

Prosthodontics: An Overview

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Prosthodontics deals with the substitution or replacement of oral structures. Prosthodontics can include anything from replacing one missing tooth to constructing a complex designed device to replace structures of the face such as eyes, ears, or a cleft palate.

This chapter presents in brief about the prosthesis—definition and types; appliance—definition and differentiation with prosthesis; prosthodontics—definition, scope, objectives, and branches, and lastly glossary of important terms.

PROSTHESIS

- It may be defined as *an artificial replacement of an absent part of the human body or a therapeutic device to improve or alter function or it can also be said as a device used to aid in accomplishing a desired surgical result.*

TYPES

- Prosthesis is of three types (Fig. 1.1).
 - I. Dental prosthesis
 - II. Maxillofacial prosthesis
 - III. Axillary prosthesis

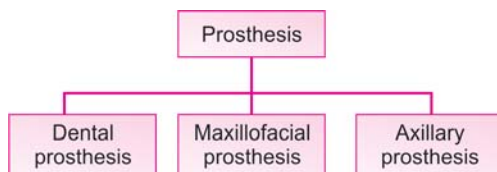


Fig. 1.1: Types of prosthesis

I. Dental Prosthesis or DP (Fig. 1.2)

- Dental prosthesis can be defined as *an artificial replacement of one or more teeth (up to entire dentition in either arch) and associated dental/alveolar structures.*
- It is subdivided as ‘fixed dental prosthesis’ (FDP) and ‘removable dental prosthesis’ (RDP).
- Fixed dental prosthesis is again categorized into three types, i.e.
 1. Cement retained FDP
 2. Screw retained FDP
 3. Friction retained FDP
- Removable dental prosthesis is also categorized into two types, i.e.
 - i. Complete RDP
 - ii. Partial RDP

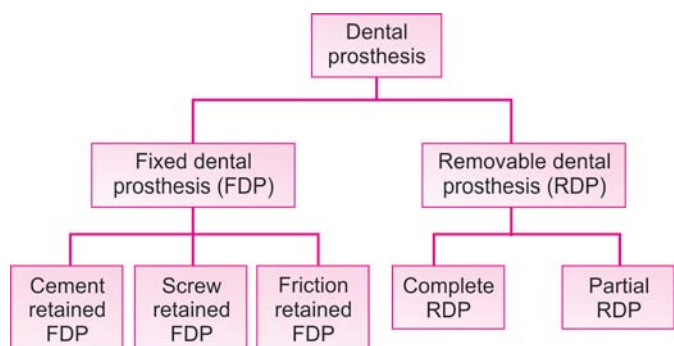


Fig. 1.2: Types of dental prosthesis

1. Fixed dental prosthesis

- It can be defined as *any dental prosthesis that is luted (cemented), screwed or mechanically attached (frictional) or otherwise securely retained to natural teeth, tooth roots and (or) dental implant abutments (that furnish the primary support for the dental prosthesis).*

2. Removable dental prosthesis

- It can be defined as *any dental prosthesis that replaces some or all teeth in a partially edentulous (without teeth) arch (partial RDP) or edentate/edentulous arch (complete RDP) and that can be removed from the mouth and replaced at will.* It's again classified into the following:

i. Complete removable dental prosthesis

- ✦ Also called as **removable complete denture prosthesis**.
- ✦ It is defined as *a removable dental prosthesis that replaces the entire dentition and associated structures of the maxillae or mandible.*

ii. Partial removable dental prosthesis

- ✦ Also called as **removable partial denture prosthesis**.
- ✦ It is defined as *any prosthesis that replaces some teeth in a partially edentulous arch and that can be removed from the mouth and replaced at will.*

II. Maxillofacial Prosthesis (MP) (Fig. 1.3)

- It is defined as *any prosthesis that is used to replace a part or all of any stomatognathic and/or craniofacial structures.*
- Depending on the source of its retention, it is subdivided in tissue retained MP, tooth retained MP, implant retained MP, tissue and implant retained MP.

III. Ancillary Prosthesis (AP)

- It is a prosthesis, that cannot be categorized as either a dental prosthesis or a maxillofacial prosthesis.
- They are intended for short-term or special usage purposes.
- *Examples:* Splints, carriers (fluoride gel, radiation), feeding aids, guides, stents, etc.

APPLIANCE

- Appliance is defined as *a dental or surgical device designed to perform a therapeutic or corrective function.*

PROSTHODONTICS

- Prosthodontics is a branch of dentistry pertaining to the diagnosis, treatment planning, rehabilitation and maintenance of the oral function, comfort, appearance and health of patients with clinical conditions associated with missing or deficient teeth and/or maxillofacial tissues using biocompatible substitutes.
- The term prosthodontics has been derived from Latin—**pros** meaning replacement; **dons** means teeth; **ics** means science.
- Prosthodontist is a specialist in prosthodontics and who has successfully completed an advanced education programme in the speciality of prosthodontics that is accredited (recognized) by the appropriate body. In India, those bodies are the Universities of Health Sciences and which are in turn under the control of Dental Council of India (DCI).

SCOPE AND OBJECTIVES OF PROSTHODONTICS

- Prosthodontics is pertaining to the restoration and maintenance of oral function, comfort, appearance and health of the patient by the restoration of natural teeth and/or the replacement of missing teeth and contiguous oral and maxillofacial tissues with artificial substitutes.

Objectives

1. Preservation of remaining oral structures
2. Promotion of health
3. Restoration of function and esthetics

BRANCHES OF PROSTHODONTICS (Fig. 1.4)

- Prosthodontics is broadly categorized into the four branches, i.e.

1. Removable prosthodontics

- The branch of prosthodontics concerned with the replacement of missing teeth and adjacent structures for edentulous or partially edentulous patients by artificial substitutes that can be removed at will.
- Which is again divided into two subtypes i.e.,

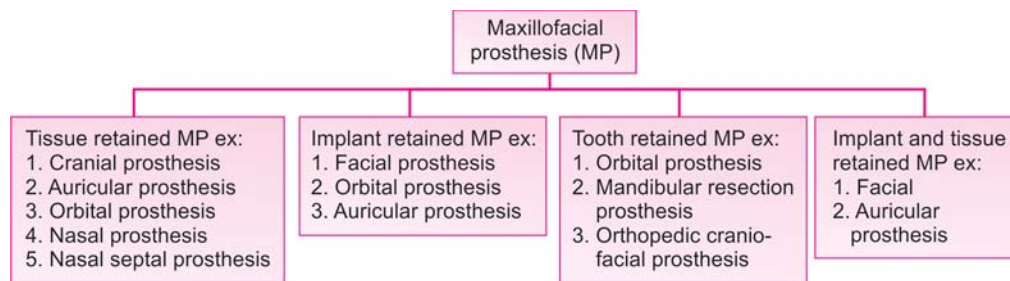


Fig. 1.3: Types of maxillofacial prosthesis

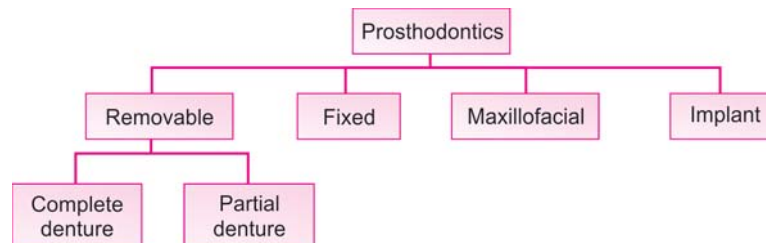


Fig. 1.4: Branches of prosthodontics

i. Complete denture prosthodontics

- That body of knowledge and skills pertaining to the restoration of the edentulous arch with a removable dental prosthesis.

ii. Partial denture prosthodontics

- Any prosthesis that replaces some teeth in a partially dentate arch, that can be removed from the mouth and replaced at will.

2. Fixed prosthodontics

- The branch of prosthodontics concerned with the replacement and/or restoration of teeth

by artificial substitutes that are not readily removed from the mouth.

3. Maxillofacial prosthodontics

- The branch of prosthodontics concerned with the restoration and/or replacement of the stomatognathic and craniofacial structures with prosthesis that may or may not be removed on a regular or elective basis.

4. Implant prosthodontics

- The phase of prosthodontics concerning the replacement of missing teeth and or associated structures by restorations that are attached to dental implants.

2

The Oral Cavity

To construct a prosthesis, the dentist should have a thorough understanding of the anatomical landmarks of the face and oral cavity. This chapter is designed to identify the surface anatomy of the face, edentulous mouth and denture bearing areas. By the end of this chapter, student should be able to recognize and identify the surface anatomy of the edentulous mouth; identify the negative likeness of anatomical fractures presented in an impression; understand the relevance of certain anatomical features to full denture construction.

DENTULOUS AND EDENTULOUS

- **Dentulous** is a condition in which natural teeth are present in the mouth (synonym: Dentate).

- **Edentulous** is a condition of without teeth or lacking teeth. If all the teeth are missing, the condition is *complete edentulous* and if only a few teeth are missing, the condition is called *partial edentulous*.
- **Edentulism** is the state of being edentulous or without natural teeth.
- **Edentics** is the art, science and technique used in treating edentulous patients.

ANATOMIC LANDMARKS

DEFINITION

- A recognizable anatomic structure used as a point of reference—GPT.

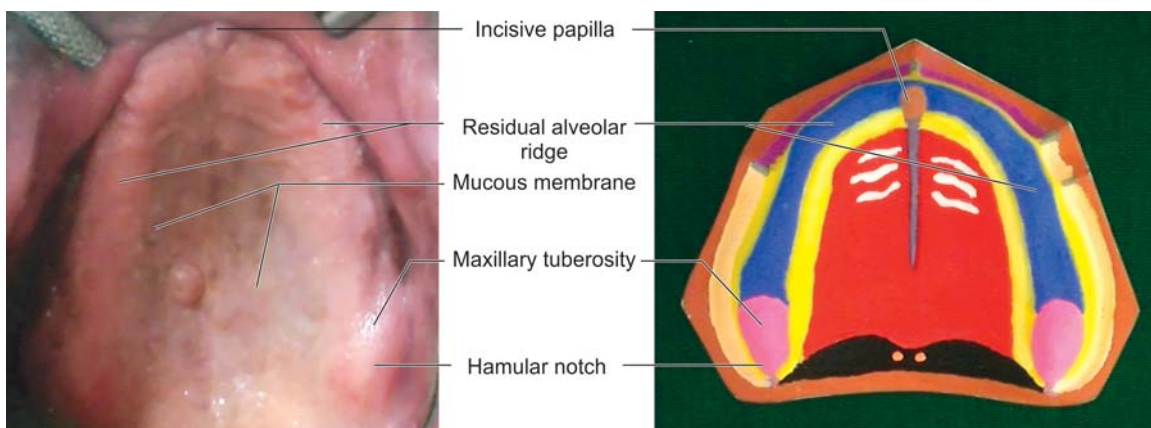


Fig. 2.1: Maxillary anatomical landmarks

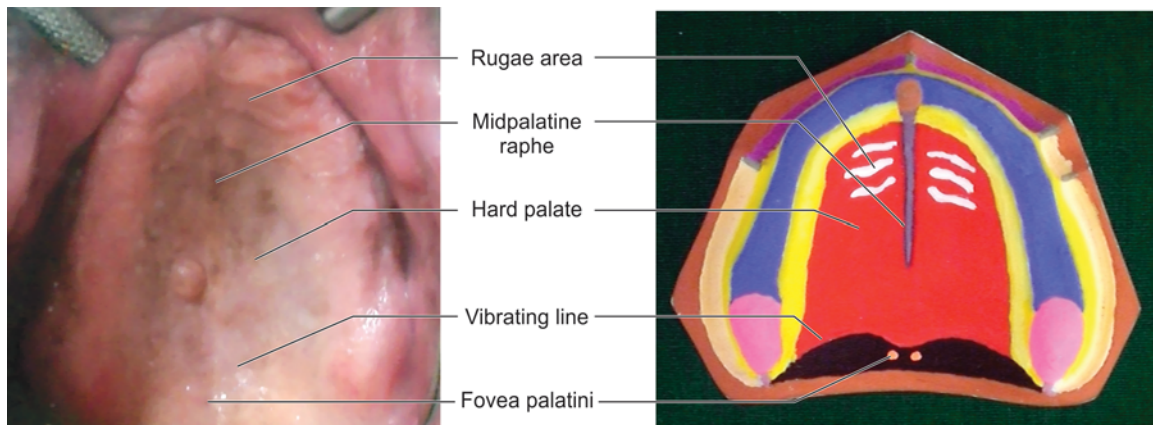


Fig. 2.2: Maxillary anatomical landmarks

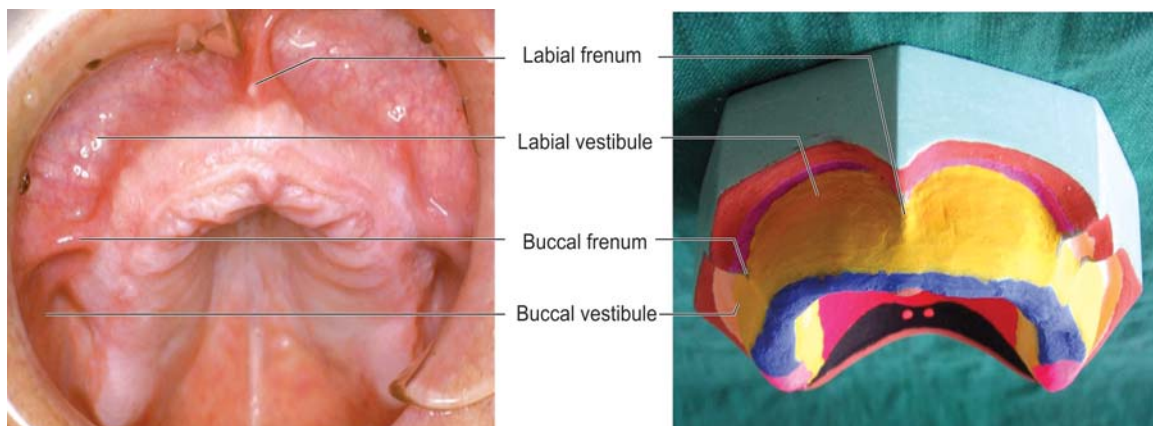


Fig. 2.3: Maxillary anatomical landmarks

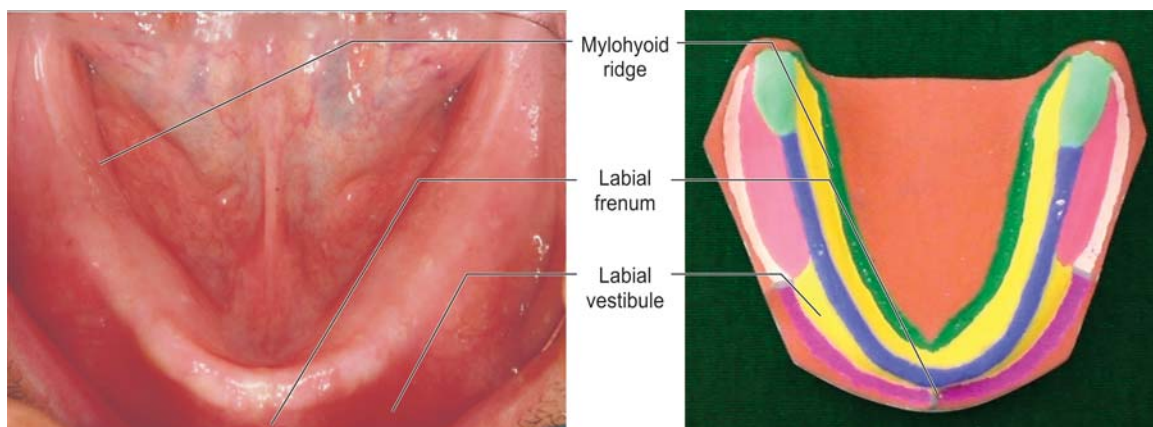


Fig. 2.4: Mandibular anatomic landmarks

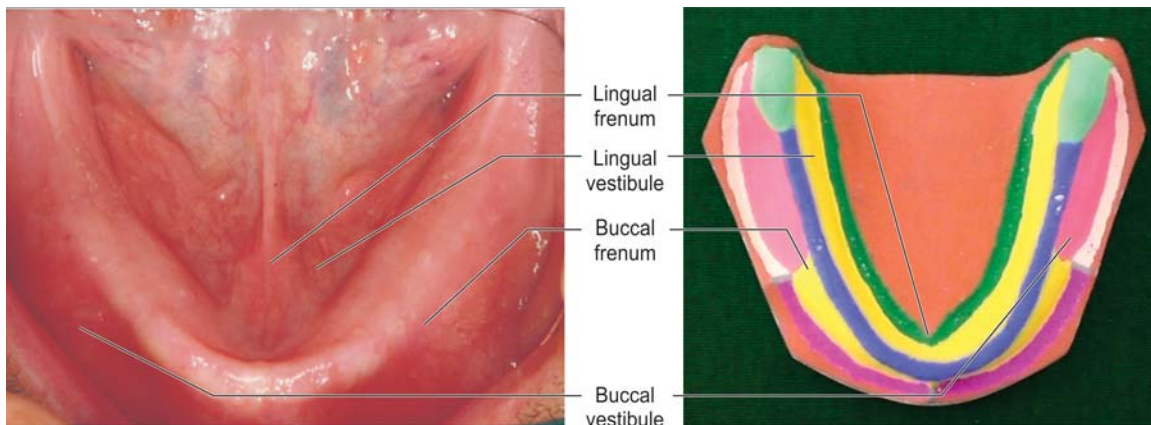


Fig. 2.5: Mandibular anatomic landmarks

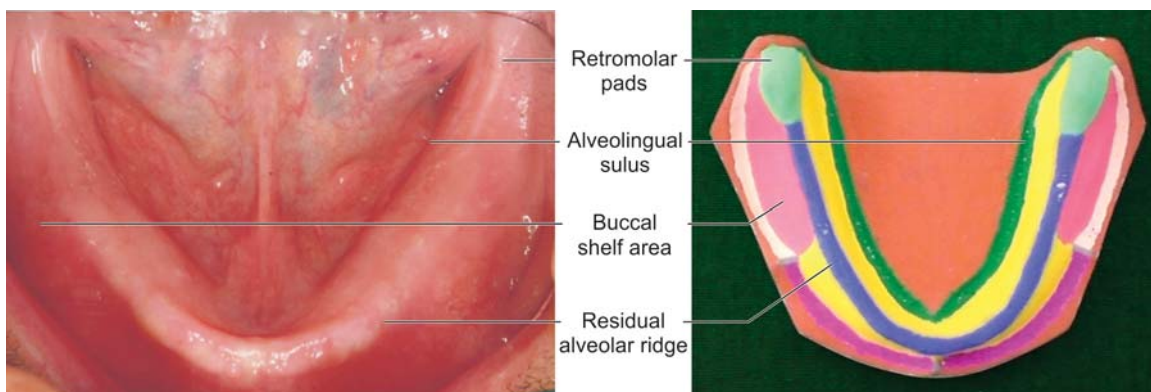


Fig. 2.6: Mandibular anatomic landmarks

SIGNIFICANCE

- Helps in locating the stress bearing areas, retentive areas, relief areas and limiting structures while impression making.
- Helps in preservation of remaining tissues.
- Helps in construction of complete dentures with good masticatory efficiency, pleasant esthetics and correct phonetics.

MAXILLARY ANATOMIC LANDMARKS

- Average available denture bearing area for edentulous maxilla is 24 cm².

I. Based on supporting and limiting structures

A. Supporting structures

1. Mucous membrane
2. Hard palate
3. Rugae area

4. Mid palatine raphe

5. Residual ridge

6. Incisive papilla

7. Maxillary tuberosity

8. Torus palatinus

B. Limiting and peripheral structures

1. Labial frenum

2. Labial vestibule

3. Buccal frenum

4. Buccal vestibule

5. Hamular notch

6. Vibrating line

7. Fovea palatini

II. Based on function

A. Stress bearing areas

1. *Primary:* Horizontal portion of hard palate lateral to midline.

2. *Secondary*: Palatal rugae, crest of alveolar ridge, facial slopes of alveolar ridge, maxillary tuberosity.

B. Relief areas

- Mid palatine raphe, torus palatinus, labial frenum, buccal frenum.

1. Mucous Membrane (Fig. 2.1)

Definition

- A thin layer of tissue that lines a cavity, envelopes a vessel or part or separates a space or organ—GPT.

Structure

- Structure of oral mucous membrane resembles skin in many ways.
- Oral mucous membrane consists of

A. Mucosa

- Epithelium
- Lamina propria (connective tissue)
- Oral mucosa is divided into 3 categories depending on its function and location.

i. Masticatory mucosa covers

- Hard palate.
- Crest of alveolar ridge.
- Residual attached gingiva that is firmly attached to supporting bone.
- Stratified squamous epithelium of masticatory mucosa has well-defined keratinized layer.
- It is associated with those parts of oral cavity which are firmly attached to periosteum.

ii. Lining mucosa covers

- Lips
- Cheeks
- Vestibular spaces
- Alveolingual sulcus
- Soft palate
- Ventral surface of tongue
- Unattached gingiva found on slopes of residual ridges.
- Stratified squamous epithelium of lining mucosa is devoid of keratinized layer.
- It is associated with those parts of oral cavity which are not firmly attached to periosteum.

- These tissues are freely movable because of elastic nature of underlying lamina propria.

iii. Specialized mucosa covers

- Dorsal surface of tongue.
- This mucosal covering is keratinized and includes specialized papillae on upper surface of tongue.
- To support complete dentures, the mucosa should be firmly attached, keratinized or masticatory type.

B. Submucosa

- Submucosa is formed by connective tissue and may contain glandular, fat or muscle cells and transmits blood and nerve supply to mucosa.
- It attaches mucous membrane to underlying structures and whether this attachment is loose or firm depends on the character of submucosa.
- To support complete dentures, the submucosa should consist of resilient, fibrous connective tissues having average thickness and should be firmly attached.
- In a healthy mouth, submucosa is firmly attached to periosteum of underlying supporting bone and will usually withstand successfully the pressures of the dentures.

☞ **Note:** Mucosa is important from health standpoint and submucosa is largely responsible for support that mucous membrane affords a denture because in most instances, submucosa makes up bulk of mucous membrane.

2. Hard Palate (Fig. 2.2)

Macroscopic Anatomy

- The two palatine processes of maxillae and palatine bone form the hard palate and provide support for denture.
- The horizontal portion of hard palate lateral to midline provides primary support area for denture.
- Antero lateral and posterolateral part of hard palate act as secondary retentive areas.

Microscopic Anatomy

- Epithelium is normally keratinized.
- Submucosa contains adipose tissue anterolaterally and glandular tissue posterolaterally.

Clinical Consideration

- During final impression procedure, posterolateral part should not be compressed as it can interfere with function of glands.

3. Palatal Rugae (Fig. 2.2)**Definition**

- The irregular fibrous connective tissue ridges located in the anterior third of hard palate—GPT.

Macroscopic Anatomy

- These are mucosal folds located in anterior region of palatal mucosa.
- The palatal rugae plays an important role in speech.
- In rugae, the palate is set at angle to the residual ridge and is thinly covered by soft tissue, which resists anterior displacement of dentures. Hence it is considered as secondary stress bearing area.

Microscopic Anatomy

- It is made-up of keratinized fibrous connective tissue.

Clinical Consideration

- The rugae area should be recorded without pressure. If the tissue distorts while making the impression, it can rebound and unseat the denture.

4. Mid Palatal Raphae (Fig. 2.2)**Definition**

- The ridge of mucous membrane that marks the median line of hard palate.

Macroscopic Anatomy

- It is the area extending from incisive papilla till the posterior region of hard palate.
- This sutural joint is formed by median fusion of two maxillary processes and two horizontal plates of palatine bone.
- Function of sutural joint is growth and sometimes there will be overgrowth of sutural joint resulting in torus palatinus.

Microscopic Anatomy

- Epithelium is normally keratinized.
- Submucosa is extremely thin and practically in contact with underlying bone. Hence soft tissue covering the mid palatine raphae is non-resilient and should be relieved.

Clinical Consideration

- During final impression procedure, mid palatine raphae is relieved to avoid trauma from denture base and to prevent rocking of dentures over center of palate when vertical forces are applied to the teeth.

5. Residual Ridge (Fig. 2.1)**Definition**

- It is defined as 'the portion of the residual bone and its soft tissue covering that remains after the removal of teeth'—GPT.

Macroscopic Anatomy

- The resorption following extraction of teeth is rapid at first, but it continues at a reduced rate throughout the life.
- If the teeth have been out for many years, the residual ridge may become small and crest of ridge may lack smooth, cortical bony surface under the mucosa.
- Unlike palate, crest of alveolar ridge undergoes resorption and hence considered as the secondary supporting area, rather than a primary supporting area.
- The inclined facial surfaces of maxillary ridge provide little support and is also considered as secondary supporting area.

Microscopic Anatomy

- *Crest of residual ridge*
 - ✧ Mucosa is formed by stratified squamous epithelium which is thickly keratinized and firmly attached to underlying bone.
 - ✧ Submucosa of residual ridge is devoid of fat and glandular cells and is characterized by dense collagenous fibers that are contiguous with lamina propria.
- *Slopes of residual ridge*
 - ✧ Mucosa is formed by stratified squamous epithelium which is non-keratinized or para keratinized.
 - ✧ Submucosa contains loose connective tissue and elastic fibers. Hence this loosely attached tissue will not withstand the forces of mastication.

Clinical Consideration

- Less stress is placed on loosely attached and movable tissues during making of final impression because the final impression material in that region is close to escape ways.

6. Incisive Papilla (Fig. 2.1)

Definition

- The elevation of soft tissue covering the foramen of the incisive and nasopalatine canal—GPT.

Macroscopic Anatomy

- It is situated on a line immediately behind and between the central incisors about 8–10 mm posterior to central incisors.
- Biometric guide which gives information about location of maxillary canines. A perpendicular drawn posterior to center of incisive papilla to sagittal plane passes through canines.
- Its location varies in edentulous mouth. It lies nearer to crest of ridge as resorption progresses. Thus, the location of incisive papilla gives an indication is to the amount of resorption that has taken place.

Microscopic Anatomy

- It is a pad of fibrous connective tissue overlying the orifice of nasopalatine canal.
- It covers the incisive foramen through which the nasopalatine nerves and vessels pass.

Clinical Consideration

- During final impression procedure, care should be taken not to compress incisive papilla. It is a relief area. If not relieved, the denture will compress the blood vessels and nerves causes necrosis of distributing areas and paresthesia of anterior palate respectively.

7. Maxillary Tuberosity (Fig. 2.1)

Definition

- The most distal portion of the maxillary alveolar ridge — GPT.

Macroscopic Anatomy

- It is usually a bulbous extension of residual alveolar ridge in the second and third molar regions, terminating in hamular notch.
- The tuberosity region can hang down abnormally low when maxillary posterior teeth supra erupt due to early loss and non-replacement of lost opposing mandibular posterior teeth.
- It is considered as secondary stress bearing area as it is least likely to resorb.

Clinical Consideration

- An overhanging tuberosity may interfere with location of occlusal plane and reduces space available. It should be surgically reduced.
- Soft tissue tuberosity should be excised on both sides if present. But bony tuberosity if present should be retained on one side so that it can be used for retention of denture, etc. if patient is right side chewer we should retain that sided tuberosity.
- Teeth are not set on the maxillary tuberosity region.

8. Torus Palatinus

Definition

- Torus is defined as a smooth rounded anatomical protuberance—GPT.

Macroscopic Anatomy

- It is a hard-bony enlargement that occurs in midline of hard palate and is found in 20% of the population.

Microscopic Anatomy

- Mucous membrane covering the torus palatinus is very thin, and is easily traumatized by denture unless relief is provided.

Clinical Consideration

- The relief of torus palatinus should conform exactly to the shape of torus because on extensive relief, it will reduce the support area of denture.

9. Labial Frenum (Fig. 2.3)

Definition

- Frenum is defined as a connecting fold of membrane serving to support or retain a part—GPT.

Macroscopic Anatomy

- It is a fibrous band covered by mucous membrane that extends from the mucous lining of mucous membrane of lip to or toward the crest of residual alveolar ridge in a fan shaped fashion.
- It contains no muscle and has no action of its own.
- It inserts in a vertical direction.
- The frenum may be narrow or broad.
- It's a relief area.

Clinical Consideration

- During final impression procedure, sufficient relief should be given, if not denture impinges

on frenum and results in pain and dislodgement of denture.

- During impression procedure lip, should be stretched horizontally outwards for proper recording of frenum.
- The labial notch in the labial flange of denture must be just wide and deep enough to allow for frenum to pass through it without manipulation of lip.
- Frenectomy is indicated in cases where frenum lies close to the crest of alveolar ridge and affects the denture seal and retention.

10. Labial Vestibule (Fig. 2.3)

Definition

- The portion of the oral cavity that is bounded on one side by the teeth, gingiva, and alveolar ridge (in the edentulous mouth, the residual ridge), and on the other by the lips anterior to the buccal frenula—GPT.

Macroscopic Anatomy

- The labial vestibule is divided into left and right labial vestibule by labial frenum. Labial vestibule area extends on both sides from labial frenum to buccal frenum.
- It accommodates labial flange of denture and provides valve seal.
- The reflection of mucous membrane superiorly determines the height and thickness of labial flange depend on the degree of alveolar resorption.

Microscopic Anatomy

- Mucous of vestibular spaces is described as lining mucosa which is devoid of keratinized layer and is freely movable with tissues to which it is attached because of elastic nature of lamina propria.
- Submucosal layer is thick and contains large amount of loose areolar tissue and elastic fibers.

Muscles of Importance

- Orbicularis oris is the main muscle of lip which forms the outer surface of labial vestibule.
- The fibers of orbicularis oris muscle pass horizontally through lips anastomose with fibers of buccinator muscle.
- Tone of orbicularis oris muscle depends on support it receives from labial flange and position of teeth.
- Orbicularis oris muscle has only an indirect effect on the extent of impression and denture base as its fibers run in a horizontal direction.

Clinical Consideration

- Labial flange affects the appearance of patient. If the flange is too thick, the lips bulge out and if too thin the lips lose support and look unsupported.
- For effective border contact between denture and tissue, vestibule should be filled with impression material.

11. Buccal Frenum (Fig. 2.3)

Definition

- Frenum is defined as a connecting fold of membrane serving to support or retain a part—GPT.

Macroscopic Anatomy

- Buccal frenum extends from buccal mucous membrane reflection area to or towards slope at crest of residual ridge.
- It forms the dividing line between labial and buccal vestibules.
- It can be single, double or broad, and fan shaped.
- *Relief area.* Its reflection is in an anteroposterior direction.

Muscles of Importance

- Levator anguli oris attaches beneath frenum and hence influenced by other muscles of facial expression.
- Orbicularis oris muscle pulls the buccal frenum forwards.
- Buccinator muscle pulls the buccal frenum backwards.

Clinical Consideration

- During final impression procedure, buccal frenum should be given sufficient relief and manipulated to mimic its function during chewing, smiling, etc. If not recorded in function results in dislodgement of denture during function.
- Frenectomy may be necessary if frenum is attached close to crest of alveolar ridge.

12. Buccal Vestibule (Fig. 2.3)

Definition

- The portion of the oral cavity that is bounded on one side by teeth, gingiva and alveolar ridge (in the edentulous mouth, the residual ridge), and on

the lateral side by the cheek posterior to the buccal frenula—GPT.

Macroscopic Anatomy

- It extends from buccal frenum to the hamular notch. It is bound externally by cheek and internally by the residual ridge.
- The size of buccal vestibule varies with the contraction of buccinator muscle, position of mandible and amount of bone lost from maxilla.
- This space is usually higher than any other part of the border.
- When the mandible opens, or moves to opposite side the width of buccal vestibule is reduced.

Microscopic Anatomy

- The mucous membrane lining the buccal vestibule is like that lining the labial vestibule.

Muscles of Importance

- The size of buccal vestibule varies with contraction buccinator and masseter muscles.

Clinical Consideration

- The extent of buccal vestibule can be deceiving because the coronoid process obscures it when the mouth is opened wide. So, it should be examined with the mouth is nearly closed as possible.
- The coronoid process affects buccal flange as mandible moves forward, from side to side or opened wide. So, the distal end of buccal flange of denture should be adjusted in such a way that there is no interference to coronoid process during mouth opening. If distal end of buccal flange is too thick the coronoid process can dislodge the dentures.
- To effectively record the buccal, vestibule the mouth should be half way closed because wide opening of mouth narrows the space and does not allow proper contouring of sulcus because the coronoid process of mandible comes closer to the sulcus.

13. Hamular Notch (Pterygomaxillary Notch) (Fig. 2.1)

Definition

- The palpable notch formed by the junction of maxilla and the pterygoid hamulus of the sphenoid bone.

Macroscopic Anatomy

- It forms the distal limit of buccal vestibule and is situated between the maxillary tuberosity and hamulus of medial pterygoid plate.
- The pterygomandibular ligament attaches to the hamulus.
- Hamular notch is a narrow cleft of loose connective tissue approximately 2 mm is extent antero-posteriorly.
- Pterygomandibular raphe extends from hamulus to top inside back corner of retromolar pad in mandible.

Microscopic Anatomy

- The mucous membrane of Hamulus notch consists of thick submucosa made-up of loose areolar tissue.
- Loose areolar tissue presents in the center of deep part of hamular notch can be displaced by posterior palatal border of denture to achieve pterygomaxillary seal.

Clinical Consideration

- Dentures should not be overextended beyond hamular notch because, when mouth is opened wide, the pterygomandibular raphae is pulled forward resulting in trauma of mucous membrane covering the raphe and dislodgement of dentures.
- Hamular notch is located by using T—burnisher.
- If the dentures not extended till hamular notch and border is located anteriorly near maxillary tuberosity, denture will not have any retentive properties because of absence of pterygomaxillary seal.

14. Vibrating Line (Fig. 2.2)

Definition

- An imaginary line across the posterior part of the palate marking the division between the movable and immovable tissues of the soft palate. This can be identified when the movable tissues are functioning.

Macroscopic Anatomy

- Vibrating line is an imaginary line drawn across the palate that marks the beginning of motion in soft palate when an individual says 'ah'.
- This is not a straight line from hamular notch to hamular notch but follows the contour of the distal

border of the palatal bone. At the midline, it usually passes through about 2 mm within front of the fovea palatini.

- Vibrating line is always present on the soft palate. It is not the junction of hard and soft palates.
- It is not a well-defined line and should be described as an area.
- Some authors consider the presence of two vibrating lines:
 - Anterior vibrating line
 - Posterior vibrating line
- ✦ *Anterior vibrating line:* It is an imaginary line present at the junction between immovable tissues over the hard palate and slightly movable tissues of the soft palate.
 - It can be located by:
 - ✦ Asking the patient to perform the Valsalva's maneuver (The patient is asked to close nostrils firmly and gently blow through the nose).
 - ✦ Asking the patient to say 'ah' in short vigorous bursts.
 - ✦ Anterior vibrating line takes the shape of cupid's bow.
- ✦ *Posterior vibrating line*
 - It is an imaginary line present at the junction of soft palate that shows limited movement and the soft palate that shows marked movement.
 - It also represented the junction between aponeurosis of tensor veli palatini muscle and muscular portion of soft palate.
 - It is recorded by asking the patient to say 'ah' in short but normal non-vigorous fashion.
 - Posterior vibrating line is usually a straight line. (Fig. 1.2.2)

MICROSCOPIC ANATOMY

- The submucosa in the region of vibrating line contains glandular tissue. But, as the soft palate does not rest directly on bone, the tissue for a few millimeters on either side of vibrating line can be repositioned in the impression to improve posterior palatal seal.

Clinical Consideration

- The distal end of denture should extend at least to the vibrating line. In most cases, it should end 1 to

2 mm posterior to the vibrating line to improve the posterior palatal seal.

15. Fovea Palatini (Fig. 2.2)

Definition

- Two small pits or depressions in the posterior aspect of the palate, one on each side of the midline, at or near the attachment of the soft palate to the hard palate.

Macroscopic Anatomy

- Fovea palatini are usually two in number located one on each side of midline and slightly posterior to junction of hard and soft palates.

Microscopic Anatomy

- Fovea palatini are formed by coalescence of several mucous gland ducts.

Clinical Consideration

- The denture can extend 1 to 2 mm beyond fovea palatine. The secretion of mucous glands spreads as a thin film and aids in retention of denture.
- Fovea palatini should be uncovered in patients with thick ropy saliva because the thick saliva flowing between the tissue and denture can increase the hydrostatic pressure and displace the denture.

INTERPRETATION OF MAXILLARY ANATOMIC LANDMARKS IN FINAL IMPRESSION

1. Labial frenum appears as labial notch.
2. Labial vestibule forms labial flange.
3. Buccal frenum appear as buccal notch.
4. Buccal vestibule forms buccal flange.
5. Mucous membrane reflections in labial and buccal vestibules make the impression to turn out towards lips and cheeks.
6. These reflections are smooth.
7. Residual alveolar ridge forms the alveolar groove.
8. Maxillary tuberosity produces a depression at the distal end of alveolar groove.
9. Hamular notch appears as anteroposterior groove distal to maxillary tuberosity region when extreme mouth opening is allowed is making impression.
10. If patient is asked to open wide, protrude and do lateral movements during final impression, the distobuccal flange in distobuccal vestibule will be contoured by the anterior border of coronoid process.

11. Incisive papilla appears as small round depression in the anterior region.
12. Midpalatine raphe appears as irregular groove (central groove) in the middle of the vault anteroposteriorly.
13. Rugae area appear as small grooves radiating laterally from central groove.
14. Fovea palatina appear as two small raised dots in the impression on either side of midline posteriorly.
15. At junction of hard and soft palates impression appear is smooth. But due to influence of active palatal glands at this region surface will be irregular (but not smooth), and glandular secretions will adhere to impression material.

MANDIBULAR ANATOMIC LANDMARKS

- Average denture bearing area for edentulous mandible is 14 cm².

I. Based on supporting and limiting structures

A. Supporting structures

1. Residual alveolar ridge
2. Buccal shelf area
3. Mental foramen area
4. Mylohyoid ridge
5. Genial tubercles
6. Torus mandibularis

B. Limiting or peripheral structures

1. Labial frenum
2. Labial vestibule
3. Buccal frenum
4. Buccal vestibule
5. Lingual frenum
6. Mylohyoid muscle
7. Retromylohyoid fossa
8. Sublingual gland region
9. Alveolingual sulcus
10. Retromolar pads

II. Based on function

A. Stress bearing areas

1. *Primary*: Buccal shelf area
2. *Secondary*: Slopes of residual alveolar ridge

B. Relief areas

1. Crest of residual alveolar ridge
2. Labial frenum
3. Buccal frenum

4. Lingual frenum
5. Mental frenum area
6. Genial tubercles
7. Torus mandibularis

1. Residual Alveolar Ridge (Fig. 2.6)

Definition

- Refer maxillary anatomic land marks.

Macroscopic Anatomy

- Because of the direction and inclination of teeth and alveolar process, the maxillae resorb upward and inward to become progressively smaller and mandible resorb downwards and outwards to become progressively wider recording to its edentulous age. Hence many edentulous patients appear prognathic.
- Many edentulous mandibles become extremely flat with a concave denture bearing surface, allowing the attaching structures especially on lingual side of ridge to fall over on to the ridge surface.

Microscopic Anatomy

- Crest of residual alveolar ridge is covered by a keratinized layer and is firmly attached by its submucosa to the periosteum of mandible in healthy mouths. In some people submucosa is loosely attached to bone and soft tissues are quite movable. But the underlying bone is cancellous.
- The slopes of residual ridge have thin plate of cortical bone. But slopes are steep and at an acute angle to occlusal forces. Hence it is considered as secondary stress bearing area.

Clinical Consideration

- When soft tissues over residual alveolar ridge are movable, they must be registered in their resting position in the final impression.

2. Buccal Shelf Area (Fig. 2.6)

Macroscopic Anatomy

- The area between the mandibular buccal frenum and the anterior edge of masseter muscle is called as *buccal shelf area*.
- Boundaries of buccal shelf area
 - ✧ *Anteriorly*—Buccal frenum
 - ✧ *Posteriorly*—Retromolar pad

- ✧ *Medially*—Crest of residual ridge
- ✧ *Laterally*—External oblique ridge
- The width of bony foundation in buccal shelf area increases with resorption because width of inferior border of mandible is greater than the width at alveolar process.
- Buccal shelf area is considered as primary stress bearing area for lower denture because:
 - ✧ Bone of buccal shelf area is covered by a layer of dense and smooth cortical bone.
 - ✧ Buccal shelf area lies at right angles to vertical occlusal forces.

Microscopic Anatomy

- Mucous membrane covering buccal shelf area is more loosely attached and less keratinized than mucous membrane covering crest of lower residual ridge.
- It contains thicker submucosal layer.

Muscles of Importance

- The inferior part of buccinator muscle is attached to buccal shelf area but fibers run in anterior posterior direction, so does not interfere with the function of dentures.

Clinical Consideration

- It is advisable to extend the impression beyond external oblique ridge.

3. Mental Foramen Area

Anatomy

- It usually lies between first and second premolar region.
- When the ridge is extremely resorbed, mental foramen will come to lie closer to crest of alveolar ridge.
- Pressure on mental nerve which passes through mental foramen can cause numbness of lower lip. Hence relief should be provided in mental foramen area.

4. Mylohyoid Ridge (Fig. 2.4)

Definition

- An oblique ridge on the lingual surface of mandible that extends from level of roots of the last molar teeth and that serves as a bony attachment for the mylohyoid muscles forming the floor of mouth—GPT.

Anatomy

- It is a bony ridge found on the lingual aspect of mandible which starts from last molar tooth at level of roots and slopes downward and forwards.
- Anteriorly it lies close to inferior border of mandible and posteriorly it often lies flush with superior surface of residual ridge after resorption.

Clinical Consideration

- A thin and sharp mylohyoid ridge can irritate the soft tissues on denture placement. So, it may be corrected surgically (or) relief must be given.

5. Genial Tubercles

Definition

- Mental spines; rounded elevations (usually two pairs) clustered around the midline on the lingual surface of the lower portion of the mandibular symphysis. These tubercles serve as attachments for the genioglossus and geniohyoid muscles.

Macroscopic Anatomy

- Usually seen below the crest of ridge on the lingual surface of lower portion of mandibular symphysis.
- In severely resorbed ridges genial tubercles become prominent may lie on crest of residual ridge and hence it should be relieved.

Microscopic Anatomy

- Mucosa covering the genial tubercles is thin and tightly adherent to underlying bone.

Clinical Consideration

- Failure to relieve genial tubercles results in ulceration of soft tissues present over genial tubercles.

6. Torus Mandibularis

Definition

- Torus is defined as a smooth rounded anatomical protuberance.

Macroscopic Anatomy

- It is commonly located bilaterally and lingually near the first and second pre-molars, midway between soft tissues of floor of mouth and crest of the ridge.
- In edentulous patients with considerable resorption, the superior border of torus may be in flush with crest of residual ridge.