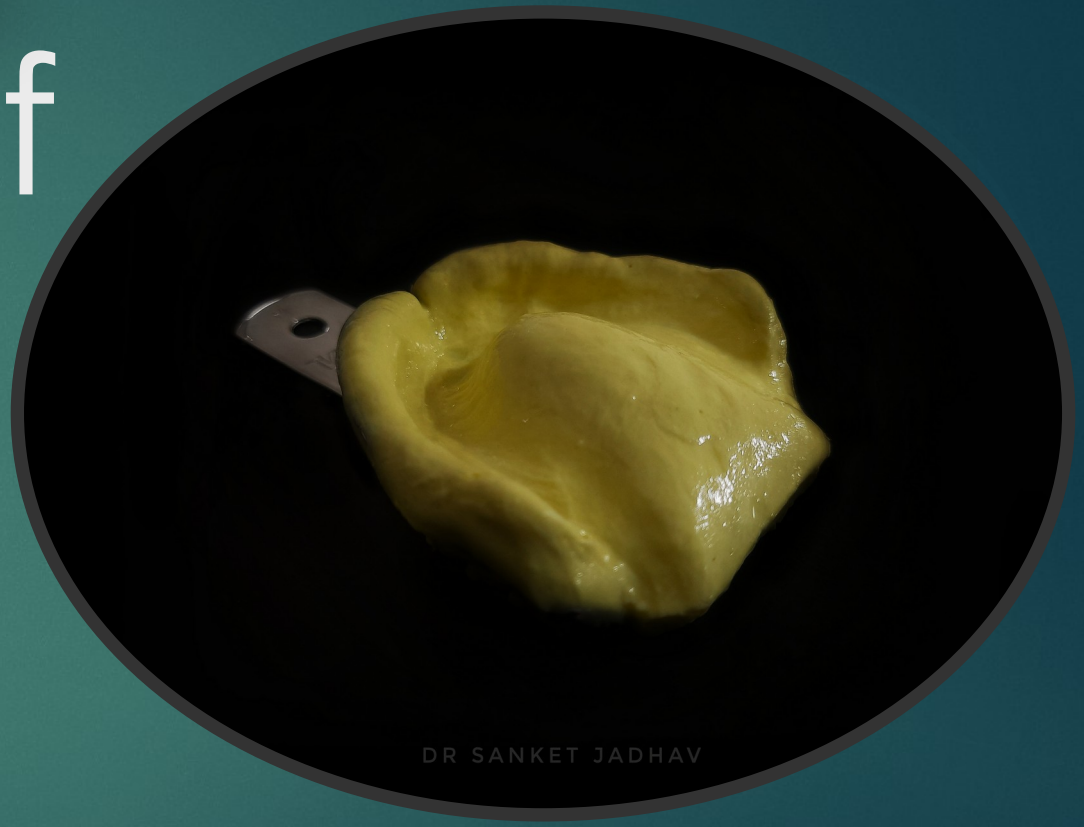
# Objectives of Impression Making




DR. SANKET JADHAV

An impression should be made with the purpose of obtaining the following characteristics in the dentures to be fabricated.

- Preservation of remaining structures
- Retention.
- Esthetics.
- Stability.
- Support.

- **Preservation of remaining structures**

Muller De Van (1952) stated that, "*the preservation of that which remains is of utmost importance and not the meticulous replacement of that which has been lost*."
Impressions should record the details of the basal seat and the peripheral structures in an appropriate form to prevent injury to the oral tissues.

E.g. the stress-bearing and **nonstress-bearing** areas should be recorded under stress and **relief** respectively.

- This prevents the damage of the oral structures due to the action of improperly distributed forces.

- The peripheral tissues should be recorded accurately to prevent over-extension of the denture and tissue irritation.

- **Retention**

**Retention**

It is defined as "*That quality inherent in the prosthesis which resists the force of gravity, adhesiveness of foods, and the forces associated with the opening of the jaws*"- GPT.

Retention is the ability of the denture to **withstand displacement against its path of insertion.**

The factors that affect retention can be classified as:

- Anatomical factors.
- Physiological factors.
- Physical factors.
- Mechanical factors.
- Muscular factors.

- **Retention**

- Anatomical factors.

**Size of the denture-bearing area**

Retention increases with increase in size of the denture-bearing area.

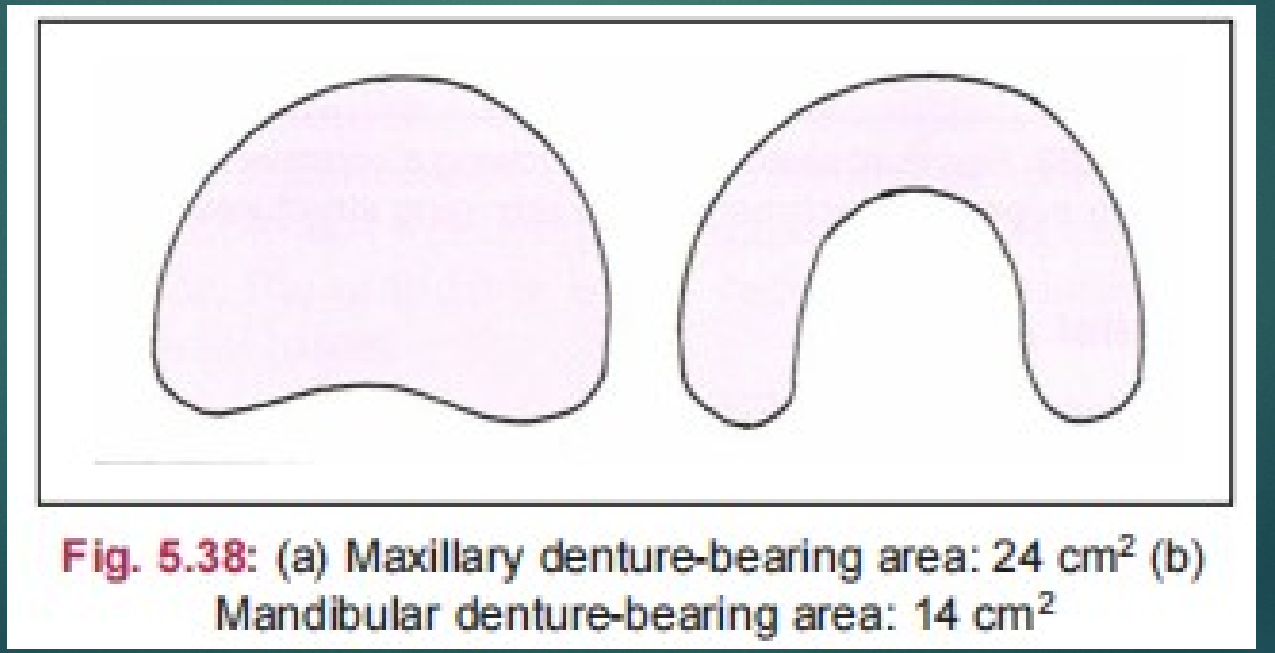


**Fig. 5.38:** (a) Maxillary denture-bearing area: 24 $cm^2$ (b) Mandibular denture-bearing area: 14 $cm^2$

- **Retention**
- Anatomical factors.

**Quality of the denture-bearing area**

The displaceability of the tissues influences the retention of the denture.

Tissues displaced during impression making will lead to tissue rebound during denture use, leading to loss of retention.

- **Retention**
  - Physiological factors

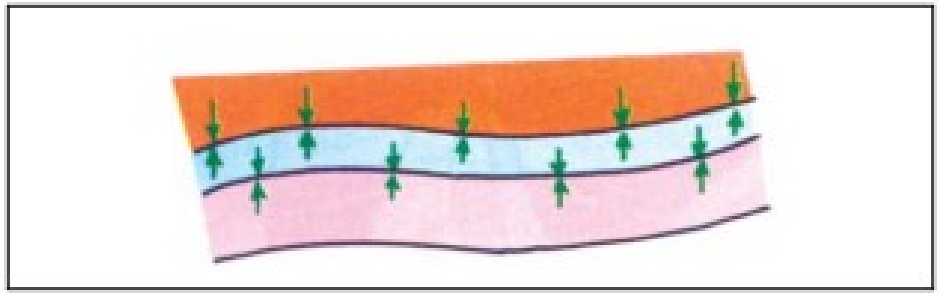


Fig. 5.39: Schematic representation showing adhesion between the saliva and tissues (black arrows) and the adhesion between the saliva and the denture base (green arrows)

**Saliva**

The viscosity of saliva determines retention. Thick and ropy saliva gets accumulated between the tissue surface of the denture and the palate leading to loss of retention. **Thin and watery** saliva can also lead to compromised retention.

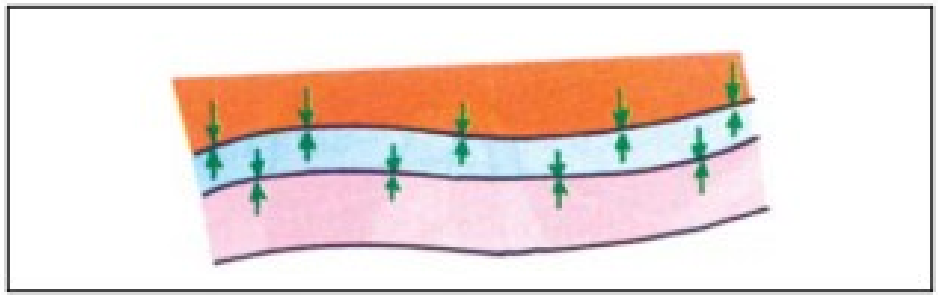
- The average flow of saliva is 150 ml/min.
- Saliva has gylcoproteins called "**MUCINS**", responsible for stringiness of saliva.

- **Retention**

- Physical Factors

The various physical factors which affect retention, are:

- **Adhesion.**
- **Cohesion.**
- **Interfacial surface tension.**
- **Capillarity or capillary attracti**
- **Atmospheric pressure and pe**



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- **Retention**

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The various physical factors which affect retention, are:

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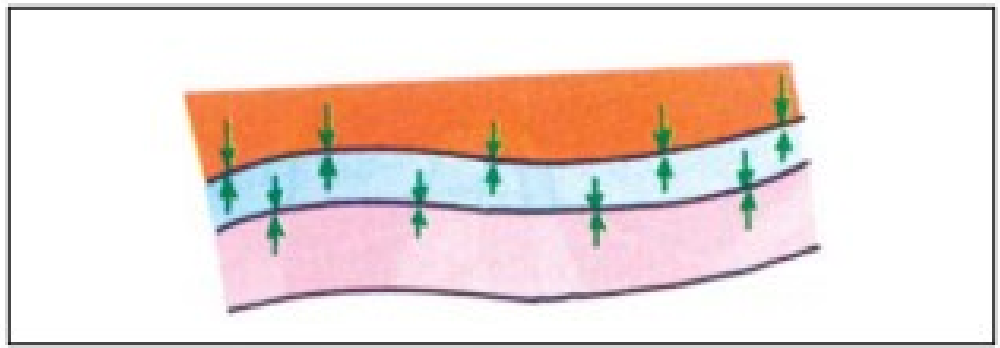

**Fig. 5.39:** Schematic representation showing adhesion between the saliva and tissues (black arrows) and the adhesion between the saliva and the denture base (green arrows)

***Adhesion*** *(Fig. 5.39)* It is defined as "*The physical attraction of unlike molecules to one another.*"- GPT.

The role of saliva is very important for adhesion.

In patients with xerostomia, adhesion does not play a major role.

# • Retention

- Physical Factors

The various physical factors which affect retention, are:

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- **Cohesion.**
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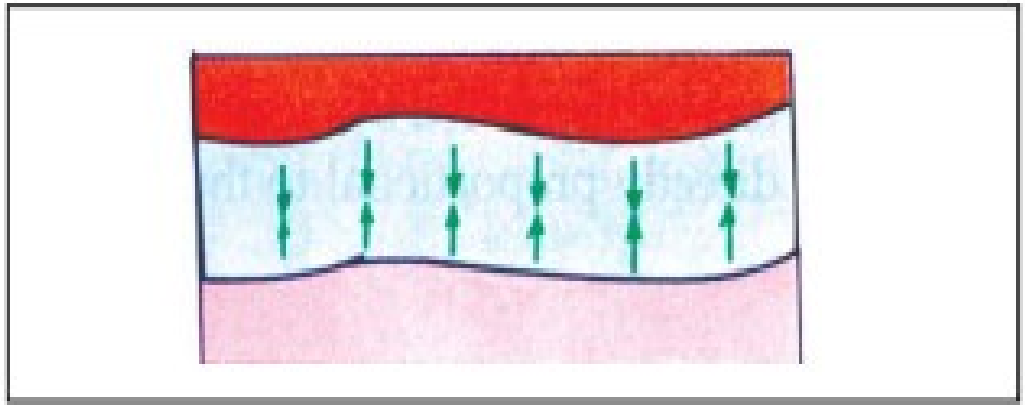

Fig. 5.40: Schematic representation showing cohesive forces within the saliva (green arrows)

***Cohesion*** *(Fig. 5.40)* It is defined as " *The physical attraction of* ***like molecules*** *for each other*".
The cohesive forces act within the thin film of saliva.

Watery serous saliva can form a thinner film and is more cohesive than thick mucous saliva.

# • Retention

- Physical Factors

The various physical factors which affect retention, are:

- **Adhesion.**
- **Cohesion.**
- **Interfacial surface tension.**
- **Capillarity or capillary attraction.**
- **Atmospheric pressure and peripheral seal.**

***Interfacial surface tension*** It is defined as " *The tension or resistance to separation possessed by the film of liquid between two well-adapted surfaces*"- GPT.
These forces are found within the thin film of saliva separating the denture base from the tissues. This film of saliva tends to resist the displacing forces.

It plays a major role in the retention of a maxillary denture.

- **Retention**
  - Physical Factors

***Interfacial surface tension***

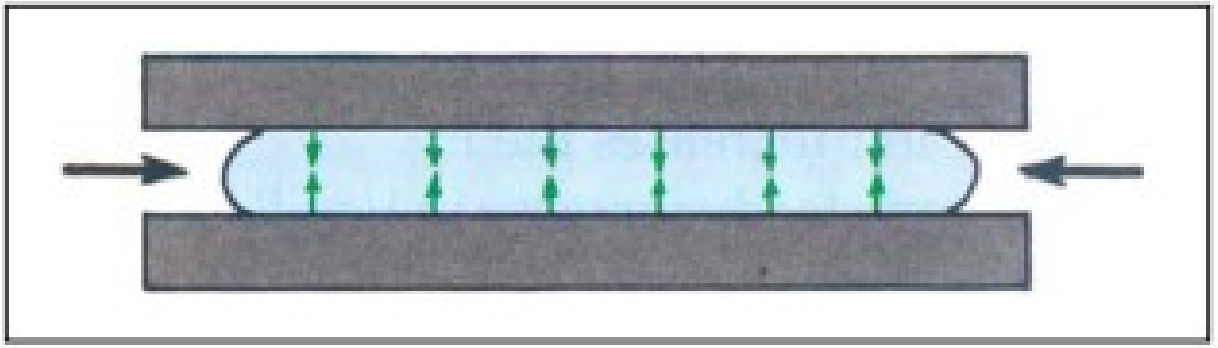

**Fig. 5.41a:** A liquid drop placed between two glass slabs prevents the separation of the slabs due to the action of forces of surface tension: (green arrows) at the air-water interface (black arrows)

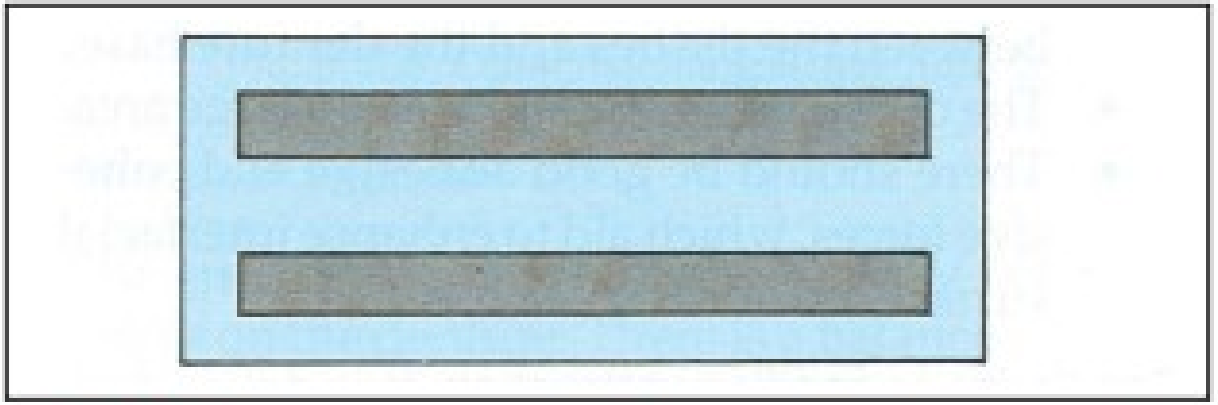

**Fig. 5.41b:** The same assembly when palced under water, will lose its surface tension due to the loss of its air-water interface

- **Retention**
  - Physical Factors

***Interfacial surface tension***

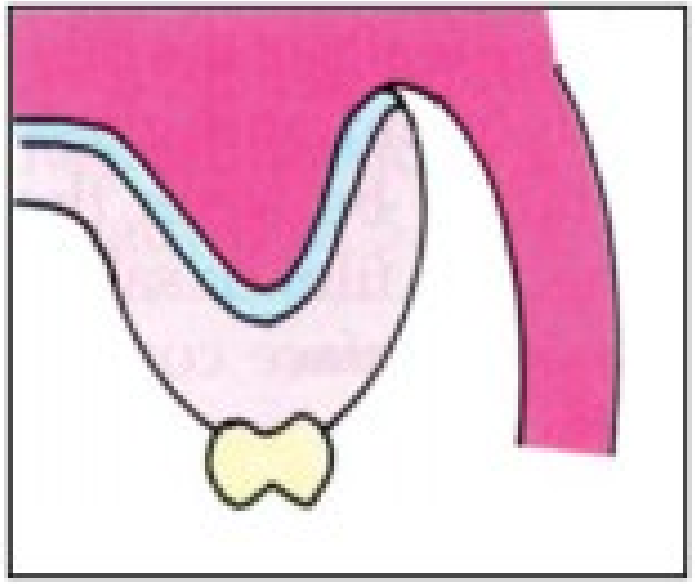

**Fig. 5.41c:** Surface tension present in the maxillary denture

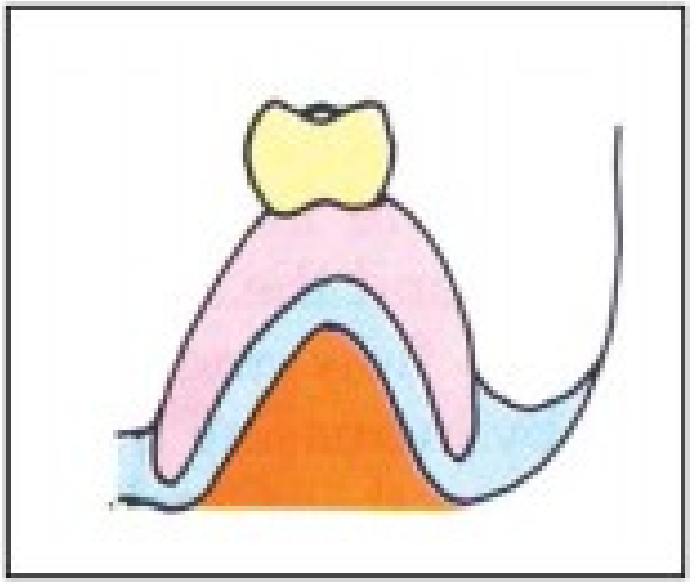

**Fig. 5.41d:** Surface tension lost in the mandibular denture due to the loss of the air-saliva interface at the denture border

- **Retention**
  - Physical Factors

The various physical factors which affect retention, are:

- **Adhesion.**
- **Cohesion.**
- **Interfacial surface tension.**
- **Capillarity or capillary attraction.**
- **Atmospheric pressure and peripheral seal.**

## Capillarity or capillary attraction:

It is defined as, "*That quality or state, because of surface tension causes elevation or depression of the surface of a liquid that is in contact with a solid*"-GPT.

A liquid tends to rise in a capillary tube by maximizing its contact along the walls of the tube at the interface between the liquid and glass. When there is close adaptation between the denture and the mucosa, the thin film of saliva tends to flow and increase its surface contact thereby increasing the retention.

# • Retention

- Physical Factors

The various physical factors which affect retention, are:

- **Adhesion.**
- **Cohesion.**
- **Interfacial surface tension.**
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- **Atmospheric pressure and peripheral seal.**

## Atmospheric pressure and peripheral seal

Peripheral seal is the area of contact between peripheral borders of the denture and the resilient-limiting structures. This peripheral seal prevents air entry between the denture surface and the soft tissue.

To achieve good peripheral seal, the denture borders should rest on soft and resilient tissues.

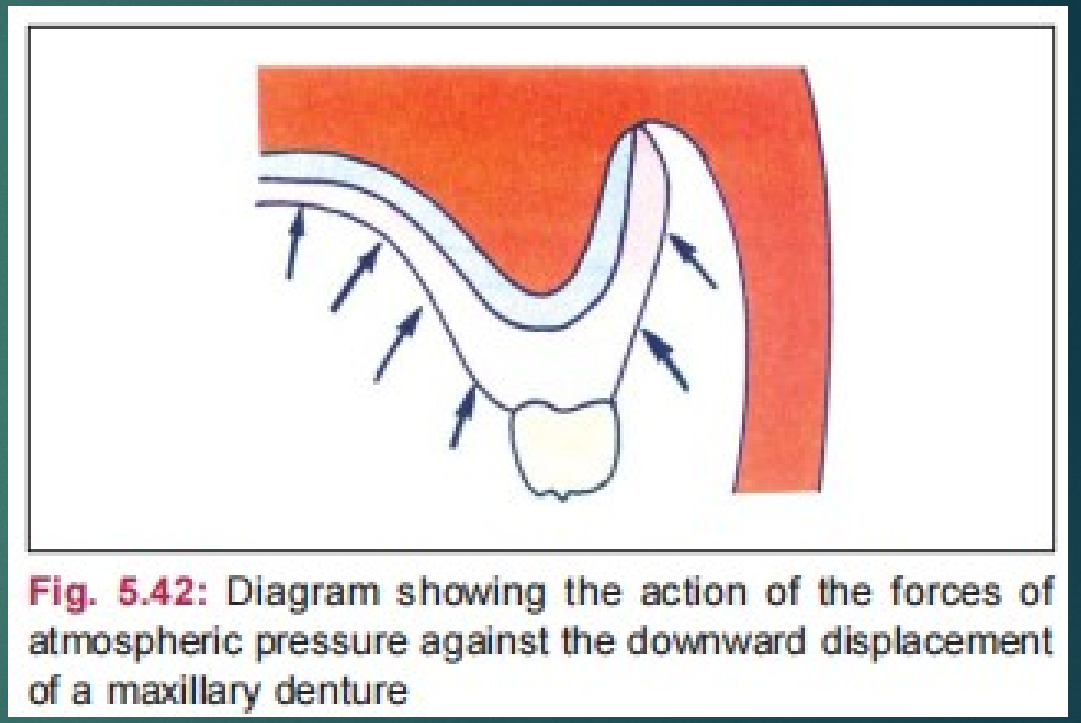


**Fig. 5.42:** Diagram showing the action of the forces of atmospheric pressure against the downward displacement of a maxillary denture

- **Retention**
  - Mechanical Factors

The various mechanical factors, which aid in retention, are:

- Undercuts.
- Retentive springs.
- Magnetic forces.
- Denture adhesives.
- Suction chambers and suction discs.

# • Retention

- Mechanical Factors

The various mechanical factors, which aid in retention, are:

• Undercuts : Undercuts Unilateral undercuts aid in retention while bilateral undercuts will interfere with denture insertion and require surgical correction

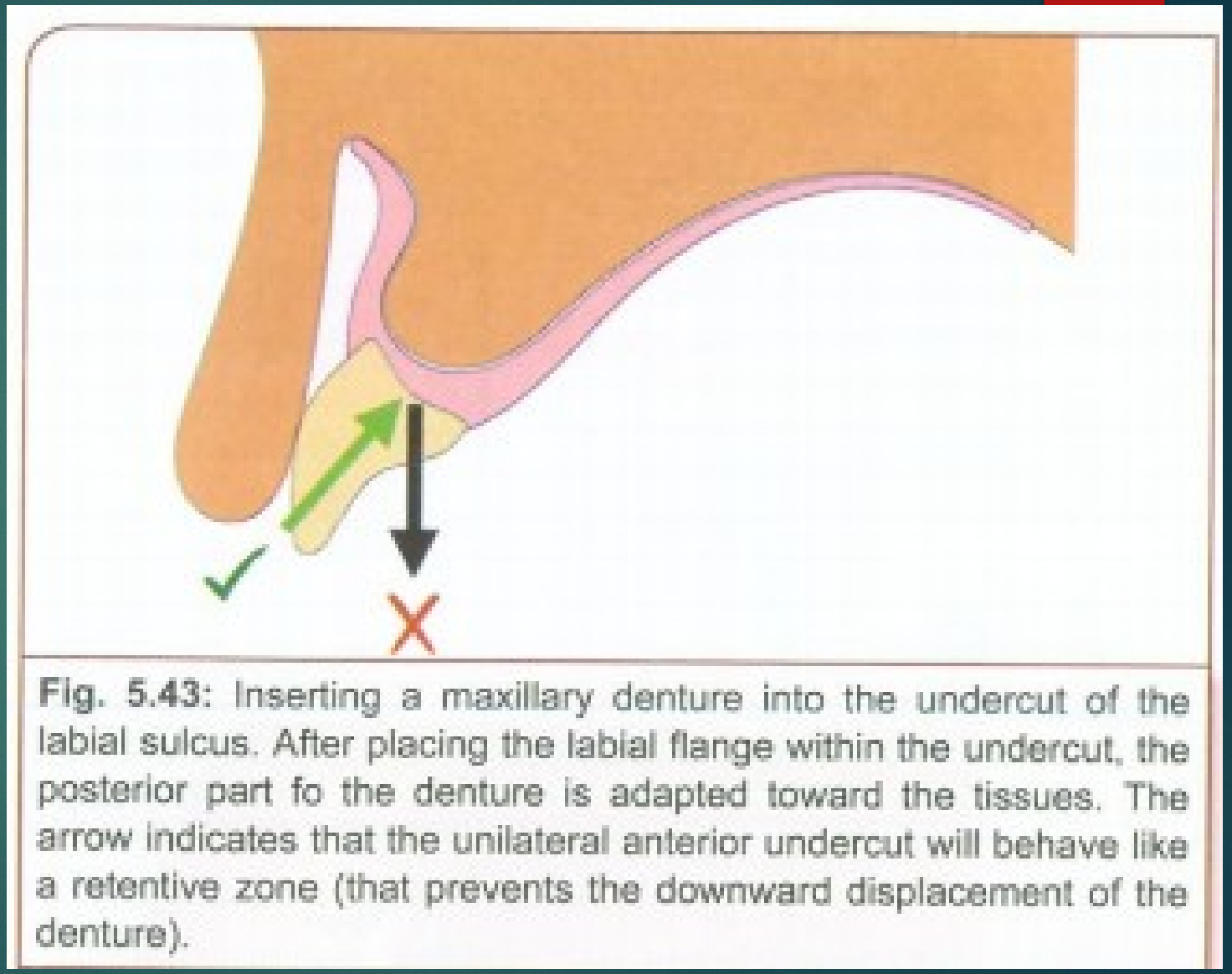


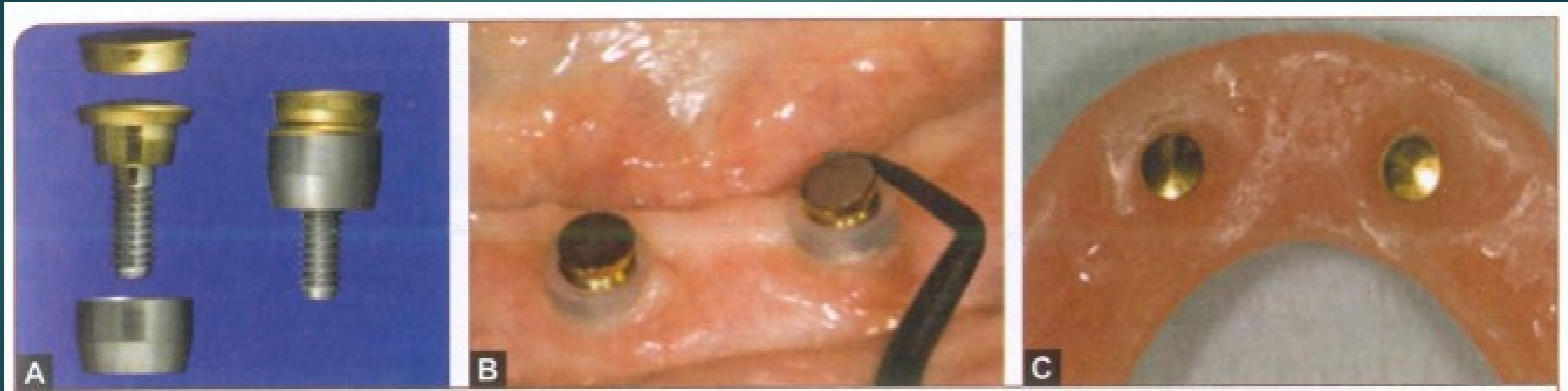
**Fig. 5.43:** Inserting a maxillary denture into the undercut of the labial sulcus. After placing the labial flange within the undercut, the posterior part fo the denture is adapted toward the tissues. The arrow indicates that the unilateral anterior undercut will behave like a retentive zone (that prevents the downward displacement of the denture).

- **Retention**

- Mechanical Factors

Magnetic forces

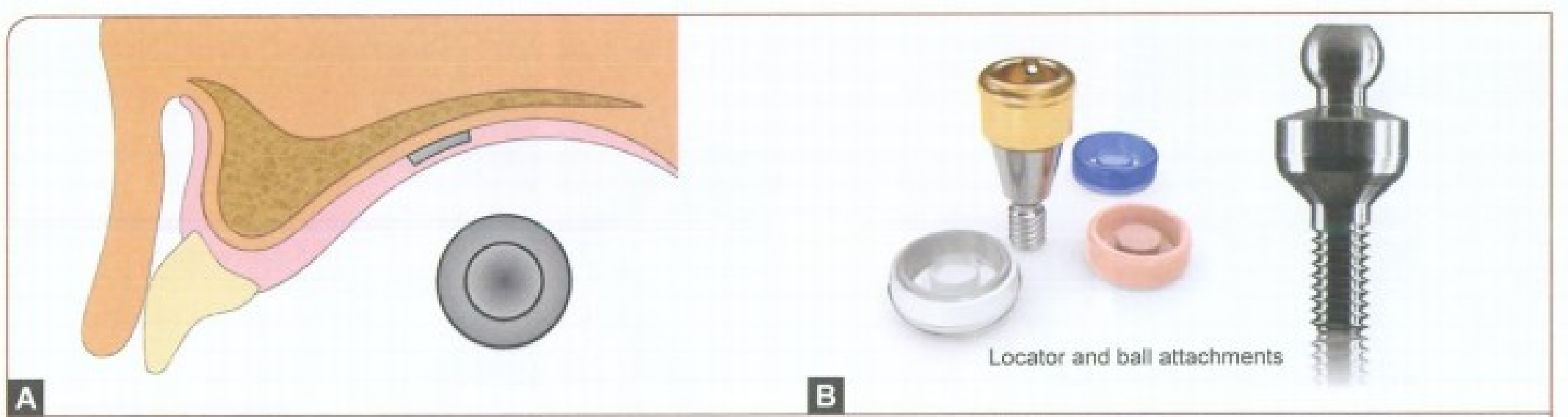
Intramucosal magnets aid in increasing retention of highly-resorbed ridges.




Figs. 5.44A to C: Intraoral magnet-retained dentures.

- **Retention**
- Mechanical Factors

**Suction chambers and suction discs** In the past suction chambers in the maxillary dentures were used to aid in retention. The suction chamber creates an area of negative pressure, which increases retention. They are avoided now due to their potency for **creating palatal hyperplasia**.




**Figs. 5.45A and B:** Cross-sectional view of a suction disk-retained denture showing the formation of vacuum (blue); (B) Other mechanical attachments.

- **Retention**
- Mechanical Factors

**Denture adhesives** They are available as creams or gels or powders. They should be coated on the tissue surface before wearing the denture.




- **Retention**
- Muscular Factors

The muscles apply supplementary retentive forces on the denture. There is a balance between the forces acting from the buccal musculature and the tongue. This balance is obtained in the *neutral zone*.

Hence, the artificial teeth should be arranged in the neutral zone to achieve the best retention possible.

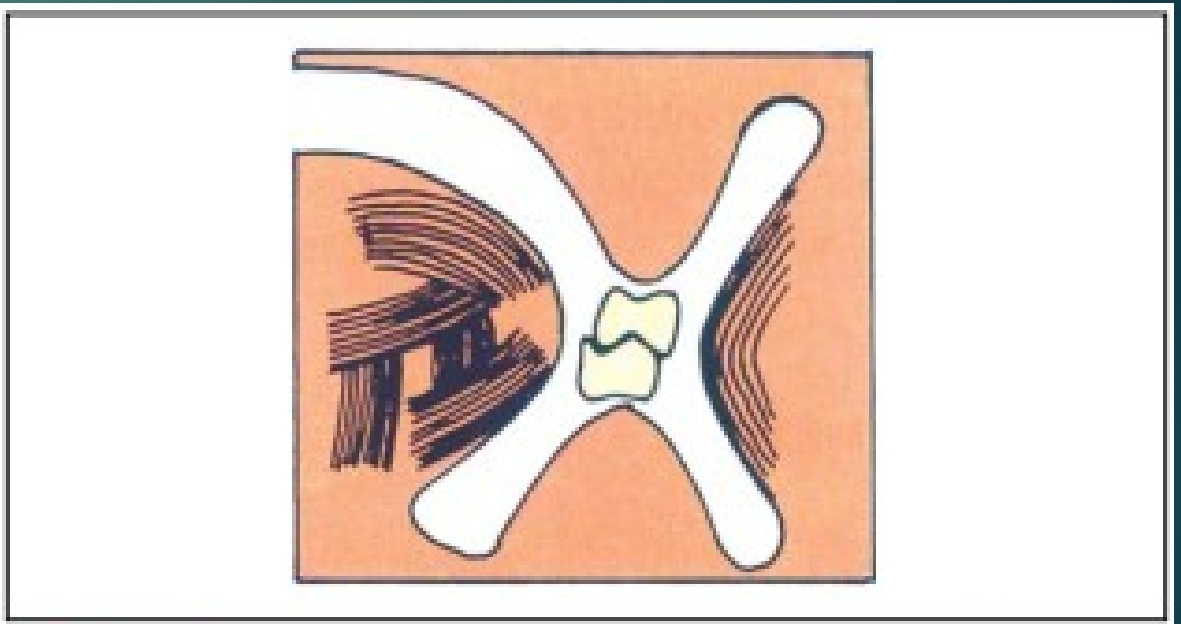


Fig. 5.46: Posterior teeth arrangement in the neutral zone in order to prevent the action of muscular de-stabilizing forces on the denture

# • Esthetics

**Aesthetics**
Aesthetics is one of the prime concerns of the patient in the complete denture treatment.

The thickness of the denture flanges is one of the important factors that govern aesthetics.

Thicker denture flanges are preferred in long-term edentulous patients to give the required mouth fullness.

Impression should perfectly reproduce the width and height of the entire sulcus for the proper fabrication of the flanges.

- **Support**

Support is defined as, "*The **resistance to vertical forces** of mastication, occlusal forces and other forces applied in a **direction towards the denture-bearing area.**"*

In order to provide good support, the denture base should cover as much denture-bearing area as possible.

This helps to distribute forces over a wide area. This ability of the denture to distribute forces over wide areas due to an increase in the denture-base area is termed the "***snowshoe***" effect

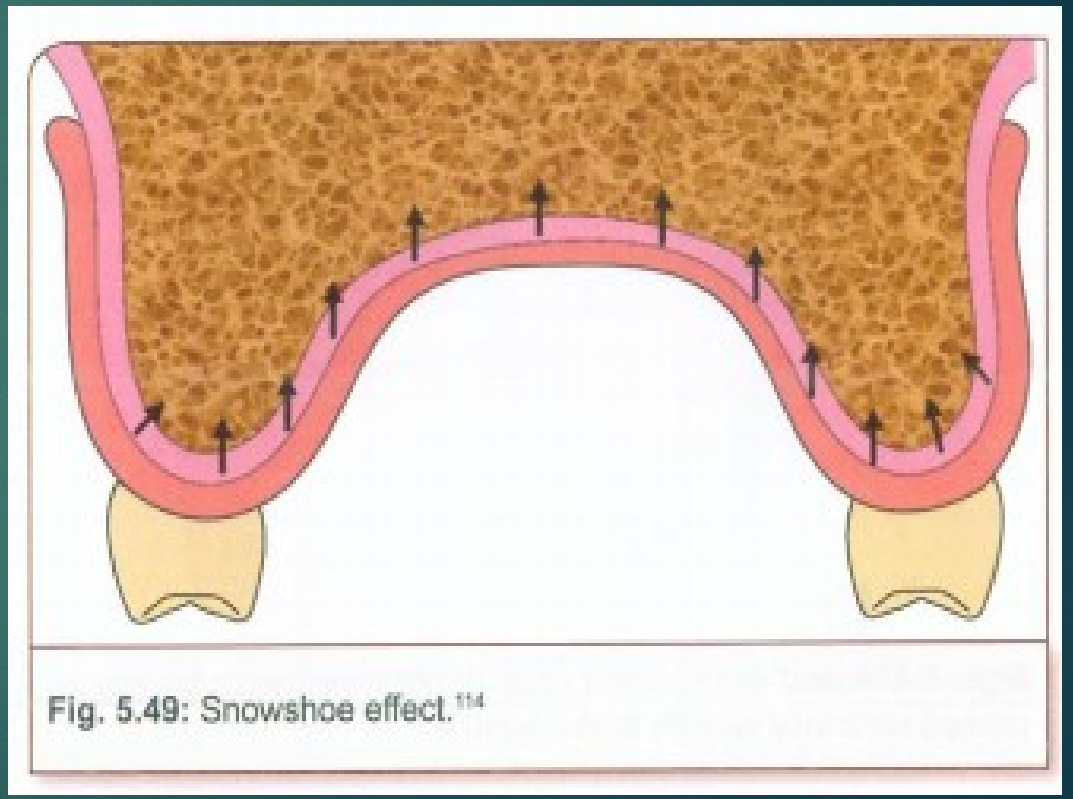


Fig. 5.49: Snowshoe effect.[114]

- **Support**

Confining the occlusal forces to stress-bearing areas and reliving the nonstress-bearing areas will aid to improve support.

***Primary support area*:** Area of edentulous ridge that are at right angle to occlusal forces and is more resistant to resorption.

*Maxillary:*

- Posterior ridge.
- Flat areas of the palate.

*Mandibular:*

- Buccal shelf area.
- Posterior ridge.
- Pear shaped pad.

***Secondary supporting area*:** Area of edentulous ridge that are greater than at the right angle to the occlusal forces also the area of edentulous ridge that are at right angles to the occlusal forces but tend to resort under load.[25,53]

*Maxillary*: Crest of the anterior ridge, rugae and all ridge slopes.

*Mandibular*: Anterior ridge and all ridge slopes.

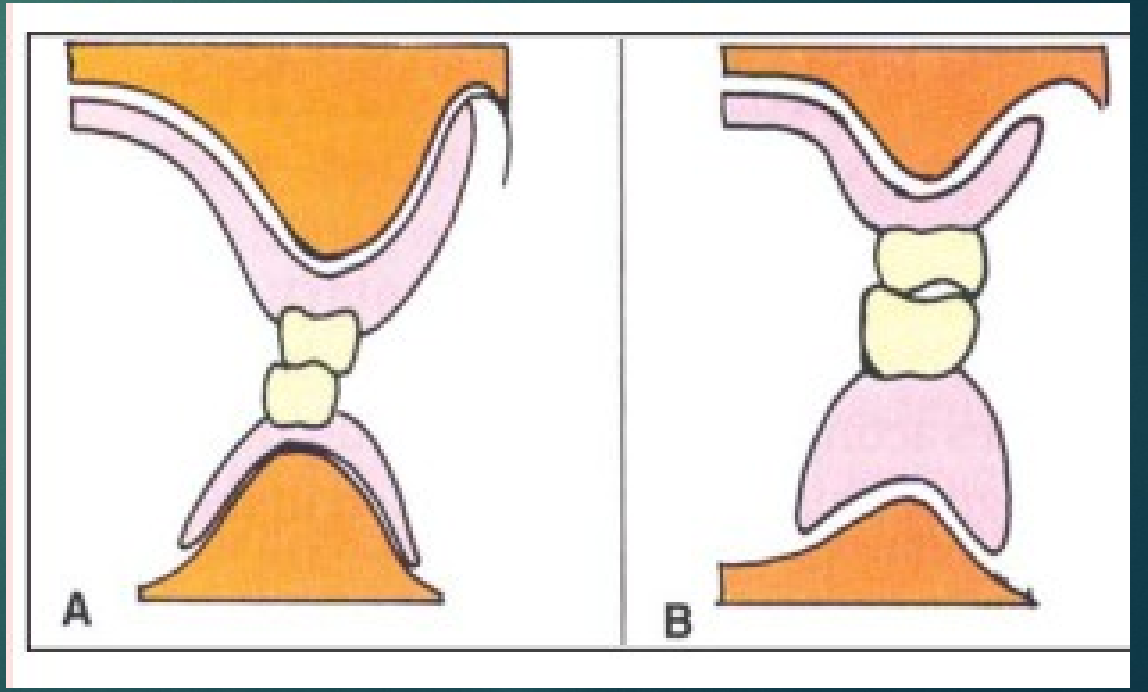
- **Stability**

Stability is the ability of the denture **to withstand horizontal forces**. The various factors affecting stability are:

- **Vertical height of the residual ridge.**
- **Quality of soft tissue covering the ridge.**
- **Quality of the impression.**
- **Occlusal rims.**
- **Arrangement of teeth.**
- **Contour of the polished surfaces.**

**Vertical Height of the Residual Ridge**

The residual ridge should have sufficient vertical height to obtain good stability.



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## Quality of Soft Tissue Covering the Ridge

The ridge should provide a firm soft tissue base with adequate submucosa to offer good stability.
Flabby tissues with excessive submucosa offer poor stability.

# • Stability

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- **Contour of the polished surfaces.**

## Quality of the Impression

- An impression should be as accurate as possible.
- The impression surface should be smooth and duplicate all the details accurately

# • Stability

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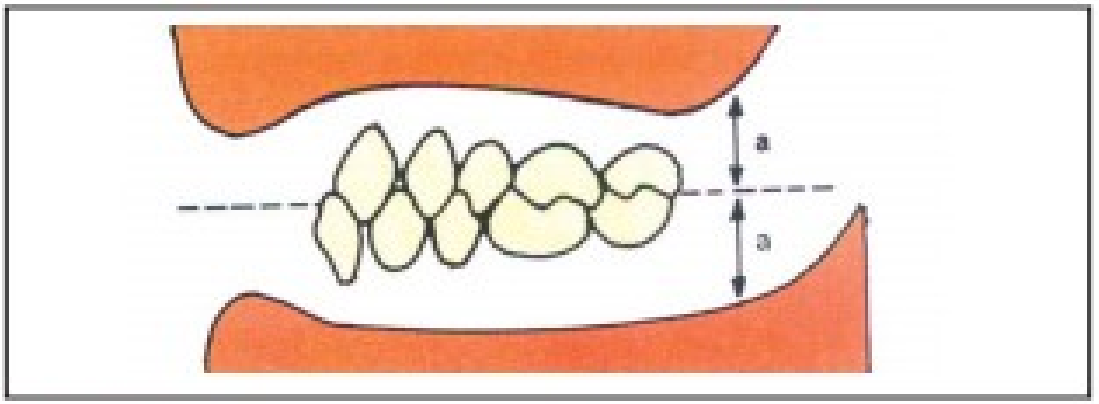


Fig. 5.48: The plane of occlusion should approximately divide the interarch space equally

**Occlusal Plane**

The occlusal plane should be oriented parallel to the ridge. If the occlusal plane is inclined, then the sliding forces may act on the denture, reduce its stability.

The occlusal plane should divide the interarch space equally

# Stability

Stability is the ability of the denture **to withstand horizontal forces**. The various factors affecting stability are:

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- **Arrangement of teeth.**
- **Contour of the polished surfaces.**

## Teeth Arrangement

- The position of the teeth and their occlusion play an **important** role in the stability of the denture.
- Balanced occlusion facilitates the even distribution of forces across the denture. Absence of balanced occlusion may produce unbalanced, lever type forces on any one side of the denture leading to loss of stability.

- **Stability**

Stability is the ability of the denture **to withstand horizontal forces**. The various factors affecting stability are:

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- **Quality of soft tissue covering the ridge.**
- **Quality of the impression.**
- **Occlusal rims.**
- **Arrangement of teeth.**
- **Contour of the polished surfaces.**

## Contour of the Polished Surface

The polished surfaces of the denture should be harmonious with the oral structures. They should not interfere with the action of the oral musculature.