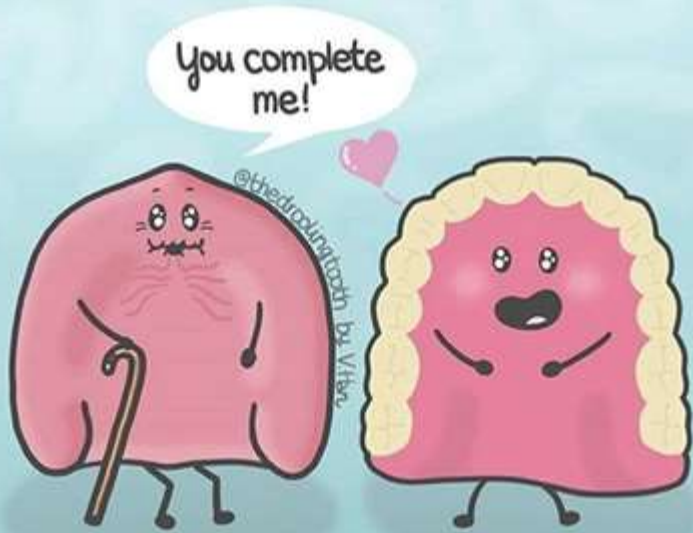
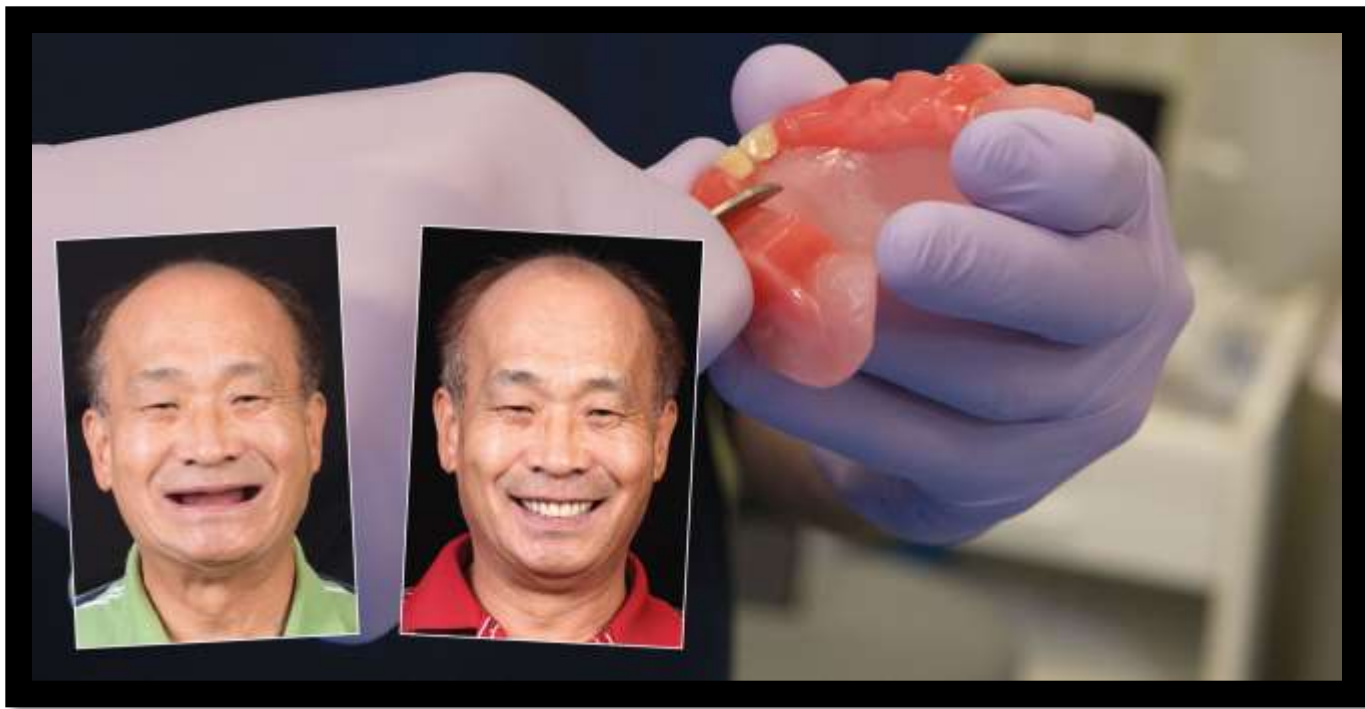


Basic anatomy of an edentulous mouth



By Dr. Humam Mahmoud



- The construction of prosthesis requires having a thorough knowledge of both anatomy & physiology of the related supporting structures. This is to obtain retention, support, and stability in addition to the preservation of the underlying and surrounding structures.

Osseous landmarks (osteology)

- The osseous structures are not only responsible for the support of a denture but they also have direct relation to impression making procedure, together with the arrangement of artificial teeth, and the contour of the finished denture bases.



STRUCTURES RELATED TO THE MAXILLARY AND MANDIBULAR EDENTULOUS FOUNDATION

These structures can be divided into two categories:

- 1. limiting structures:** These are the structures that limit the border extent of the denture (maxillary and mandibular denture).
- 2. Supporting structures:** These are the structures that support the denture
- 3. Relief areas :** these are structures that can not bear stresses so relieved

Landmarks associate with Maxilla

Landmarks associate with Maxilla

- **Limiting structures:**

A. Labial frenum

B. Labial vestibule

C. Buccal frenum

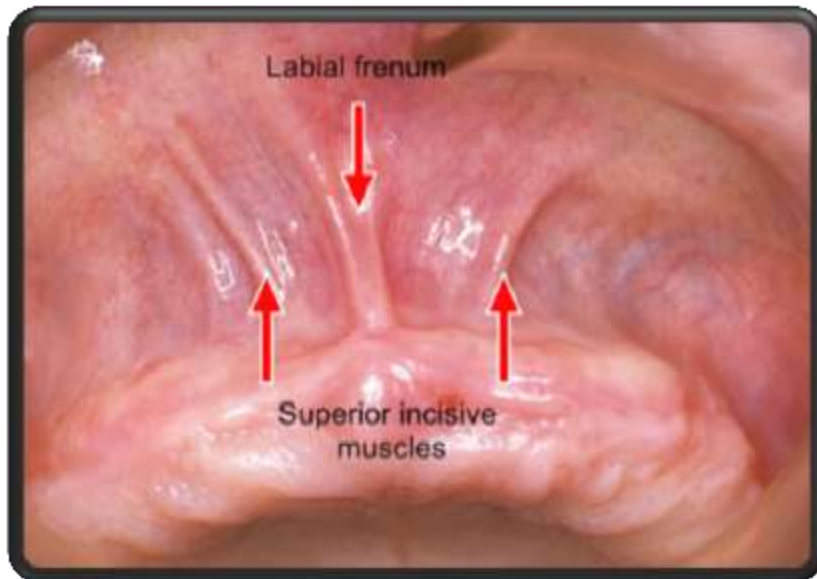
D. Buccal vestibule

E. Hamular notch (pterygo-maxillary notch)

F. Posterior palatal seal area

A. Labial frenum

It is a fold of mucous membrane extending from the mucosal lining of the upper lip to the labial surface of the residual ridge at the median line. It contains no muscle fibers, but it is moved with the muscles of the lip, and inserted in a vertical direction, which creates the maxillary labial notch in the impression or denture.



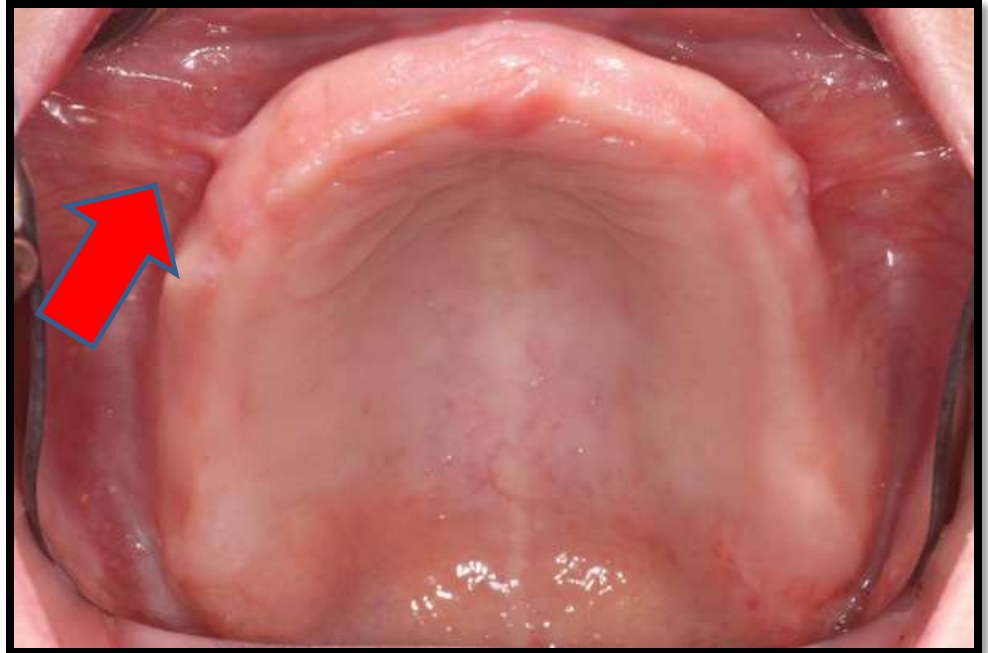
B. Labial vestibule

It is a space extends on both sides of the labial frenum to the buccal frenum bounded externally by the upper lip and internally by the residual ridge. It is very important to record the depth and width of the vestibule, as the retention and stability of the dentures depend on the optimum extension. Flange overextension can cause instability of the dentures and soreness at the vestibular area. However, proper contouring of the flanges can give optimal esthetics.



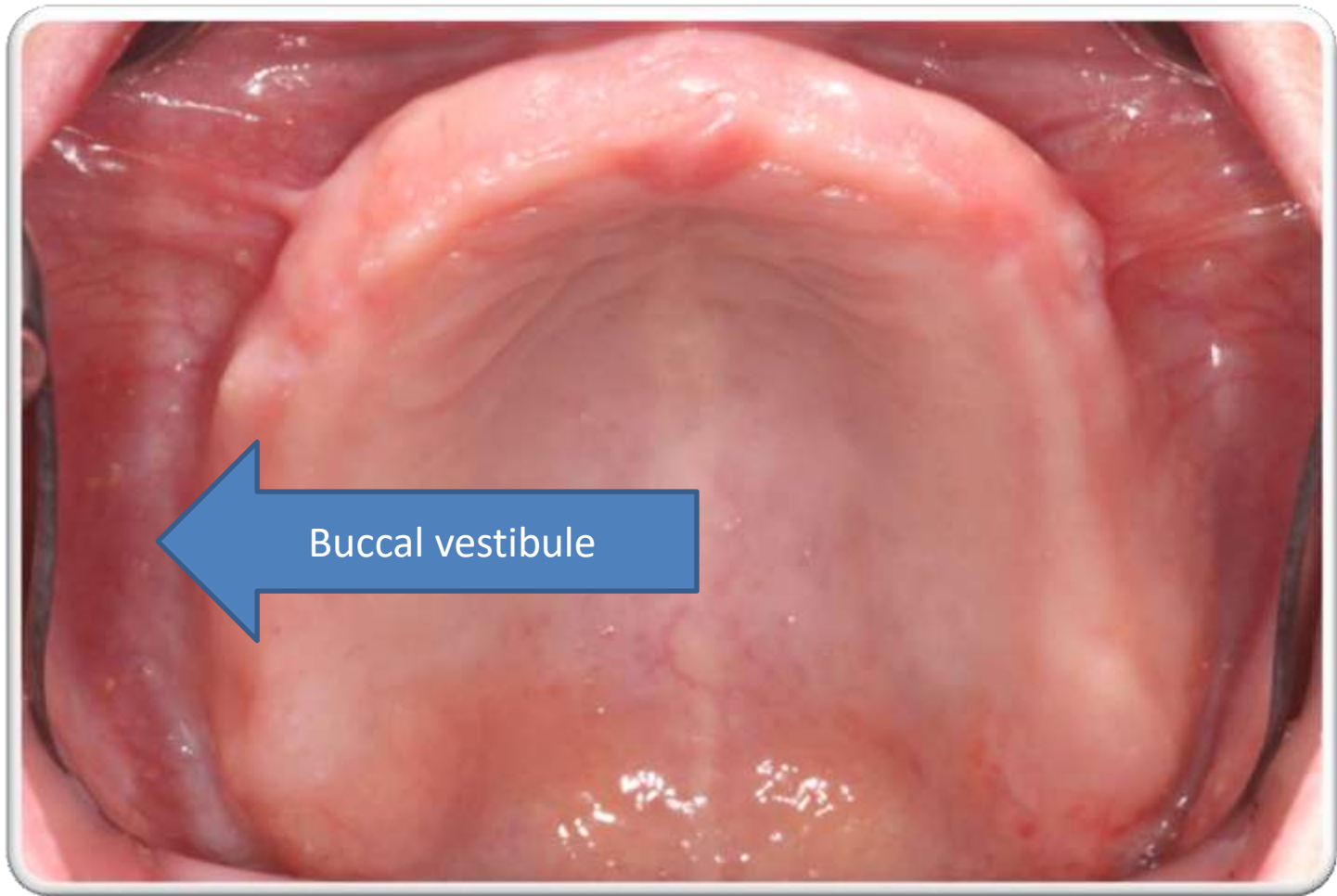
C. Buccal frenum

A fold or folds of mucous membrane extends from the buccal mucous membrane reflection area toward the slope or crest of residual ridge. It contains no muscle fibres and its direction is anteroposterior. It produces the maxillary buccal notch in the denture which must be broad enough to accommodate the movement of frenum which is affected by some of the facial muscles.



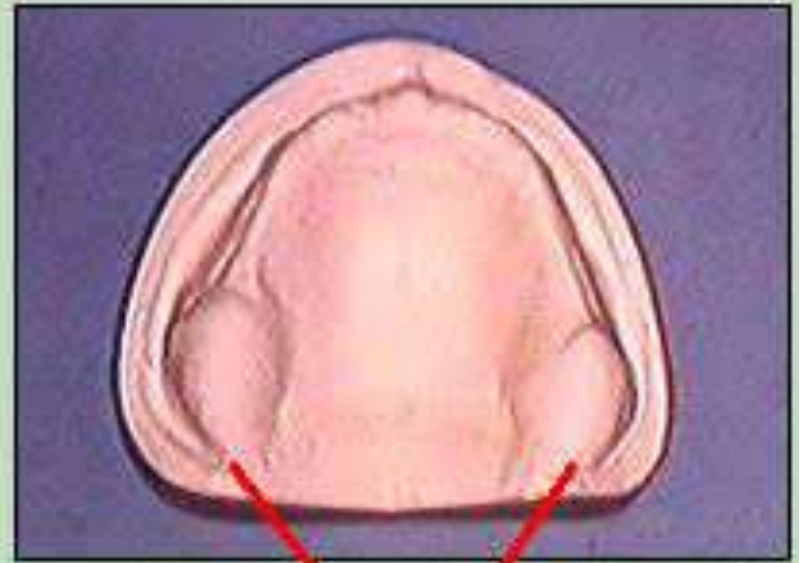
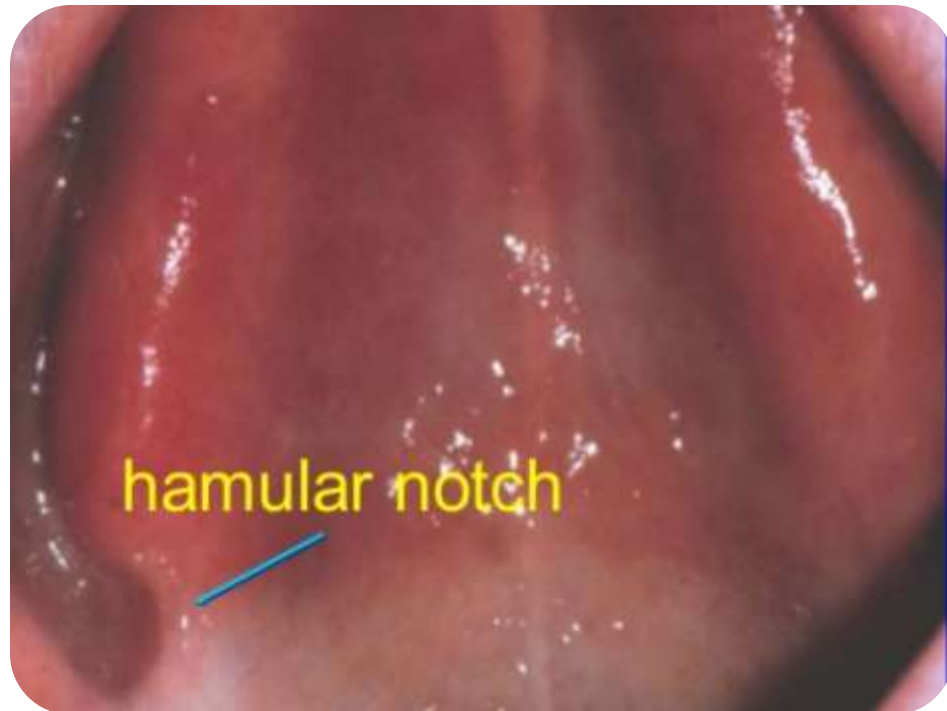
D. Buccal vestibule

It is the space distal to the buccal frenum to the hamular notch. It is bounded laterally by the cheek and medially by the residual ridge. The stability and retention of the denture are greatly enhanced if the vestibule is properly filled with the flange distally, so recording adequate depth and width is very important.



E. Hamular notch (pterygo-maxillary notch)

It is a narrow cleft of loose connective tissue between distal surface of tuberosity and the hamular process of the medial pterygoid plate. It is considered as the posterior boundary of the maxillary denture and it aids in achieving posterior palatal seal. The overextension of the denture base beyond the pterygo-maxillary notch may cause soreness, and under-extension may cause poor retention.



The hamular notches

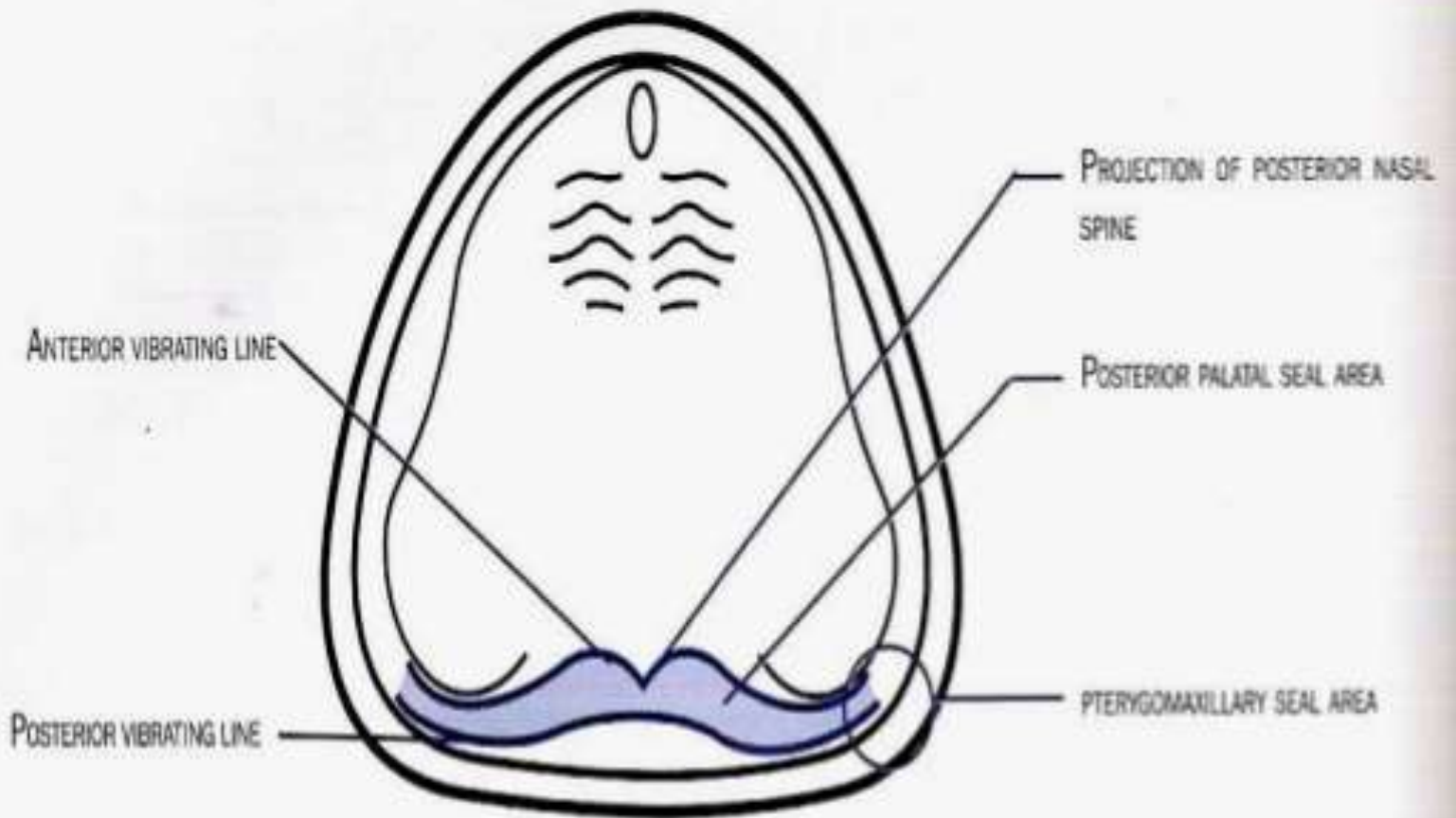
F. Posterior palatal seal area

It is the soft tissue area 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.

The imaginary line across the posterior part of the palatal seal area marking the division between the movable and immovable tissues of the soft palate called vibrating line.

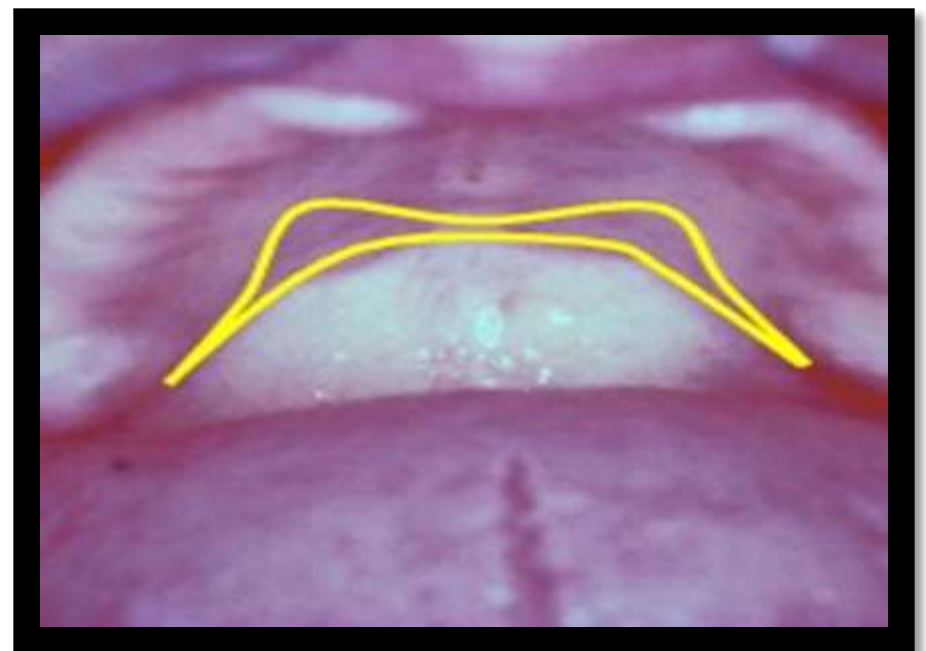
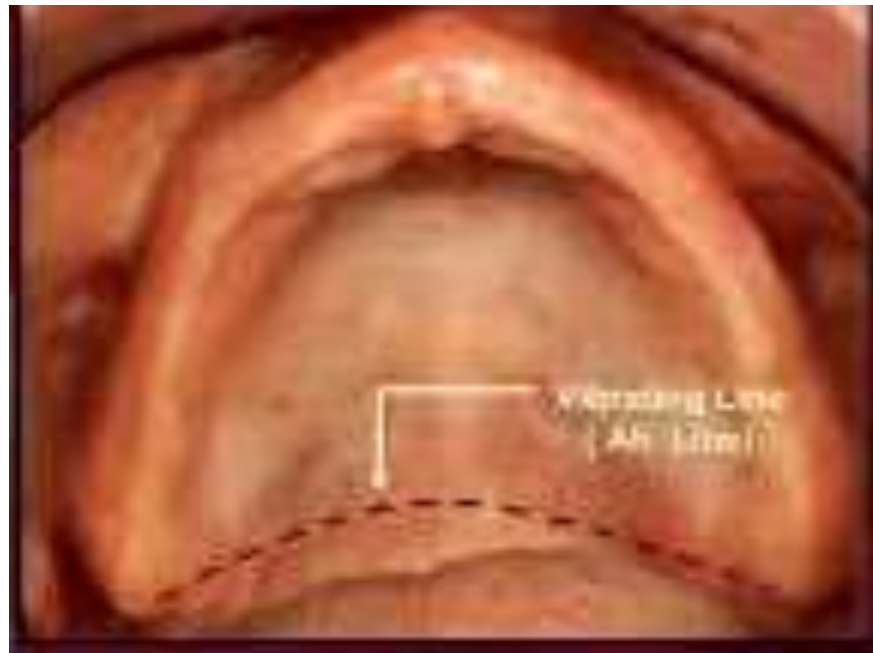
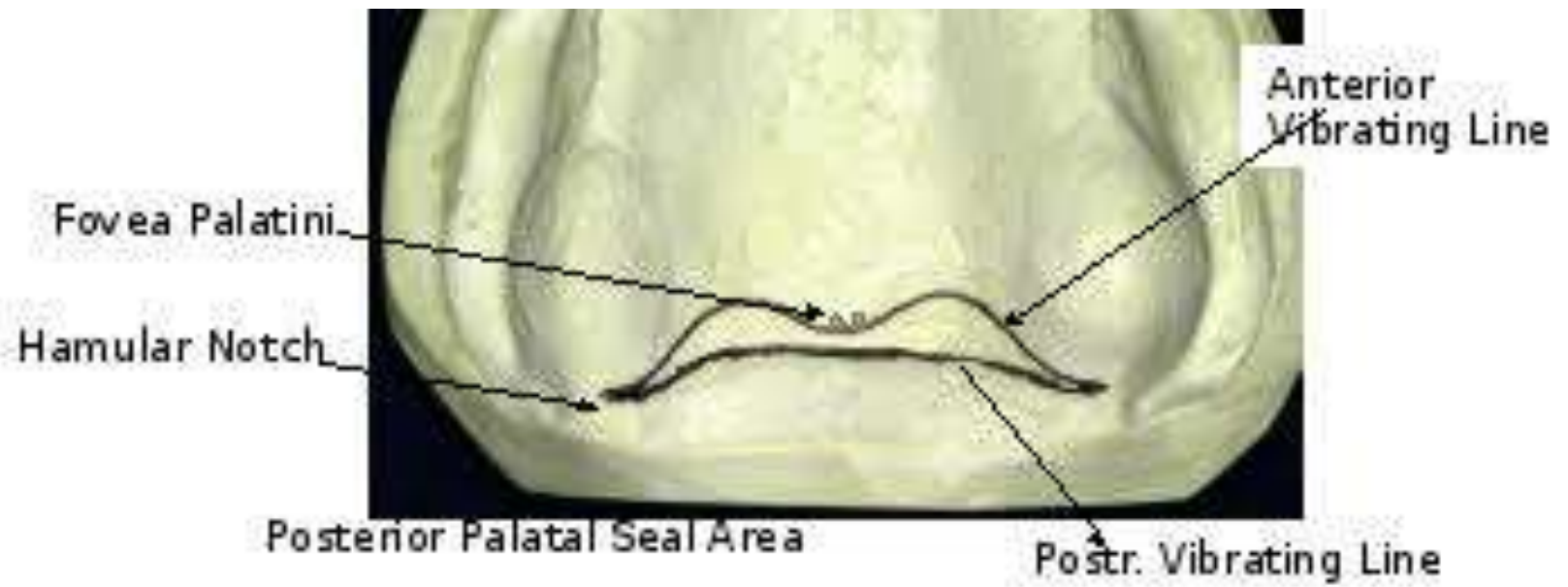
F. Posterior palatal seal area

- Vibrating line: is an imaginary line drawn across the palate, marks the beginning of motion of soft palate when the individual says (Ah), it extends from one hamular notch to the other. In midline it passes about 2 mm in front of fovea palatinae and it is always on the soft palate.



THE POSTERIOR PALATAL SEAL AREA

- The vibrating line should not to be confused with the junction of the hard and soft palate since the vibrating line is always on the soft palate. It is described as an area and not a line and its direction varies according to the shape of the palate.
- The higher the vaults, the more abrupt and forward the vibrating line. A flat palatal vault affords a broader posterior palatal seal area; it is usually further posterior having a gradual curvature.



Landmarks associate with Maxilla

Supporting structures:

1- Primary stress bearing area

- A. The horizontal portion of the hard palate lateral to the midline (Palatine vault).
- B. Postero-lateral portion of the residual alveolar ridge:

2- Secondary stress bearing area

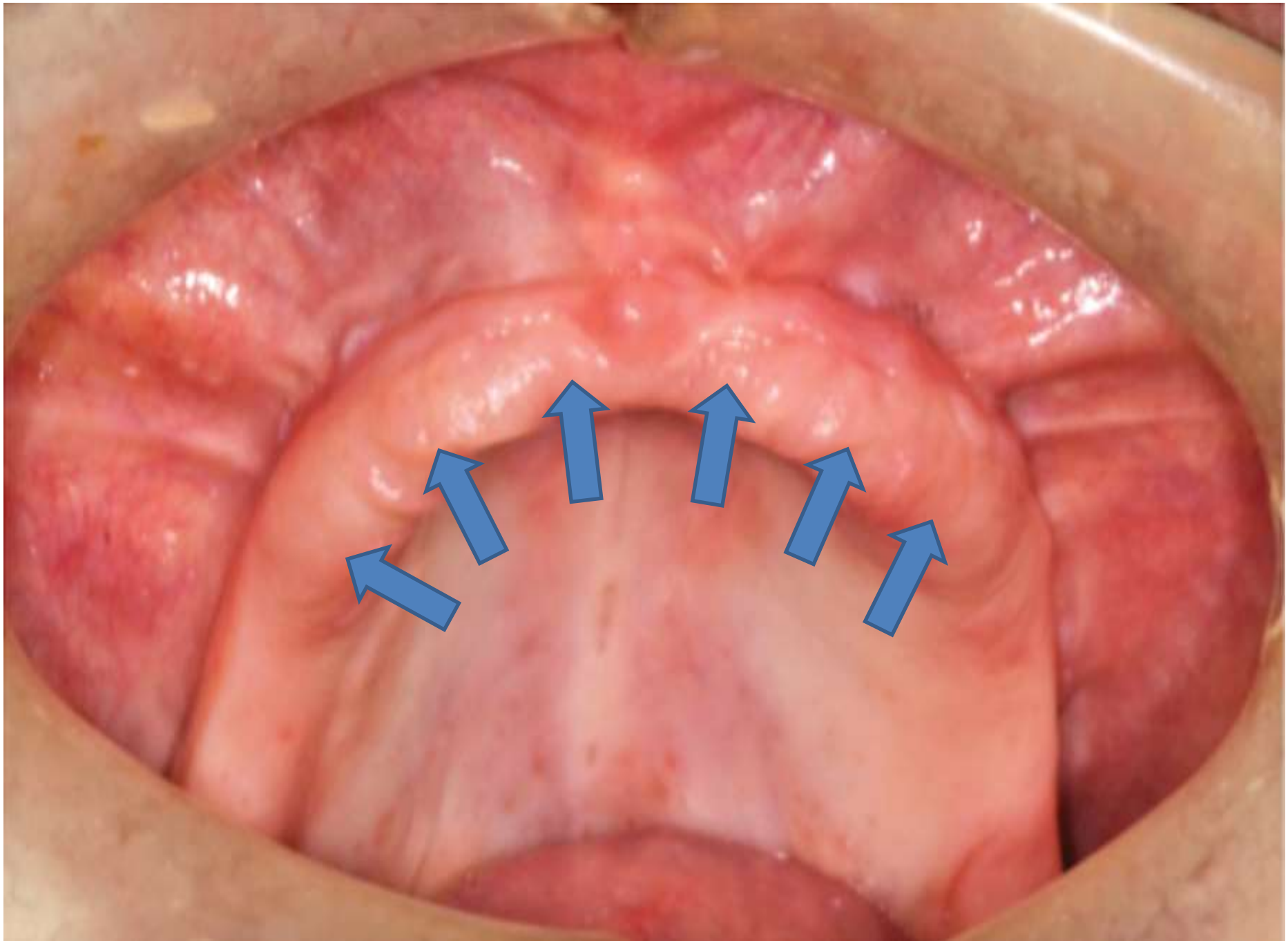
- A. Maxillary tuberosity:
- B. Rugae area

1.Primary stress bearing area

A. The horizontal portion of the hard palate lateral to the midline (Palatine vault).

B. Postero-lateral portion of the residual alveolar ridge:

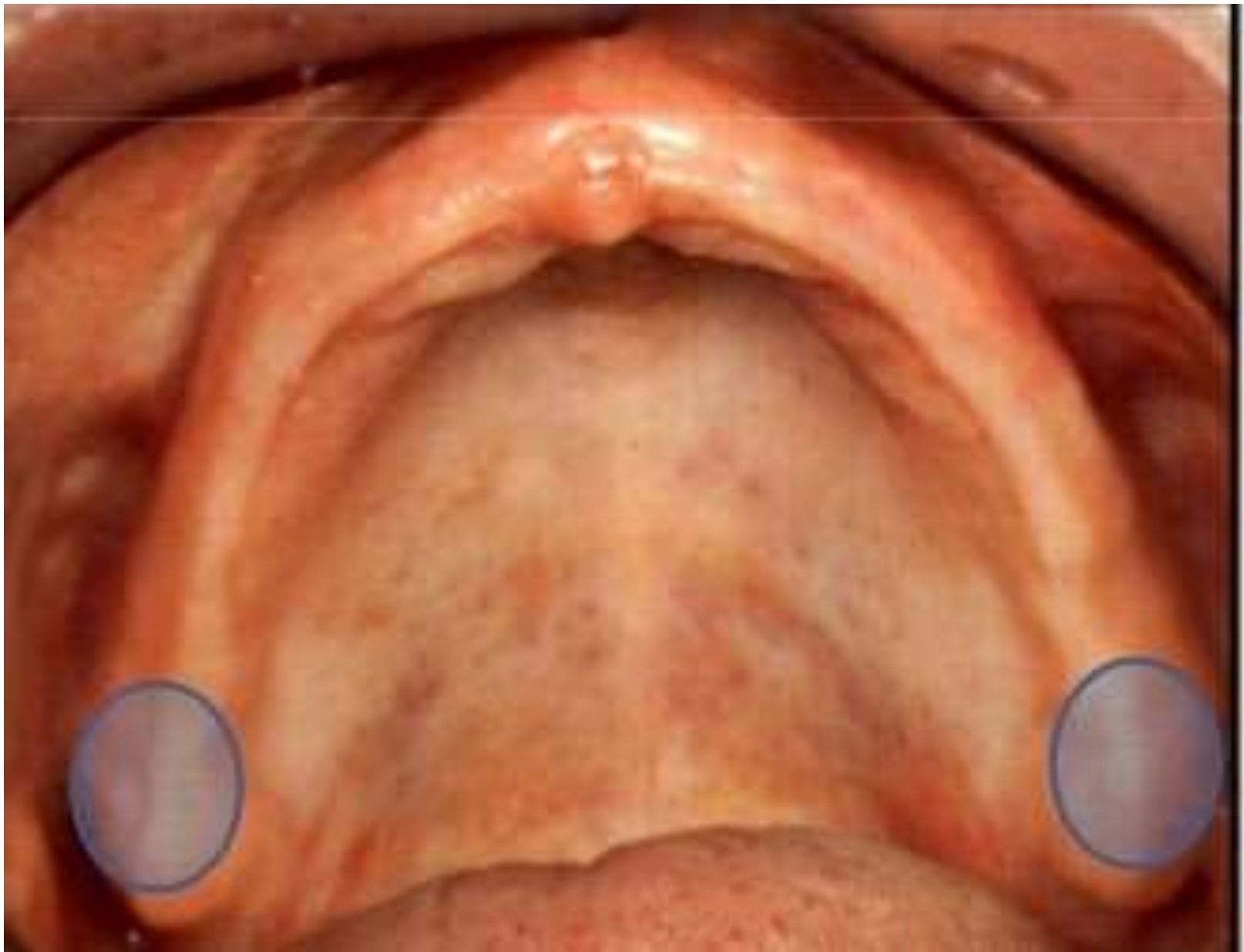
Residual ridge: It is the bony process that remains after teeth have been lost, which is covered by mucous membrane. The residual ridge considered to be the primary stress bearing area. The residual ridge will produce the ridge fossa or groove in the impression or denture. 3



2- Secondary stress bearing area

A. Maxillary tuberosity:

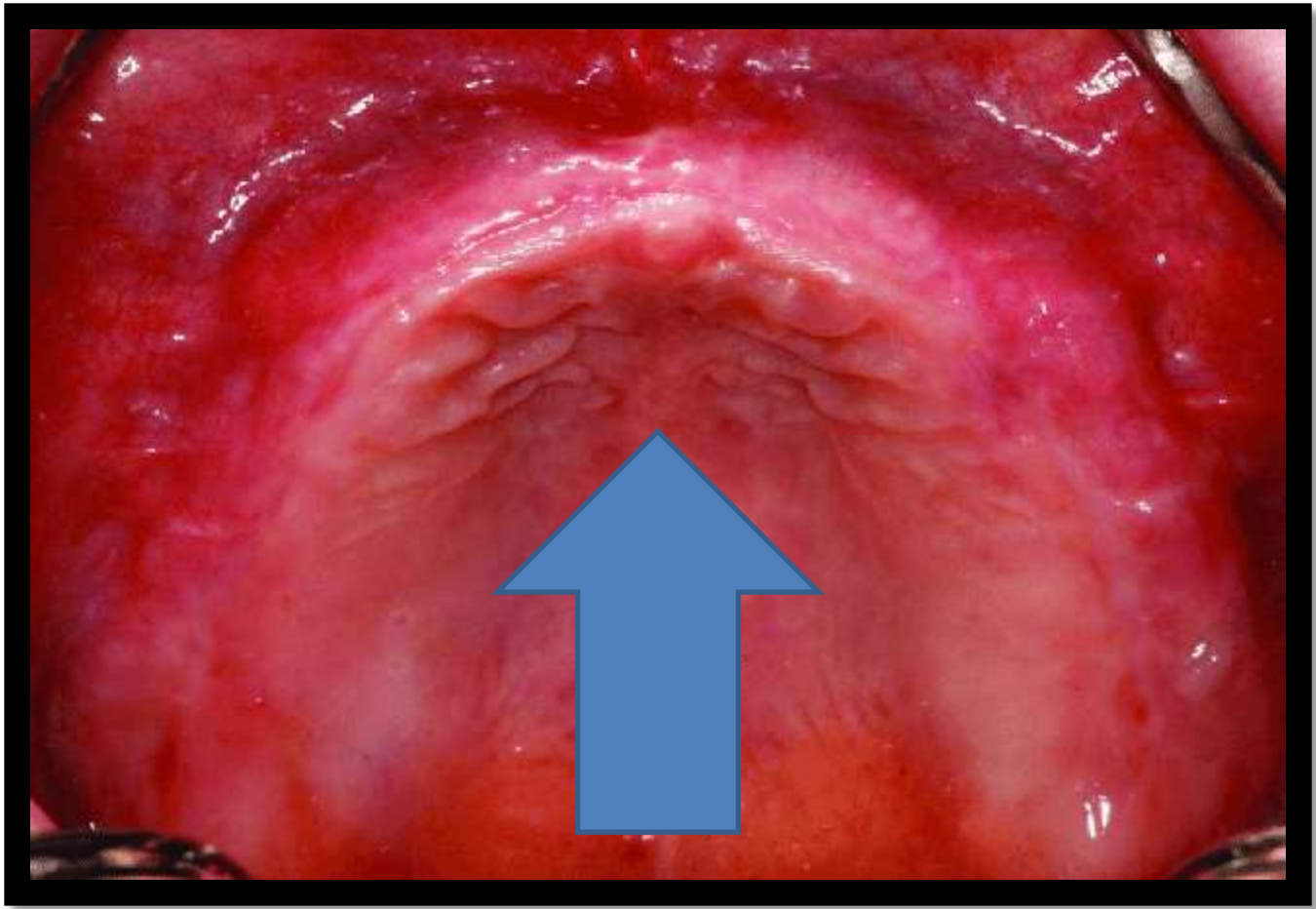
It is the area of the alveolar ridge that extends distal to the maxillary third molar to the hamular notch. It is important to preserve the integrity of the tuberosities for they provide resistance against horizontal movement of the maxillary denture. Maxillary complete denture should cover the tuberosity & fill the hamular notch for better retention & support, the square arch form provides a base for the best form denture stability.



2- Secondary stress bearing area

B. Rugae area:

are raised areas of dense connective tissue radiating from the median suture in the anterior third of the palate. The folds of the mucosa play an important role in speech. Also it is regarded as a secondary stress bearing area as this area resists anterior displacement of the denture, therefore, it should not be distorted in the impression.



Landmarks associate with Maxilla

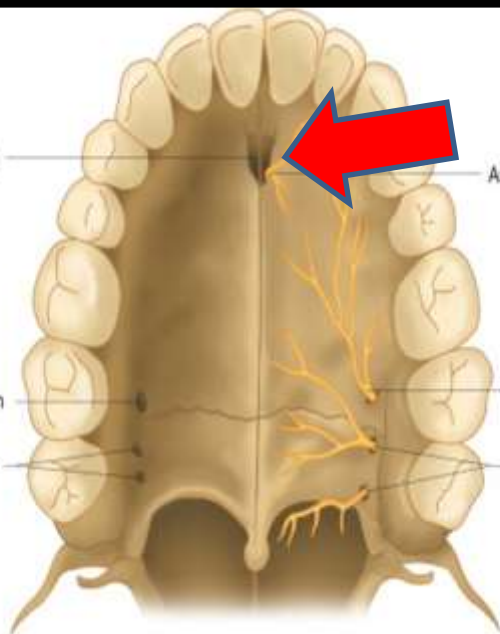
Relief areas:

- A. Incisive foramen and papilla.
- B. Canine eminence (Cuspid eminence) .
- C. Zygomatic process (Malar bone).
- D. Mid-palatine raphe.
- E. Fovea Palatina.
- F. Torus palatinus.

A. Incisive foramen and papilla

Incisive foramen: is located in the midline of palate posterior to the maxillary central incisors just behind the crest of the residual alveolar ridge in between them. If care is not taken, then the impinging on the nerve by the denture could occur.

Incisive fossa (foramen)



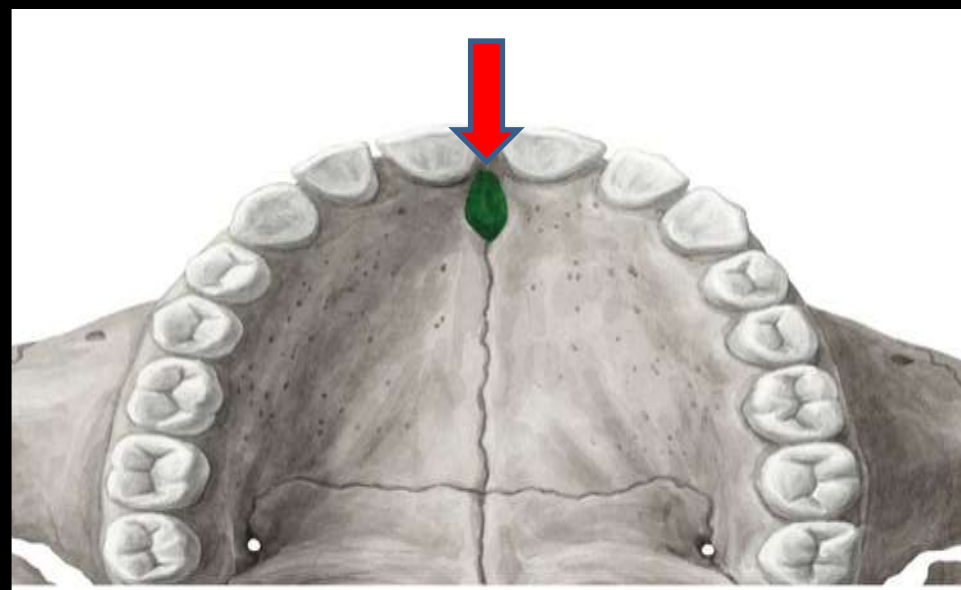
Anterior palatine branch of the nasopalatine nerve

Greater palatine foramen

Greater palatine nerve

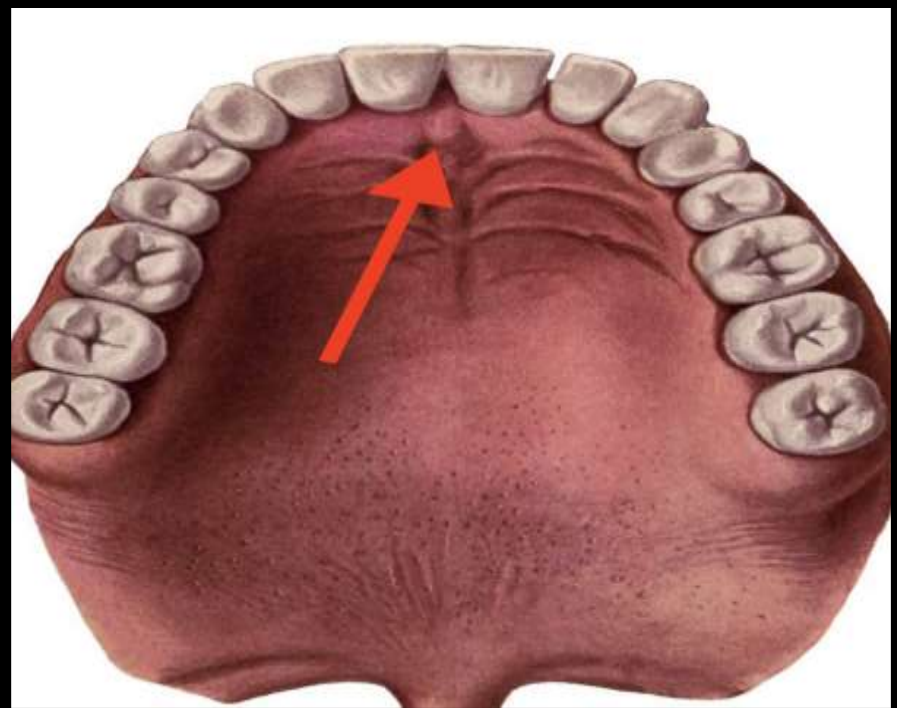
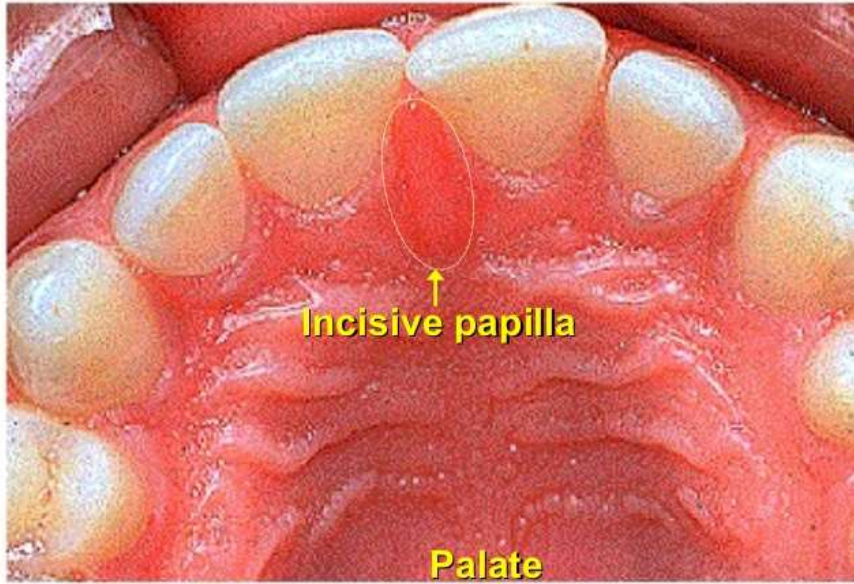
Lesser palatine foramen

Lesser palatine nerve



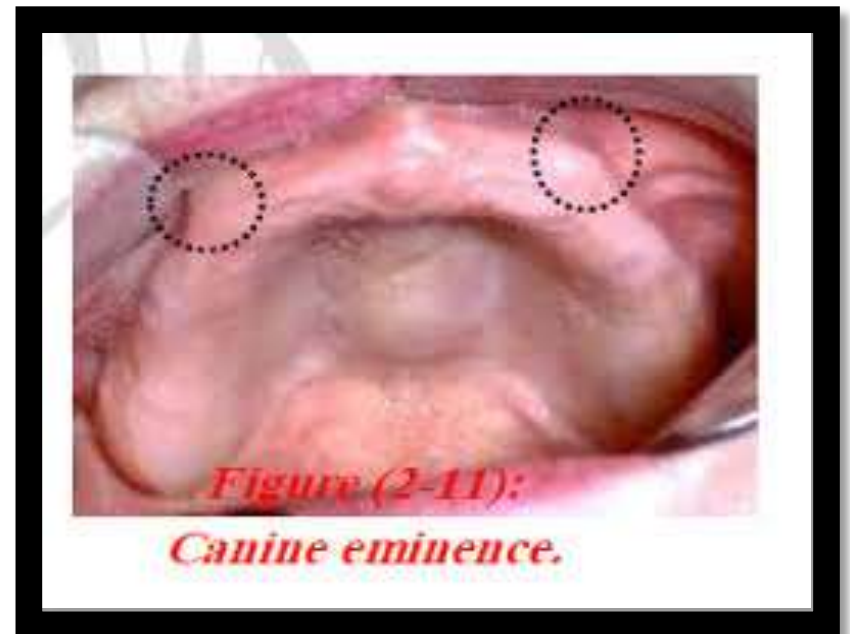
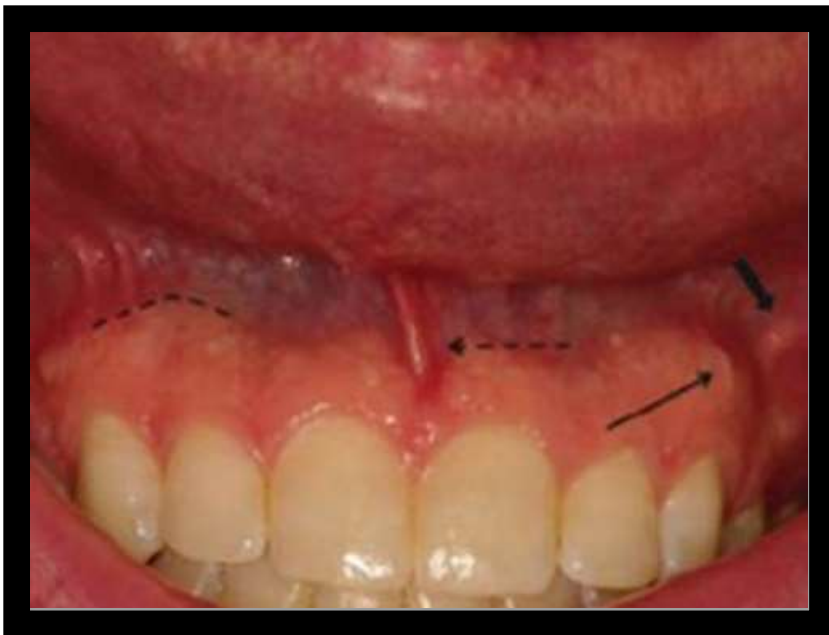
A. Incisive foramen and papilla

Incisive Papilla: is a pad of fibrous connective tissue overlies the incisive foramen. In an edentulous mouth, it may lie close to the crest of the residual ridge. Relief over this area should be provided in denture to avoid any interference with blood supply and nerve pathway which causes burning sensation and pain. Incisive Papilla aids in determination of the location of artificial central incisors also its location can gives a proper estimation to the amount of alveolar bone resorption.



B. Canine eminence (Cuspid eminence)

It is a round bony elevation in the corner of the mouth it represents the location of the root of the canine, which is helpful to be used as a guide for selection and arrangement of maxillary anterior teeth



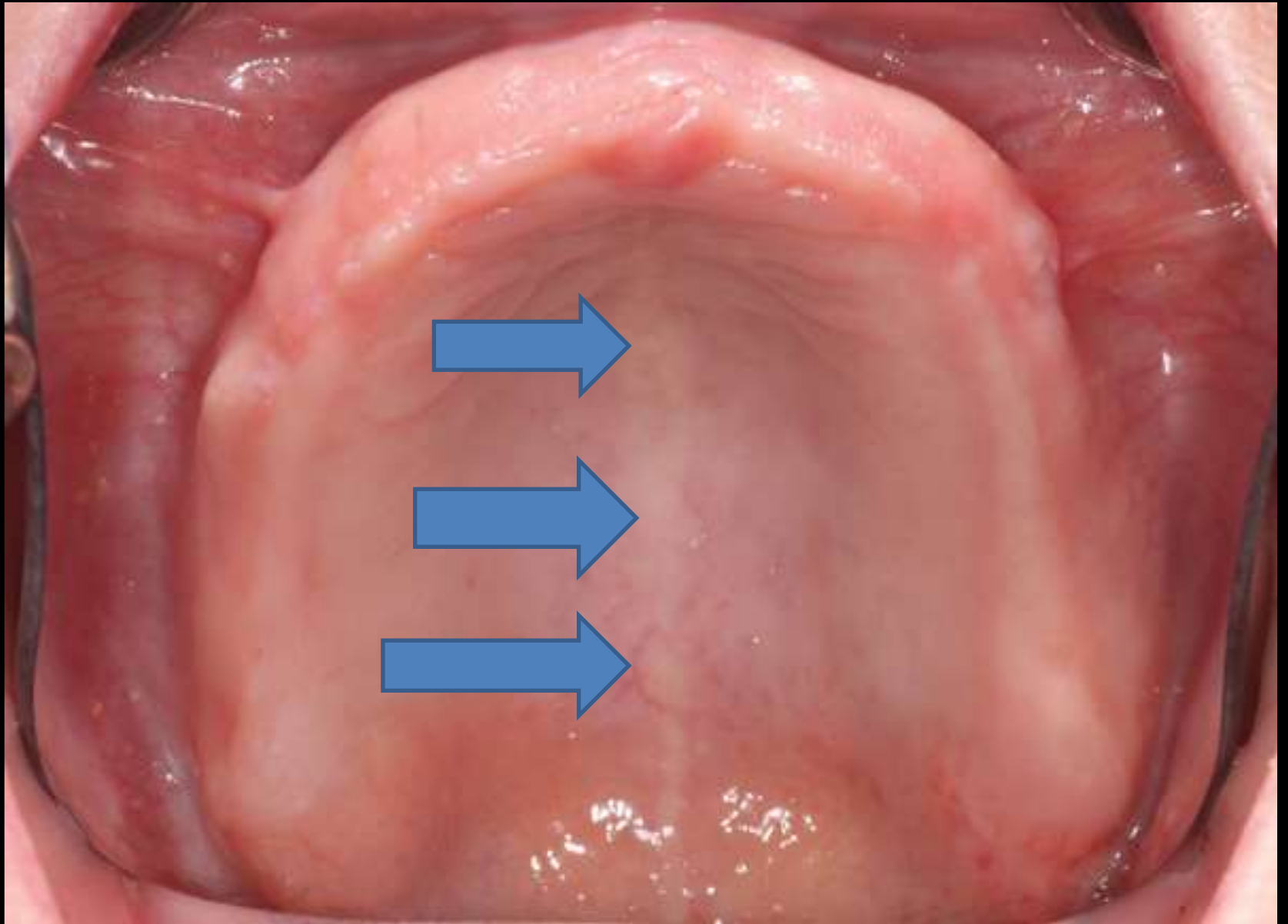
C. Zygomatic process (Malar bone)

It is extended upwards & outwards on the buccal aspect of the residual alveolar ridge in the last molar region. It is hard area found in the mouth that has been edentulous for a long time. Some dentures require relief over this area to prevent soreness of the underlying tissue.



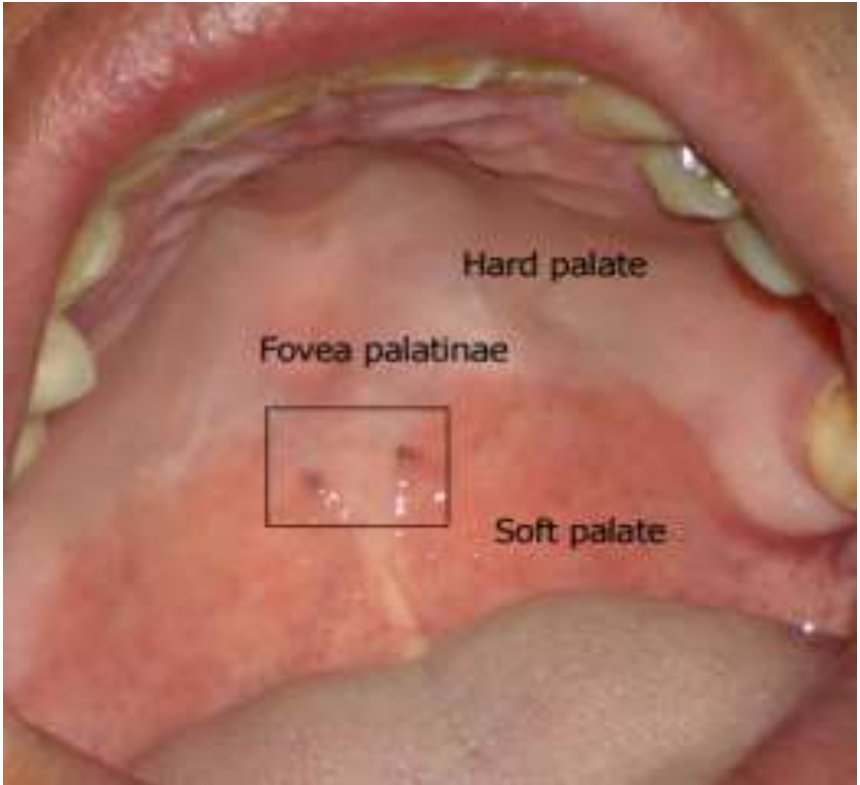
D. Mid-palatine raphe

It overlies the medial palatal suture, extended from the incisive papilla to the distal end of the hard palate. The mucosa over this area is usually tightly attached, thin and non-resilient, the underlying bony union being very dense and often raised. This area relieved adequately in order to avoid trauma from denture base.



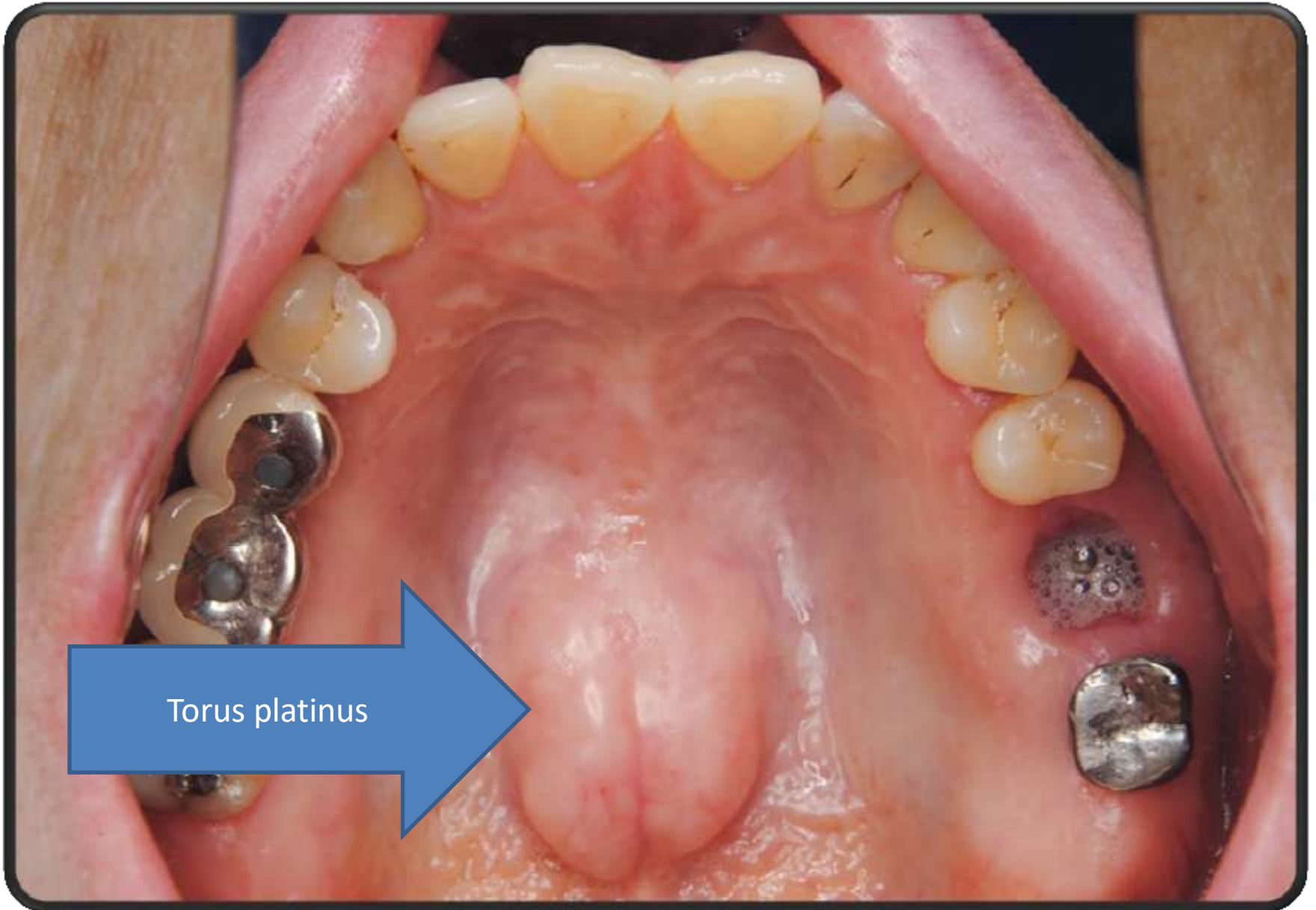
E. Fovea Palatina:

A two small pin point depressions in the midline, in the posterior part of the vault, located usually on the soft palate they are usually forming a collection of mucus glands ducts. They considered an ideal guide for the location of the posterior border of the maxillary denture.



F. Torus palatinus

It is a hard bony enlargement that occurs in the midline of the roof of the mouth (hard palate). It is found in **20 %** of the population, relief done if it is small and surgical correction may be needed if the tori are very large and extends to the vibrating line.



Torus platinus

**Landmarks associate
with mandible**

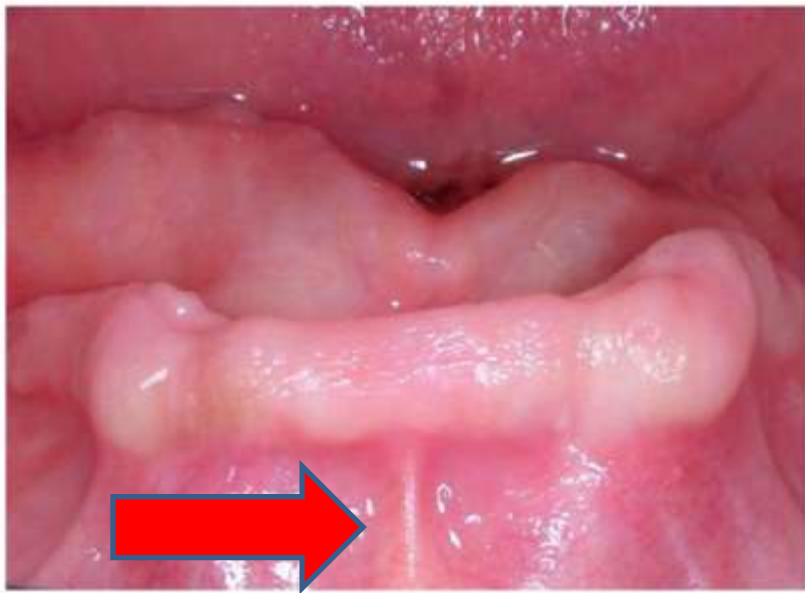
Landmarks associate with mandible

Limiting structures

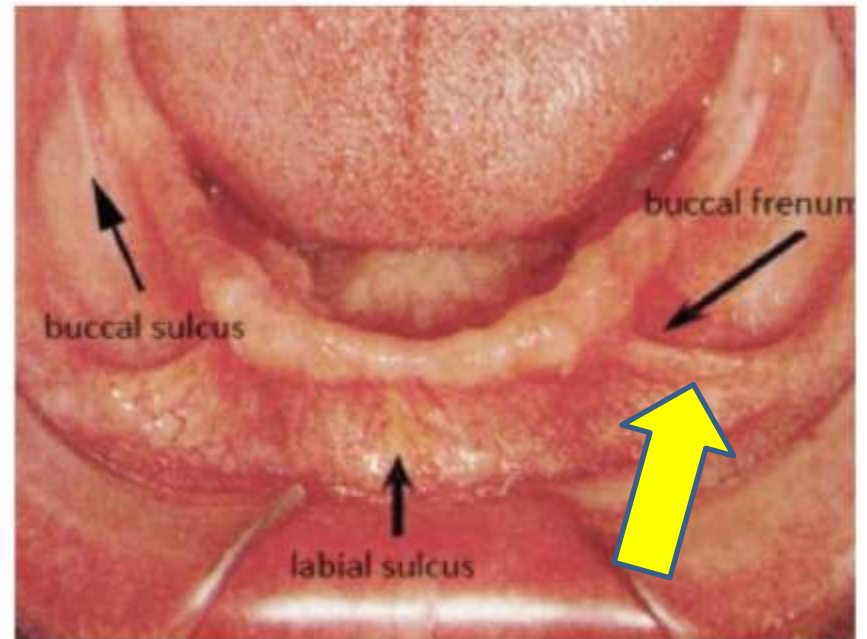
- A. Labial, buccal & lingual frenum
- B. Labial & buccal vestibule
- C. Alveololingual sulcus
- D. Retromolar pad
- E. Pterygomandibular raphe

A. Labial, buccal & lingual frenum

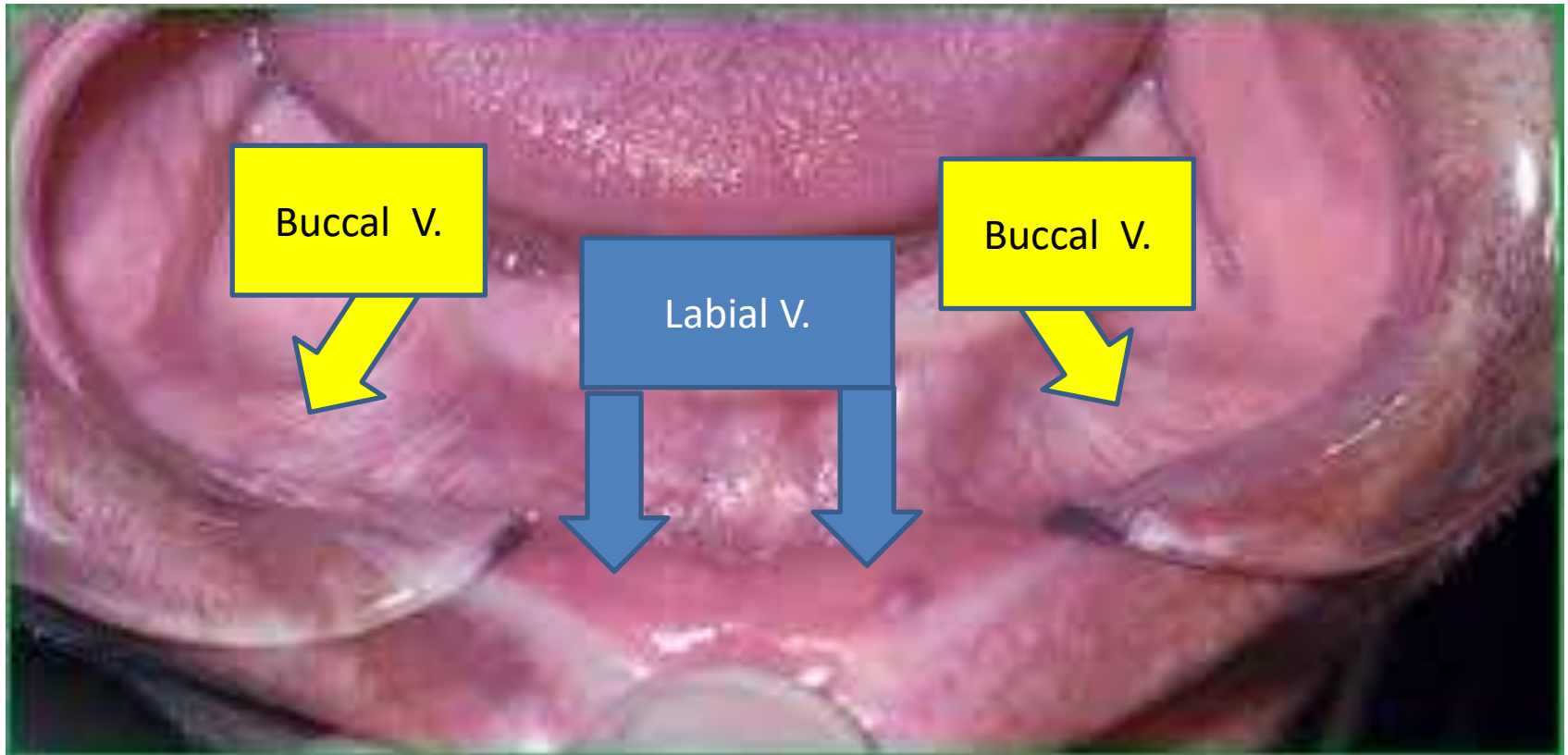
They should be relieved in order to prevent the displacement of the denture during function. The lingual frenum relief should be provided in the anterior portion of the lingual flange and should be well adapted otherwise it will affect the denture stability.



- Labial frenum
- Buccal frenum
- Lingual frenum

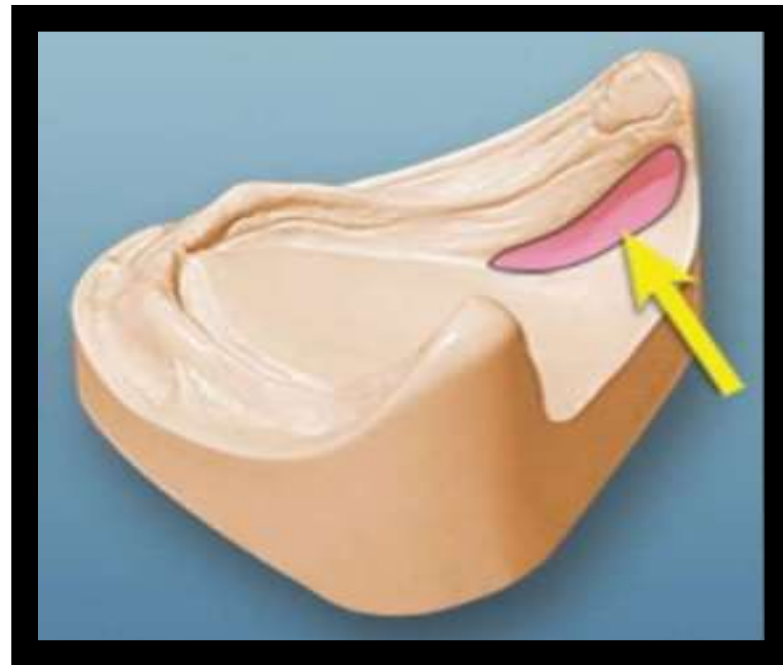


C. Labial & buccal vestibule



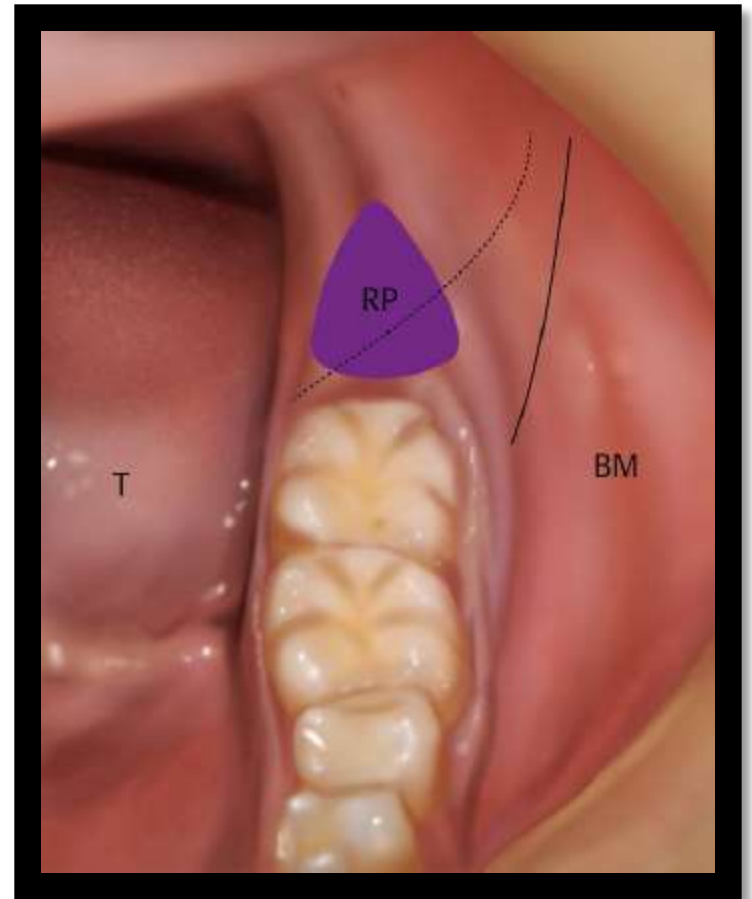
C. Alveololingual sulcus

It extends from the lingual frenum to retromylohyoid curtain. Any overextension at this region causes soreness and instability.

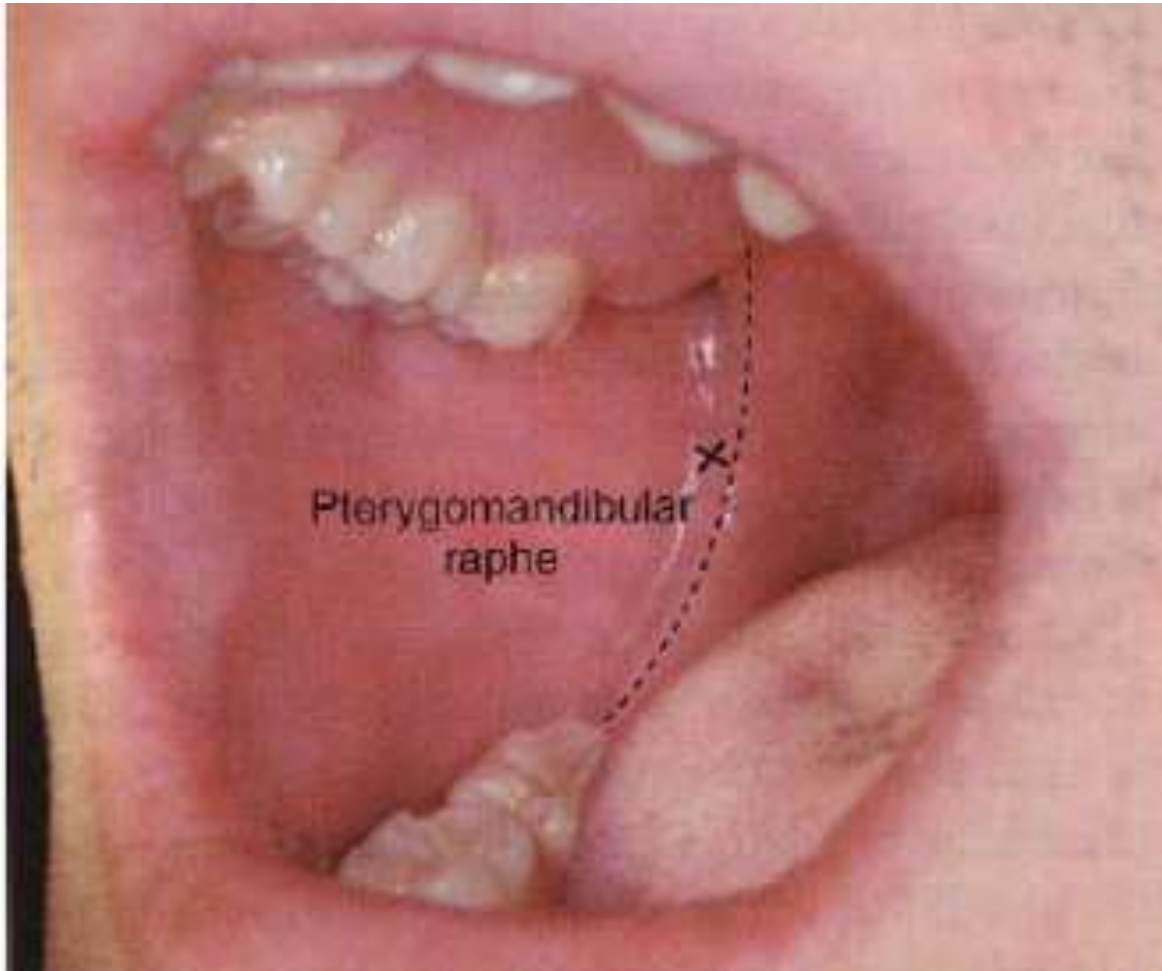


D. Retromolar pad

It is a pear-shaped triangular soft pad of tissue located at the distal end of the lower ridge. It is considered as an important structure, as it forms the posterior seal of the mandibular denture. The denture base should extend up to 2/3rd of the retromolar pad triangle.



E. Pterygomandibular raphe



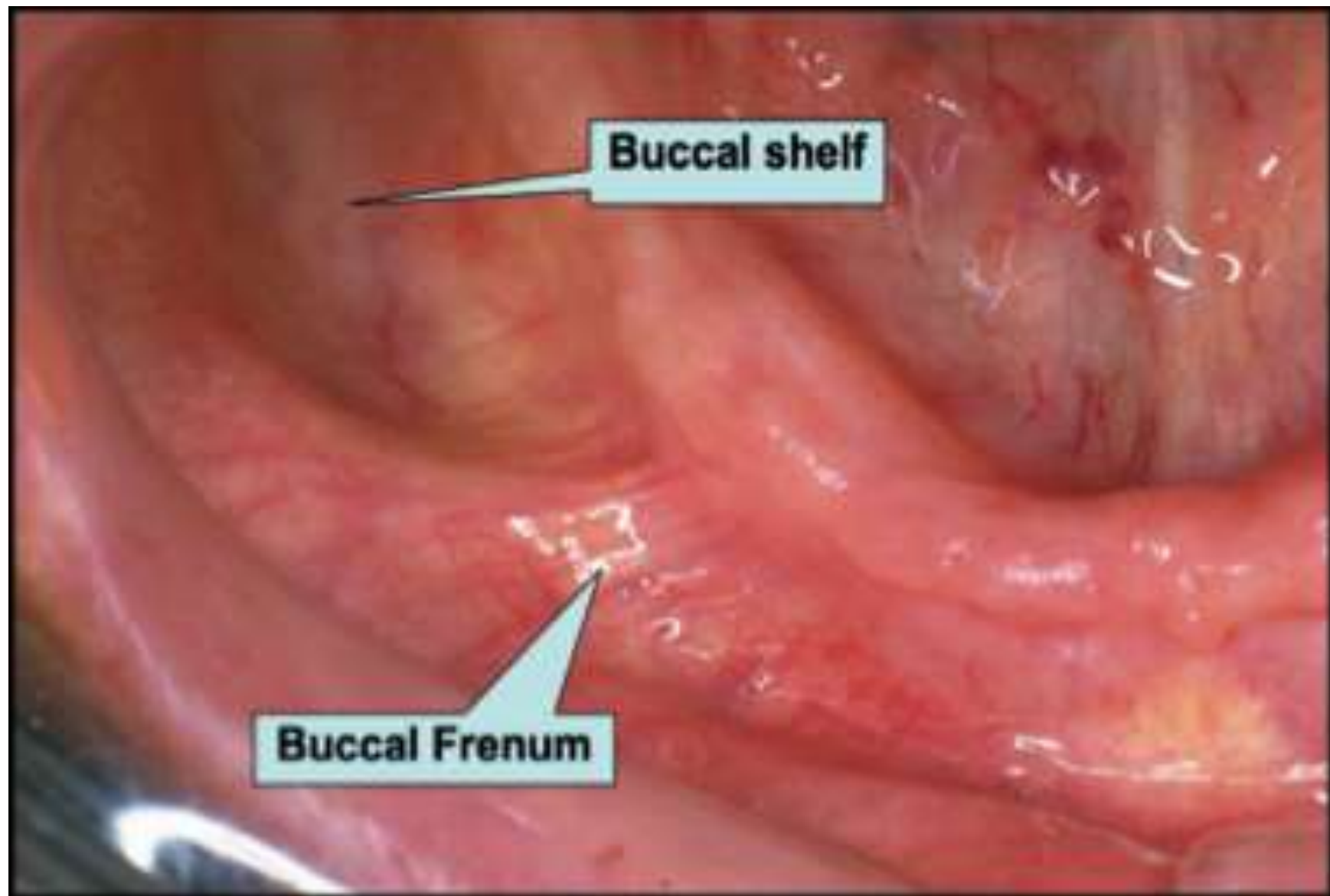
Landmarks associate with mandible

Supporting structures

- A. Buccal shelf area.
- B. Residual alveolar ridge.
- C. External oblique line.

A. Buccal shelf area:

It is bounded externally by external oblique ridge and internally by the slope of residual ridge. The bone of this area is very dense therefore it acts as a primary stress bearing area in the mandibular arch and should be covered by the mandibular denture for maximum support. It can resist the forces transmitted from the denture base such forces and stresses are named the masticatory forces. This is due to its density, mucosal covering and relation to the vertical closure of the jaw.



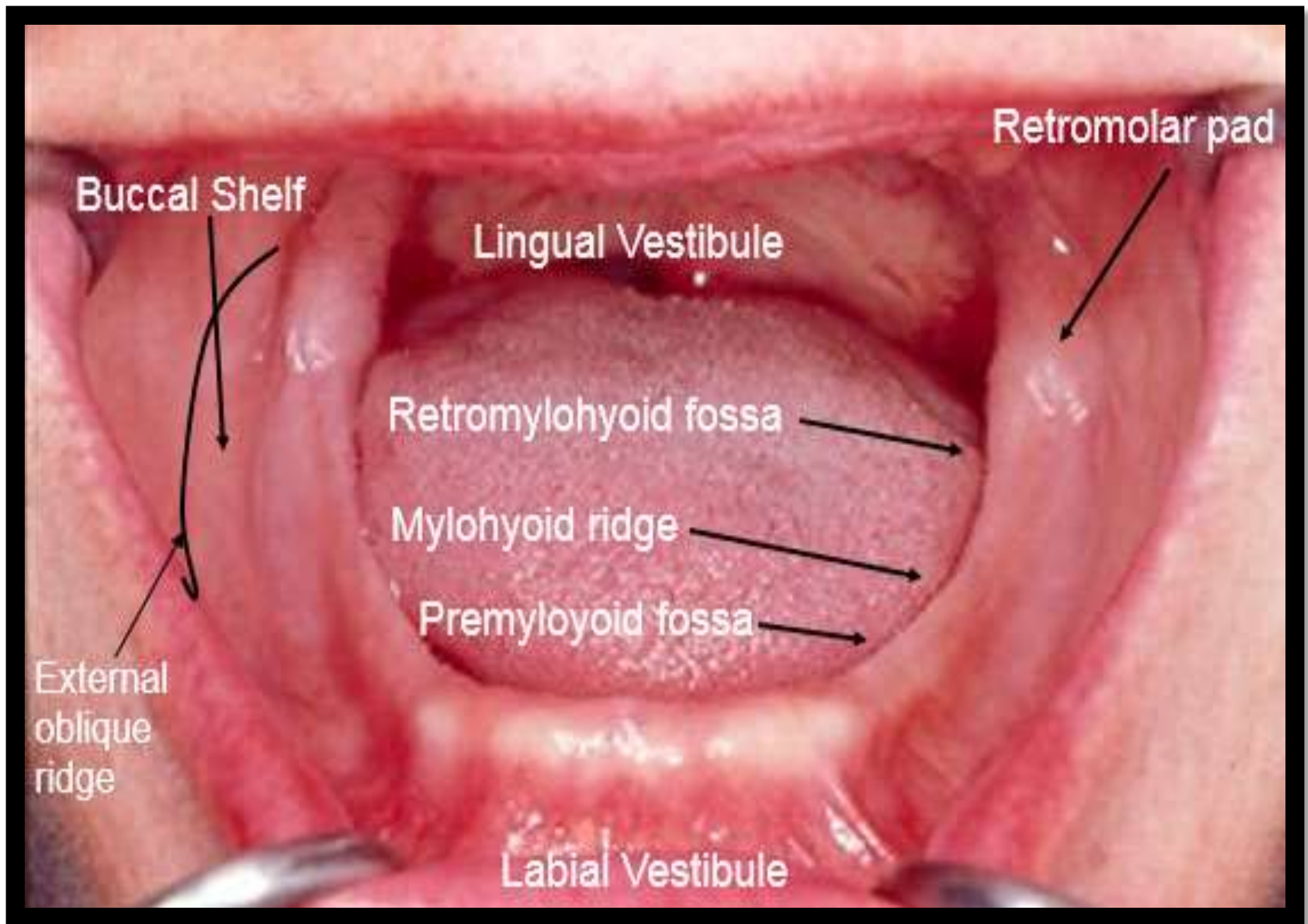
B. Residual alveolar ridge:

Horse shoe ridge left after the extraction of the teeth superimposed on the body of the mandible. It is formed from cancellous bone; therefore it is considered as secondary stress bearing area.



C. External oblique line

Is the ridge of dense bone extending from just above the mental foramen in a superior and distal direction to become continues with anterior border of the ramus. In most individual the external oblique line is the anatomic guide for lateral termination of the buccal flange of the mandible denture. The mandibular denture should cover but not extend beyond this ridge in order to avoid the displacement because of the powerful muscles in this region.



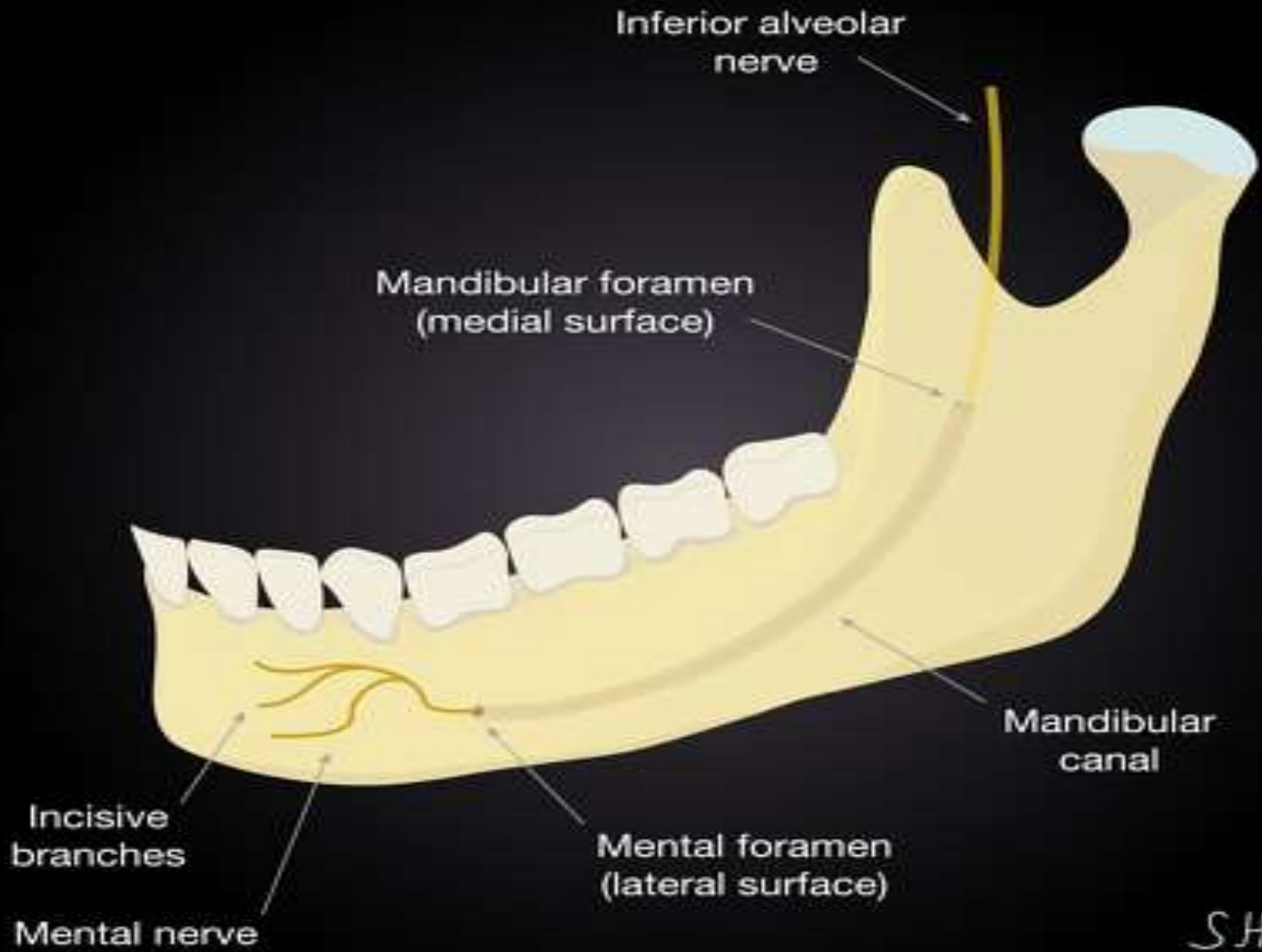
Landmarks associate with mandible

Relief areas:

- A. Mental foramen.
- B. Mylohyoid line (internal oblique line).
- C. Genial tubercles.
- D. Torus mandibularis.

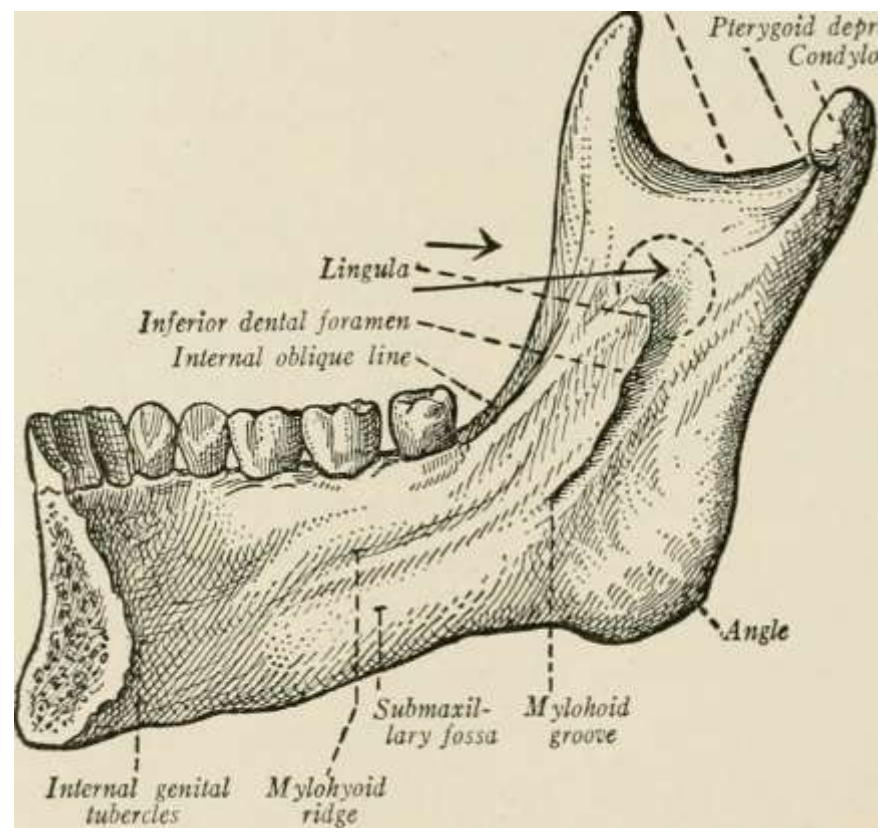
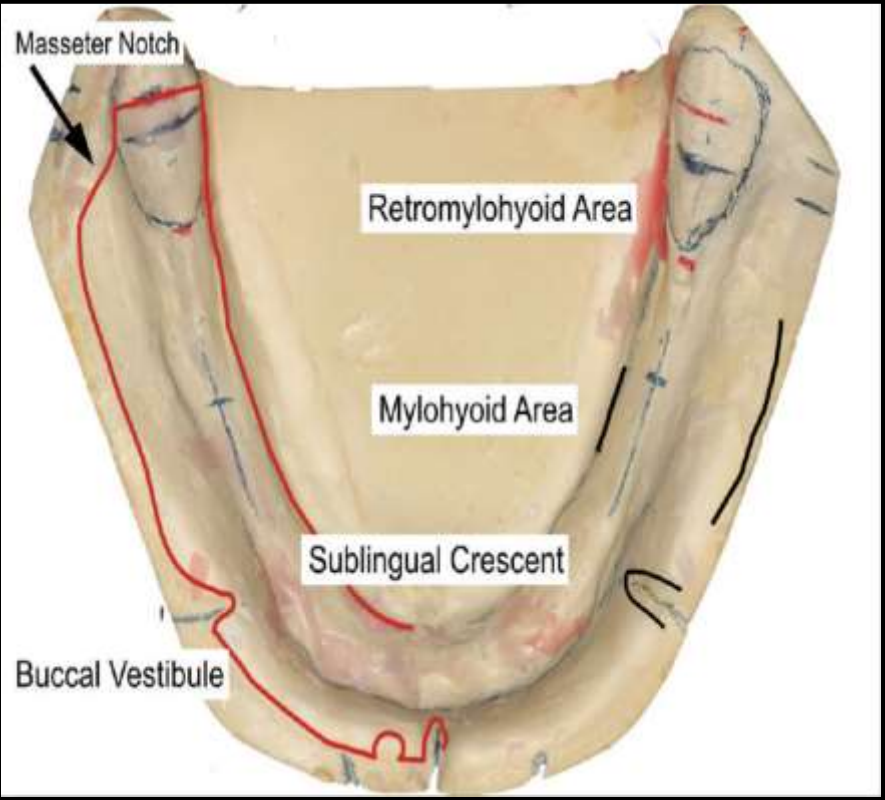
A. Mental foramen

It is located on the external surface of the mandible between 1st & 2nd premolars. In case of a highly resorption of the mandibular ridge, the patient may feel burning sensation due to pressure on the mental nerve as the mental foramen occupies a more superior position and the denture must be relieved over this area.



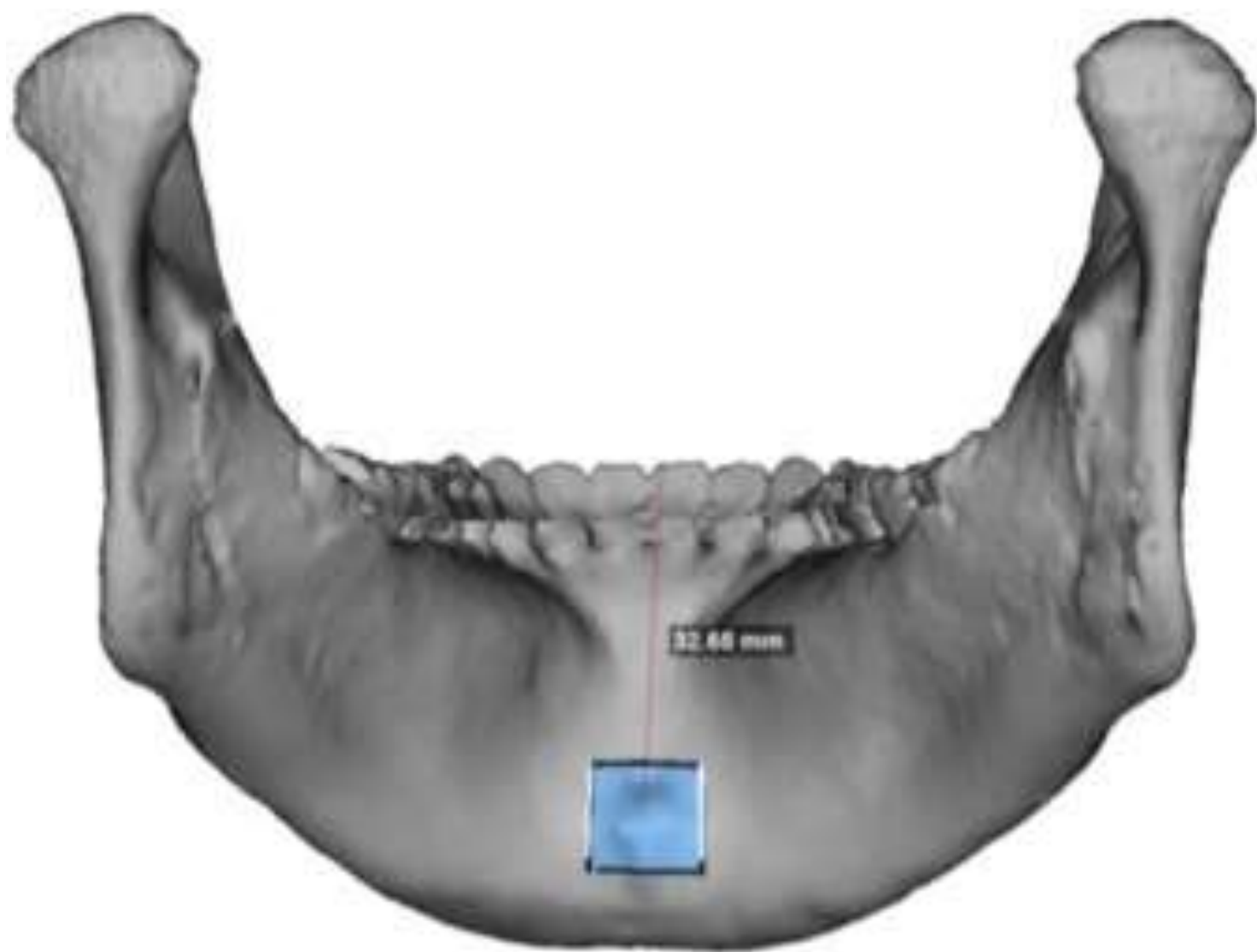
B. Mylohyoid line (internal oblique line)

It is an irregular rough bony crest extending from the 3rd molar region to the lower border of the mandible in the region of chin. In case of sever resorption it present a problem for the denture wearer because it will act as a sharp edge, so should be relieved.



C. Genial tubercles.

- Over 2-4 in number also called mental spines. These are located in the lingual aspect of mandibular body in the midline slightly above the lower border. When they are prominent they should be relived or removed surgically.



D. Torus mandibularis.

Irregular bony prominence, always appear bilaterally on the lingual surface of the body of the mandible on the distal end of the mylohyoid ridge sometimes they may need alteration of the design or even surgically rounded or removed also termed as lingual tuberosity.



Resorption pattern

The maxillary ridge usually resorbed at the expense of the crest, labial and buccal aspects resulting in movement of the crest of the ridge in superior and palatal direction (upwards inwards). That is why the maxillary arch has tendency to become smaller.

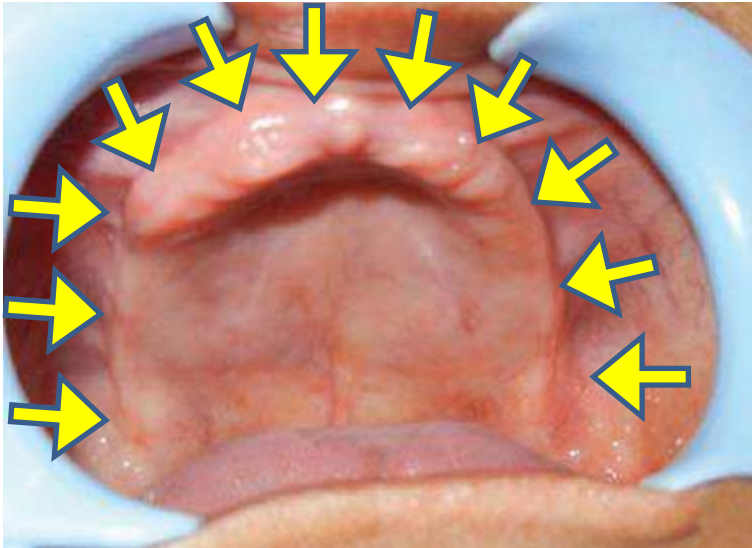
- The mandibular ridge resorbed at the expense of the crest of the ridge, resulting in movement of the crest of the ridge in an inferior direction (downwards outwards). That's why the mandibular arch has tendency of becoming larger.

- The process of remodeling of bone affects particularly the cortical bone, which is usually the labial and buccal cortical bone of maxilla and lingual cortical bone of mandible.

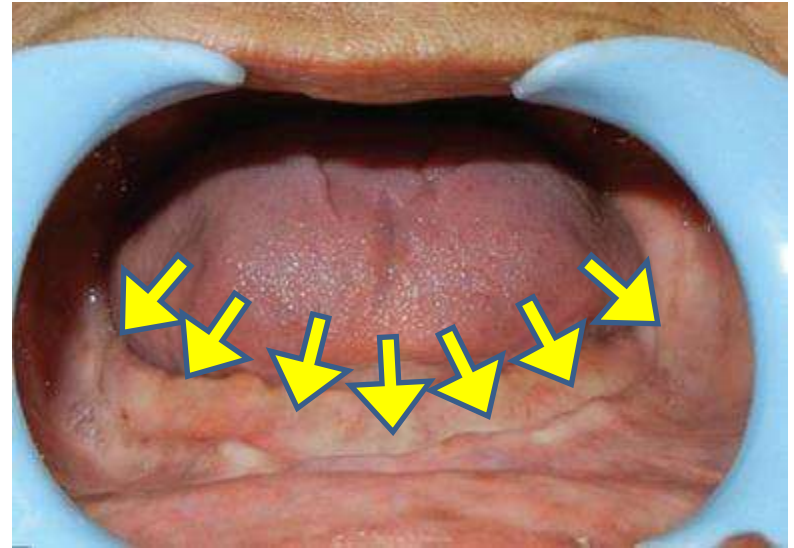
The most important things are the consequences of residual ridge resorption:-

- 1) Loss of width and depth of sulcus, we have a decreased in height of ridge so the muscles will be near the denture.
- 2) Loss of occlusal vertical dimension and decreased in height of lower face.

3) The most important consequences are the change in inter alveolar ridge relationship because of the resorption direction which is centripetal in maxilla and centrifuge in the mandible. This resorption will cause a small upper jaw and wide lower jaw and this will affect the arrangement of teeth.



**Maxilla (upwards
inwards)**



**Mandible (downwards
outwards)**

Thank you