Partial denture

Direct retainer

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Lecture 5

Direct retainer

Is defining as :-any unit of removable dental prostheses that engages an abutment tooth to resist displacement of the prosthesis away from basal seat tissue .

Classification:

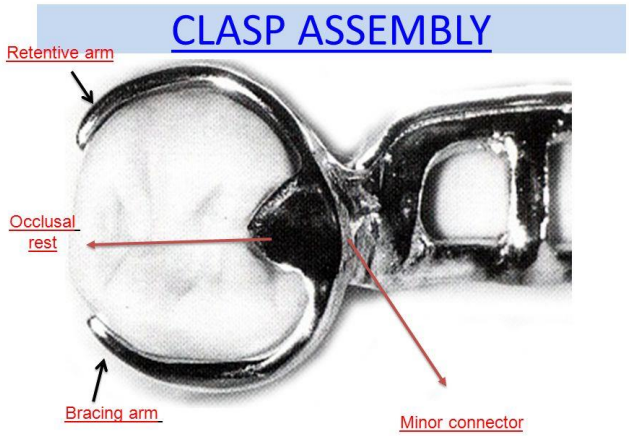
1- Extra –coronal retainer:- outside the contour of the crown ex: clasp.
2- Intra –coronal retainer:- within the contour of the crown ex: precision attachment

1- Extra –coronal retainer:- it engage the external surface of the tooth (abutment tooth)in an area cervical to its greatest convexity ex:clasp assembly.

Clasp:- the part of RPD that act as a direct retainer and –or stabilizer for a prosthesis by partially contacting an abutment tooth.

Part of extra coronal retainer:-

1- Rest :-function is a vertical support
2- Minor connector :- function is stabilizing by acting through guide planes placed on the proximal surface of the abutment tooth
3- The proximal plate :-extending from the prepared marginal ridge to the middle and gingival third of the abutment tooth .
4-Clasp arms :-function as stabilizing ,retentive and reciprocating units.



Requirement of design clasp :-

1- Support :-resistance to gingival displacement (occlusal rest)

2- Bracing (stabilization);-resistance to lateral movement (reciprocal arms ,minor connector)

3- Reciprocation (reciprocal action):-each force exerted on the tooth by the clasp arm(retentive arm)must be opposed by an equal balancing force normally .

4- Passivity ;-when the clasp is in its placed on the tooth ,it should be at rest and exerted no force .a retentive function only activated when a dislodging force is applied on the RPD

5- Retention ;-retentive arms located in undercuts on the abutment

Factor that determine the amount of retention provide by aparticular clasp arm:-

1- Size of the angle of cervical convergenc (depth of undercut) and how far the clasp terminal is placed into the angle of cervical convergence.

2- The flexibility of the clasp arm which is produced by :-

a-the length of the clasp arm

b-the diameter of the clasp arm.

c-the cross – sectional form.
d-the type of metal used.

Classification of extra –coronal retainer :-

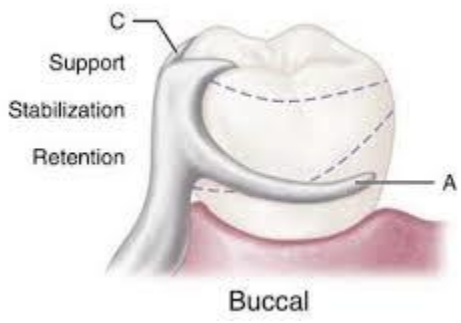
1- Supra –bulge clasps (akers clasp-circumferential clasp):-the retentive arm approaches the undercut area from the supra –bulge direction.
2- Infra –bulge clasp (gingivally approaching ,bar clasp):-the retentive arm approaching the undercut from the infra –bulge direction ,e.g. bar clasp arm (I,Y,T bar ….)

Types of circumferential clasps (supra –bulge clasps)

1- Circlet clasp
2- Half and half clasp
3- A fish hook or hairpin clasp
4- Embrasure clasp
5- Multiple clasp
6- Ring clasp
7- Combination clasp

1- Simple circlet clasp (C-clasp) :-

It’s the most common clasp used for removable partial denture, the least complex in design,it may be used in canine ,premolars ,and molars .



Advantage :-

1- easy to design and construct

2- less potential for food accumulation.

Disadvantage :-

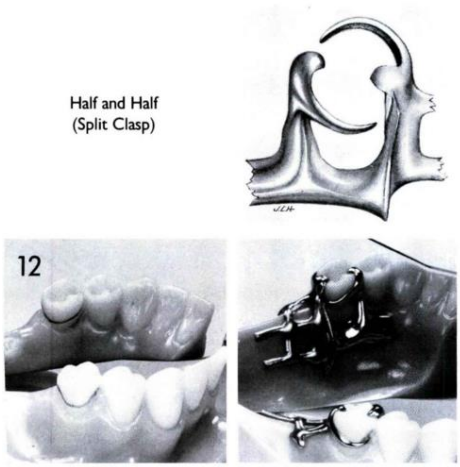
1- More tooth coverage than bar clasps

2- More metal display than with bar or combination clasps

3- Adjustment are difficult or impossible due to the half –round nature of the clasp .

2- Half and half clasp

The half and half clasp are a modification of the circlet clasp with the reciprocal arm coming from one direction and the retentive arm from the other .two rests are used for this clasp .it is used on molars and premolars . this is used in unilateral denture design because it has dual retention . the retentive tip is placed into a 0.01 inch undercut .



3- Fish hook or hair pin or reverse action clasp

The fishhook or hairpin clasp is another modification of the circlet clasp . it is mostly used in the teeth with long crowns .it is rarely used because so much of the teeth are covered by the retentive arm. the

other difficulty is the lack of flexibility of the retentive tip because of the bulk of the clasp .

Advantage :-

Allows use of undercut adjacent to edentulous space

Disadvantage :-

1- It only can be used in the tooth with adequate occlusogingival height.

2- There tends to be food accumulation.

3- The upper arm can cause occlusal interference.

4- Not aesthetic

5- A large amount of tooth surface covered that can cause decalcification and caries

6- Minimum flexibility and cannot be used in distal extension bases

4- Embrasure (double Akers) clasp

The embrasure clasp always should be used with double occlusal rests, two retentive clasp arms and two reciprocal clasp arms, which are bilaterally opposed.

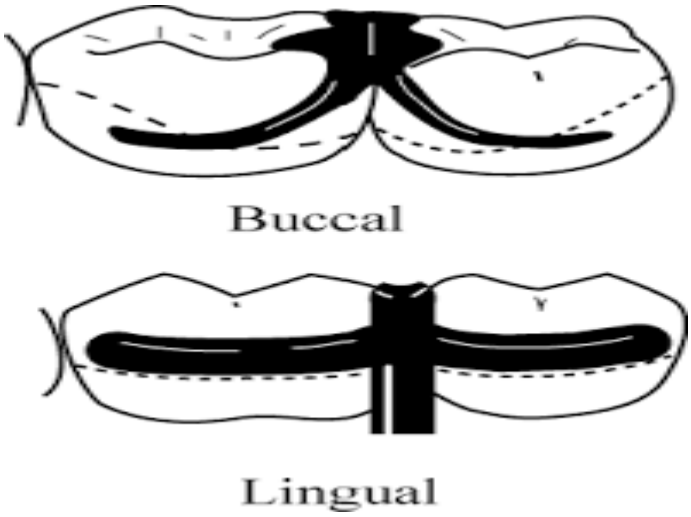
Indications:

In an unmodified Class II or Class III partial denture, where there are no edentulous spaces on the opposite side of the arch to aid in clasping also with class IV.

Disadvantages:

a. Extensive interproximal reduction is usually required.

b. Covers large area of tooth surface – hygiene considerations



5-Multiple clasp

The multiple clasp is simply two opposing circumferential clasps joined at the terminal end of the two reciprocal arms.

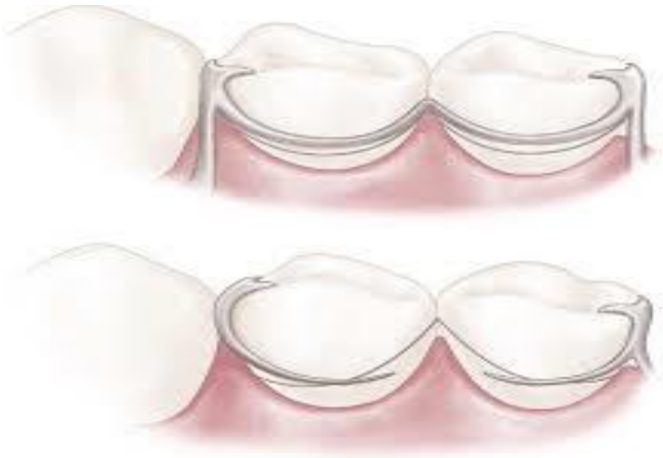
Indications:

a. It is used when additional retention and stabilization are needed, usually on tooth-supported partial dentures.

b. It may be used for multiple clasping in instances in which the partial denture replaces an entire half of the dental arch.

c. It may be used rather than an embrasure clasp when the only available retentive areas are adjacent to each other.

Disadvantage: Its disadvantage is that two embrasure approaches are necessary rather than a single common embrasure for both clasps.



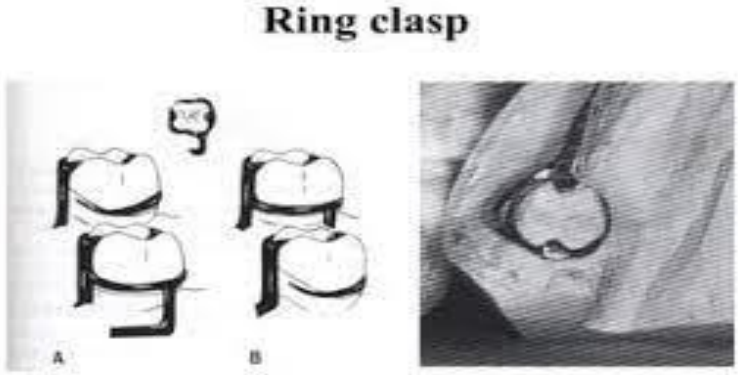
6- Ring - type clasp

Ring clasp, which encircles nearly all of a tooth from its point of origin. Clasp originates on the mesiobuccal surface and encircles the tooth to engage the mesiolingual undercut.

Indication:

It is used when a proximal undercut cannot be approached because of lingual inclination of the tooth.

Advantages: Allow use of an available undercut adjacent to edentulous area.



7- Combination clasp

consists of a wrought-wire retentive clasp arm and a cast reciprocal clasp arm.

Advantages:

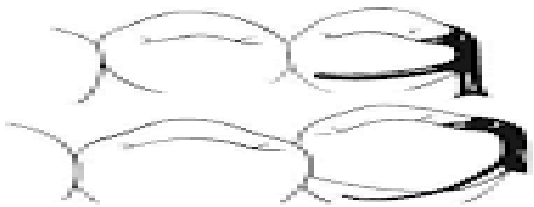
a. The flexibility.
b. The adjustability.
c. esthetic appearance.
d. Minimum of tooth surface coverage

Disadvantages:

a. It involves extra steps in fabrication.
b. It may be distorted by careless handling.
c. provide less stabilization.

Indications:

a. When maximum flexibility is desirable, such as on a weak abutment or where a large tissue undercut contraindicates a bar type direct retainer.
b. When esthetic required.



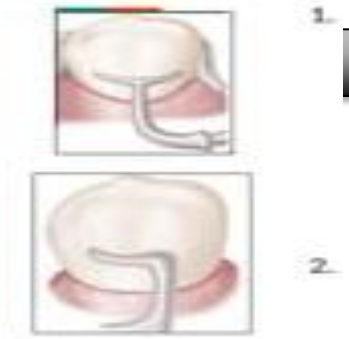
2- Infra Bulge Retainers :Bar clasp(Roach)

The bar clasp originates from the denture framework or a metal base and approaches the retentive undercut from a gingival direction.

-Other bar clasps e.g T bar or modified T bar do not have a tripping action since the retentive terminal engages the undercut from an occlusal direction.
- The push-type retention of bar clasps is more effective than the pull retention of a circumferential clasp.

Types of bar clasps:

-The bar clasp arm is classified by the shape of the retentive terminal into T modified T,I,Y or any letter clasp arm.
- Bar clasp arms generally are used on the buccal surfaces of teeth in combination with lingual circumferential arms.



1. T clasp

2. modified T

Y clasp

I bar

Advantages:

1-Greater retention than occlusal approaching due to the trip action.
2-It is more esthetic than the occlusal approaching clasps.
3-The flexibility of the bar clasp arm can be controlled by its taper and length.
4-Covers less tooth structure than the occlusal approaching (less caries susceptibility).

Disadvantages:

1-Greater tendency to collect and hold food debris(more gingival irritation)
2-The retentive arm does not contribute to bracing and stability.

Contraindication:

1-When a deep cervical tooth undercut exists.
2- When a severe tissue undercut exists.
3- When there is a shallow vertibule.
4- When there is an excessive buccal or lingual tilt of the tooth.
5- When the height of the contour is close to the occlusal surface of the tooth.

Types of the gingivally approaching:

1-Bar Clasp (Roach or vertical projection)

Indications:

1-On abutment for tooth-supported or tooth-mucosa supported RPD when there is distobuccal undercut.

2-In situations in which esthetics is important.

2-RPI System Clasp:

Indication:

Commonly used for tooth mucosa-borne partial dentures

Design:

1-It consists of:

a)Mesial rest

b)Minor connector, placed into the mesiolingual embrasure, but not contacting the adjacent tooth.

c)Proximal plate contacts approximately 1mm of the gingival portion of the guiding plane.

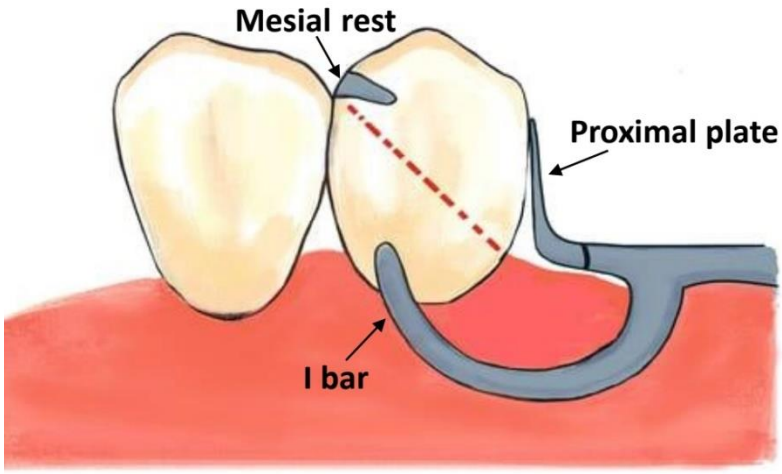
d)Cast I bar retentive clasp arm located at the mesiobuccal prominence of the tooth or mesial to it.

2-Engages 0.01-inch undercut.

3-Provide unilateral bracing.

4-The Proximal plate and the minor connector provide stabilization and reciprocation.

5-During the function ,the Proximal plate and I bar clasp arm move in a mesiogingival direction-disengaging the tooth. This distributes a more function load to the edentulous ridge.



2. Intra–coronal retainer (precision attachment)

This retainer is either cast or attached totally within restored natural contours of an abutment tooth. It is typically composed of a prefabricated machined key and keyway, with opposing vertical parallel walls, which serve to limit movement and resist removal of the partial denture through frictional resistance. It is usually regarded as an internal or precision attachment, which consists of a key and keyway.

Note:-

The key is attached to the abutment tooth and the keyway is attached to the saddle of the denture, that is matched to interlock together. Their function is to provide positive direct retention for a partial denture.

In this respect, they may prove more efficient than clasps but the clinical situations in which they are used require careful assessment and in all cases, the patient's standard of oral hygiene must be good, this factor is an even greater importance to the success of a precision attachment partial denture.

Advantages of precision attachments

1. labial or buccal clasp arms on canine or premolars are not required so aesthetics can be better.
2. Vertical and horizontal loads are applied more directly to the abutment teeth than by clasps or rests.
3. The efficiency of retention is not affected by the contours of the abutment teeth.
4. The number of components of the denture is reduced and hence tolerance should be better.
5. when used with lower free end saddles posterior movement of the denture is prevented.
6. Their use may be indicated when retentive clasp arm reciprocation cannot be achieved.

Disadvantages of precision attachments

1. Extensive preparation of all abutment teeth is necessary, together with the construction of the necessary crowns or inlays.
2. When the crowns of the abutment teeth are small or short, these attachments cannot be used.
3. Teeth with large pulps are at risk owing to the relatively deep preparations.
4. Intracorneal attachments are not normally advised for free end saddle dentures owing to the rigidity of the union between tooth and saddle.
5. Owing to the chairside and laboratory time involved and the high cost of the attachment

Types of intra-coronal retainers:-

1-Internal attachment:

It is also known as precision attachment or frictional attachment or key and keyway attachment or parallel attachment or slotted attachment.

Intracoronal attachments

Advantages: -

1. Elimination of visible retentive and support components.
2. Better vertical support through a rest seat is located more favorably in relation to the horizontal axis of the abutment tooth.

Disadvantages: -

1. Require preparation of abutment and casting.
2. Require somewhat complicated clinical and laboratory procedures.
3. Difficult to repair and replace.
4. They are effective in proportion to their length and are therefore least effective on short teeth.
5. Difficult to place completely within the abutment tooth because of the size of the pulp.
6. They are eventually wearing, with progressive loss of frictional resistance to denture removal.
7. They are considered more costly.

2- External attachment (Dalbo):-

They are indicated for an anterior prosthesis in a young patient with a large pulp chamber. it extended outside the normal contour of the crown of the abutment tooth. contain L–shape male portion attached to abutment crown and female sleeve placed in artificial tooth adjacent to the abutment.

Advantages:-

1. more esthetic.
2. resilient.
3. easy to insert.

Disadvantages:-

1. bulky attachment requires more space within removable partial denture
2. weak and break easily.
3. difficult to replace

3- Stud attachment (Rotherman):-

Which is an attachment that is inside the root that has a ball-like structure coming from it where a component of R.P.D would come and fits exactly on top of the ball.

Indications

The placement of a stud attachment is one of personal choice and it's used for overdenture

Advantages

1. The size of the attachment is small therefore less room is required in the denture base.
2. more versatile.
3. easy to adjust and repair.

Disadvantages

1. it has a tipping effect on the abutment teeth.
2. complex design.
3. can't be used in cases with limited space.
4. expensive.

4- Bar attachment:

These attachments join together teeth or roots and in addition to providing retention for a denture, its indication when there is bone loss around abutment teeth. The denture fits over the bar and is connected to it with one or more sleeve.

Advantages: -

1. rigid splinting.
2. cross-arch stabilization.
3. it can be used along with other attachments or implants for a combined fixed- removable prosthesis.

Disadvantages

1. space requirement.
2. needs frequent soldering.

3. difficult to maintain oral hygiene.