

***Tishk International University
Dentistry Faculty
Dentistry Department***



***Prosthodontic lectures/
Complete denture***



Lecture No.:3

Anatomical landmarks

2nd Grade / Spring Semester 2020-2021

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Anatomical landmarks and their clinical significance in edentulous maxillary and mandibular arch

Extra oral examination

The following extra-oral anatomical features should be noted:

1. *Philtrum*: is a midline shallow depression of the upper lip, which starts at the labial tubercle and ends at the nose.

2. *Labial tubercle*: is a little swelling in the midportion of the vermillion border of the upper lip.

3. *Vermillion borders*: the lip is covered by the skin at its facial surface and the mucous membrane at its inner surface. The transitional area between the skin and the mucous membrane of the upper and lower lips is a pink or red zone of thinner epithelium, which is called the vermillion border.

4. *Nasolabial groove*: is a furrow of variable depth that extends from the wing (ala) of nose to end at some distance from the corner of the mouth.

5. *Labio-mental groove*: is a sharp or deep groove that lies between the lower lip and the chin.

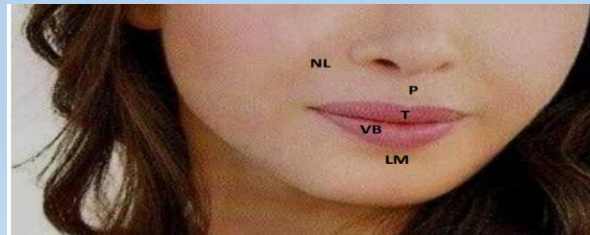


Figure (2-1): Philtrum (P), Nasolabial groove (NL), Labial tubercle (T), Vermillion border (VB), Labio-mental groove (LM).

6. Nasolabial Angle: is an angle between columella of nose and philtrum of lip, normally, approximately 90° as viewed in profile.



Figure (2-2): Nasolabial angle

7. Angle of the mouth and Labial commissure: Angle of the mouth is the lateral limit of the oral fissure. Labial commissure is a junction of upper and lower lips lateral to the angle of the mouth.



8.Modiolus:

This muscular knot is at the angles of the mouth. Modiolus may lie laterally to the lower premolars so it will displace a lower denture if those teeth are set too far buccally.

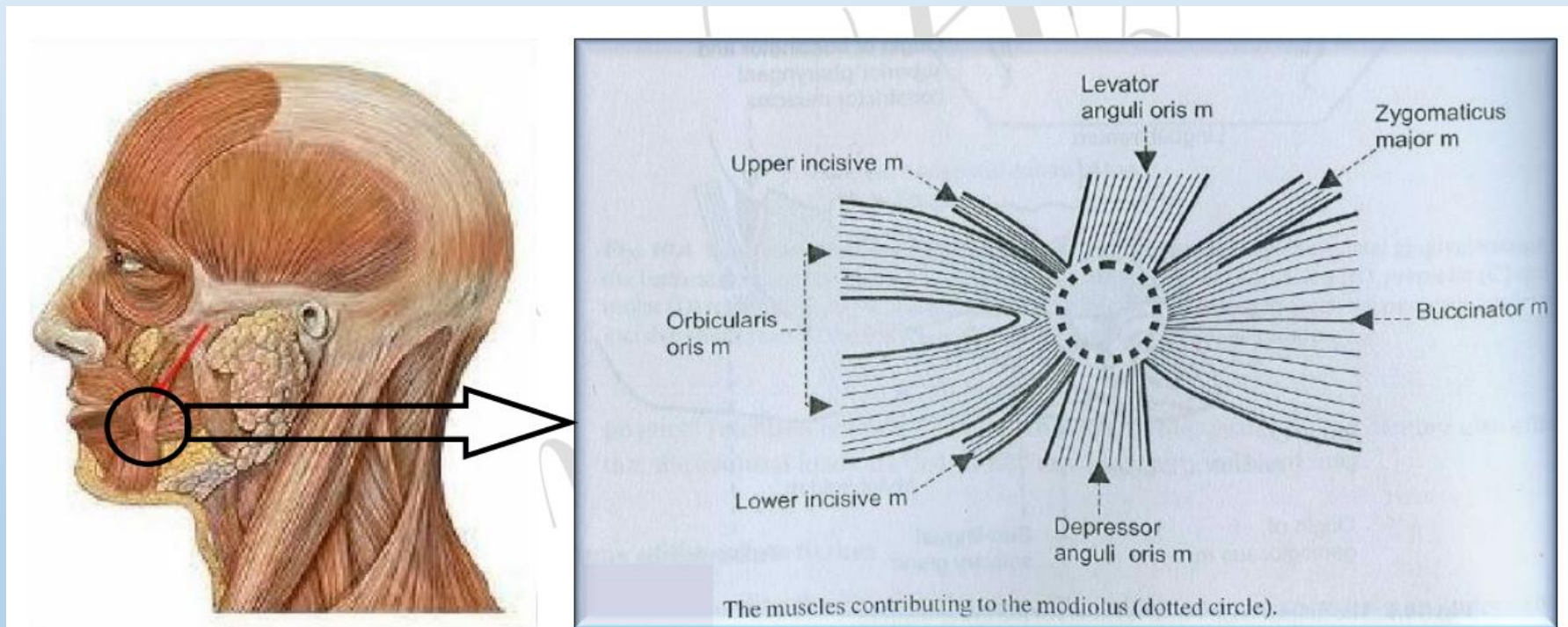


Figure (2-4): Modiolus and contributing muscles.

ANATOMICAL LANDMARKS (intra oral examination):

- The anatomy of the edentulous ridge in the maxilla and mandible is very important for the design of a complete denture.
- The consistency of the mucosa and the architecture of the underlying bone is different in various parts of the edentulous ridge. Hence, some parts of the ridge are capable of withstanding more force than other areas.
- A thorough knowledge of these landmarks is essential even prior to impression making.
- The landmarks of an edentulous jaw are grouped into:
 - I. Limiting Structures,
 - II. Supporting Structures
 - III. Relief Area.

ANATOMICAL LANDMARKS IN THE MAXILLA

The anatomical landmarks in the maxilla are:

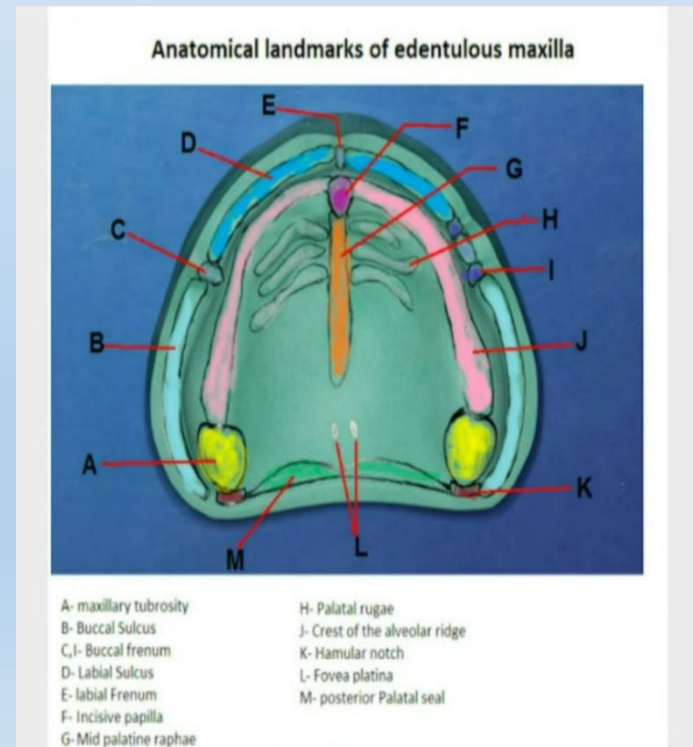
LIMITING STRUCTURES:

These are the sites that will guide us in **having an optimum extension** of the denture so as to engage maximum surface area without encroaching upon the muscle actions.

Encroaching upon these structures will lead to dislodgement of the denture and/or soreness of the area while failure to cover the areas up to the limiting structure will imply decreased **retention stability and support**.

They are:

1. Labial frenum
2. Buccal frenum
3. Labial vestibule
4. Buccal vestibule
5. Hamular notch
6. Posterior palatal seal area (vibrating line)



1. Labial Frenum:

Fibrous band covered by mucous membrane, which extends from the labial aspect of the residual ridge to the lip. A passive frenum and has no active muscle fibers. The Frenum may be single or multiple, narrow or broad.

A v-shaped notch (labial notch) should be provided very carefully which should be narrow but deep enough to avoid interference and should snugly around frenum if peripheral seal is to be achieved.



Clinical Consideration:

- ❑ Sufficient relief should be given during final impression procedure and in completed prosthesis because overriding of function of frenum will cause pain and dislodgement of denture. So during impression procedure the lip should be stretched horizontal outwards for the proper recording of frenum.
- ❑ If frenum is attached close to the crest frenectomy is done, failure of which will lead to the denture border being placed on the bone tissue which will cause decreased border seal.

2 .Buccal frenum

It's a fold or folds of mucous membrane extending from mucous membrane reflection area to or towards the slope or crest of residual alveolar ridge.

- It has the attachment of following muscles; levator anguli oris,orbicularis oris and buccinator;(muscles of facial expression).

Clinical Consideration

- It produce the maxillary buccal notch in the maxillary impression or denture which must be broad enough because of the movement of the Frenum which is affected by some of the facial muscles.
- It needs **greater clearance** on buccal flange of the denture (shallower and wider) than the labial frenum.
- In final prosthesis sufficient relief should be given for the movement of frenum because overriding of function of frenum will cause pain and dislodgement of denture.
- During impression procedure the cheek should be reflected laterally and posteriorly. If frenum is attached close to the crest of alveolar ridge, frenectomy is called for.

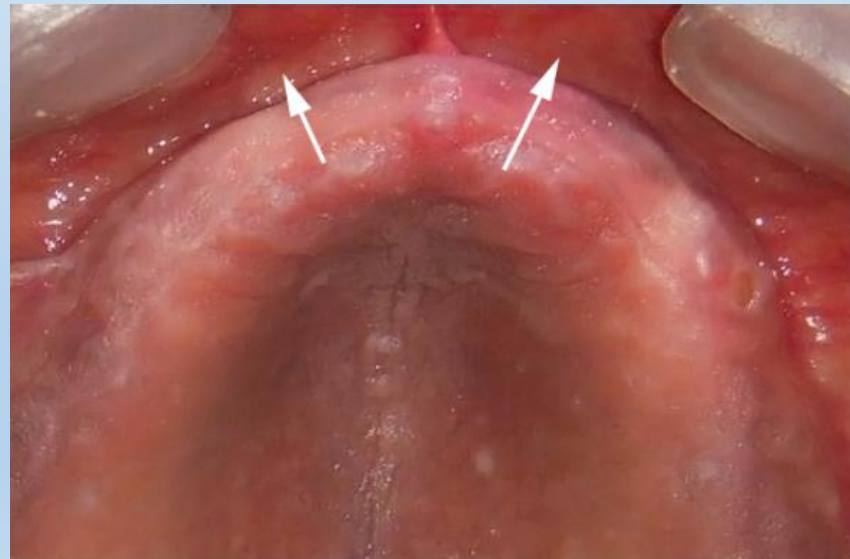


3.LABIAL VESTIBULE:

It extends on both sides of the labial frenum to the buccal frenum, bounded by the upper lip and residual alveolar ridge. The reflection of the mucous membrane superiorly determines the height of the vestibule. It contains no muscle fibers. In the denture the area that fills this space is known as labial flange.

Clinical Consideration:

For effective border contact between denture and tissue, vestibule should be completely filled with impression material.



4. BUCCAL VESTIBULE:

Is the space distal to the buccal frenum. It is bounded laterally by the cheek and medially by the residual alveolar ridge. The area of the denture which will fill this space is known as buccal flange.

The size of the vestibule is dependant upon:

- 1) Contraction of buccinator muscle.
- 2) Position of the mandible.
- 3) Amount of bone loss in maxilla.



Clinical Consideration:

- During impression procedure the vestibule should be completely filled with impression material for proper border contact between denture and tissues.
- The buccal flange borders depend upon movement of ramus of mandible at the distal end of buccal vestibule.
- The stability and retention of a denture are greater enhanced if the vestibule space properly filled with the flange distally.
- the patient should move the mandible laterally and protrusively to make sure the mandible does not interfere with these functions.
- To effectively record the maxillary buccal sulcus the mouth should be half way closed because wide opening of the mouth narrows the space and does not allow proper contouring of sulcus.

5. Hamular notch

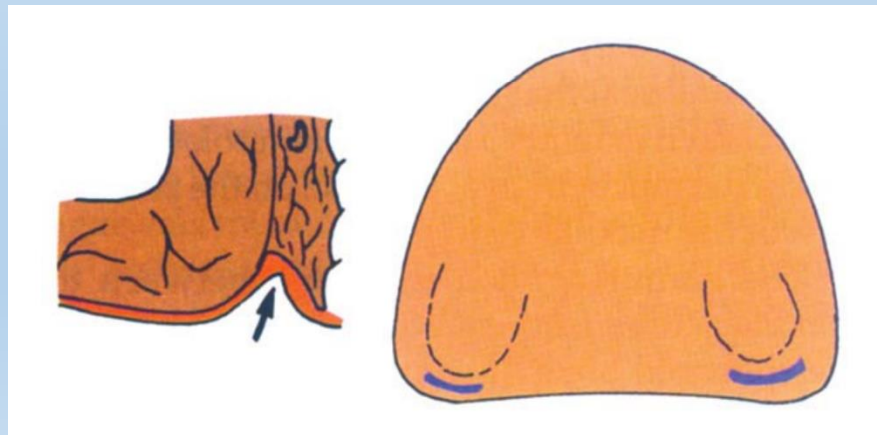
It is **depression** situated between the maxillary tuberosity and the hamulus of the medial pterygoid plate. It is a soft area of **loose connective tissue**.

- It houses the disto-lateral termination of the denture. It is used as boundary of the posterior border of maxillary denture.
- Aids in achieving posterior palatal seal.

Clinical Consideration: Denture should not extend beyond the hamular notch.

Overextension causes soreness.

Underextension poor retention



6. Posterior palatal seal area (post-dam):

It is a soft tissue area at or beyond the junction of the hard and soft palates on which pressure within physiological limits can be applied by a complete denture to **aid in its retention**.

Pterygomaxillary seal :The part of the posterior palatal seal that extends across the hamular notch and It extends 3-4 mm anterolaterally to end in the mucogingival junction on the posterior part of the maxillary ridge.

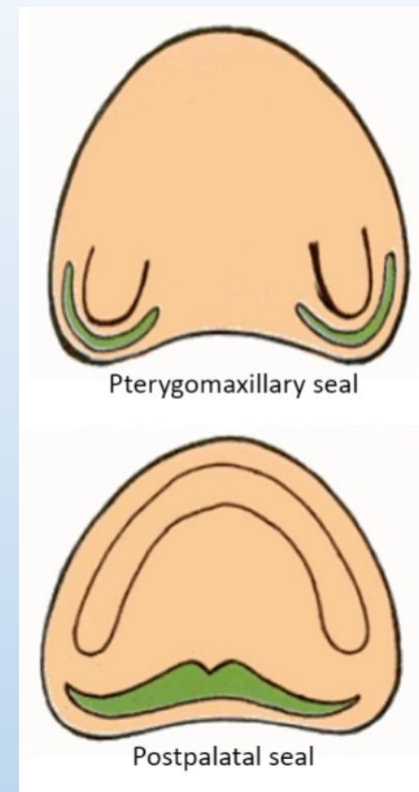
Postpalatal seal – This is a part of the posterior palatal seal area that extends between the two maxillary tuberosities.

Extensions:

Anteriorly – **Anterior vibrating line**

Posteriorly – **Posterior vibrating line**

Laterally – **3-4 mm anterolateral to hamular notch**



WHAT IS VIBRATING LINE?

An imaginary line drawn across the posterior part of the palate that marks the division between the movable and immovable tissue of the soft palate which can be identified by asking the patient to say 'ah'. It is extending from one hamular notch to the other hamular notch; lying usually 2mm in front of fovea palatinae.

The distal end of the denture mustcover the tuberosities
extend into..... the hamular notches

It should end1-2 mm posterior to the vibrating line

Functions of the posterior palatal seal:

- 1.Aids in retention.**
- 2.Prevents food** accumulation.
- 3.Compensation** for polymerization shrinkage.
- 4.Reduces** the tendency for **gag reflex** as it **prevent the formation of the gap** between the denture base and soft palate during functional movement.



SUPPORTING STRUCTURES:

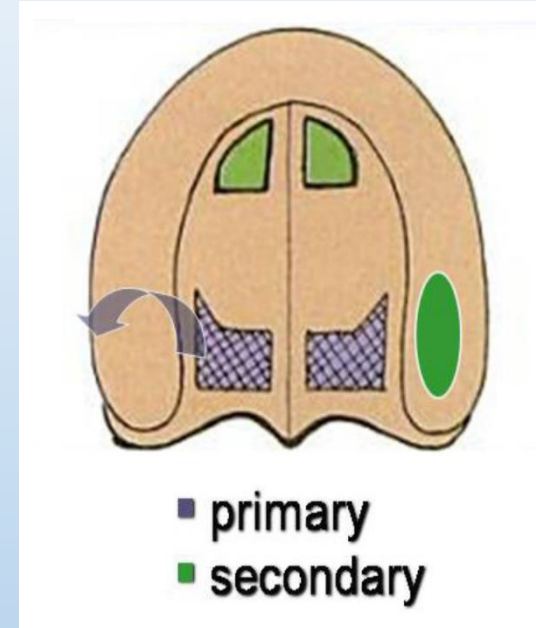
(Stress-bearing areas)

- Supporting structures are the **load bearing areas**.
- The denture should be designed such that most of the load is concentrated on these areas.

Support :is the **resistance to the displacement towards the basal tissue** or underlying structures.

So it is the resistance to the displacement towards the basal tissue or underlying structures and it can be:

- Primary stress bearing areas or supporting area represented by the horizontal portion of the hard palate lateral to the midline and Slopes of residual alveolar ridge.
- Secondary stress bearing area or supporting areas represented by Rugae area and Maxillary Tuberosity.



Primary stress bearing area:

1. Palatal shelf area: The horizontal portion of the hard palate lateral to the midline
(Palatine vault)

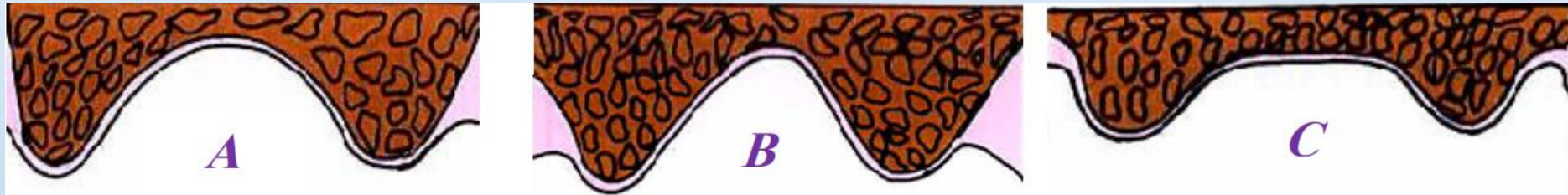


Figure (2-17): Different shapes of palatine vault:

A: U-shape: Ideal for both retention and stability.

B: V-shape: Retention is less.

C: Flat shape: Reduced resistance to lateral and rotatory forces.

2. Residual alveolar ridge:

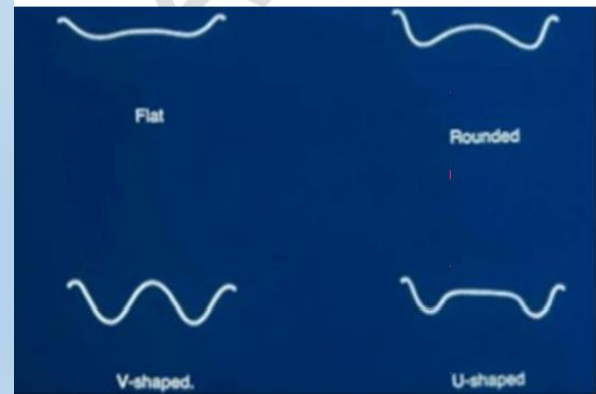
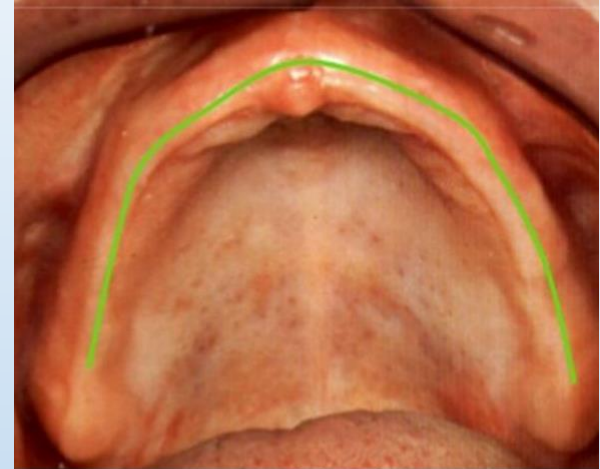
The bony process that remain after teeth have been lost is known as Residual alveolar ridge which is covered by mucous membrane.

The Residual alveolar ridge considered to be as a primary stress bearing area. And it will produce the ridge fossa or groove in the impression or denture.

The slope of the Residual alveolar ridge considered to be as a primary stress bearing area. And it will produce the ridge fossa or groove in the impression or denture.

Types of Residual alveolar ridge:

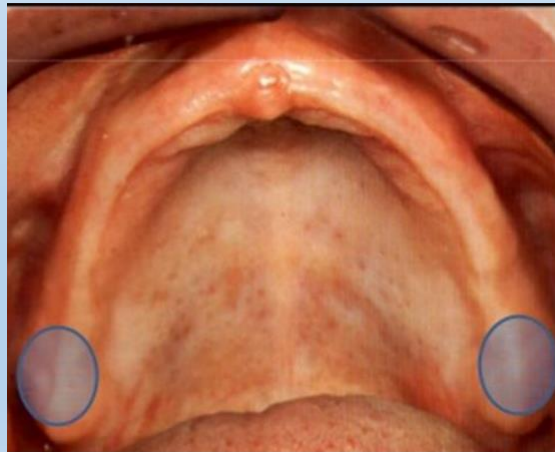
- a. Flat
- b. Rounded
- c. V Shape
- d. U Shape



Secondary Stress Bearing Area:

1. Maxillary tuberosity

It is the area of the alveolar ridge that extends distally from the second molar to the hamular notch in some cases it may be very large in size and not allow for proper placement of the denture so may need surgical interferences. Maxillary tuberosity may be oversized, resorbed or undercut areas; in case of oversized and undercut type surgical corrections may be needed.



2. *Rugae area:* These are raised areas of dense connective tissue in the anterior One-third of the palate. It aid in the formation of vocal sound also regarded as a secondary stress bearing area.

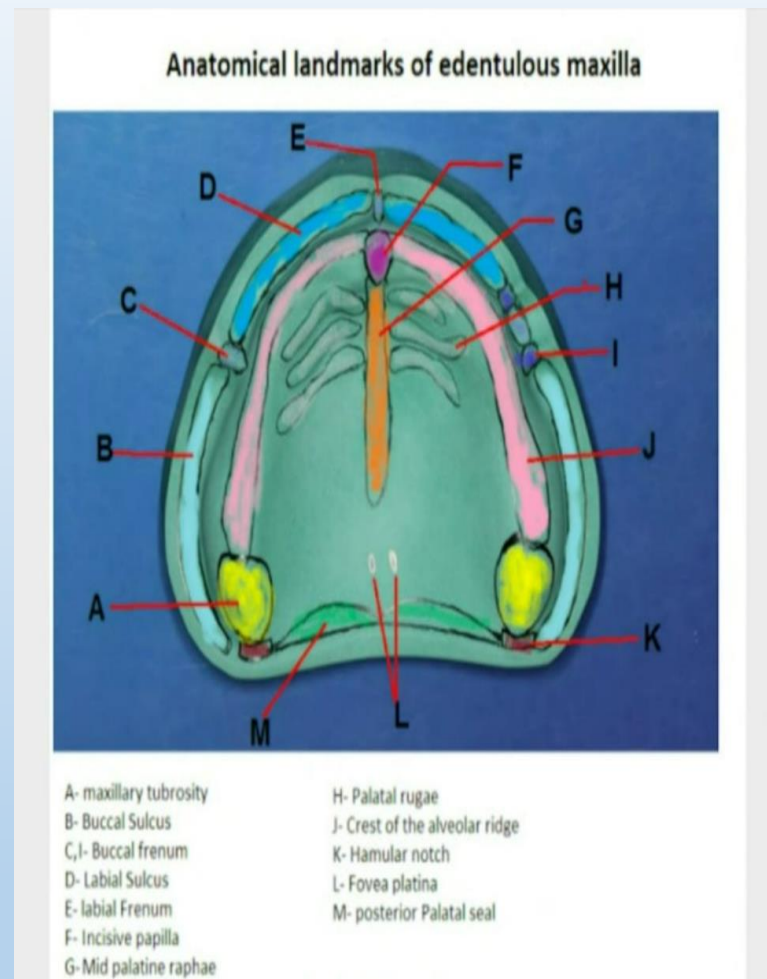


RELIEF AREA

- Relief areas are areas where they are **either resorb under constant load, having fragile structures within or covered by thin mucosa** which can be easily traumatized.

- It should be designed in such way that the masticatory load is not concentrated over these area.

- 1. Incisive papilla
- 2. Mid-palatine raphe
- 3. Crest of the residual alveolar ridge
- 4. Cuspid eminence
- 5. Zygomatic Process
- 6. fovea palatini



Relief Areas :

These areas resorb under constant load or contain fragile structures within. The denture should be designed such that the masticatory load is not concentrated over these areas.

1.Incise papilla:

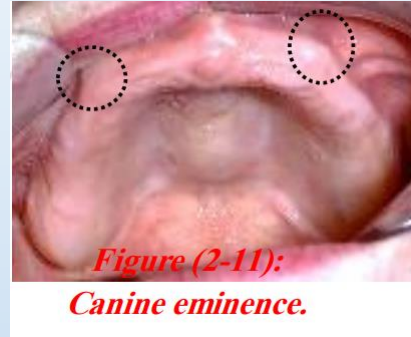
It is a pad of connective tissues lies between the two central incisors on the palatal side overlying the incisive foramen of the nasopalatine duct where the nasopalatine nerves and vessels arise. In an edentulous mouth it may lies close to the crest of the residual ridge. Relief over the Incisive papilla should be provided in the Denture to avoid pressure on the nerve and blood supply.



3.Median palatal raghae:

It overlies the medial palatal suture; extend from the incisive papilla to the distal end of the hard palate. The mucosa over this areas is usually tightly attached and thin, the underlying bonny union being very dense and often raised, the palatal tori are located here if present.

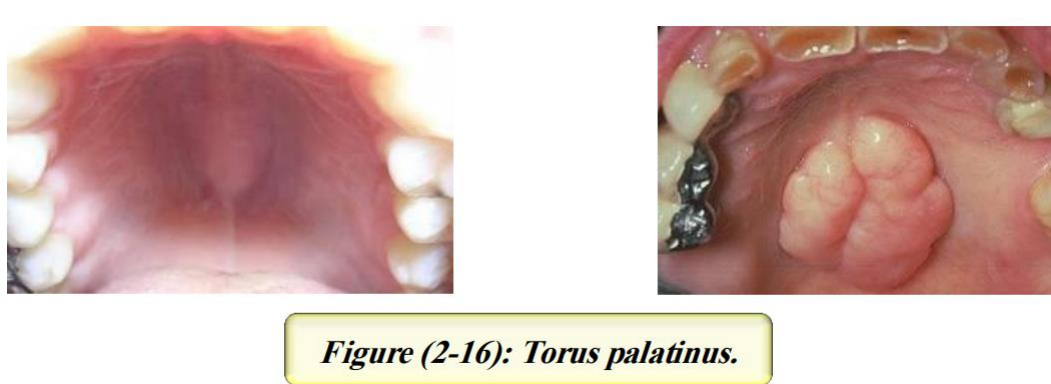
3. Canine eminence : It is a round elevation in the corner of the mouth, it represent the location of the root of the canine which is helpful to be use as a guide for the arrangement of maxillary anterior teeth.



4. Zygomatic process: It is located opposite to the 1st molar region, hard area found in the mouth that has been edentulous for long time. Relief over this area may be required to prevent soreness of the underlying tissues.

5. Torus palatinus :

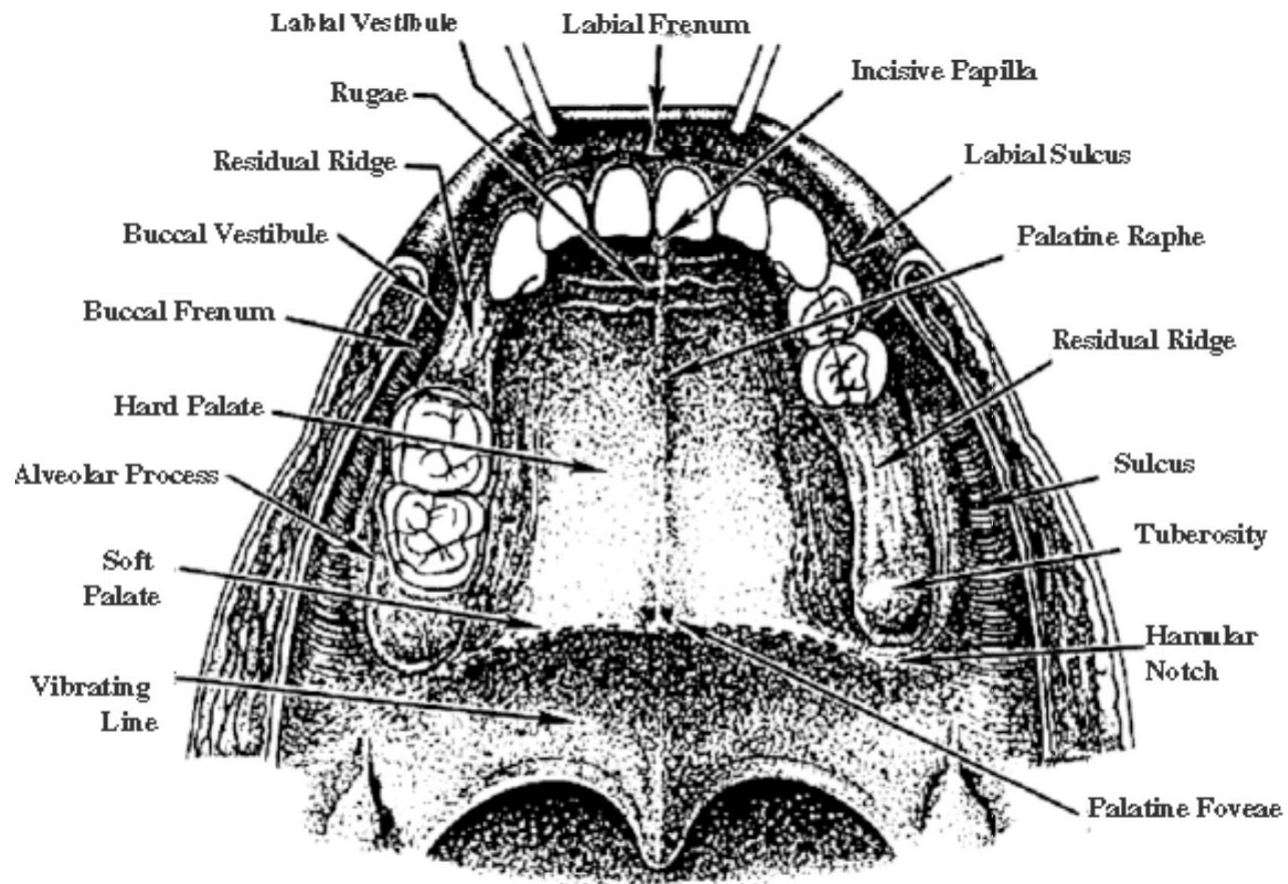
It is a hard bony enlargement occurs in the midline of the roof of the mouth (hard palate). It is found in 20% of some patient, surgical correction may be needed if the tori very large.



6.Fovea Palatinae:

They are the remnants of ducts coalescence. Usually two in number on either side of the midline. They indicate the vicinity of posterior palatine seal area. It has no clinical significance.





Anatomical Landmarks of the maxillary arch