Retention, stability and support of complete denture

Retention

Retention may be defined as the resistance of denture to removal from patient's mouth. It is checked by firmly seating the denture in the mouth &trying to displace it with force at right angles to its occlusal surfaces. If the denture resist displacement it has adequate retention.

Factors effect on the retention of CD:

- Physical factors.
- Anatomical factors.
- Mechanical factors.
- Muscular factors.
- Surgical factors.

I. ANATOMICAL FACTORS:

The various anatomical factors that affect retention & it mainly affect lower denture are:

1. Ridge form:

- High and flat crest and well formed in recent extraction. The problem only is no space for setting of teeth.
- Flat one difficult and no retention and stability so in taking the impression try to extend it beyond mylohoid area to gain more stability &retention.
- Ridge with undercut more common in upper (bilateral maxillary tuberosity) so we do surgery in one side and block out the other & we have to change the path of insertion.

- Knife ridge difficult and cause lacerations and pain so do relief.
- Flabby ridge fibrous tissue and movable, no good seal so we either modified in the impression technique or do surgical correction.

2.Volt Form:

U shaped >>> good in retention and stability.

V shaped >>have retention but no stability and any pressure on it could break the seal

Flat shaped>>> no enough depth, so no retention and stability .

3.Arch Form:

Squared, ovoid, tapered and the best one is the squared,this is because of:-

1-there is 4 point of contact with denture.

2-Resistant the lateral forces.

4.Arch relationship

- Most of edentulous patient have class III >>> because of the pattern of bone resorption of the ridges.
- Some have class II and it isn't favorable because it has small surface area, and difficult to get the upper and lower in contact.

5.Interarch distance:

Small inter arch space more retention .

6.Tongue:

If too big >> it could interfere with denture. So dislodging of the lower and upper.

8.Mucosa:

We need it Firm, compressible and even thickness. Not to be thick and flabby.

II. PHYSICAL FACTORS

1. Adhesion:

It's a physical attraction between unlike molecule like the contact of saliva to both oral tissue and denture base. Adhesion of saliva to mucous membrane &the denture base is achieved through (ionic forces) between changed salivary glycoproteins &surface epithelium acrylic resin.

The amount of retention provided by adhesion is depend on:

1- Close adaptation of the denture base.

2- type of saliva (viscosity and wet ability). Thin serous saliva provide better adhesion than thick ropy saliva , it builds up pressure & pushes the denture out of position

3- Area cover by the denture. The size of maxillary denture bearing area is about (24 cm^2) & that of mandible is about (14 cm^2 **)**

Mandibular foundation has decreased surface area and hence decreased adhesion.V shaped palate induces sliding or deflection, hence retention by adhesion is less.

2. Cohesion:

Its physical attraction between like molecules. Factor affecting cohesion:

1. **Area covered by the denture** (cohesion is directly related to the area covered by denture if all the factor are equal)

2. **Thickness of the salivary film** (saliva film should be thin , watery serous saliva can form a thinner film and is more cohesive than thick mucous saliva

3. **Adaptation to denture base to mucosa** (close adaptation of denture to the mucosa is needed so that only a thin of saliva is present.

3. Interfacial surface tension:

A property of liquids in which the exposed surface tends to contract to the smallest possibly.

To obtain maximum interfacial surface tension:

1. Saliva should be thin and even.

2. Perfect adaptation should be present between the tissues and denture .

3. The denture base should cover a large area.

4. There denture should have good adhesive and cohesive force to aid to the enhancement of interfacial surface tension.

4. Capillary attraction

It defined as the quality that causes elevation or depression of the surface of the liquid that is in contact with the solid. Factors that aid to improve capillary attraction:

1) Close adaptation of denture base to soft tissue. Greater the distance less the capillary force

2) Greater the size of the denture bearing area greater the Capillary attraction retention

5. Atmospheric pressure and peripheral seal

When a dislodging force is applied on the denture having good border seal, a negative pressure develops in the space created between the denture base and the mucous membrane. When the negative pressure develops inside, the atmospheric pressure from outside pushes the denture towards the basal seat helping in retention of the denture .

Factor affecting atmospheric pressure :

a) Closeness of adaptation to keep air out of tissue contact depends mainly on the 1) impression technique.

2) An impression material that places slight generalized pressure on soft tissue is preferred.

3) Proper border molding

b) Peripheral seal :Is defined as the area of contact between the mucus membrane & peripheral polished surface of denture base,should have good peripheral seal

c) Posterior palatal seal area

It is defined as "The soft tissue at or along the junction of the hard and soft palates on which pressure within the Physiological limits of the tissues can be applied by the denture to aid in the retention of the denture. The shape of posterior palatal area depends on the shape of palate. According to **house classification**:

1) **Class l** flat - Wide palatal vault in the hard palate so the shape of posterior palatal seal is butter- flay 3-4 mm in width and Width 1.5 depth.

2) **Class ll** intermediate

3) **Class lll** deep-high vault so the shape of PPS is bead 1mm in depth ,Width 1.5 depth .

6. Gravity

Gravity acts as retentive forces for the mandibular denture and displacement for the maxillary denture when patient is in upright posture. In most cases, weight at lower denture has certain advantages especially if it has thick flanges to compensate resorption&enhance retention.

7.Viscosity

Is the resistance to flow of fluid resulting from intermolecular forces acting within the fluid. Fluid having a high viscosity resist flow more effectively than those of lower viscosity The additional saliva will cause loss of retention of the denture because of the resultant increase in distance between the denture &mucosa

8.Wettability

For adhesion to be accomplished between a solid & fluid, Wetting of solid by fluid must take place

- The degree to which this occur depend on relative surface tension .The wetting characteristics may be described in terms of contact angle (high contact angle indicate poor wetting).

III. MECHANICAL FACTORS :

The varicose mechanical factors which aid in retention are:

1) Undercuts

2) Magnetic force

3) Denture adhesion

4) Suction chambers and suction discs.

1- Engagement of undercut:

- Unilateral undercuts aids in retention while bilateral undercuts will interfere with denture insertion and require surgical correction.
- If bony undercuts exist, retention may be enhanced by designing a denture that utilizes these undercut areas. In order to achieve this without traumatizing the mucosa" on insertion and removal of the denture, special care is required in planning the path of insertion

2- Magnets:

Intramucosal magnetic aid in increase retention of highly resorbed ridge. Magnetic attachments can significantly improve the retention of mandibular complete over denture. The location of magnetic attachments greatly influences the retentive force of the over denture

Indication:

Some metal alloys possess magnetic properties which can be utilized in the retention of over dentures or partial dentures.

3- Denture adhesive:

Indications:

1. Denture adhesives are indicated when well-made complete dentures do not satisfy a patient's perceived retention and stability expectations.
2. Patients who suffer from xerostomia.
3. Neurological diseases like stroke and Orofacial dyskinesia
4. Patients who have undergone extensive surgery for removal of Oral Neoplasia

Contraindication:

1. Adenture adhesive should not be used for patient with ill- fitting dentures
2. It should not be used with patient with worn out denture.
3. It should not be used as a substitute to a relining or tissue conditioner.
4. it should not be used for patient with physical inability to clean dentures.
5. It should not be used in patient with temporary or immediate dentures where infections could result.
6. It should not be used in patient allergic to adhesive

Mode of action of adhesives:

Mechanism of action: its enhance retention through the optimizing **interfacial forces**by :

1. Increasing adhesive &cohesive properties & viscosity of the interposed medium.
2. Eliminating the voids & fill the spaces between denture base and its basal seat .
3. Increases viscosity of saliva.
4. Hydrated material swells up in the presence of saliva /water .
5. Hydrated material formed by adhesives stick readily to the tissue surface and the mucosal surface of the denture.

Forms of denture adhesive:

A- Powder form

Start its action immediately with maximum effectiveness &decrease with time.

B- Cream form

Starts its action immediately with accepted effectiveness which increases to maximum within time,moist the inner surface of denture &sprinkle adhesive powder on the wet surface then insert denture into patient's mouth.

Cleaning of denture adhesive should be done routinely by warm water to keep the denture clean.

Side effect of denture adhesive:

- High or Elevated Zinc Blood Levels.
- Symptoms of Nerve Damage.
- Numbness or Tingling in the Arms and Legs Paresthesia.
- Anemia
- Bone Marrow Failure