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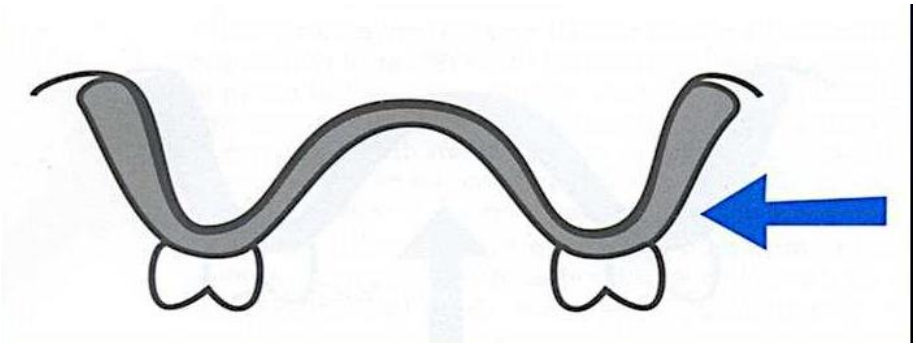
Department of prosthetic dentistry

5th stage / lec 7 *Dr. Hasanein Al-namel*

STABILITY:

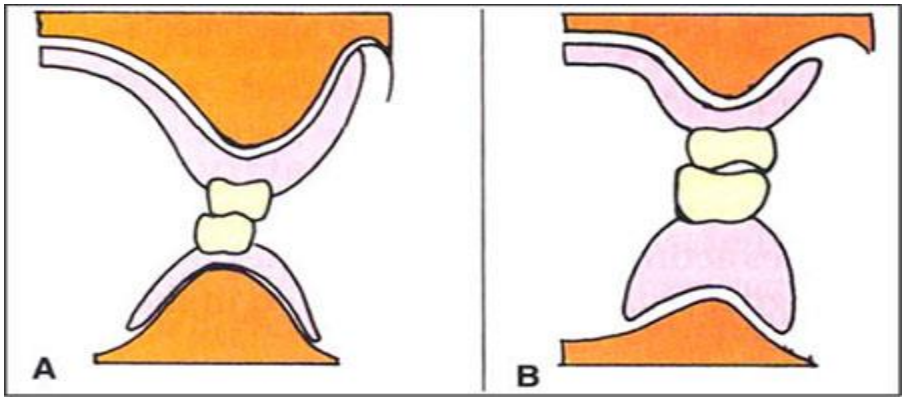
that quality of denture maintaining it in a constant position in the presence of forces that threaten it; The quality of a denture to be firm, stable, or constant and to resist displacement by functional stresses (horizontal forces) and not to be subject to change of position when forces are applied.



various factors that affect the stability:

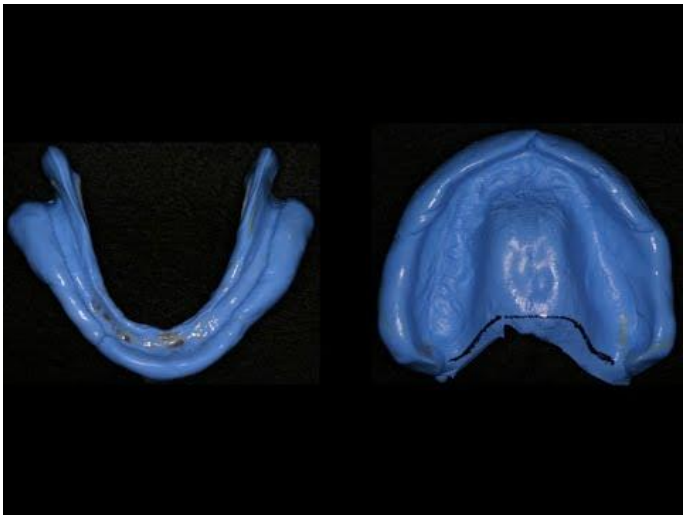
1. **Vertical height of the residual ridge**

the residual ridge should have sufficient vertical height to obtain good stability. Highly resorbed ridges offer the least stability.



2. **Quality of the impression**

An impression should be as accurate as possible, smooth, and duplicate all the details accurately, with no voids or any rough surfaces. The impression should not warp on removal, dimensionally stable and the cast should be poured as soon as possible.



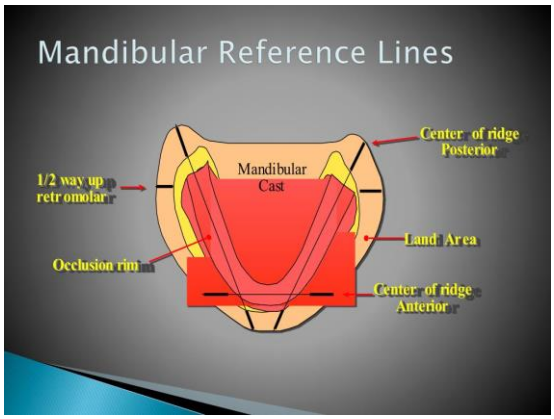
3. **Occlusal rims orientation**

The occlusal plane should be oriented parallel to the ridge. if the occlusal plane is inclined then the sliding force may act to reduce its stability.

4. **Arrangement of the teeth**

Teeth arrangement (balanced occlusion and neutral zone): 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 force across the denture. The absence of a balanced occlusion may produce an unbalanced lever type of force on any one side of the denture leading to loss of stability. The teeth in the denture should be arranged in the neutral zone.

Neutral zone: the potential space between the lips and cheeks on one side and the tongue on the other. Natural or artificial teeth in this neutral zone are subjected to equal and opposite force from the surrounding musculature



5. Contour of the polished surface

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

6. Shape of the palatal Vault

A steep palatal vault may enhance stability by providing a greater surface area of contact and long inclines approaching. a right angle to the direction of force

Hard palate: Hard palate can be classified as

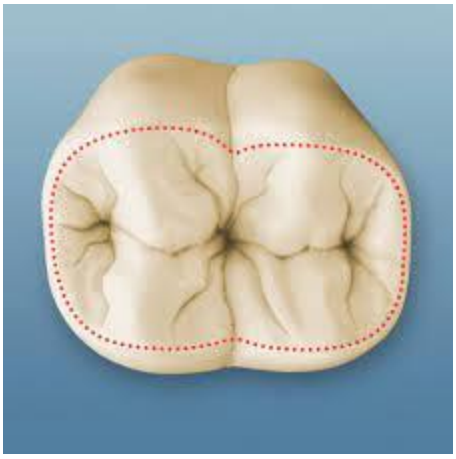
a. U-shaped: ideal for both retention and stability.

b. V-shaped: retention is less as the peripheral seal is easily broken.

c. flat: reduced resistance to lateral and rotator force

Stability decreases with Loss of the vertical height of the ridge, and Increase in the movement of flabby tissue.

7. **Retention**
8. **Proper relief**
9. **The width of the occlusal table**: must be less than normal teeth to get good stability and retention through force elimination.



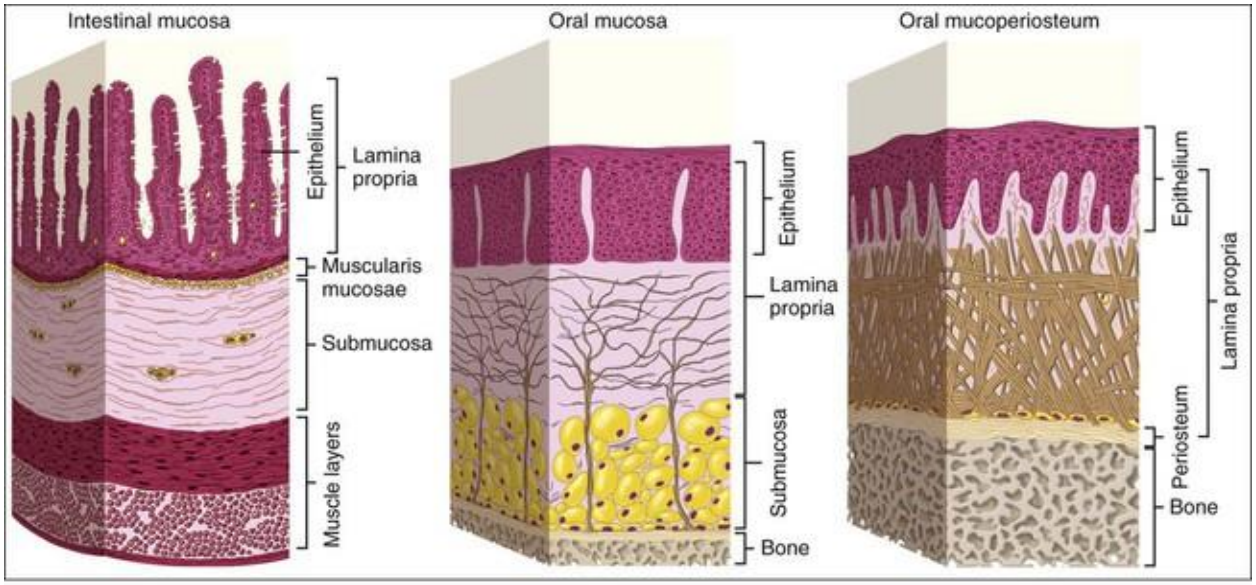
SUPPORT:

The resistance to the forces of mastication, occlusal forces, and other forces applied in a direction towards the denture bearing area. The resistance to vertical forces of mastication, occlusal forces, and other forces applied in a direction towards the denture bearing area. Initial denture support is achieved by using an impression procedure that provides optimal extension and functional loading of the supporting tissue

Nature of the supporting tissue

- **The soft tissues should be**:

1. In the edentulous person, the mucosa covering the hard palate and the crest of the residual ridge, including the residual attached gingiva, is classified as masticatory mucosa. It is characterized by a well-defined keratinized layer on its outermost surface that is subject to changes in thickness depending on whether dentures are worn and on the clinical acceptability of the dentures
2. the submucosa is firmly attached to the periosteum of the underlying supporting bone and will usually withstand successfully the pressures of the dentures. (The thickness and consistency of the submucosa are largely responsible for the support that the mucous membrane affords a denture because, in most instances, the submucosa makes up the bulk of the mucous membrane. When the submucosal layer is thin, the soft tissues will be non-resilient, and the mucous membrane will be easily traumatized. When the submucosal layer is loosely attached to the periosteum or it is inflamed or edematous, the tissue is easily displaceable, and the stability and support of the dentures are adversely affected.

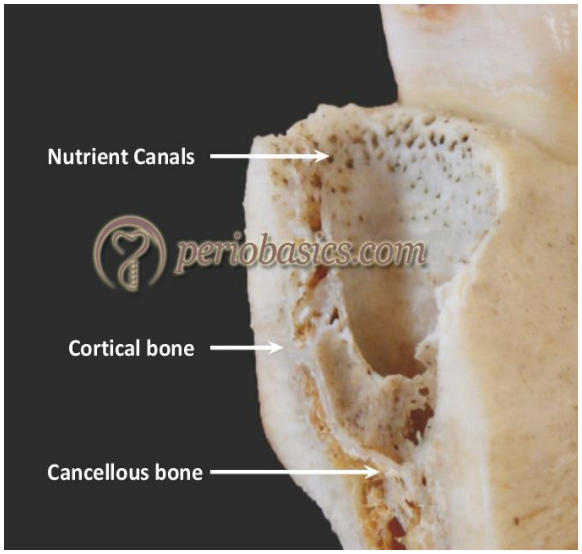


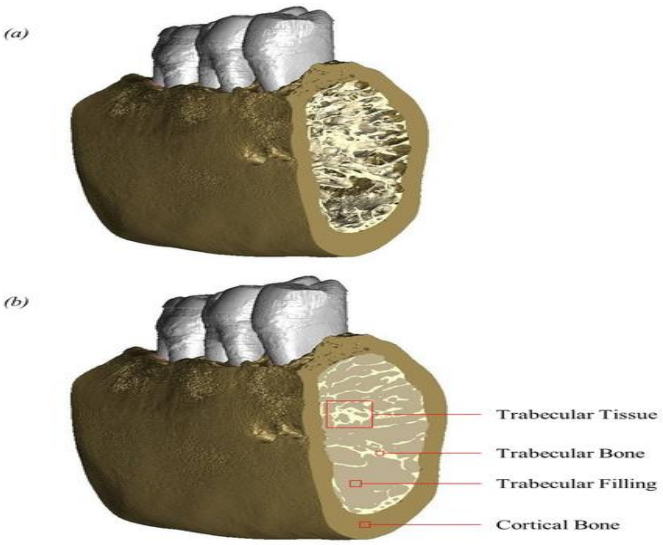
- **Hard tissue should be:**

Relatively resistant to remodeling and resorptive changes. Consideration must be given to the maintenance of alveolar ridge height in the conventional complete denture patient. Minimizing the pressure in those regions most susceptible and directing the forces toward those regions relatively resistant to resorption can maintain a healthy residual ridge. There are two types of osseous tissue that form bones.

Cortical bone: It is harder, stronger, and stiffer than cancellous bone

Cancellous bone: is less dense, softer, weaker, and less stiff. It typically occurs at the ends of long bones





Mandibular anatomical consideration:

1. **Buccal shelf area** is the surface of the mandible from the residual alveolar ridge or alveolar ridge to the external oblique line in the region of the lower buccal vestibule. It is covered with cortical bone. The buccal shelf area is the primary support area for the mandibular denture because:
   a. it's usually covered by mucosa with an intervening sub-mucous layer containing glandular connective tissue & and buccinators' muscle fibers

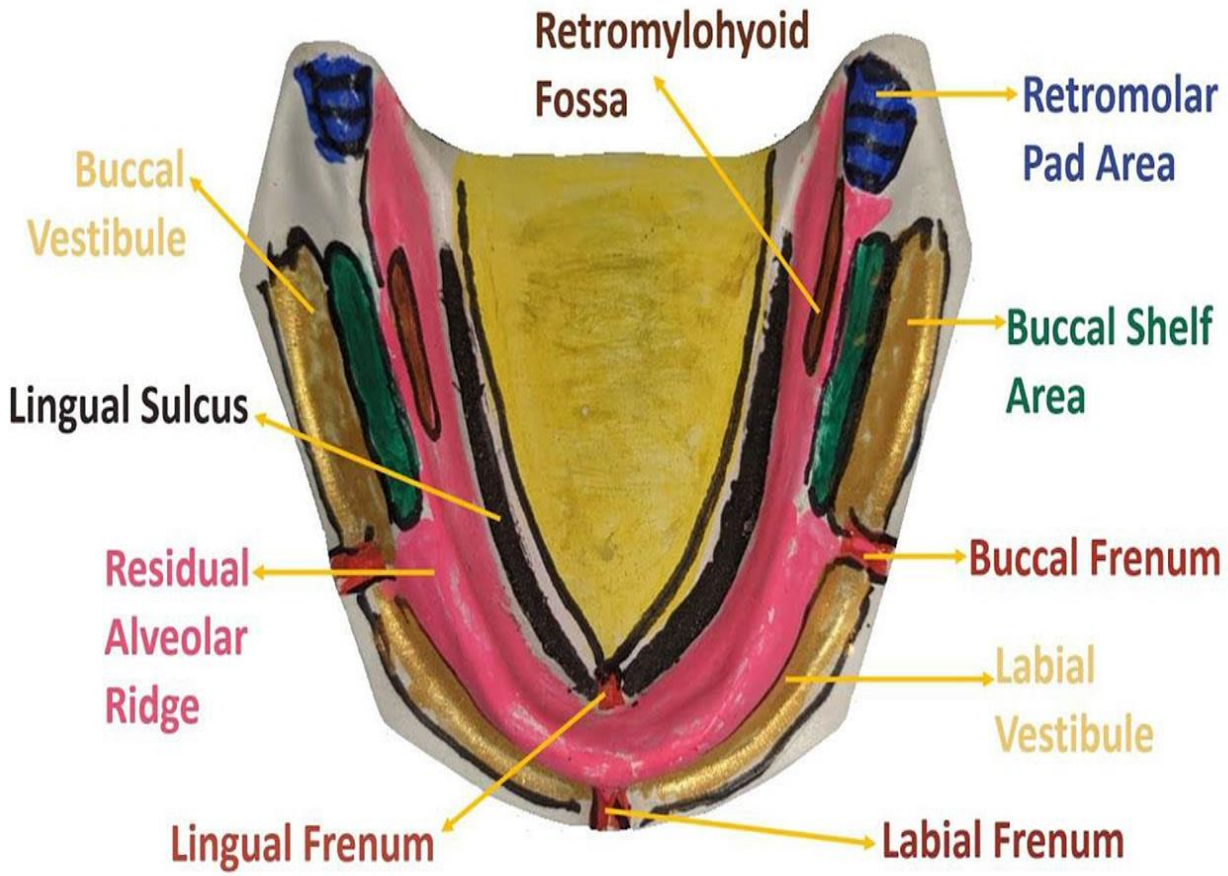
b. It is parallel to the occlusal plan.

c. It is lined by cortical bone.

2. **Mandibular residual ridge**: It is covered by a keratinized layer and is attached by its submucosa to the periosteum of the mandible. The extent of this attachment varies considerably. In some people, the submucosa is loosely attached to the bone over the entire crest of the residual ridge, and the soft tissue is quite movable. In others, the submucosa is firmly attached to the bone on both the crest and the slopes of the lower residual ridge. The ridge crests are reserved as secondary support areas because:

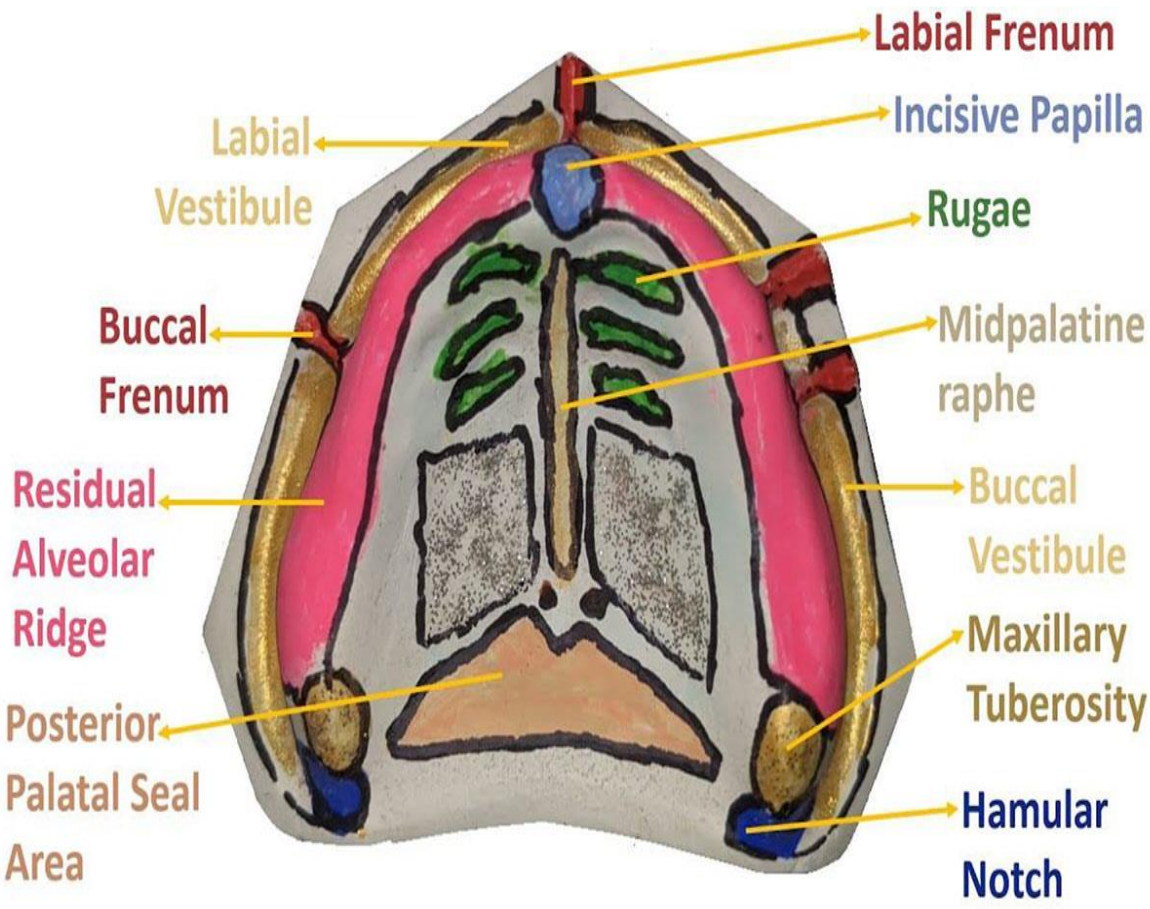
A. The lack of muscle attachment

B. Presence of cancellous bone



Maxillary anatomic considerations:

1. **The horizontal portion of the hard palate** is considered as primary stress-bearing area. It has keratinized masticator mucosa that overlies a distinct Sub mucosa layer everywhere
2. **In the region of the medial palatal suture**, the submucosa is extremely thin, with the result that the mucosal layer is practically in contact with the underlying bone. For this reason, the soft tissue covering the medial palatal suture is non-resilient and may need to be relieved to avoid trauma from the denture base.
3. **In the area of the rugae**, the palate is set at an angle to the residual ridge and is rather thinly covered by soft tissue. This area contributes to the stress-bearing role, though in a secondary capacity. The submucosa covering the incisive papilla and the nasopalatine canal contains the nasopalatine vessels and nerves
4. **The crest of the edentulous ridge** is an important area of support. However, the bone is subject to resorption, which limits its potential for support, unlike the palate, which is resistant to resorption. Because of this, the ridge crest should be looked at as a secondary supporting area, rather than a primary supporting area. The inclined facial surface of the maxillary ridge provides little support, Although the peripheral tissues should be contacted to provide a border seal The configuration of the bone that provides the support for the maxillary denture varies considerably with each patient.
5. **Tuberosity**



Factors that influence the form and size of the supporting bone include:

1. Its original size and consistency
2. The person's general health
3. Forces developed by the surrounding musculature
4. The severity and location of periodontal disease (a frequent cause of tooth loss).
5. Forces accruing from the wearing of dental prostheses.
6. Surgery at the time of removal of the teeth.
7. The relative length of time different parts of the jaws have been edentulous. In addition, a number of anatomical features influence the shape of the hard palate and residual ridge.

Methods used for improving the retention stability and support, are described in the following.

1. **Dental implants** improve the support, retention, and stability of a full or partial denture reducing the slip and movement while speaking or eating
2. **Mini-implants** have become a common treatment option for improving retention of lower denture