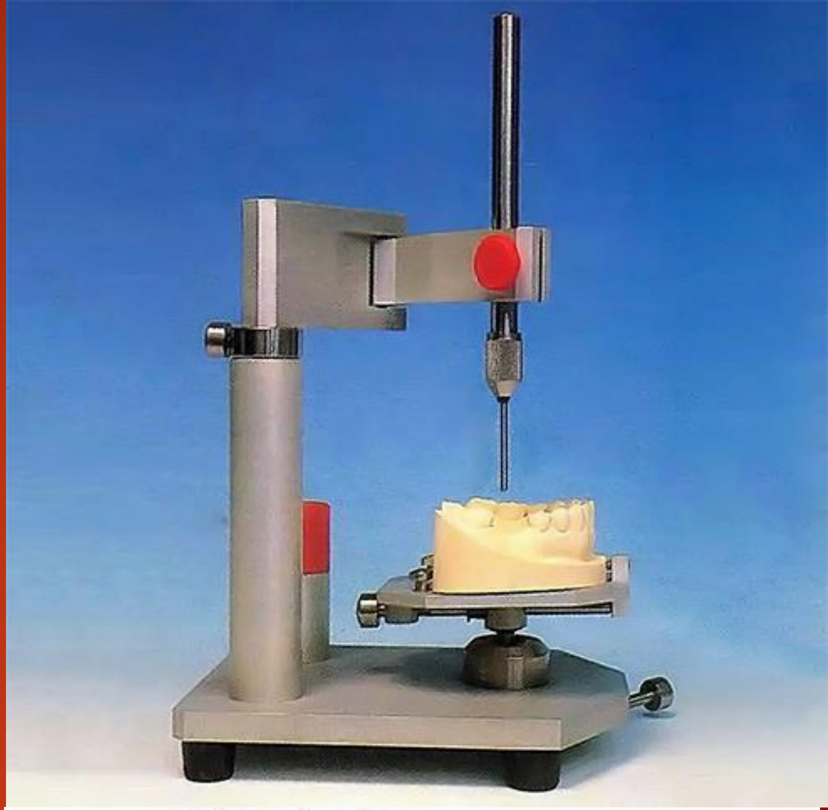
- The effect of tilting a cast on the surveyor will be:
- 1. Redistribution of undercuts to the desired areas.
- 2. Allow more favorable path of insertion.
- 3. Allow the use of a desired type of clasp for better function and
- esthetic.
- 4. Allow the use of a design to minimize food impaction.

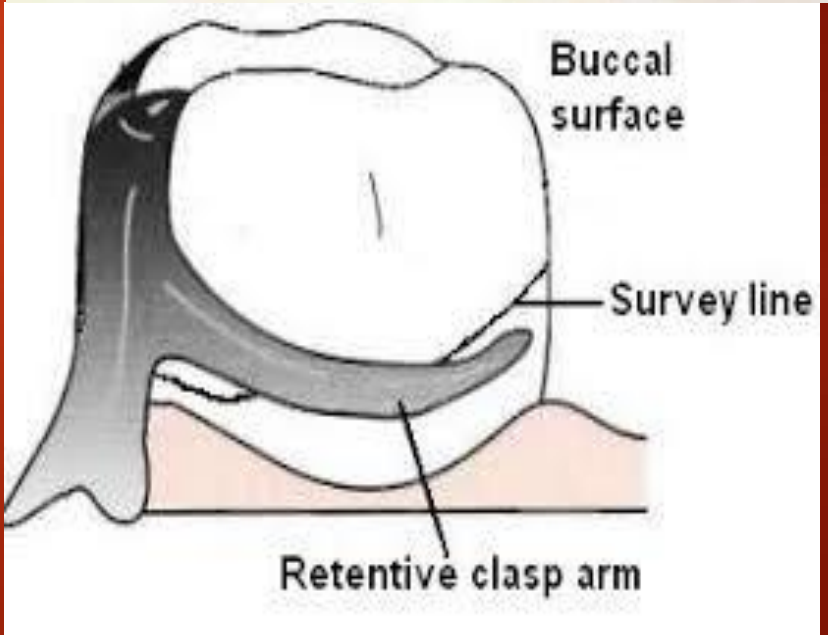
Rules of surveying

1- The undercut areas **cannot** be created or produced by tilting the cast.

2- All casts are originally surveyed with the occlusal plane is parallel to the base of surveyor; this is what we called **zero tilt**. Most patients will tend to seat the partial denture under force of occlusion. If the path of insertion is other than vertical to the occlusal plane such seating may deform the clasps.

3- The retentive tip of the clasp must engage the undercut area, which are present when the cast is surveyed in certain position.





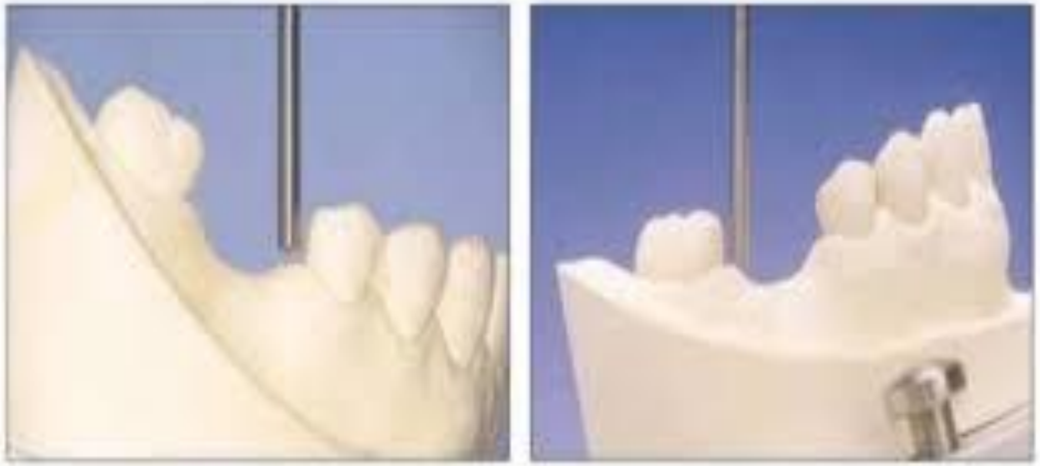
Rules of surveying

4- Wherever possible, the undesirable undercut and area of interference are removed during mouth preparation by recontouring teeth or making necessary restoration.

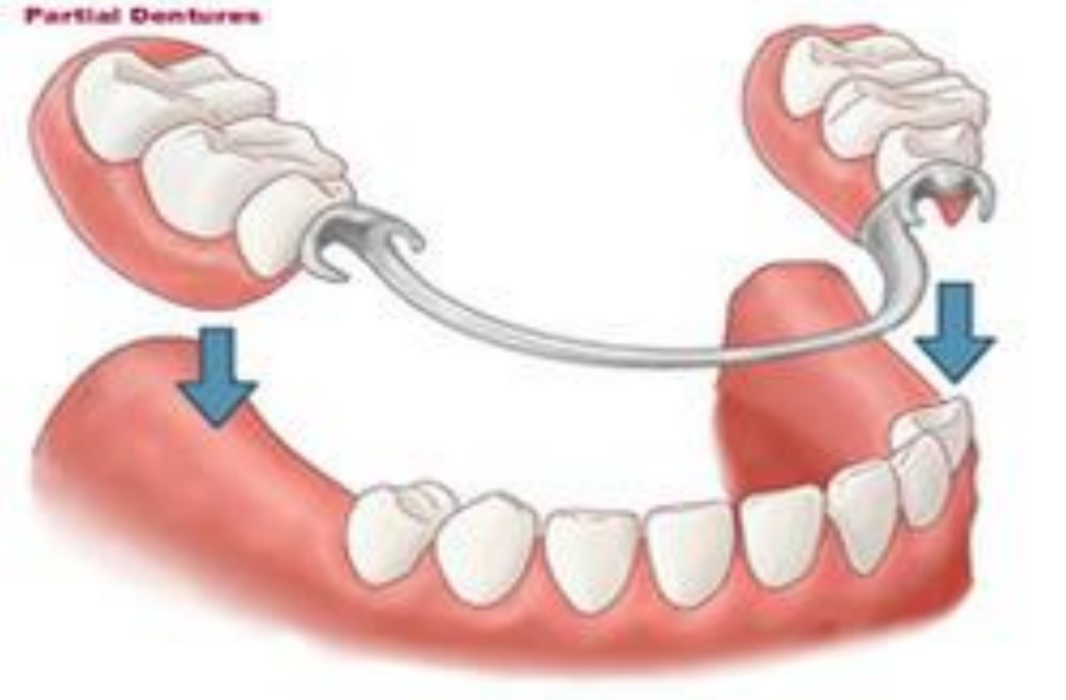
5- Anteroposterior tilt: anterior tilt will increase the mesial undercut, while the posterior tilt will increase the distal undercut. Such as in free end extension partial denture. Tilting the cast anteriorly will decrease or eliminate the distal undercut where the path of insertion will be changed, thus getting rid of undesirable undercut located distally, therefore the tilting of the cast is to minimize or equalize the undesirable undercut.

6- Lateral tilt: dealing with retentive undercut situated buccally or lingually on posterior teeth.

Note: A partial denture should have a single path of insertion, this is only possible for dentures with bounded saddle, for dentures with free end saddles two or more paths of insertion will be possible.



Anterior tilt ('heels up')   Posterior tilt ('heels down').



Types of undercuts established by surveyor

1-Contour: due to natural contour of the tooth.

2-Positional: due to tilting of cast on surveyor.

3-Desirable undercut: used for retaining the removable partial denture against the dislodging forces by incorporating retentive flexible clasp arm.

4-Undesirable undercut: undercuts other than those used for retention are considered undesirable and should be eliminated by:

a) Tooth recontouring.

b) Placing properly contoured crown restoration on the tooth.

c) Tilting the cast and change the path of insertion.

d) Blocking out the undercut with wax on the master cast.


Believe in
Yourself

Lec#: 5

Factors that determine path of placement and removal

1-Guiding Planes

Proximal tooth surfaces that bear a parallel relationship to one another must either be found or be created to act as guiding planes during placement and removal of the prosthesis. Guiding planes are necessary to ensure the passage of the rigid parts of the prosthesis. Thus the denture can be easily placed and removed by the patient without strain on the teeth contacted or on the denture itself and without damage to the underlying soft tissue.

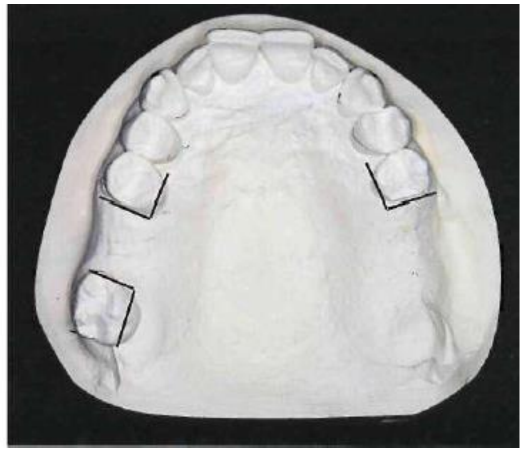
The components of the denture that contact the guiding plane during placement of removable partial denture are:

1- Proximal surface: are the minor connector that joins the occlusal rests and clasp to the saddle, and proximal plates are used with I bar or R.P.I. system.

2- Axial or lingual tooth surface: are reciprocal clasp arms, lingual plates that act as reciprocal arm, and minor connector that joins the auxiliary rest to the major connector.

Function of guiding plane:

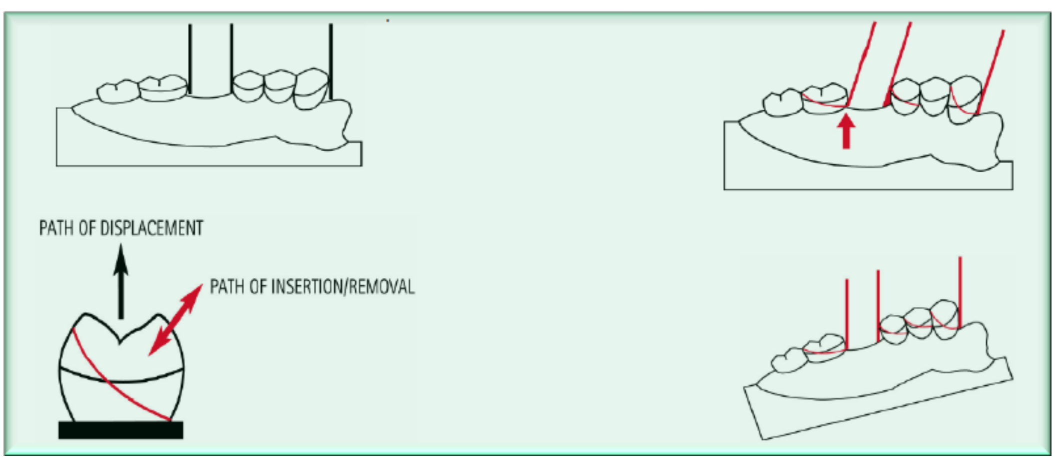
1- Guide the prosthesis **in** and **out** of the mouth without any undesirable forces against remaining teeth (Assure definite path of insertion).
2- The frictional forces of contact of the prosthesis with the guiding plane wall will contribute significantly to the retention of removable partial denture.
3- Can provide bracing or stabilization when placed in the axial tooth surfaces.
4- Insure positive clasp action.



2- Retentive Areas

Retentive areas must exist for a given path of placement and must be contacted by retentive clasp arms, which are forced to flex over a convex surface during placement and removal. For a clasp to be retentive; its path of escapement must be other than parallel to the path of removal of the denture itself; otherwise, it would not be forced to flex and thereby generate the resistance known as retention. Clasp retention therefore depends on the existence of a definite path of placement and removal.

Fairly even retention may be obtained by one of two means. One is to change the path of placement to increase or decrease the angle of cervical convergence of opposing retentive surfaces of abutment teeth. The other is to alter the flexibility of the clasp arm by changing its design, its size and length, or the material of which it is made.



3- Interference

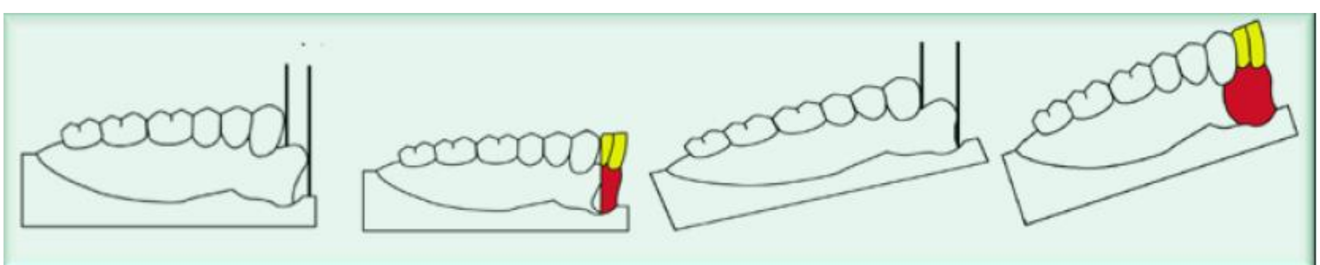
The prosthesis must be designed so that it may be placed and removed without encountering tooth or soft tissue interference. A path of placement may be selected that encounters interference only if the interference can be eliminated during mouth preparation or on the master cast by a reasonable amount of block-out.

Interference may be eliminated during mouth preparation by surgery, extraction, modifying interfering tooth surfaces, or altering tooth contours with restorations.

4- Esthetics

The location of retentive areas may influence the path of placement selected, and therefore retentive areas always should be selected with the most esthetic location of clasps. Generally, less metal will be displayed if the retentive clasp is placed at a more distogingival area of tooth surface made possible either by the path of placement selected or by the contour of the restorations.

Esthetics also may dictate the choice of path selected when missing anterior teeth must be replaced with the partial denture. In such situations a more vertical path of placement is often necessary so that neither the artificial teeth nor the adjacent natural teeth will have to be modified excessively.



Recording relation of cast to surveyor

1-Tripod method

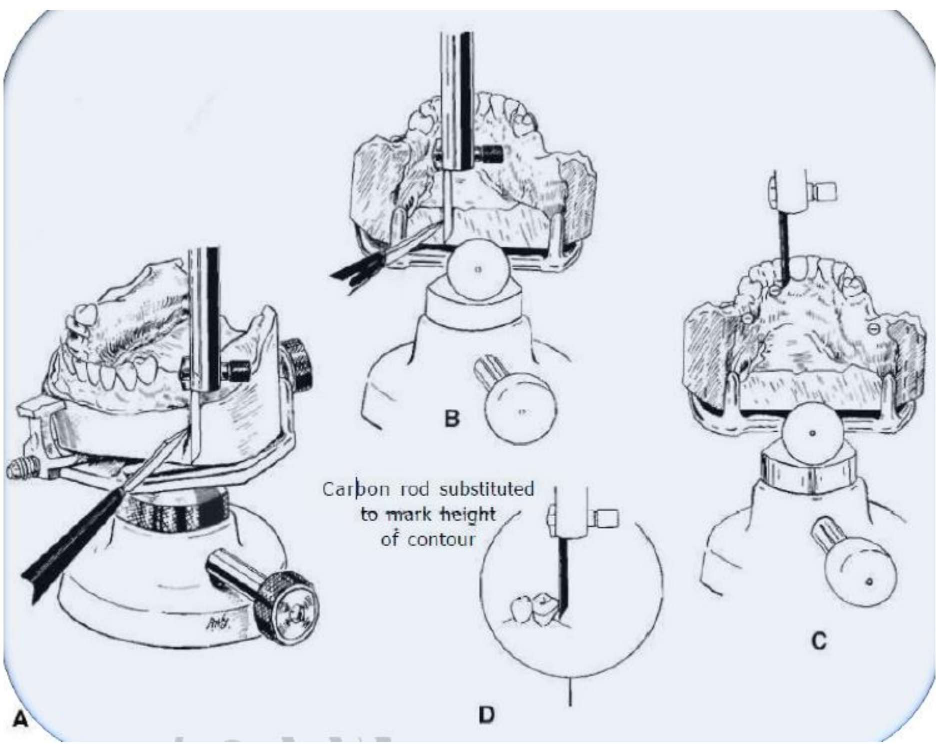
Place three widely divergent dots on the tissue surface of the cast using the tip of a carbon marker, with the vertical arm of the surveyor in a locked position.

On returning the cast to the surveyor, it may be tilted until the tip of the surveyor blade or diagnostic stylus again contacts the three dots in the same plane. This will produce the original position of the cast and therefore the original path of placement.

This is known as tripoding the cast some dentists prefer to make tiny pits in the cast at the location of the tripoding dots to preserve the orientation of the cast and to transfer this relationship to the refractory cast.

2-Analyzing rod method

Score two sides and the dorsal aspect of the base of the cast with a sharp instrument held against the surveyor blade.
On returning the cast to the surveyor, tilting the cast until all three lines are again parallel to the surveyor blade, the original cast position can be reestablished.



The End
Best Wishes

Lec#: 6

Maxillary Major Connectors

Definition:

It is that unit of the partial denture to which all other parts are directly or indirectly attached.

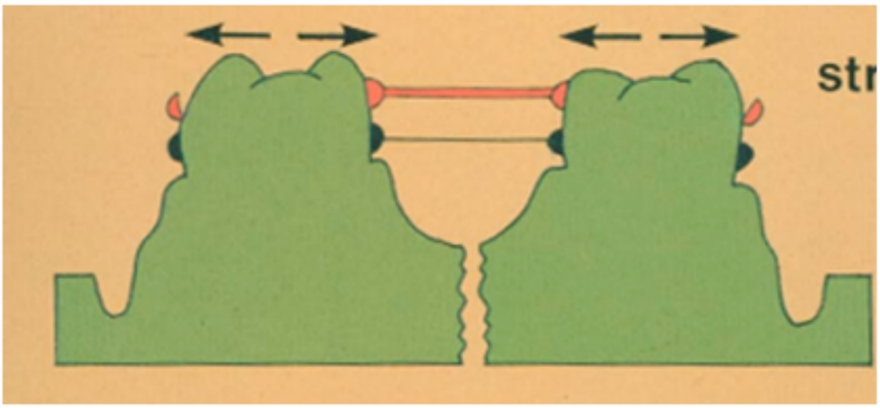
Or it is the part of a removable partial denture that joins the components on one side of the arch to those on the opposite side.

Functions of Major Connectors:

1. Unification of the major parts of the prosthesis.

2. Distribution of the applied force throughout the arch to selected teeth and tissue. (properly designed rigid MC distributes forces throughout the arch and decreases the load to any one area while controlling prosthesis movement).

3. Cross-arch Stability: Cross-arch tooth contact is effective when a rigid major connector joins the portion of the prosthesis receiving the function to selected regions of the arch. A rigid MC will limit movement possibilities by acting as a counteracting lever.



Requirements of Major Connectors:

1. Sufficiently rigid: To be able to transmit forces from one side of the arch to the other, to distribute forces to supporting tissues (dento-alveolar & muco-osseous segments)

- Other components of RPD (retentive clasps, occlusal rests, and indirect retainers) can be effective only if the MJ is rigid.

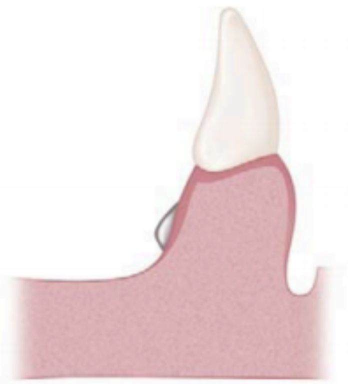
If the major connector is flexible:

It will lead to concentration of forces that in turn will cause:

- Traumatic damage to periodontal support of the abutment teeth.
- Injury to residual ridges.
- Impingement of underlying tissue.
- Resorption of hard and soft tissues.

So, in order to increase rigidity, this could be done:

- Use a more rigid alloy: Chrome-cobalt has a better rigidity than gold alloys, and cast is better than wrought.
- Shape (cross-section): half round and half pear shaped are better than flat bars.
- Increase the bulk as the length increases.
- Corrugate linguo-plate or rugae areas.



2. Must not permit impingement upon the free gingival margins of the remaining teeth.

Location:

1. Major connectors should be free of movable tissue.
2. Impingement of gingival tissue should be avoided.
3. Bony and soft tissue prominences should be avoided during placement and removal.
4. Relief should be provided beneath a major connector to prevent its settling into areas of possible interference.
5. They should be located and/or relieved to prevent impingement of tissue because the distal extension denture rotates in function.

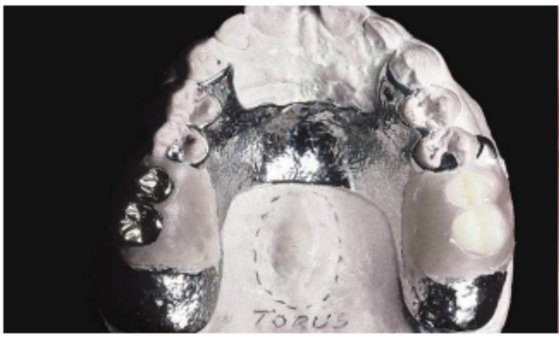
3. Should not enter undercut areas, and it's avoided by:

• Changing path of insertion or Using blockout.

4.Cross abruptly at 90°: to avoid creating angles and bends that will concentrate forces.

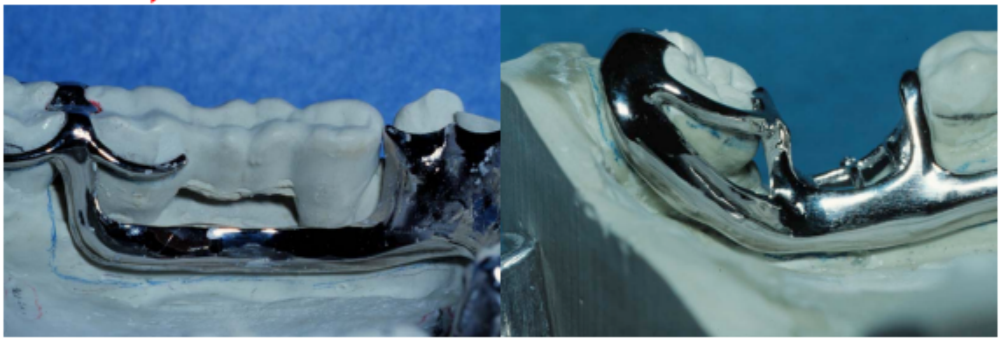

5.Avoid terminating on:

• Hard structures: ex mid-palatal suture or mandibular tori.
• Soft tissues: ex Lingual frenum & the movable soft palate.



6. Minimize food impaction:

• Locate margins away from the free gingival margin.
• Eliminate "traps" or large concavities where food can collect.



Characteristics of Major Connectors Contributing to Health and Well-being

1. Made from an alloy compatible with oral tissues.
2. Is rigid and provides cross-arch stability through the principle of broad distribution of stress.
3. Does not interfere with and is not irritating to the tongue.
4. Does not substantially alter the natural contour of the lingual surface of the mandibular alveolar ridge or of the palatal vault.
5. Does not impinge on oral tissue when the restoration is placed, removed, or rotates in function.
6. Covers no more tissue than is necessary.
7. Does not contribute to the trapping of food particles.
8. Has support from other elements of the framework to minimize rotation tendencies in function.
9. Contributes to the support of the prosthesis.

Maxillary Major Connectors Design Specification:

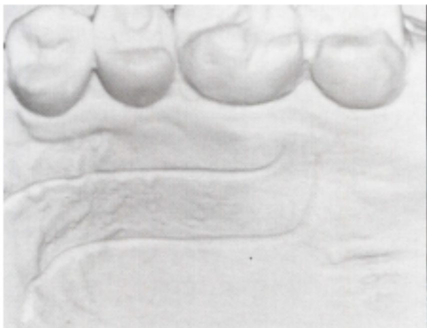
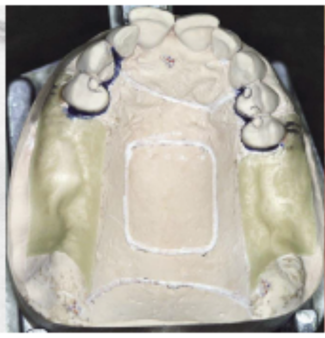
A. Placement of the border:

1. border is at least 6mm from the gingival margin if not so, the metal extends to cover the cingulum of the tooth or the palatal surface of the posterior teeth.

2. Border should be tapered to be less perceptible to the patient and smoothly curved, pass in the valley of the rugae region.
3. Posteriorly the border shouldn't extend to the movable soft palate.

B. Borders should be beaded:

- ✓ Minor elevations at maxillary major connector borders that contact the palatal soft tissues, they are termed bead lines.
- ✓ They are intended to:
  - Slightly displace the adjacent soft tissues.
  - Produce a mechanical seal and prevent food particles from collecting under the major connector.
  - Provide excellent visual finish lines for technicians who finish and polish RPD frameworks.
  - The groove must fade within 6 mm of the gingival margin to prevent impingement also fade over a hard midline of the palate.
- ✓ Created by scribing shallow channels on the surface of a cast before duplication in investment material.
- ✓ Each channel should have a width and depth of 0.5 to 1.0 mm.
- ✓ The depth of the beading should be reduced in areas of thin tissue coverage such as the midpalatine raphe or a palatal torus.
- ✓ When the partial denture is not in the mouth, the outline of the beading should be evident in the palatal soft tissues (no evidence of irritation or inflammation).


C. Relief:

Except in the presence of a palatal torus or a prominent median suture line, relief should not be used under a maxillary MC.

The intimate contact between the palatal soft tissues and the metal connector enhances the retention and stability of the denture.

To maintain this intimate metal–soft tissue contacts, the tissue side of the major connector is not brought to a high finish during polishing procedures.

TYPES OF MAXILLARY MAJOR CONNECTORS

1. Palatal bar
2. Palatal strap
3. Anteroposterior palatal bar
4. Anteroposterior palatal strap
5. Complete palate
6. U-shaped Palatal MC (horse-shoe)

1. Palatal bar

• A narrow half oval with its thickest point at the center.

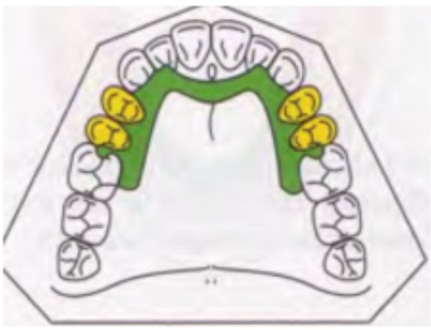
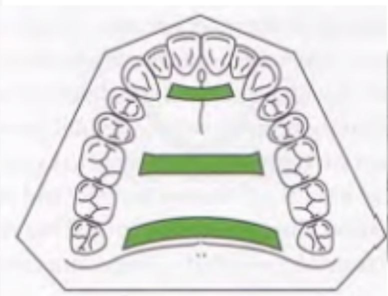
• The bar is gently curved and should not form a sharp angle at its junction with the denture base.

Advantages:

• For many years, the palatal bar was one of the most widely used.
• Today, palatal bar major connectors are used primarily in interim applications.
• The palatal bar has few advantages and should be avoided.

Disadvantages:

• To provide the necessary rigidity, a palatal bar major connector must be bulky.
• So, patients find the palatal bar uncomfortable.
• Palatal bar derives little vertical support from the bony palate.
• As a result, a palatal bar major connector must derive nearly all its support from rests on the remaining teeth.
• should be limited to short-span Class III applications should not be placed anterior to the second premolar position, otherwise its bulk may produce noticeable discomfort and alteration of speech.


2.Palatal Strap

- ✓ The palatal strap is the most versatile MC.
- ✓ Wide band of metal with a thin cross-sectional dimension.
- ✓ The anteroposterior dimension of a palatal strap should not be less than 8 mm to avoid compromise of its rigidity.
- ✓ The width of a palatal strap should increase as the edentulous space increases in length. Thus, ensuring rigidity and permitting greater support from the hard palate.

Indication: Tooth borne partial denture when anterior teeth are missing tooth borne partial denture when anterior teeth and posterior teeth are massing when palatal torus can't be covered.

Advantages:

• It is in two or more planes great resistance to bending and twisting, this theory is similar to the "L-beam" principle.

• It has little interference with normal tongue action, so it’s well accepted by patients.

• The increased tissue coverage helps distribute applied stresses over a larger area.

Disadvantages:

1. Patient may complain of excessive palatal coverage this may be due to improper positioning of the strap borders.

- Anterior border positioned posterior to the palatal rugae.
- If this is not possible, the anterior border should be terminated on the posterior slopes of prominent rugae.
- Posterior border positioned anterior to the junction of the hard and soft palates.

2. May predispose the patient to papillary hyperplasia when the partial denture is worn 24 hours a day.

3. Anteroposterior Palatal Bar

Has characteristics of palatal bar and palatal strap MC.:

- ✓ The anterior bar is relatively flat. Its cross-sectional is similar to palatal strap. Borders of the anterior bar are positioned on the slopes of prominent rugae, to blend with the contours of the anterior palate.
- ✓ The posterior bar is a half oval, similar to the palatal bar MC.
- ✓ Two bars joined by flat longitudinal elements on each side of the palate.

This configuration gives the effect of a circle and is more rigid than any of the two individual elements.

The two bars, lying in different planes, produce a structurally strong L-beam effect.


Advantages:

- Rigid.
- Minimizes soft tissue coverage,
- Resistant to deformation.
- Used when support is not a major consideration.
- When the anterior and posterior abutments are widely separated.
- Large palatal tori that cannot be removed for health reasons.

Disadvantages:

- Uncomfortable & bulky bothers the tongue and interferes with phonetics.
- Little support from the bony palate (So, contraindicated in pts. with poor periodontal support)
- Shouldn't be considered the first choice (selected only after other choices have been considered and eliminated).

4. Combination AnteroPosterior Palatal Strap

- The anterior and posterior components are joined together by longitudinal connectors on either side.
- Form a square or rectangular frame. Each component braces the others against possible torque and flexure.
- Flexure is nonexistent in such a design
- A posterior palatal strap should be flat and a minimum of 8 mm wide. located as far posterior as possible to avoid interference with the tongue but anterior to the line of flexure formed by the junction of the hard and soft palates.
- Anterior connector may be extended anteriorly to support anterior tooth replacements.

Properties

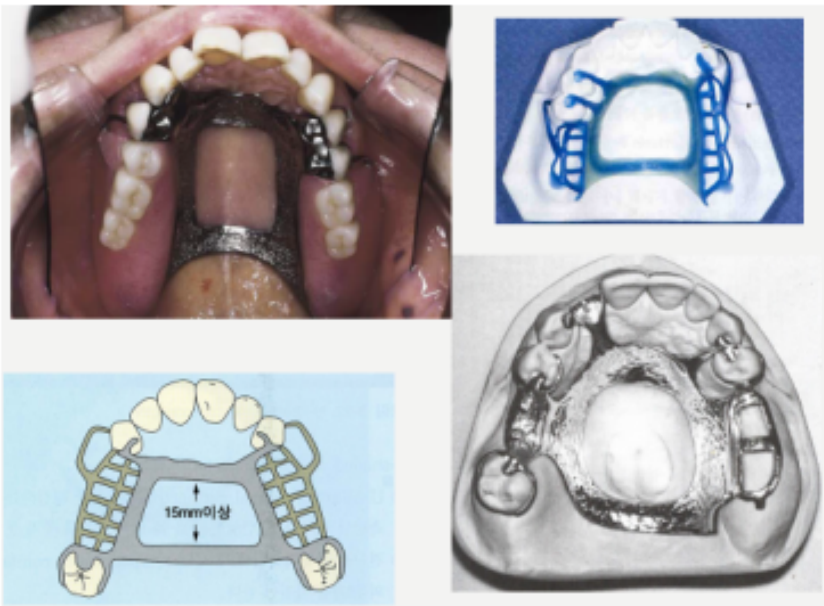
- Lying in two different plane increase rigidity.
- Lack of support it covers less of horizontal hard palate.
- Should cross the midline at right angle rather than on a diagonal.

Indication:

- For tooth born and tooth mucosa born partial denture cases needing rigidity more than that of an anterior palatal strap.

- When torus exists.

Contraindication: Maxillary torus extending posteriorly to soft palate.



5. Palatal Plate (Complete Palate)

Indications:

1) Class I partially edentulous arches with residual ridges that have undergone little resorption and will lend excellent support.
2) V- or U-shaped palates.
3) Strong abutments (single or made by splinting).
4) More teeth in arch than six anterior teeth.
5) Direct retention not a problem.
6) No interfering tori.

-The anatomic contours of the palate will be faithfully reproduced in the finished denture.

Advantages:

- Uniformed thickness.
- Thermal conductivity of the metal makes the palatal plate acceptable to the tongue and underlying tissues.
- Corrugation in the anatomic replica adds strength
- Intimate contact, interfacial surface tension between metal and tissue provides the prosthesis with greater retention.

The palatal plate may be used in any one of three ways:

❖It may be used as a plate of varying width that covers the area between two or more edentulous areas, as a complete.

❖Partial cast plate that extends posteriorly to the junction of the hard and soft palates.

❖The form of an anterior palatal connector with a provision for extending an acrylic resin denture base in a posterior direction.



6. U-shaped Palatal MC (horse-shoe):

It is the least desirable of maxillary major connectors

• Indications:

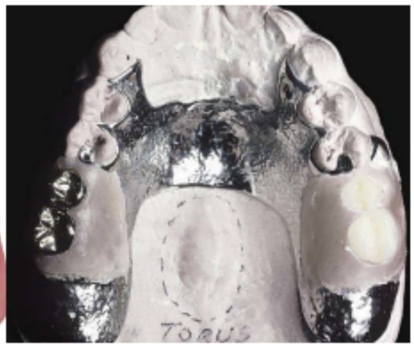
1) When a large inoperable palatal torus exists.
2) when several anterior teeth are to be replaced.

Disadvantages:

Its lack of rigidity allows lateral flexure under occlusal force leading to torque or direct lateral force to abutment teeth.

May permit impingement of underlying tissue when subjected to occlusal loading (no good support)

Bulk results in increased thickness in areas that are irritant to the tongue



The End

Best Wishes

MANDIBULAR MAJOR CONNECTORS

Bushra Mohammed Ali Al-Ameen

B,D,S,. M,Sc.(Pros)

REQUIRMENTS OF MAJOR CONNECTOR.

1. Relief is provided for soft tissue under all portions of the mandibular major connector and at any location where the framework crosses the marginal gingiva.

2. The inferior border of mandibular major connectors should be gently rounded after being cast to eliminate any sharp edge.

3. Not impinging on the movable floor of the mouth → only reaching the "functional depth"

4. Lingual bar major connector should be located at least 4 mm inferior to gingival margins and farther if possible.

5. If less than 8 mm exists between gingival margins and the movable floor of the mouth, a lingual plate, a sublingual bar, or a continuous bar is preferred as a major connector.

SIX TYPES OF MANDIBULAR MAJOR CONNECTORS ARE:

1) Lingual bar.
2) Linguoplate.
3) Lingual bar with cingulum bar (continuous bar).
4) Sublingual bar.
5) Cingulum bar (continuous bar).
6) Labial bar.

1) LINGUAL BAR MAJOR CONNECTOR.

Indications:

1. The lingual bar should be used for mandibular removable partial dentures where sufficient space exists between the slightly elevated alveolar lingual sulcus and the lingual gingival tissue (at least 8 mm).
2. Diastemas or open cervical embrasures of anterior teeth.
3. Overlapped anterior teeth.

Contraindications:

1. When the lingual frenum is high or the space available for a lingual bar is limited (less than 8 mm).
2. Lingually inclined teeth.
3. An undercut lingual alveolar ridge which would result in an excessive space between the bar and the mucosa.
4. When the future replacement of one or more incisor teeth.

1) LINGUAL BAR MAJOR CONNECTOR.

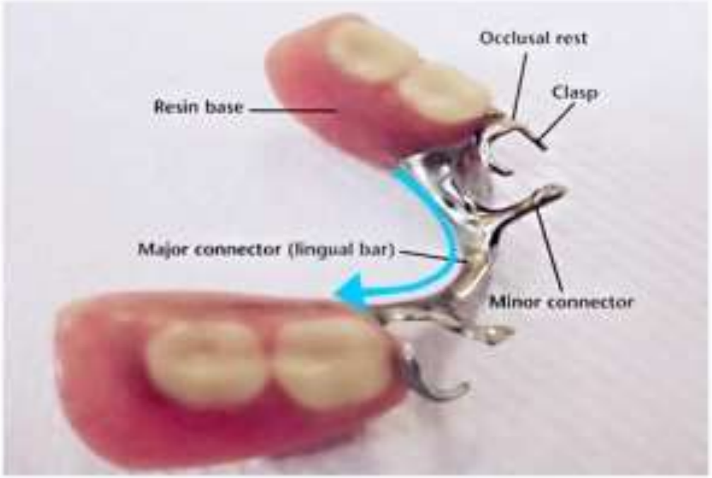
Advantages:

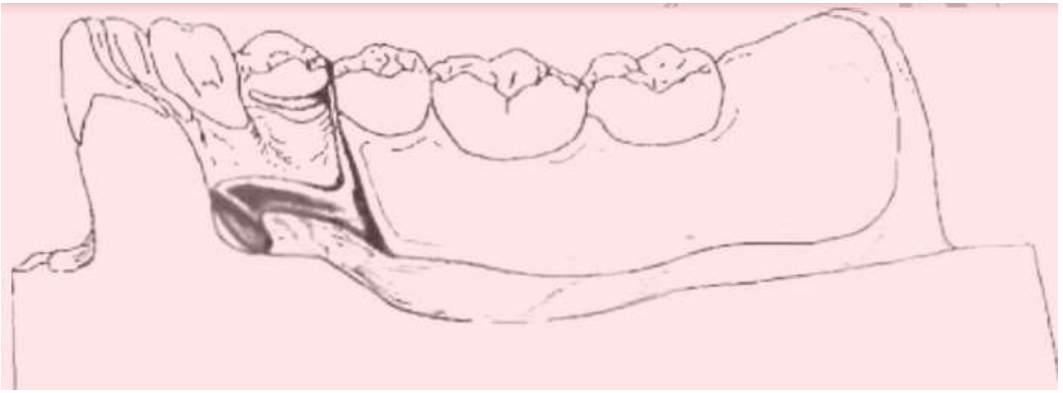
1. Covers minimum surface area of teeth and tissue therefore potential for caries, periodontal problems caused by plaque being held in contact with teeth and tissue is minimal.
2. It is relatively small, inconspicuously located and minimally interfere with functions, so patient prefers lingual bar over linguoplate.

1) LINGUAL BAR MAJOR CONNECTOR.

Characteristics and location:

- Half-pear shaped with bulkiest portion inferiorly located.
- Superior border tapered to the soft tissues will minimize interference with tongue.
- The inferior border of the lingual bar should be slightly rounded. A rounded border will not impinge on the lingual tissue when the denture bases rotate inferiorly under occlusal loads.
- Superior border located at least 4 mm inferior to gingival margins.
- Inferior border located at the ascertained height of the alveolar lingual sulcus when the patient's tongue is slightly elevated.

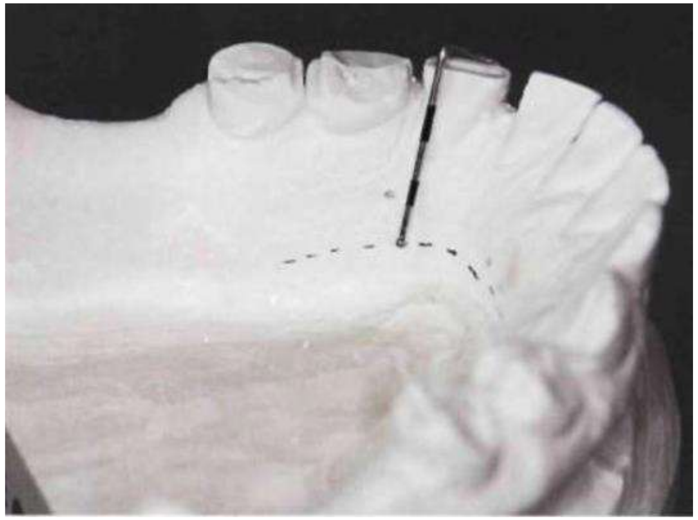


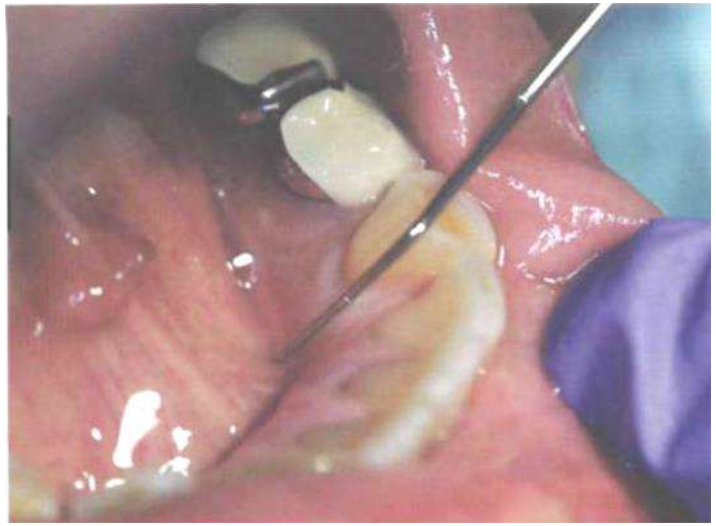


1) LINGUAL BAR MAJOR CONNECTOR.

There are two clinically methods to determine the relative height of the floor of the mouth to locate the inferior border of a lingual mandibular major connector.

1. Ask the patient to touch the vermilion border of upper lip with the tip of his tongue, and measure the height of the floor of the mouth in relation to the lingual gingival margins of adjacent teeth with a periodontal probe. Recording of these measurements permits their transfer to both diagnostic and master casts.

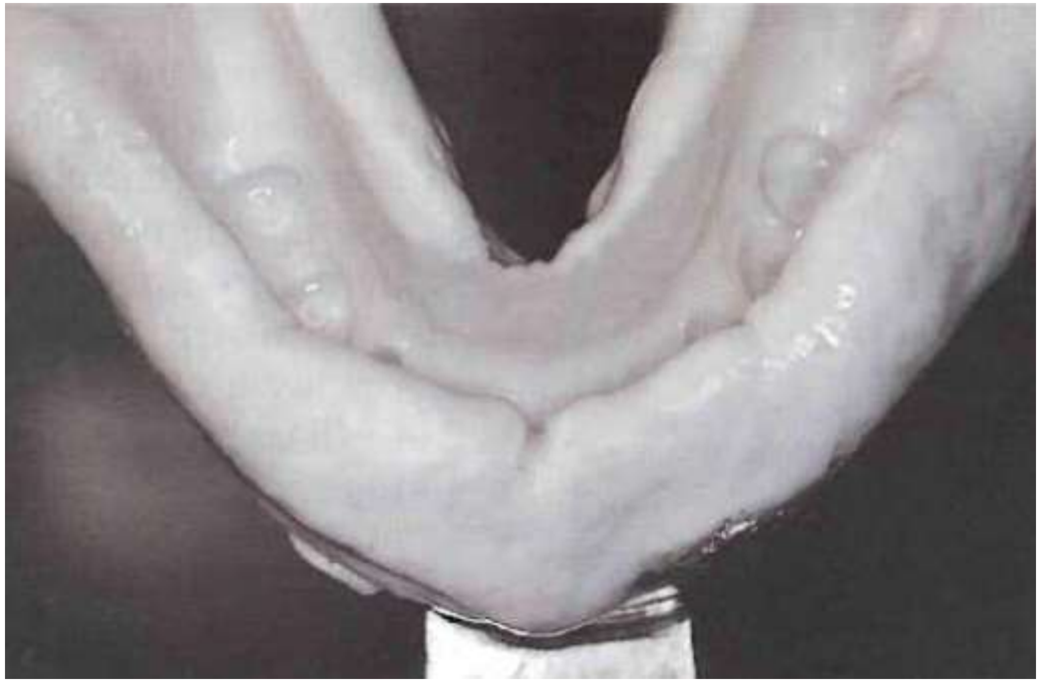




1) LINGUAL BAR MAJOR CONNECTOR.

There are two clinically methods to determine the relative height of the floor of the mouth to locate the inferior border of a lingual mandibular major connector.

2. Use a special tray having its lingual borders 3 mm short of the elevated floor of the mouth and then to use an impression material that will permit the impression to be accurately molded as the patient licks the lips. The inferior border of the planned major connector can then be located at the height of the lingual sulcus of the cast resulting from such impression.



2) LINGUOPLATE MAJOR CONNECTOR.

Indications:

1. When the lingual frenum is high or the space available for a lingual bar is limited (Where a clinical measurement from the free gingival margins to the slightly elevated floor of the mouth is less than 8 mm, a linguoplate is indicated in lieu of a lingual bar).
2. When the residual ridges in Class I arch have undergone such vertical resorption that they will offer only minimal resistance to horizontal rotations of the denture through its bases.
3. For using periodontally weakened teeth in group function to furnish support to the prosthesis and to help resist horizontal rotation of the distal extension type of denture.
4. When the future replacement of one or more incisor teeth will be facilitated by the addition of retention loops to an existing linguoplate.
5. Mandibular tori which must be covered by removable partial denture, because they cannot be surgically removed or avoided in the design. Relief is provided between the torus and the framework.
6. For stabilizing periodontally weakened teeth.

2) LINGUOPLATE MAJOR CONNECTOR.

Contraindications:

1. Overlapped anterior teeth, that leads to small gaps between the superior edge of the plate and the teeth.
2. Lingually inclined teeth.
3. Open cervical embrasures where the plate would be visible, so a lingual bar with continuous bar or labial bar should be considered.
4. Diastemas, unless the lingual plate can have slots in it to avoid the displayed metal.

2) LINGUOPLATE MAJOR CONNECTOR.

Advantages:	Disadvantages:
More rigid than lingual bar.	Covers more teeth and tissue surface than lingual bar.
Easy to add additional prosthetic teeth to framework.	May be more noticeable to the patient than lingual bar.
	May cause flaring of incisors if it contacts their cingula as the base area rotates tissue-ward.

2) LINGUOPLATE MAJOR CONNECTOR.

Characteristics and location:

- Half-pear shaped with bulkiest portion inferiorly located.
- Thin metal apron extending superiorly to contact cingula of anterior teeth and lingual surfaces of involved posterior teeth at their height of contour.
- Apron extended interproximally to the height of contact points (closing interproximal spaces).

- Scalloped contour of apron as dictated by interproximal block out, the straight superior margin can be bulky at the cingulum region, causing tongue discomfort.
- Superior border finished to continuous plane with contacted teeth.
- Inferior border at the ascertained height of the alveolar lingual sulcus when the patient's tongue is slightly elevated.

2) LINGUOPLATE MAJOR CONNECTOR.

- A linguoplate should be made as thin as is technically feasible and should be contoured to follow the contours of the teeth and the embrasures.
- The upper border should follow the natural curvature of the supra-cingular surface of the teeth and should not be located above the middle third of the lingual surface

- The linguoplate does not in itself act as an indirect retainer. When indirect retention is required, definite rests must be provided for this purpose.
- Both the linguoplate and the cingulum bar should ideally have a terminal rest at each end regardless of the need for indirect retention. However, when indirect retainers are necessary, these rests may also serve as terminal rests for the linguoplate or continuous bar.

- In Class I and Class II partial dentures especially, the superior border of the linguoplate or continuous bar retainer should never be placed above the middle third of the teeth so that orthodontic movement is prevented during the rotation of a distal extension denture. This guideline is not as important when the six anterior teeth are in nearly a straight line, but when the arch is narrow and tapering, a cingulum bar or linguoplate on anterior teeth extends well beyond the terminal rests and orthodontic movement of those teeth is more likely.

3) LINGUAL BAR WITH CINGULUM BAR

Indications:

When a linguoplate is otherwise indicated but the open cervical embrasures of anterior teeth and a linguoplate would objectionably display metal in a frontal view.

Contraindications:

1. Any contraindication for a lingual bar.
2. Any contraindication for a linguoplate except open cervical embrasures.
3. Wide diastemas.

Advantages:

1. More rigid than lingual bar.
2. Covers less tooth.

3) LINGUAL BAR WITH CINGULUM BAR

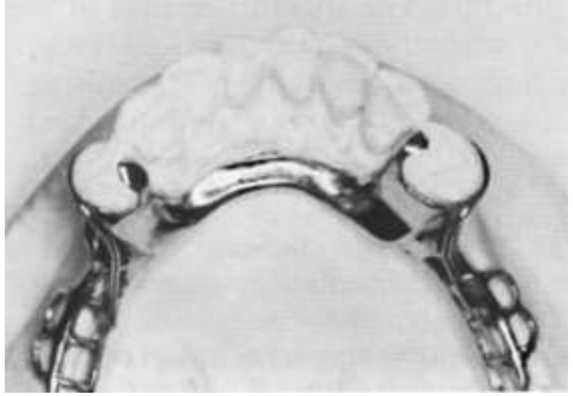
Disadvantages:

1. Very complex design.
2. May be objectionable to patient because there are four edges exposed to the tip of the tongue.

Characteristics and location:

- Conventionally shaped and located same as lingual bar major connector component when possible.
- Thin, narrow (3 mm) metal strap located on cingula of anterior teeth, scalloped to follow interproximal embrasures with inferior and superior borders tapered to tooth surfaces.
- Originates bilaterally from incisal, lingual, or occlusal rests of adjacent principal abutments.

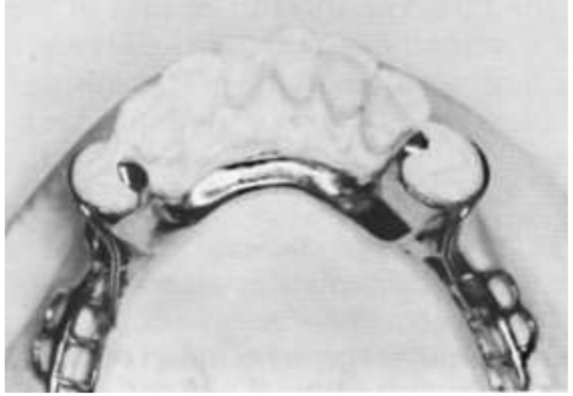
4) SUBLINGUAL BAR MAJOR CONNECTOR.



Indications:

1. Where the height of the floor of the mouth in relation to the free gingival margins will be less than 6 mm.
2. Bracing and indirect retention can be provided by clasps and indirect retainers and future additions of prosthetic teeth to the framework are not anticipated.
3. Severely undercut lingual alveolar ridge.
4. Diastemas and open cervical embrasures of anterior teeth.
5. Overlapped anterior teeth.

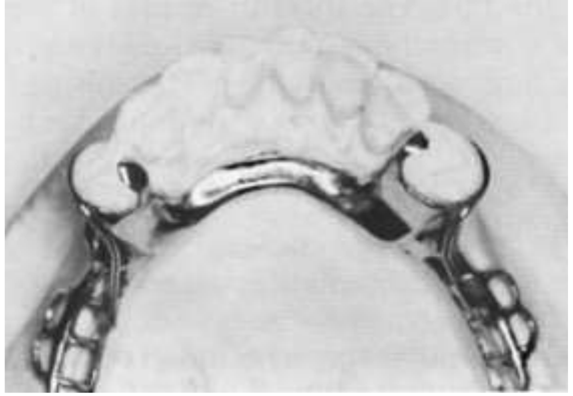
4) SUBLINGUAL BAR MAJOR CONNECTOR.



Contraindications:

1. Where a lingual bar or linguoplate will suffice.
2. Situations where bracing and/or indirect retention must be provided by contact of the major connector with the teeth.
3. Situations where future additions of prosthetic teeth to the framework are anticipated.
4. Remaining natural anterior teeth severely tilted toward the lingual.
5. Interfering lingual tori.
6. High attachment of a lingual frenum.
7. Interference with elevation of the floor of the mouth during functional movements.

4) SUBLINGUAL BAR MAJOR CONNECTOR.



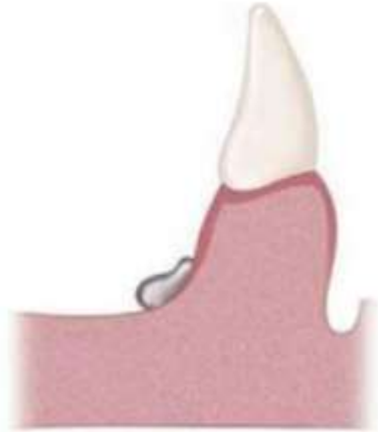
Advantages:

1. Sublingual bar does not contact anterior teeth or lingual alveolus.
2. More esthetic than other lingual major connectors because of its location.
3. More rigid than lingual bar because bulk of metal is horizontal rather than vertical.

Disadvantages:

1. Requires border molded impression of floor of mouth for accurate placement of major connector.
2. Difficult to add prosthetic teeth to framework.

4) SUBLINGUAL BAR MAJOR CONNECTOR.

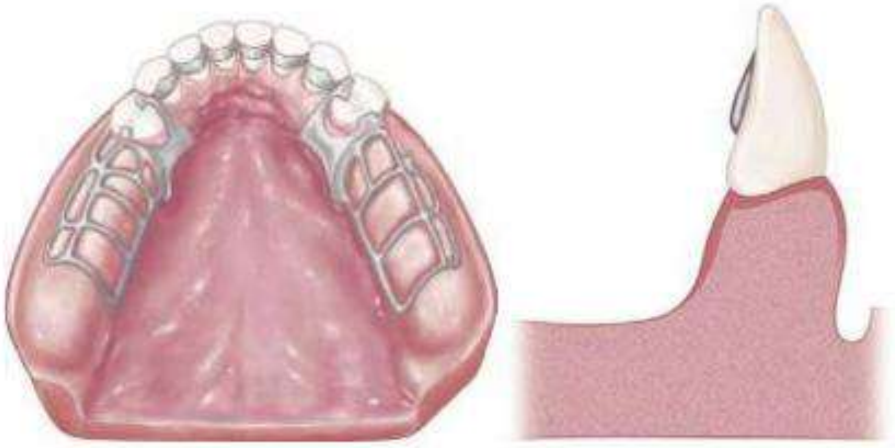


Characteristics and location:

- The sublingual bar is essentially the same half-pear shape as a lingual bar except that the bulkiest portion is located to the lingual and the tapered portion is toward the labial.
- The superior border of the bar should be at least 3 mm from the free gingival margin of the teeth.
- The inferior border is located at the height of the alveolar lingual sulcus when the patient's tongue is slightly elevated, lying over and parallel to the anterior floor of the mouth.

5) CINGULUM BAR MAJOR CONNECTOR (CONTINUOUS BAR).

Indications :

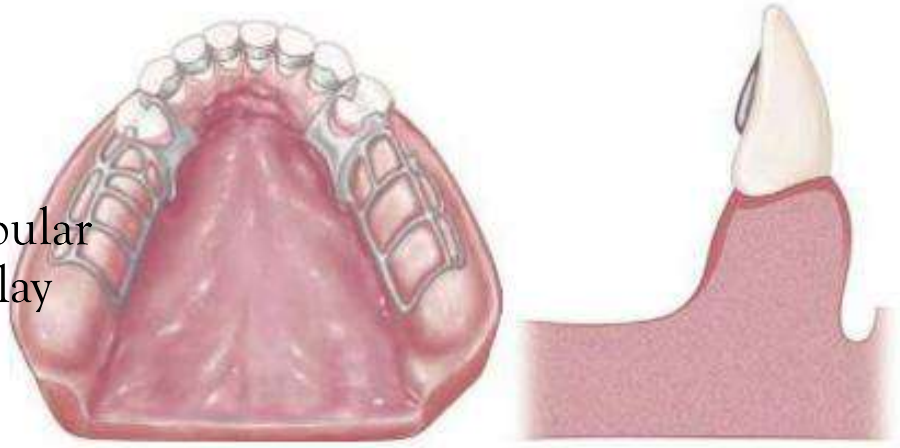


1. When a linguoplate is the major connector of choice, but the axial alignment of the anterior teeth is such that excessive block out of interproximal undercuts must be made, a cingulum bar may be considered.
2. Height of activated lingual frenum and floor of the mouth at the same level as marginal gingiva.
3. Inoperable tori or exostosis at the same level as the marginal gingiva.
4. Severely undercut lingual alveolus.
5. Concern that the major connector cross the gingival sulcus will cause a periodontal problem.

5) CINGULUM BAR MAJOR CONNECTOR (CONTINUOUS BAR).

contraindications :

1. Anterior teeth severely tilted to the lingual. When wide diastemas/open cervical embrasures exist between the mandibular anterior teeth and the cingulum bar would objectionably display metal in a frontal view.
2. Overlapped anterior teeth.



Advantages:

Does not cross the marginal gingiva or overlay the lingual alveolus.

Easy to add prosthetic teeth to framework.

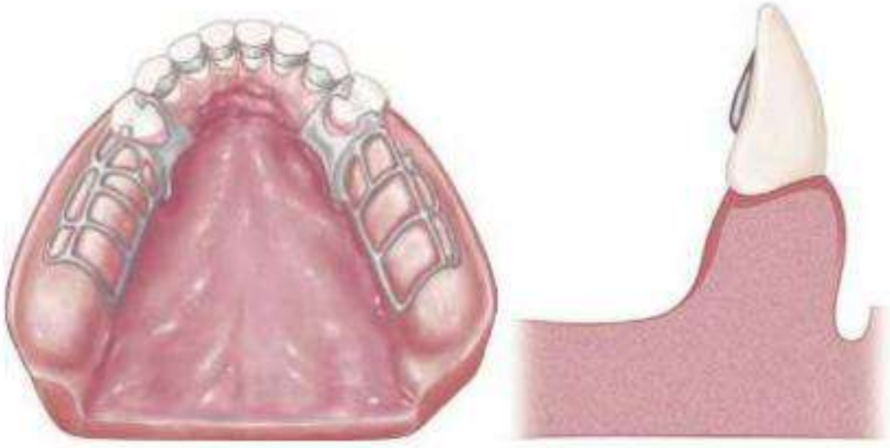
Disadvantges:

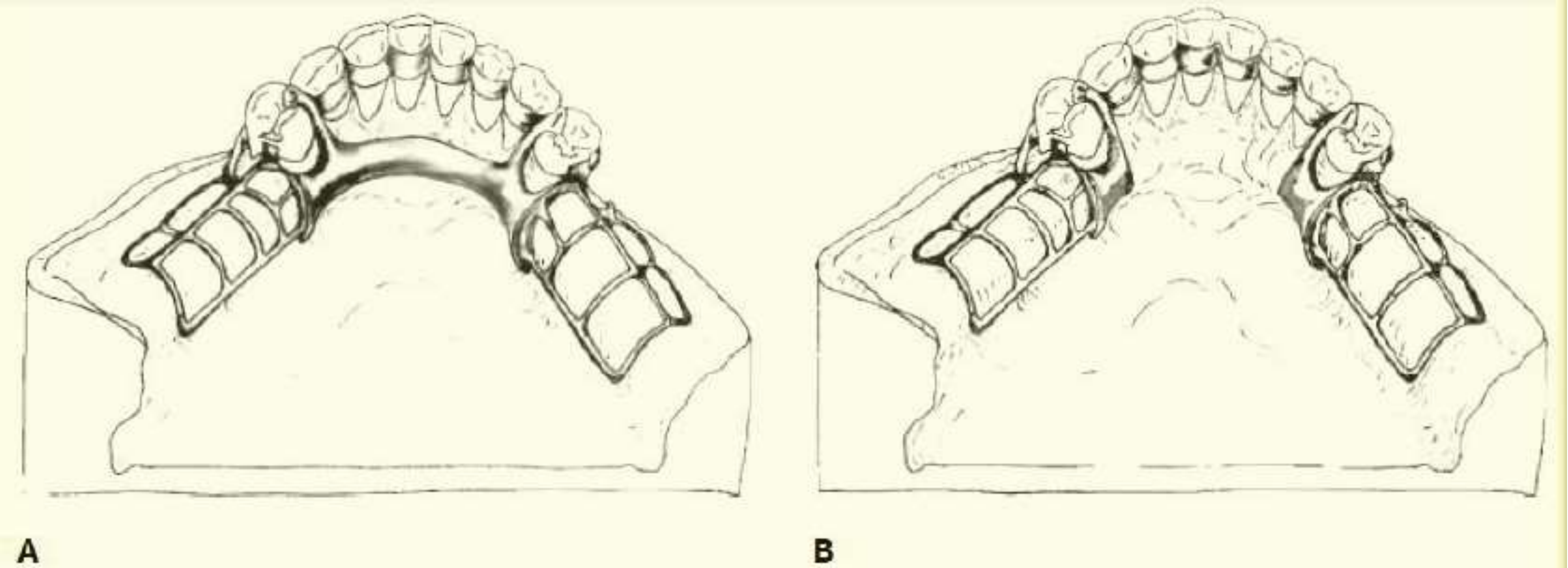
Must be bulky to have sufficient rigidity and thus may be objectionable to the patient.

5) CINGULUM BAR MAJOR CONNECTOR (CONTINUOUS BAR).

Characteristics and location:

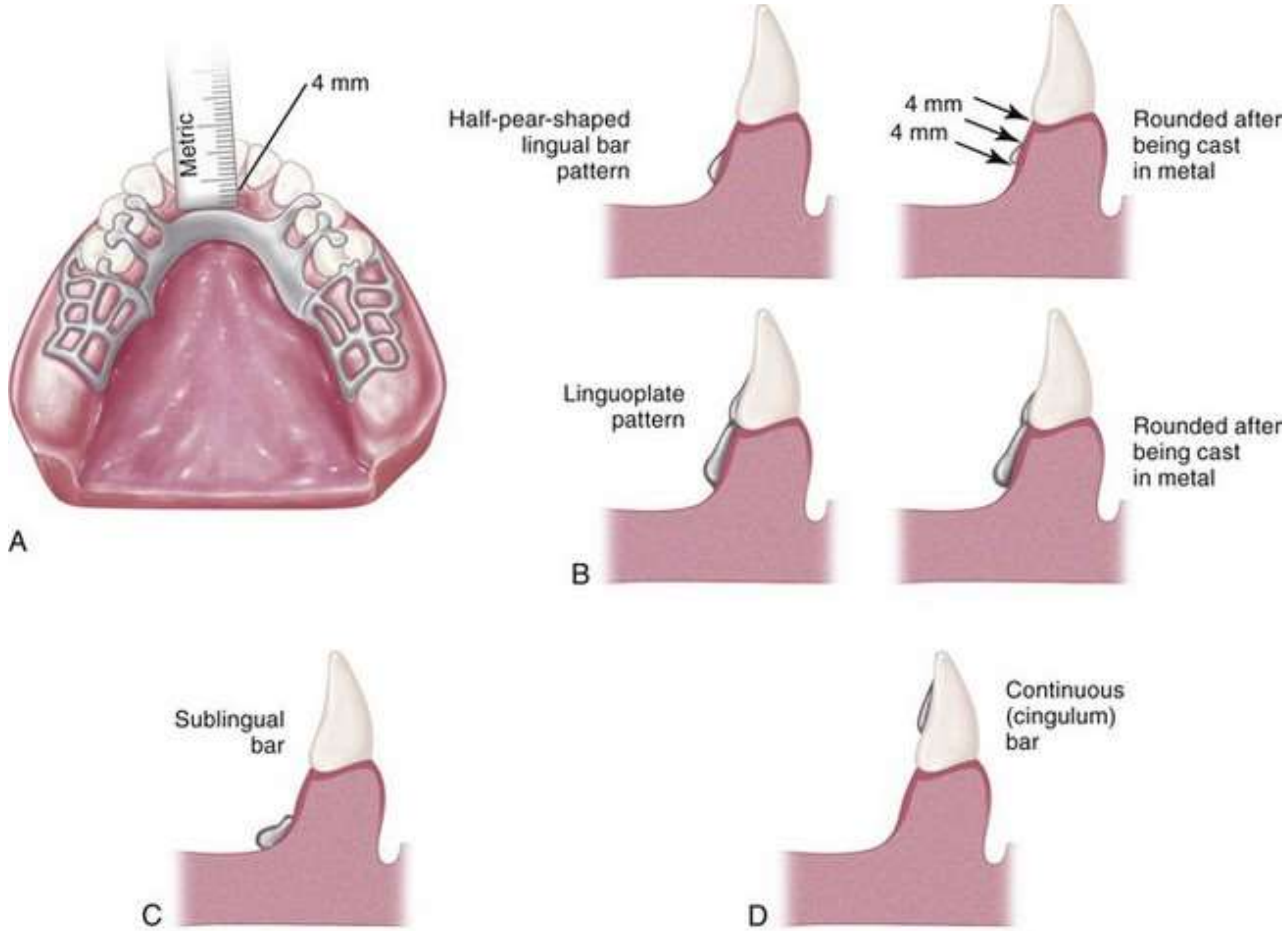
- Thin, narrow (3 mm) metal strap located on cingula of anterior teeth, scalloped to follow interproximal embrasures with inferior and superior borders tapered to tooth surfaces.
- Originates bilaterally from incisal, lingual, or occlusal rests of adjacent principal abutments.





A. Lingual bar and cingulum bar (continuous bar) major connector. this major connector is located on cingula of anterior teeth. Requirement of positive support by rest seats, at least as far anteriorly as the canines, is critical. Note that superior border of lingual bar portion is often placed objectionably close to gingival margins if sufficient bulk for rigidity is to be obtained. This type of major connector easily traps food and is often more objectionable to patients than a linguoplate.

B. The Cingulum bar (continuous bar) major connector although this design may reduce possibility of food entrapment, it may not provide adequate rigidity.



4 mm
Metric
A
Half-pear-shaped
lingual bar
pattern
4 mm
4 mm
Rounded after
being cast
in metal
Linguoplate
pattern
Rounded after
being cast
in metal
B
Sublingual
bar
C
Continuous
(cingulum)
bar
D

6) LABIAL BAR MAJOR CONNECTOR

Indications:

1. When lingual inclinations of remaining mandibular premolar and incisor teeth cannot be corrected, thus prevents the placement of conventional lingual bar connectors.
2. When severe lingual tori cannot be removed and prevent the use of a lingual bar or lingual plate major connector.
3. When severe and abrupt lingual tissue undercuts make it impractical to use a lingual bar or lingual plate major connector. Diastemas, open cervical embrasures, and overlapped anterior teeth may contraindicate a linguoplate.

Contraindications:

1. Lingual major connectors can be used.
2. Facial tori or exostoses.
3. Facial alveolar ridge undercuts.
4. High facial muscle attachments which would result in less than 3 mm of space between the superior edge of the labial bar and the marginal gingiva of the teeth.

6) LABIAL BAR MAJOR CONNECTOR

Advantages:

It can be used where other types of lingual major connectors cannot.

Disadvantages:

1. The labial major connector is longer than a lingual major connector and therefore, must be wider and/or thicker to provide the necessary rigidity.
2. The labial major connector may be visible when the patient smiles.
3. May distort lip contour resulting in poor esthetic.
4. Difficult to add prosthetic teeth to the framework.

6) LABIAL BAR MAJOR CONNECTOR

Characteristics and locations:

1. Half-pear shaped with bulkiest portion inferiorly located on the labial and buccal aspects of the mandible.
2. Superior border tapered to soft tissue.
3. Superior border located at least 4 mm inferior to labial and buccal gingival margins and more if possible.
4. Inferior border located in the labial-buccal vestibule at the juncture of attached (immobile) and unattached (mobile) mucosa.

A. Lingual inclination of patient's canines and premolars precludes use of lingual bar.
B. Labial bar major connector was used in treatment. Retention was obtained on terminal abutments. Support and stabilization were gained by using rests, minor connectors arising from labial bar, and well-fitting denture bases.

DESIGN OF MANDIBULAR MAJOR CONNECTOR

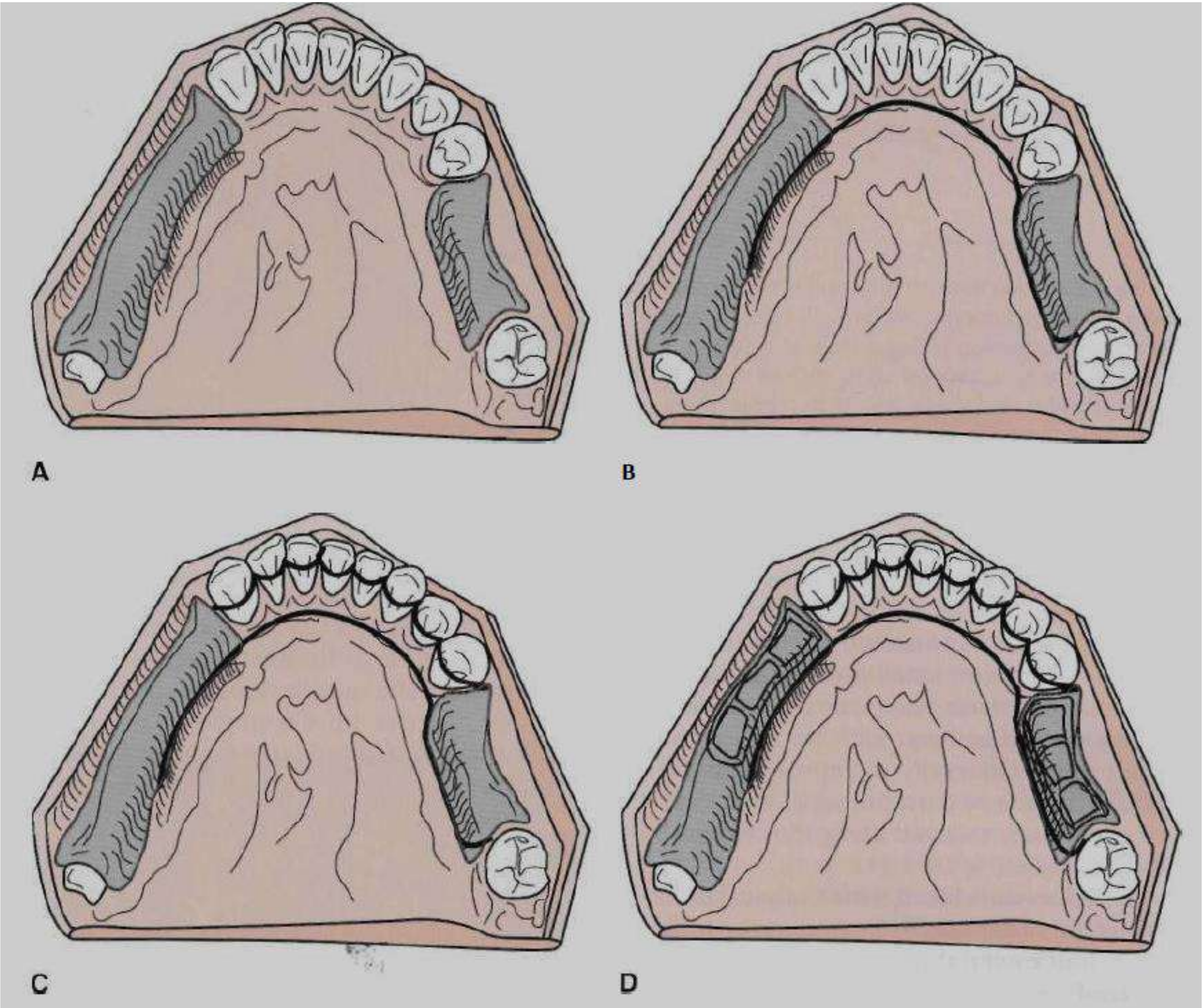
The following systematic approach to designing a mandibular lingual bar and linguoplate major connectors:

Step 1: Outline the basal seat areas on the diagnostic cast.

Step 2: Outline the inferior border of the major connector.

Step 3: Outline the superior border of the major connector.

Step 4: Connect the basal seat area to the inferior and superior borders of the major connector, and add minor connectors to retain the acrylic resin denture base material.




thank
you

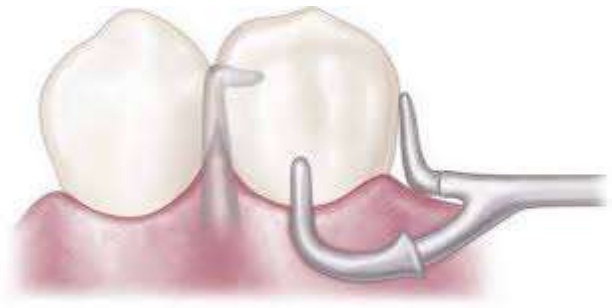
Minor Connectors

Bushra Mohammed Ali Al-Ameen

B,D,S,. M,Sc.(Pros)

Minor Connectors

- Minor connectors are those components that serve as the **connecting link** between the major connector or base of a removable partial denture and the other components of the prosthesis, such as the clasp assembly, indirect retainers, occlusal rests, or cingulum rests.



Functions of minor connectors

The <u>primary function</u> of a minor connector <u>is to join</u> the denture parts to major connector.

- **The minor connector serves other purposes.**

1- To transfer 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.

Functions of minor connectors

The primary function of a minor connector is to join the denture parts to major connector.

- **The minor connector serves other purposes.**

2- To transfer the effect 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 originating 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.

Functions of minor connectors

The primary function of a minor connector is to join the denture parts to major connector.

- **The minor connector serves other purposes.**

3- Provide unification and rigidity.

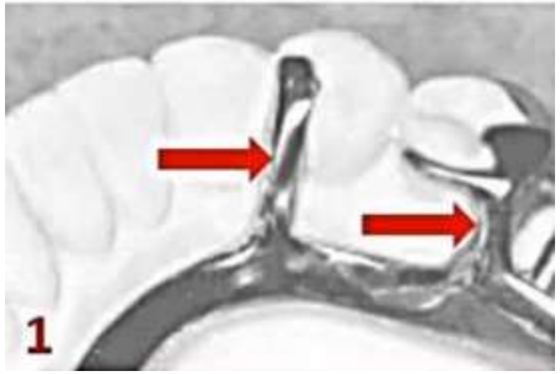
4- It might help in retention and stability of the prosthesis.

5- Through its connection to the guiding plane; it helps as a bracing element.

6- Share in the path of insertion and removal maintenance.

Basic types of the minor connectors

1. **Type 1**: Minor connectors placed into embrasures between two adjacent teeth or adjacent to an edentulous space to join clasp assembly, indirect retainer and auxiliary rest.



Basic types of the minor connectors

2. Type 2: Grid work minor connectors that covers the edentulous area to join denture base to major connector .

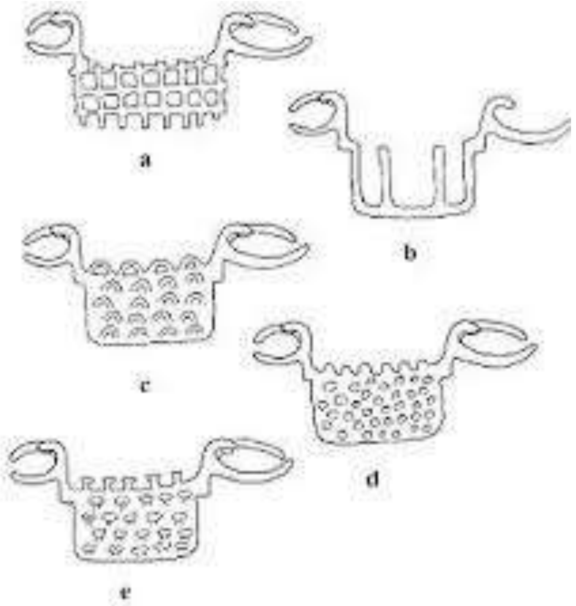
a. Retentive mesh.

b.Retentive lattice.

c. Retentive loops.

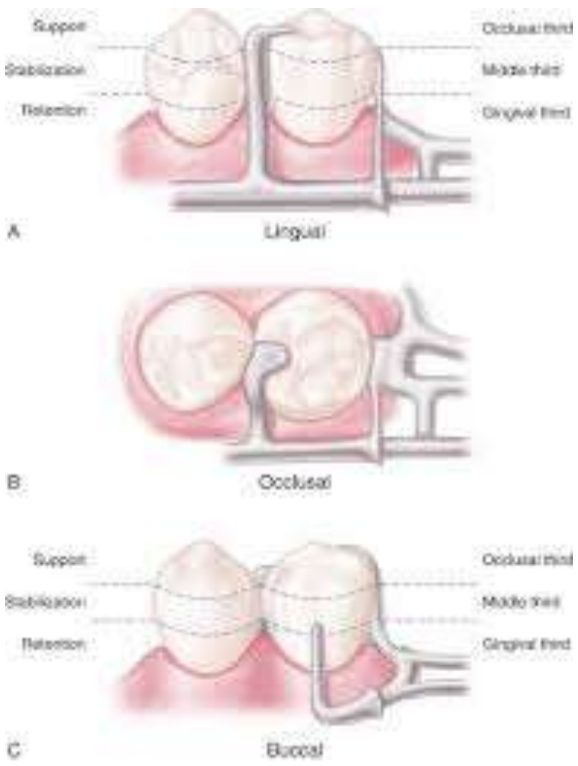
d.Retentive bead.

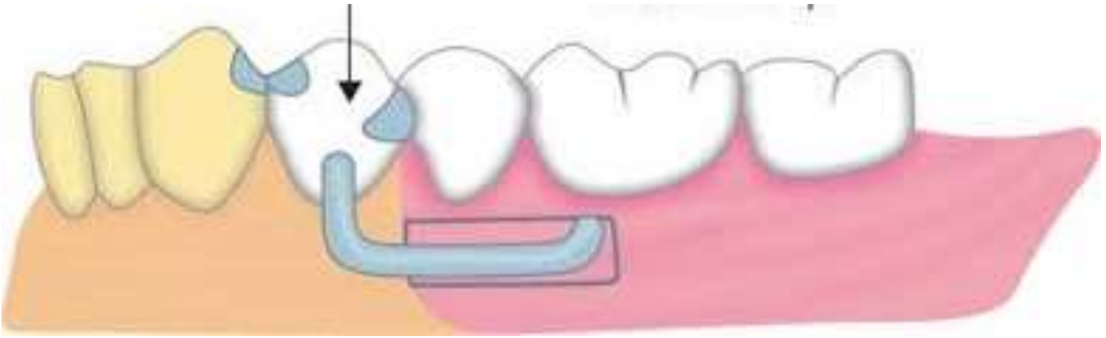
e. Retentive posts.



Basic types of the minor connectors

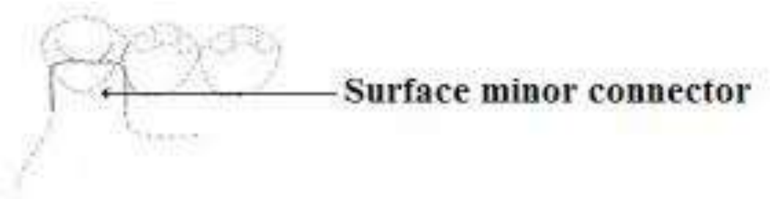
3. Type 3: minor connector that serve as approach arm for vertical projection of bar type clasp.

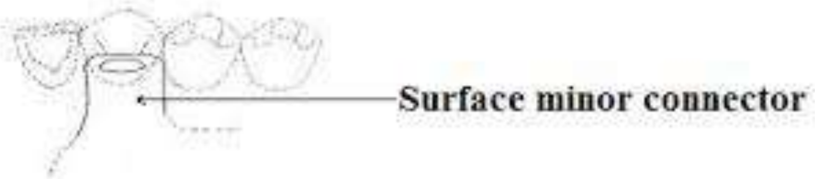




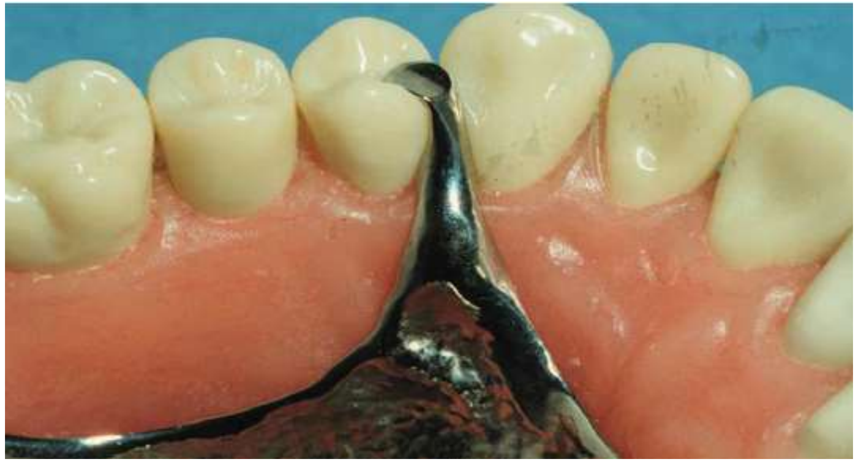
Basic types of the minor connectors

3. Type 4: Surface minor connectors are located on the lingual surface of incisors and canines. They connect lingual rests to the major connector.



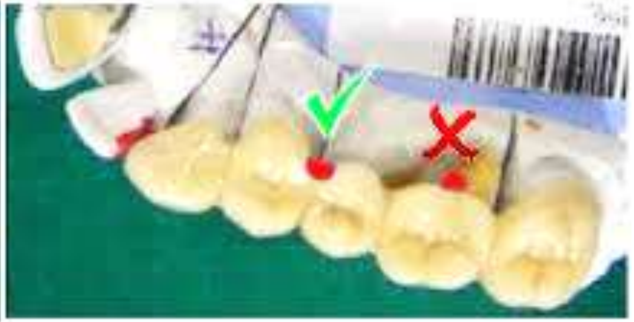


Form and location



1- 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.

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.

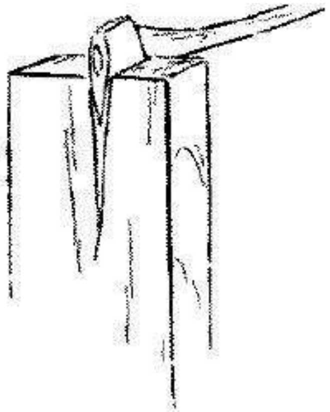


Form and location

3- It should passing vertically from the major connector and covers as little of the gingival tissue as possible.

4- The minor connector cross the free gingival area must be relieved in order not to impinge the tissue.

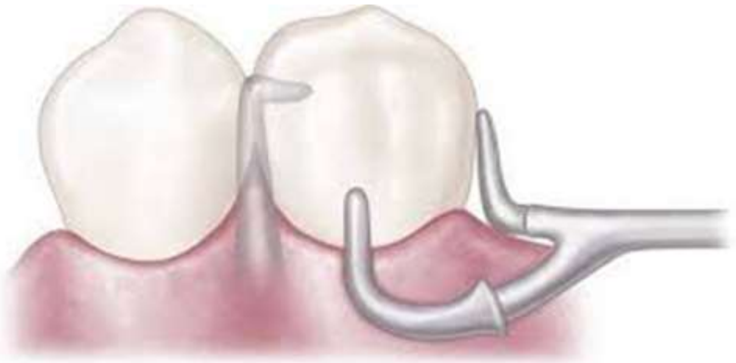
5- The deepest part of the interdental embrasure should have been blocked out to avoid interference during placement and removal, and to avoid any wedging effect on the contacted teeth.



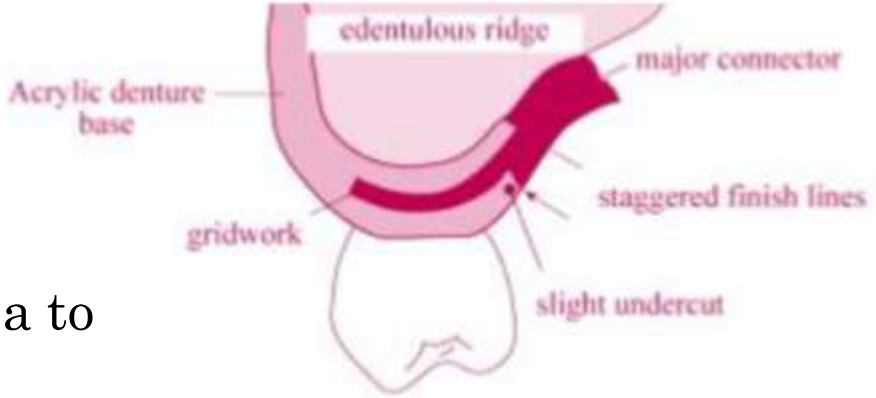
Form and location

6- It is a minor connector that contacts the guiding plane surfaces of the abutment teeth adjacent to an edentulous space. Here the minor connector must be broad buccolingually to use the guiding plane to the fullest advantage. And thin mesiodistally to place the prosthetic tooth in a natural position.

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. This way sufficient bulk is ensured with the least interference to placement of the artificial tooth.

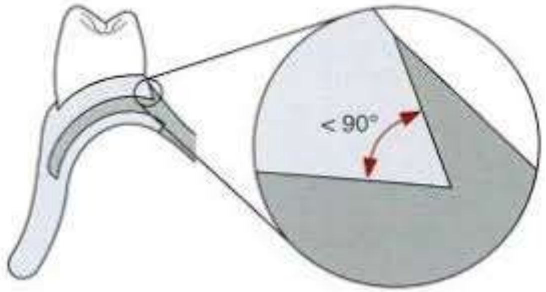


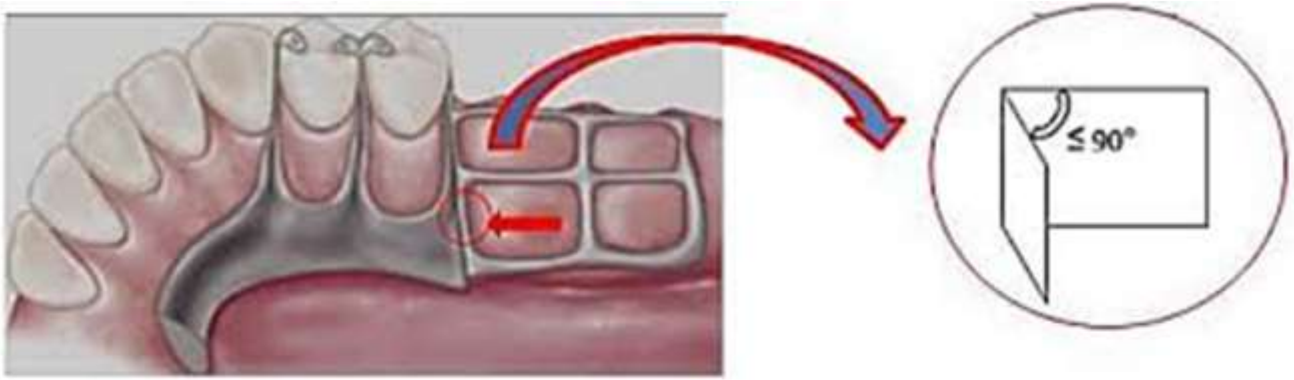
Form and location



8- Minor connector that covers the edentulous area to join denture base to major connector should be completely embedded within the denture base.

9- The junctions of these mandibular minor connectors with the major connectors should be strong butt-type joints. Angles formed at the junctions of the connectors should not be greater than 90 degrees, thus ensuring the most advantageous and strongest mechanical connection between the acrylic resin denture base and the major connector.

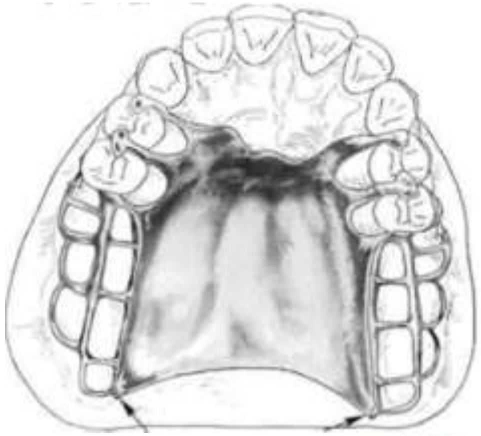


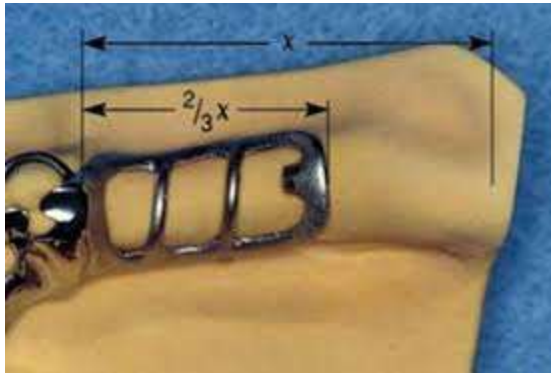


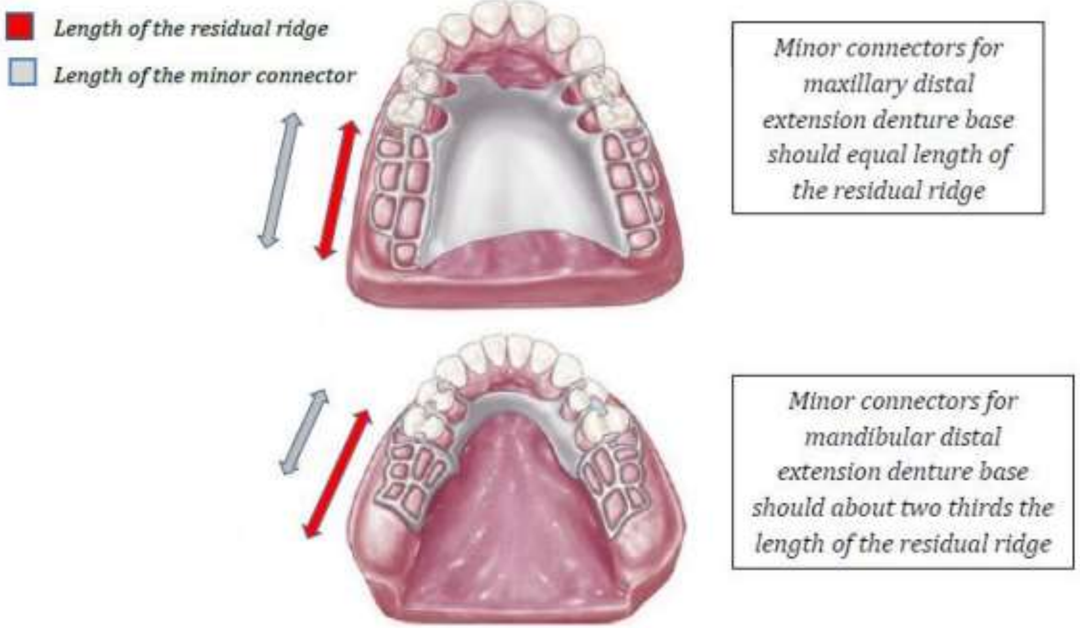
Form and location

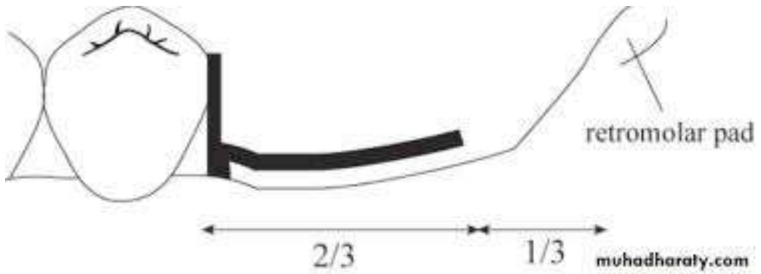
10- The minor connector for the mandibular distal extension base should extend posteriorly about two thirds the length of the edentulous ridge and have elements on both the lingual and buccal surfaces. Such an arrangement will not only add strength to the denture base but also may minimize distortion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

11- Minor connectors for maxillary distal extension denture bases should extend the entire length of the residual ridge and should be of a ladder-like or mesh-like.





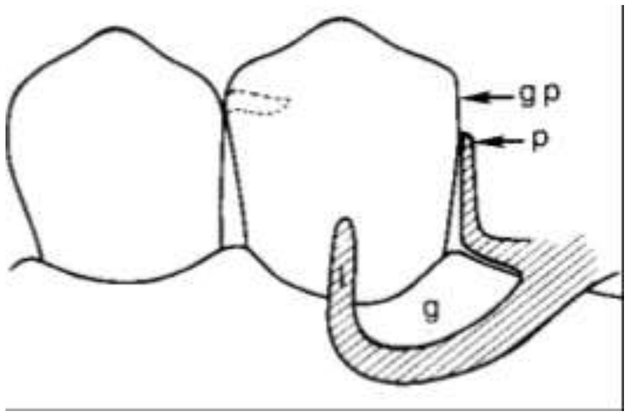


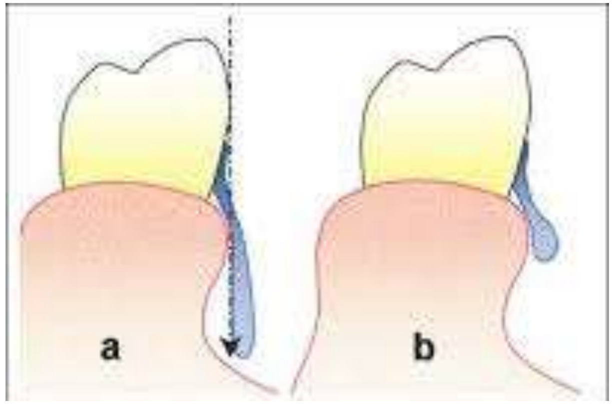


Form and location

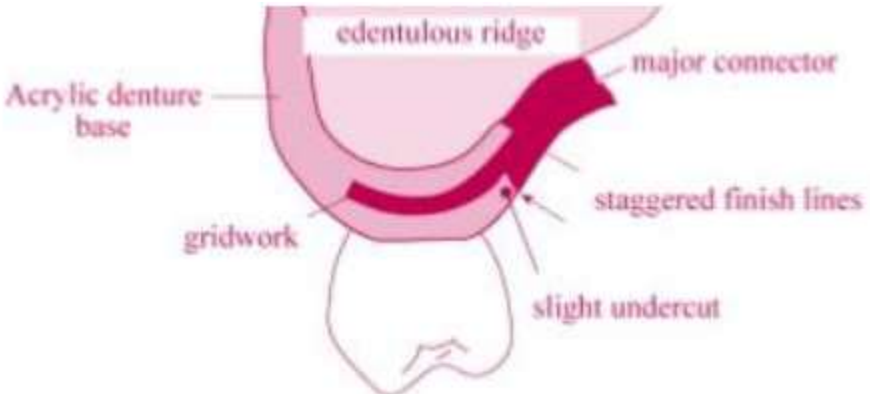
12- The minor connector for vertical projection of bar type clasp approaches the tooth from an apical direction rather than from an occlusal direction, the approach arm should display a smooth, even taper from its origin to its terminus

13- Minor connectors for vertical projection of bar type clasp must not cross a soft tissue undercut (need parallel block out).





Finishing line

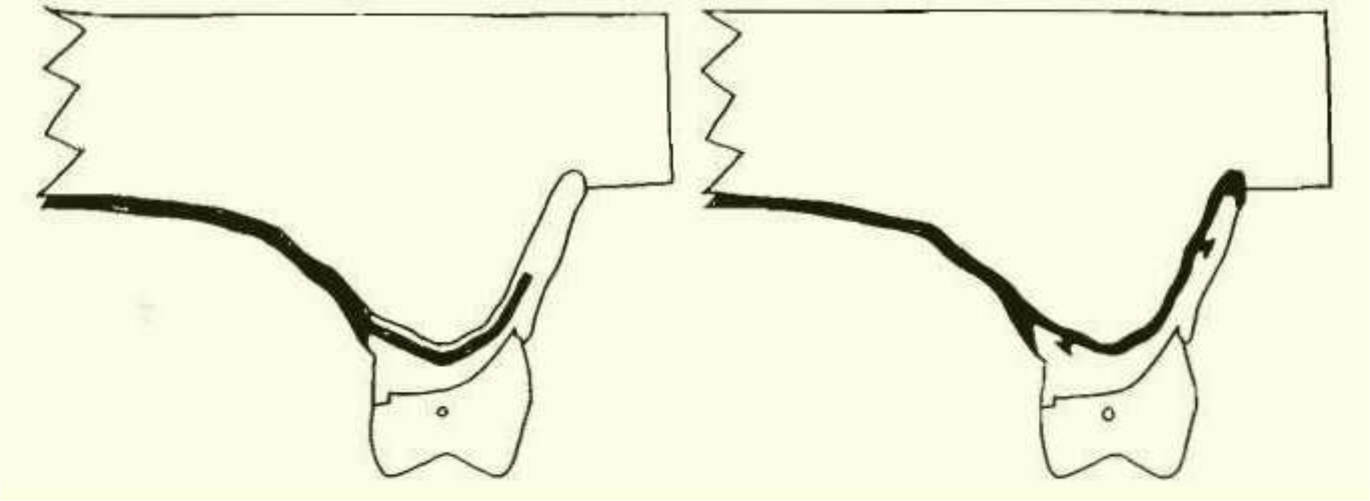


- **The finishing line junction with the major connector should take the form of an angle not greater than 90°, therefore being somewhat undercut.**

Functions:

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.

Finishing line



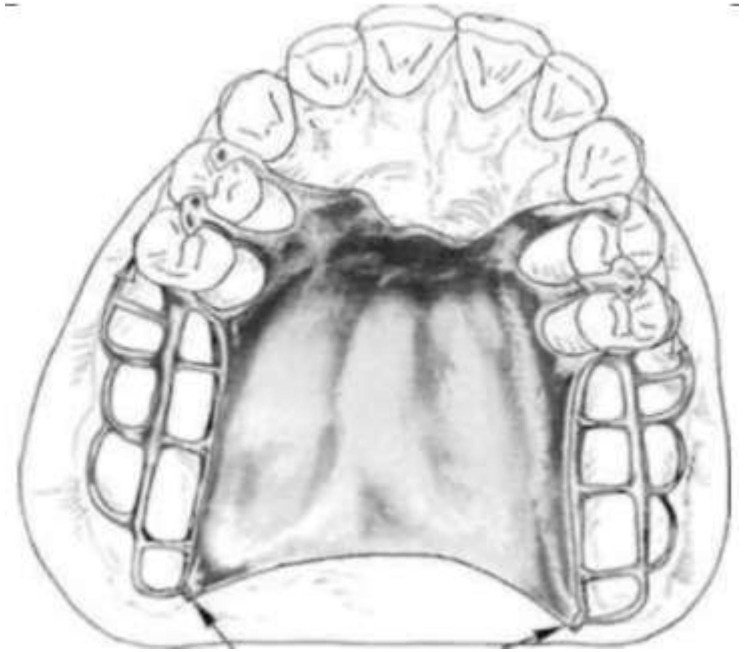
Frontal sections through lingual finishing lines of palatal major connectors. Right image is through full cast metal base major connector; left image is through resin denture base.

Finishing line

- Of course 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, on the other hand, 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.

Finishing line

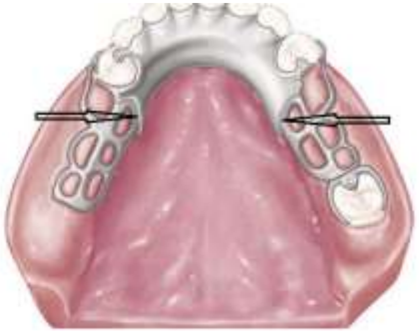
- Junction of major connector and minor connector at palatal finishing lines should be located 2 mm medial from an imaginary line that would contact lingual surfaces of missing posterior teeth. Finish line on right is too far toward midline of palate.
- Extension of finishing line to area of pterygomaxillary notch provides butt-type joint for attachment of border portion of resin base through pterygomaxillary notch (arrows).



Types of finishing line

1. Vertical finish line:

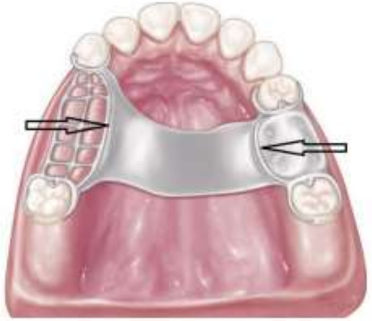
It is the finishing line at the junction of ladder area and major connector in free end extension cases (class I and class II) in mandibular arch, and class IV mandibular arch with labial bar major connector. It represents the area where the acrylic resin that supporting artificial teeth ending.

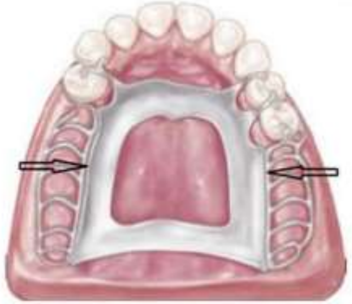


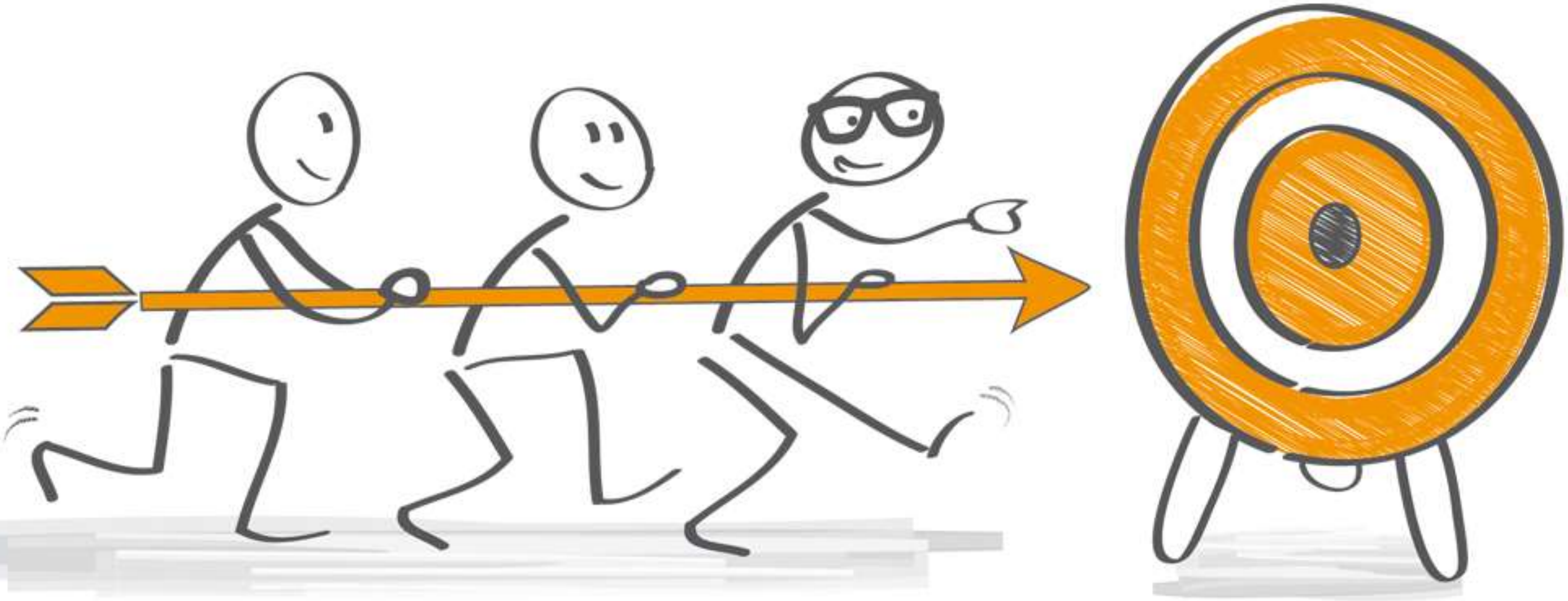
Types of finishing line

2. Horizontal finish 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 cl III mandibular cases and Class IV mandibular cases with lingually located major connector.







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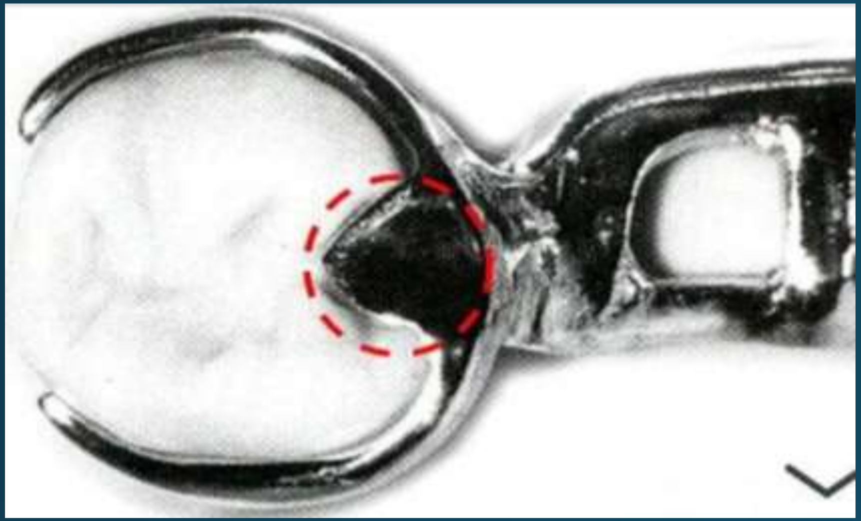

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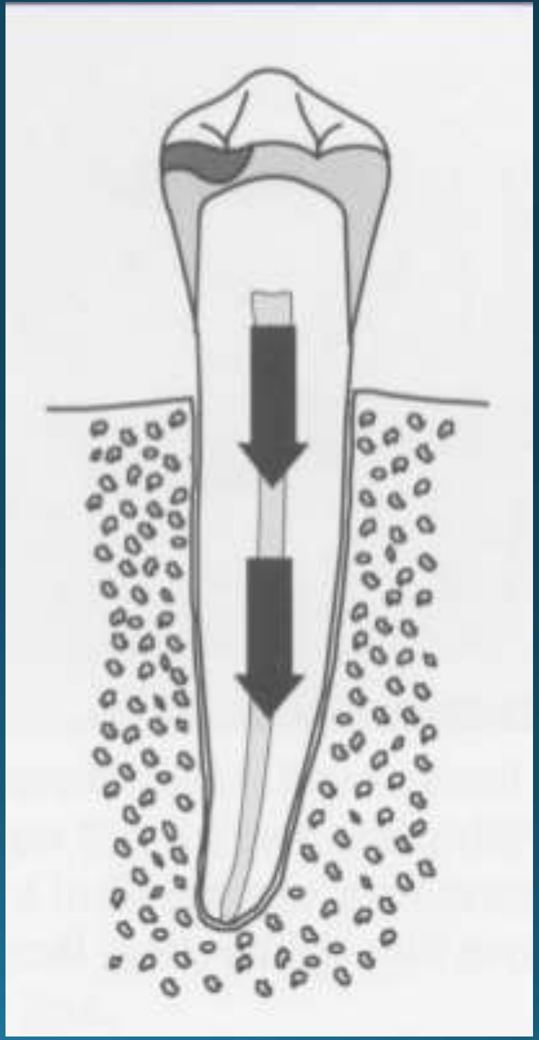
Rest And Rest Seats

Rest And Rest Seat

Rest:

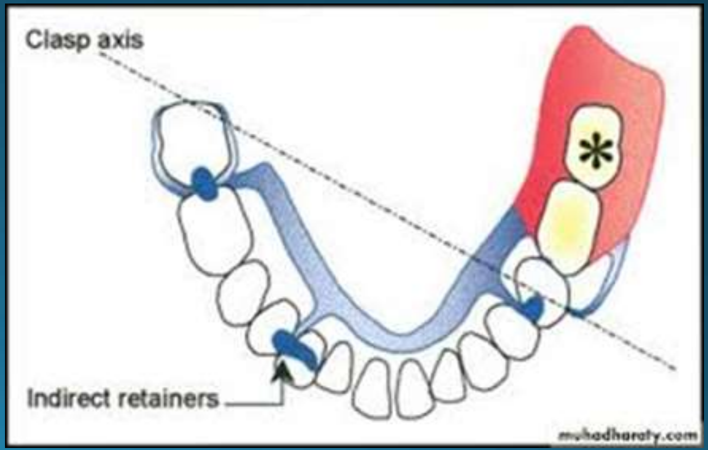
- It is a rigid extension of partial denture which rest on occlusal, incisal, and lingual surface of a tooth to provide vertical support for the removable partial denture and transmit functional forces to the teeth in an atraumatic fashion (i.e. transfer forces down the long axes of the abutment teeth, in this manner the stress can be absorbed by the fibers of the PDL.



Rest And Rest Seat

Rest seat:

- It is that portion of the tooth that have been selected and prepared to receive a rest.
- The rest that is part of a retentive clasp assembly is called primary rest while rest that is responsible for additional support or indirect retainer is called secondary or auxiliary rest.



Functions of rests:

1. The primary purpose of the rest is to provide vertical support for the partial denture.
2. Directs and distributes occlusal loads to abutment teeth.
3. Maintains components in their planned positions.
4. Maintains established occlusal relationships by preventing settling of the denture.
5. Prevents impingement of soft tissue.

Functions of rests:

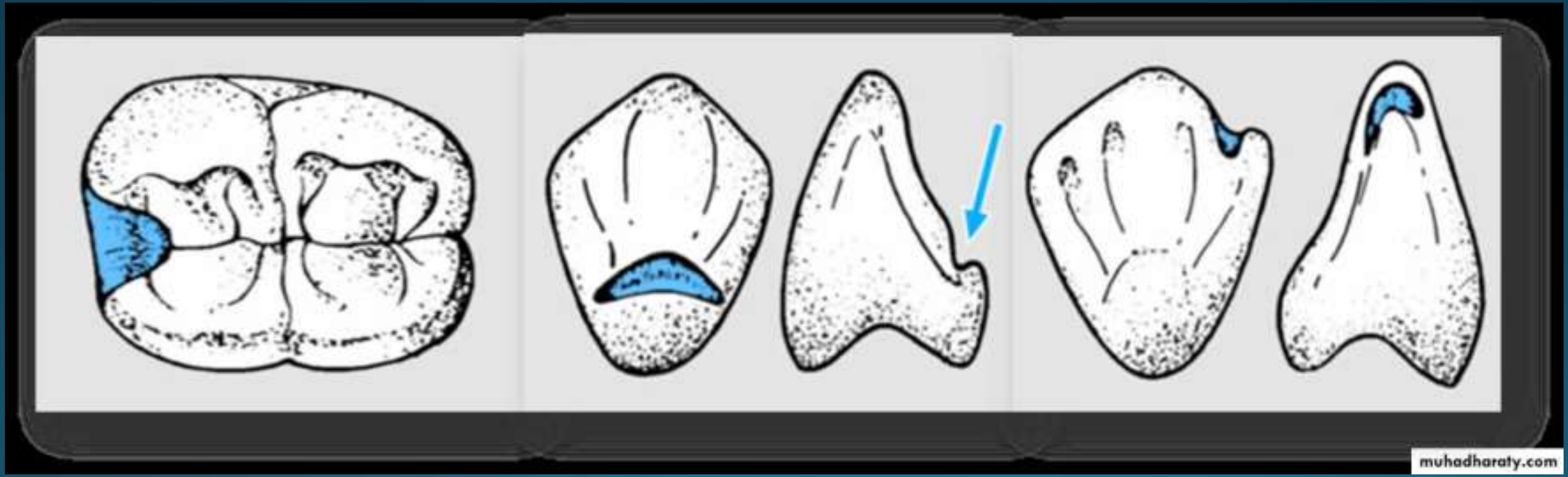
6. Serve as a reference point for evaluating the fit of the framework to the teeth.
7. Prevent extrusion, tipping, or migration of the abutment teeth.
8. Acts along with its minor connector as an indirect retainer for a tooth-tissue supported removable partial denture.
9. Deflection of food by bridging the gap between two teeth.
10. Splints mobile teeth.

There are several points which should be put into consideration in determination of the site and form of the rests.

1. Root form.
2. Root length.
3. Inclination of the tooth.
4. Ratio of the length of the clinical crown to the alveolar support.

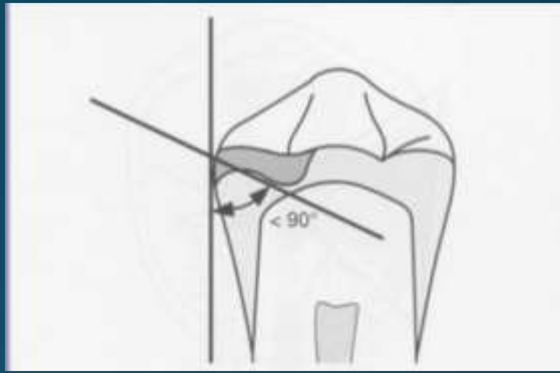
Types of rests:

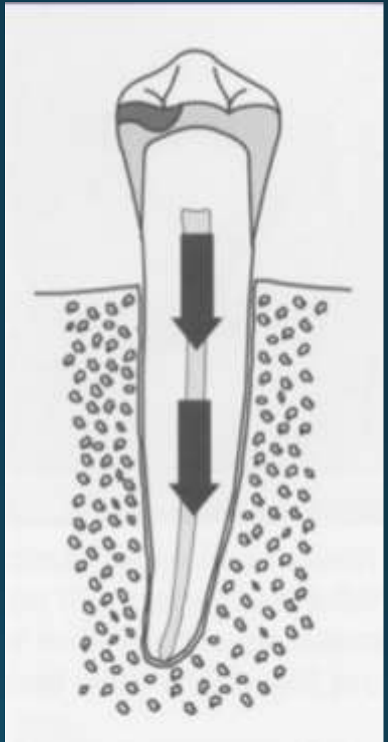
- Occlusal rest.
- Lingual rest.
- Incisal rest.

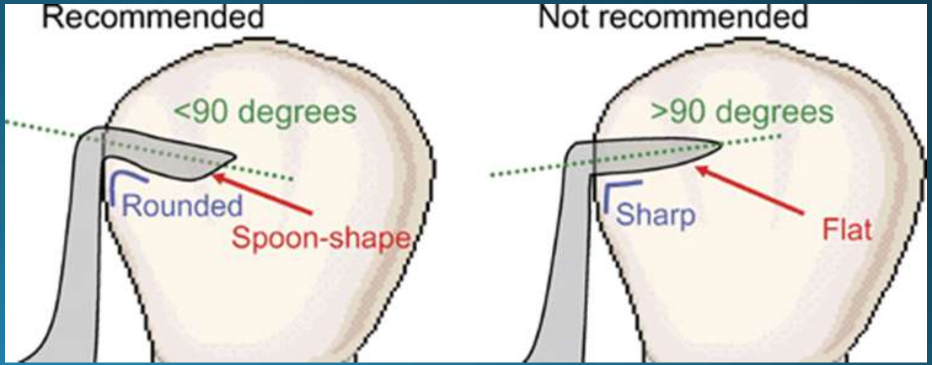


Basic requirements of rest and rest seat

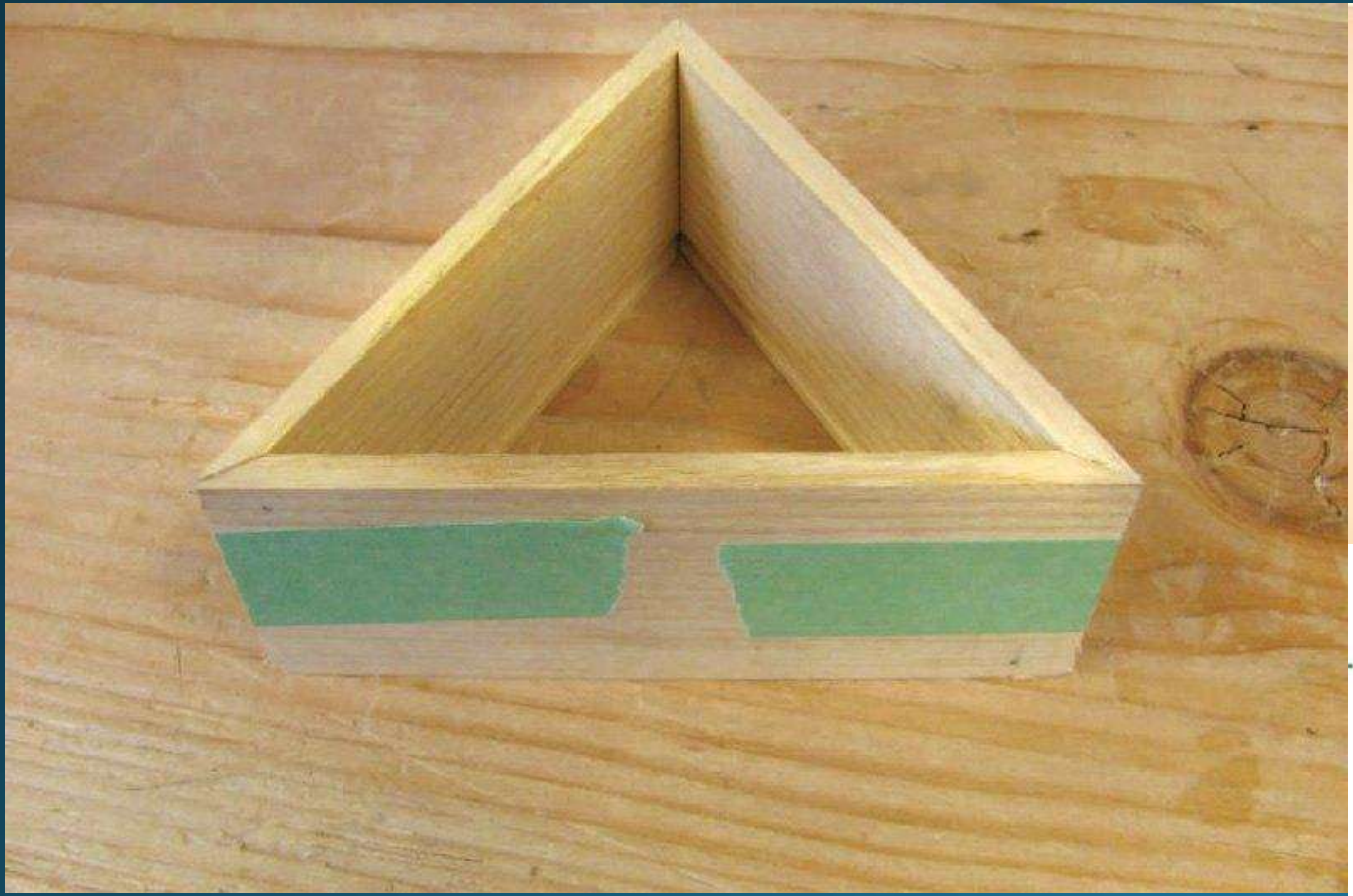
1. Provide rigid support.
2. Extends to the center of the tooth in tooth supported situations, so the vertical stress will be resisted by all of the periodontal ligament fibers.
3. Rests should be placed in properly engineered seat, with minimal preparation in dentine of the surfaces of the teeth, (rounded, the floor of rest seat shloud be less than 90° to the long axis of the tooth, to direct stresses axially. Also its seat should be apical to the marginal ridge with no sharp angles (for ease of cleaning , making impressions and prevents tooth fracture).

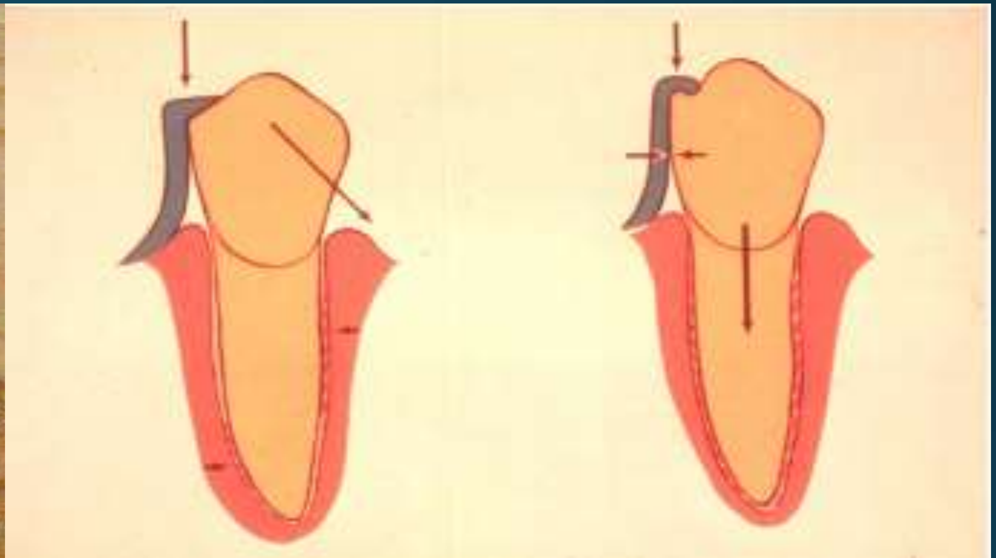


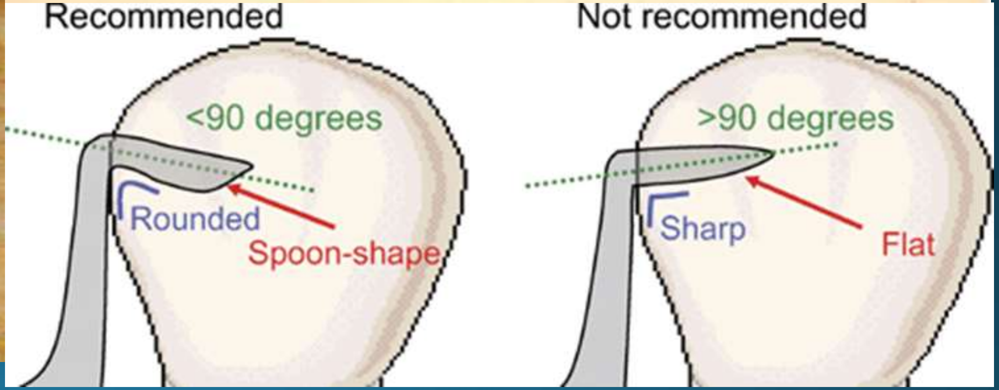




Basic requirements of rest and rest seat

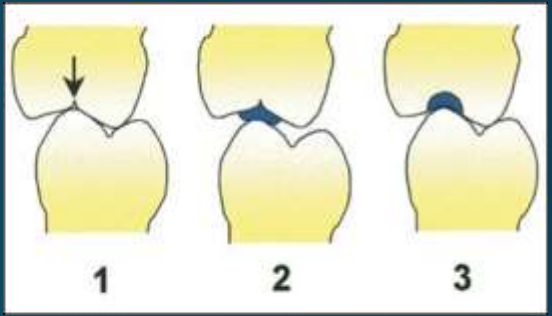


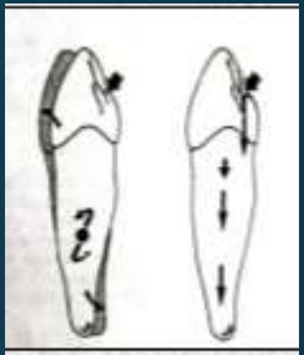


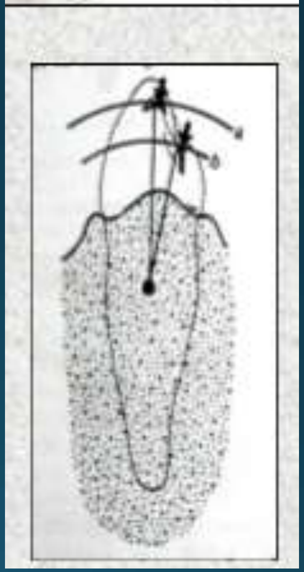


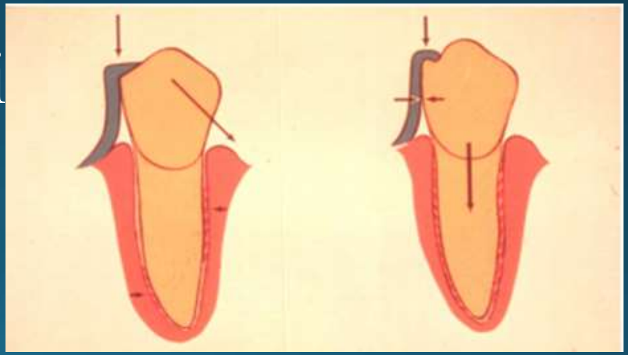
Basic requirements of rest and rest seat

4. No undercuts in the path of insertion.
5. Minimum of 1 mm thick.
6. Restore the occlusal plane.
7. Contoured so that when increased force is applied to the prosthesis the rest will engage more securely to prevent separati
8. Anterior rests should be as close to the center of the tooth as possible.



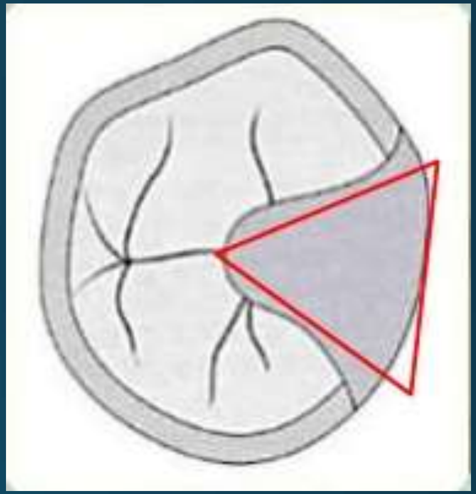




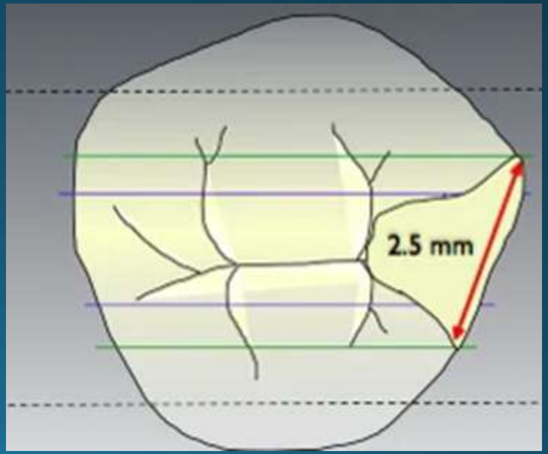


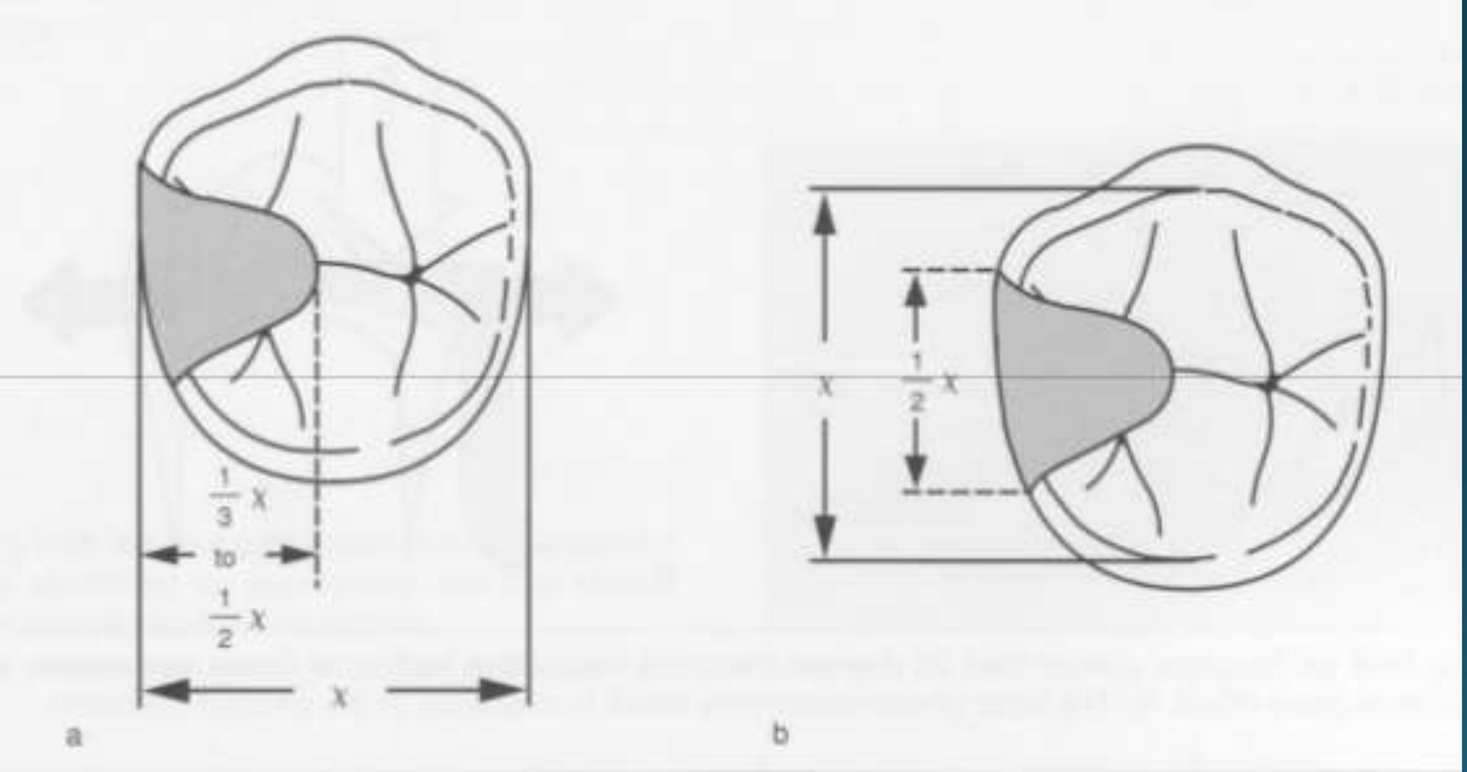
Form of the occlusal rest and rest seat

1- The outline form of an occlusal rest seat should be a rounded triangular shape with the apex toward the center of the occlusal surface.



2- It should be as long as it is wide, It should occupy 1/3 to ½ the mesiodestal diameter of the abutment and ½ the buccolingual intercuspal width. Rest seats of smaller dimensions do not provide an adequate bulk of metal for rests.

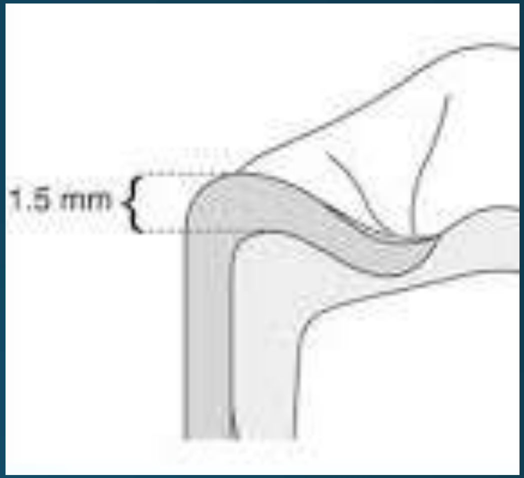




1/3 x
to
1/2 x
x
a
x
1/2 x
b

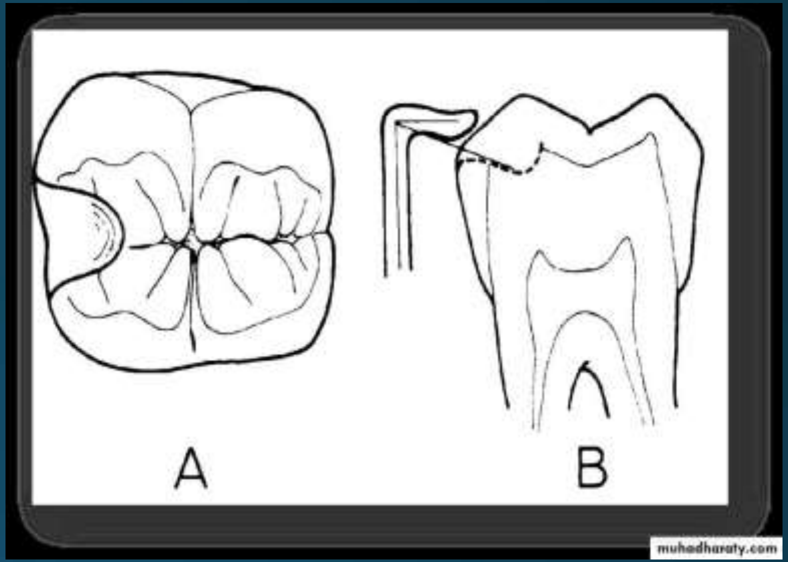
Form of the occlusal rest and rest seat

3- The marginal ridge of the abutment tooth at the site of the rest seat must be lowered to permit a sufficient bulk of metal for strength and rigidity of the rest and the minor connector. This means that a reduction of the marginal ridge of approximately 1.5 mm is usually necessary.

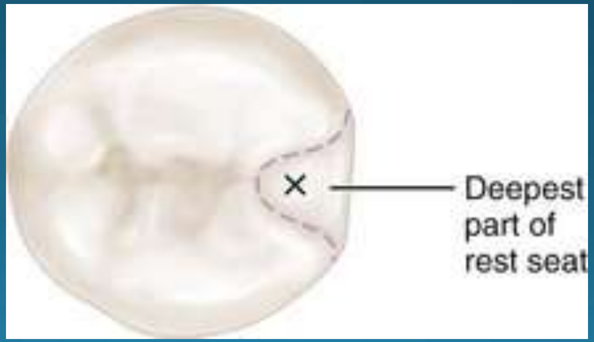


Form of the occlusal rest and rest seat

4- The floor of the occlusal rest seat should be apical to the marginal ridge and the occlusal surface and should be concave, or spoon shaped. Caution should be exercised in preparing a rest seat to avoid creating sharp edges or line angles in the preparation.

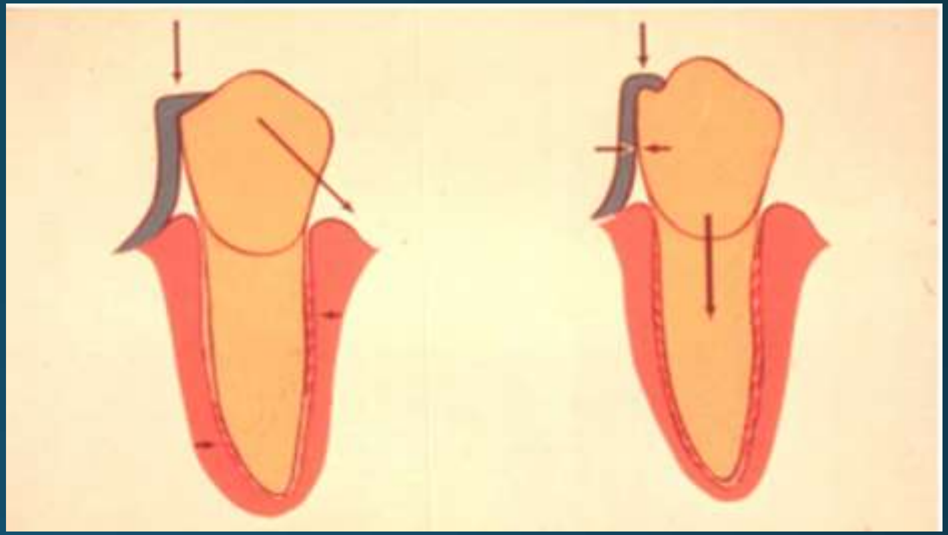


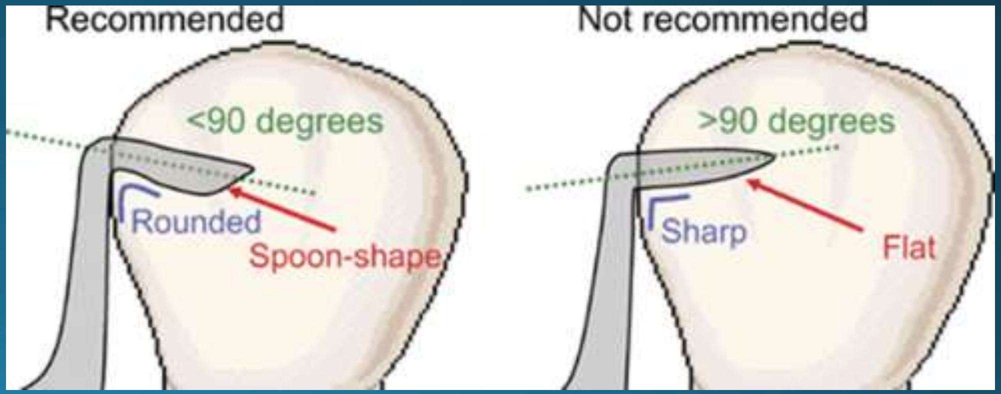
5- The angle formed by the occlusal rest and the vertical minor connector from which it originates should be less than 90°.

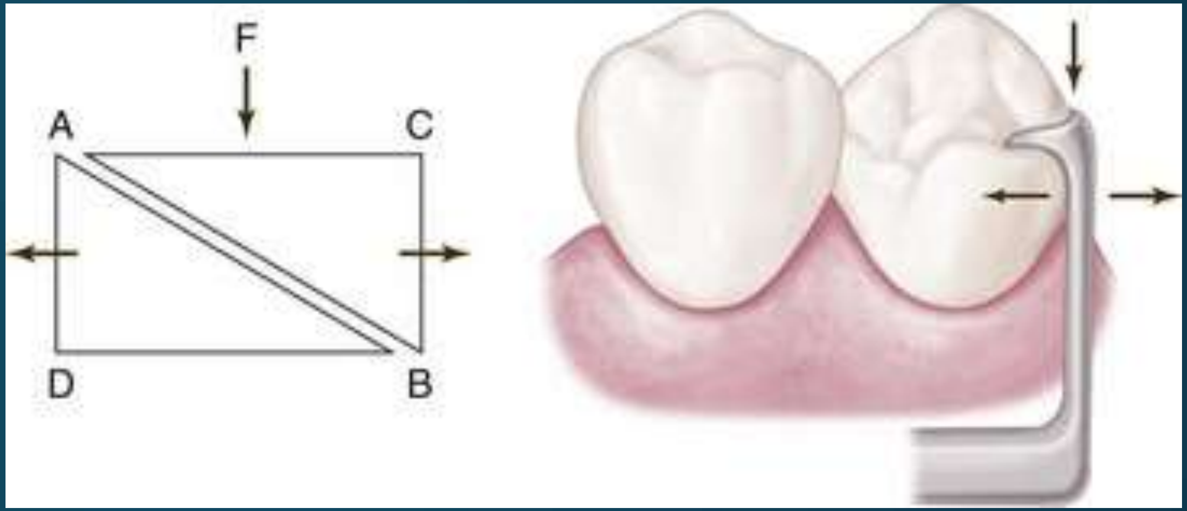


Form of the occlusal rest and rest seat

Only in this way can the occlusal forces be directed along the long axis of the abutment tooth. An angle greater than 90° fails to transmit occlusal forces along the supporting vertical axis of the abutment tooth. This also permits slippage of the prosthesis away from the abutment, which can result in orthodontic-like forces being applied to an inclined plane on the abutment, with possible tooth movement, so a secondary rest is placed on the opposite side of an abutment to prevent slippage of the rest.







If angle greater than 90 degrees

↓

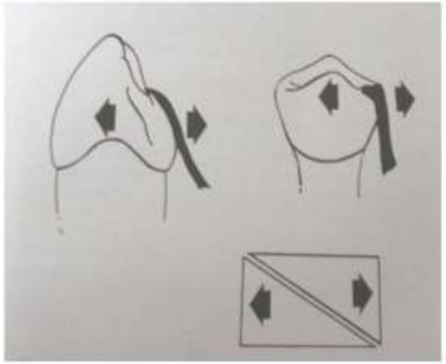
Forces not along long axis but will create an inclined plane effect

↓

Slippage of prosthesis away from the abutment

↓

Orthodontic like forces

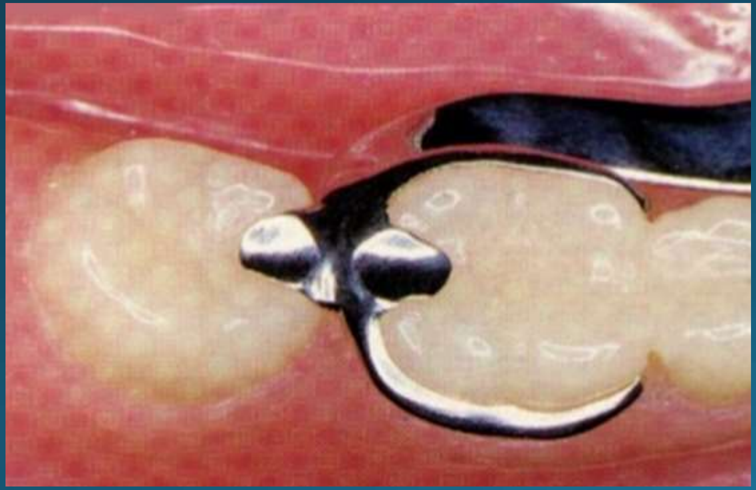


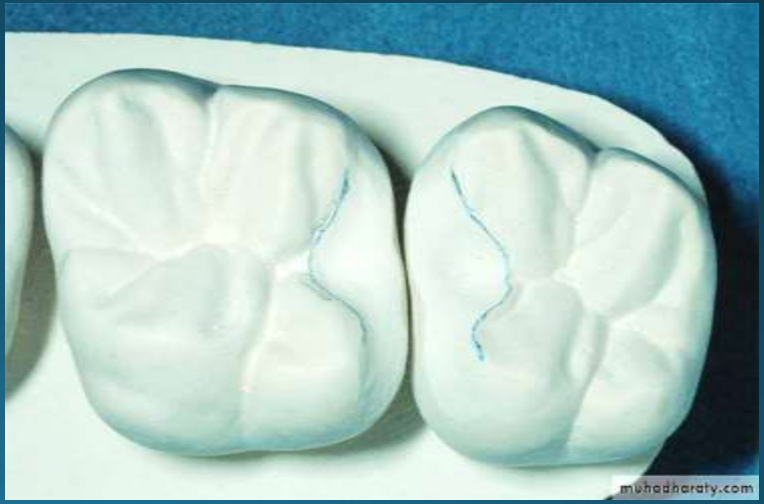
McCracken's Removable Partial Prosthodontics 11th edition

Form of the occlusal rest and rest seat

Interproximal rests (embrasure rest):

One or two occlusal rests on adjacent teeth; every seat must be prepared as an individual occlusal rest with exception that the preparation must be more lingually.

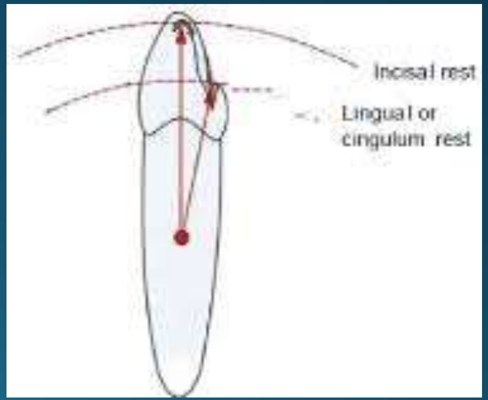




Lingual rests on canines and incisor teeth

Although the preferred site for an external rest is the occlusal surface of a molar or a premolar, also anterior teeth occasionally must be used to support an indirect retainer or an auxiliary rest.

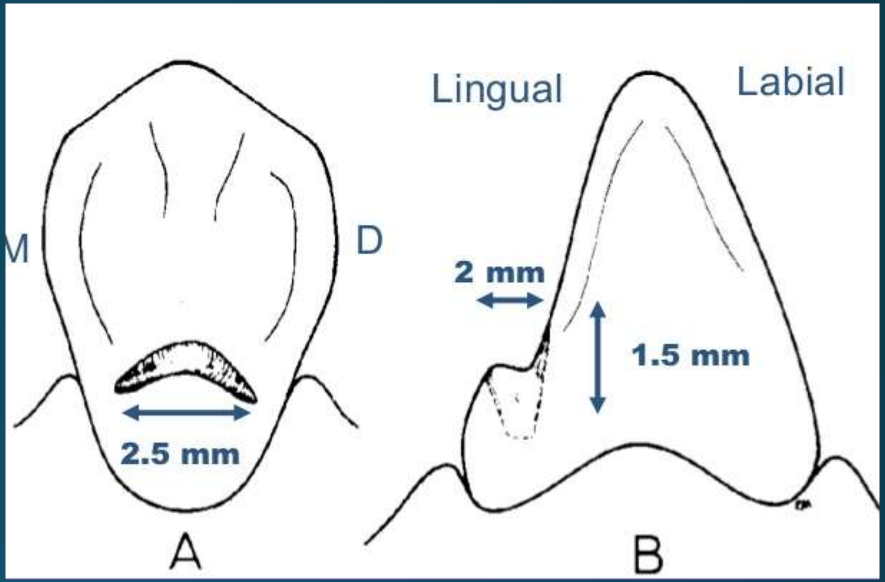
1. A canine is much preferred over an incisor for this purpose.
2. When a canine is not present, multiple rests that are spread over several incisor teeth are preferable to the use of a single incisor.
3. A lingual rest is preferable to an incisal rest.



Lingual rests on canines and incisor teeth

The rest seat, from lingual aspect, form of a broad inverted V-notch form is self-centering for the rest and at the same time directs forces rather favorably in an apical direction. Looking at preparation from incisal view, it will be noted that rest seat preparation is broadest at most lingual aspect of canine. As preparation approaches proximal surfaces of tooth, it is less broad than at any other areas.

Proximal view demonstrates correct taper of floor of rest seat. It also should be noted that borders of rest seat are slightly rounded to avoid line angles in its preparation. Mesiodistal length of preparation should be a minimum of 2.5-3 mm, labiolingual width about 2 mm, and incisoapical depth a minimum of 1.5 mm.



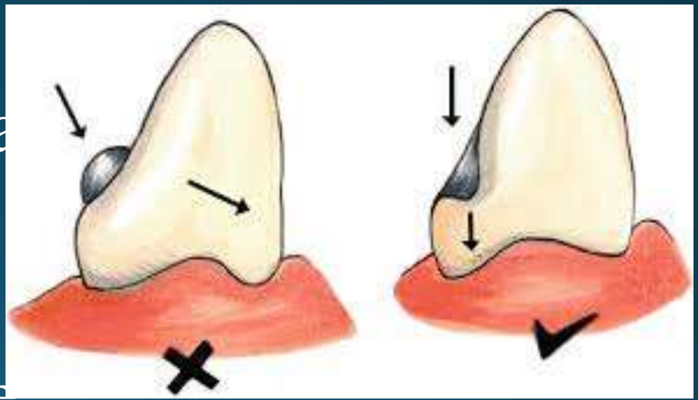
Lingual rests on canines and incisor teeth

Lingual view demonstrates a slightly rounded V prepared on the lingual surface at the junction of the gingival and the middle one third of the tooth.

The apex of the V is directed incisally.

All line angles must be eliminated, and the rest sea must be prepared within the enamel and must be highly polished.

A predetermined path of placement for the denture must be kept in mind in preparing the rest seat.



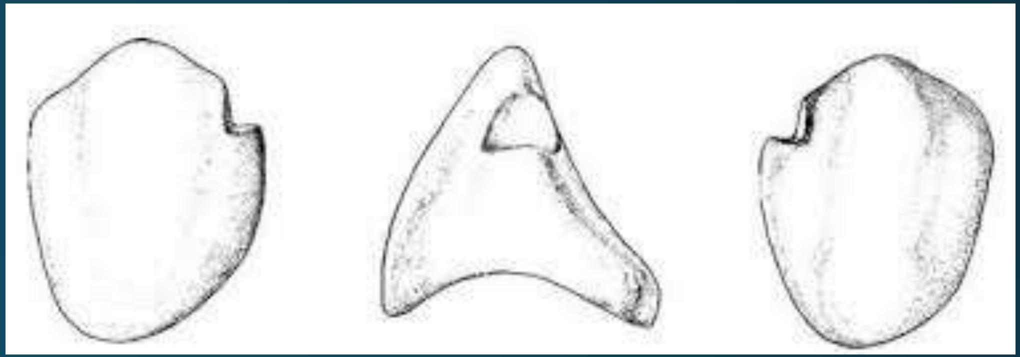
Incisal rest and rest seat

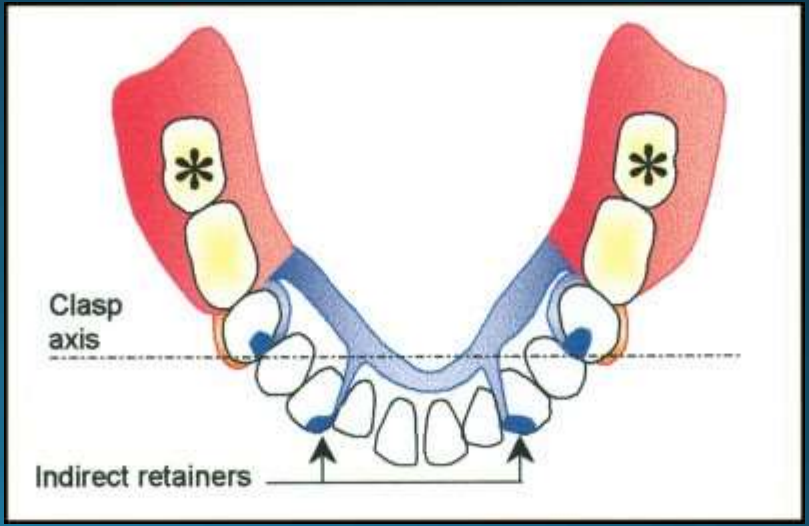
- Incisal rests are placed near the incisal angles of anterior teeth and on prepared rest seats. Although this is the least desirable placement of a rest seat for reasons previously mentioned, it may be used successfully for selected patients when the abutment is sound.



Incisal rest and rest seat

- It is prepared in the form of a rounded notch at the incisal angle or on an incisal edge; the floor of rest seat has been extended slightly onto labial aspect of tooth. Lingual view shows that all borders of rest seat are rounded to avoid sharp line angles. It is especially important to avoid a line angle at junction of axial wall of preparation and floor of rest seat.
- The enamel on the lingual surface should be prepared as a shallow depression to accommodate the minor connector and avoid annoying the tongue.

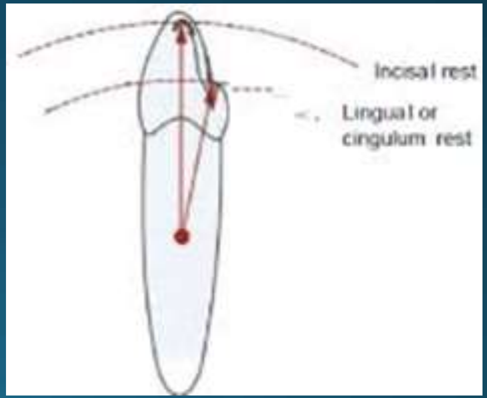




Incisal rest and rest seat

Lingual rest is preferable over the incisal rest because:

1. Lingual rest is more esthetic than the incisal rest because it lies on the lingual surface completely.
2. Lingual rest usually placed nearer to the horizontal axis of rotation of the abutment tooth (tipping axis), so it will has fewer tendencies to tip the teeth.
3. For mandibular teeth, they are not involved in the occlusion.




Success
Ahead

RETAINERS

BUSHRA MOHAMMED ALI AL-AMEEN

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IN GENERAL A REMOVABLE PARTIAL DENTURE SHOULD HAVE THESE REQUIREMENTS:

1-Support: The support derived from the abutment teeth through the use of **rests** and from the residual ridge through the use of **well fitting bases**.

2-Stability: Removable partial denture must be stable against **horizontal movement** through the use of rigid components like reciprocal arm of circumferential clasp and minor connector. Removable partial denture must also be stable against **rotational movements** through the use of rigid connector and indirect retainers.

3-Retention: Sufficient retention is provided by two means: **Primary retention** for removable partial denture is accomplished mechanically by placing retaining elements (direct retainers) on the abutment teeth. **Secondary retention** is provided by the intimate relationship of the minor connector contact with the guiding planes ,denture bases, and major connectors (maxillary) with the underlying tissue .The latter (secondary retention) is similar to the retention of complete denture. It is proportionate to the accuracy of the impression registration, the accuracy of the fit of the denture bases, and the total involved area of contact.

RETAINERS CAN BE DIVIDED INTO:

I. Direct retainers.

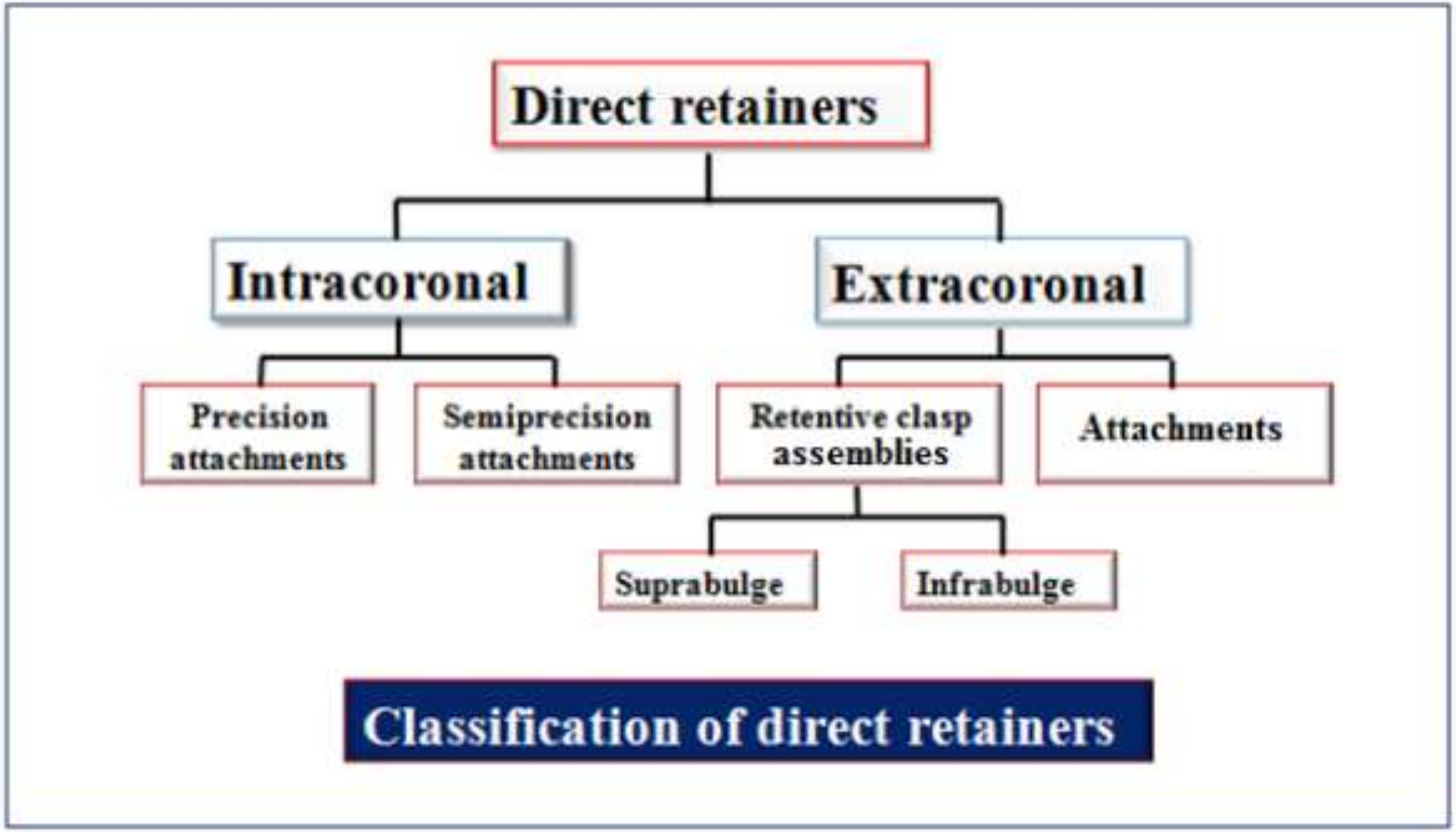
II. Indirect retainers.

Direct retainers

A direct retainer is any unit of a removable dental prosthesis that engages an abutment tooth to resist displacement of the prosthesis away from basal seat tissue.

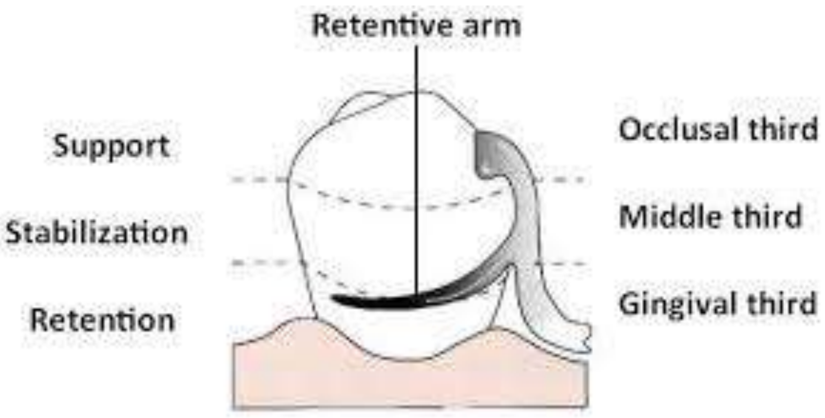
The direct retainer's ability to resist this movement is greatly influenced by the stability and support of the prosthesis provided by major and minor connectors, rests, and tissue bases.

CLASSIFICATION OF DIRECT RETANERS:

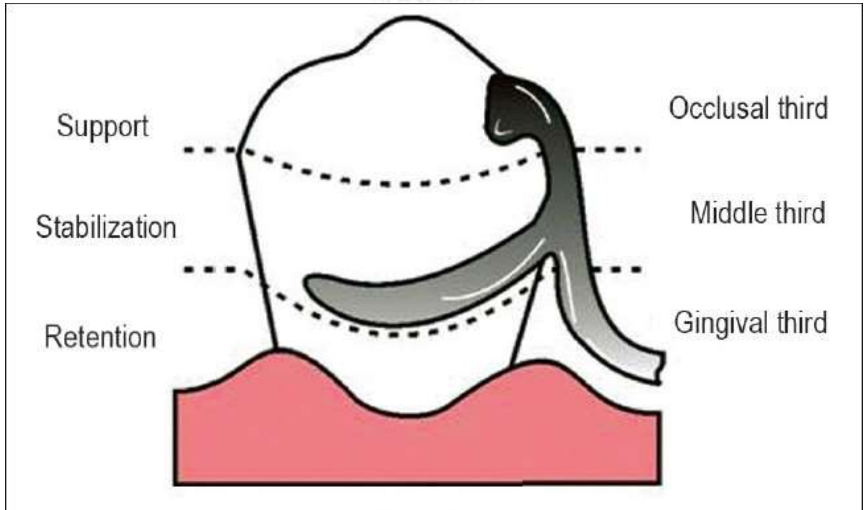


THE EXTRACORONAL RETAINER (CLASP TYPE)

- The extracoronal retainer is the most commonly used retainer for removable partial dentures, which uses mechanical resistance to displacement through components placed on the external surfaces of an abutment tooth in an area cervical to survey line or in a depression created for this purpose. Usually a flexible arm is forced to deform, so there will be resistance to removal.



Buccal

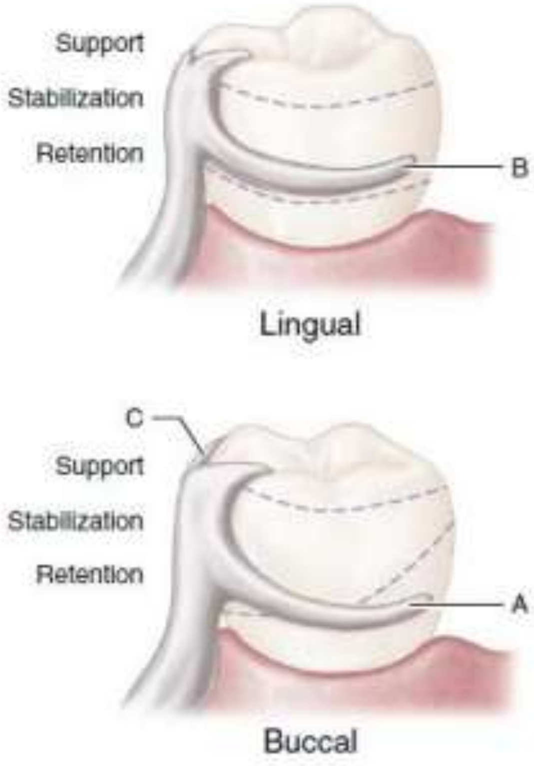


Lingual

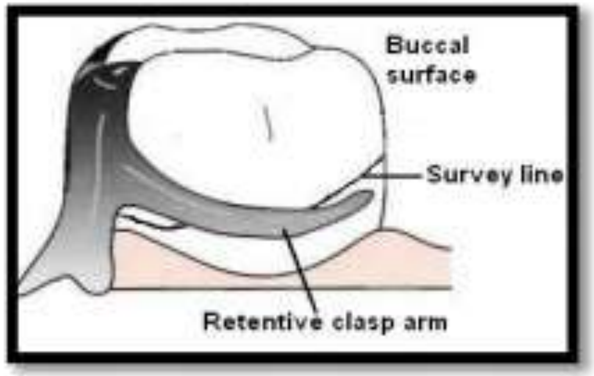
COMPONENTS OF CLASP ASSEMBLY:

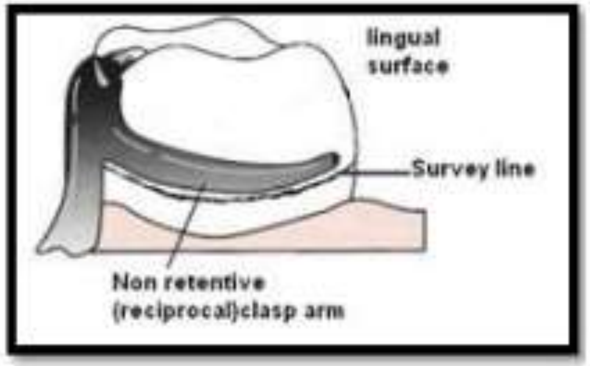
Component parts, Function and position of clasp assembly parts

Component Part	Function	Location
Rest	Support	Occlusal, lingual and incisal rests.
Minor connector	Stabilization	Proximal surfaces extending from a prepared marginal ridge to the junction of the middle and gingival one third of abutment crown.
Clasp arms	Stabilization (Reciprocation)	Middle one third of crown.
	Retention	Gingival one third of crown in measured undercut.

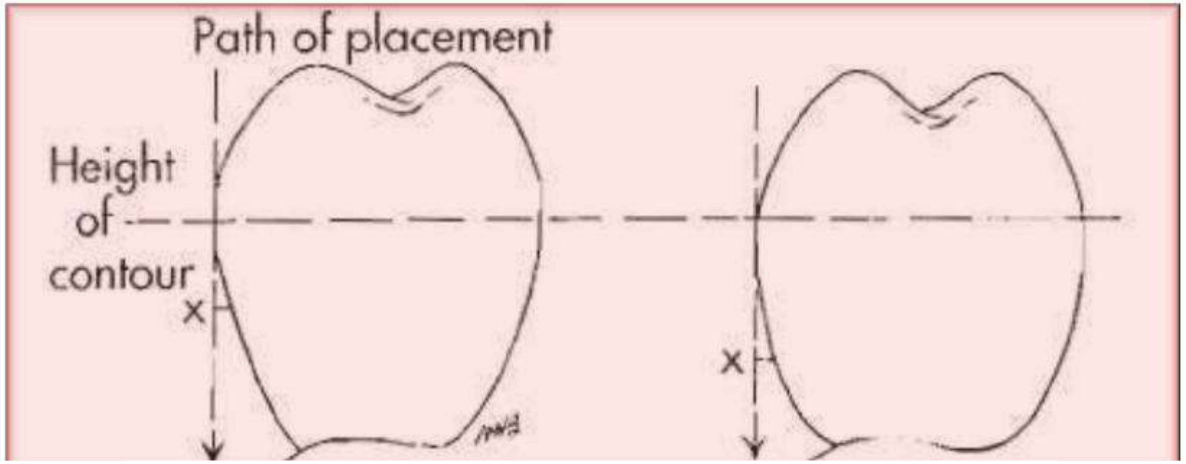


Extracoronal circumferential direct retainer Assembly consists of: (A) the buccal retentive arm; (B) the rigid lingual stabilizing (reciprocal) arm; and (C) the supporting occlusal rest. The terminal portion of the retentive arm is flexible and engages measured undercut. Assembly remains passive until activated by placement or removal of the restoration, or when subjected to masticatory forces that tend to dislodge the denture base.

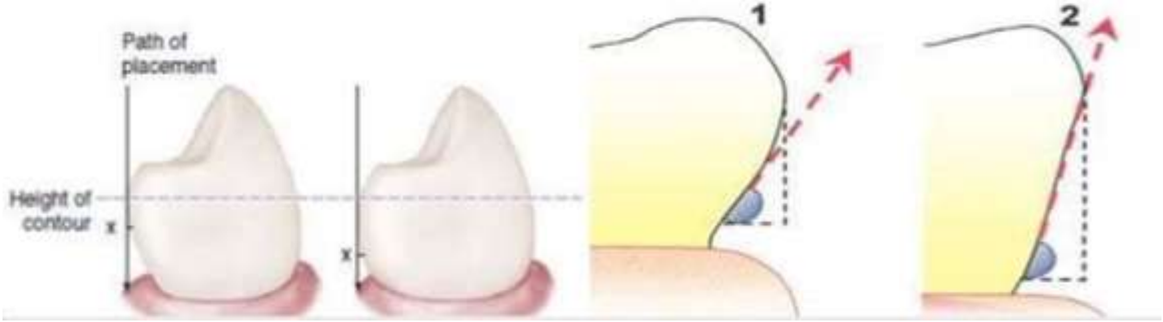




FACTORS AFFECTING THE MAGNITUDE OF RETENTION



Greater angle of cervical convergence on tooth (A) necessitates placement of clasp terminus, (X), nearer the height of contour than when lesser angle exists, as in (B).



I. Size of and distance into the angle of cervical (gingival) convergence and how far into the angle of convergence the clasp terminal is placed

- To be retentive, a tooth must have an angle of convergence cervical to the height of contour.
- When the angle of convergence between two abutments differs, uniformity of retention can be obtained by placing the clasp arms into the same degree of undercut (i.e. both 0.01").A guiding principle of partial denture design is that retention should be uniform in magnitude and bilaterally opposed amongst abutments.

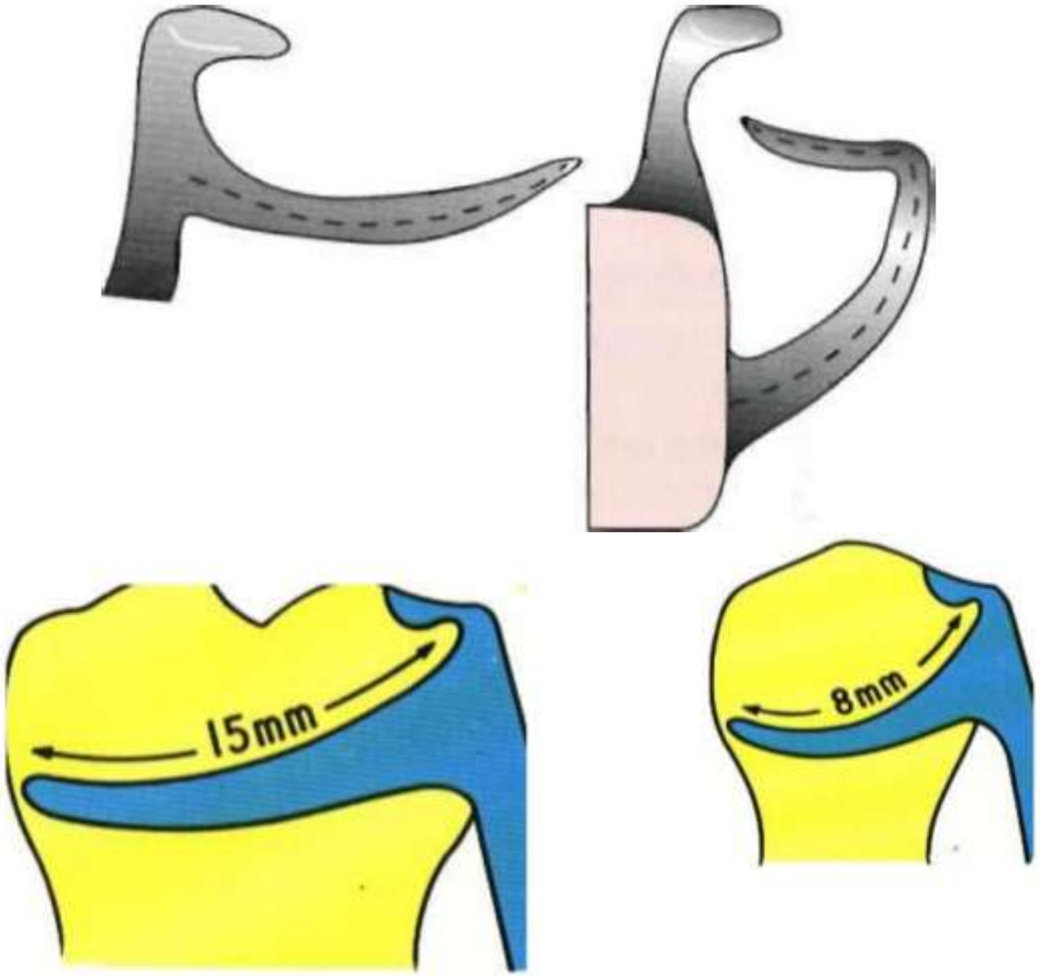
FACTORS AFFECTING THE MAGNITUDE OF RETENTION

II. Flexibility of the clasp arm

This is influenced by the following factors:

1. Length of clasp arm

- Increase length of clasp arm increase the flexibility of it (increasing clasp curvature increases length).
- Length of clasp arm is measured from the point where the taper begins.
- Length of clasp arm may be increased by using curving rather than straight retentive arms.



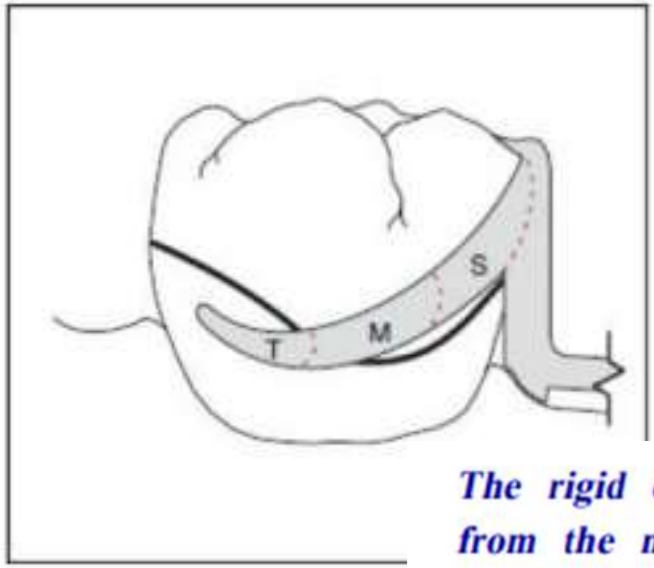
FACTORS AFFECTING THE MAGNITUDE OF RETENTION

II. Flexibility of the clasp arm

This is influenced by the following factors:

2. Diameter of clasp

- The greater the average diameter of a clasp arm the less flexible it will be.
- If it's taper is absolutely uniform, the average diameter will be at a point midway between its origin and its terminal end. If its taper is not uniform, a point of flexure and therefore a point of weakness will exist.
- The clasp should always taper from the body to the tip, being thicker where the body is attached to the denture base metal or acrylic and thinnest at the end of the arm.



The rigid clasp shoulder (S) originates from the minor connector and projects across the axial surface of the abutment. The relatively flexible midsection of the clasp arm (M) continues along the abutment surface and approaches the height of contour. The flexible clasp terminus (T) crosses apical to the height of contour, contacting the abutment on a surface undercut relative to the path of prosthesis insertion and removal.

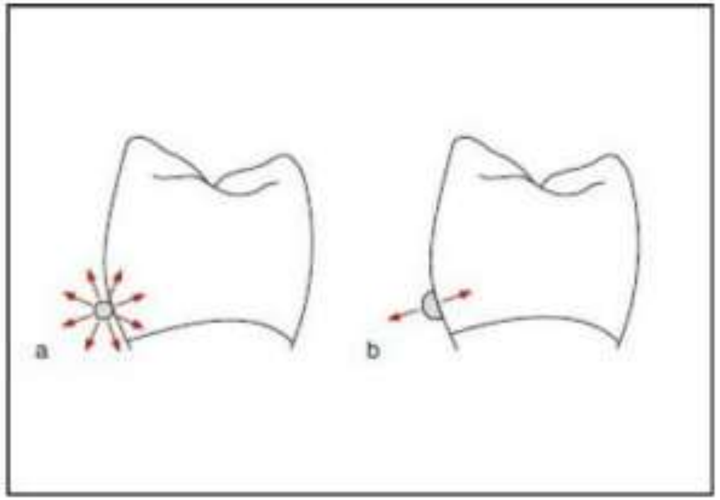
FACTORS AFFECTING THE MAGNITUDE OF RETENTION

II. Flexibility of the clasp arm

This is influenced by the following factors:

3. Cross-sectional form of the clasp arm

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



When viewed in cross-section, a round clasp (a) is able to flex in all directions, while a half-round clasp (b) is restricted to bidirectional flexure.

FACTORS AFFECTING THE MAGNITUDE OF RETENTION

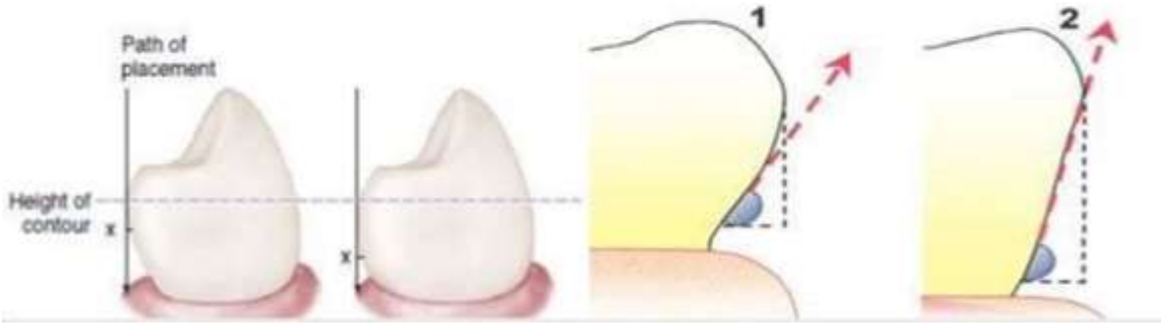
II. Flexibility of the clasp arm

This is influenced by the following factors:

4. Clasp material

- Whereas 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.
- Gold clasps are bulky and have a high cost.
- Wrought wire clasp have greater tensile strength than cast clasps and hence can be used in smaller diameter to provide greater flexibility without fatigue fracture.

FACTORS AFFECTING THE MAGNITUDE OF RETENTION



II. Flexibility of the clasp arm

This is influenced by the following factors:

5. Relative uniformity of retention

- Having reviewed the factors inherent to a determination of the amount of retention from individual clasps, it is important to consider coordination of relative retention between various clasps in a single prosthesis.

FACTORS AFFECTING THE MAGNITUDE OF RETENTION

II. Flexibility of the clasp arm

This is influenced by the following factors:

6. Stabilizing-reciprocal cast clasp arm

- When the direct retainer becomes active, the framework must be stabilized against horizontal movement. This stabilization is derived from either cross-arch framework contacts or a stabilizing or reciprocal clasp in the same clasp assembly.

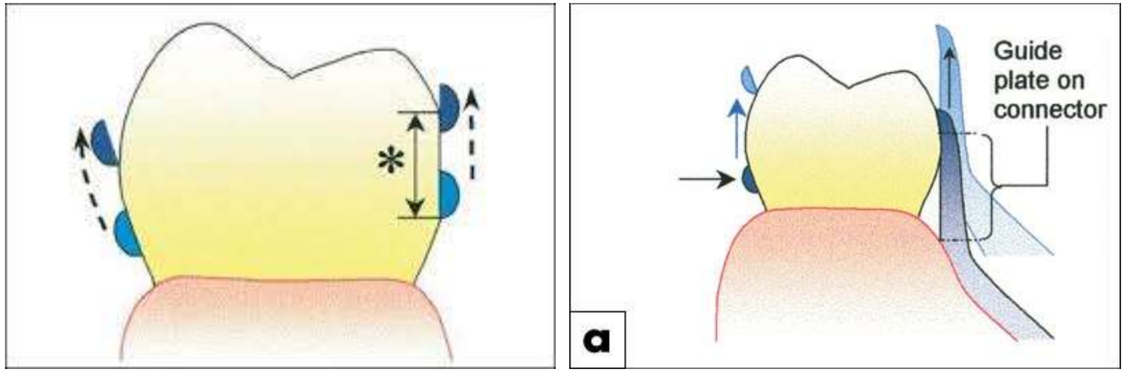
FACTORS AFFECTING THE MAGNITUDE OF RETENTION

II. Flexibility of the clasp arm

This is influenced by the following factors:

6. Stabilizing-reciprocal cast clasp arm

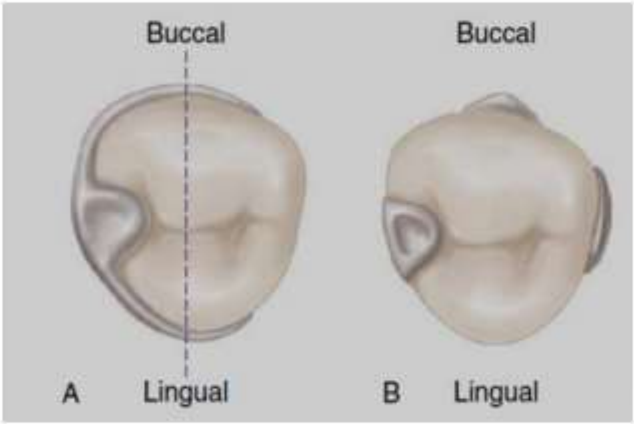
- To provide true reciprocation, the reciprocal clasp must be in contact during the entire period of retentive clasp deformation. This is best provided with lingual palatal, guide-plane surfaces.
- Its average diameter must be greater than the average diameter of the opposing retentive arm to increase desired rigidity.

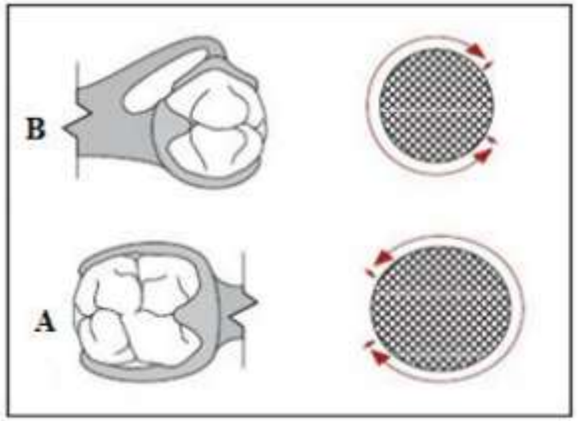


THE BASIC PRINCIPLES OF CLASP DESIGN

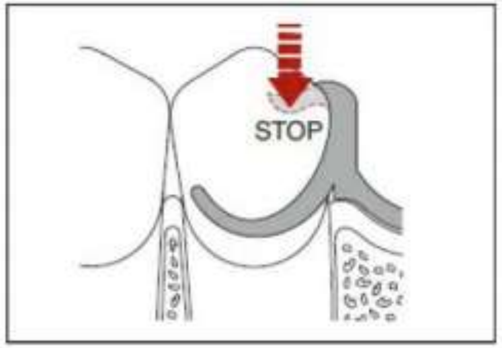
1. Encirclement:

- The principle of encirclement means that more than 180 degrees in the greatest circumference of the tooth must be engaged by the clasp assembly.
- The engagement can be in the form of continuous contact, such as in a circumferential clasp (A), or discontinuous contact, such as in the use of a bar clasp (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.**





THE BASIC PRINCIPLES OF CLASP DESIGN



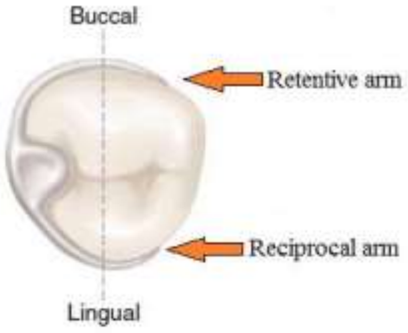
A rest must prevent apical displacement of the prosthesis. If this is not accomplished, the underlying hard and soft tissues may damaged.

2. Support:

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

3. Reciprocation:

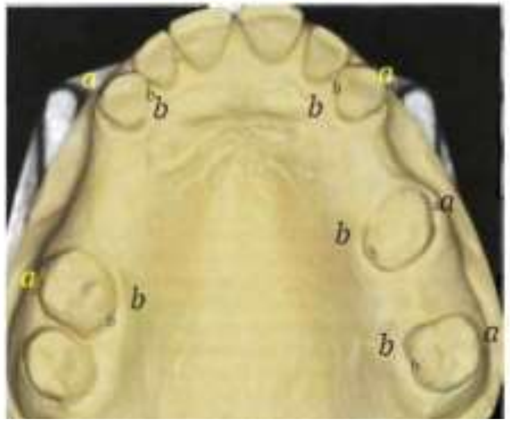
Each retentive terminal should be opposed by a reciprocal component capable of resisting any transient pressures exerted by the retentive arm during placement and removal.



THE BASIC PRINCIPLES OF CLASP DESIGN

4. Clasp retainers on abutment teeth adjacent to distal extension bases should be designed so that they will prevent direct transmission of tipping and rotational forces to the abutment. In effect, they must act as stress breakers either by their design or by their construction.

5. 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, or lingual on one side opposed by lingual on the other.

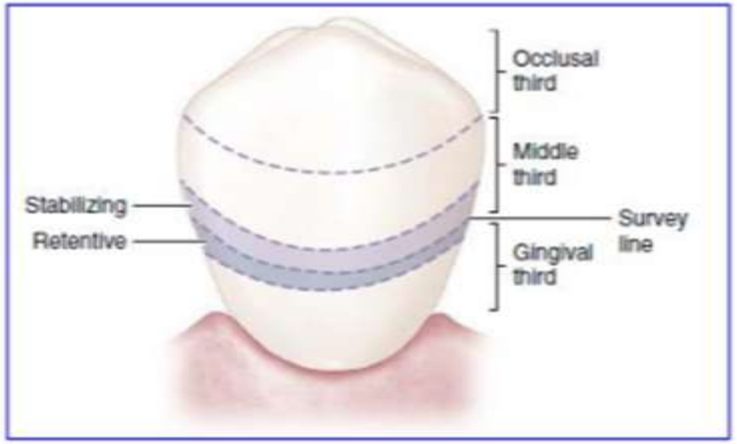


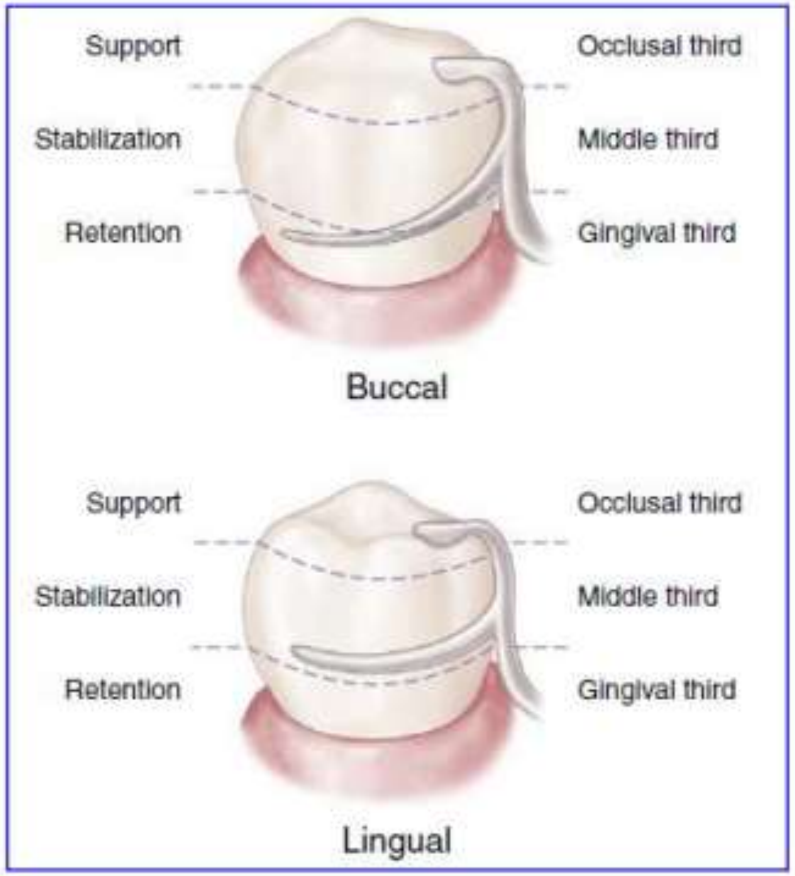
Retentive clasps should be bilaterally opposed. This means using bilateral buccal or bilateral lingual undercuts as shown on this Class III, mod. 2 arch where the retention may be either (a) bilaterally buccal or (b) bilaterally lingual.

THE BASIC PRINCIPLES OF CLASP DESIGN

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

7. 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. These locations permit better resistance to horizontal and torqueing forces because of a reduction in the effort arm.





THE BASIC PRINCIPLES OF CLASP DESIGN

8. Passivity:

When the clasp is in its place on the tooth surface, it should be at rest, the retentive tip of the clasp arm must be passive and remain in contact with the tooth ready to resist vertical dislodging force, so when a dislodging force is applied the clasp arm should immediately become active to engage tooth surface resist vertical displacement.

THE KEY TO SELECTING A SUCCESSFUL CLASP DESIGN FOR ANY GIVEN SITUATION IS TO CHOOSE ONE THAT WILL:

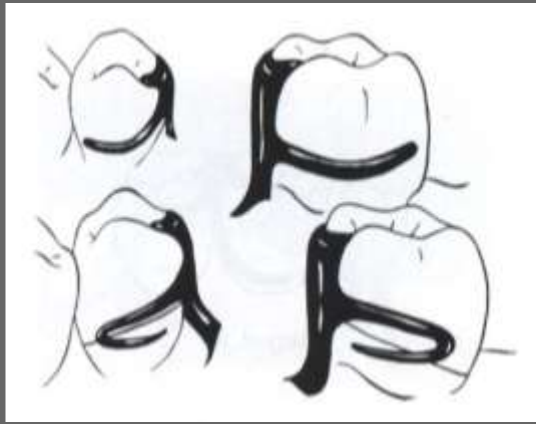
1- Avoid direct transmission of tipping or torquing forces to the abutment.

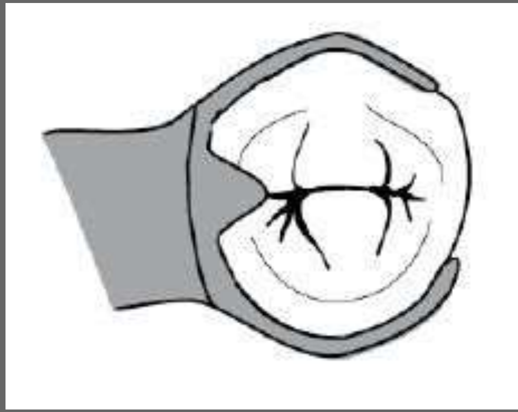
2- Accommodate the basic principles of clasp design by definitive location of component parts correctly positioned on abutment tooth surfaces.

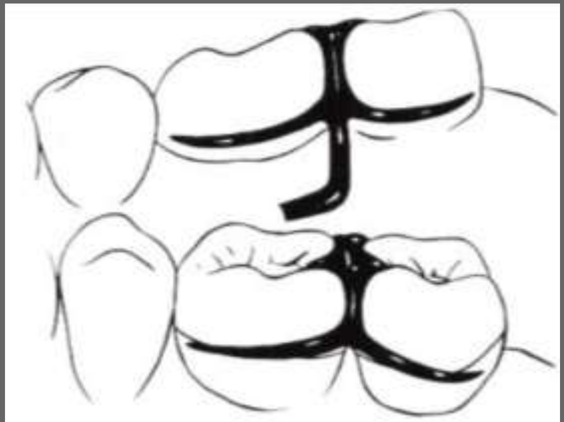
3- Provide retention against reasonable dislodging forces (with consideration for indirect retention).

4- Be compatible with undercut location, tissue contour, and esthetic desires of the patient.

Thank you







Types of Clasp Assemblies (1)

Bushra Mohammed Ali Al-Ameen

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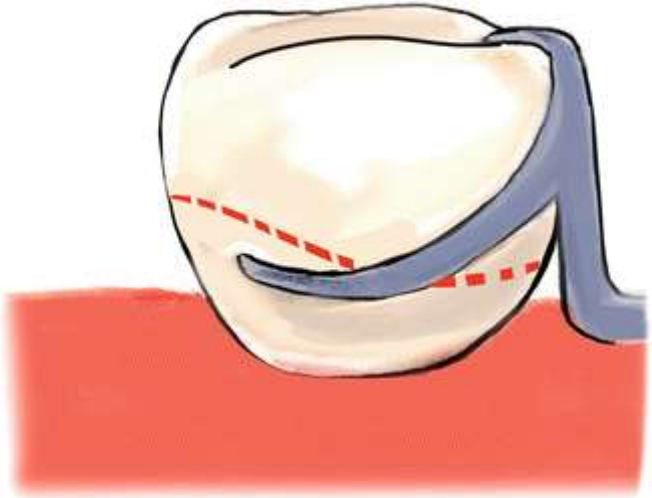
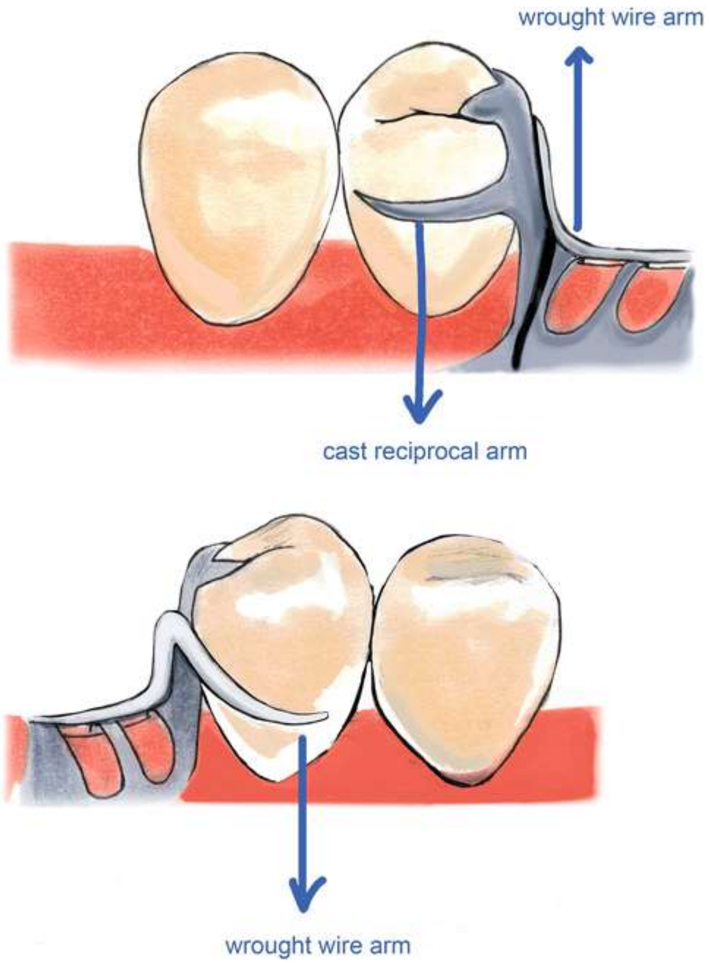
There are 4 principal forms of extracoronal retainers:

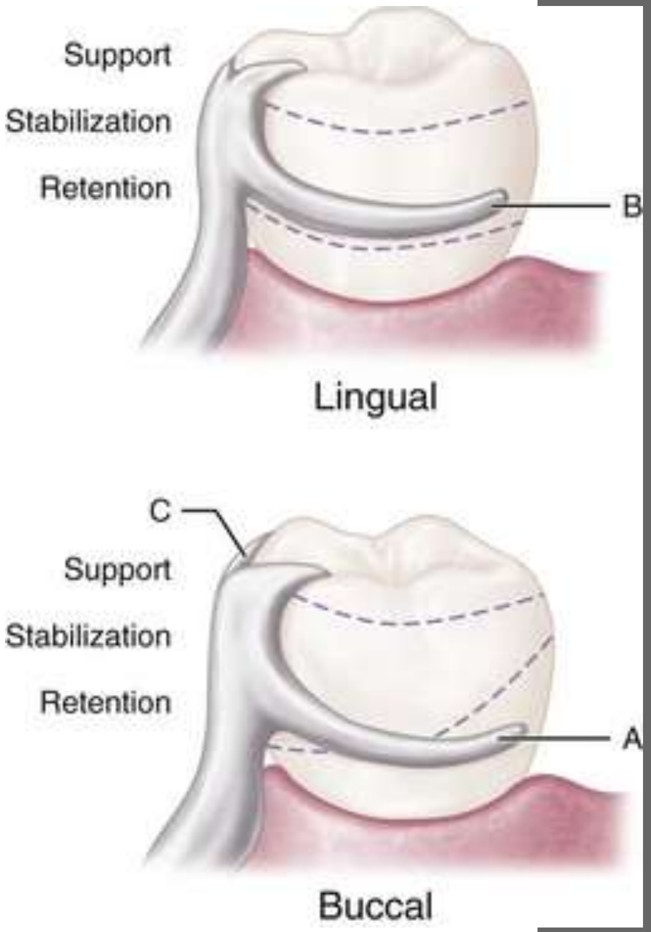
1. Circumferential clasp.
2. RPI system.
3. Bar clasp.
4. Combination clasp.





A- Circumferential clasp

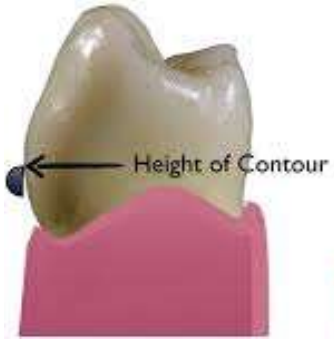
- It approach the undercut area from occlusal direction, it is called (occlusally approaching clasp), since it is coming to the undercut area above the height of contour so called supra-bulge clasp and since it is pulling the tooth during action so called pull clasp.

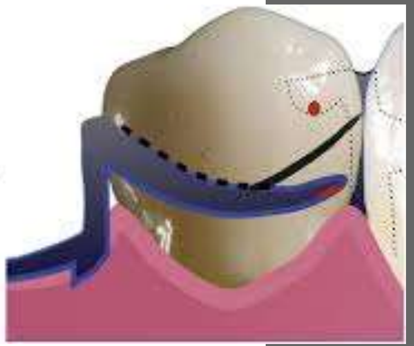


Circumferential clasp assembly consists of:

1. Buccal retentive arm: The terminal portion of retentive arm is flexible and engages measured undercut.
2. Rigid lingual stabilizing (reciprocal) arm.
3. Supporting occlusal rest.

- Assembly remains passive until activated by placement or removal of restoration or when subjected to masticatory forces that tend to dislodge the denture base.

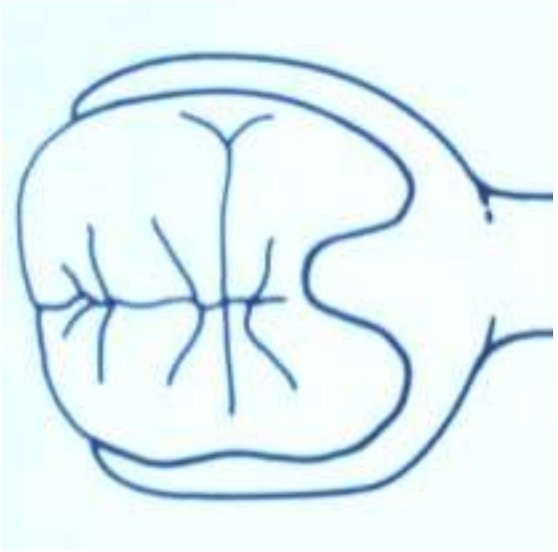




A- Circumferential clasp

Disadvantages:

1. More tooth surface is covered than with a bar clasp arm.
2. It may increase the width of the occlusal surface of the tooth.
3. More metal may be displayed than with the bar clasp arm.
4. As with all cast clasps, true adjustment is impossible.



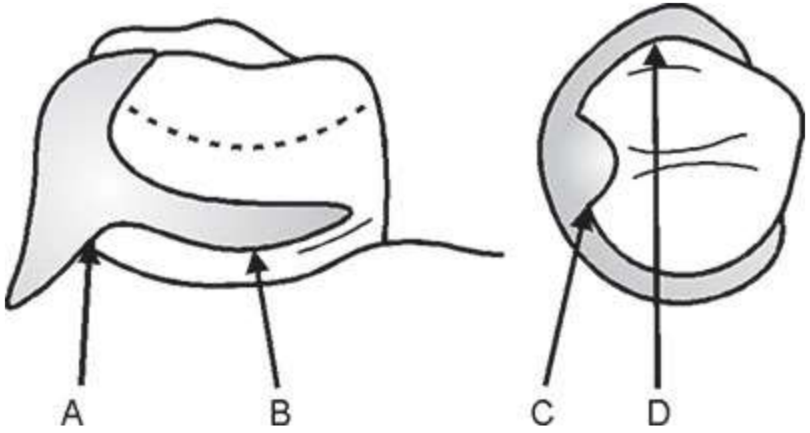
Types of circumferential clasps

1. Basic form of circumferential clasp
2. Ring Clasp
3. Embrasure clasp (Butterfly clasp)
4. Multiple clasp
5. Half-and-half clasp
6. Reverse-action clasp (hairpin)
7. Back-action clasp

Types of circumferential clasps

1. Basic form of circumferential clasp:

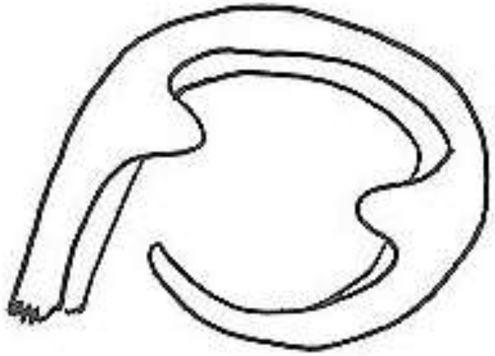
- It is a buccal and lingual arm originating from a common body.
- This clasp is used properly when two clasp arms originate from the body and occlusal rest areas and approach bilateral retentive and nonretentive areas on the sides of the tooth away from the point of origin.
- It is the clasp of choice for tooth-supported removable partial denture.



Types of circumferential clasps

2. **Ring Clasp:**

- It is indicated with isolated mandibular molar abutment.
- It encircles nearly all of a tooth from its point of origin.
- It is used when a proximal undercut cannot be approached by other means. For example, when a mesiolingual undercut on a lower molar abutment cannot be approached directly because of its proximity to the occlusal rest area and cannot be approached with a bar clasp arm because of lingual inclination of the tooth, the ring clasp encircling the tooth allows the undercut to be approached from the distal aspect of the tooth.
- The clasp should never be used as an unsupported ring, because if it is free to open and close as a ring, it cannot provide either reciprocation or stabilization.

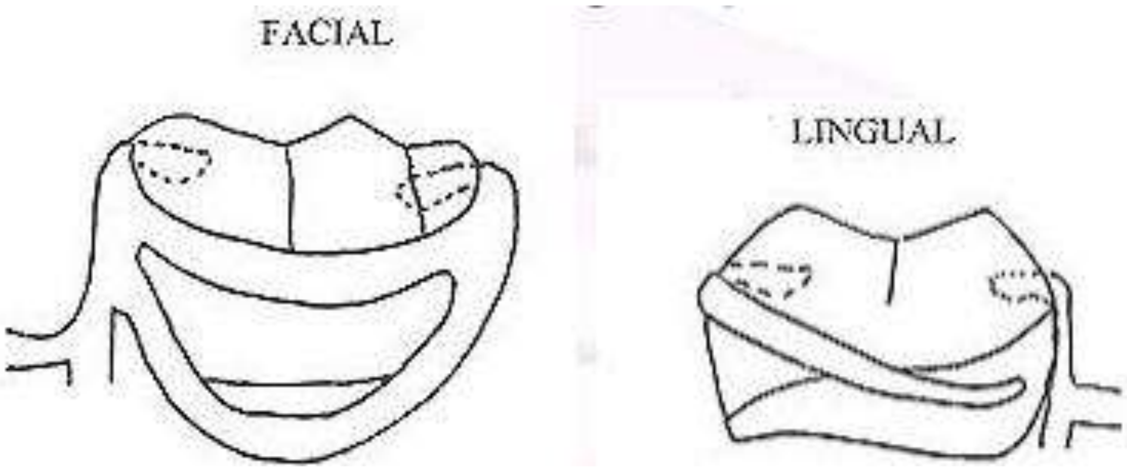


Ring clasp

Types of circumferential clasps

2. Ring Clasp:

- It should always be used with a supporting strut on the non-retentive side, with or without an auxiliary occlusal rest on the opposite marginal ridge.



Types of circumferential clasps

2. Ring Clasp:

Advantages:

1. Provides adequate encirclement.
2. Excellent retention with adequate flexibility due to increased length of clasp arm.
3. The advantage of an auxiliary rest is that further movement of a mesially inclined tooth is prevented by the presence of a distal rest.

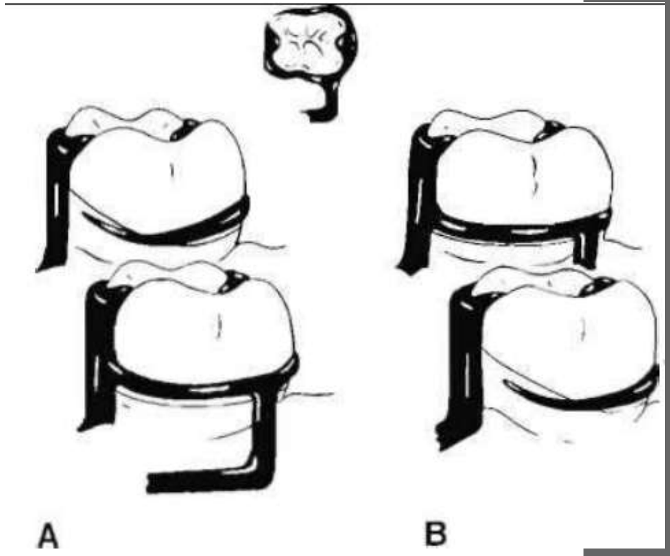
Disadvantages:

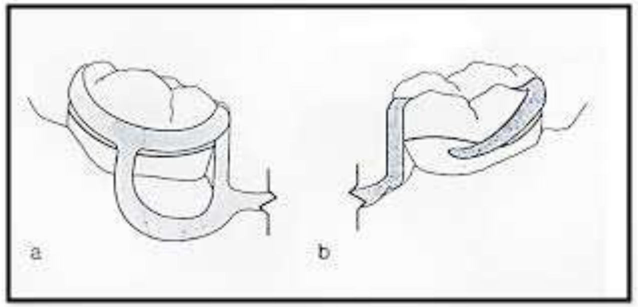
1. Decalcification of teeth.
2. Increased occlusal table.
3. Poor esthetics, Esthetics need not be considered on such a posteriorly located tooth.

Types of circumferential clasps

2. Ring Clasp:

- Ring clasp encircling nearly all of tooth from its point of origin. A, Clasp originates on mesiobuccal surface and encircles tooth to engage mesiolingual undercut. B, Clasp originates on mesiolingual surface and encircles tooth to engage mesiobuccal undercut. In either example, supporting strut is used on non-retentive side.
- A ring-type clasp may be used in reverse on an abutment located anterior to a tooth bounded edentulous space. The only justification for its use is when a distobuccal or distolingual undercut cannot be approached directly from the occlusal rest area and/or tissue undercuts prevent its approach from a gingival direction with a bar clasp arm.

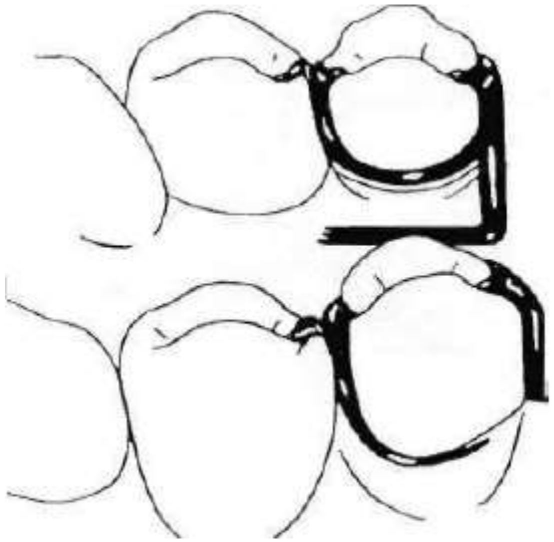




Types of circumferential clasps

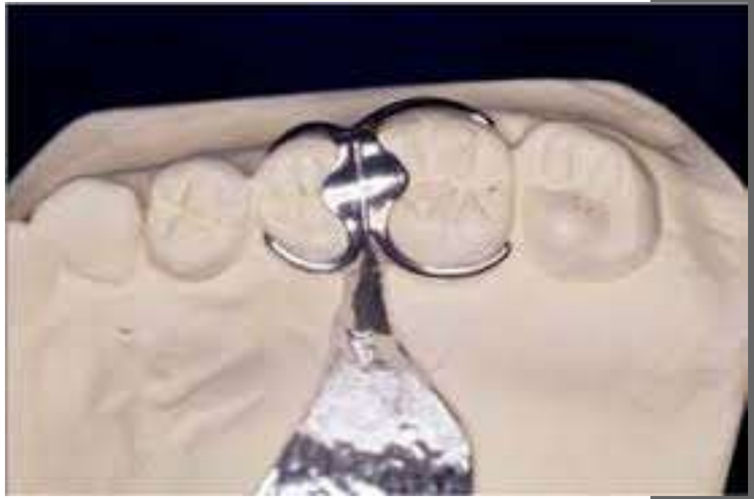
2. **Ring Clasp:**

- Improperly designed ring clasp lacking necessary support. Such a clasp lacks any reciprocating or stabilizing action because entire circumference of clasp is free to open and close.

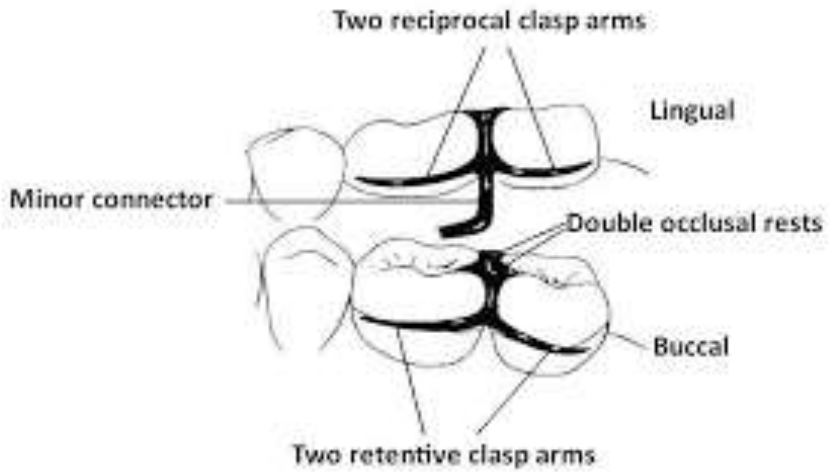


Types of circumferential clasps

3. **Embrasure clasp (Butterfly clasp) (bonwill clasp):**



- Embrasure clasp two opposing circumferential clasps joined at their bodies. Embrasure clasps should have two retentive clasp arms and two reciprocal clasp arms, either bilaterally or diagonally opposed.
- It always should be used with double occlusal rests. This is done to avoid interproximal wedging by the prosthesis, which could cause separation of the abutment teeth and result in food impaction and clasp displacement. In addition to providing support, occlusal rests also serve to shunt food away from contact areas.
- It is used on the side of the arch where there is no edentulous space(unmodified class II or class III).



Types of circumferential clasps

3. **Embrasure clasp (Butterfly clasp):**

- Example of use of embrasure clasp for a Class II partially edentulous arch. Embrasure clasp on two left molar abutments was used in the absence of posterior modification space.

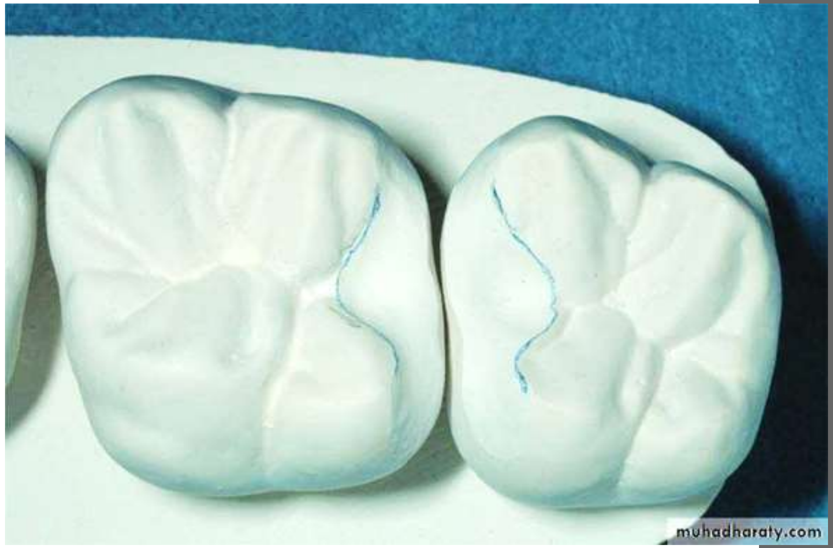
Types of circumferential clasps

3. **Embrasure clasp (Butterfly clasp):**

Disadvantages:

1. Improper clearance can give rise thin section of clasp leading to breakage.

- Occlusal and proximal surfaces of adjacent molar and premolar prepared for embrasure clasp.
- Note that rest seat preparations are extended both buccally and lingually to accommodate retentive and reciprocal clasp arms.



Types of circumferential clasps

4. Multiple clasp:

- The multiple clasp is simply two opposing circumferential clasps joined at the terminal end of the two reciprocal arms. It is used when additional retention and stabilization are needed, usually when the principal abutment tooth is periodontally compromised and stresses originating from prosthesis retention can be distributed between multiple abutment teeth. It may be used for multiple clasping in instances in which the partial denture replaces an entire half of the dental arch. It may be used rather than an embrasure clasp when the only available retentive areas are adjacent to each other. Its disadvantage is that two embrasure approaches are necessary rather than a single common embrasure for both clasps.

Types of circumferential clasps

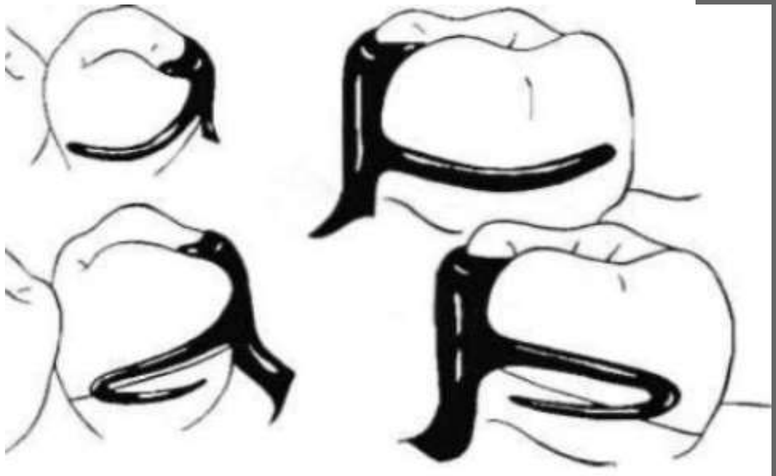
5. **Half-and-half clasp:**

- The half-and-half clasp consists of a circumferential retentive arm arising from one direction and a reciprocal arm arising from another.
- The second arm must arise from a second minor connector, and this arm is used with or without an auxiliary occlusal rest. Reciprocation arising from a second minor connector can usually be accomplished with a short bar or with an auxiliary occlusal rest, thereby avoiding so much tooth coverage. There is little justification for the use of the half-and-half clasp in bilateral extension base partial dentures.

Types of circumferential clasps

6. **Reverse-action clasp (hairpin)(fish hook):**

- The reverse-action clasp arm is designed to permit engaging a proximal undercut from an occlusal approach by looping back the retentive arm to engage an undercut apical to the point of origin.



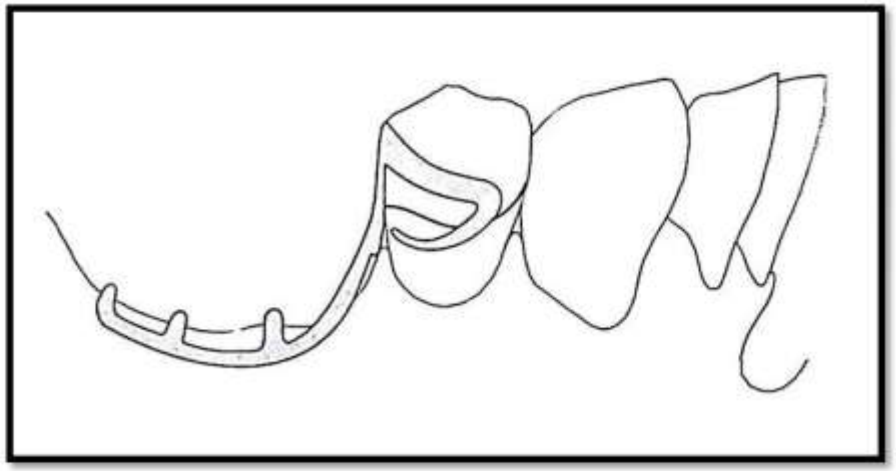
Retentive arm has two horizontal components:

- The occlusal portion which acts as a minor connector.
- The apical portion which pass over the height of contour to engage the desired undercuts.
- Properly designed, the reverse-action clasp should make a hairpin turn to engage an undercut below the point of origin.

Types of circumferential clasps

6. **Reverse-action clasp (hairpin):**

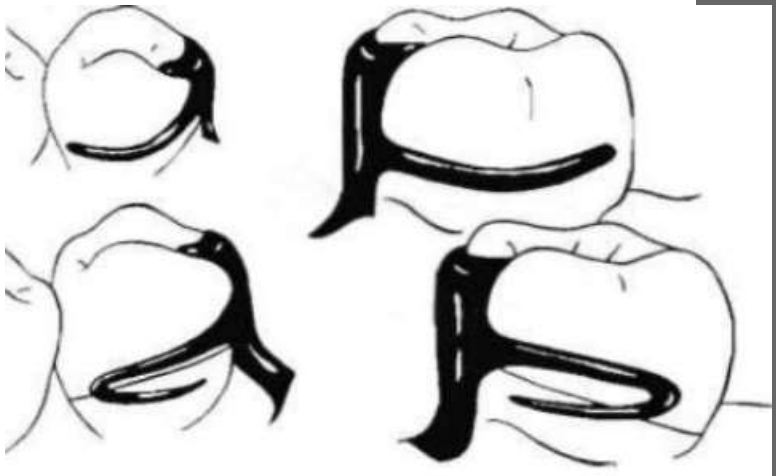
- The upper part of the arm of this clasp should be considered a minor connector and must be rigid, giving rise to the tapered lower part of the arm. Therefore only the lower part of the arm should be flexible. With the retentive portion beginning beyond the turn, only the lower part of the arm should flex over the height of contour to engage a retentive undercut. The bend that connects the upper and lower parts of the arm should be rounded to prevent stress accumulation and fracture of the arm at the bend.



Types of circumferential clasps

6. **Reverse-action clasp (hairpin)(fish hook):**

- Other methods of accomplishing the same result are with a ring clasp originating on the opposite side of the tooth or with a bar clasp arm originating from a gingival direction. However, when a proximal undercut must be used on a posterior abutment and when tissue undercuts, tilted teeth, or high tissue attachments prevent the use of a bar clasp arm, the reverse-action clasp may be used successfully.



Types of circumferential clasps

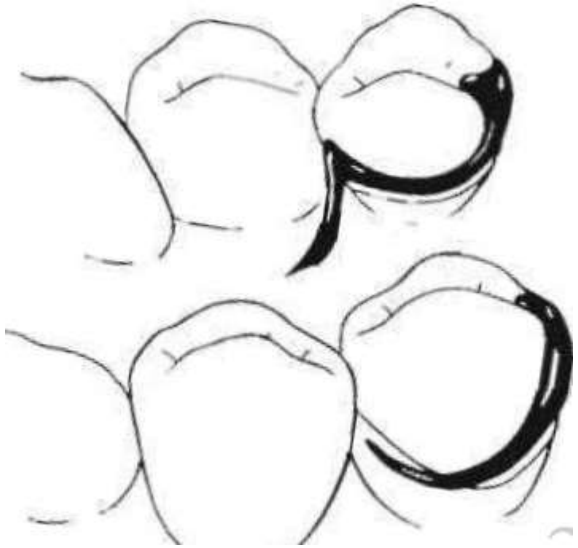
6. Reverse-action clasp (hairpin):

- Although the ring clasp may be preferable, lingual undercuts may prevent the placement of a supporting strut without tongue interference. In this limited situation, the hairpin clasp arm serves adequately, despite its several disadvantages.
- The clasp covers considerable tooth surface and may trap debris; its occlusal origin may increase the functional load on the tooth, and its flexibility is limited.
- Esthetics usually need not be considered when the clasp is used on a posterior abutment, but the hairpin clasp arm does have the additional disadvantage of displaying too much metal for use on an anterior abutment.
- To use this type of clasp, there should be sufficient clinical crown height to provide space between occlusal and apical arms.

Types of circumferential clasps

7. **Back-action clasp:**

- The back-action clasp is a modification of the ring clasp. Back-action circumferential clasp is used on premolar abutment anterior to edentulous space. The undercut can usually be approached just as well using a conventional circumferential clasp, with less tooth coverage and less display of metal. With the circumferential clasp, the proximal tooth surface can be used as a guiding plane as it should be, and the occlusal rest can have the rigid support it requires.
- An occlusal rest always should be attached to some rigid minor connector and should never be supported by a clasp arm alone. If the occlusal rest is part of a flexible assembly, it cannot function adequately as an occlusal rest.

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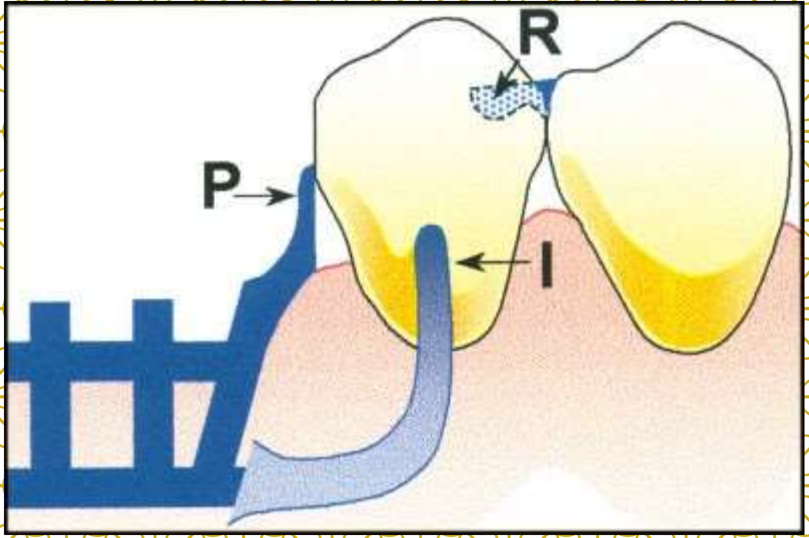

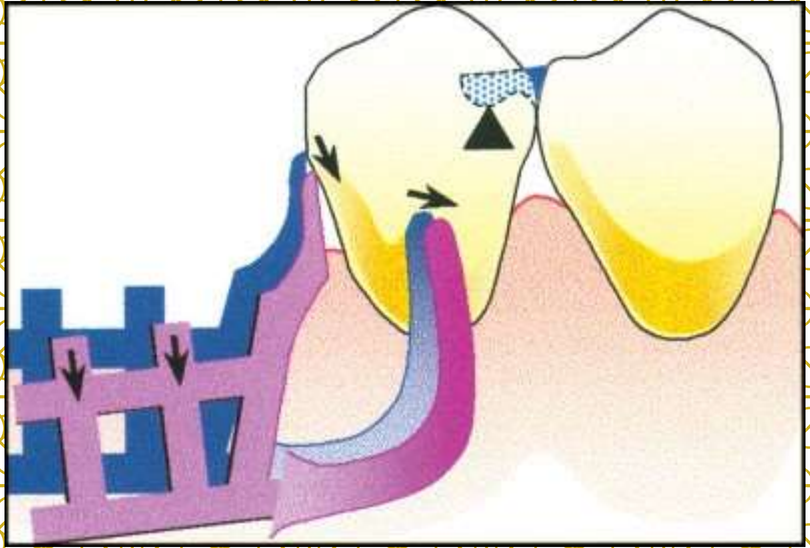

TYPES OF CLASP ASSEMBLIES (2)

Bushra Mohammed Ali Al-Ameen
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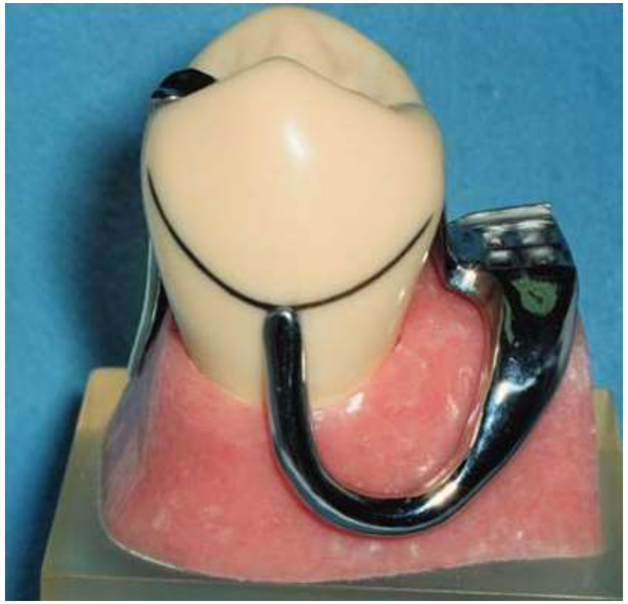
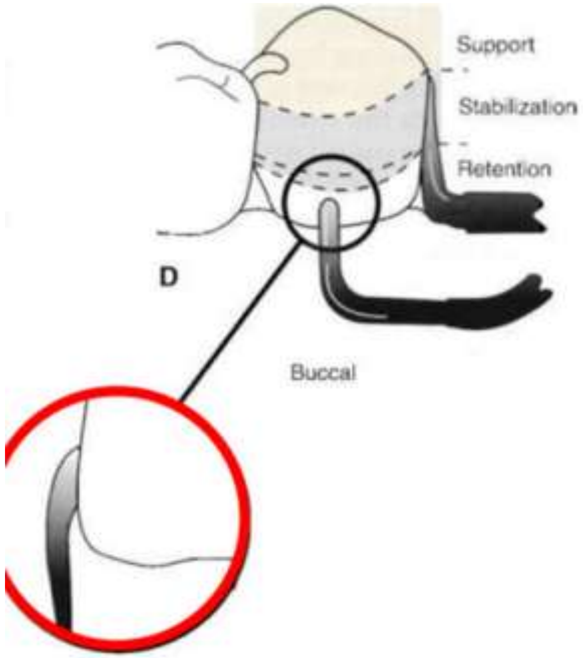
BAR CLASP

It approaches the undercut area from gingival direction, it is called **gingivally approaching clasp**, since it is coming to the undercut area under the height of contour, so called **infrabulge clasp**, and since it is pushing the tooth during action so called **push clasp**.

The I bar should be located in the gingival third of the buccal or labial surface of the abutment. The whole arm of the I-bar should be tapered to its terminus, **with no more than 2 mm of its tip contacting the abutment**, the retentive tip contacts the tooth from the undercut to the height of contour.



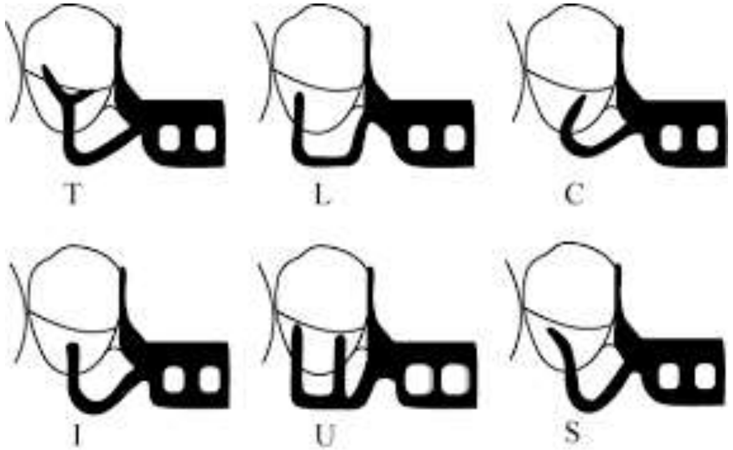
BAR CLASP



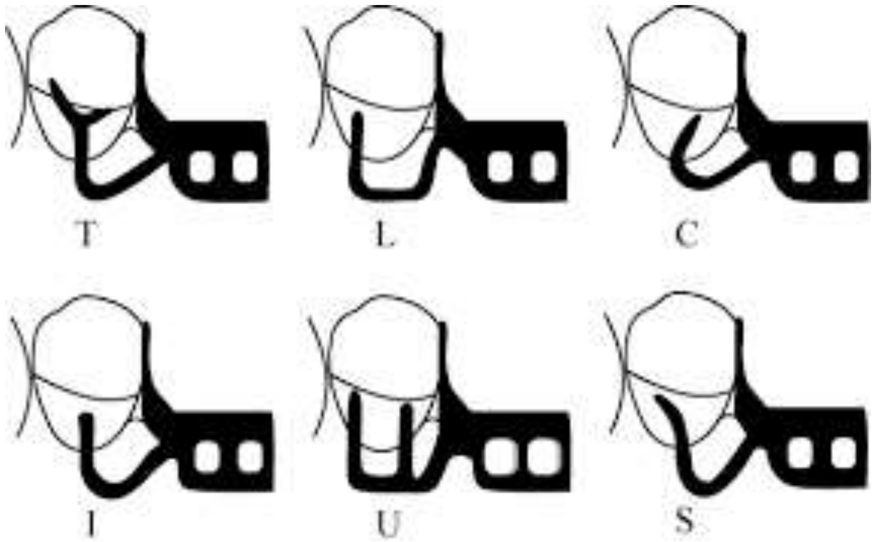
The horizontal portion of the approach arm must be located at least 4 mm from the gingival margin and even farther if possible.

The term bar clasp is generally preferred over the less descriptive term Roach clasp arm. The bar clasp arm arises from the denture framework or a metal base and approaches the retentive undercut from a gingival direction.

The bar clasp arm has been classified by the shape of the retentive terminal. Thus it has been identified as a T, modified T, I,Y or U…etc.



BAR CLASP



1. Buccal retentive arm (I-bar) engaging measured undercut (with slight occlusal extension for stabilization.
2. The approach arm of an infra-bulge clasp must not impinge on the soft tissues adjacent to the abutment.
3. The approach arm should cross perpendicular to the free gingival margin.
4. It should not be used in area of tissue undercut.
5. Uniform length and adequate taper should be given for sufficient flexibility
6. The clasp terminus tip should be placed as apical as possible on the abutment teeth.

BAR-TYPE CLASP ASSEMBLY

Indications:

1. When a small degree of undercut (0.25 mm) exists in the cervical third of the abutment tooth, which may be approached from a gingival direction.
2. On abutment teeth for tooth-supported partial dentures or tooth-supported modification areas, and on abutments teeth of tooth-tissue supported as a part of the RPI system.
3. In situations in which esthetic considerations must be accommodated and a cast clasp is indicated.

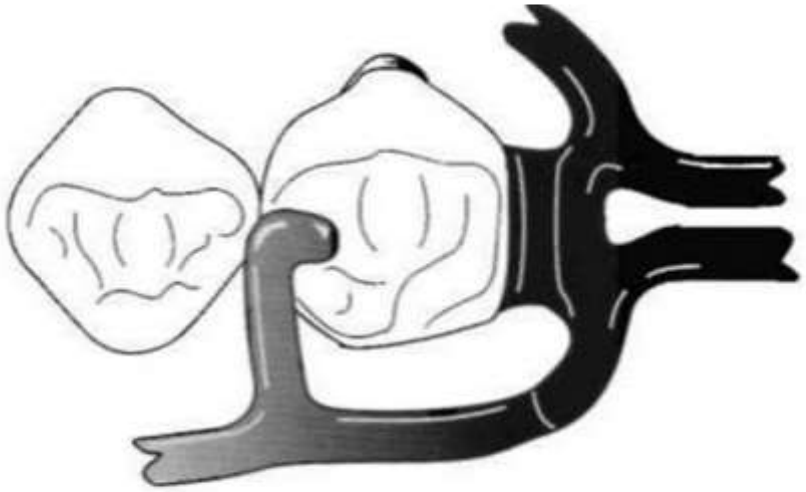
BAR-TYPE CLASP ASSEMBLY

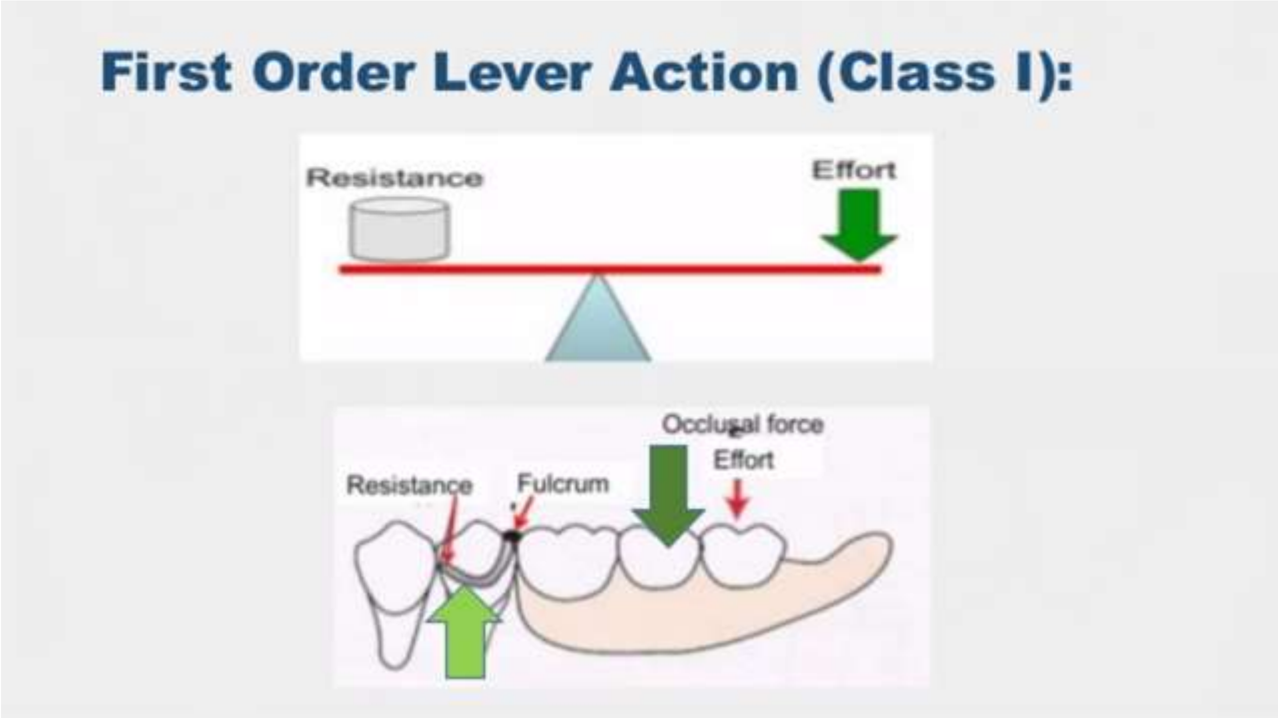
Contraindications:

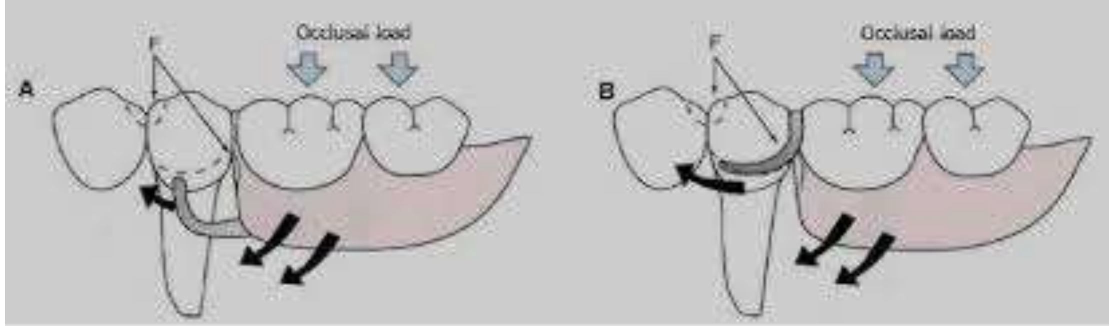
1. When a deep cervical undercut exists or when a severe tooth and/or tissue undercut exist, either of which must be bridged by excessive block-out. When severe tooth and tissue undercuts exist, a bar clasp arm usually is an annoyance to the tongue and cheek and also traps food debris.
2. Shallow vestibule (less than 4 mm) or an excessive buccal or lingual tilt of the abutment tooth.

RPI SYSTEM

- Clasp assemblies that accommodate functional prosthesis movement are designed to address the concern of a Class I lever.
- The concern is that the distal extension acts as a long "effort arm" across the distal rest "fulcrum“ to cause the clasp tip "resistance arm" to engage the tooth undercut.
- This results in a harmful tipping or torqueing of the tooth and is greater with stiff clasps and more denture base movement.

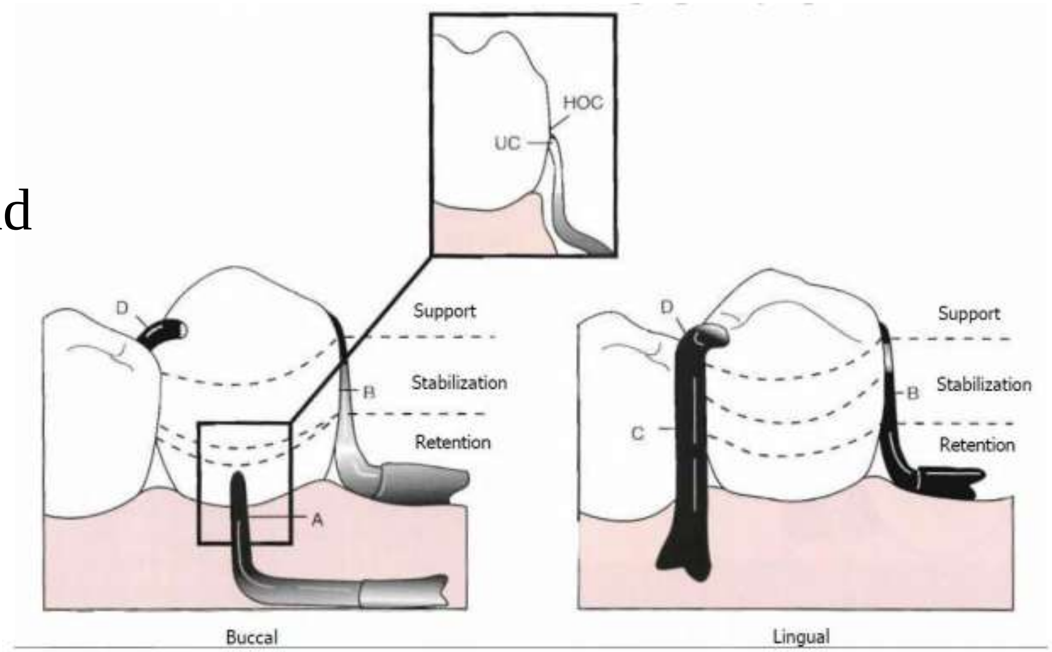






RBI SYSTEM CONSISTS OF:

1. Buccal retentive arm (I-bar) engaging measured undercut.
2. Stabilizing (reciprocal) elements , the area of bar contact along with the rest and its minor connector and proximal plate contact provides stabilization through encirclement.
3. Proximal plate minor connector on distal.
4. Lingually placed mesial minor connector for occlusal rest, which also serves as a stabilizing (reciprocal) component.
5. Mesially placed supporting occlusal rest. Assembly remains passive until activated.

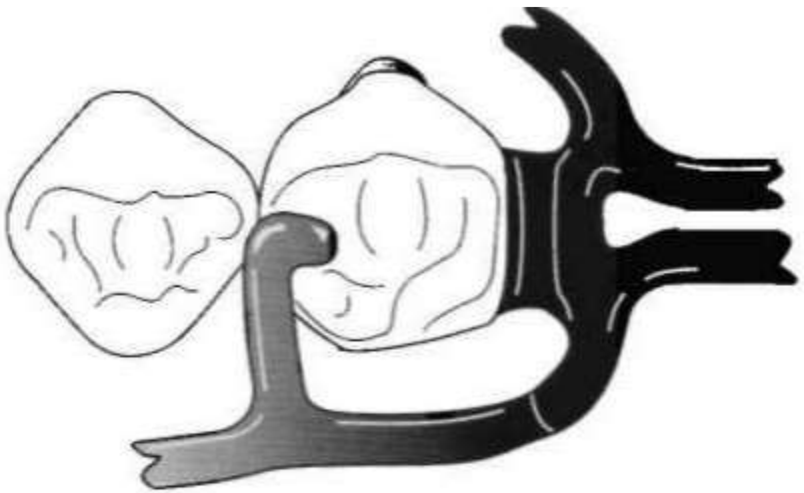


RPI SYSTEM

In case of free end extension denture two strategies are adopted to either change the fulcrum location and subsequently the "resistance arm" engaging effect (mesial rest concept clasp assemblies), or to minimize the effect of the lever by use of a flexible arm (wrought-wire retentive arm) which is called combination clasp.

Mesial rest concept clasps are proposed to accomplish movement accommodation by changing the fulcrum location. This concept includes the RPI clasps. The RPI is a current concept of bar clasp design, and refers to the rest, proximal plate, and I-bar component parts of the clasp assembly.

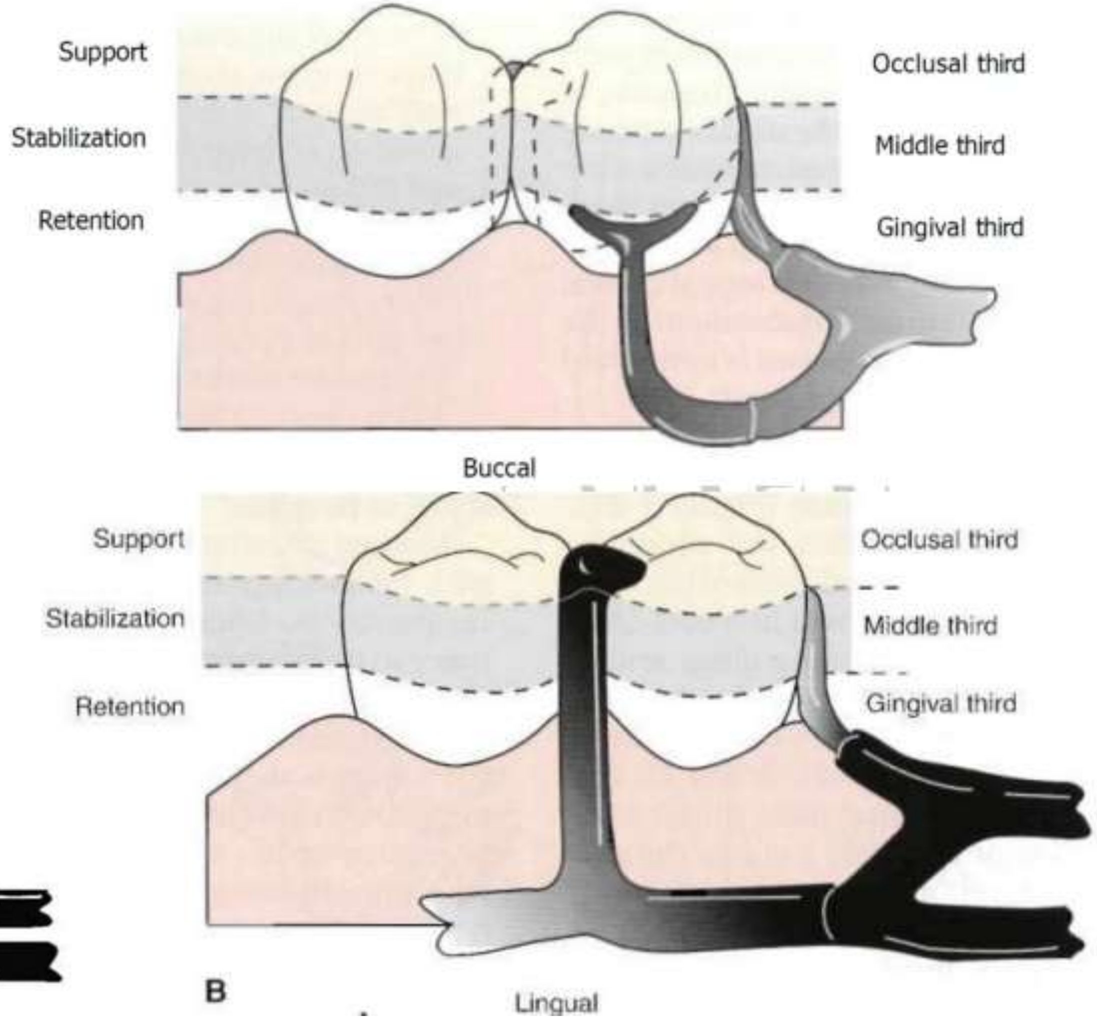
Basically, this clasp assembly consists of a mesioocclusal rest with the minor connector placed into the mesiolingual embrasure, but not contacting the adjacent tooth.

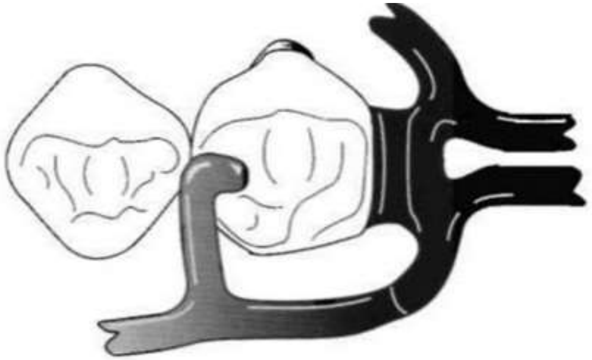


BAR-TYPE CLASP ASSEMBLY

A distal guiding plane, extending from the marginal ridge to the junction of the middle and gingival thirds of the abutment tooth, is prepared to receive a proximal plate.

The buccolingual width of the guiding plane is determined by the proximal contour of the tooth.

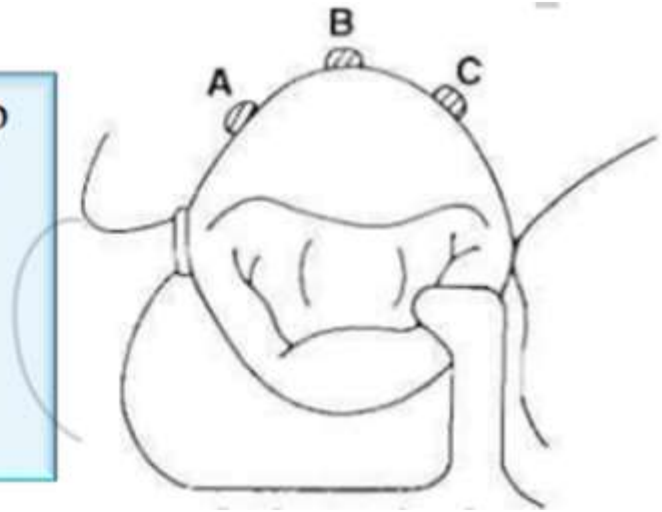




BAR-TYPE CLASP ASSEMBLY

The proximal plate, in conjunction with the minor connector supporting the rest, provides the stabilizing and reciprocal aspects of the clasp assembly.

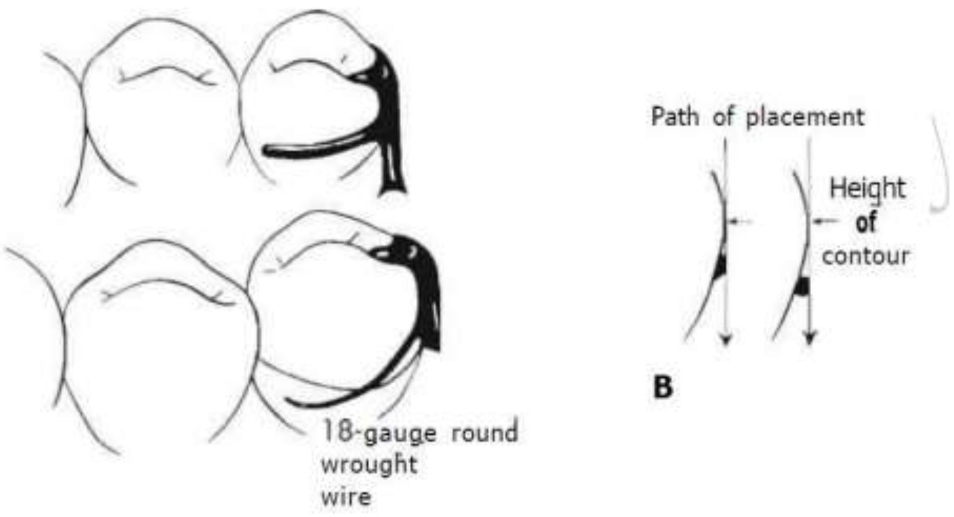
Occlusal view of RPI bar clasp assembly. Placement of l-bar:
(A) On distobuccal surface.
(B) At greatest mesiodistal prominence.
(C) On mesiobuccal surface.



COMBINATION CLASP

Another strategy to reduce the effect of the Class I lever in distal extension situations is to use a flexible component in the (resistance arm) which is the strategy employed in the combination clasp.

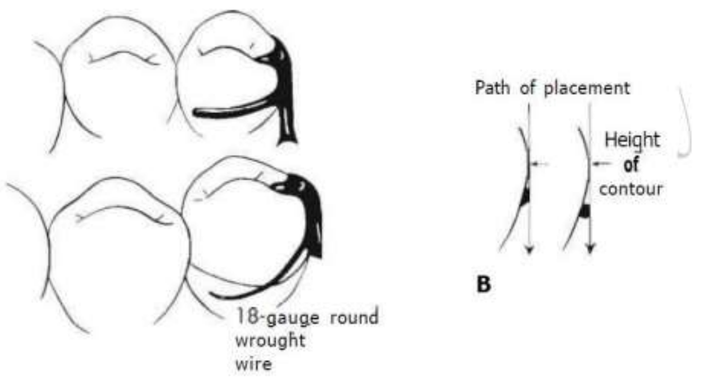
The combination clasp consists of a wrought-wire retentive clasp arm and a cast reciprocal clasp arm, the wrought-wire retentive clasp arm is either cast to, or soldered to, a cast framework.



COMBINATION CLASP

Indication:

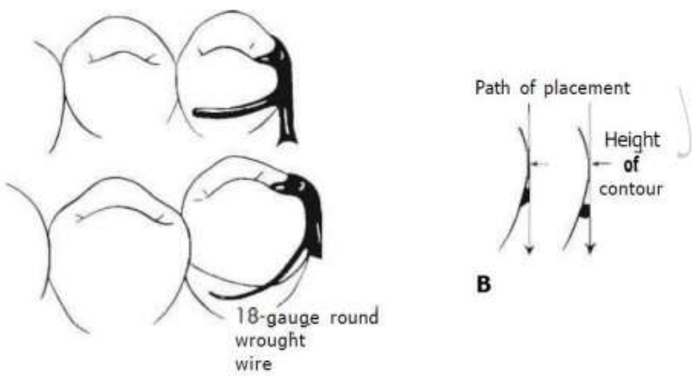
1. On an abutment tooth adjacent to a distal extension base where only a mesial undercut exists on the abutment or where a large tissue undercut contraindicates a bar-type retainer, to minimize the effects of first-class lever system.
2. When maximum flexibility is desirable, such as on an abutment tooth adjacent to a distal extension base or on a weak abutment when a bar-type direct retainer is contraindicated.
3. Its adjustability when precise retentive requirements are unpredictable and later adjustment to increase or decrease retention may be necessary.
4. Its esthetic advantage over cast clasps.



COMBINATION CLASP

Advantages:

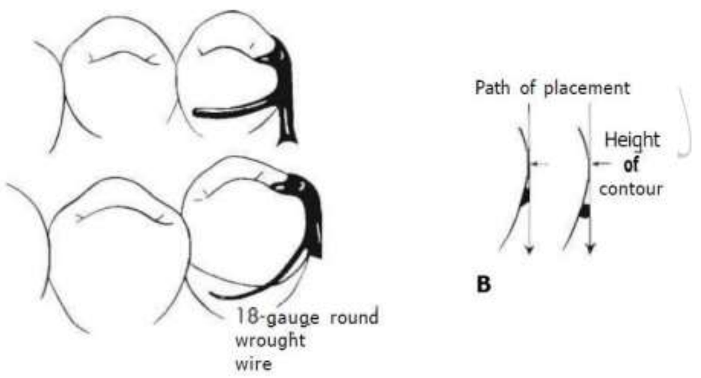
1. Flexibility, adjustability, and appearance of the wrought-wire retentive arm.
2. Wrought-wire retentive arm makes only line contact with abutment tooth, rather than broader contact of cast clasp.
3. Wrought in structure, it may be used in smaller diameters than a cast clasp, with less danger of fracture.
4. Because it is round, light is reflected in such a manner that the display of metal is less noticeable than with the broader surfaces of a cast clasp.
5. A less likely occurrence of fatigue failures in service with the tapered wrought-wire retentive arm versus the cast.
6. Tapered, round wrought wire clasp arm may act somewhat as a stress breaker between denture base and the abutment teeth.



COMBINATION CLASP

Disadvantages:

1. It involves extra steps in fabrication, particularly when high-fusing chromium alloys are used.
2. It may be distorted by careless handling on the part of the patient.
3. Because it is bent by hand, it may be less accurately adapted to the tooth and therefore provide less stabilization in the suprabulge portion.
4. It may distort with function and not engage the tooth.
5. Fracture at joining point because of recrystallization of soldering metal.




Just Do It!

INDIRECT RETAINER

BUSHRA MOHAMMED ALI AL-AMEEN

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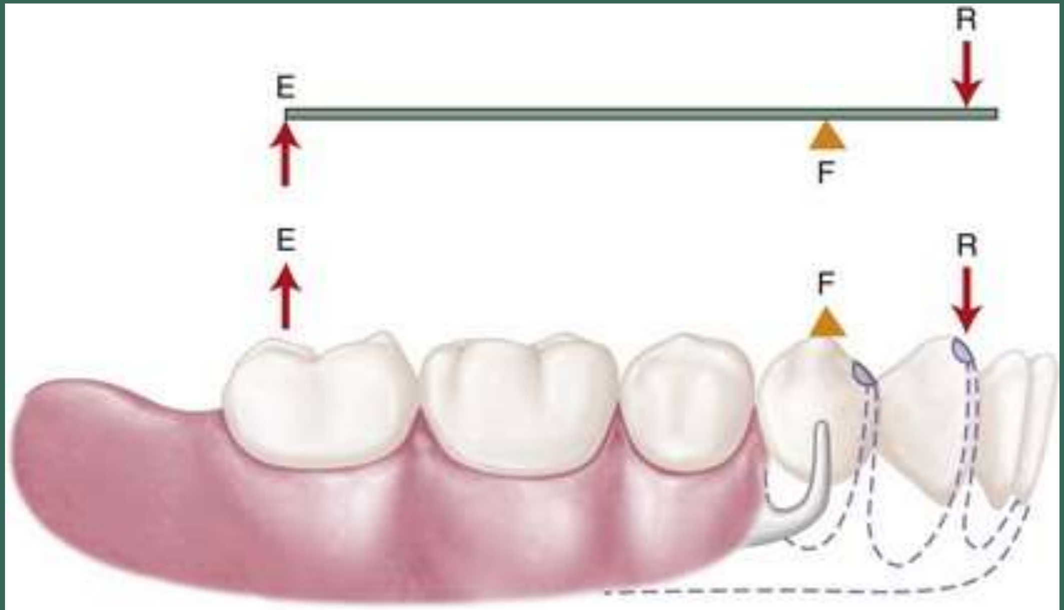
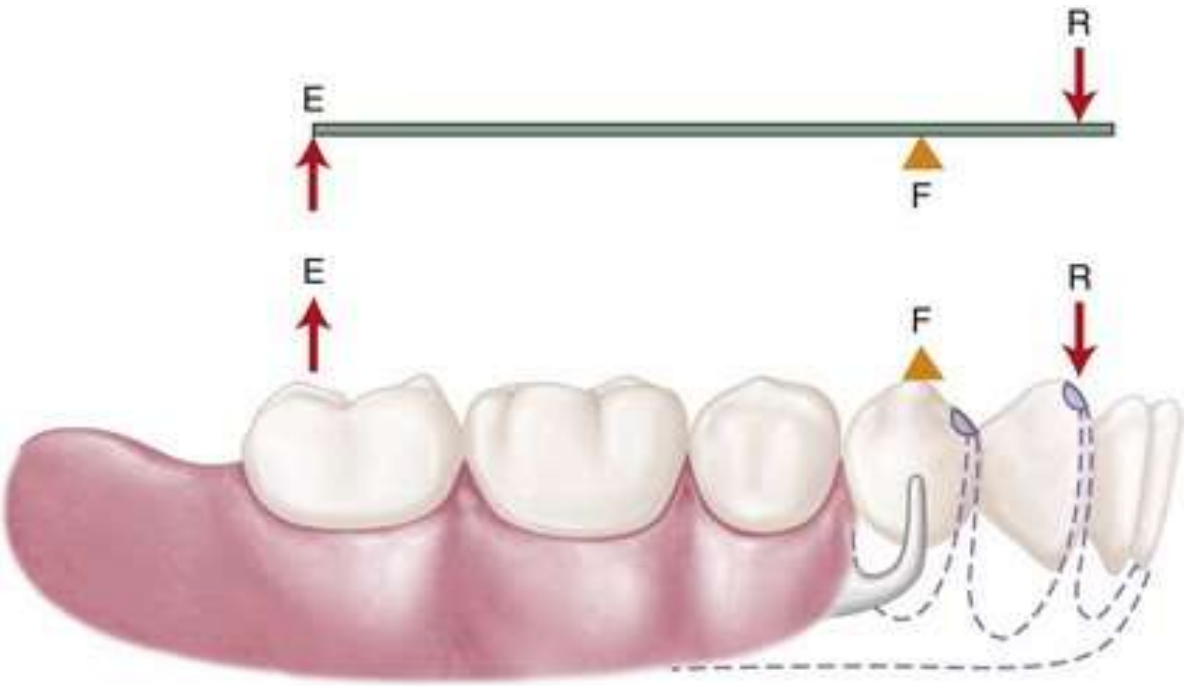


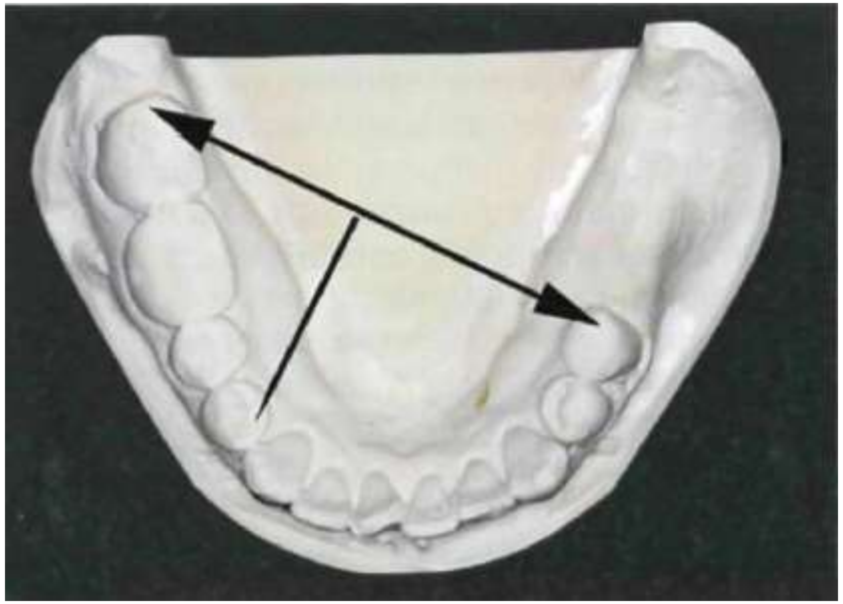
INDIRECT RETAINER

- It is that part of removable partial denture which assists the direct retainers in preventing displacement of distal extension denture bases by resisting lever action from the opposite side of the fulcrum line, when the denture moves away from tissue in pure rotation around the fulcrum line.



FULCRUM LINE:

- It is an imaginary axis passing through the most posterior abutments (through occlusal rests or any other rigid portion of a direct retainer assembly located occlusally or incisally to the height of contour of the primary abutments), around which the denture rotates slightly when subjected to various forces directed toward or away from residual ridge.



FULCRUM LINE:

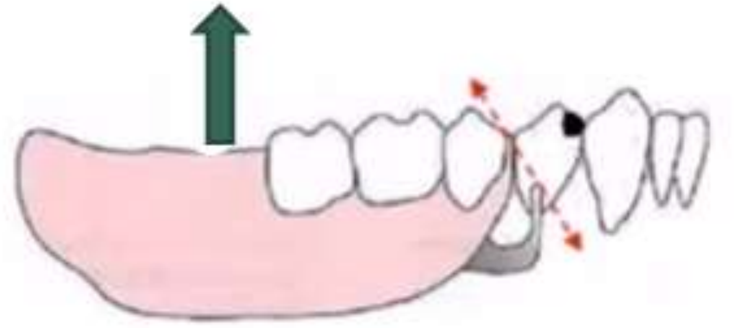
- ## Types of fulcrum line:

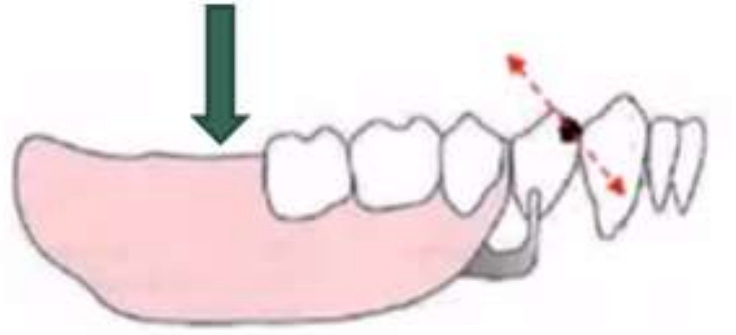
1- Retentive fulcrum line:

An imaginary line connecting <u>retentive points of clasp</u> arms, around which denture tend to rotate when subjected to forces such as the pull of sticky foods.

2- stabilizing fulcrum line:

An imaginary line connecting <u>occlusal rests</u>, around which denture tend to rotate when subjected to masticatory forces.



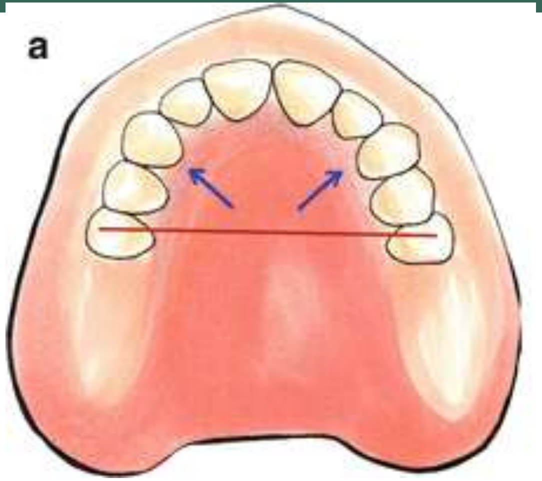


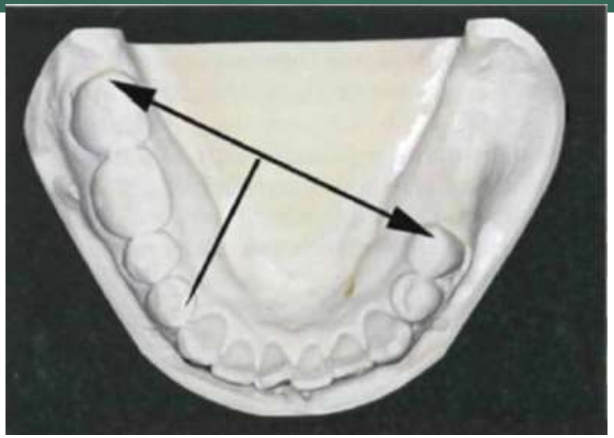
FULCRUM LINE:

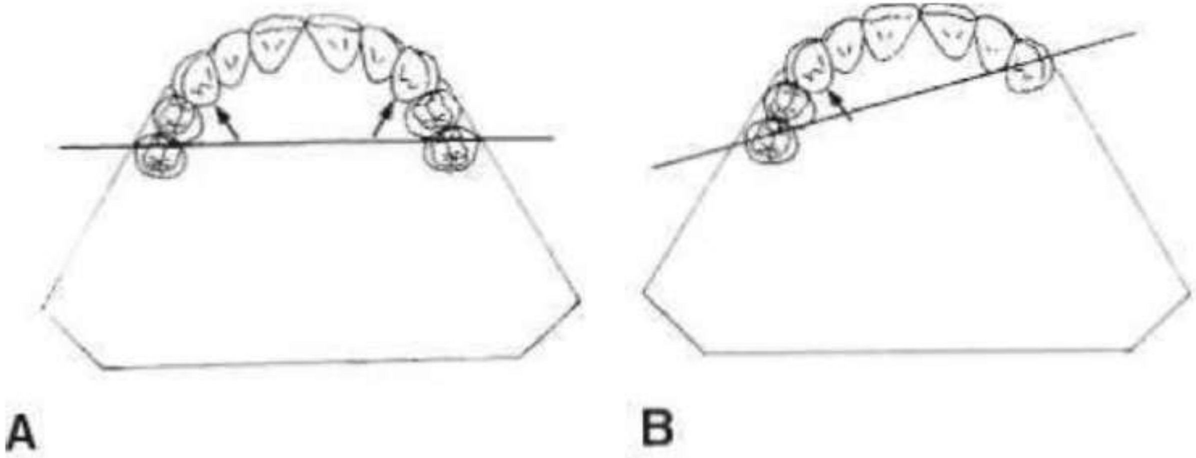
- Location of fulcrum line for different classes of removable partial denture:

The best location for the indirect retainer at 90 degrees to the fulcrum line and provides an efficient resistance to denture base lift.

- In Class I arch: Fulcrum line passes through tl most posterior abutments, provided some rigid component of framework is occlusal to abutment's heights of contour.

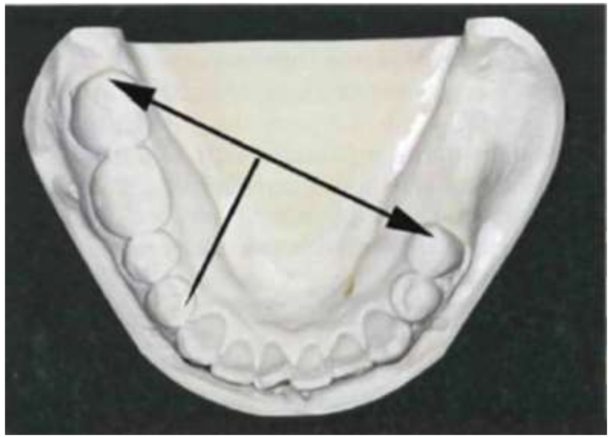


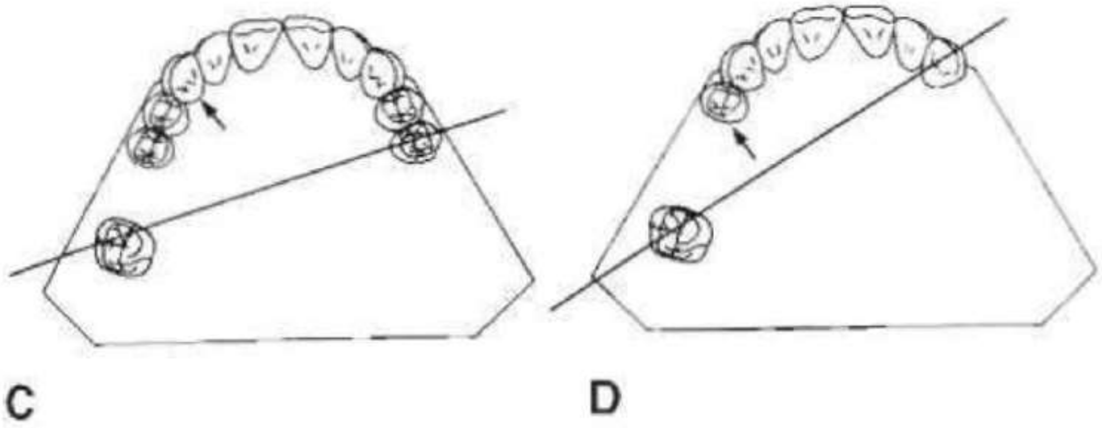




FULCRUM LINE:

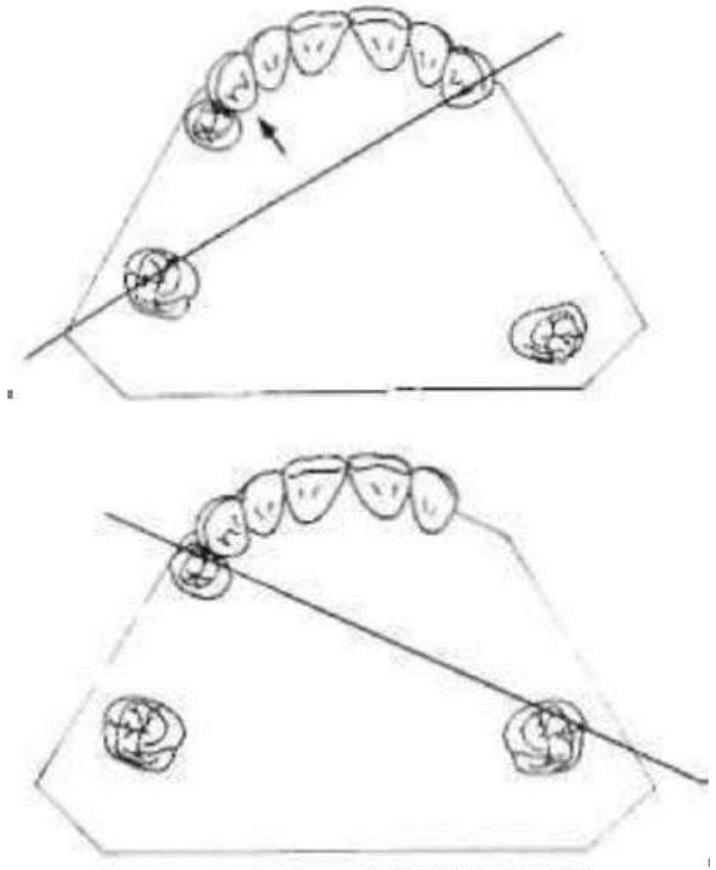
- **Location of fulcrum line for different classes of removable partial denture:**
- **In Class II arch:** Fulcrum line is diagonal, passing through abutment on distal extension side and the most posterior abutment on opposite side.
- If abutment tooth anterior to modification space lies far enough from fulcrum line, it may be used effectively for support of indirect retainer.





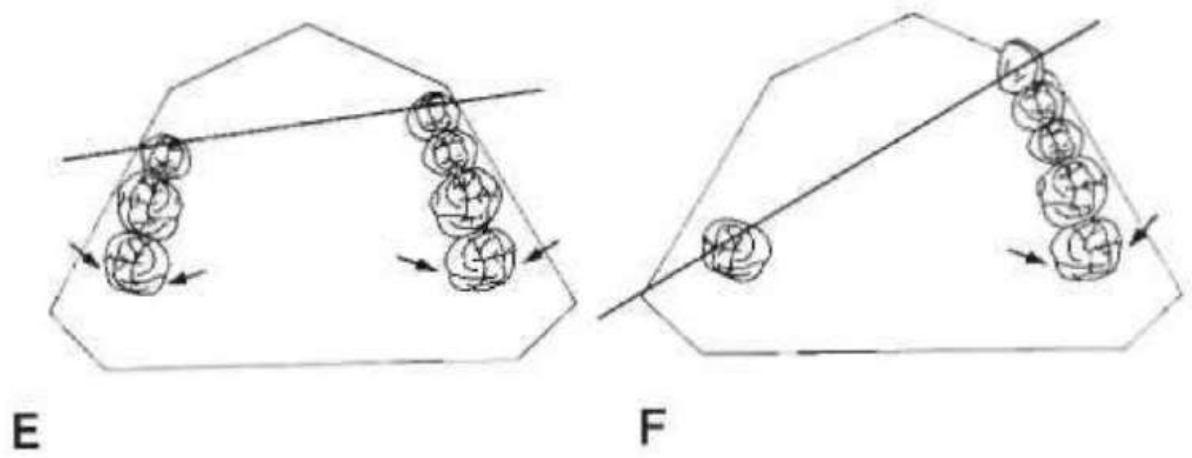
FULCRUM LINE:

- Location of fulcrum line for different classes of removable partial denture:
- In Class III arch with posterior tooth on right side, which has a poor prognosis and will eventually be lost, fulcrum line is considered the same as though posterior tooth were not present. Thus its future loss may not necessitate altering original design of the removable partial denture framework.
- In Class III arch with non-supporting anterior teeth, adjacent edentulous area is considered to be tissue-supported end, with diagonal fulcrum line passing through two principal abutments as in Class II arch.



FULCRUM LINE:

- Location of fulcrum line for different classes of removable partial denture:
- In Class IV arch: Fulcrum line passes through two abutments adjacent to single edentulous space.

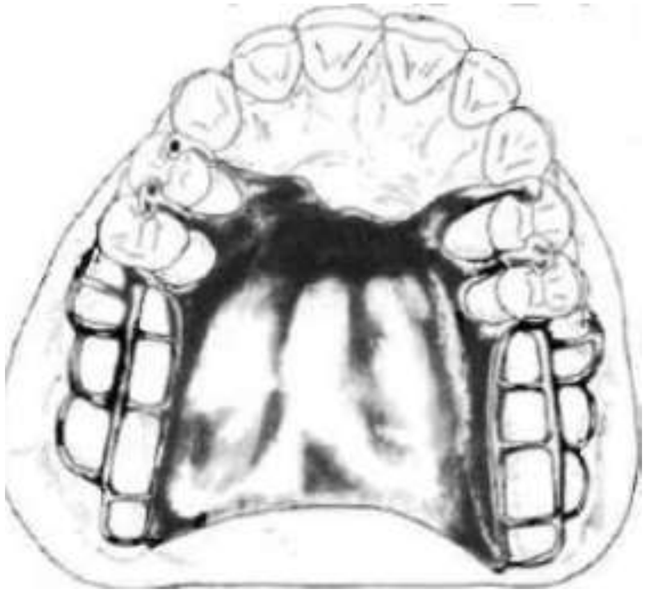


FORMS OF INDIRECT RETAINERS:

1- Auxiliary occlusal rest:

The most commonly used indirect retainer is an auxiliary occlusal rest located on an occlusal surface and as far away from the distal extension base as possible.

- In a Class I arch, this location is usually on the mesial marginal ridge of the first premolar on each side of the arch. The ideal position for the indirect retainer perpendicular to the fulcrum line would be in the vicinity of the central incisors, which are too weak and have lingual surfaces that are too perpendicular to support a rest. Bilateral rests on the first premolars are quite effective, even though they are located closer to the axis of rotation.

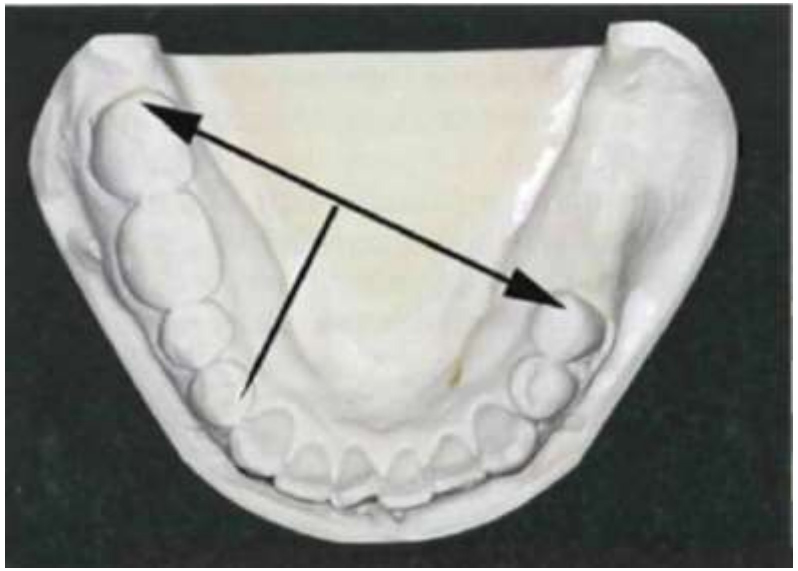


FORMS OF INDIRECT RETAINERS:

1- Auxiliary occlusal rest:

- Indirect retainers for Class II partial dentures are usually placed on the marginal ridge of the first premolar tooth on the opposite side of the arch from the distal extension base.

- Bilateral rests (indirect retainer) are seldom indicated except when an auxiliary occlusal rest is needed for support of the major connector or when the prognosis of the distal abutment is poor and provision is being considered for later conversion to a Class I partial denture.



FORMS OF INDIRECT RETAINERS:

2- Canine rest:

A. The mesial marginal ridge of the first premolar is too close to the fulcrum line.

B. When the teeth are overlapped so that the fulcrum line is not accessible.

C. When only anterior teeth including canines is remaining.

- Such a rest may be made more effective by placing the minor connector in the embrasure anterior to the canine, either curving back onto a prepared lingual rest seat or extending to a mesioincisal rest.
- The same types of canine rests as those previously outlined, which are the lingual or incisal rests, may be used.

FORMS OF INDIRECT RETAINERS:

3- Canine extensions from occlusal rests:

- Finger extension from a premolar rest is placed on the prepared lingual slope of the adjacent canine tooth. Such an extension is used to increase the effect of indirect retention by increasing the distance of a resisting element from the fulcrum line. This method is particularly applicable when a first premolar must serve as a primary abutment. The distance anterior to the fulcrum line is only the distance between the mesioocclusal rest and the anterior terminal of the finger extension.
- Even when they are not used as indirect retainers, canine extensions, continuous bar retainers, and linguoplates should never be used without terminal rests because of the resultant forces effective when they are placed on inclined planes alone.

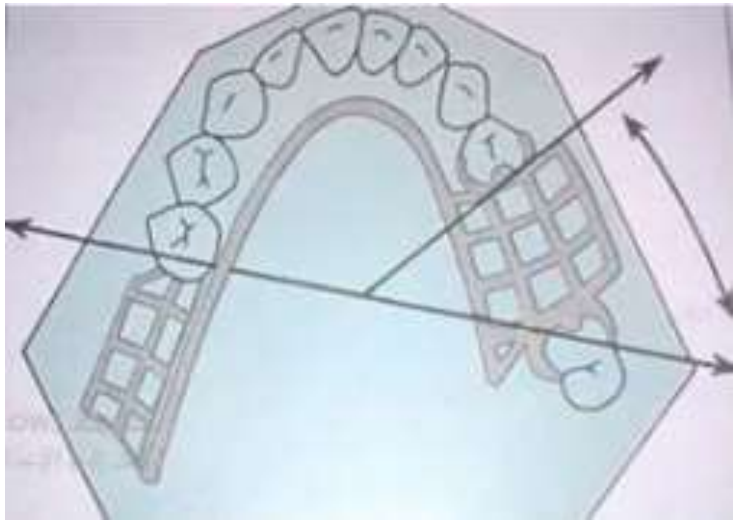
FORMS OF INDIRECT RETAINERS:

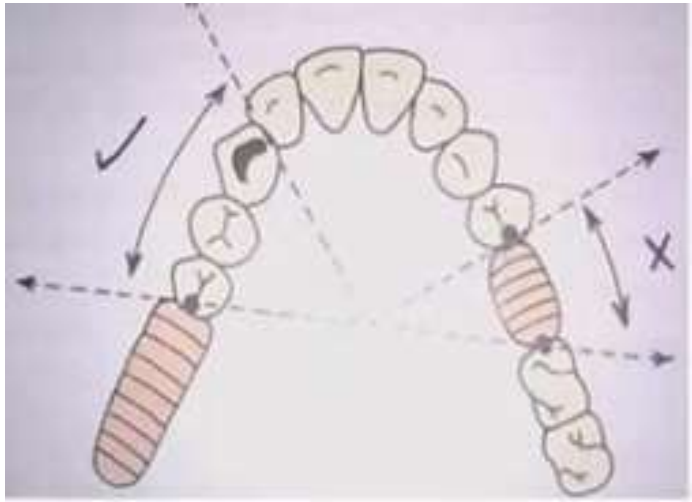
4- Terminal rest of cingulum bar and linguoplate major connector:

- Technically, cingulum bars (continuous bars) and linguoplates are not indirect retainers because they rest on unprepared lingual inclines of anterior teeth.
- The indirect retainers are actually the terminal rests at either end in the form of auxiliary occlusal rests or canine rests.
- In toothsupported partial dentures, a cingulum bar or linguoplate is placed for other reasons but always with terminal rests.

FORMS OF INDIRECT RETAINERS:

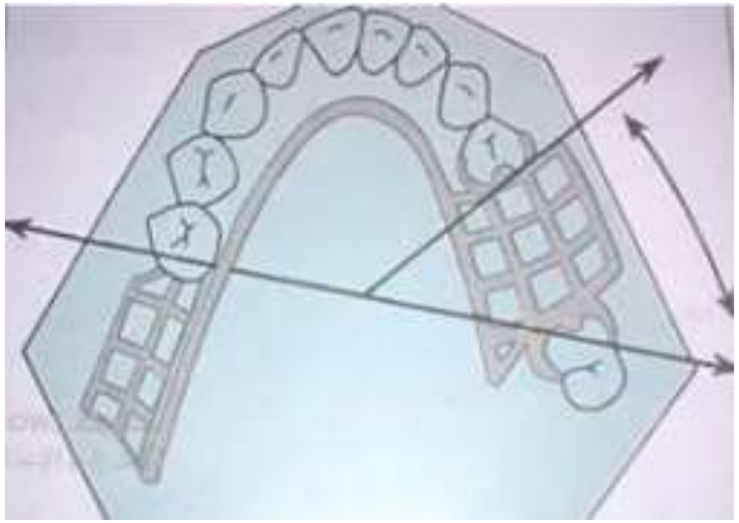
- 5- Modification areas:
- The occlusal rest on a secondary abutment in a Class II partial denture may serve as an indirect retainer. This use will depend on how far from the fulcrum line the secondary abutment is located.
- Direct retainer of a modification space located anterior to the terminal abutment axis may also act as indirect retainers provided they are far enough from the fulcrum line.
- If the secondary abutment is present farther away from the fulcrum line than the direct retainers of the modification space, it will be more efficient as an indirect retainer.





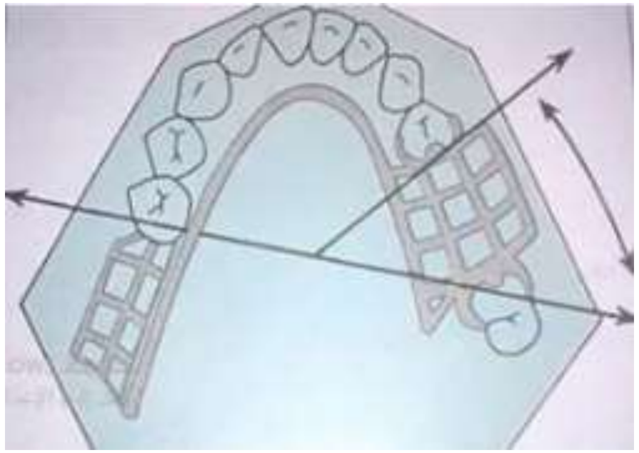
FORMS OF INDIRECT RETAINERS:

- **5- Modification areas:**
- **Note:** The primary abutments in a Class II, modification 1 partial denture are the abutment adjacent to the distal extension base and the most distal abutment on the tooth-supported side.
- Class II mod. 1 removable partial denture framework. Fulcrum line, when denture base is displaced toward residual ridge, runs from left second premolar to right second molar. When forces tend to displace denture away from its basal seat, supportive element (distal occlusal rest) of direct retainer assembly on right first premolar serves as indirect retainer.

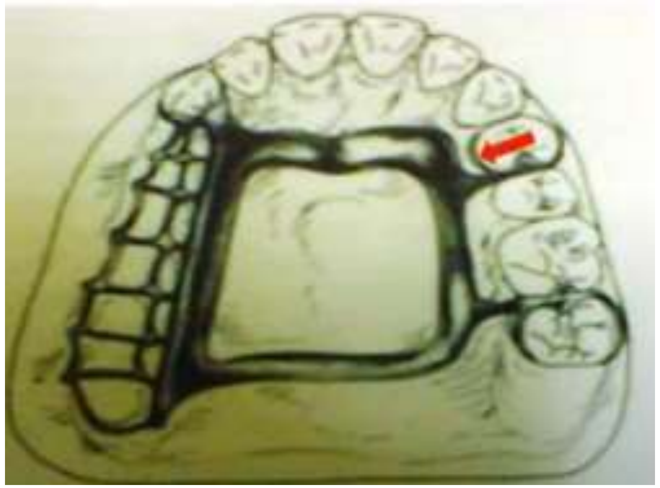


FORMS OF INDIRECT RETAINERS:

- 5- Modification areas:
- The anterior abutment on the tooth-supported side is a secondary abutment, serving to support and retain one end of the tooth-supported segment and adding horizontal stabilization to the denture.
- If the occlusal rest on the secondary abutment lies far enough from the fulcrum line, it may serve adequately as an indirect retainer (dual function) (tooth support for one end of the modification area and support for an indirect retainer).
- If the modification space were not present, as in an unmodified Class II arch, auxiliary occlusal rests and stabilizing components in the same position would still be essential to the design of the denture.



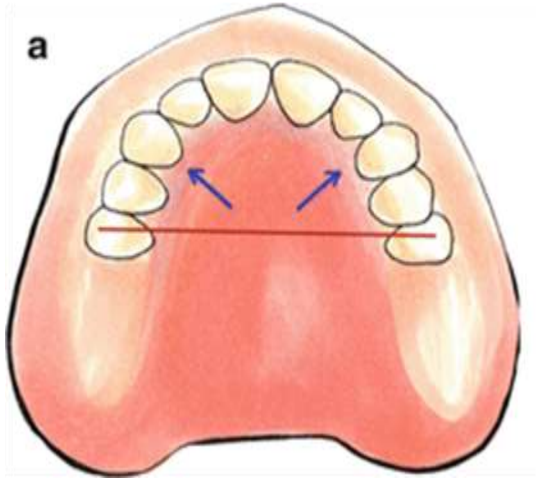
FORMS OF INDIRECT RETAINERS:



- 6- direct indirect retention :
- Reciprocal arm of a direct retainer located anterior to fulcrum line may act as indirect retainer.
- 7- Incisal rest :
- On mandibular canines when mesial fossa of first premolar is close to fulcrum line.

FORMS OF INDIRECT RETAINERS:

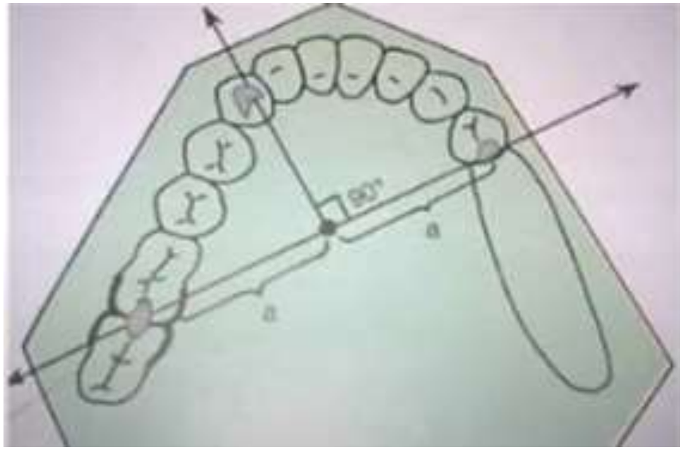
- 8- Rugae support the major connector :
- Some clinicians consider coverage of the rugae area of the maxillary arch as a means of indirect retention because the rugae area is firm and usually well situated to provide indirect retention for a Class I removable partial denture.
- Although it is true that broad coverage over the rugae area can conceivably provide some support, the facts remain that tissue support is less effective than positive tooth support and that rugae coverage is undesirable if it can be avoided.



FACTORS INFLUENCING THE EFFECTIVENESS OF INDIRECT RETAINERS:

1. The effectiveness of the direct retainers:

The principal occlusal rests on the primary abutment teeth must be reasonably held in their seats by the retentive arms of the direct retainers.



2. Distance from the fulcrum line:

The following three areas must be considered:

A. Length of the distal extension base.

B. Location of the fulcrum line, ideally indirect retainer should be located at a point perpendicular to the midpoint of the fulcrum line.

C. How far beyond the fulcrum line the indirect retainer is placed.

FACTORS INFLUENCING THE EFFECTIVENESS OF INDIRECT RETAINERS:

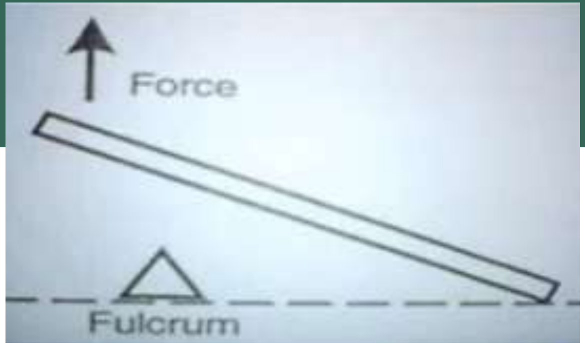
3. Rigidity of the connectors supporting the indirect retainer:

All connectors must be rigid if the indirect retainer is to function as intended.

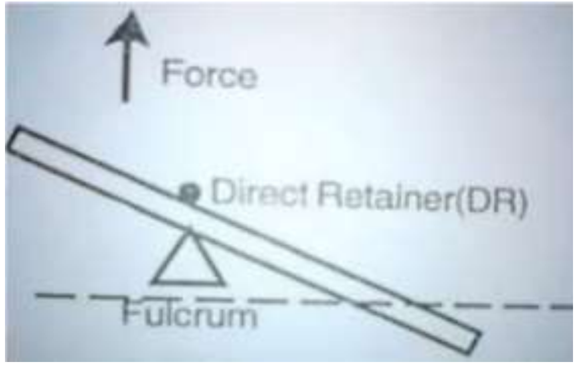
4. Effectiveness of the supporting tooth surface:

The indirect retainer must be placed on a definite rest seat on which slippage or tooth movement will not occur. Tooth inclines and weak teeth should never be used to support indirect retainers.

DIRECT RETAINER – INDIRECT RETAINER INTERACTION:

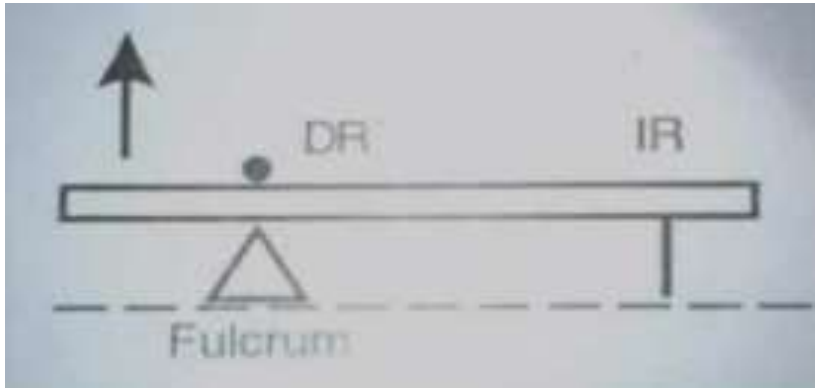


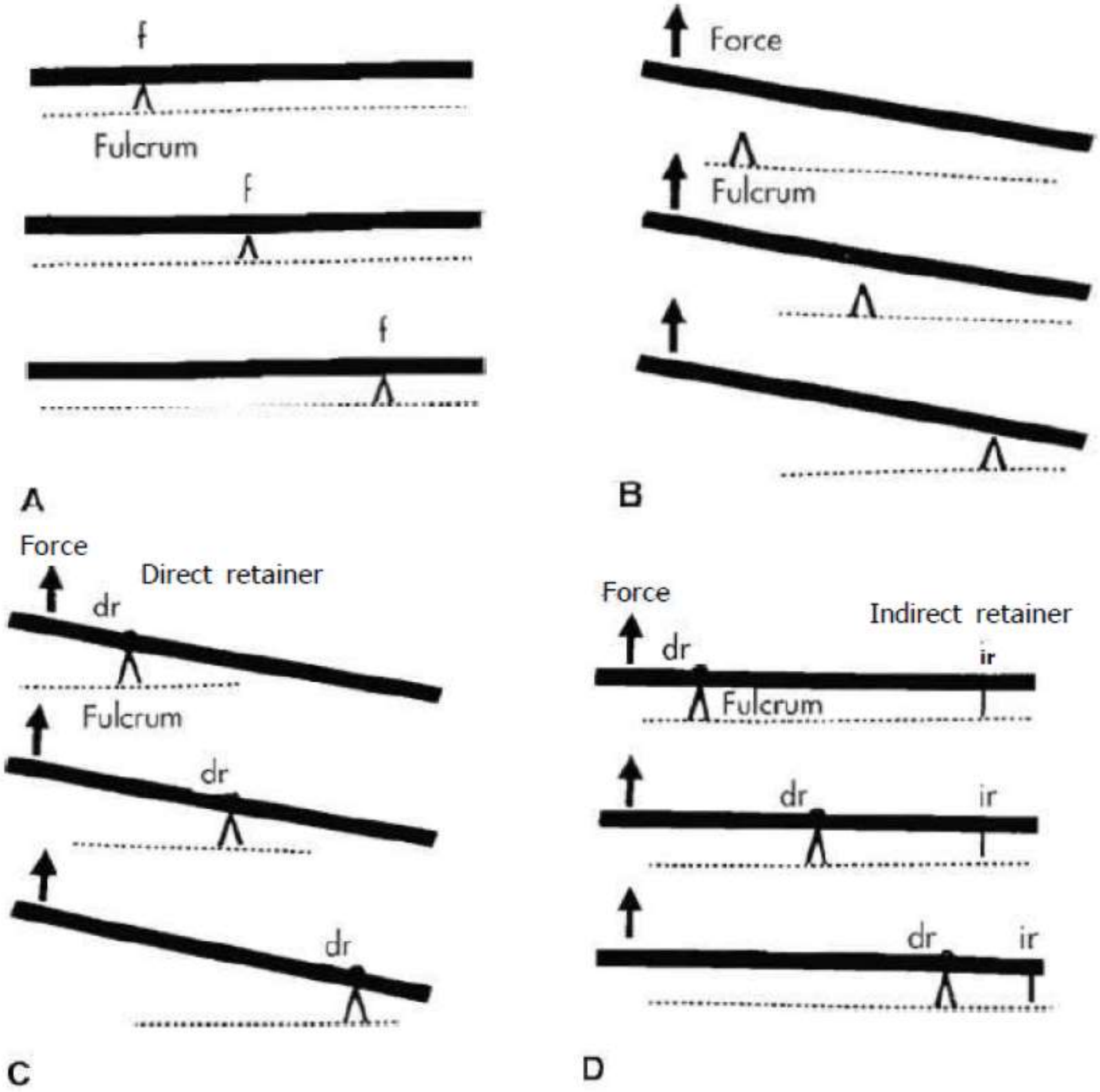
1- Indirect retainer without direct retainer:



2- Direct retainer without indirect retainer:

3- Direct retainer with indirect retainer:

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Fulcrum
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C
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Indirect retainer
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AUXILIARY FUNCTIONS OF INDIRECT RETAINERS:

1. It tends to reduce anteroposterior-tilting leverages on the principal abutments. This is particularly important when an isolated tooth is being used as an abutment.
2. Contact of its minor connector with axial tooth surfaces aids in stabilization against horizontal movement of the denture.
3. Anterior teeth supporting indirect retainers are stabilized against lingual movement.
4. Act as an auxiliary guiding plane.
5. It may support a portion of the major connector facilitating stress distribution.
6. It may provide the first visual indications for the need to reline an extension base partial denture.
7. It act as a third point of contacting the tooth structure to ensure accurate repositioning of the frame work on the tooth during rebasing and relining.

INDIRECT RETAINER PRINCIPLE

A. Beams are supported at various points.
B. Lifting force will displace entire beam in absence of retainers.
C. With direct retainers (dr) at fulcrum, lifting force will depress one end of beam and elevate other end.
D. With both direct and indirect retainers (ir) functioning, lifting force will not displace beam. The farther the indirect retainer is from the fulcrum, the more efficiently it should control movement.


Thank you

Stress breaker –Stress equalizer

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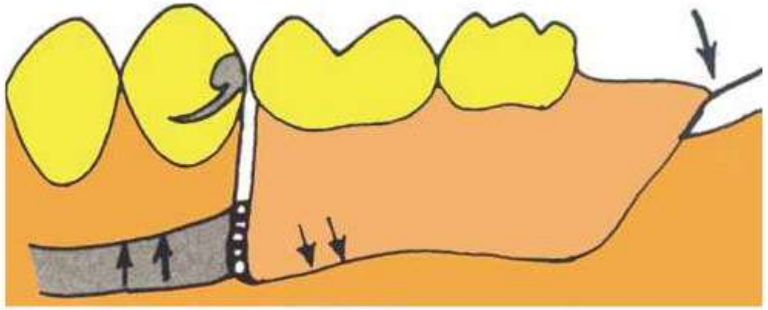
STRESS BREAKER

- In the distal extension RPD, Support is derived from both the residual ridge and abutment teeth.
- The variation in consistency providing this support allows some rotational movements of the free end base towards the soft tissues.
- Harmful tissue –ward movements of distal extension under occlusal load are transmitted to the abutment teeth resulting in loosening of these teeth.
- Dentures with a stress breaker are also called as a broken stress partial dentures or articulated prostheses

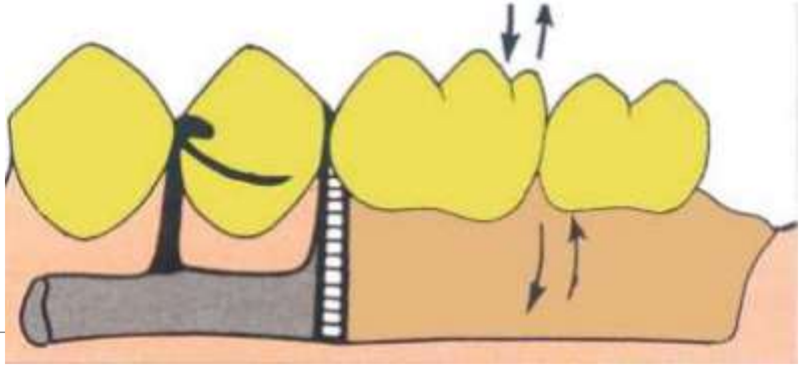


STRESS BREAKER

STRESS BREAKER :

- It is A device which relieves the abutment teeth of all or part of the occlusal forces” Or, "is a device that allows movement between the denture base and the direct retainer which may be intracoronal or extracoronal”.
- Or, It is a device that permits some hinge or rotational movement between the denture base or its supporting framework and the direct retainers (whether they are intra coronal or extracoronal retainer), this device separate the action of the direct retainers from the base movement, so it was used to minimize strain on the abutment teeth to which the partial denture is attached and transfer them to the denture bearing areas. It is indicated in a distal extension restoration.
- All vertical and horizontal forces applied to the artificial teeth are distributed throughout the supporting portions of the dental arch. Broad distribution of the force is obtained through the rigid major, minor connectors and stabilizing components.

Types of stress breaker



1-First group (non rigid attachments): RPD having a movable joint between the direct retainer and the denture base. include hinge , sleeve and cylinder, ball and socket device.

These types have a movable joint between the direct retainer and the denture base and permit vertical movement and hinge action of the distal extension denture base.

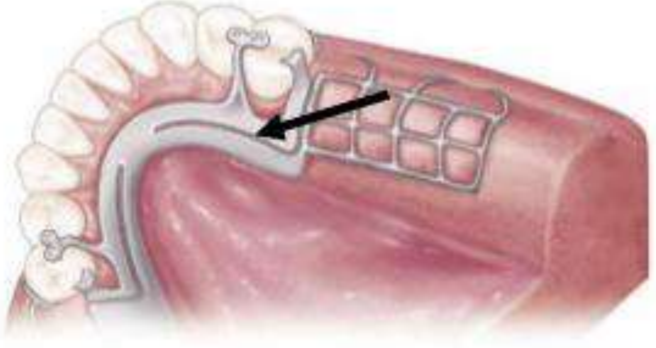
Types of stress breaker

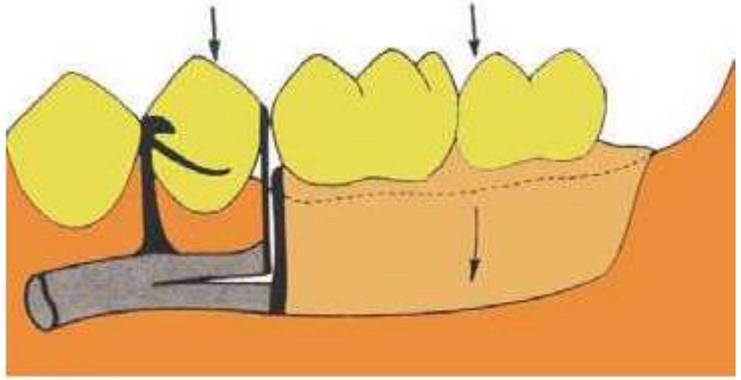
2-second group: include design having a flexible connection between the direct retainer and the denture base (articulated partial denture) this group include the use of:

A-Divided major connector (split bar):

- by using this type of stress breakers, the vertical forces applied on distal extension base must pass anteriorly along the lower bar and then back along more rigid upper bar to reach abutment tooth therefore the tipping forces that would otherwise be transmitted directly to abutment teeth are dissipated by flexibility of lower bar and distance traveled .

- Lingual Bar connector with flexible distal extension





Types of stress breaker

2-second group: include design having a flexible connection between the direct retainer and the denture base (articulated partial denture) this group include the use of:

B-Wrought wire clasp (combination clasp)

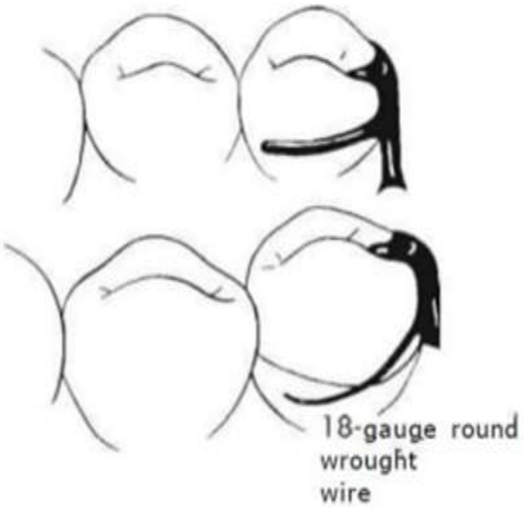
C-clasps having stress breaking effect:

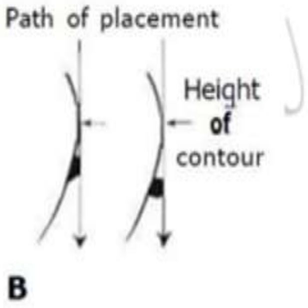
1-RPI system

2-Reverse Aker clasp

3-RPA system

R=rest mesially located, P=proximal plate, A= Aker clasp





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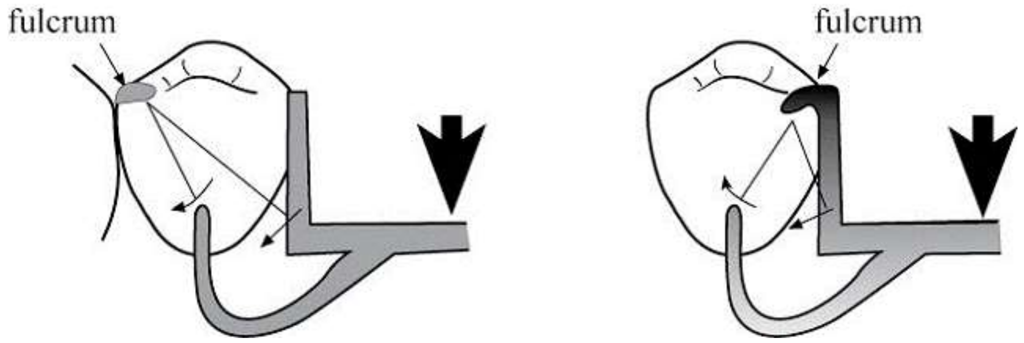

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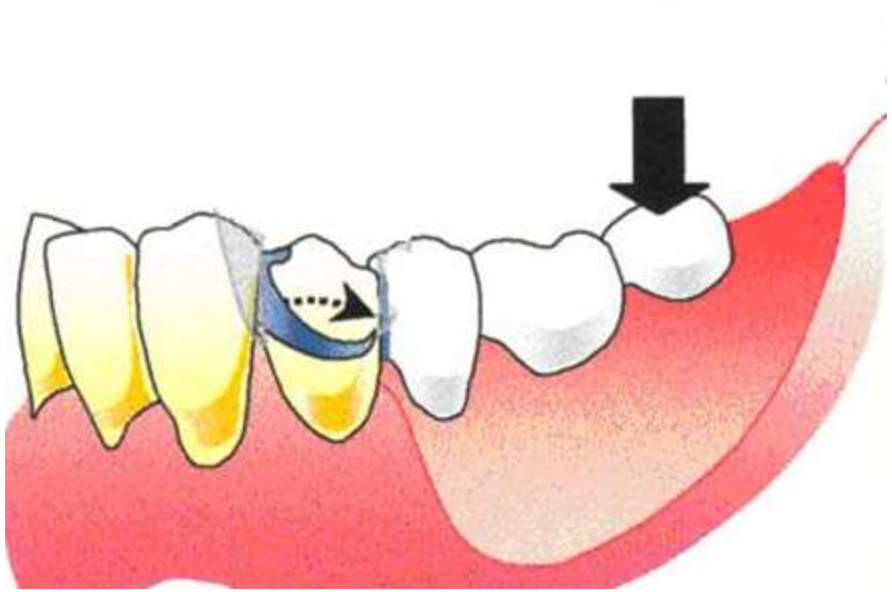

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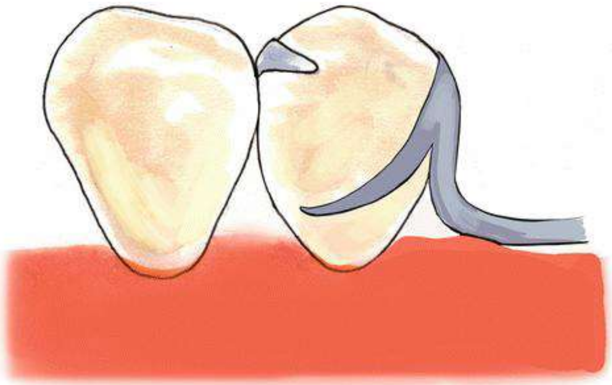

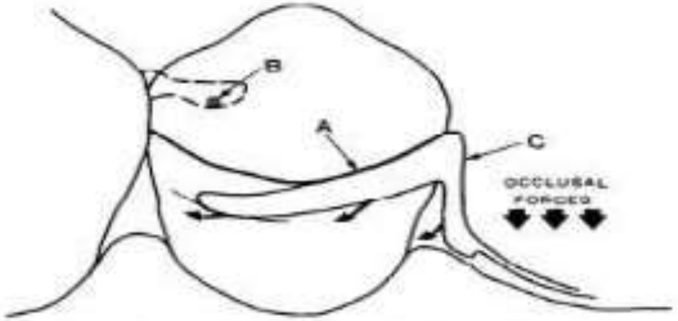

Fig. 5. Properly designed RPA clasp showing movement from occlusal forces. Proximal plate, *C*, drops gingivally and slightly mesially as rotation occurs around mesial rest with approximate center of rotation, *B*. Rigid portion of retentive arm contacts tooth only along survey line, *A*, and moves gingivally and mesially. Retentive end of clasp arm moves mesially and slightly gingivally.

Advantages Of Stress Breakers:

1. Preservation of alveolar support of abutment teeth by minimizing the horizontal forces acting on the teeth.
2. The flexible type of stress breaker creates a balance of stress between the abutment teeth and the residual ridge
3. Movement of the denture base result in the physiologic stimulation to the mucosa
4. If relining is needed and but not done, the abutment teeth are not damaged quickly.
5. The flexible attachment (non-rigid attachment) of the distal extension base to the major connector makes splinting of weak teeth by the denture framework is possible.

Disadvantages Of Stress Breakers:

1. Lack of occlusal stability.
2. Not provide bracing for lateral forces
3. Improper control of forces distribution between the dentate and edentulous areas.
4. The denture is more difficult to fabricate and therefore more costly.
5. If relining is not done when needed excessive resorption of the residual ridge may result
6. Flexible connectors may be bent and fractured by careless handling and by repeated flexing.
7. Repair and maintenance of any stress breaker are difficult, costly, and frequently required.
8. All mechanical devices those are free to move in the mouth in collect debris and become unclean.
9. some split connector is used as stress breaker pinch the underlying soft tissue or the tongue as they open and close under function.

Thank You

PARTIAL DENTURE BASE

BUSHRA MOHAMMED ALI AL-AMEEN

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Partial Denture Base

- It is that part of partial denture that supports the artificial teeth, and rest on the foundation tissues, and transfers the occlusal force to the supporting structures.

Functions Of Denture Base

1. Masticatory function: It supports the artificial teeth and consequently receives the functional forces from occlusion and transfers functional forces to supporting oral structures.
2. Cosmetic function: this is related to reproducing natural-looking contours.
3. Physiological function: The stimulation of the underlying tissue of the residual ridge, by massaging action during movement of the denture base under functional stress (within physiological tolerance) maintain their form and tone better than similar tissues suffering from disuse (disuse atrophy).

Functions Of Denture Base

4. Prevent vertical and horizontal migration of remaining natural teeth.
5. Oral cleanliness: eliminate undesirable food traps.
6. The denture bases must contribute to the support of the denture and improving prosthesis stability
7. Secondary retention is provided by the intimate relationship of denture bases.

Type Of Denture Base According To Support:

1- Tooth supported partial denture base.

- In a tooth-supported prosthesis, the denture base is primarily a span between two abutments supporting artificial teeth. Thus occlusal forces are transferred directly to the abutments through rests.
- Also, the denture base and the supplied teeth serve to prevent horizontal migration of all of the abutment teeth in the partially edentulous arch and vertical migration of teeth in the opposing arch.
- When anterior teeth are replaced, esthetics may be of primary importance.
- Future relining or rebasing may not be necessary to reestablish support. Relining is necessary only when tissue changes have occurred beneath the tooth-supported base to the point that poor esthetics or accumulation of debris result.

Type Of Denture Base According To Support:

2- Distal Extension partial denture base.

- In a distal extension partial denture, the denture bases must contribute to the support of the denture and improving prosthesis stability. Maximum support from the residual ridge may be obtained by using broad, accurate denture bases, which spread the occlusal load equitably over the entire area available for such support (snowshoe principle).
- Therefore support should be the primary consideration in selecting, designing, and fabricating a distal extension partial denture base. It must be made of a material that can be relined or rebased when it becomes necessary to reestablish tissue support for the distal extension base.

Type Of Denture Base According To Support:

2- Distal Extension partial denture base.

- Secondary retention is provided by the intimate relationship of denture bases, Retention of denture bases has been described as the result of the following forces:

a) Adhesion.

b) Cohesion.

c) Atmospheric pressure.

d) Physiological molding of the tissue around the polished surfaces of the denture.

e) Effect of gravity on the mandibular denture.

Type Of Denture Base According To Support:

2- Distal Extension partial denture base.

- **Management of distal extension cases:**

1. Using mesial rest on the last abutments.
2. Using indirect retainers.
3. Using special type of direct retainers, such as R.P.I system and combination clasp.
4. Using special kind of impression technique called altered cast technique.
5. Using implant to support the denture base.
6. Using a stress breaker if indicated.

Types Of Denture Base According To Material:

I. **Resin Type Denture Base**

II. **Metal Type Denture Base**

Types Of Denture Base According To Material:

I. Resin Type Denture Base:

It is most widely used type of denture base because of easy fabrication and easy of attachment to metal framework.

- **Indications** :

A- Distal extension ridge

B- Long span ridge

C- In cases of immediate partial denture

Types Of Denture Base According To Material:

I. Resin Type Denture Base:

- **Indications :**

A- Distal extension ridge:

The resin denture base is indicated for distal extension cases (class I and class II) because of the support of the denture by tissue and ridge and denture base, so there will be need for relining.

Types Of Denture Base According To Material:

I. Resin Type Denture Base:

- **Indications** :

B- Long span ridge:

In class III and class IV edentulous cases because of possibility of tissue changes underneath the denture base and there will be need for future relining.

Types Of Denture Base According To Material:

I. Resin Type Denture Base:

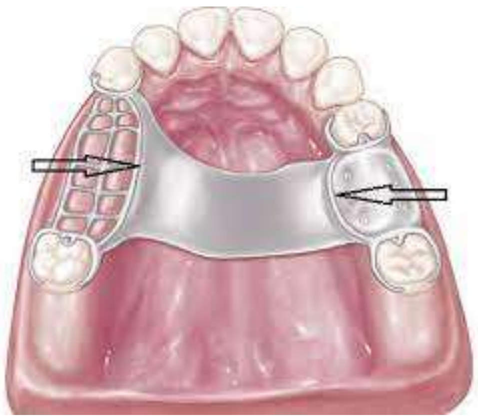
- **Indications :**

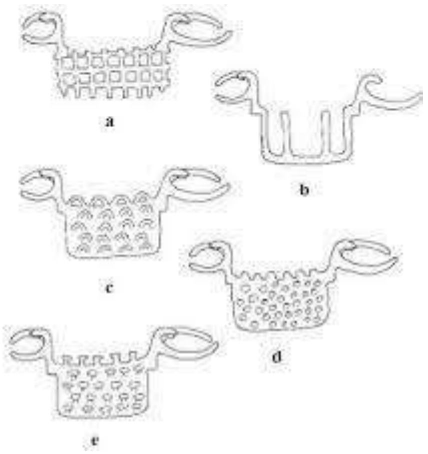
C- In cases of immediate partial denture:

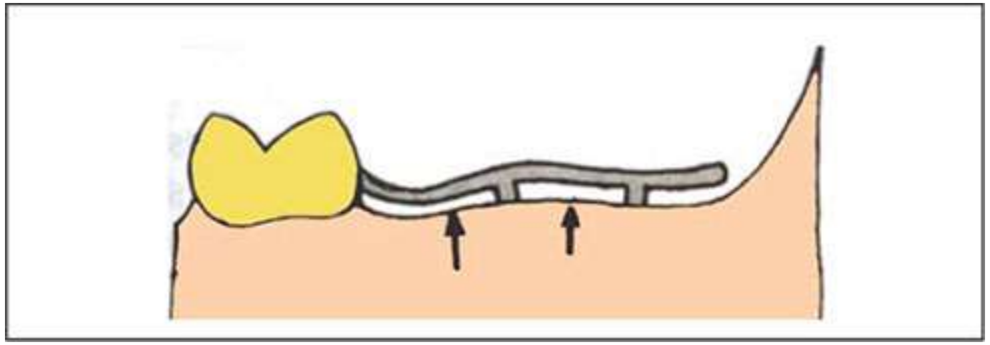
Since after healing period there will be need for relining so that resin denture base will be needed for such cases.

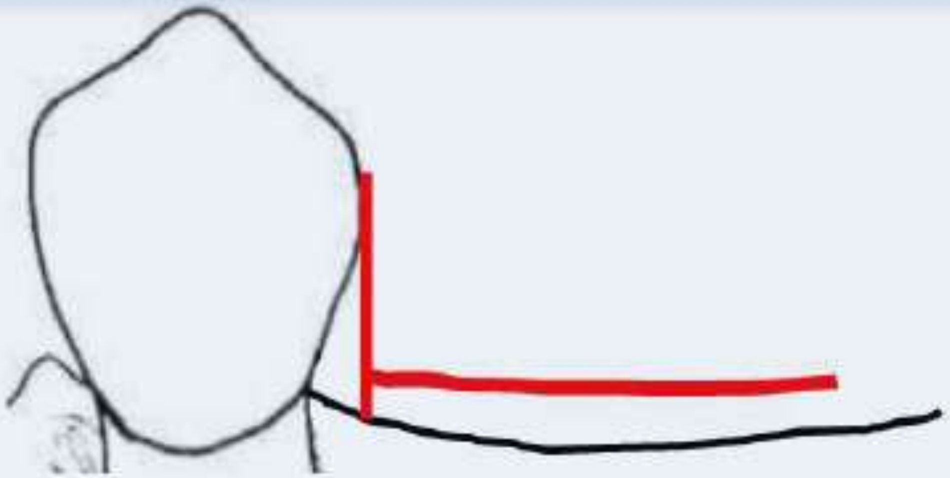
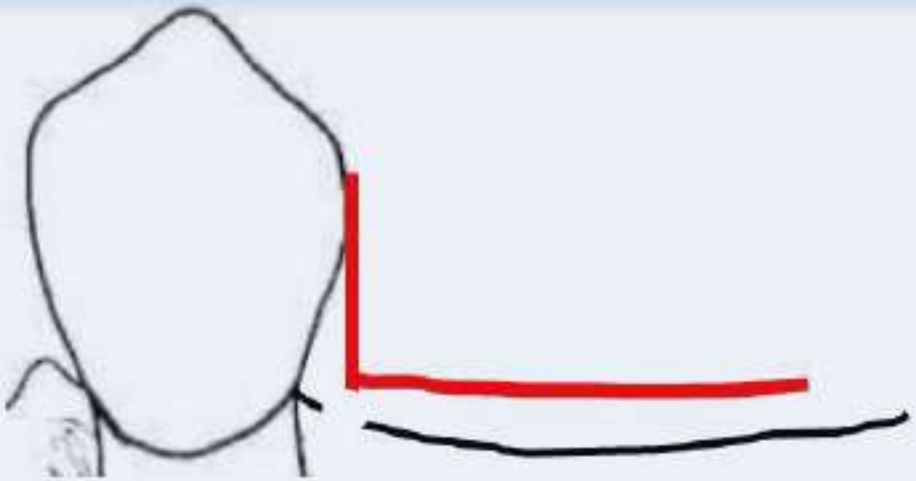
Mechanical attachment of plastic denture base materials to the metal framework

- Acrylic resin bases are attached to the partial denture framework by means of minor connector; the method of attachment is mainly mechanical by undercuts or holes.
- Relief over the basal seat areas of the master cast is used; after casting, the portion of the retentive framework to which the acrylic resin base will be attached will stand away from the tissue surface sufficiently to permit a flow of acrylic resin base material beneath its surface and provide mechanical retention.
- Relief under the mesh should not be started immediately adjacent to the abutment tooth but should begin 1.5-2 mm from the abutment tooth. This will create a metal to tissue contact immediately adjacent to the tooth.





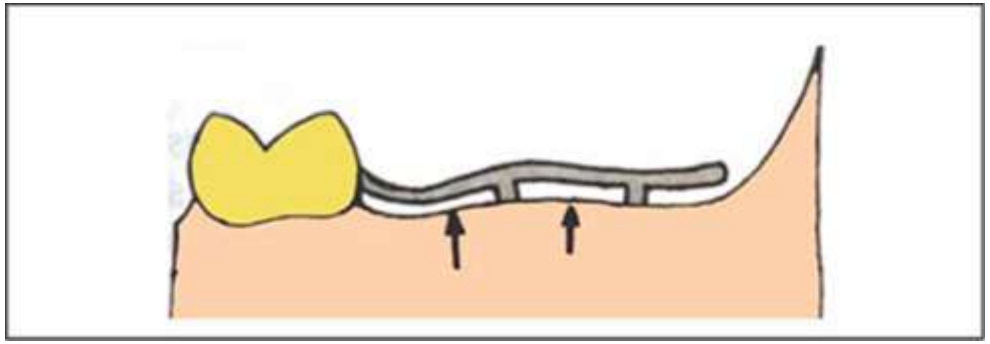


(A) Metal immediately adjacent to abutment, (B) incorrect acrylic of base is adjacent to abutment.

Mechanical attachment of plastic denture base materials to the metal framework

- The retentive framework for the base should be embedded in the base material with sufficient thickness of resin (1.5 mm) this becomes necessary during the denture adjustment period or during relining procedures.
- Thickness is also necessary to prevent weakness and fracture of the acrylic resin base material surrounding the metal framework.



Mechanical attachment of plastic denture base materials to the metal framework may has several DISADVANTAGES:

A. 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.
B. To provide mechanical retention; the denture base must be designed with considerable bulk.
C. The flexing of the plastic denture base at the finish lines weakens the plastic resulting in fracture.

- The technique of bonding plastic to metal surface is being introduced into removable partial denture fabrication. These recently developed adhesive techniques and materials, and future developments, will eliminate the disadvantages of mechanical retention of plastic only and may alter the design and fabrication of removable partial denture base retention minor connector in the near future.

Types Of Denture Base According To Material:

I. Resin Type Denture Base:

- **Advantages:**

1. Can be easily relined.
2. Easy to fabricate, adjust, finish, polish, and repair.
3. Resin is more esthetic than metal.

- **Disadvantages:**

1. More porous than metal and therefore more difficult to clean.
2. Requires more bulk for rigidity than metal.
3. Easily abraded.
4. Easily fractured.
5. Plastic is a poor thermal conductor.
6. Has the potential to be dimensionally unstable.

Types Of Denture Base According To Material:

II. Metal Type Denture Base:

- **It is made of either:**

1- Gold and platinum: but these materials are so expensive.

2- Cobalt chromium: this is more being in use nowadays.

3- 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 bone resorption.

Types Of Denture Base According To Material:

II. Metal Type Denture Base:

- **Indications:**

1- Short span (tooth borne removable partial denture).

2- When there is no enough inter-ridge space for artificial teeth (inadequate intermaxillary space) because of over eruption of opposing teeth.

Maxillary cast molar designed as integral part of framework. Interocclusal space limitation necessitated using metal rather than another form of artificial teeth.

Types Of Denture Base According To Material:

II. Metal Type Denture Base:

- **Advantages:**

1- Accuracy and Permanence of Form.

Cast metal bases not only more accurately than denture resins but also can maintain their accuracy of form without change in the mouth.

Because of its accuracy, the metal base provides an intimate 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.

Types Of Denture Base According To Material:

II. Metal Type Denture Base:

- **Advantages:**

2- Comparative Tissue Response

The inherent cleanliness of the cast metal base contributes to the health of oral tissue when compared with an acrylic resin base. The reasons for this are the greater density and the bacteriostatic activity contributed by ionization and oxidation of the metal base. Acrylic resin bases tend to accumulate mucinous deposits containing food particles.

Types Of Denture Base According To Material:

II. Metal Type Denture Base:

- **Advantages:**

3- Thermal Conductivity

Temperature changes are transmitted through the metal base to the underlying tissue, thereby helping to maintain the health of that tissue. Freedom of interchange of temperature between the tissue covered and the surrounding external influences (temperature of liquid, solid foods, and inspired air) contributes much to the patient's acceptance of a denture and may help prevent the feeling of the presence of a foreign body.

Types Of Denture Base According To Material:

II. Metal Type Denture Base:

- **Advantages:**

4- Weight and Bulk

Metal alloy may be cast much thinner than acrylic resin and still have adequate strength and rigidity.

Sometimes weight and thickness may be used to advantage in denture bases. In the mandibular arch, the weight of the denture may be an asset in regard to retention.

On the other hand, extreme loss of residual alveolar bone may make it necessary to add fullness to the denture base to restore normal facial contours and to fill out the buccal vestibule to prevent food from being trapped in the vestibule beneath the denture. In such situations an acrylic resin base may be preferable to the thinner metal base.

Types Of Denture Base According To Material:

II. Metal Type Denture Base:

- **Disadvantages:**

1. Difficult to reline, adjust, and rebase.
2. It is expensive.
3. The errors that occur in posterior palatal seal area cannot be corrected with metal denture base.
4. Poor esthetic.

Types Of Artificial Teeth:

1- Acrylic teeth:

- It has the ability to be attached chemically to the denture base.

2- Porcelain teeth:

- It is attached to the 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 molar teeth may be processed as part of the denture base by casting procedure this is indicated in cases of limited inter-maxillary spaces.

Thank you

Designing of Partial Denture

Bushra Mohammed Ali Al-Ameen

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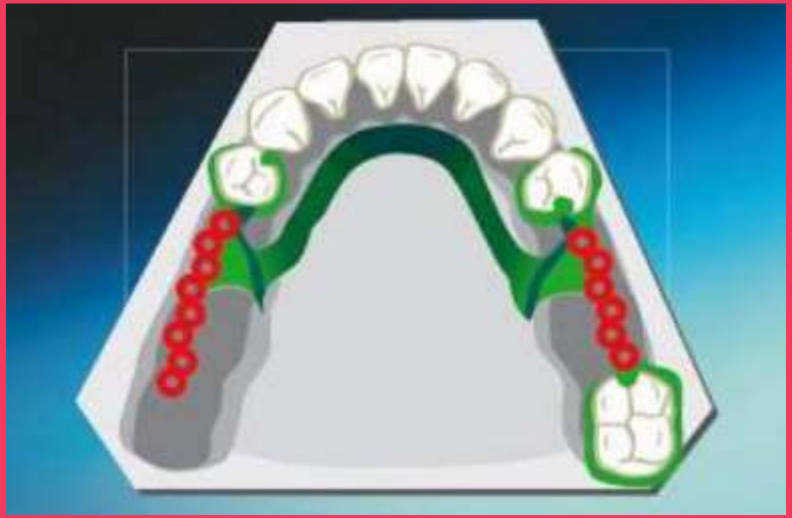
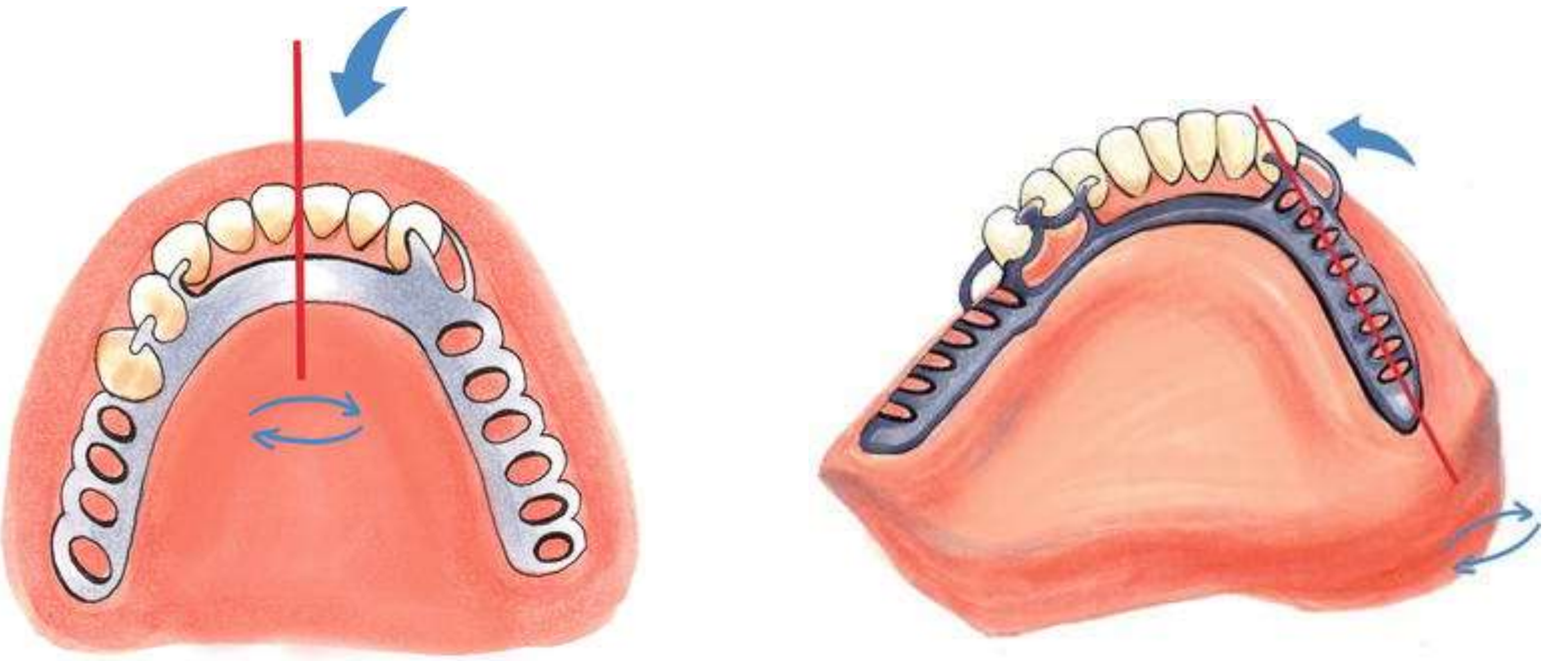
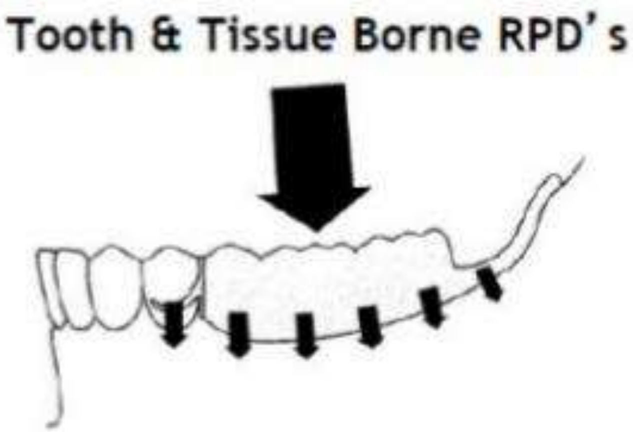


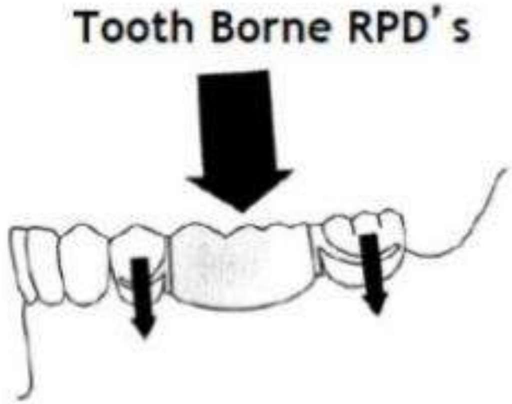
Designing of Partial Denture

- The objective of partial denture designing can be thought of as the control of denture movement while not exceeding the physiological tolerance of the oral structures.



Differentiation Between Two Main Types of Removable Partial Dentures



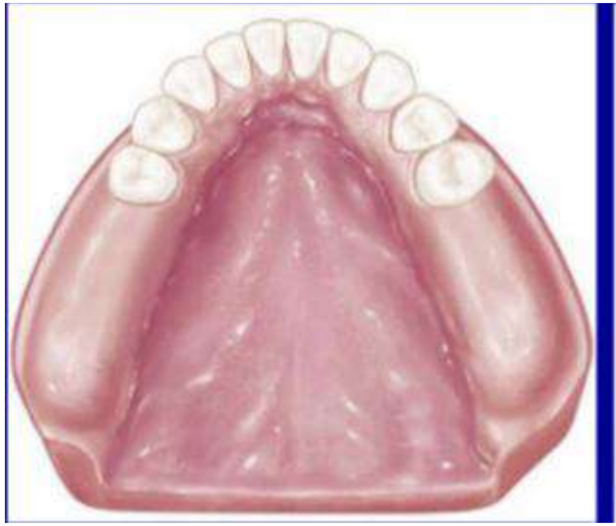


	Class I and II	Class III
The manner in which each is supported	Derive their primary support from tissues underlying the base and secondary support from the abutment teeth	Derives all of its support from the abutment teeth

Differentiation Between Two Main Types of Removable Partial Dentures

	Class I and II	Class III
The method of impression making	Dual impression/ functional impression	Anatomic impression

Differentiation Between Two Main Types of Removable Partial Dentures

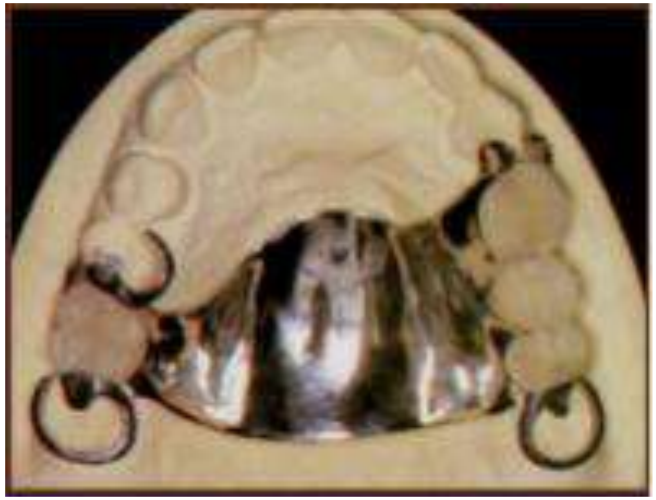


	Class I and II	Class III
The need for some kind of indirect retention	Needed (because it rotates about a fulcrum)	Not needed

Differentiation Between Two Main Types of Removable Partial Dentures

	Class I and II	Class III
The use of a base material that can be relined to compensate for tissue changes	Acrylic- resin is generally used as a base material for distal extension bases.	Metal bases are more frequently used in tooth- supported restorations, because relining is not as likely to be necessary.

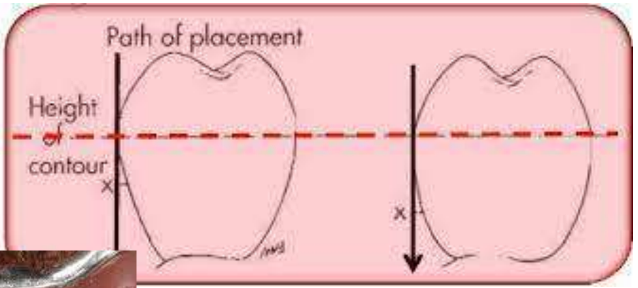
Differentiation Between Two Main Types of Removable Partial Dentures

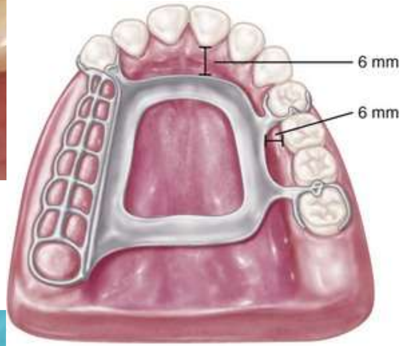


	Class I and II	Class III
Requirements for direct retention	combination clasp could be used because it is a combination of cast and wrought materials incorporated into one direct retainer, RPI, RPA	Akers, Embrasure, Ring clasp

Design Sequence

1. Path of insertion
2. Rests
3. Major connector
4. Minor connectors
5. Direct retainers
6. Indirect retainers



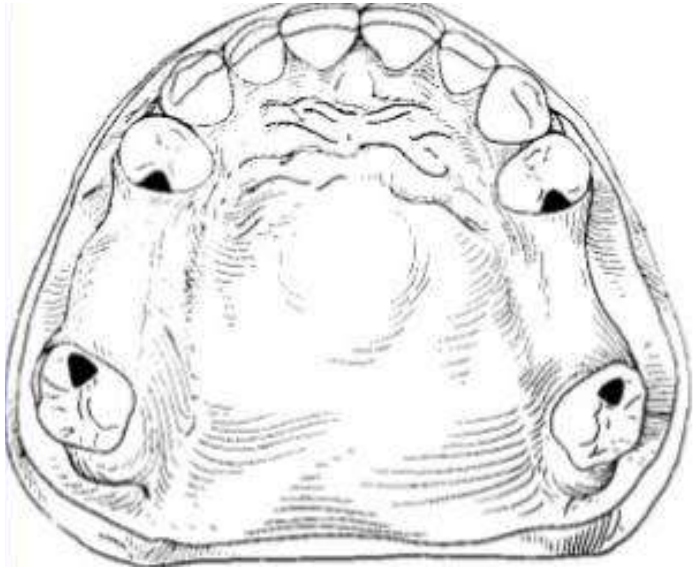





Design Sequence
2-Rest

Kennedy Class III

- Place rests adjacent to edentulous space (both ends).
- Exceptions:
  - o Teeth incapable of providing adequate support, poor crown/root ratio, or uncorrectable periodontal disease.
  - o If abutment tooth has improper anatomy for the indicated rest.

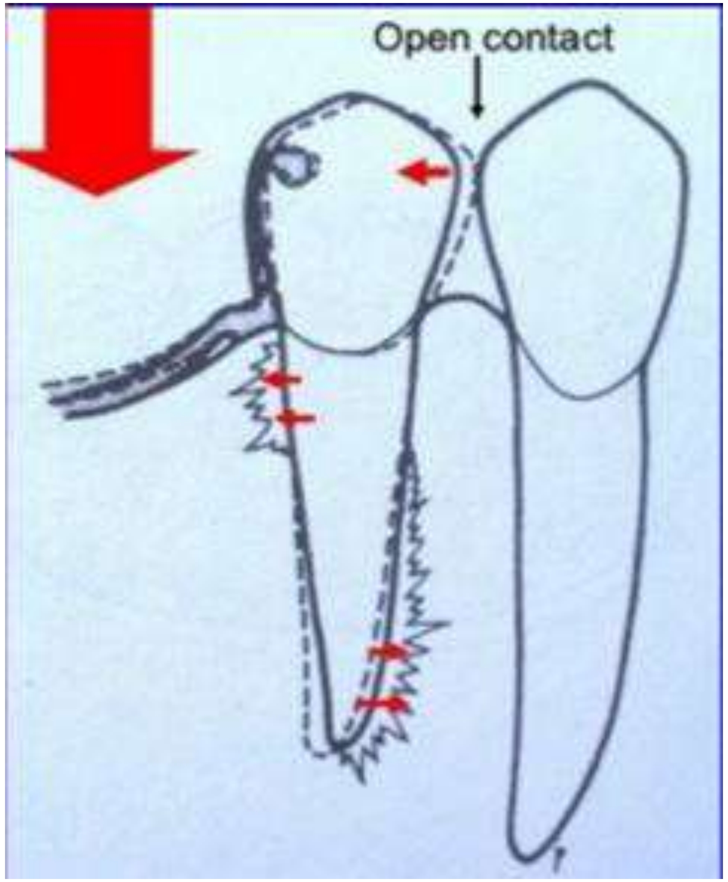


Design Sequence
2-Rest

Kennedy Class I & II

- Mesial rest preferred
- Distal rest preferred when:
  - Abutment is rotated
  - Heavy centric contact on mesial
  - Large restoration on mesial

Design Sequence
2-Rest



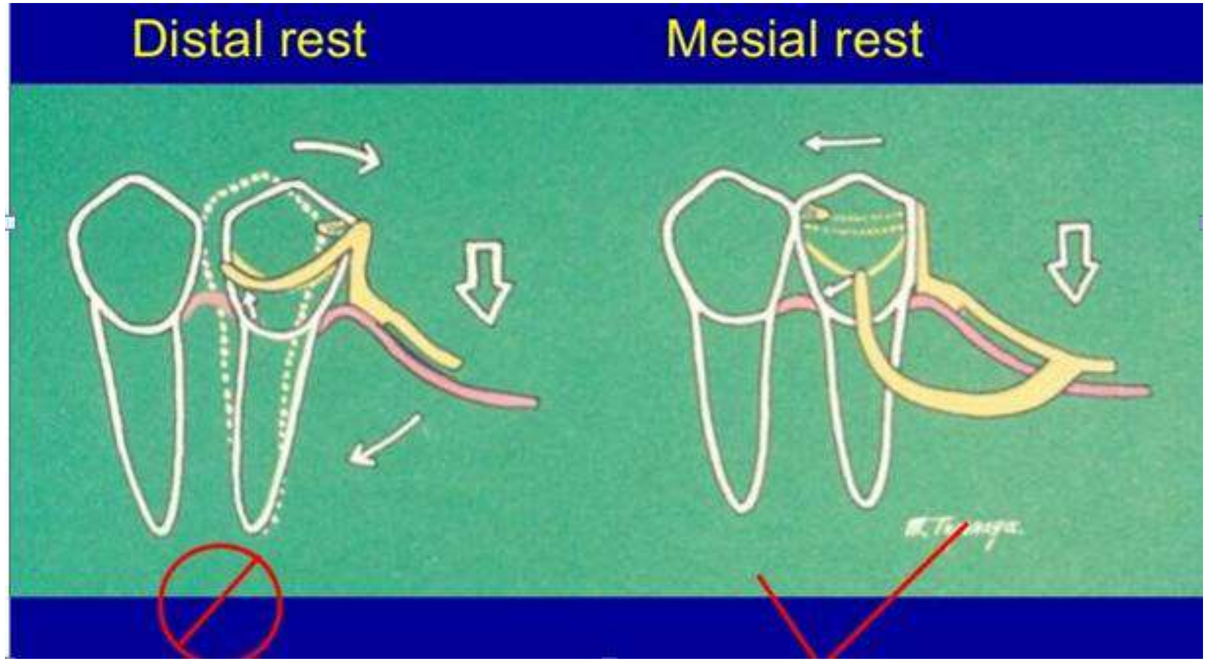
Kennedy Class I & II

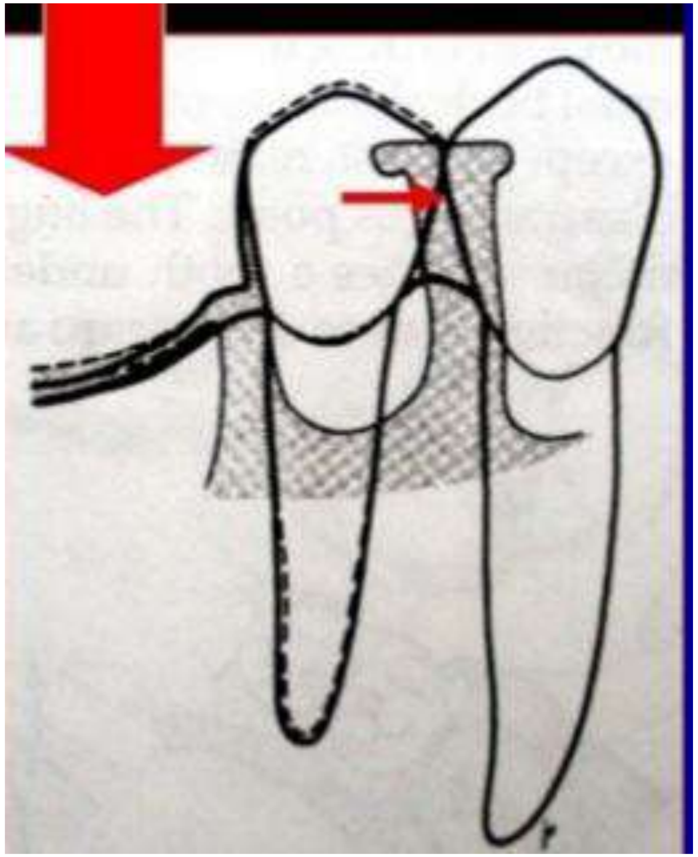
- If the rest is placed on the distal of the tooth adjacent to the edentulous area, when a posterior force is applied the tooth is tipped towards the edentulous area, which opens the proximal contacts between teeth and moves the tooth causing mobility and bone loss.

Design Sequence
2-Rest

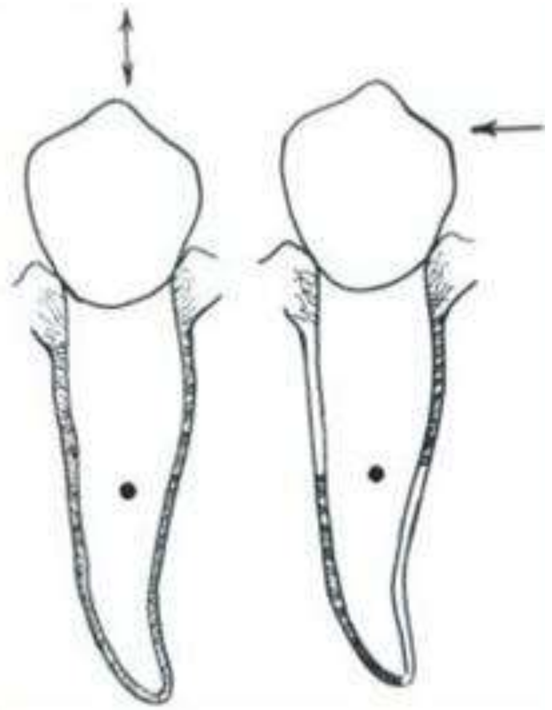
Kennedy Class I & II

- When the rest is placed mesially (away from the edentulous area), the force tends to move the tooth towards the adjacent tooth mesially. Thus the adjacent tooth absorbs some of the forces of occlusion.



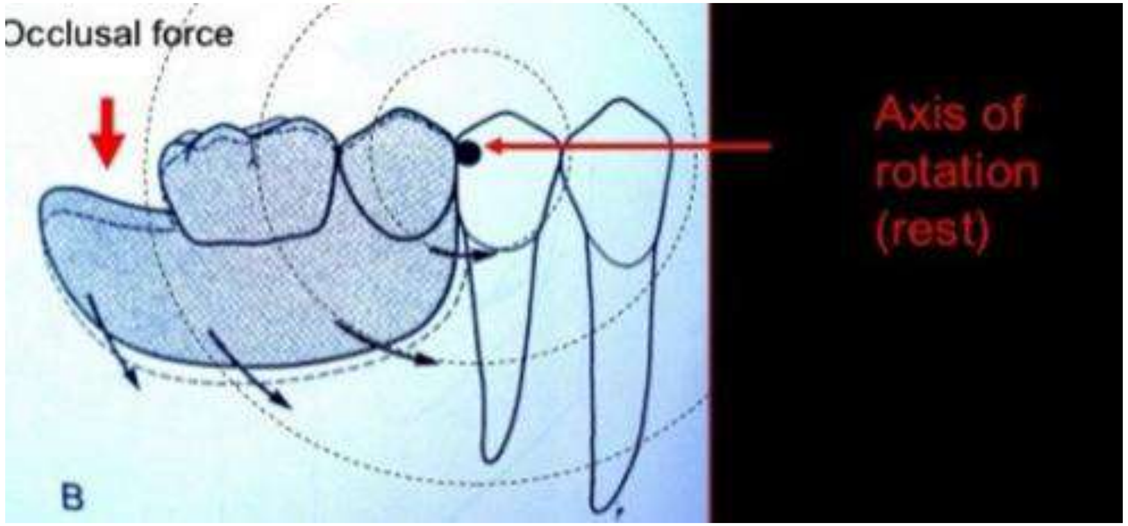


Design Sequence
2-Rest



Kennedy Class I & II

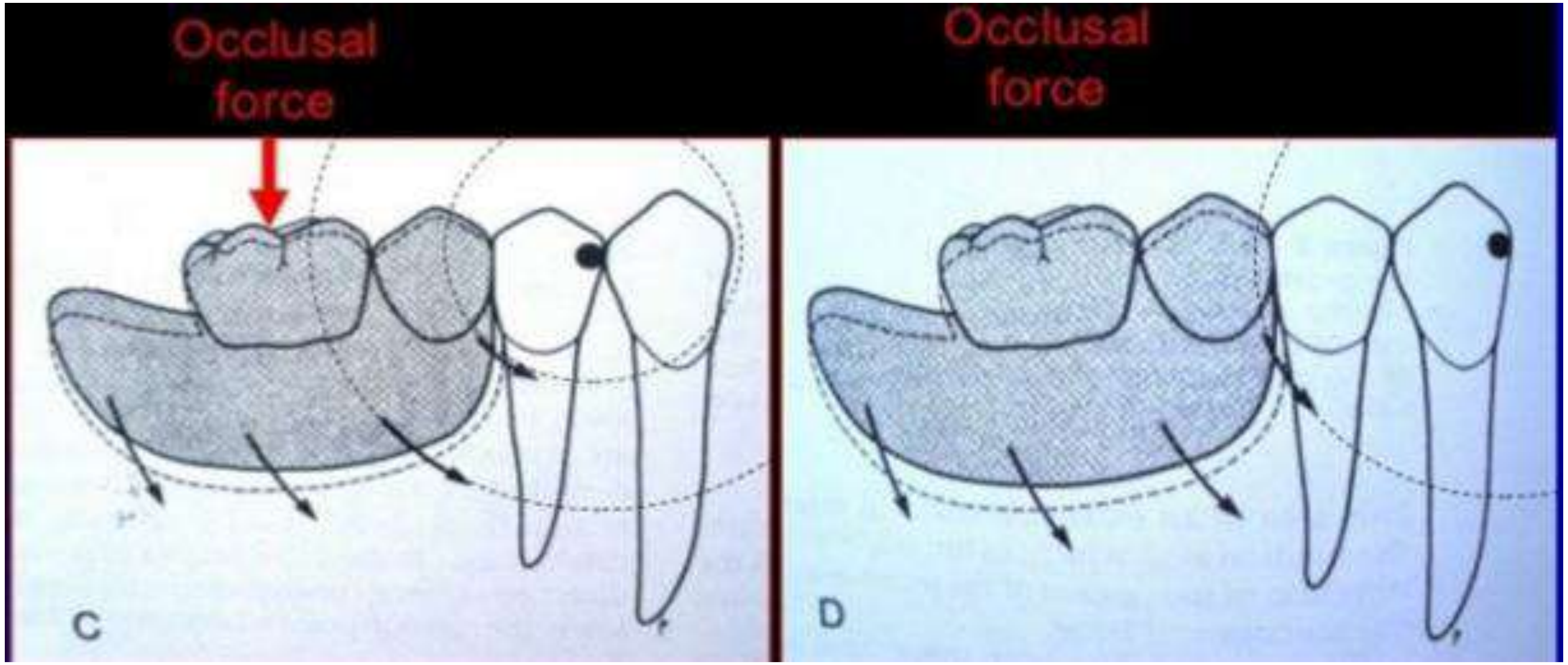
- A tooth is better able to tolerate vertically directed forces than horizontal forces.
- If the rest is placed on the distal side of the abutment near the edentulous area, the forces are not vertical but almost horizontal in the region just next to the abutment.



Design Sequence
2-Rest

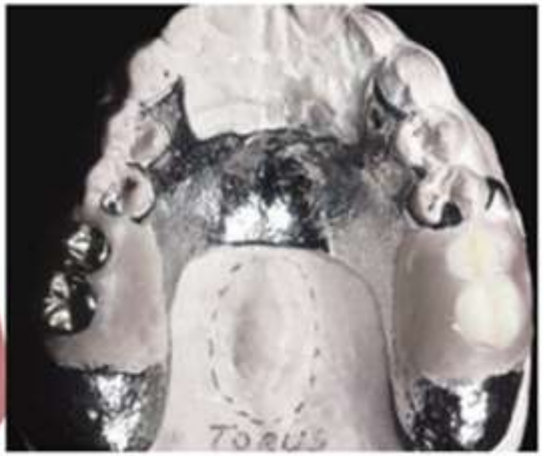
Kennedy Class I & II

- As you move the rest anteriorly, the forces are directed more favorably in a more vertical direction in relation to the edentulous area.



Design Sequence
3- Major Connectors

- Assess tori, height of floor of mouth, frenal attachments, which may affect major connector choice.



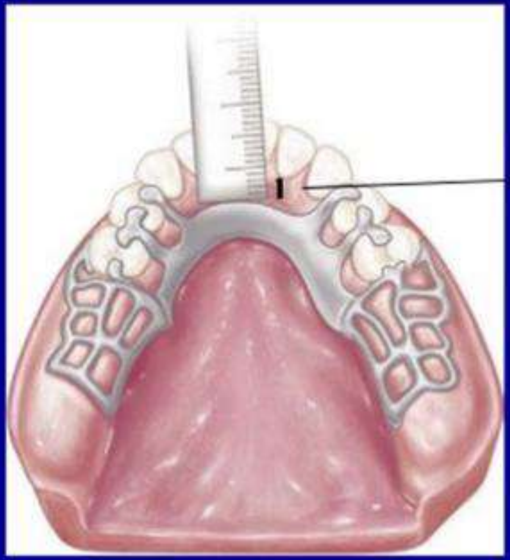
Mandibular Major connectors

Lingual Bar	Whenever possible (8 mm space)
Linguoplate	High frenum, floor of mouth less than 8 mm, resorption of ridges Want to stabilize teeth, May need to add teeth to RPD Want to avoid torus
Sublingual bar	When the height of the floor of the mouth in relation to the free gingival margins will be less than 6 mm.
Mandibular Major Connectors Lingual bar with cingulum bar (Kennedy Bar, Double Lingual Bar)	When wide diastema exists between mandibular anterior teeth
Cingulum bar (continuous bar)	Excessive block-out of interproximal undercuts (crowding of teeth)
Labial bar	Malpositioned or lingually inclined teeth and Large mandibular tori

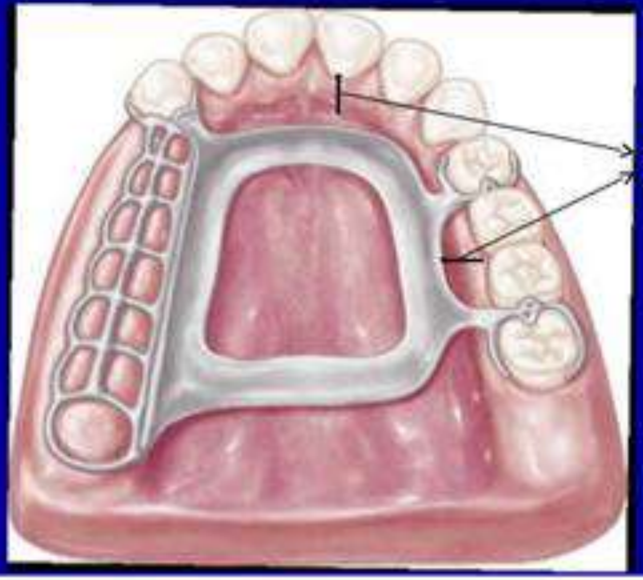
Maxillary Major Connector

Single palatal strap	Bilateral tooth-supported prostheses
Combination anterior and posterior palatal strap	Class I and II arches, Long edentulous spans in Class II, modification 1 arches, Class IV arches, Inoperable palatal tori
Palatal plate	Some or all anterior teeth remain
U-shaped palatal connector	When a large inoperable palatal torus exists, and occasionally when several anterior teeth are to be replaced
Single palatal bar	
Anterior– posterior palatal bars	

Lingual bar major connector should be located at least 3-4 mm inferior to gingival margins



Palatal major connector should be located at least 6 mm away from gingival margins.



Design Sequence
4 Minor Connectors

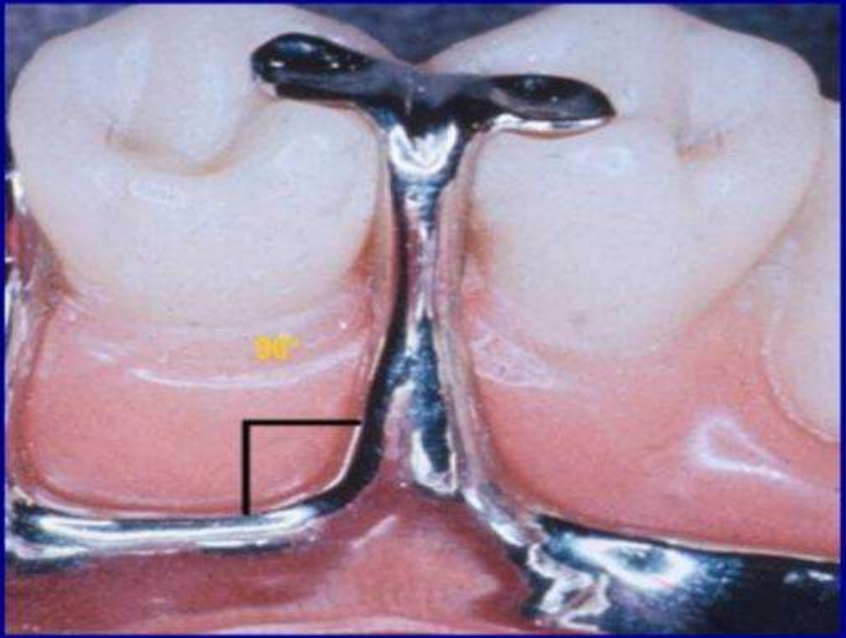
- ➢Connects components to the major connector:

1. Direct retainer
2. Indirect retainer
3. Denture base

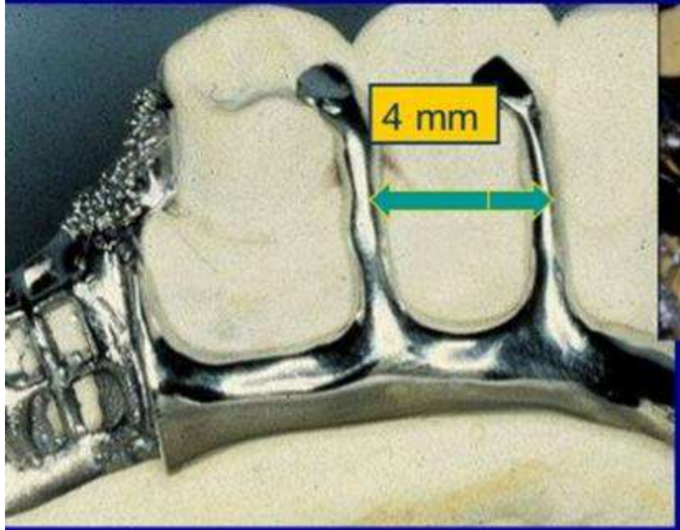
- ➢Minor connectors:

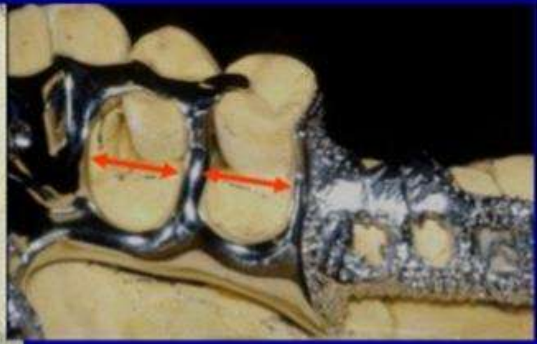
- Should be rigid
- Mostly located in an embrasure
- Should taper towards the contact area

- Should form a right angle with the major connector



Between one minor connector and the other minor connector - 4 mm





Design Sequence
5- Direct Retainers

- Direct Retainers in Cl III
- Clasp of Choice: Akers.
- Embrasure clasp: on dentulous side.
- Ring clasp: on single molar or tilted molar.
- Direct Retainers Cl I & II
- Use stress releasing retainers
- More load transferred to residual ridge RPI RPA Combination Clasp

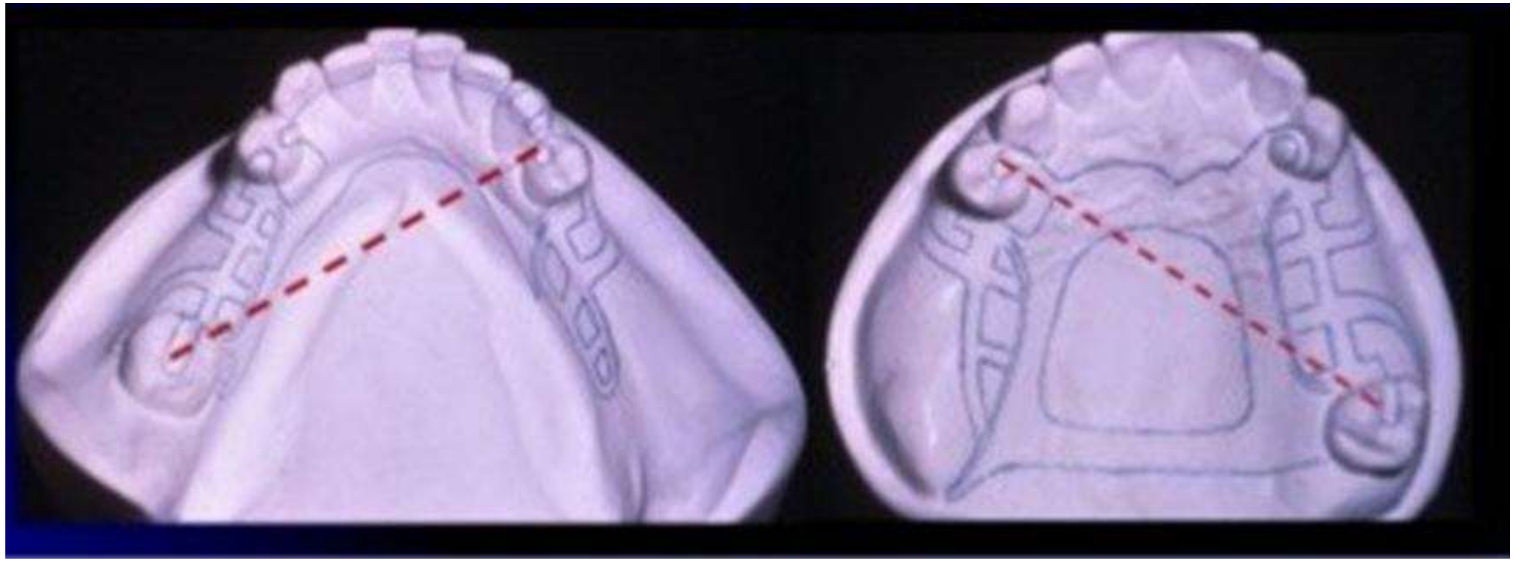
Design Sequence
5- Direct Retainers

Clasp of Choice: RPI

- If can't use I-bar then RPA: in cases of high frenal attachment, soft tissue undercut, shallow vestibule.
- If can't use mesial rest then Combination Clasp: in cases of restoration, heavy occlusion, rotated tooth.

Design Sequence
6- Indirect Retainers

- Usually for Class I & II only
- Position on the opposite site of fulcrum line
- Perpendicular and far from fulcrum line
- Canine and premolar usually
- Rest at each end of lingual plate




Thank you

ACRYLIC REMOVABLE PARTIAL DENTURE

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ACRYLIC REMOVABLE PARTIAL DENTURE

- It is a dental prosthesis which artificially supplies teeth and associated structures in a partially edentulous arch, made of acrylic resin and can be removed from the mouth at will. An acrylic removable partial denture consists of an acrylic resin denture base, artificial teeth, and wrought wire clasps.

TYPES OF ACRYLIC PARTIAL DENTURE

- **1- Temporary (Interim) removable partial denture:** It is a removable prosthesis used temporarily for a period of time until a more definite prosthesis can be provided.
- **2- Transitional removable partial denture:** A partial denture which is to serve as a temporary prosthesis and to which more artificial teeth will be added as more teeth are lost and which will be replaced after post-extraction and tissue changes have occurred.
- **3- Treatment partial denture:** A dental prosthesis used for the purpose of treating or conditioning the tissue.
- **4- Immediate partial denture:** It is prosthesis used to replace one or more teeth and is inserted on the day of extraction of teeth. It is a partial denture constructed before the extraction of unwanted teeth and is inserted immediately after this extraction.

INDICATIONS OF REMOVABLE PARTIAL DENTURE:

1- In young patients when the pulp chamber is so large that a fixed prosthesis is not feasible.

2- As space maintainer: recent extraction or premature loss of teeth resulting in a space, to maintain this space we have to make an acrylic temporary treatment.

a. In young patient: it is important to maintain the space until adjacent teeth have fully erupted to be used as abutments for fixed restorations.

b. In adult: the maintenance of space can prevent migration of adjacent teeth, extrusion, or over-eruption of opposing teeth.

3- Elderly patients, whose general health contraindicate lengthy procedure.

INDICATIONS OF REMOVABLE PARTIAL DENTURE:

4- Cost: acrylic removable partial denture is considerably less than that for metallic partial denture or fixed partial denture.

5- Serviceable for periodontically weakened standing teeth.

6- Interim (temporary) prosthesis: may be used:

a. When denture is needed while healing is progressing after extraction or surgery.

b. Denture is needed while prolonged treatment is being accomplished

c. The patient has no enough time at the moment for lengthy definite treatment.

INDICATIONS OF REMOVABLE PARTIAL DENTURE:

7- Transitional partial denture: during the periodic shift from a partial denture to complete denture.

8- Treatment partial denture: may be used:

a. As vehicle to carry tissue treatment material for abused oral tissue (tissue conditioner).

b. To reestablish the vertical dimension of occlusion on temporary bases, while the results of the increase can be observed.

c. As a splint for surgical correction in the oral cavity.

d. As a night-guard or mouth protective device to correct or control undesirable oral habits or to protect the mouth and teeth from trauma.

9- As immediate partial denture.

ADVANTAGES OF ACRYLIC PARTIAL DENTURE:

1) Not expensive.
2) Light weight.
3) Simpler design.
4) Easily constructed.
5) Easily added artificial teeth, if natural teeth are extracted.
6) Easily relined if bone resorbed.
7) Easily repaired if fractured.
8) Good appearance if extended labially or buccally because it is color resembles that of gingiva.
9) Easily adjusted by grinding at chair-side.

DISADVANTAGES OF ACRYLIC PARTIAL DENTURE:

1) Less patient response and tolerance for acrylic dentures than metallic dentures.
2) Poor thermal conductivity.
3) Lower strength, therefore:
   a. Easily broken
   b. Must be constructed in thick section.
   c. The denture is somewhat larger and bulker.
4) Not rigid enough for ideal connection.
5) Tendency for warpage if overheated during polishing or during recurring in repair or reline.

DISADVANTAGES OF ACRYLIC PARTIAL DENTURE:

6) Design difficulties:

   a. Ideal tooth support is difficult.

   b. Ideal indirect retainer is difficult.

   c. Unnecessary tissue coverage because of strength considerations.

   d. Impossible to use more sophisticated components (precision attachments, stress breaker).

DESIGNING THE ACRYLIC PARTIAL DENTURE:

1- The acrylic denture base

- The base acts as a saddle and as connectors and has a reciprocal function for the retentive wrought wire clasp arm.

2- Wrought wire clasps:

- Wrought stainless steel wire clasps are used with acrylic partial dentures; they are attached to the acrylic denture base by embedding their non-retentive portion into the denture base.
- The wrought wire clasps consist of a retentive portion and non-retentive portion, which should be looped or twisted to help anchorage it in the acrylic resin of the base.

DESIGNING THE ACRYLIC PARTIAL DENTURE:

2- Wrought wire clasps:

- **The most commonly clasp design used for acrylic partial denture:**

A. Simple circular clasp:

- It is used for the teeth adjacent to the edentulous ridges. It starts lingually and passes over the relieved ridge along the proximal surface of the clasped tooth to engage buccal undercuts. It should pass 3-4 mm away from the proximal surface of the clasped tooth, to allow grinding.

B. Half Jackson clasp:

- It finds its application on molars and premolars when no edentulous space exists on either side of the tooth. It starts lingually and passes up to cross the occlusal plane on the embrasure between two neighboring teeth, then down to the buccal surface to engage the undercut.

DESIGNING THE ACRYLIC PARTIAL DENTURE:

3- Acrylic Teeth:

- They are attached by chemical bond to acrylic denture base.


Don't look back.
For a bright
future is ahead of
you.