DEVELOPMENTAL DISTURBANCES IN SIZE OF TEETH :

MICRODONTIA — Teeth which are smaller than normal.

Types:
1. True generalized 2. Microdontia Involving Single tooth 3. Relative Generalized

True Generalized

All teeth are smaller than normal

Microdontia Involving Single tooth

Only single tooth is smaller, most common seen in maxillary lateral incisor.

Relative Generalized — Tooth are slightly smaller or normal but the presenting jaw are larger than the normal.

MACRODONTIA — Teeth which are larger than normal

Types:
1. True generalized 2. Macrodontia Involving Single tooth 3. Relative Generalized

True Generalized — All teeth are larger than normal

Relative Generalized

Teeth are slightly large or normal but presenting jaw are smaller than normal

Macrodontia Involving Single tooth

Only single tooth is larger than other teeth.

DEVELOPMENTAL DISTURBANCES IN NO. OF TEEH :

ANODONTIA — Refers to total lack of tooth development

Types:
1. True Anodontia 2. False Anodontia

True Anodontia

True Partial involves one or more teeth

True total involves complete absence of teeth

False Anodontia — It is the result of extraction of all teeth.

SUPERNUMERARY TEETH

It is additional entity to the normal series and is seen in all the quadrants of the jaw. **Types** : Conical, Tuberculate, Supplemental, Odontome

PREDECIDOUS DENTITION (Natal Teeth)

It is a hornified epithilial structures without roots occurring on the gingiva over the crest of the ridge which may be easily removed and appear to be erupted at time of birth

POST PERMANENT DENTITION — Refers to permanent teeth which have been extracted and yet presents subsequently erupted several more teeth, particularly after the insertion of a full denture.

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Cementum

DEFINITION: Cementum is a specialized, calcified tissue of mesodermal origin covering anatomic Root of human tooth.

INTRODUCTION : • **Cementum is the mineralized dental tissue covering the anatomic roots of the human teeth.**
• **It Begins at cervical portion of the tooth at the CEJ and continuous to the apex.**
• **It furnishes a medium for attachment of the fibers that bind the tooth to the surrounding structure.**

PHYSICAL CHARACTERISTICS : • **Cementum is less harder than dentin.** • **Cementum is light yellowish in color and lighter than dentin. It can be distinguished from enamel by its lack of luster and darker hue.**
• **Under some experimental conditions cementum has been shown to be permeable to a variety of materials.**

CEMENTOGENESIS

Cementum formation in the developing tooth is preceded by the deposition of dentin along the inner aspect of Hertwig's epithelial root sheath.

cementoid

CEMENTOBLAST : Soon after Hertwig's sheath breaks up, undifferentiated mesenchymal cells from adjacent connective tissue differentiate in to cementoblasts. Cementoblasts synthesizes collagen protein polysaccharides which make up the organic matrix of cementum.

CEMENTOID TISSUE : • ***Under normal condition growth of the cementum is a rhythmic process. As a new layer of cementoid is formed, the old one calcifies. A thin layer of cementoid tissue is always seen on the surface of cementum. The cementoid tissue is lined by cementoblasts***

SHARPEY'S FIBERS •**Connective tissue fibers from PDL pass between the cementoblasts into the Cementum.** •These fibers are known as " **SHARPEY'S FIBERS**"•They are embedded in the cementum & serve as an attachment for the tooth to surrounding bone

ACELLULAR CEMENTUM: Acellular cementum covers the root dentin from CEJ to the apex but often missing on apical third of root. Cementum is thinnest at the CEJ (20-50μm) Cementum is thickest towards root apex.

CELLULAR CEMENTUM

Mostly presents at the apical third of root. Cells included in cellular cementum are cementocytes, similar to osteocytes. They lie in spaces designated as lacunae. Cell body has shape of plum stone, with numerous long processes known as canaliculli. Most of the processes are directed towards the periodontal surface of the cementum.

•Both cellular and acellular cementum are separated by incremental lines into layers, which indicate periodic formation.
•Incremental lines can be best seen in decalcified Specimen prepared for light microscopic observation.

CEMENTOENAMEL JUNCTION : (1) 30% - meet at sharp line (2) 60% - cementum overlaps the cervical end of enamel for a [illegible] - no CEJ but a zone of root devoid of cementum covered by enamel epithelium.

FUNCTION : ***(1) The primary function of cementum is to furnish a medium for the attachment of collagen fibers*** **(2)To compensate by its growth for loss of tooth substance due to occlusal wear. (3)Cementum serves as the major reparative tissue for root surface.**

Anatomic repair: In anatomic repair there is tendency to reestablish former outline of the root surface. It occurs by formation of acellular and/or cellular Cementum.

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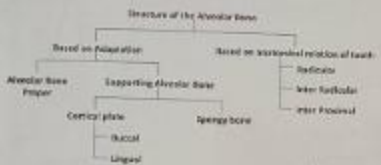
BONE : Bone is a living and growing tissue. It is specialized, porous and mineralized connective tissue structure.

ALVEOLAR BONE : Defined as the part of maxilla and mandible that supports and forms the socket of the teeth



ALVEOLAR BONE PROPER

It consist of- partly lamellated bone And partly bundle bone

a)Lamellated bone- it contains osteon each of which has a blood vessels in a haversian canal. Some lamellae are arrangent parallel to the surface of adjacent bone and others form haversian canal.

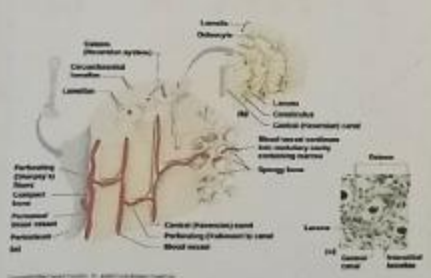
b)Bundle bone:- it is term applied to that portion of inner alveolar wall which gives attachments to the PDL fibers and into which Sharpey's fibers are attached. It is characterized by the acidity fibrils in intercellular substance radiographically referred as Lamina Dura

2)Supporting alveolar bone:-

Consist of two parts:-

a)Cortical plates: It is the external compact covering of alveolar process. It is thicker in mandible than maxilla. It is more posteriorly. It is porous in mandible and dense in maxilla.

b) Spongy bone: It is the cancellous bone with presence of cancellous bone trabeculae, lying between cortical plate and alveolar bone proper. Trabeculae surround marrow spaces and duplex nutrition from it. Haversian canal are infrequent.



ALVEOLAR BONE

FUNCTIONS

1)Houses the root of teeth
2)Anchors the teeth with help of Sharpey's fibers
3)Helps to move teeth for better Occlusion
4)Absorb and distribute occlusal forces
5)Supplies the blood to PDL
6)Organizes and manner eruption of teeth
7)Houses and protect permanent developing teeth, while supporting primary teeth

AGE CHANGES :-

In elder individuals:-
-Alveolar radiant appear jagged and uneven.
-Marrow spaces have fatty infiltrations.
-Alveolar process in edentulous jaws decreases in size.
-Loss of medullary bone is overcompensated by increase in the size of medullary sinus
-Normal trabecular arrangement is more open, which indicates bone loss
-The distance between the crest of alveolar bone and CEJ increase with age approximately by 2.81mm

CLINICAL CONSIDERATIONS:

> "The Lamina Dura" is the most important diagnostic landmark in determining health of periapical tissues.
> Discontinuity and loss of density is usually due to infection in periapical tissue
> Bone is resorbed on the side of pressure and apposed on the side of tension. thus entire alveolus is allowed to shift with the tooth.
> The most harmful change in the alveolar process is associated with periodontal disease:- bone loss horizontal or vertical fenestration or dehiscence.
> Disappears gradually after tooth is lost Bone grafts and implants:-
*Autograft
*Allograft
*Xenograft
> Non bone graft material Requires functional stimuli to maintain bone mass
> Increase functional forces → formation of new bone
> Decrease functional forces → loss of bone volume

PERMENANT MAXILLARY SECOND MOLAR

INTRODUCTION

- THE MAXILLARY SECOND MOLAR SUPPLEMENTS THE FIRST MOLAR IN FUNCTION.
- THE DISTOBUCCAL CUSP IS NOT AS LARGER OR AS WELL DEVELOPED, AND THE DISTOBUCCALCUSP IS SMALLAR.
- NO FIFTH CUSP EVIDENT.

BUCCAL ASPECT

- CROWN IS SHORTER CERVICO-OCCLUSALLY AND NARROWER MESIODISTALLY THAN IS THE MAXILLARY FIRST MOLAR.
- THE DISTOBUCCAL CUSP IS SMALLER AND ALLOWS PART OF THE DISTAL MARGINAL RIDGE AND PART OF THE DISTOLINGUAL CUSP TO BE SEEN.
- THE BUCCAL ROOTS ARE ABOUT THE SAME LENGTH.THESE ROOTS ARE MORE NEARLY PARALLEL AND INCLINED DISTALLY.
- DISTOBUCCAL ROOT IS SLIGHTLY DISTAL TO THE DISTAL EXTREMITY OF THE CROWN.
- THE APEX OF THE MESIOBUCCAL ROOT IS ON A LINE WITH THE BUCCAL GROOVE OF THE CROWN.

LINGUAL ASPECT:

- THE DISTOLINGUAL CUSP OF THE CROWN IS SMALLER THEN THE FIRST MOLAR.
- THE DISTOBUCCAL CUSP MAY BE SEEN THROUGH THE SULCUS INTEWEEN THE MESIOLINGUAL AND DISTOBUCCAL CUSP.
- THE APEX OF THE LINGUAL ROOT IS IN LINE WITH THE DISTOLINGUAL CUSP TIP INSTEAD THE LINGUAL GROOVE AS WAS FOUND ON THE FIRST MOLAR.

DISTAL ASPECT

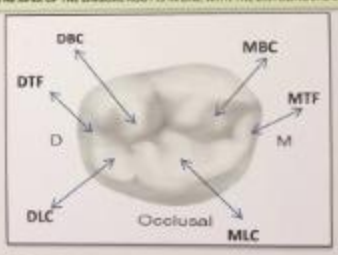
- BECAUSE THE DISTOBUCCAL CUSP IS SMALLAR IN THE MAXILLARY SECOND MOLAR THAN THAT IN THE FIRST MOLAR, MORE OF THE MESIOBUCCAL CUSP MAY BE SEEN FROM THIS ANGLE.
- THE MESIOLINGUAL CUSP CAN NOT BE SEEN.
- THE APEX OF THE LINGUAL ROOT IS IN LINE WITH THE DISTOLINGUAL CUSP.

MESIAL ASPECT

- THE BUCCOLINGUAL DIMENSION OF THE SECOND MOLAR IS ABOUT THE SAME AS THAT OF THE FIRST MOLAR BUT THE CROWN LENGTH IS LESS.
- THE ROOTS DO NOT SPREAD AS FAR BUCCOLINGUALLY BUT ARE WITHIN CONFINES OF THE BUCCOLINGUAL CROWN OUTLINE.

OCCLUSAL ASPECT

- THE RHOMBOIDAL TYPE OF SECOND MAXILLARY MOLAR IS MOST COMMON, ALTHOUGH IN COMPARISON WITH THE FIRST MOLAR, THE ACUTE ANGLES OF THE RHOMBOID ARE LESS AND THE OBTUSE ANGLES GREATER.
- THE BUCCOLINGUAL DIAMETER OF THE CROWN IS ABOUT EQUAL, BUT MESIODISTAL DIAMETER IS APPROXIMATELY 1MM LESS THEN 1ST MOLAR.
- THE MESIOBUCCAL AND MESIOLINGUAL CUSP ARE JUST AS LARGE AND WELL DEVELOPED AS IN THE FIRST MOLAR, BUT THE DISTOBUCCAL AND DISTOLINGUAL CUSPS ARE SMALLER AND LESS WELL DEVELOPED.
- MORE CONVERGENCE DISTALLY IS SEEN THAN IN THE MAXILLARY FIRST MOLAR.



CERVICO OCCLUSAL LENGTH OF CROWN (MM)	LENGTH OF ROOT (MM)	MESIODITAL DIAMETER OF CROWN (MM)	MESIODISTAL DIAMETER OF CROWN (MM)	BUCCOLINGUAL DIAMETER OF CROWN (MM)	BUCCOLINGUAL DIAMETER OF CROWN AT CERVIX (MM)
7.0	BUCCAL=13 LINGUAL=12	9.0	7.9	11.8	10.00

- FIRST EVIDENCE OF CALCIFICATION : 2.5 YR
- ENAMEL COMPLETED : 7-8 YR
- ERUPTION : 12-13 YR
- ROOT COMPLETED : 14-16 YR

GUIDED BY : DEPARTMENT OF ORAL PATHOLOGY AND MICROBIOLOGY

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1 ST YEAR BATCH:2014-15

PERMANENT MAXILLARY CENTRAL INCISOR

The permanent maxillary incisor are 4 in numbers.The maxillary central incisor is the widest mesiodistally of any of the anterior teeth.

Chronology

First Evidence of Calcification	3 -4 months
Enamel Completed	4-5 year
Eruption	7-8 year
Root Completed	10 year

Measurement Table

Cervicoincisal Length of Crown	Length of Root	Mesiodistal Diameter of Crown	Mesiodistal Diameter of Crown at Cervix	Labio-or Buccolingual Diameter of Crown	Labio-or Buccolingual Diameter of Crown at Cervix	Curvature of Cervical Line -Mesial	Curvature of Cervical Line-Distal
10.5 mm	13.0 mm	8.5 mm	7.0 mm	7.0 mm	6.0 mm	3.5 mm	2.5 mm

Labial Aspect

- The mesial outline of the crown is only slightly convex , with the crest of curvature approaching the mesiodistal angle.
- The distal outline of the crown is more convex then the mesial outline ; with the crest of curvature higher towards the cervical line.
- The incisal outline is usually regular and straight in a mesiodistal direction after the tooth has been in function long enough to obliterate the mamelons.
- The labial surface is marked by two developmental grooves.

Lingual Aspect

- Lingual topography gives scoop like form to the crown.
- The lingual outline of maxillary central incisor is reverse of that found on the labial aspect.
- The lingual aspect has convexities and concavities.
- Below the cervical line a smooth convexity is to be found this is called CINGULUM.
- Between the marginal ridges , below cingulum a shallow concavity is present called the LINGUAL FOSSA.

Incisal Aspect

- The labial surface of the crown appears broad and flat in comparison with lingual surface.
- The mesiolabial and distolabial angles are prominent from the incisal aspect.
- The crown of this tooth shows more bulk from the incisal aspect than one would expect from viewing it from the mesial or distal aspect.
- Bilaterally , the outline of the incisal aspect is rather uniform.
- A view of the crown from incisal aspect super imposes it over the root entirely so that the root is not visible.

The Root

- The root of the central incisor is cone shaped.
- The apex of the root is bluntly rounded.
- The lingual portion of the root is narrower than the labial portion.
- At the level of the cervical line , the shape of the canal is triangular but becomes circular at the middle level of the tooth.

Mesial Aspect

- The crown is wedge – shaped or triangular.
- The incisal ridge of the crown is on a line with the centre of the root. This is special feature of central maxillary incisor.
- The crests of contour gives the crown its greatest Labio-Lingual measurement.
- The cervical curvature is greater on the mesial surface of this tooth than on any other surface.
- The root of this tooth from mesial aspect is cone shaped and the apex of the root is usually blunt.

Distal Aspect

- The crown is thicker towards incisal third.
- Because of the slope of labial surface disto-lingually , that surface is seen from distal aspect, this creates the illusion of greater thickness.
- The curvature of the cervical line outlining the CEJ is less in extent on the distal than on the mesial surface.

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Permanent Mandibular lateral incisor

Introduction

Resembles mandibular central incisor closely than direct

comparison is made with MC1

The 2 incisors i.e. central & lateral operate in the dental

arch as a team

Thus their functional form is related Compared to MC1 the shape of ML2 is uniform

Rarely will it have a labial & lingual root division

in the cervical 3rd

ML1 is somewhat larger but generally speaking, its form

closely resembles the MC1

Also called second incisors

LABIAL ASPECT:-

The lateral incisor looks like the central incisor in

overall appearance but is slightly larger and not bilaterally symmetric.

Whereas the central incisor has a level incisal edge, the

incisal edge of the

lateral declines toward the distal and

forms a rounded incisal angle with the distal side.

The distal side is slightly convex.

The lateral incisal angle is sharp, the mesial side can be

straight or slightly convex as it tapers toward the cervical line.

Both the mesial and distal contact areas are at the incisal angle.

The cervical line forms a narrow arch.The root is

straight, tapering at the apical third

Lingual aspect

The characteristics of this surface are:

An outline that is the reverse of the labial side.

Cingulum, fossa and ridges that appear the same as those

on the central incisor

Except for size and length, the mandibular lateral incisor is

similar to the central incisor and has the same characteristics.

However, the cingulum is distally displaced as it starts to

curve toward the centre

Table: 7.3
Mandibular Lateral Incisor

Tooth evidence of calcification					3 to 4 mo			
Enamel completed					4 to 5 yr			
Eruption					7 to 8 yr			
Root completed					10 yr			
MEASUREMENT TABLE								
	CERVICAL MESIAL LENGTH OF CROWN	LENGTH OF ROOT	MESIODISTAL DIAMETER OF CROWN	MESIODISTAL DIAMETER OF CROWN AT CERVIX	LABIO OR BUCCO LINGUAL DIAMETER OF CROWN AT CERVIX	LABIO OR BUCCO LINGUAL DIAMETER OF CROWN AT INCISAL THIRD	CURVATURE OF CERVICAL LINE MESIAL	CURVATURE OF CERVICAL LINE DISTAL
Dimensions suggested by various technique	9.5	14.0	5.5	4.9	6.1	5.8	3.0	2.9

Proximal aspect:-

The mesial side of the crown is often longer than the distal side causing the incisal ridge to slope downward in a distal direction. The distal contact area is more toward the cervical than the mesial contact area.

Except for size, no marked difference is seen between the mesial & distal surfaces.

Even the curvatures of cervical line are similar in extent.

A tendency exists toward a deeper concavity immediately above the cervical line on the distal surface.

Root form is similar to that of the central incisor.

Incisal aspect

The incisal edge of the lateral incisor curves toward the

distal, following the outline of the mandibular arch.

Whereas the incisal edge of the central incisor is straight.

The curvature on the lateral incisor creates a distally

displaced cingulum as compared to the centrally situated

cingulum of the central incisor.

This overlap occurs in distinguishing the two teeth from

each other.

ROOT:

- Root is wider, thicker, little longer.
- Longitudinal grooves are more common.
- Variation of root is common.

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ORAL EXFOLIATIVE CYTOLOGY

Definition : It is Study of Cells Exfoliated from the Oral Cavity

Recommended for

1. Detection of Malignant Cells.
2. Detection of Precancerous Cervical Lesions In Women.
3. Assessment of female hormonal status in case of sterility and endocrine disorders.
4. Detection of Genetic Sex.
5. Detection of The Presence of Infectious Micro organisms.

PAPANICOLAOA METHOD (PAP)

Steps of Staining Procedure :-

1. Fixation:- 95% Ethyl Alcohol
2. Nuclear Staining :- By Using Hematoxylin Stain And Alcohol or 0.05% Aqueous Solution of KCL Azo blue
3. Cytoplasmic Staining :- Eosin Azo G-44 And Ex-36
4. Dehydration :- Rinse The Smear In Absolute Alcohol
5. Clearing :- Alcohol Is Being Replaced By Xylene
6. Mounting of Slide :- Mounting Media with Clearing Agent Prevent Fading of The Stain.

INSTRUMENTATIONS

- Glass microscopic slides
- Glass marking pencil
- Cotton tip applicator or wooden spatula
- Fixative
  a. Cold wax – Polyvinyl glycol
  b. 70% Alcohol c. Ether alcohol
- Cover glass
- DPX mounting media

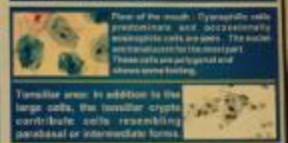
Smear Usually Divided into 5 Classes

- Class I (Normal) :- Only Normal Cell Were Observed.
- Class II (Atypical) :- Indicate Presence of Atypia But No Malignant Changes.
- Class III (Indeterminate) :- This Is An In Between Cytology That Separates Cancer From Non Cancer Diagnosis.
- Class IV (Suggestive of Cancer) :- Few cell With In Malignant Characteristic and Many cells With Border Line Characteristic.
- Class V (Positive For Cancer) :- They are Obviously Malignant

Appearance of cells in relation to location :

(location is important)

1. Lip – Mature cells
2. Hard palate – High degree of cornification and some cells are anucleate.
3. Gingiva & Dorsal tongue – Intermediate maturity composed of varying percentage of basophilic & acidophilic staining cells.
4. Buccal and Labial Floor of mouth, ventral tongue, soft palate & oropharynx – Latest maturity predominantly basophilic cells.



Method

- First Collect The Debris And Mucin From The Lesion
- This Can Be Done With The Help Of Metal Cement Spatula
  Wooden Tongue Blade and Cyto brush
- This Collected Material Quickly Spread Evenly Over Microscopic Slide
- Fix Immediately Before Dry
- Wet fix Such as Spray Cyte 95% Alcohol, Equal Part Of Alcohol and ether
- It Should Be Allow To Stand For 30 Mins In Air Dry

Staining Method in Cytology

- Papanicolaou Staining Method
- Rapid Papanicolaou Staining
- Hematoxylin and Eosin Staining Method
- Method: Gronwall Gomise Staining Method
- Most Routinely Used Method Is Papanicolaou Method.

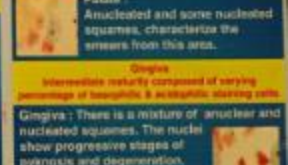
NORMAL APPEARANCE OF ORAL EPITHELIAL CELLS

Basal cells:
Well defined round nuclei. Rarely seen in the normal oral Mucosa smears.

Parabasal Cells:
The nuclei are round with well Defined nuclear membrane and Evenly distributed chromatin.

Intermediate cells:
The nuclei are slightly smaller than Those of parabasal cells but are still translucent. Appears in oral mucosal smears if vigorous scrapping done

Superficial cells:
The nuclei are smaller than in intermediate Cells and are usually translucent. Predominate in the smears of oral Mucosa.



Floor of the mouth : Eosinophilic cells predominate and occasionally eosinophilic cells are seen. The nuclei are translucent for the most part. These cells are polygonal and shows some folding.

Tonsillar area: In addition to the large cells, the tonsillar crypts contribute cells resembling parabasal or intermediate forms.

Hard palate – High degree of cornification and some cells are anucleate

Palate :
Anucleated and some nucleated squames, characterize the smears from this area.

Gingiva
Intermediate maturity composed of varying percentage of basophilic & acidophilic staining cells.

Gingiva : There is a mixture of anuclear and nucleated squames. The nuclei show progressive stages of pyknosis and degeneration. The cytoplasm ranges from orange to eosinophilic. The cells are irregular and occasionally folded

It is Useful In Diagnosis of

- Herpes Simplex
- Herpes Zoster
- Pemphigus Vulgaris
- Benign Familial Pemphigus
- Keratosis Follicularis
- Hereditary Benign Intraepithelial Dyskeratosis
- White Sponge Nevus
- Pernicious and Sickle Cell Anemia

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3rd Year (2011-12)

DEVELOPMENTAL DISTURBANCES IN SHAPE OF TEETH :

GEMINATION

The anomalies which arise from an attempt at division of single tooth germ by an invagination with resultant incomplete formation of two teeth.

FUSION

The union of two normally separated tooth buds with the resultant formation of a joined tooth with confluence of dentin.

CONCRESCENCE

The union of two teeth by cementum without confluence of the dentin.

DILACERATION

It is abnormal angulation or bend in the root.

TALON CUSP

It is an anomalous structure resembling an eagle's talon, projects lingually from the cingulum area of a maxillary or mandibular permanent incisor.

DENS IN DENTE

Deep surface invagination of the crown or root that is lined by enamel.

DENS EVAGINATUS

Cusp like elevation of enamel located in the central groove or lingual ridge of permanent premolar or molar teeth.

TAURODONTISM

It is a peculiar dental anomaly in which the body of tooth is enlarged at the expense of the roots.

SUPERNUMERARY ROOTS :

Refers to the development of an increased number of roots on a tooth compared with that classically described in dental anatomy.

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Oral Mucous Membrane : Keratinized and Non Keratinized Epithelium

The moist lining of GIT, nasal passage and other body cavities that communicates with exteriors is Known as Mucous Membrane. Mucous membrane that lines the oral cavity is known as Oral Mucous Membrane

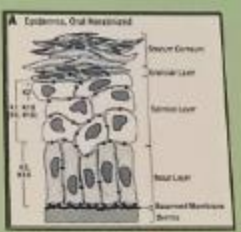
OMM is classified on the basis of:- ***a)LOCATION*** **b)FUNCTION** **c)KERATINISATION**

OMM [KERATINIZATION] :- ***1)KERATINIZED – a)ORTHO & b)PARA*** **2)NON-KERATINIZED**

The **KERATINISED EPITHELIUM** has various cell layers :- **1)STRATUM BASALE 2)STRATUM SPINOSUM 3)STRATUM GRANULOSUM 4)STRATUM CORNEUM**

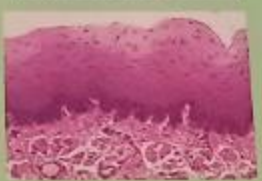
STRATUM BASALE

- The layers are named from their morphologic appearance
- Single cell is at times a pot of each layer.
- After mitosis, cell may remain in basal layer or may migrate upward.
- After reaching the surface , it sheds off-DESQUAMATION.
  TURN OVER TIME- Time taken for the cell to divide and pass through entire epithelium.
- Process of cell migration from basal layer to surface is called MATURATION.
- The stratum basale is a single layer of cuboidal cells present above basement membrane.
- The cell layer consists of progenitor & maturing cell population which appear same morphologically.
- Basal and parabasal spinous cell layer is known as STRATUM GERMINATIVUM.
- 2 cell populations are present :-
  1)SERRATED - heavily packed with tonofilaments which are adaptation for attachment.
  2)NON-SERRATED - composed of slowly cycling stem cells.
- Certain transmembranous proteins are also present – DESMOGLEIN & DESMOCOLLEIN.



STRATUM SPINOSUM (PRICKLED CELL LAYER)

- It is a 15-22 layer of polyhedral cells.
- On light microscopy, it appears that cells are joined by intercellular bridges.
- Tonofibrils course from cell to cell across these bridges.
- Tonofilament & desmosomes give tensile strength.
- Shrinkage of cells during histologic preparation & desmosomes attachments together are responsible for prickled appearance(ACANTHE).
- FUNCTION – Synthesis of proteins more active than other layers.



STRATUM GRANULOSUM

- This layer consists of flatter & wider cells above prickle cell layer.
- It is named for basophilic keratohyaline granules.
- ODLAND BODY/KERATINOSOME/MEMBRANE COATED GRANULES forms in upper spinous layer and in granular layer.
- These are glycolipids.

STRATUM CORNEUM

- Composed of flat dehydrated cells (squamae).
- Cells only have tonofilaments surrounded by filiagrin and are eosinophilic.
- Keratinisation or absence of nucleus is called ORTHO KERATINISATION.
- If cell retain shrunken/pyknotic nucleus then it is termed as PARAKERATINISATION.

Non-keratinising epithelia differ from keratinising epithelia primarily because they do not produce a cornified surface layer.

The NON-KERATINISED EPITHELIUM consists of 3 layers :- 1)STARTUM BASALE 2)STRATUM INTERMEDIUM 3)STRATUM SUPERFICIALE

STRATUM BASALE

- It is a single layer of cuboidal cells.
- It is a site of cell division.
- It is made of 2 different types of cells – PROGENITOR & MATURING CELL.
- Tonofilaments are present.

STRATUM INTERMEDIUM

- Cells of stratum intermedium are larger than spinous layer.
- It is several cell thick.
- Tonofilaments are dispersed & thick.
- Cells are larger, round & plump or with few and less organized tonofilaments.
- ODLAND BODIES appear in upper part of this layer(200nm),circular with amorphous core(no lamellae),***but no prickly appearance.***
- These granules may have similar function but contents have different lipid composition & do not form an effective permeability barrier.

STRATUM SUPERFICIALE/STRATUM DISTENDUM

- It contains nucleated cells.
- Lack keratohyaline granules.
- It reflects mechanical flexibility.
- There are more number of flattened cells.
- Cells are not dehydrated thus form a surface that flexible and tolerant to compression & distention.

GUIDED BY DEPARTMENT OF ORAL PATHOLOGY AND MICROBIOLOGY PREPARED BY ANVI SHAH, BRIJESHA SOLANKI, SAURABH SHRIMALI, SHRUTI SHETH, PRATHNA SHARMA (FIRST BDS , B

Permanent Maxillary 1st Premolar

Introduction

- Premolars are anterior to the molars in the permanent dentition.
- They are total 8 in number ; 2 in each quadrant.
- They are mainly used for grinding purpose.
- The buccolingual dimension of the crown is greater than the mesiodistal dimension.

Buccal Aspect

- Mesial outline of the crown is slightly concave from the cervical line to the mesial contact area.
- Distal outline of the crown below the cervical line is straighter as compared to mesial outline.
- Mesial slope of the buccal cusp is rather straight and longer than distal slope.

Chronology

- First evidence of calcification : 1.5 to 2.0 yrs
- Enamel completed : 5 to 6 yrs
- Eruption : 10 to 11 yrs
- Root completed : 12 to 13 yrs

Mesial Aspect

- The mesial aspect of the crown of the maxillary first premolars is roughly trapezoidal.
- There is a marked depression called mesial developmental depression.
- Mesial marginal developmental groove is contribute with the conical groove of occlusal surface and crossing the marginal ridge.

Lingual Aspect

- The crown tapers towards the lingual because the lingual cusp is narrower mesiodistally than the buccal cusp
- Lingual cusp is shorter than buccal cusp so the mesial and distal slopes and cusp tip of buccal cusp may be seen from the lingual aspect.

Occlusal Aspect

- Roughly hexagonal and wider on the buccal than on the lingual.

Root

- The roots are 3 or 4 mm shorter than those of maxillary canine.

Distal Aspect

- It is similar to mesial aspect.
- A deep developmental groove crossing the distal marginal ridge of the crown is not evident.
- The curvature of the cervical line is less on the distal than on the mesial surface.

	Cervico-occlusal length of crown	Length of root	Mesio-distal diameter of crown	Mesiodistal diameter of crown at cervix	Labio-lingual diameter of crown	Labio-lingual diameter of crown cervix	Curvature of cervical line - mesial	Curvature of cervical line - distal
ensions	8.5	14.0	7.0	5.0	9.0	8.0	1.0	0.0

Guided by : Department of Oral Pathology and Microbiology

ared by : Dhara Chaudhary , Bhakti Daxini , Hetashvi Dave , Shivak[illegible]hi Desai , Karthik Dhinoja [1st BDS, Batch -2014-2

PREMALIGNANT CONDITIONS

THE PREMALIGNANT CONDITION IS DEFINED AS GENERALIZED STATE OF BODY, WHICH IS ASSOCIATED WITH SIGNIFICANTLY INCREASED RISK OF CANCER.

1) Oral Sub Mucous Fibrosis (OSMF)

2) Syphilis (Lues)

3) Oral Lichen Planus (OLP)

4) Dyskeratosis Congenita (Zinsser-Cole-Engman Syndrome)

5) Sideropenic Dysphgia (Plummer-Vinson Syndrome)

6) Discoid Lupus Erythematosus

3rd YEAR

GUIDED BY : DEPARTMENT OF ORAL PATHOLOGY & MICROBIOLOGY

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YEAR 2014-15

SELF-DETECTION OF ORAL CANCER

IN ITS VERY EARLY STAGES, MOUTH CANCERS CAN BE EASILY IGNORED.
YOU CAN IMPROVE YOUR CHANCES OF SURVIVAL IF THE CANCER IS DETECTED EARLY AND TREATED RAPIDLY

LUMP BEHIND MOLARS

BUCCAL MUCOSA

DIFFICULTY IN OPENING MOUTH

HARD PALATE

A PATIENT SHOULD CHECK FOR

- A SORE IN THE MOUTH THAT DOES NOT HEAL WITHIN THREE WEEKS.
- A LUMP OR OVERGROWTH OF TISSUE ANY WHERE IN THE MOUTH.
- A WHITE OR RED PATCH ON THE GUMS, TONGUE, OR LINING OF THE MOUTH.
- A FEELING THAT SOMETHING IS CAUGHT IN THE THROAT.
- A CHRONIC SORE THROAT OR HOARSE VOICE THAT PERSISTS EVEN AFTER CONSERVATIVE TREATMENT MEASURES.
- DIFFICULTY IN CHEWING OR SWALLOWING.
- DIFFICULTY IN MOVING THE JAW OR TONGUE.
- NUMBNESS OF THE TONGUE OR OTHER AREAS OF THE MOUTH.
- SWELLING OF THE JAW THAT CAUSES THE DENTURES TO FIT POORLY OR BECOME UNCOMFORTABLE.

ULCER ON TONGUE

SWELLINGS

WHITE PATCH

LIP-CANCER

(STEPS FOR SELF DETECTION OF ORAL CANCER)

Neck
(head upright)
With your head upright try to feel both sides of your neck and under your jaw.

Neck
(head back)
With your head tilted back look for masses or lumps

Lips
Perioral and Intraoral Soft Tissue Examination.

Floor of the mouth
(perioral and intraoral soft tissue examination)

Gums
With your lips pulled away examine all the gums

Cheeks
Pull your cheeks outs for your teeth and observe.

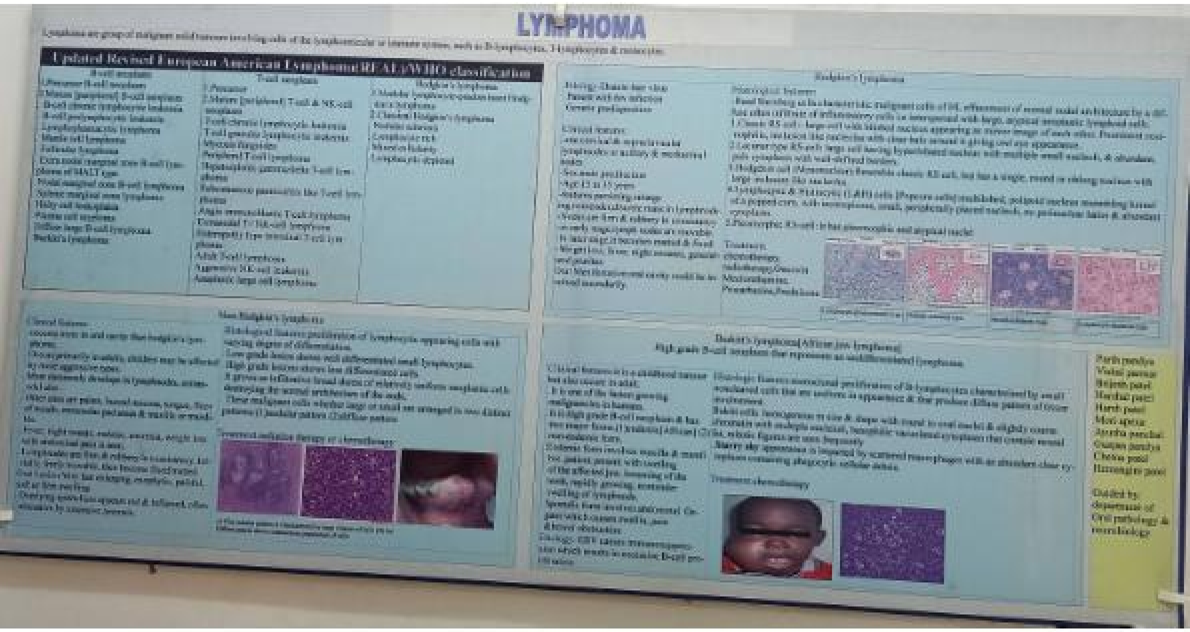
Palate
Open wide to see the back and roof of your mouth.

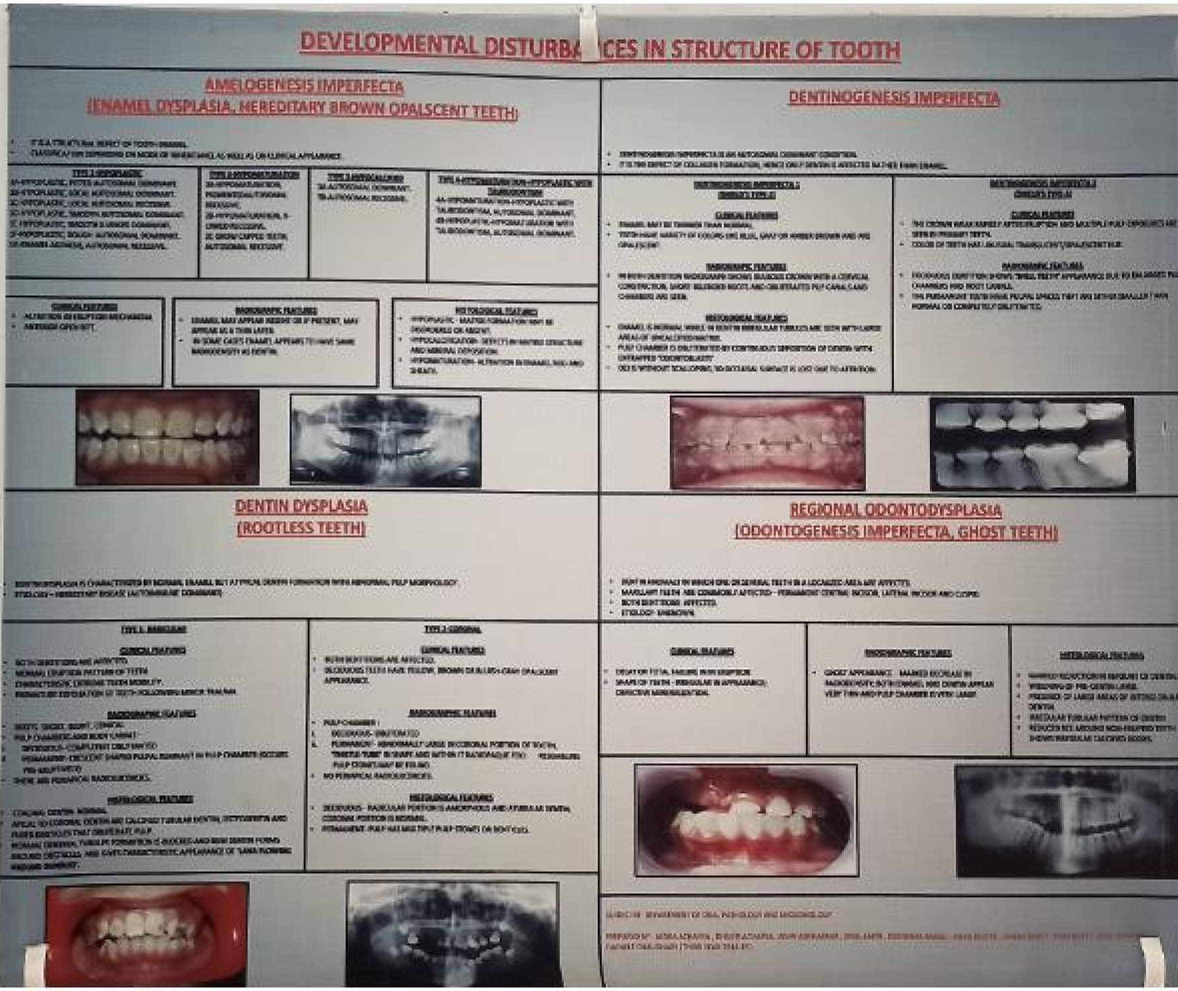
Oropharynx
(perioral and intraoral soft tissue examination)

Tongue
Grab the End of your tongue with a tissue or gauze. Pull your tongue out, right and left and examine each surface

Tongue
(upward)
Raise the tip of your tongue to the roof of your mouth. Check the floor of your mouth and under your tongue

COLLEGE OF DENTAL SCIENCE


LYMPHOMA
Updated Revised European American Lymphoma(REAL)/WHO classification


DEVELOPMENTAL DISTURBA CES IN STRUCTURE OF TOOTH
AMELOGENESIS IMPERFECTA
(ENAMEL DYSPLASIA, HEREDITARY BROWN OPALSCENT TEETH)
DENTINOGENESIS IMPERFECTA
DENTIN DYSPLASIA
(ROOTLESS TEETH)
REGIONAL ODONTODYSPLASIA
(ODONTOGENESIS IMPERFECTA, GHOST TEETH)

VESICULOBULLOUS LESIONS

EFINITION:

esicle is a small 2-5 mm circumscribed elevated sion on the skin or mucous membrane composed f thin or thick surface covering overlying or containing accumulation of fluid which may be clear slightly red i.e. serum plasma or blood. It may be ither subepithelial or intraepithelial.

Bulla is a large vesicular type lesion which is of more than 5mm in size. It may develop directly or may form from the union of several vesicles erupting lose together.

CLASSIFICATION:

Viral lesions:

1. Primary herpetic gingivostomatitis
2. Secondary herpes simplex infection
3. Herpes zoster
4. Herpangina
5. Small pox
6. Chicken pox
7. Mumps
8. Hiv
9. Measles

Skin lesion:

1. Pemphigus
2. Erythema multiforme
3. Epidermal bullosa
4. Bullous lichen planus
5. Lupus erythmalosus
6. Pemphigoid

erpes Simplex

1. Primary herpetic Stomatitis
2. Secondary herpetic stomatitis

Primary Herpetic Stomatitis

Clinical Features:

- Affects children and young adults.
- Multiple painful oral ulcers preceded by vesicles.
- It is characterized by fever, irritability, headache, pain upon swallowing and regional lymphadenopathy.
- After few days, mouth becomes painful and gingiva gets inflammed and erythematous.
- Sites: lips, tongue, buccal mucosa, palate, pharynx and tonsils.
- Yellowish fluid filled vesicles develop. They rupture and form shallow, extremely painful ulcer covered by grey membrane and surrounded by erythematous halo.
- It heals spontaneously within 7-14 days and leaves no scar.

Histologic Features:

- Herpetic vesicle is an intraepithelial blister filled with fluid.
- Infected cells are swollen and have pale eosinophilic cytoplasm and large vesicular nuclei known as BALLOONING DEGENERATION.
- Others contain intranuclear inclusions known as LIPSCHUTZ BODIES.
- Cytoplasm of the infected cells form giant cells.

Secondary Herpetic Stomatitis

Etiology :

- Reactivation of latent herpes simplex virus type 1.
- Triggers: sunlight, stress, immunosuppression reactivation common.

Clinical Features:

- Usually seen in adult patients.
- Burning or tingling sensation, feeling of tautness, swelling or slight soreness is seen at the location in which the vesicles subsequently develop.
- Gray or white vesicles rupture quickly, leaving a small red ulceration sometimes with a slight erythematous halo.
- The most common sites are hard palate and attached gingiva or alveolar ridge.
- It heals within 7-10 days.

Histological Features:

- Ballooning degeneration.
- Lipschultz bodies.
- Multinucleated giant cell.

HERPES ZOSTER

- It is an acute infectious viral disease extremely painful in nature characterized by inflammation of dorsal root ganglia or extramedullary cranial nerve ganglia associated with vesicular eruptions of the skin or mucous membrane supplied by affected sensory nerves.
- It is caused by reactivation of the latent v-z virus which had been acquired during previous attack of chicken pox.

Clinical Features

- Patient exhibits fever, a general malaise and pain and tenderness usually unilateral.
- Within few days, the patient has a vesicular eruption of skin or mucosa supplied by affected nerves.
- Triggering factors: trauma, development of malignancy or tumour involvement of dorsal root ganglia.
- Common in immunocompromised patients.
- It involves the face by infection of trigeminal nerve, usually consist of unilateral involvement of skin areas supplied by either ophthalic maxillary or mandibular nerves.
- The characteristic feature is unilaterality of the lesions.

Histologic features

- Microscopically, virus infected epithelial cells show homogenous nuclei representing viral products with margination of chromatin along the nuclear membrane.
- Multinucleation of infected cells is also typical.
- Acantholytic vesicles eventually breakdown and ulcerate.

PEMPHIGUS

It is serious chronic skin disease characterized by the appearance of vesicles and bullae, small or large fluid filled blisters that develop in cycles. There are three primary subsets of pemphigus.

1. Pemphigus vulgaris
2. Pemphigus foliaceus
3. Paraneoplastic pemphigus

PEMPHIGUS VULGARIS

It is an autoimmune, intraepithelial blistering disease affecting the skin and mucous membranes. It results from a breakdown or loss of intercellular adhesion, thus producing epithelial cell separation known as acantholysis.

Clinical Features

- Characterized by rapid appearance of vesicles and bullae varying in diameter from few mm to cm. The lesion contain thin watery fluid shortly after development but may soon become purulent or sanguineous.
- The loss of epithelium occasioned by rubbing apparently unaffected skin is termed NIKOLSKY'S SIGN which is caused by prevesicular edema which disrupts the dermal-epidermal junction.

Histologic Features

- Vesicle or bulla is formed entirely intraepithelially just above the basal layer producing the distinctive SUPRABASILAR SPLIT.
- Intercellular bridges between the epithelial cells disappear which results in loss of cohesiveness or acantholysis and clumps of epithelial cells are often found lying free within the vesicular space. These are called TZANCK CELLS.
- They are characterized by degenerative changes which includes swelling of nuclei and hyperchromatic staining.

DEPARTMENT OF ORAL PATHOLOGY

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Year 2011-2012

DENTAL PULP

Dental pulp can be defined as a richly vascular and innervated connective tissue of mesodermal origin enclosed by dentin, it occupies the center of each tooth.

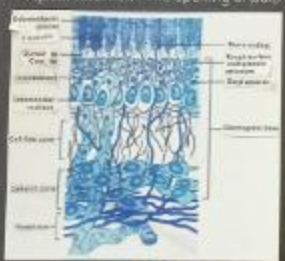
ANATOMY OF PULP

✓ **Coronal pulp** : The coronal pulp has shape according to the outer surface of crown. It has pulp horns, which are protrusions that extend into the cusps of each crown.

✓ **Radicular pulp** : The radicular pulp extends from the cervical region of the crown to the root apex. The radicular portion of the pulp is continuous with the periapical connective tissue through the apical foramen or foramina.

✓ **Accessory canals** : The accessory canals leads from the radicular pulp laterally through the root. It communicate between radicular pulp and periodontal tissue.

✓ **Apical foramen** : The opening of pulp cavity at the apex is constricted and is called apical foramen.



ZONES OF THE PULP

1. **Odontoblastic zone** : Lines the outer pulpal wall and consists of the cell bodies of odontoblast and lie in a continuous row near dentinal end of the pulp.
2. **Cell free zone(zone of weil, sub odontoblastic layer)** : Lies just beneath the odontoblastic zone. Prominent in coronal pulp. Fibers are present.
3. **Cell rich zone** : It is situated just below the cell free zone. Consists of fibroblast, undifferentiated mesenchymal cells, macrophages, immunocompetent cell and young collagen fibers.
4. **Pulp core** : Located in the center of the coronal and radicular pulp. Contains large nerves and blood vessels.

CELLS OF PULP

Fibroblasts : Fibroblasts are the most numerous cell type in pulp. Helps in synthesis, maintenance and degradation of pulp matrix.

Odontoblast : Second most prominent cell in pulp.They are tall, columnar in crown, cuboidal in middle of the root, flat, spindle shaped near the apex of tooth.

Undifferentiated mesenchymal cells : Polyhedral in shape with peripheral processes and large oval nucleus. They are totipotent cell and give rise to odontoblast, fibroblast and macrophages.

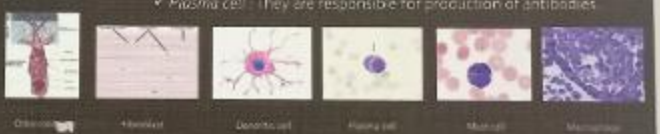
Defense cells :

✓ *Macrophages* : Scavenger cell, help in elimination of dead cells.

✓ *Dendritic cells* : Capture and present foreign antigen to T cells.

✓ *Mast cell* : They release heparin and histamine in response to injury or inflammation of bodily tissues.

✓ *Plasma cell* : They are responsible for production of antibodies.



MATRIX

Fibers : Prominent collagen type I & III present.

Ground substance : Mucopolysachharide, Glycosaminoglycans, Proteoglycans.

Blood vessels : Blood vessels enter and exit the dental pulp by way of apical and accessory foramina. They divide and subdivide with in pulp to form a extensive vascular capillary network.

Lymphatics : Anterior teeth drains to submental lymph nodes. Posterior teeth drains to submandibular and deep cervical lymph nodes.

Nerves : The nerves form a plexus just below the odontoblastic zone known as "PLEXUS OF RASCHKOW".

PULP CALCIFICATIONS

It is a pathologic process characterized by localized / generalized calcification with in the pulp.

True pulp stone : Localized masses of calcified tissue having tubular structure.

False pulp stone : Localized masses of calcified tissue not having tubular structure but made of concentric layers of calcium deposited around a central nidus.

Diffuse calcifications : Linear strands or columns of calcification paralleling the blood vessels & nerves of the pulp.

A is Embedded pulp stone, B and C are Free pulp stone.

FUNCTIONS

- Inductive
- Formative
- Nutritive
- Protective
- Defensive or reparative

Guided by : Department of Oral Pathology and Microbiology Prepared by : Raxit Patel, Riddhi Patel, Roshani Patel, Srushti Patel, Vishvani Patel (1st BDS, Batch-2014-15)

DEVELOPMENTAL DISTURBANCES OF TONGUE

THEY ARE AS FOLLOW:-

1.MICROGLOSSIA
2.ANKYLOGLOSSIA
3.MACROGLOSSIA
4.FISSURED TONGUE
5.MEDIAN RHOMBOID GLOSSITIS
6.BENIGN MIGRATORY GLOSSITIS
7.CLEFT TONGUE
8.HAIRY TONGUE
9.LINGUAL VARICES
10.LINGUAL THYROID NODULE

MICROGLOSSIA

A Rudimentory,small tongue.
CAUSE:- Lack of muscular stimulus b/w the alveolar arches.

CLEFT TONGUE (BIFID TONGUE)

-Appear as deep groove in the midline of the dorsal surface.
CAUSE:-
-Lack of merging of the lateral lingual swelling of the tongue.

ANKYLOGLOSSIA (TONGUE TIE)

IT Occurs when the inferior frenulam attaches to the bottom of the tongue.
COMPLICATION:-
-Speech problem specially in sound like l,r,t,d,n,th,sh,z.
-Feeding problem in infant.
-Persistant gap b/w mandibular incisors.

MEDIANRHOMBOID - GLOSSITIS

-Posterior dorsal point of fusion of lingual tubercleis occasionally defective leaving a rhomboid shape smooth arythmatous mucosa lacking in taste- burds or papillae.

CLINICAL FEATURES:-
Midline soft palate erythma in the area of routine contact with underlying tongue involvement called "KISSING LESION".
HISTOLOGIC FEATURES:-
-Smooth/nodular surface covered by atrophic stratified squamous epithelium with fibrous stroma & dialated capillaries.
-Elongation of rete process.
-Inflammatory cell infiltrate.

MACROGLOSSIA

(TONGUE HYPERTROPHY)
Means large tongue.
TYPES:- 1.true macroglossia
2.pseudo macroglossia.
Associated with '
DOWNSYNDROME"
"BECKWITH WIEDEMANN SYNDROME".

BENIGN MIGRATORY GLOSSITIS

(GEOGRAPHIC TONGUE)
-IS a psoriasiform mucositis of tongue.

HISTOLOGIC FEATURES:-
-A prominant serpiginous lines at the periphery of depapilated patch.

FISSURED TONGUE (SCROTAL TONGUE)

-Appear as grooves on dorsal & lateral aspect of tongue of varing depth.
-Associated with "MELKERSSON ROSENTHAL" & "DOWN" Syndrome.
HISTOLOGIC FEATURES
-Increased thickness of lamina propria.
-Loss of filliform papillae.
-Hyperplasia of retepegs.
-Neutrophilic microabcess within the epithelium.
-Mixed inflammatory infiltrate in lamina propria.

HAIRY TONGUE

-Defective desquamation of filiform papillae.
CAUSE:-
-Hypertrophy of filiform papillae due to lack of mechanical stimulation & debridement.
-Poor oral hygiene.

CLINICAL FEATURES:-
-Burning tongue.
-Halitosis.
-Tickling & Gagging sensation.
HISTOLOGIC FEATURES:-
-Elongation of filiform papillae.
-Inflammator cell infiltrate.

LINGUAL VARICES

-A dilated,tortous vein appear as a red-purple shotlike clusters of vessels on ventral surface or lateral border of tongue.

LINGUALTHYROID NODULE

-Condition in which follicles of thyroid tissue are found in substance of tongue.

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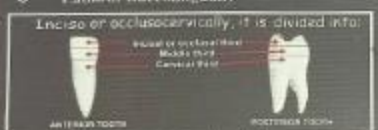
DIVISION INTO THIRDS

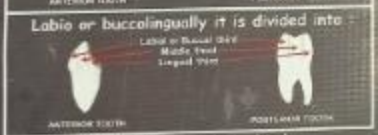
For purposes of description, the crowns and roots of teeth have been divided into thirds.

The surfaces of the crown and root portions are divided into thirds, which are named according to their locations.

Crown may be divided into thirds on the basis of directions as follows:

- Incisor Occlusocervically
- Mesiodistally
- Labio or Buccolingually





Division of root into thirds

LINE ANGLES

A line angle is formed by the junction of two surfaces and derives its name from the combination of the two surfaces that join to form the line angle.

Line angles of anterior tooth

There are total 6 line angles in anterior teeth.

Line angles of posterior tooth

There are total 8 line angles in posterior teeth.

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POINT ANGLES

A point angle is formed by the junction of three surfaces and derives its name from the combination of the surfaces that join to form the point angle.

Point angles of anterior tooth

There are total 4 point angles in posterior teeth.

Point angles of posterior tooth

There are total 4 point angles in anterior teeth.

Prepared by

Dhairya Patel(46) - Naman Patel(56) - Abraham Johnson(1) - Abdul Tausif Sipai(87) (1st year 2009-10)

SALIVARY GLAND TUMOURS

BENIGN TUMORS

Pleomorphic adenoma (Mixed tumor)

Most common salivary neoplasm

Clinicl features

- Parotid gland is the most common site.
- Painless but may show rapid increase.
- Slow growing firm mass.
- Female predilection. It occurs in 20-50 years of age.
- In parotid tumors, in the superficial lobe and presents as a swelling in front of the ear.

- Consists a mixture of glandular epithelium and mesenchyme like tissue. Myoepithelial cells are major component.
- The epithelium forms sheets and cystic structures or may appear as islands or cords or anastomosing cords or sheets of cells.
- Extensive accumulation of mucin/basement around these cells may give a myxoid appearance.

Warthins tumor

(Papillary Cystadenoma Lymphmatosum)

- Benign neoplasm that occurs almost exclusively in parotid glands.
- Second most common salivary gland tumor.

Clinical features :

- Slow growing, painless.
- Most commonly occurs in the tail of parotid, near angle of mandible
- Frequently occurs bilaterally

Histopathology :

Made up of two histologic components epithelial and lymphoid tissue.

It is usually an adenoma containing cyst formations, with papillary projections into the cystic spaces and a lymphoid matrix showing germinal centers.

- Inner layer cells are tall columnar with normally placed Hyperchromatic nuclei and a finely granular and eosinophilic cytoplasm.
- Outer layer cells are usually oncocytic triangular.
- Multiple papillary folds of epithelial lining into cystic spaces.

Warthin tumor
Tall columnar double layered epithelium lining spaces, lymphoid stroma.

MALIGNANT TUMORS

Acinic cell carcinoma

It is the third most common malignant salivary gland neoplasm, after mucoepidermoid carcinoma and adenocarcinoma.

Clinical features :

Histologic features :

Exhibits four growth patterns solid, papillary cystic, follicular, acinar cystic

The most characteristic cell seen has the features of the serous acinar cell with abundant granular basophilic cytoplasm and a round, slightly eccentric nucleus.

Other cells are seen are the intercalated duct like cells which are smaller and the vacuolated cells which seem to be unique of this tumor.

parotid tumor showing sheets of granular basophilic acinous acinar cells.

Mucoepidermoid carcinoma

- Most common malignant neoplasm of both major and minor salivary glands.
- Parotid is the most common site.

Clinical Features

- Most common malignant salivary gland tumor in children
- The low grade tumors are slowly enlarging, painless masses, which simulate the pleomorphic adenoma.
- The High grade tumors grow rapidly and produce pain as an early symptom. Facial nerve palsy is common when parotid is involved.

Mucoepidermoid carcinoma

Histopathology :

Composed of mucous secreting cells, Epidermoid type (squamous cells and intermediate cells)

The Mucous cells are of various shapes and have abundant

The spin-woid cells are polygonal shaped with prominent intercellular bridges and rarely keratinization

A group of highly prolific basaloid cells referred to as intermediate cells.

Mucous cells, which typically surround cystic spaces and sheets of epidermoid cells.

Adenoid cystic carcinoma (cylindroma)

- Slow growing but aggressive neoplasm.

Clinical features :

- Parotid, submaxillary and accessory glands in the palate and tongue are the most commonly involved glands.
- Early local pain, facial nerve palsy, fixation to deeper structures and local invasion are some of the presenting features.

Histologital features:

3 growth pattern

- Cribriform pattern shows basaloid epithelial cell nests that form multiple cylindrical cyst like pattern resembling a Swiss cheese or honey comb pattern.
- Tubular pattern:tubular structures are lined by stratified cuboidal epithelium.
- Solid pattern: it shows solid groups of cuboidal cells with little tendency towards duct or cyst formation.

Polymorphous low grade adenocarcinoma (PLGA)

- Limited to minor salivary gland sites.
- Characterized by bland, uniform nuclear features, infiltrative growth and perineural infiltration.

Clinical features :

- Typically presents as a firm, non tender swelling involving the mucosa of the cheek, palate or upper lip.

Histologital features:

- Four types of growth patterns are seen solid, Ductal cystic and tubular.
- Sometimes a cribriform pattern is seen, which resembles adenoid cystic carcinoma.
- Tumor is composed of Cuboidal to columnar cells that have uniform ovoid to spindle shaped nuclei.

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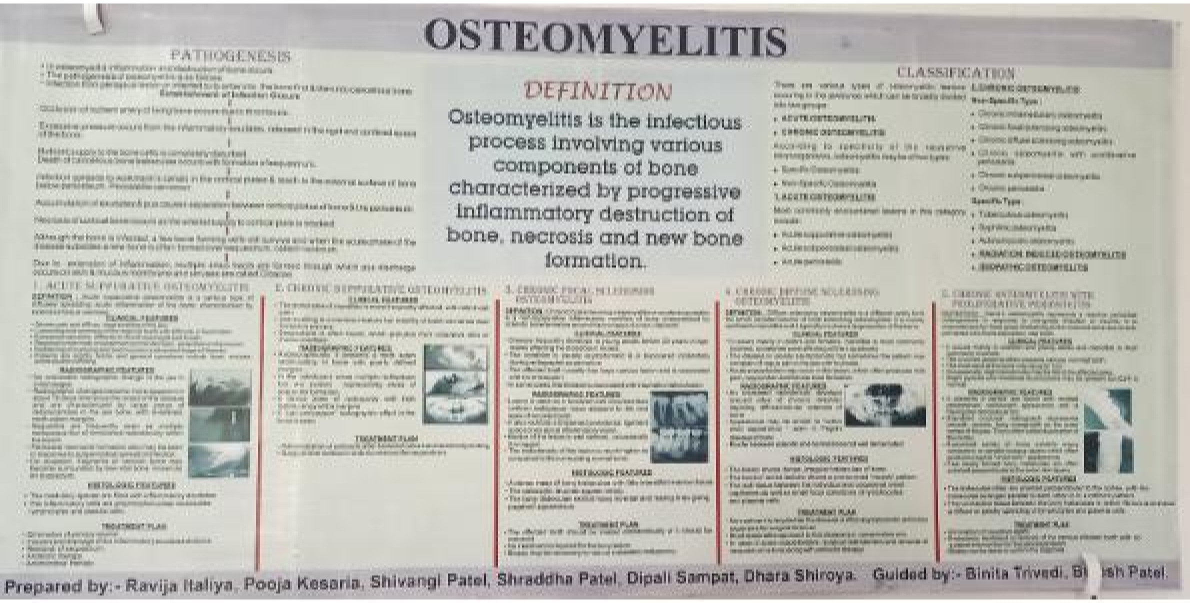
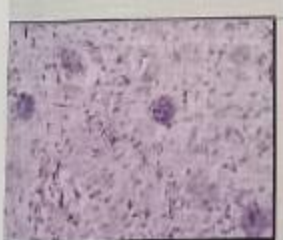
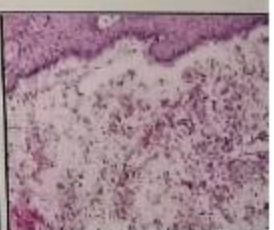
Bijal Patel Mauli Vyas
3rd Year : 2011 - 12


OSTEOMYELITIS
PATHOGENESIS
DEFINITION
Osteomyelitis is the infectious process involving various components of bone characterized by progressive inflammatory destruction of bone, necrosis and new bone formation.
CLASSIFICATION
Prepared by:- Ravija Italiya, Pooja Kesaria, Shivangi Patel, Shraddha Patel, Dipali Sampat, Dhara Shiroya.
Guided by:- Binita Trivedi, B

PSEUDOCYSTS

An abnormal or dilated cavity resembling a true cyst but not lined with epithelium is known as Pseudocyst .

ANEURYSMAL BONE CYST	SIMPLE BONE CYST/ TRAUMATIC BONE CYST/ HEMORRHAGIC BONE CYST/ UNICAMERAL BONE CYST	STATIC BONE CYST / STAFNE'S BONE CYST / LATENT BONE CYST	MUCOUS EXTRAVASATION CYST
•An intraosseus accumulation of variable sized, blood filled spaces surrounded by the cellular fibrous connective tissue that often is admixed with trabeculae of reactive woven bone. •May occur due to local circulatory disturbances, or maldevelopment of blood vessels	• A benign pathologic cavity in bone that is not lined with epithelium. • May be associated with trauma.	• It represents a focal concavity of the cortical bone on lingual surface of the mandible. • It is a developmental defect which contains a portion of sublingual / submandibular salivary gland within the body of the mandible.	• Extravasation mucocele results from a broken salivary gland duct and consequent spillage into the soft tissue around this gland
➢ CLINICAL FEATURES : • Age: 20-30 years • Site:Mandibular predominance, mostly posterior region • Firm, diffuse, rapidly growing swelling with facial asymmetry. • Pain,parasthesia, compressibility, crepitus.	➢ CLINICAL FEATURES: • Age:10-20 years • Male:female = 2:1 • Site: Mandibular premolar and molar region, maxillary molar. • Painless swelling of affected area, parathesia, bone expansion in some cases.	➢ CLINICAL FEATURES: • **Age: Middle aged** • **Male predominance** • **Site: Below the mandibular canal in the posterior mandible between molar and angle of mandible** • **Does not increase in size thus known as static bone cyst .**	➢ CLINICAL FEATURES : • Age: Young adults and children • Site: Lower lip • Size: 1-2 cm • Dome shaped, fluctuant swelling. • Superficial lesion appear as bluish translucent hue but deeper lesion may appper normal in color.
➢ RADIOGRAPHIC FEATURES: • Unilocular / multilocular radiolucency • Ballooning or blow out distention of bony contour. Honey comb or soap bubble like appearance	➢ RADIOGRAPHIC FEATURES: • Unilocular/multilocular well defined radiolucency (1-10 mm diameter) associated with cortical expansion. • When several teeth involved radiolucent domelike projection that scallop upward between the roots.	➢ RADIOGRAPHIC FEATURES: • Round, oval, well circumscribed, radiolucency with a sclerotic border about 1-3 cm in diameter. • In Anterior variant, Radiolucency is seen between lower central incisors and first premolars	
			
➢ HISTOLOCIGAL FEATURES: Macroscopic appearance: Blood soaked sponge Microscopic appearance: Spaces filled with unclotted blood surrounded by cellular fibroblastic tissue containing multinucleated giant cells and trabeculae of osteoid and woven bone. These blood filled speces are not lined by the epithelium	➢ HISTOLOGICAL FEATURES: • The wall of the defect is lined by a thin band of vascular fibrous connective tissue. • Demonstrate a thickened myxofibromatous proliferation, intermixed with trabeculae of cellular & reactive bone. • Areas of vascularity, fibrin, erythrocytes and occasional giant cell adjacent to the bone surface. • Occasional stringy lace like dystrophic calcification.	➢ HISTOLOGICAL FEATURES: • Normal salivary gland tissue is seen • Sometimes muscles, fat, connective tissue, lymphoid tissue, blood vessel is seen.	➢ HISTOLOGICAL FEATURES: • Mucin-filled cystic cavity surrounded by granulation tissue but the epithelial lining is absent. • The cystic cavity is often surrounded by a compressed connective tissue wall which contain macrophages, Polymorphonuclear leukocytes, eosinophils, lymphocytes.
			

PREPARED BY : APEKSHA KHATRI ,ISHA KOTADIYA ,VIPAL KOTAK ,VISHAL LADVA, JAYESH MAKWANA, CHINTAN MALPANI, CHARMI MANDALI , JIGINASHA MANGULKIA SANDEEP MITHAPARA, OMKAR MODI

GUIDED BY :DEPARTMENT OF ORAL PATHOLOGY AND MICROBIOLOGY

ODONTOGENIC EPITHELIUM WITHOUT ODONTOGENIC ECTOMESENCHYME

❖ Ameloblastoma ❖ Adenomatoid Odontogenic Tumor (AOT)
❖ Calcifying Epithelial Odontogenic Tumor (CEOT) ❖ Squamous Odontogenic Tumor (SOT)

ADENOMATOID ODONTOGENIC TUMOR

- It is a benign neoplasm.
- While others have categorized it as a hamartomatous malformation due to the limited size & to the lack of most cases.

CLINICAL FEATURES

- SITE:
  1. unerupted maxillary cuspid
  2. rarely distal to premolar area
- Asymptomatic swelling
- AOT may occur within the jaw bones /the gingiva.
- Peripheral lesions present as a painless, gingival-colored mass that changes from 1-1.5 cm in diameter.

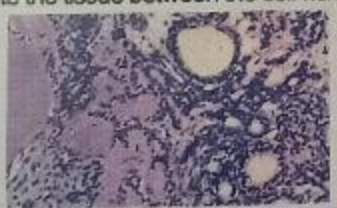
HISTOLOGICAL FEATURES

MACROSCOPIC FEATURES

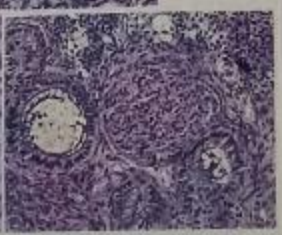
- It is a soft , roughly spherical mass with a distinct fibrous capsule.
- White to ten , solid to crumbly tissue or one/more cystic spaces of varying sizes.

MICROSCOPIC FEATURES

- Multinodular proliferation of spindal, cuboidal & columnar cells in a variety of patterns comprising of scattered duct like structures.
- The stellate reticulum like spindle cells & occasionally round or polygonal epithelial cells dominate the tissue between the cell-rich nodules.



AOT- PAS-positive material



AOT-duct like appearance

CALCIFYING EPITHELIAL ODONTOGENIC TUMOR (PINDBERG TUMOR)

- It is a uncommon, benign , odontogenic neoplasm that is exclusively epithelial in origin.

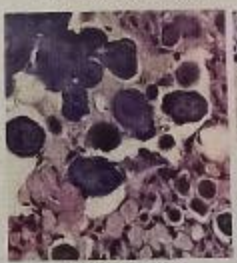
CLINICAL FEATURES

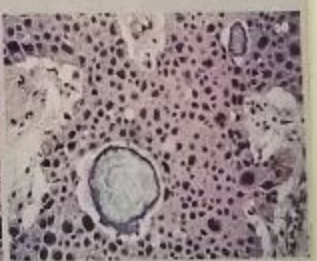
- CEOT occurs most frequently in middle age.
- AGE:- 8-92 years
- SITE- posterior mandibular area involved.
- This lesions are asymptomatic & are aware only of a painless swelling.

CEOT-radiograph

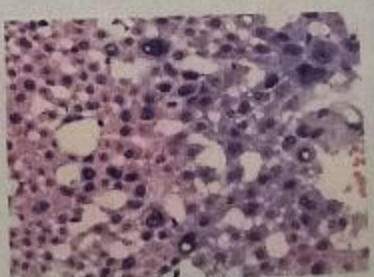
HISTOLOGICAL FEACTURES

- Polyhedral epithelial cell with a finely granular eosinophilic cytoplasm & pleomorphic nuclei.
- Intercellular bridges are prominent.
- Presence of a homogenous , eosinophilic substance which has been variously interpreted as amyloid.
- Presence of calcification in the form of Liesegang rings.





Liesegang rings



CEOT : Prominent intercellular bridges and marked nuclear pleomorphism

Prepared by: Renuka, Payal, Priyanka, Urvi, Pallavi (3rd Year – 2011-12)
Guided By : Binita Trivedi (H.O.D.), Brijesh Patel (Sr. Lecturer)

LEUKEMIA

Definition : Leukaemia is disease characterised by the progressive overproduction of white blood cells which usually appear in the circulating blood in an immature form. A proliferation occur in uncoordinated and independent fashion that leukaemia consider as a true malignant neoplasm.

Etiology:
- Infectious origin
- Virus e.g.: EB virus
- Radiation
- Chemicals e.g.: Benzene
- Chromosomal abnormalities

Predisposing factor:
- Age
- Genetics
- Hormones
- Immune competence
- Stress

Classification

Lymphoid leukaemia
- Lymphoblastic leukaemia
- Lymphocytic leukaemia

Myeloid leukaemia
- Erythrocytes
- Granulocytes
- Monocytes
- Platelets

ACUTE
- The development of acute leukaemia is sudden, characterised by weakness, fever, headache ,generalised swelling of lymph node , petechial or ecchymatic haemorrhage in the skin and mucous membrane and evidence of anaemia , lymphadenopathy is often on the first sign of the disease .
- Cervical lymph nodes are palpable before diagnosis
- Numerous organs such as s the spleen , liver and kidney become enlarged ,owing to leukaemia infiltration
- Haemorrhage's are common

Lab finding:

- both bleeding time and coagulation time are pro
- The tourniquets test is usually positive.
- In the early stage leucocyte count may be subnormal , but it rise in the terminal stage to 100000 an more cells per cubic millimetre.
- Stem cell leukaemia is sometimes applied to those types in which the leukaemia cells are highly undifferentiated

CHRONIC
- This disease may be present for months or even several years before the symptomatic lead to discovery .
- It is found by the unexplained leukocytes is noticed in the haemorrhage examination
- Xerostomia often present.

Lab finding :

- Anaemia and thrombocytopenia are also common in the chronic leukaemia.
- The leukocytosis may be great white blood cell count of over 500000 cells per cubic millimetre are not uncommon
- Very low white blood cell count also occur.

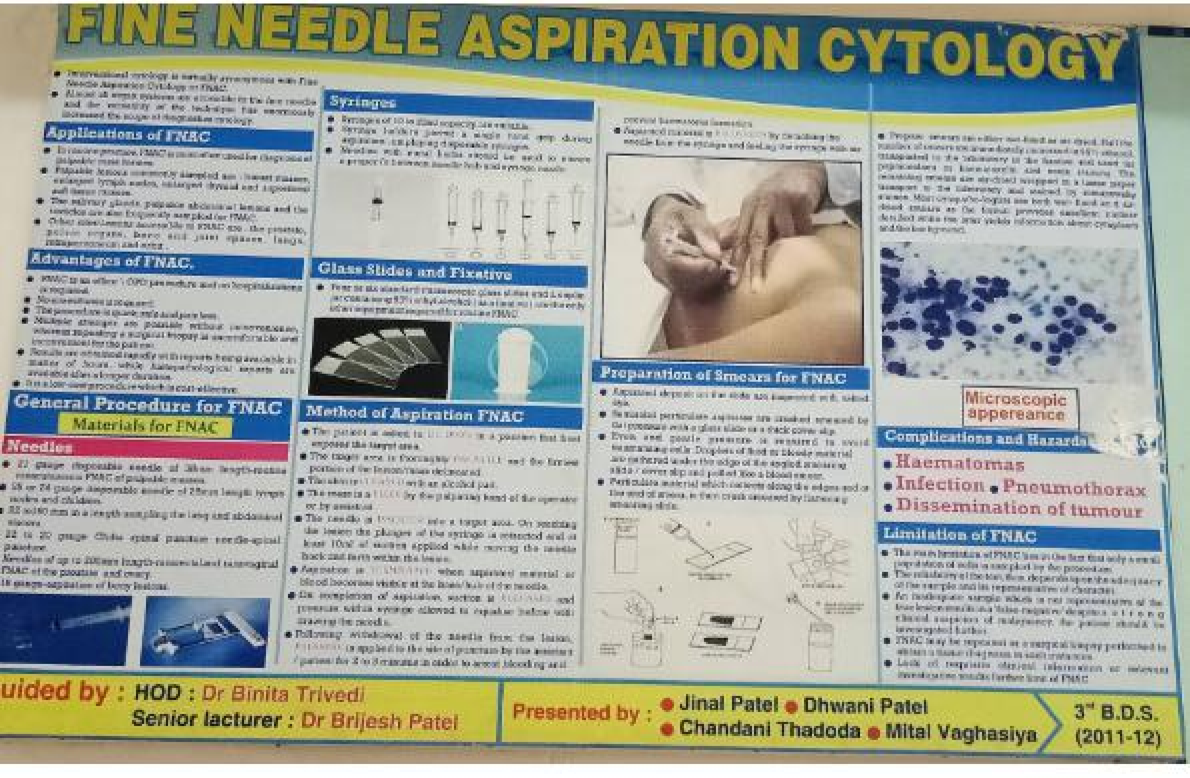
ORAL MANIFASTATION

- Oral lesion occur in cell type of leukaemia more come in the acute stage of disease
- According to burket most common monocytic leukaemia .
- Primary clinical manifestation :
  - Gingival hyperplasia
  - Haemorrhage
  - Gingivitis
  - Petechiae
  - Ulceration of mucosa
- In sever disease cases the teeth almost completely hidden by gingiva .
- Gingiva are boggy , edematous and deep red .
- Purpura: lesion of the oral mucosa analogous to the cutaneous ecchymosis may be seen
- Rapid loosening of the teeth.
- Patient experienced sudden gingival bleeding or gingival hyperplasia should suggest possibility of leukaemia .
- Any disease that causes immunosupressen and disease of t blood forming organ may have one or more of the oral finding of acute leukaemia .

Guided by :- Department of oral pathology and microbiology .

Prepared by :- Meera Rao , Krupa Rana , Rushika Savliya, Bhavya Raval , Shruti Raval , Nidhi Rupareliya , Aarohi Shah , Vi[illegible]tel , Urja Patel , Unnati Patel . (3rd year, batch - B , 2014 -2015)

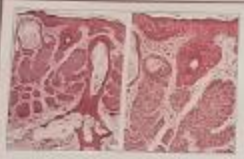

SPREAD OF ORAL INFECTION VIA TISSUE SPACES
Prepared by :
Guided by:


FINE NEEDLE ASPIRATION CYTOLOGY
Applications of FNAC
Advantages of FNAC.
General Procedure for FNAC
Materials for FNAC
Needles
Syringes
Glass Slides and Fixative
Method of Aspiration FNAC
Preparation of Smears for FNAC
Microscopic appereance
Complications and Hazards
Haematomas
Infection
Pneumothorax
Dissemination of tumour
Limitation of FNAC
uided by : HOD : Dr Binita Trivedi
Senior lacturer : Dr Brijesh Patel
Presented by : Jinal Patel Dhwani Patel
Chandani Thadoda Mital Vaghasiya
3rd B.D.S.
(2011-12)

HISTOPATHOLOGY OF MALIGNANT TUMORS OF EPITHELIAL ORIGIN

- Basal cell Carcinoma
- Sqamous cell Carcinoma
- Verrucous Carcinoma
- Basaloid Sqamous cell Carcinoma
- Adenoid Sqamous cell Carcinoma
- Spindle cell Carcinoma
- Adenosqamous Carcinoma
- Undifferentiated Carcinoma

BASAL CELL CARCINOMA



BASAL CELL CARCINOMA
Well demarcated islands showing peripheral palisading
(L) Low power (R) high power view

VERRUCOUS CARCINOMA

SQUAMOUS CELL CARCINOMA (WELL DIFFERENTIATED)

MALIGNANT MELANOMA

SQUAMOUS CELL CARCINOMA (POORLY DIFFERNTIATED)

SPINDLE CELL CARCINOMA

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HOD :
Dr. Binita Trivedi

Reader :
Dr. Suchi Shah

DEPARTMENT OF ORAL PATHOLOGY, 3rd YEAR BDS - 2009-10

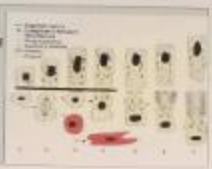
Dentinogenesis

Dentinogenesis is the process of formation of dentin.

It is two phase sequence:a)Odontoblast differentiation b)Formation of organic matrix

Odontoblast differentiation

- Odontoblast differentiate from the cells of dental papilla.
- They change from an ovoid to columnar shape nuclei become basally oriented.
- One or several processes arise from apical end.
- Proline appears in RER and golgi apparatus
- Key protein secreted by odontoblast is dentin phosphoprotein.



Formation of Organic Matrix

- Proline appears and migrates into cell process in dense granules and emptied into extracellular collegenous matrix in predentin.
- The odontoblaar secrete both collagen and intercollagen substance proteoglycans.
- As the cell recedes it leaves behind a single extension and several initial process join into one which becomes enclosed in a tubule
- Odontoblasts increases to approximately 40 micrometer.

Mineralization

Control of mineralization

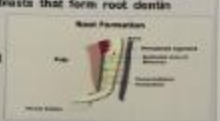
- Mineralization is achieved by continuous deposition of mineral.
- It is initiated by producing matrix vesicles and proteins that can regulate mineral deposition and by adapting organic matrix at mineralization end,so that it receives the mineral deposits.
- Presence of alkaline phosphate activity and calcium adenosinetriphosphatase activity at the distal end of the cell also is consistent with a cellular implication in the transport and release of mineral ions into forming dentin layers.

Pattern of mineralization

- Histologically two patterns a) Globular b) Linear Calcification
- Depends on rate of dentin formation
- Globular calcification involves deposition of crystal in several discrete areas of matrix by heterogeneous capture in collagen,mainly seen in mantle dentin.With continued crystal growth,globular masses are formed that continue to enlarge and eventually use to form a single calcified mass.
- When it is necessary to form dentin fastest,the dentin will form in globular pattern.
- When the dentin form slowly,the linear pattern will be use.

Formation of Root Dentin

- The epithelial cells of Hertwig's Root Sheath initiate the differentiation of odontoblasts that form root dentin
- Root dentin increasingly is recognized as being structurally and compositionally different from coronal dentin
- Phosphoryn content of Root dentin is less than Coronal dentin



Secondary Dentinogenesis

- It is laid down after root formation is completed
- Its formation is achieved at much slower pace
- It can be distinguished histologically from primary dentin by a demarcation line,a slight differential in staining a less regular organization of dentinal tubules.

Tertiary Dentinogenesis

- Tertiary dentin or reparative dentin is deposited at specific sites in response to injury by damaged odontoblasts or replacement cells that are recruited from pulp
- The rate of deposition depends on degree of injury,more severe the injury more rapid the rate of dentin deposition.

Guided by:Department of Oral Pathology and Microbiology

Prepared By:Satish, Kaksha, Nishi, Mukesh, Devang(1st Year B.D.S,Batch 2014-15)

AMELOGENESIS

On the basis of ultrastructure and composition, two processes are involved in the development of enamel.

1. Organic Matrix Formation.
2. Mineralization.

Although the inception of mineralization does not await the completion of matrix formation, the two processes will be treated separately.

A. Organic Matrix Formation

- The ameloblasts start their secretory activity after a thin layer of dentin is formed. The islands of enamel matrix are deposited along the predentin.
- As enamel deposition proceeds, a thin continuous layer of enamel is formed along the dentin.
- Amelogenins are major component of enamel matrix proteins. It undergoes extra cellular degradation by proteolytic enzyme like matrix metalloproteinase. Most of the secreted amelogenins are removed during maturation.
- Amelogenin forms thixotropic gel which can be easily squeezed out by pressure of growing crystals.
- Ameloblastin and enamelin are other important proteins of enamel matrix.

❖ Development Of Tome's Process

- The projections of ameloblasts into enamel matrix have been called **Tome's Process.**
- This Tome's process also contains secretory granules, endoplasmic reticulum and mitochondria.
- The junctional complexes which encircle the ameloblasts at their distal and proximal ends have fine radiating actin filaments.
- The junctional complexes which form at the distal end are called **Distal Terminal Bars**. These terminal bars separate the Tome's Process from the cell proper.
- Secretions from areas close to junctional complexes and adjacent ameloblast form inter rod enamel.
- They occur earlier and serve to outline the pit into which secretions from Tome's Process occurs later to form the enamel rod.

❖ Transition

- The changes occurring after secretory stage and prior to onset of maturation process is called **Transition Stage**.
- In this stage,
  - Ameloblast reduce in height,
  - Enamel secretion stops completely,
  - Process of amelogenin removal starts,
  - About 60% ameloblast undergo apoptosis.

❖ Modulation

- Ameloblast **alternate** cyclically in developing smooth ended and rough ended borders in apical cytoplasm during maturative stage which is called **Modulation**.
- **Smooth Ended:** Leaky distal and tight proximal junction.
  - It leaks small proteins and water into forming enamel.
- **Ruffle Ended:** Proximal leaky and tight distal junction.
  - It promotes calcium entry into the forming enamel.

B. Mineralization

- In the first stage, an immediate partial mineralization of about 25-30% of the total mineral content occurs in the matrix as it is laid down.
- The second stage of maturation occurs very rapidly after the first stage. It is characterized by the gradual completion of mineralization till the inorganic content reaches 96%.
- Maturation involves the resorption of enamel matrix by the ameloblasts through,
  - Removal of large amounts of water.
  - Removal of certain part of enamel proteins.
  - Growth of the pre-existing crystals.

Guided by : Department Of Oral Pathology & Microbiology

Presented By : Himani Patel, Hiral Patel, Janki Patel, Komal Patel, Krina Patel, 1st BDS (2015)

TOOTH DEVELOPMENT

DEVELOPMENTAL STAGES

Tooth development is a continous process, the histology of development of tooth divides into 4 stages are as:

1. Bud stage
2. Cap stage
3. Bell stage
4. Advance bell stage

BUD STAGE

⇨ The epithelium of the dental laminae is separated from the underlying ectomesenchyme by basement membrane.

⇨ Differentiation of each dental laminae, round or ovoid swellings arise from the basement membrane corresponding to the future positions of deciduous teeth.

⇨ In bud stage, there are peripherally located low columnar cells and centrally located polygonal [illegible]

⇨ The ectomesenchymal cells [illegible] surrounding tooth bud condenses.

⇨ The area of ectomesenchymal condensation immediately subjacent to the enamel organ is DENTAL PAPILLA.

⇨ The condensed ectomesenchyme that surrounds tooth bud and dental papilla is the DENTAL SAC.

CAP STAGE

Shallow invagination on deep surface of the bud give rise [illegible]

OUTER AND INNER ENAMEL EPITHELIUM:

⇨ Peripheral cells are cuboidal covers convexity called the outer enamel epithelium.

⇨ Cells in concavity becomes tall, columnar cells called inner enamel epithelium.

STELLATE RETICULUM:

⇨ Polygonal cells located in the centre of epithelial enamel organ becomes star shaped called stellate reticulum. Glycosaminoglycans in ground substance and remains in contact with each other by cytoplasmic processes.

⇨ The cells in the centre of the enamel organ are densely packed and form the ENAMEL KNOT.

⇨ The vertical extension of enamel knot is called ENAMEL CORD.

⇨ When enamel cord extends to meet the outer enamel epithelium it is called ENAMEL SEPTUM.

⇨ The outer enamel epithelium at the point of meeting shows a small depressions and this is called ENAMEL NAVEL.

DENTAL PAPILLA:-

⇨ "The ectomesenchyme(neural crest cells) that is partially enclosed by the invaginated portion of the inner enamel epithelium proliferates. It condenses to form the dental papilla which is formative organ of dentin and primordium of pulp."

DENTAL SAC:-

⇨ Marginal condensation in the ectomesenchyme surrounding the enamel organ and dental papilla, a denser and more fibrous layer develops, which is the PRIMITIVE DENTAL SAC.

BELL STAGE

⇨ As the invagination of the epithelium deepens and it margins continue to grow, the enamel organ assumes a bell shape.

⇨ Four different types of epithelial cells can be distinguish of the bell stage of the enamel organ are:-

1. INNER ENAMEL EPITHELIUM:

⇨ It consists of a single layer of cells that differentiate prior to amelogenesis into tall columnar cells called AMELOBLASTS.

⇨ These cells are 4 to 5 μm in diameter and about 40μm high.

2. STRATUM INTERMEDIUM:

⇨ A few layers of squamous cells form the stratum intermedium, between the inner enamel epithelium and the stellate reticulum.

⇨ These cells are closely attached by desmosomes and gap junctions.

3. STELLATE RETICULUM:

⇨ The stellate reticulum expands further, mainly by an increase in the amount of intercellular fluid.

⇨ The cells are star shaped , with long processes that anastomose with those of adjacent cells.

4. OUTER ENAMEL EPITHELIUM:

⇨ The cells of this flatten to form a low cuboidal.

⇨ At the end of the bell stage, preparatory to and during the formation of enamel, formely smooth surface of the outer enamel epithelium is laid in folds.

DENTAL LAMINA:

⇨ It is seen to extend lingually and is termed successional dental lamina as it gives to enamel organs of permanent deciduous teeth.

DENTAL PAPILLA:

⇨ It is enclosed in the invaginated portion of the enamel organ. Before the inner enamel epithelium begins to produce enamel, the peripheral cells of the mesenchymal dental papilla differentiate into ODONTOBLASTS.

DENTAL SAC:

⇨ Before formation of dental tissues [illegible] the dental sac shows a circular arrangement of its fibers and resembles a capsular structure.

ADVANCED BELL STAGE:

⇨ During this the boundary between inner enamel epithelium and odontoblasts outlines the future dentinoenamel junction.

⇨ In addition the cervical portion of the enamel organ gives rise to the epithelial root sheath of hertwig.

⇨ The hertwig's epithelial root sheath(HERS) outlines the future root and is thus responsible for the shape, length, size and number of roots.

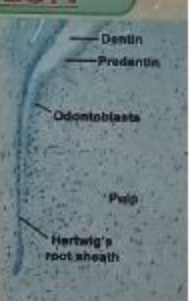
ROOT FORMATION

⇨ Hertwig's root sheath consists of outer and inner enamel epithelia only.

⇨ Clumps of epithelial remnants near external surface of root which are found in periodontal ligament of erupted teeth are called REST OF MALASSEZ.

⇨ Root sheath forms epithelial diaphragm which is fixed during development and growth of root.

⇨ If the cells of epithelial root sheath remain adherent to the dentin surface, they may differentiate into fully functioning ameloblasts and produce enamel. Such droplets of enamel are called ENAMEL PEARLS.



DEPARTMENT OF DENTAL ANATOMY AND DENTAL HISTROLOGY

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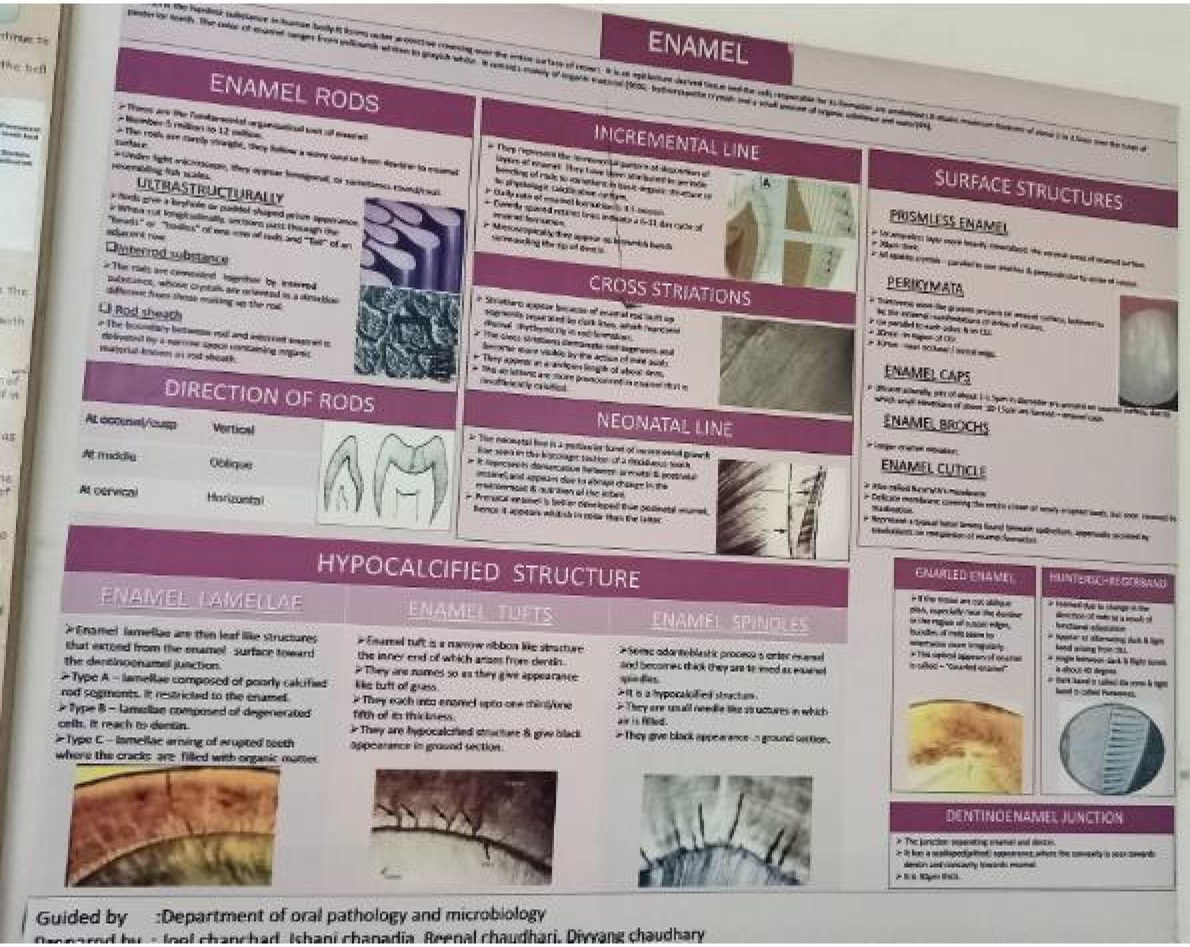
Dr. Brijesh Patel

1st Year B.D.S. Students (2009-2010)

By : Sejal A. Mehta
Bhumika H. Sha


ENAMEL
ENAMEL RODS
ULTRASTRUCTURALLY
Interrod substance
Rod sheath
DIRECTION OF RODS
At occlusal/cusp Vertical
At middle Oblique
At cervical Horizontal
INCREMENTAL LINE
CROSS STRIATIONS
NEONATAL LINE
SURFACE STRUCTURES
PRISMLESS ENAMEL
PERIKYMATA
ENAMEL CAPS
ENAMEL BROCHS
ENAMEL CUTICLE
HYPOCALCIFIED STRUCTURE
ENAMEL LAMELLAE
➢Enamel lamellae are thin leaf like structures that extend from the enamel surface toward the dentinoenamel junction.
➢Type A – lamellae composed of poorly calcified rod segments. It restricted to the enamel.
➢Type B – lamellae composed of degenerated cells. It reach to dentin.
➢Type C – lamellae arising of erupted tooth where the cracks are filled with organic matter.
ENAMEL TUFTS
➢Enamel tuft is a narrow ribbon like structure the inner end of which arises from dentin.
➢They are names so as they give appearance like tuft of grass.
➢They each into enamel upto one third/one fifth of its thickness.
➢They are hypocalcified structure & give black appearance in ground section.
ENAMEL SPINDLES
➢Some odontoblastic process enter enamel and becomes thick they are termed as enamel spindles.
➢It is a hypocalcified structure.
➢They are small needle like structures in which air is filled.
➢They give black appearance in ground section.
GNARLED ENAMEL
DENTINOENAMEL JUNCTION
Guided by :Department of oral pathology and microbiology
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Cells and fibers of Periodontal Ligament

PDL is a connective tissue structure that attaches the tooth to the alveolar bone.
Components of PDL includes cells, fibers, ground substance, etc.

CELLS

A. Synthetic Cells

They synthesize proteins that forms extracellular substance of connective tissue.

1. **Osteoblasts**
- Cuboidal cells with prominent round nucleus at the basal end lining the tooth socket.
- Function: Formation of organic matrix of bone and mineralization of matrix.

2. **Cementoblasts**
- Distributed along cementum surface of PDL fibroplasts.
- Cuboidal with large vesicular nucleus and prominent nucleoli.
- Function: Formation of cementoid.

3. **Fibroblasts**
- They are predominant cells in PDL.
- They are fusiform in shape and lie parallel to tooth surface.
- Function: Formation of proteins like GAG, glycoproteins, collagen, elastin, etc.

B. Resorptive Cells

1. **Osteoclasts**
- Large oval multinucleated cells found in Howship's lacunae or surrounds end of bone spicule.
- Function: Resorption of bone that allows functional changes in position of teeth.

2. **Cementoclasts**
- Resembles osteoclasts and occasionally found in current functioning periodontal ligament.
- They are mononucleated or multinucleated giant cells.
- Function: Resorbs cementum.

3. **Fibroblasts**
- Fusiform cells with large nucleus.
- Function: rapid degeneration of collagen by fibroblast phagocytosis.

C. Progenitor Cells

- Have capacity to undergo mitotic cell division.
- Present in low concentration in location adjacent to blood vessels and also enter PDL through adjacent endosteal spaces.
- They are derived from undifferentiated mesenchymal cells.

D. Epithelial Cell Rests Of Malassez

- They are remnants of HERS found closer to cementum.
- Appears cluster like with prominent nucleus and scanty cytoplasm.
- Undergo rapid proliferation and give rise to certain pathogenic conditions like cysts and tumors of jaw.

E. Defense Cells

1. **Mast Cells**
- They are small ovoid/oval cells with centrally located nucleus.
- They are found adjacent to blood vessels.
- Function: 1.Important role in regulation of endothelial and fibroblast cell proliferation.
2. Mast cell histamine plays role in inflammatory reaction.

2. **Macrophages (scavenger cells)**
- Round or oval cells with kidney shaped nucleus.
- Derived from blood monocytes, found adjacent to blood vessels.
- Function: Phagocytosing dead cell and secreting growth factors.

3. **Eosinophils**
- Occasionally seen in PDL.
- They possess granules that consists of one or more crystalloid structure.
- Function: Phagocytosis.

FIBERS

Collagenous Fibers:

- They are fibers containing collagen which is a protein composed of different amino acids. These are principal fibers.
- The collagen is gathered to form bundles appox. 5 micro meter in diameter. Within each collagen bundle, subunits are present called Collagen fibrils.
- They are classified into:

1.Alveolar crest group
- Extends obliquely from cementum beneath junctional epithelium to alveolar crest.
- Function: Fibers resist tilting, intrusive, extrusive and rotational forces.

2.Horizontal group
- Run at right angles to long axis of teeth from cementum to alveolar bone and parallel to occlusal plane of arch.
- Function: Resist horizontal and tipping forces.

3.Oblique group
- Most numerous and occupy two third of ligament.
- Inserted into alveolar bone at position coronal to their attachment to cementum.
- Function: Resist vertical and intrusive force.

4.Apical group
- Absent in incompletely formed root.
- From cementum to root tip and fibers gets anchored into fundus of bony socket.
- Function: Resist force of luxation, prevent tooth tipping.

5.Interradicular group
- They are inserted into cementum from crest of interradicular septum in multirooted teeth.
- Function: Resist tooth tipping, torquing and luxation.

Elastic Fibers:

- Three types, which are histochemically and ultra structurally different.

1.Mature elastic fibers
- Elastic protein contains a high percentage of glycine, proline and hydroxylic residues.
- These fibers are observed only in the wall of afferent blood vessels.

2.Oxytalic fibers
- Fibers are seen as bundles of micro fibrils embedded in a small amount of amorphous elastin.
- Observed only within the fibers of gingival ligament.

3.Oxytalan Fibers
- They are type of immature elastic fibers.
- Appears to consist of microfibrillar component only.

Sharpey's fibers:

- Collagen fibers are embedded in cementum on one side of PDL space and into alveolar bone on another.
- Sharpey's fibers in cellular cementum are mineralized fully.
- Few Sharpey's fibers pass through bone to alveolar process as Transalveolar fibers.

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THE MANDIBULAR CANINE

Introduction

The mandibular canine crown is narrower mesiodistally than that of the maxillary canine.The root may be as long as the maxillary canine,but usually it is somewhat shorter.

The labiolingual diamention of crown and root is usually a fraction of a millimeter less,adapting this measurement to the other anterior teeth.

The lingual surface of the crown is smoother,with less cingulum development and less bulk to the marginal ridge.

The cusp of the mandibular canine is not as well-developed as that of the maxillary canine, and the cusp ridge are thinner labiolingually.

A variation in the form of the mandibular canine is bifurcated root.This variation is not rare.

Here,
MCR :- Mesial cusp ridge
MMR :- Mesial marginal ridge
MLF :- Mesiolingual fossa
DMR :- Distal marginal ridge
DCR :- Distal cusp ridge
C :- Cingulum
CL :- Cervical line
LR :- Lingual ridge
DLF :- Distolingual fossa

Chronology & Measurement Table

Appearance of calcification	4 To 5 Year
Enamel completed	6 To 7year
Eruption	9 To 10 Year
Root Completed	12 To14 year

CUSP TIP TO INCISAL LENGTH OF CROWN [MM]	LENGTH OF ROOT [MM]	MESIAL DISTAL DIAMETER AT CERVIX [MM]	MESIO DISTAL DIAMETER AT CROWN [MM]	LABIO LINGUAL DIAMETER AT CROWN [MM]	LABIO LINGUAL DIAMETER AT CERVIX [MM]	CERVICAL LINE MESIAL [MM]	CERVICAL LINE DISTAL [MM]
11.0°	14.8	7.0	7.5	7.5	5.0	2.5	3.0

Labial Aspect

The mesiodistal dimensions of the mandibular canine are 1mm lees than maxillary canine.

The crown of the mandibular canine appear longer. The crown is narrower mesiodistally and the height of the contect areas above the cervix.

The mesial outline of the crown is nearly straight with the center of the root with the mesial contect area being near the mesioincisal angle.

The distal contect area is more toward the incisal aspect than that of the maxillary canine but it not up to the level of the mesial aspect.

The cervical line labially has a semicircular curvature apically.

Many mandibular canine give the impression from this aspect of being bent distally on the root base.

Labial ridge is less prominent than maxillary canine .

Lingual Aspect

The lingual surface of the crown is flatter,simulating the lingual surface of mandibular incisor.

The cingulum is smooth and poorly developed.

The margical ridge are lees distinct.The lingual surface of the crown is smooth and regular.

The lingual portion of the root is narrower relativity then that of the maxillary canine.

Mesial Aspect

The mandibular canine has lees curvature labially on the crown with very little curvature directly above the cervical line.

The curvature at the cervical portion is lees than 0.5mm.The lingual outline of the crown is curved that of the maxillary canine,but it differs in degree.

The cingulam is not as pronounced and the incisal portion of the crown is thinner labiolingually,which allows the cusp to apper more pointed and the cusp ridge to appear more slender.

The tip of the cusp is more nearly centered over the root,with a lingual placement in some cases camparable to the placement of incisal ridge on mandibular incisors.

The developmental depression mesially on the root of the mandibular canine is more pronounced and some time quite deep.

Distal Aspect

Incisal portion is blunt in maxillary canine. Incisal portion is sharp in mandibular canine.

Labial surface is lees convex in maxillary canine. In mandibuler canine labial surface is more convex.

Littel difference from the distal aspect can be seen between mandibular and maxillary canine in this FIGURE*

Incisal Aspect

The outline of the crowns of mandibular and maxillary canine from the incisal aspect are often similar.

The cusp tip and mesial cusp ridge are more likely to be inclined in a lingual direction in the mandibular canine with the distal ridge and the contect area extension distinctly so.

The mesiodistal dimention is lees than the labiolingual dimention.

The outline of the mesial surface are lees curved.

The Root

Second longest root of all teeth.

Less wider mesiodtstally.

Root apex is sharp.

Distal deflection of apex is less greater.

The lingual portion of the root is narrower relativity then that of the maxillary canine.

The developmental depression mesially on the root of the mandibular canine is more pronounced and some time quite deep.


Cervical Cross Section of Root


Labio-lingual Section


Mesio-distal Section

DENTAL ANATOMY AND DENTAL HISTOLOGY

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Dr. Binita Trivedi

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1st Year B.D.S. Students (2009-2010)

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•The Permanent Maxillary Second Premolar•

INTRODUCTION

It develops from four lobes.
This tooth supplements the first premolar in its functions.
It is a more rounded tooth with a single root.

CHRONOLOGY

First evidence of calcification	: 2-2.25 years
Crown completed	: 6-7 years
Eruption	: 10-12 years
Root completed	: 12-14 years

MEASUREMENT TABLE

	Maxillary 2nd Premolar (mm)
Cervico-incisal length of crown	8.5
Length of root	14.0
Mesiodistal diameter of crown	7.0
Mesiodistal diameter of crown at cervic	5.0
Labio or bucco-lingual diameter of crown	9.0
Labio or bucco-lingual diameter at cervic	8.0
Curvature of cervical line-mesial	1.0
Curvature of cervical line-distal	0.0

BUCCAL ASPECT

Buccal surface is smaller and less convex.
Buccal ridge is less prominent.
Tip of buccal cusp is less sharp.
Distal slope of buccal cusp ridge is longer than mesial slope.
The crown and root are thicker at their cervical portions.

LINGUAL ASPECT

Lingual surface is larger and more convex.
Lingual cusp appears longer making crown longer on lingual side.

MESIAL ASPECT

The cusps of the second premolar are shorter, with the buccal and lingual cusps more nearly the same length.
Greater distance between cusps widens the occlusal surface buccolingually.
No developmental depression is evident on the mesial surface of the crown.
The crown surface is convex.
A shallow developmental groove appears on the single tapered root.
No deep developmental groove crossing the mesial marginal ridge.

DISTAL ASPECT

The distal root depression is deeper than the mesial depression on the maxillary second premolar.

OCCLUSAL ASPECT

The outline of the crown is more rounded or oval, rather than angular.
The central developmental groove is shorter and more irregular.
This supplementary groove terminates in a shallow depression of the enamel.
This arrangement makes for an irregular occlusal surface and gives the surface a very wrinkled appearance.

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PERMANENT MAXILLARY CANINE

INTRODUCTION :-

- Canine is the third tooth from median line, right and left, in the maxilla.
- It is commonly referred as "cornerstone" of the dental arches.
- Their resemblance to the prehensile tooth of the carnivore gave the term CANINE.
- They are very efficient in function, stability and maintaining natural facial expressions.

CHRONOLOGY:-

- First evidence of calcification: 4-5 months
- Enamel completed:6-7 years
- Eruption: 11-12 years
- Root completed: 13-15 years

DIMENSIONS:-

Cervicoincisal length of the crown:	10.0mm
Length of root:	17 mm
Mesiodistal diameter of the crown:	7.5 mm
Mesiodistal diameter of the crown at cervix:	5.5 mm
Labiolingual diameter of the crown:	8 mm
Labiolingual diameter of the crown at cervix:	7mm

Detailed Description

LABIAL ASPECT:-

- The Cusp has mesial and distal slopes with mesial being shorter.
- Shallow depressions give rise to three labial lobes.
- Middle one has greater development, thus produces a ridge, whose all areas exhibit convexity except for insignificant developmental lines in enamel.
- The labial surface of crown is smooth without developmental lines.
- Mostly the cusp tip is on a line with the centre of the root.

LINGUAL ASPECT:-

- The cingulum is large and in some instances pointed like a small cusp.
- At times lingual surface of the canine crown is so smooth that fossae or minor ridges are difficult to distinguish.
- Usually the smooth cingulum marginal ridges and lingual portion of the incisal ridges are confluent with the little evidence of developmental grooves.

MESIAL ASPECT:-

- The outline of the crown is wedge shaped and the greatest measurement is at the cervical third.
- Many canines show a flattened area labially a the cervical third of the crown.
- The entire labial outline is more convex than the maxillary central incisor.
- The mesial surface of the canine crown presents convexities at all points except for a small, circumscribed area above the contact area, where the surface is concave and flat between that area and the cervical line.

DISTAL ASPECT:-

- The distal aspect is similar to the mesial one but with some variations, which are as follows.
- The cervical line exhibits less curvature towards the cusp ridge; the distal marginal ridge is heavier and more irregular in outline; the surface displays more concavity above the contact area.

INCISAL ASPECT:-

- The labiolingual dimension is greater than the mesiodistal.
- The tip of the cusp is labial to the centre of the crown labiolingually, and mesial to the centre mesiodistally.
- The crown of this tooth gives the impression of having the entire distal portion stretched to make a contact with the first premolar.
- Buccal ridge is noticeable labially from the incisal aspect.

The Root:-

- Labially root is conical with a bluntly pointed apex and has a sharp curve at apical third.
- Root is narrower lingually than labially.
- The lingual ridge of the root is rather narrow but is smooth and convex at all points from the cervical line to the apical end.
- Mesially, the outline of the root is conical and the root may curve labially towards the apical third.
- The developmental depression on the distal side of the root is more pronounced.

Department of Dental Anatomy & Histology

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By Students of 1st BDS 2009-2010

• Krushnangi Yagnik • Naisargi Raval •

• Dhara Shiroya • Ravija Italiya • Shivangi Patel

DIFFERENCE BETWEEN THE MAXILL
• FIRST AND SECOND PREMOLAR

General Feature :

First Premolar	Second Premolar
✒Crown is longer ✒Crown is more angular ✒bell shaped feature are well marked	✒Crown is shorter ✒Crown is less angular ✒Bell-shaped features are less marked

Chronology

First Premolar	Second Premolar
✒Tooth : 5, 12 ✒First Evidence of Calcification : 1½ - 1¾ Yr. ✒Crown completed years : 5-6 yr. ✒Emergence (Eruption Years) : 10-11 yr. ✒root Completed years : 12-13 yr.	✒Tooth : 4, 13 ✒First Evidence of Calcification 2 – 2¼ yr. ✒Crown completed Years : 6-7 yr. ✒Emergence (Eruption years) : 10-12 yr. ✒root Completed Years : 12-14 yr.

Measurement

	First Premolar	First Premolar
Cervico Occusal length of crown	8.5	8.5
Length of Roots	14.0	14.0
Mesio-distal diameter of crown	7.0	7.0
Mario-distal diameter of crown at cervix	5.0	5.0
Bucco lingual or Labial diameter of crown	9.0	9.0
Bucco lingual or Labial diameter of crown at cervix	8.0	8.0

Buccal Aspect :

✒Buccal Surface is larger and more convex ✒Buccal ridge is more prominent ✒tip of the buccal cusp is more sharp	✒Buccal surfaces is smaller and less convex ✒Buccal ridge is less prominent ✒tip of the buccal cusp is less sharp

Lingual Aspect :

✒Lingual surface is smaller ✒Cervical border of lingual surface is placed nearer the occlusal than that of buccal ✒Lingual surface is less convex ✒Lingual cusp is much shorter than buccal	✒Lingual surface is larger ✒Cervical border of lingual surface is not so nearer the occlusal than that of buccal ✒Lingual surface is more convex ✒both lingual cusp and buccal cusp are equal

Mesial & Distal aspect :

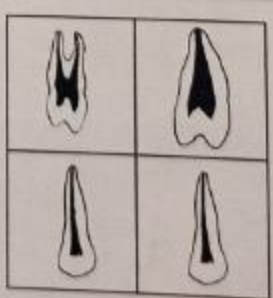
✒Mesial surface shows prominent concavity near cervical & buccal known as canine fossa ✒Distal surface is less convex ✒contact point is smaller on mesial and larger on distal surface	✒No such marked concavity is seen on this surfaces ✒Distal surfaces is comparatively more convex ✒contact point is larger on mesial as well as distal surface

Occlusal aspect :

✒Cusps are shaper ✒Marginal ridges are not so wide and strong ✒Pits and groves are more regular ✒Supplementary grooves are less observed ✒Mesial and distal pits are located ¼ distance from mesial & distal surface ✒Central groove is longer ✒Crown profile hexagonal with sharp mesio buccal and disto buccal corners ✒mesial Marginal developmental groove present in First premolar	✒Cusps are burnt ✒Marginal ridges are wider and strong ✒Pits and groove are less regular ✒Supplementary grooves are more observed ✒Mesial & distal pits are located 1/3 distance from mesial and distal surface ✒Central groove is shorter ✒Crown profile ovoid with mesio buccal and disto buccal corner rounded ✒mesial marginal developmental groove absent in second premolar

Root :

✒Comparatively shorter ✒Root is bifurcated ✒Usually two pulp canal are present ✒Root does not show any tendency of being rounded and conical ✒Apex is usually sharp ✒longitudinal section are seen on mesial & distal surface	✒Comparatively longer ✒Root is usually single ✒Usually a single pulp canal is present ✒Root usually shows tendency of being rounded and conical ✒Apex is usually burnt ✒no longitudinal section are seen on mesial & distal surface



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PERMANENT MANDIBULAR SECOND PREMOLAR

PULP CHAMBERS & CANALS

***Bucco-lingual section:**
There is larger & wider pulp cavity then of the mandibular 1st premolar. The pulp chambers are usually large & may gently taper into pulp canal.

***Mesio-distal section:**
Usually has one root & canal that may be curved, but usually in the distal section.

CUSP TYPES

***Two Cusp type:**
This form of premolar is more rounded having a buccal cusp & lingual cusp.

***Three cusp type:**
This form of premolar is more angular & has one buccal cusp & two lingual cusps.

INTRODUCTION

- The Second mandibular premolar is the larger of the two mandibular premolars.
- This tooth assumes two common forms-
  1. three cusp type
  2. two cusp type

CRONOLOGY

- First evidence of calcification - 21/2 to 21/2yr
- Enamel completed - 6 to 7yr
- Eruption - 11 to 12yr
- Root completed - 13 to 14yr

MEASUREMENT TABLE

	Cervico-Occlusal Length of crown	Length of root	Mesio-distal Diameter of crown	Mesio-distal diameter of crown at cervix	Labio or bucco-diameter of crown	Labio or bucco-lingual diameter of crown at cervix	Curvature of cervix -Mesial	Curvature of cervix -Distal
Dimensions	8.6	14.5	7.0	5.0	8.0	7.0	1.0	0.0

BUCCAL ASPECT

- It resembles the mandibular first premolar from the buccal aspect.
- The buccal cusp is shorter than the first premolar.
- The mesiobuccal & distobuccal cusp ridges presenting angulation of less degree.
- The contact area are broad because of the short buccal cusp.

LINGUAL ASPECT

- The lingual surface is smooth & sphiroidal.
- The root is wide lingualy.
- The two cusp type has no groove, but it shows a developmental depression distolingually.
- The lingual portion of root is smoothly convex for most of its length.

MESIAL ASPECT

- The crown & root are wider buccolingually.
- The buccal cusp is not so nearly centered over the root trunk & it is shorter.
- The mesial marginal ridge is at right angles to the long axis of the tooth.

DISTAL ASPECT

- It is similar to the mesial aspect.
- Distal marginal ridge is at a lower level than the mesial marginal ridge.

OCCLUSAL ASPECT

- The outline of the crown is rounded lingual to the buccal cusp ridge.
- The mesiolingual & distolingual line angles are rounded.
- The three-cusp type appears square lingual & two- cusp type appears round lingual to the buccal cusp ridge.
- Buccal cusp is largest.
- Deep developmental groove converge in central pit & forms "Y" shape on occlusal surface.

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F.Year B.D.S.-2010

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Difference Between Permanent Mandibular First and Second Premolar

Mandibular Right First Premolar

- BC: Buccal Cusp
- LC: Lingual Cusp
- BTR: Buccal Triangular Ridges
- MLDG: Mesiolingual Developmental Groove
- CL: Cervical Line
- BCR: Buccal Cervical Ridge
- MCA: Mesial Contact Area
- MMR: Mesial Marginal Ridge
- MBCR: Mesiobuccal Cups Ridge
- DBCR: Distobuccal Cups Ridge
- CDG: Central Developmental Groove
- DMR: Distal Marginal Ridge

GENERAL OUTSTANDING DIFFERENCES

MANDIBULAR FIRST PREMOLAR	MANDIBULAR SECOND PREMOLAR
• Crown does not show any variations	• There are three types of Crowns Y,H and U
• Crown is smaller. The tooth is smallest of all premolars	• Crown is larger. The tooth is largest of all premolars
• Less efficient as masticatory organ	• More efficient as masticatory organ

THE CROWN : BUCCAL SURFACE

MANDIBULAR FIRST PREMOLAR	MANDIBULAR SECOND PREMOLAR
▪ Narrower Mesio-distally.	▪ Wider Mesio-distally
▪ Compared to its size occlusogingival length is not so short.	▪ Occlusogingival length is shorter than other premolars.
▪ Tip of the buccal cusp is sharper.	▪ Tip of buccal cusp is not so sharp.
▪ Buccal developmental grooves well defined.	▪ Buccal developmental grooves are less defined
▪ Crown is bilaterally asymmetrical	▪ Crown is bilaterally symmetrical

THE CROWN BUCCAL SURFACE (Cont.)

LINGUAL SURFACE (Cont.)

LINGUAL SURFACE

MANDIBULAR FIRST PREMOLAR	MANDIBULAR SECOND PREMOLAR
▪ Lingual surface is not so well developed and is much smaller.	▪ Lingual surface is well developed and larger.
▪ Lingual cusp is shorter and covers smaller area of the occlusal surface.	▪ Lingual cusp is bigger and covers larger area of occlusal surface.
▪ Lingual grooves is absent. Mesio-lingual groove is present	▪ Lingual grooves is present in Y type.
▪ Surface does not show variation in size.	▪ Surface show considerable variations may be narrower in width or same in width as buccal.

MESIAL AND DISTAL SURFACE

FIRST PREMOLAR	SECOND PREMOLAR
▪ Marginal grooves are usually absent.	▪ Marginal grooves are always present.
▪ Both mesial and distal surfaces are smaller.	▪ Both mesial and distal surfaces are larger.
▪ Mesial and distal surfaces converge more rapidly toward lingual.	▪ Mesial and distal surface converge less rapidly.
▪ Mesial marginal ridge inclines cervically above 45 degree.	▪ Mesial marginal ridge is horizontal.
▪ Mesiolingual groove is present	▪ No Mesio-lingual groove is present

MEASUREMENT TABLE

In millimeters

MANDIBULAR FIRST PREMOLAR		MANDIBULAR SECOND PREMOLAR	
Cervicoocclusal Length of Crown	8.5*	Cervicoocclusal Length of Crown	8.0*
Length of Root	14.0	Length of Root	14.5
Mesiodistal Diameter of Crown	7.0	Mesiodistal Diameter of Crown	7.0
Mesiodistal Diameter of Crown At cervix	5.0	Mesiodistal Diameter of Crown At Cervix	5.0
Labio-orbuccolingual Diameter of Crown	7.5	Labio-Orbuccolingual Diameter At Cervix	8.0
Labio-orbucco-lingual Diameter of Crown at Cervix	6.5	Labio-Orbucco Lingual Diameter At Cervix	7.0
Curvature of Cervical Line Mesial	1.0	Curvature of Cervical Line Mesial	1.0
Curvature of Cervical Line Distal	0.0	Curvature of Cervical Line Distal	0.0

CHRONOLOGY

MANDIBULAR FIRST PREMOLAR		MANDIBULAR SECOND PREMOLAR	
First evidence of calcification	1½ to 2 yr	First evidence of calcification	2½ to 2½ yr
Enamel completed	5 to 6 yr	Enamel completed	6 to 7 yr
Eruption	10 to 12 yr	Eruption	11 to 12 yr
Root Completed	12 to 13 yr	Root Completed	13 to 143 yr

MESIAL AND DISTAL SURFACE (Cont..)

OCCLUSAL SURFACE

MANDIBULAR FIRST PREMOLAR	MANDIBULAR SECOND PREMOLAR
▪ Occlusal surface show no variation in the form.	▪ Occlusal surface shows variation in the form. There are three types. Y,H and U types of occlusal
▪ Smaller in size and masticatory function is less.	▪ Larger in size and masticatory function is more.
▪ Formed almost entirely by buccal cusp.	▪ Formed by both buccal and lingual cusp.
▪ Occlusal outline is diamond shape.	▪ Occlusal outline is square of round.
▪ Buccal cusp is more than twice the size of lingual cusp.	Buccal cusp is almost equal in size of lingual cusp.
▪ Occlussal surface slopes lingually.	▪ Occlussal surface is horizontal.
▪ Central pit is never present.	▪ Central pit is present in Y type of premolar.
▪ Mesial marginal ridge is shorter and less prominent than distal marginal ridge.	▪ Mesial and distal marginal ridge are similar.
▪ Transverse ridge is common linking occlusal & lingual cusps.	▪ No transverse ridge is seen.

OCCLUSAL SURFACE (Cont.)

THE ROOT

MANDIBULAR FIRST PREMOLAR	MANDIBULAR SECOND PREMOLAR
▪ Smaller in all dimensions.	▪ Larger in all dimensions.
▪ Usually straight.	▪ May tend to curve distally at apex.
▪ Root may show tendency to bifurcate.	▪ Root does not show tendency to bifurcate

COLLAGE OF DENTAL SCIENCE AND RESEARCH CENTRE

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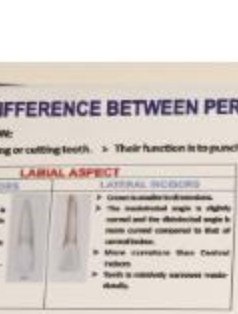
DIFFERENCE BETWEEN PERMANENT MAXILLARY CENTRAL AND LATERAL INCISORS

ORAL INTRODUCTION:

- The Incisors are shearing or cutting teeth.
- Their function is to punch and cut food material during process of mastication.
- Central Incisor is the largest Incisor.

LABIAL ASPECT

CENTRAL INCISORS	LATERAL INCISORS
➢ Crown is bigger in dimensions. ➢ The mesiodistal angle of crown is sharp but distodistal angle is slightly curved. ➢ Labial aspect shows less curvature than Lateral Incisors. ➢ Tooth is relatively wider mesio-distally.	➢ Crown is smaller in dimensions. ➢ The mesiodistal angle is slightly curved and the distodistal angle is more curved compared to that of central incisor. ➢ More curvature than Central Incisors ➢ Tooth is relatively narrower mesio-distally.



CHRONOLOGY

Permanent maxillary central incisor	Permanent Maxillary lateral incisor
➢First evidence of calcification 3-4 months ➢Enamel completed 4-5 yrs ➢Eruption 7-8 yrs ➢Root completed 10 yrs	➢First evidence of calcification 10-12 months ➢Enamel completed 4-5 yrs ➢Eruption 8-9 yrs ➢Root completed 11 yrs

LINGUAL ASPECT

CENTRAL INCISORS	LATERAL INCISORS
➢ The lingual fossa is less concave and shallow than that found on Lateral Incisor. ➢ Lingual fossa is 'U' shaped. ➢ The developmental grooves are less pronounced than that found on the Lateral Incisors. ➢ Ungually, the surface form of maxillary Central Incisors is less irregular. ➢ Mesial & distal marginal ridges are less marked than Lateral Incisors. ➢ Cingulum is less prominent compared to Lateral Incisors	➢ The lingual fossa is more concave & circumscribed than that found on central incisor. ➢ Lingual fossa is 'V' shaped. ➢ More developmental grooves are within the lingual fossa. ➢ Ungually, the surface form of maxillary Lateral Incisors is less irregular with respect to Central Incisors. ➢ Mesial & distal marginal ridges are more marked than Central Incisors ➢ Cingulum is more prominent

INCISAL ASPECT

CENTRAL INCISORS	LATERAL INCISORS
➢ The cervical curvature is greater on mesial surface of central incisors compared to Lateral Incisors. ➢ All maxillary central incisors exhibit less outwardly labially & lingually from incisal aspect than that of maxillary Central Incisors.	➢ The cervical curvature is less on the mesial surface of lateral incisors compared to that of Central Incisors. ➢ All maxillary Lateral Incisors exhibits more outwardly labially & lingually from incisal aspect than that of maxillary Central Incisors.

MESIAL ASPECT

CENTRAL INCISORS	LATERAL INCISORS
➢ Crown is longer, the root is relatively shorter & slender. ➢ The incisal portion of tooth from mesial aspect appears somewhat thinner than that of Lateral Incisors. ➢ Extent of curvature of cervical line is less than that found on Lateral Incisors.	➢ Crown is shorter, root is relatively longer & bulkier. ➢ The incisal portion appears somewhat thicker than that of Central Incisors. ➢ Extent of curvature of cervical line is less than that found on Central Incisors.

ROOT

CENTRAL INCISORS	LATERAL INCISORS
➢ Root appears straight from distal aspect. ➢ Root has blunt apex.	➢ Root appears slightly bulged from distal aspect. ➢ Root has pointed apex.

DISTAL ASPECT

CENTRAL INCISORS	LATERAL INCISORS
➢ Distal outline of Central Incisors from labial surface seems to be regular. ➢ Crown is somewhat thicker towards the incisal third. ➢ The Cemento-Enamel Junction curvature is less.	➢ Distal Outline is more rounded, crest of contour is more cervical, usually in centre of middle 1/3. ➢ Crown is thicker towards marginal ridge to labial face. ➢ The Cemento-Enamel Junction Curvature in this more than Central Incisors.

	LENGTH OF CROWN	MESIO- DISTAL DIAMETER OF CROWN	MESIO-DISTAL DIAM. OF CROWN AT CERVIX	LABIO/BUCCO-LINGUAL DIAMETER OF CROWN.	LABIO/BUCCO-LINGUAL DIAMETER OF CROWN AT CERVIX	CURVATURE OF CERVICAL LINE MESIAL.	CURVATURE OF CERVICAL LINE DISTAL.
CI	10.5 mm	8.5 mm	7.0 mm	7.0 mm	6.0 mm	3.5 mm	2.5 mm
LI	9.0 mm	6.5 mm	5.0 mm	6.0 mm	5.0 mm	10.0 mm	2.0 mm

Presented by:

Anjana Patel, Deep Patel, Dhruvi Patel, Drashti Patel, Harshil Patel

Guided by:

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PERMANENT MANDIBULAR FIRST MOLAR

INTRODUCTION

- Also known as "6 years molar".
- Largest tooth in mandibular arch.
- Mesiodistal dimension is larger than Bucco-lingual dimension.

MEASUREMENT TABLE

	Crown – occlusal length of crown	Length of Root	Mesiodistal diameter of crown	Mesiodistal diameter of crown at cervix	Bucco-lingually diameter of crown	Bucco-lingually diameter of crown at cervix	Curvature of cervical line - Mesial
Dimension in mm.	7.5	14.0	11.0	9.0	10.5	9.0	1.0

CHRONOLOGY

First evidence of calcification	At Birth
Crown completed	2.5-3 years
Eruption	6-7 years
Root Completed	9-10 years

BUCCAL ASPECT

- It appears trapezoidal in shape.
- Mesiobuccal cusp > Distobuccal cusp > Distal asper dimension.
- Distobuccal cusp is sharper.
- There are 2 Grooves on buccal surface.
- (A) Mesiobuccal groove
  (B) Distobuccal groove

- Buccal pit is more prominent on end of mesiobuccal groove.
- Mesial border : It follows convex to Middle third and then becomes straight upto cervical line.
- Contact area is at junction of occlusal and middle third.
- Distal border :convex and contact area at middle third.
- Roots : There are 2 roots ,i.e. mesial and distal roots.

OCCLUSAL ASPECT

- Crown appears hexagonal in shape.
- 5 cusps can be seen.
- The size of cusps in decreasing order is as follows - MB>ML=DL>DB>DISTAL.
- Ridges -5 Triangular ridges
  -2 Marginal ridges
- Size of mesial marginal ridges is greater than distal marginal ridge.
- Fossaes - central fossa
  - mesial triangular fossa
  - distal triangular fossa

LINGUAL ASPECT

- From lingual aspect 3 cusp can be seen i.e. Mesiolingual, which is largest in size , then distolingual and then distal cusp .
- Width of mesiolingual and distolingual cusps are same.
- Root trunk is 4 mm long.
- Root appears longer.

MESIAL ASPECT

- Mesial marginal ridge is higher.
- Rhomboidal shape can be seen.

ROOTS-

- Root is broad bucco-lingually.
- Mesial root have 2 root canals.
- Deep developmental depression can be seen.

DISTAL ASPECT

- 3 cusp are seen from distal aspect.
- Tooth is slightly tilted distally , so occlusal and mesial cusp can be seen .
- Distal marginal ridge is lower in height.
- Crown is narrowed distally.

Prepared By :- Kavan Doshi, Nilesh Gadiya, Dharti Gajjar, Dhaval Gohel, Poojan Dabhi . **(First Year B.D.S)**
Guided By :- Department of Oral Pathology and Microbiology . **Batch: 2014-2015**

Mandibular Second Molar

Introduction-

- The mandibular second molar supplements first molar in function.
- The crown has 4 well developed cusps 2 buccal & 2 lingual & 2 roots (1 mesial & 1 distal).
- Second molar is smaller then first.

Chronology-

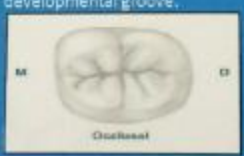
1st evidence of calcification	: 2-3 year
Enamel completed	: 7-8 year
Eruption	: 11-13 year
Root completed	: 14-15 year

Buccal Aspect-

- Buccal crown is shorter cervico-oclusally and narrower mesiodistally than 1st molar.
- Development groove lies bucally – the buccal developmental groove.
- The cervical line buccally points sharply towards the root bifurcation.
- The roots are inclined distally in relation to the occlusal plane of the crown.

Occlusal Aspect-

- Distobuccal lobe is more pronounced then mesiobuccal lobe.
- Buccal and lingual developmental grooves meet the central developmental groove at right angles.
- These grooves form 4 cusps.
- Cusp slopes on occlusal surface are not smooth as on 1st molars because they are roughened by many supplemental groove radiating from the developmental groove.



Lingual Aspect-

- The crown and root converge lingually due to this little mesial and distal surface can be seen.
- This mesiodistal calibration at the cervix lingually is always greater then 1st molar.
- Curvatures mesially and distally on crown are noticeable from these aspect.

Mesial Aspect-

- Mesial marginal ridge is 'V' shaped.
- Occlusal surface is more constricted bucco-lingually.
- Cervical line shows less curvature.
- Mesial root is pointed apically.
- Distally root may be seen buccally.

Distal Aspect -

- There is absence of distal cusp and distobuccal groove.
- Contact area is centered on distal surface.

Cervico occlusal length	Length of root	Mesiodistal diameter of the crown	Mesiodistal diameter of crown at cervix	Labial diameter of crown	Labio diameter of crown at cervix
7.0 mm	13.0 mm	10.5 mm	8.0 mm	10.0 mm	9.0 mm

Prepared By : RAVI , UTSAV, MONALI, KAVYA, NIRZARI (1ST YEAR B.D.S) Guided By :DEPARTMENT OF ORAL PATHOLOGY AND MICROBIOLOGY

MAXILLARY SINUS (Antrum of Highmore)

Sinus are air filled spaces within bone.
Maxillary sinus is pneumatic space inside the body of maxilla that communicates with environment by means of middle nasal meatus and nasal vestibule.
It's largest of all sinuses.It has it's opening on the posterior part of Hiatus semilunaris

DEVELOPMENT

- Maxillary sinus is the first sinus to develop.
- It appears as shallow groove on medial surface of maxilla during 16th week/4th month of intrautrine life
- It grows rapidly for 6-7years.
- The cavity develops laterally and downward thus have ostium at upper and other recesses.

FUNCTIONS

- Being an air space , it lessens the weight of skull
- Provides voice resonance
- Protects skull against mechanical shock
- It warms & moistens the inspired air.
- It produces bactericidal lysozyme & contribute to defence against bacterial infection.

STRUCTURE

It's described as a 4 sided pyramid.
Base is located medially and the apex is located laterally.
The 4 sides of pyramid is as follows:-
Anterior : To facial surface of body
Posterior : To infraorbital surface
Superior : To orbital surface
Inferior : To alveolar & zygomatic process
Base of sinus is it's thinnest wall with perforation in it called as ostium

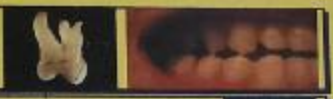
MICROSCOPIC FEATURES

- 3 layers are seen: 1. Epithelial layer 2. Basal layer 3. Sub-epithelial layer
- Epithelium is made of psuedostratified ciliated columnar derived from olfactory epithelium of middle nasal meatus.
- Most common cells found are columnar ciliated. Other cells are also found they are – Basal cells, columnar non-ciliated, mucous secreting goblet cell.
- The goblet cells displays all the characteristics of secretory cells.
- On the basis of histochemical differentiation it's evident that acini of subepithelial glands contains two types of cells-serous & mucous.
- The secretion of this glands is controlled by both divisions of ANS.
- They autonomic axon, together with general sensory components are supplied to maxillary sinus from maxillary sinus complex.
- Numerous myelinated & non-myelinated axons are present in subepithelial layer of sinus. They are related here to blood capillaries,fibroblasts,fibrocytes,collagen bundle & other connective tissue elements.

Prepared by : Susmit Upadhyay, Nihita Vaja , Nilu Varma , Hiren vasani , Shifa vohra
Guided by : Department of oral pathology and microbiology.

ANATOMICAL LANDMARKS OF TOOTH

CUSP :
- An elevation or mound on the crown portion of a tooth making up a divisional part of the occlusal surface .



TUBERCLE:
- is a smaller elevation on some portion of the crown produced by an extra formation of enamel. Deviation from the typical form are evident .

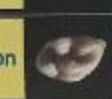
CINGULUM :
- is the lingual lobe of an anterior tooth & makes up the bulk of the cervical third of the lingual surface. Its convexity resembles a girdle encircling the lingual surface.

RIDGE :
- Ais any linear elevation on the surface of a tooth & is named according to its location.

MARGINAL RIDGE :
- are those rounded border of the enamel that form the mesial & distal margins of the occlusal surface of the premolar & molar and mesial & distal margins of the lingual surface of the incisor & canine.

TRIANGULAR RIDGE :
- descend from the tips of the cusps of molars & premolar toward the central part of the occlusal surfaces.

OBLIQUE RIDGE :
- is a ridge obliquely crossing the occlusal surfaces of maxillary molars & formed by the union if the triangular ridge of the distobuccal cusp & the distal cusp of the mesiolingual cusp .

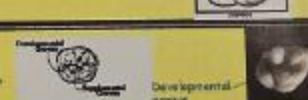


FOSSA :
- is an irregular depression or concavity .

SULCUS :
- is a long depression or valley in the surface of a tooth between ridges & cusps' the inclines of which meet at an angle.

TRANSVERSE RIDGE:
- is the union of two triangular ridges transversely crossing the surface of a posterior teeth .

DEVELOPMENTAL GROOVE :
- a shallow groove or line between the primary parts of the crown root.



SUPPLEMENTAL GROOVE :
- is less distinct is also a shallow linear depression on the surface of a tooth ' but it is supplemental to developmental groove and does not mark the junction of primary parts.

PITS :
- are small pinpoint depression located at the junction of developmental grooves or at the terminals of those grooves.

LOBE :
Ais one of the primary sections of formation in the development of the crown . Cusps and mamelons are representative of lobes .

MAMELON :
- Is any one of the three rounded protuberances found on the incisal ridges of newly erupted incisor teeth.

Prof. & Head : Dr. Binita Trivedi
Reader Dr. Suchi Shah
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1ST YEAR BDS (2009-2010)
Bijal Ridham Harnisha
Gargi Malvi Krishna

PERMANENT MANDIBULAR RIGHT CENTRAL INCISOR

INTRODUCTION:-

- The mandibular incisors have smaller mesiodistal dimensions than any of the other teeth.
- These teeth have smooth crown surfaces that show few traces of development lines.
- The crown has little more than half the mesiodistal diameter of the maxillary central incisor.

CHRONOLOGY:-

- First evidence of calcification :3 to 4 months
- Enamel completed :4 to 5 years
- Eruption :6 to 7 years
- Root completed :9 years

MEASUREMENT TABLE :-

Cervico-Incisal Length Of Crown	Length Of Root	Mesiodistal Diameter Of Crown	Mesiodistal Diameter Of Crown At Cervix	Labial-Or Bucco-Lingual Diameter Of crown	Labial-Or Bucco-Lingual Diameter Of crown At Cervix	Curvature Of Cervical Line-Mesial	Curvature Of Cervical Line-Distal
9.5	12.5	5.0	3.5	6.0	5.3	3.0	2.0

LABIAL ASPECT :-

- It is regular, tapering evenly from mesial and distal incisal angles to the apical portion of the root.
- The incisal ridge of the crown is straight and at right angle to the long axis of the tooth.
- The mesial and distal sides of the crown taper evenly from the contact areas to the narrow cervix.
- The apical third of the root terminates in a small, pointed taper curving distally.
- The crown is ordinarily smooth at the incisal third; the middle third is more convex, narrowing down to the convexity of the root at the cervical portion.

LINGUAL ASPECT :-

- The crown is smooth with slight concavity at the incisal third.
- The lingual surface becomes flat and then convex from the incisal third to cervical third.
- No developmental lines mark the cingulum development at the cervical third.
- The outlines and surfaces are regular and symmetrical.

MESIAL ASPECT :-

- The outline of the labial face of the crown is straight.
- The incisal ridge is rounded.
- The curvature of the cervical line representing the cementoenamel junction (CEJ) curves incisally.
- The roots have broad developmental depression at the junction of the middle and apical thirds.

DISTAL ASPECT :-

- The cervical line representing the cementoenamel junction (CEJ) curves incisally about 1 mm less than on the mesial.
- The distal surface is similar to that of the mesial surface.
- The developmental depression has a well defined developmental groove at its center.

INCISAL ASPECT :-

- The incisal edge is at right angles to the line bisecting the crown labiolingually. This feature is characteristic of the tooth and serves as a mark of identification in differentiation between mandibular central and lateral incisors.
- The labiolingual diameter is always greater.
- The labial surface of the crown is wider mesiodistally than the lingual surface.

ROOT :-

- The root is narrower, thinner and shorter.
- Longitudinal groove are less convex.
- Variation at root is not common.

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ACADEMIC YEAR : 2009-2010

DIFFERENCE BETWEEN MANDIBULAR CENTRAL INCISOR AND LATERAL INCISOR

INTRODUCTION

Mandibular Central Incisor	Mandibular Lateral Incisor
•Smaller in all dimensions •Smallest tooth •Bilaterally symmetrical. •First tooth erupting in oral cavity •Crown does not appear tilted on the teeth as incisal edge is placed along the labio-lingual center of the tooth.	•Slightly larger in all dimensions •Second Smallest tooth. •Bilaterally asymmetrical. •Erupts after central incisor. •Longer incisal – cervically , mesio – distally and labio-lingually. •Crown does not appear tilted on the teeth as incisal edge is placed near the lingual center of the tooth.

DIMENTION

Mandibular Central Incisor	Mandibular Lateral Incisor
•Cervico-incisal length of crown 9.5 mm •Length of root 12.5 mm •Mesio distal diameter of crown 5.0mm •Mesio distal diameter of crown at cervix 3.5 mm •Labio OR Bucco- lingual diameter of crown 6.0mm •Labio OR Bucco- lingual diameter of crown at cervix 5.3mm	•Cervico-incisal length of crown 9.5mm •Length of root 14.0mm •Mesio distal diameter of crown 6.5mm •Mesio distal diameter of crown at cervix 4.0mm •Labio OR Bucco- lingual diameter of crown 6.5mm •Labio OR Bucco- lingual diameter of crown at cervix 5.8mm

CHRONOLOGY

Mandibular Central Incisor	Mandibular Lateral Incisor
•Fort evidence of calcification 3 to 4 month •Enamel Completed 4 to 5 Yrs. •Eruption 6 to 7 Yrs. •Rool Completed 9 Yrs.	•Forst Evidence of Calcification •4 to 5 •7 to 8 •10 Yrs.

LABIAL ASPECT

Mandibular Central Incisor	Mandibular Lateral Incisor
•Labial surface is narrower Mesio-distally •In the Mesio-distal direction the incisal portion is less Convex. •Mesial and distal border are equal in length. •Incisal border is at right angle to the long axis to the tooth. •Mesio-incisal and disto-incisal angle are almost at right angle. •Mesio and distal lobes are approximately equal in length, width and degree of prominence. •Mammelons : Mesial and distal mammelons are equally prominent.	•Labial surface is wider Mesio-distally. •In the Mesio-distal direction the incisal portion is more convex. •Distal border is shorter than Mesial. •Incisal border shows inclination towards cervical as it extends from mesial to distal. •Mesio-incisal is almost at right angle while disto-incisal angle is rounded. •Mesial lobe is longer and more prominent than distal lobe. •Mammelons : Distal mammelons are less prominent.

LINGUAL ASPECT

Mandibular Central Incisor	Mandibular Lateral Incisor
•Cingulum and marginal ridge less prominent •Lingual Fossa moderately deep. •Incisal portion is less concave. •Cervical portion is compare to wider •Lingual surface is smaller than lateral incisal	•Cingulum and marginal ridge more prominent •Lingual Fossa moderately deep. •Incisal portion is more concave. •Cervical portion is comparatively narrows. •Lingual surface is slightly larger.

MESIAL & DISTAL ASPECT

Mandibular Central Incisor	Mandibular Lateral Incisor
• Mesial and distal surface resemble each other and equal in length.	• Mesial and distal surface do not resemble each other mesial is longer than distal.

INCISAL ASPECT

Mandibular Central Incisor	Mandibular Lateral Incisor
• Incisal edge is straight and crown dose not appear to be rotated on long axis. • Labial profile is flat. • Labial lobes dose not visible.	• Incisal edge is inclined towards lingual as it goes from mesial to distal and crown appear to be rotated on long axis. • Labial profile is rounded. • Labial lobes are visible.

ROOT ASPECT

Mandibular Central Incisor	Mandibular Lateral Incisor
The root is narrow, thinner, shorter. Longitudinal grooves are less common. The root is always straight.	The root is wider, thicker, little longer. Longitudinal grooves are more common. The root is usually straight.

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1ST YEAR BDS (2009-2010)

Dhwani Chandni Jinal

Shrrena Hemal

MAXILLARY LATERAL INCISOR

Introduction

The lateral incisor is smaller in all dimensions except the root length.This tooth differs from Central Incisor in its development which may vary considerably. A common situation is to find MLI with a non-descript pointed form.such teeth are called peg- shaped laterals. The presence of Palatogingival groove in MI may be a predisposing factor in periodontal disease. This groove is also known as Palato-Radicular groove.

CHRONOLOGY :

First evidence of calcification : 1 year
Enamel completed : 4 to 5 years
Eruption : 8 to 9 years
Root completed : 11 years

CERVICO- INCISAL LENGTH OF CROWN	LENGTH OF ROOT	MESIODISTAL DIAMETER OF CROWN	MESIODISTAL DIAMETER OF CROWN AT CERVIX	LABIO-OR BUCCO-LINGUALDIAMETER OF CROWN	LABIO OR BUCCO LINGUAL DIAMETER AT CERVIX
9.0	13.0	6.0	5.0	8.0	5.0

LABIAL ASPECT :

- Maxillary Lateral Incisor usually has more curvatures,with a rounded Incisal Ridge and rounded incisal angles mesially and distally.
- The distal outline is always more rounded, & the crest of contour is more cervical.
- The labial surface of the Crown is more convex.
- The crown measures from 2-3mm shorter Cervico-incisally than that of CI.
- The Root usually somewhat as long as that of CI
- The root length is greater in proportion to its crown length than that of CI.
- The root is often about 1.5 times the length of crown.

MESIAL ASPECT :

- The Crown is Shorter,the Root is relatively Longer.
- The labiolingual measurement of crown and root is millimeter or so less than CI.
- Curvature of the cervical line is marked in the direction of incisal ridge. the actual extent of curvature is less than that found in the CI.
- Incisal portion is somewhat thicker because of the development of the incisal ridge.
- The root appears as a tapered cone from this aspect with a bluntly rounded apical end.
- The labial outline of root is straight from this aspect.

INCISAL ASPECT :

- The tooth conforms in its development to its CI in other aspects, except the size.However, the Cingulum may be large,as in the Incisal Ridge.
- Additionally the Labiolingual dimension may be greater than usual in comparison with the mesiodistal dimension.
- If these variations are present the tooth has a mark resemblance to a small canine.

LINGUAL ASPECT :

- The cingulum is usually prominent,with a tendency towards deep developental grooves within the lingual fossa.
- The lingualincisal ridge is well developed and the lingual fossais more conacave.
- The tooth tapers towards the lingual.

DISTAL ASPECT :

- The width of the Crown distally appears thicker than it does on the Mesial Aspect from marginal ridge to labial face.
- The curvature of Cervical line is usually 0 mm or less in depth than on the Mesial side.
- It is not uncommon to find a developmental groove distally on this crown extending on the root for part or all of its length.

- Dr Binita Trivedi (HOD & Professor)
Dr. Shuchi Shah (Reader)
Dr Brijesh Patel (Senior Lecturer)
By : Nisha , Soha & Yama
1st year B.D.S- 2009 -2010

Oral Cancer

Oral cancer is the most common cancer in India and according to Dr. Geoff Craig "People are dying of oral cancer because of ignorance"

Introduction

- Cancer is one of the most common diseases in the developing world.
- According to the IARC 1 in 10 of all cancers in India are oral cancer.
- Just like because of enterprise use of tobacco and betel quid.
- The most common form of Oral cancer is Squamous cell carcinoma.
- Head and neck cancer can develop in anyone, but people who use tobacco (including cigarettes, cigars, pipes, and smokeless tobacco) or drink alcohol excessively are much more likely than others to develop the disease.

Causes

1. Radiation
   - Ionizing and non-ionizing radiation
2. Chemicals
   - (S)-N'-nitrosonornicotine, or (S)-NNN
3. Virus Infection
   - human papilloma virus (HPV)
4. Hereditary predisposition
5. Consumption of Tobacco and Smoking
6. Extreme Sun Exposure
   - Ultraviolet radiations

Signs & Symptoms

- a sore in the mouth that won't heal (the most common symptom of oral cancer)
- a red or white patch in the mouth that doesn't go away
- frequent mouth sores, ongoing mouth congestion, or chronic sinus infections that do not respond to treatment
- persistent sore throat
- pain in the neck, throat, or ears that won't go away
- change in the voice
- difficulty chewing, swallowing, or moving your tongue
- numbness in the tongue or other areas
- loosening of teeth
- dentures that no longer fit
- a lump or swelling in the neck
- changes in a mole or discoloration, or a sore on the skin that is crusting, oozing, or fails to heal (these are also signs of skin cancer).

F.A.Q.'s

How do I prevent oral cancer ?

Stopping all the habits of tobacco consumption. Stopping means complete stop to the habit. Reducing the consumption of tobacco does not reduce your risk of cancer. But stopping completely will remove that risk.

Is tobacco the only cause of oral cancer ?

Tobacco is the risk or cause of oral cancer but certainly not the only cause. There are other causes like poor oral hygiene, chronic irritation from sharp tooth or ill fitting dentures. There are other agents like some viruses which are thought to cause or expedite the effect of tobacco in causing oral cancer.

Why is that not all people consuming tobacco have oral cancer ?

There are many factors like genetic make of the person, his diet and many unknown factors that increases or decreases the susceptibility of person of having oral cancer. But one thing is certain that tobacco consumption increases your susceptibility by almost 6 times. That means a person consuming tobacco is more prone to have oral cancer or other tobacco related problems.

Who is more susceptible to oral cancer ?

Anybody consuming tobacco is susceptible to oral cancer. Differences in genetics have not been identified in relation to risk and survival. That means a Caucasian or a mongoloid, Black race is at are equally prone to oral cancer if they consume tobacco.

I have a precancerous lesion in my mouth, would I get cancer ?

It depends on whether you continue your habit or not. If you stop your habit then your chances of getting oral cancer decreases drastically. But it is always better to get your precancerous lesion checked by a Dentist. He will suggest you the best thing for you and may be he will take a biopsy sample of the lesion for histo-pathological check up. Or he may apply some specific Dyes to the lesion so that check its neoplastic potential.

How is the diagnosis established ?

Diagnosis is established by many ways like applying dyes like Toluidine blue which may give false positive results in inflammatory lesion but never false negative, using X rays and scans to see the extension of the lesion and the bony involvement and the most confirmatory test is biopsy of the lesion and its histo-pathological examination.

What is the treatment available ?

Treatment is surgery, and in advanced cases surgery followed by radiation therapy is done. But even that is not always successful as 70% of the cases after treatment leads to relapse and the result is death. The treatment is successful only if the lesion is diagnosed early, but sadly many times, it is ignored until the patient reports when the lesion has spread so much that the treatment is impossible or even if done the long term prognosis is poor.

I occasionally chew tobacco/smoke, and keep tobacco only for very short time. Am I susceptible for cancer ?

Tobacco has many chemicals which can cause cancer and lower intake doesn't mean less susceptibility. If a person is genetically more predisposed then even little consumption can trigger malignancy.

My friend has been told that he has oral cancer, but he does not believe it. what to do?

Cancer is very well treated with fewer complication in early stages. So if a doctor has said it at your friend has cancer than don't neglect it. If you don't believe get it checked from an authority. Remember time is an enemy here. Even if their is slight delay the prognosis mostly goes from good to bad to worse.

My dentist has recommended the biopsy of the premalignent lesion. What should I do?

Biopsy is the only confirmatory test of whether you have oral cancer or not. If your Dentist has recommended a biopsy he has given you the right advice. Go ahead and do it as soon as possible.

I have oral cancer and I am taking ayurvedic medicine. Will that help?

I am not an authority on ayurvedic medicine, but it has been generally noted that ayurvedic medicines don't work once you have oral cancer and you have to undergo surgery. So don't wait, get the surgery done at once. May be if the lesion has not progressed to a will have a excellent prognosis.

My Friend had cancer after tooth extraction. Was the doctor negligent?

No! You can never have oral cancer with any dental procedure performed by your Dentist. The predominant sign of alveolar and gingival carcinoma is mobile tooth/teeth, and only after extraction when the socket doesn't heal and there is some growth, you find out that the tooth/teeth were mobile because of cancer. This is a case of misdiagnosis and not wrong treatment. This type of diagnosis can be missed even by the best of Dentist. Usually such cases with a history of tobacco consumption

Sites of Oral Cancer

- **Oral cancer** is cancer that arises in the mouth, or oral cavity. The oral cavity includes:
- the lips,
- the gums and the cells behind the wisdom teeth,
- the inside of the lips and cheeks,
- the floor and roof (hard palate) of the mouth,
- the front two-thirds of the tongue.

Cancer Of Tongue Following Tobacco Consumption

Cancer Of Maxilla After Smoking Bidi

Cancer Of Gums Following Eating Of Gutka

Preventive Measures

1. Limit alcohol.
2. Maintain a healthy weight.
3. Stop physically active.
4. Consider limiting fat in your diet.
5. Avoid prolonged exposure to the sun and other UVR/UVA sources, such as tanning beds.
6. Use proper amount of sunscreen or products with an SPF of 15 or higher every day, even if it's cloudy.
7. Wear large-framed or wrap-around sunglasses to protect the eye area.
8. Have your skin checked by a dermatologist regularly.
9. Do avoid all poisonous chemical substances such as cigarettes, alcohol, oil without fumes, as well as human sacrificed by factory chimneys, which are very toxic.
10. Additive is a carcinogenic substance used for coloring food, or by the smoke artificially dyed foods and artificial nuts for colored foods.

Cancer Of Lower Lip

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SALIVA – Formation, Composition and Functions

Saliva is a complex fluid produced by the salivary glands, the most important function of saliva is to maintain the well being of the mouth.

FORMATION OF SALIVA

Saliva is formed in the secretary end piece and is made of 2 components

Fluid and electrolytes

Secretion of water is regulated by parasympathetic innervation.

ACh/Norepinephrine/Subs.P binds to receptors & activates Phospholipase C

↓

Release of Ca^{2+} from intracellular stores

↓

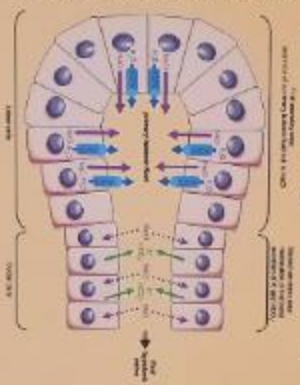
Cl^- channels (Cl^- efflux)
Na^+ channels (Na^+ influx)

↓

Change in osmotic gradient

↓

Flow of water into the lumen



Macromolecular components

Nucleus of cell send message (mRNA) to ribosomes

↓

Signal sequence synthesized & attached to RER membrane

↓

RER vesicles reach cis face of Golgi apparatus(GA)

↓

Vesicles migrate to trans face of GA where they are packed into vacuoles (immature granules)

↓

Granules undergo glycosylation

↓

Mature granules stored at the apex of the cell

↓

Granules are emptied by exocytosis (serous cells)
Mucous droplets (mucous cells)

Control of sectretion is mediated by ANS (parasympathetic). For control of secretion gustatory stimulus is more important than masticatory stimulus.

COMPOSITION OF SALIVA

Saliva

- Water(99.5%)
- Solids(0.5%)
  - Organic(0.3%)
    - PROTEINS
      - Glucoproteins
      - Salivatory proteins
      - Serum proteins
    - BLOOD GROUP SUBSTANCES
    - CARBOHYDRATES
      - Glucose
      - Galactose
    - SALIVARY CORPUSCLES
    - KALLIKREIN
    - ENZYMES
      - Ptyalin
      - Lysozyme
      - Phosphatase
    - LIPIDS
    - VITAMINS
      - Riboflavin
      - Nicotinic acid
      - Vit K
  - Inorganic(0.2%)
    - Sodium
    - Potassium
    - Calcium
    - Chloride
    - Bicarbonate
    - Inorganic Phosphate

Found in low conc.:
Magnesium
Sulphate
Iodide
Fluoride
O_2
CO_2

FUNCTIONS OF SALIVA

- CLEANSING: Flushes away debris and non adherent bacteria.
- LUBRICATION & MUCOSAL INTEGRITY: Presence of Mucin and Glycoproteins lubricates OMM.
- BUFFERING: Primary system made by Bicarbonates.
- REMINERALIZATION: Formation of Enamel Pellicle prevents caries.
- ANTIMICROBIAL: Due to presence of Lysozymes, Lactoferrins, Immunoglobulins.
- FORMATION OF BOLUS: Helps in Deglutition & Mastication.
- SPEECH: Helps in vocalization and communication.
- TASTE PERCEPTION: Maintained by presence of Water and Lipocalins.
- DIGESTION: It participates by presence of Salivary Amylase and Lingual Lipase.
- BLOOD CLOTTING: Includes Vitamin K, Kallikrein, and Nerve Growth Factor.

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Guided by: Department of Oral Pathology and Microbiology.

GIANT CELL LESIONS

Giant cell:Giant cells are large (40-50μ) multinucleated cells, formed by fusion of macrophage with only occasional internal nuclear divison.

CLASSIFICATION

MICROBIAL LESION
1)Tuberculosis
2)Leprosy
3)Actinomycosis
4)Sarcoidosis

TUMOR AND TUMOR LIKE LESION
1) Central giant cell
2)Peripheral
3)Giant cell fibroma
4)Giant cell tumor
5)Osteosarcoma
6)Rhabdomyosarcoma
7)Hodgkin's lymphoma

CYSTIC LESION
1) Traumatic cyst
2)Aneurismal bone cyst

BONY LESION
1) Cherubism
2)Pagets's disease
3)Fibrous dysplasia

METABOLIC LESION
1)Hyperparathyroidism

TYPES

FOREIGN BODY	LANGHAN'S	TOUTON	TUMOR	MISCELLANEOUS
▶Nuclei (up tp 100μ) which are uniform in size & shape and resembles the nuclei of macrophages. ▶Seen in chronic infective granulomas, Leprosy & TB.	▶Nuclei resembels macrophages and epitheloid cell. These nuclei are arranged around the periphery in the form of horseshoe shape or ring or clustered at the 2 poles of giant cells. ▶Seen in TB and sarcoidosis.	▶There are multinucleated cells which have vaculated cytoplasm due to lipid content. ▶e.g Inxanthoma	▶Nuclei are hyperchomatic and very in size and shape. ▶e.g In carscinoma of liver and various soft tissue sarcoma.	▶These includes presence of numerous nuclei in mesodermal cells. ▶e.g Aschoff cells of rheumatic nodule, readstenberg cells of hodgkin's disease and osteo-clast like cells..

CENTRAL GIANT CELL GRANULOMA

Uncommon,benign & proliferative lesion.

CLINICAL FEATURES:

- Common in young once especially <30 years of age.
-Female>Male
-Mandible>Maxilla
-Common in anterior segment of jaws
-Expansion of cortex & perfusion. Mobility,displacement and root resorption of associated teeth.
-Classified in to 1)Aggressive 2)Non-Aggressive

HISTOLOGIC FEATURE:
-Loose fibrillar connective tissue stroma with proliferating fibroblasts & small capillaries.
-Multinucleated giant cells in CT which are osteoclast like & formed from monocyte or macrophage.

RADIOLOGIC FEATURES
-Multilocular radiolucency.

TREATMENT:
-Curettage or surgical excision

PERIPHERAL GIANT CELL GRANULOMA

Reactive & Non specific nodular mass of growth present on gingiva.

CLINICAL FEATURE:

-4th-6th decade of life
-Female>Male
-Mandible>Maxilla
-Anteriors>Molars
-Asymptomatic and about 1cm in size
-Pedunculated or sessile lesion often dark red vascular or haemorrhagic in appearance.

HISTOLOGIC FEATURE:
-Characteristic feature - Zone of dense fibrous CT separating the lesional tissue from over lying stratified squamous epithelium.
-Multinucleated giant cells are distributed in highly cellular CT having numerous spindle shape resembling osteoclast being round.

RADIOLOGIC FEATURES :
-Peripheral cuffing of bone.

TREATMENT :
- Curettage

GIANT CELL TUMOR OF BONE

It is distinctive neoplasm of undifferentiated cells.

CLINICAL FEATURES:

-Seen in >19yr with a peak incidence in the 3rd decade of life.
-Female>MAle
-Swelling on affected region
-Weakness and limitation of motion of jaw

HISTOLOGIC FEATURE:
-Basic proliferating cells has round to oval or even spindle shaped nucleus in the field that is diagosis of true giant cell tumor.
-Nucleus is surrounded by ii defined cytoplasm.
-Intercellular substance is absent.
-Mitotic figures can e found.
-Areas of infarct like necrosis is common.

TREATMENT:
-Curettage
-Cryosurgery

ANEMIA

Anemia is defined as a abnormal reduction in number of circulating Red blood cells, the quantity of haemoglobin and volume of packed red cell in given unit of blood

Classification

- According to pathophysiology
  - Anemia due to increased blood loss
    - Acute post haemorrhagic anemia
    - Chronic blood loss
  - Anemia due to impaired Red cell production
    - Cytoplasmic maturation defects
      - Deficient haem synthesis – Iron deficiency anemia
      - Deficient globin synthesis – Thalassemic syndromes
    - Bone marrow infiltration
    - Defect in stem cell proliferation and differentiation
      - Aplastic Anemia
      - Pure red cell aplasia
    - Anemia of chronic disorders
    - Nuclear maturation defects
      - Vitamin B12 and/or folic acid deficiency – Megaloblastic anemia
    - Congenital anemia
- According to morphology
  - Normocytic, Microcytic
  - Hypochromic, Macrocytic
  - Hypochromic, Microcytic
  - Normocytic, Normochromic

IRON DEFICIENCY ANEMIA

The iron deficiency arises through chronic blood loss, inadequate dietary intake, faulty iron absorption or because of increased requirement of iron.
Associated with PLUMMER VINSON SYNDROME

ORAL MANIFESTATIONS

- Glossitis and stomatitis
- Angular cheilitis
- Atrophy of fungiform and filiform papillae
- Pale oral mucosa
- Candidiasis
- Erythematous mucositis
- Oral ulcers
- Burning sensation in mouth

SICKLE CELL ANEMIA

Peculiar microscopic appearance of sickle crescent shaped erythrocytes found in circulating blood. The normal adult Hb (HbA) is genetically altered to produce sickle Hb (HbS).

ORAL MANIFESTATIONS

- Significant bone changes in dental radiograph – Mild to moderate osteoporosis and a loss of trabeculation of jaw bones with appearance of large irregular marrow spaces
- Nuclear enlargement, binucleation and an atypical chromatin disturbance

PERNICIOUS ANEMIA

(Addison- Biermer anemia)

Vitamin B12 deficiency – It develops because of loss of gastric parietal cells, which are responsible for secretion of intrinsic factor

ORAL MANIFESTATION

- Glossitis, painful and burning lingual sensations
- Tongue – beefy red colour
- Shallow ulcers – resembling aphthous ulcers occurs on tongue
- Atrophy of papillae – bald tongue
- Loss of taste sensation
- Recurring stomatitis
- The burning sensation extends to involve the entire oral mucosa

APLASTIC ANEMIA

It is a bone marrow failure syndrome characterized by peripheral pancytopenia and general lack of bone marrow activity
PANCYTOPENIA : It may affect RBC, WBC and platelets resulting in pancytopenia

ORAL MANIFESTATIONS

- Petechial purpuric spots or frank hematomas of the oral mucosa may occur at any site, while haemorrhage into the oral cavity
- Development of ulcerative lesions of the oral mucosa or pharynx

THALASSEMIA

(Cooley's Anemia, Erythroblastic Anemia, Mediterranean Anemia)

Genetically determined disorders of Hb synthesis with decreased production of either alpha or beta polypeptide chains of haemoglobin molecules

2 types : Thalassemia Major and Thalassemia Minor

ORAL MANIFESTATION

- Prominent Premaxilla results in an obvious malocclusion
- Oral mucosa exhibits anemic pallor colour

PREPARED BY : SANKET PATEL, SALONI PATEL, KRUPA PATEL, NIDHI PATEL, RITU PATEL, PANKTI PATEL, KALKI PATEL, SURBHI PATEL, HETA PATEL, JEEMY PATEL
GUIDED BY: DEPARTMENT OF ORAL PATHOLOGY AND MICROBIOLOGY

3rd year
BATCH-

Op spotters

1

SUPERNUMERARY TOOTH

2

FLUROSIS

3

ATTRITION

4

CERVICAL ABRASION

5

EROSION

6

SIALOLITH

7

ODONTOME

8

FUSION

9

GEMINATION

10

CONCRECSCENCE

11

RHIZOMEGALY

RIZOMICRY

13

SUPERNUMEREARY ROOT

14

MESIODENS

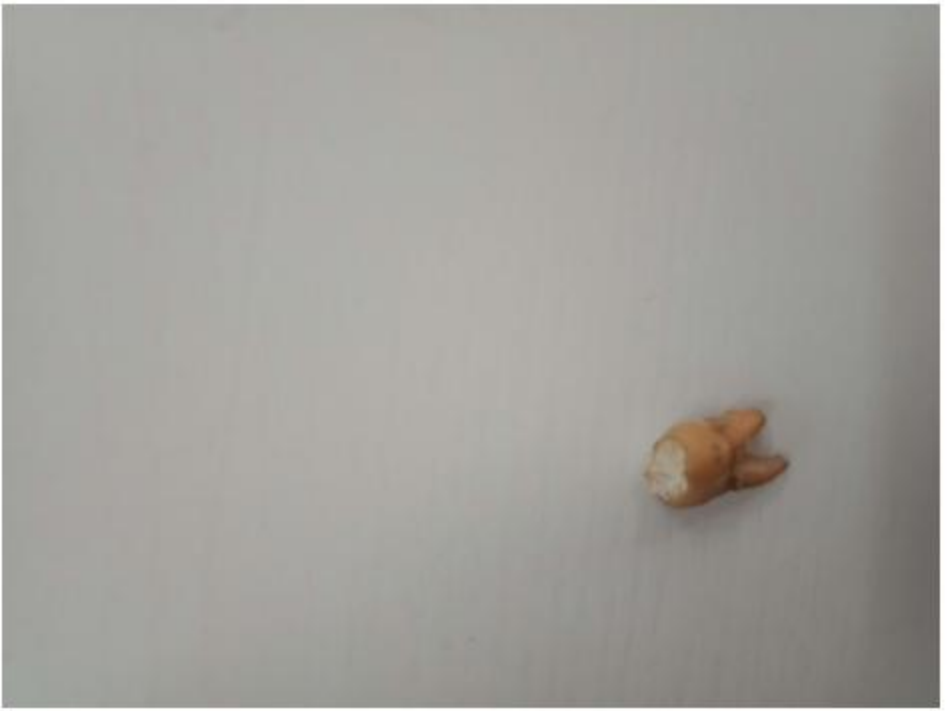
15

ENAMELPEARL

16

TAURODONTISM

17



DENS EVAGINATUS

18

PIT AND FISSURE CARIES

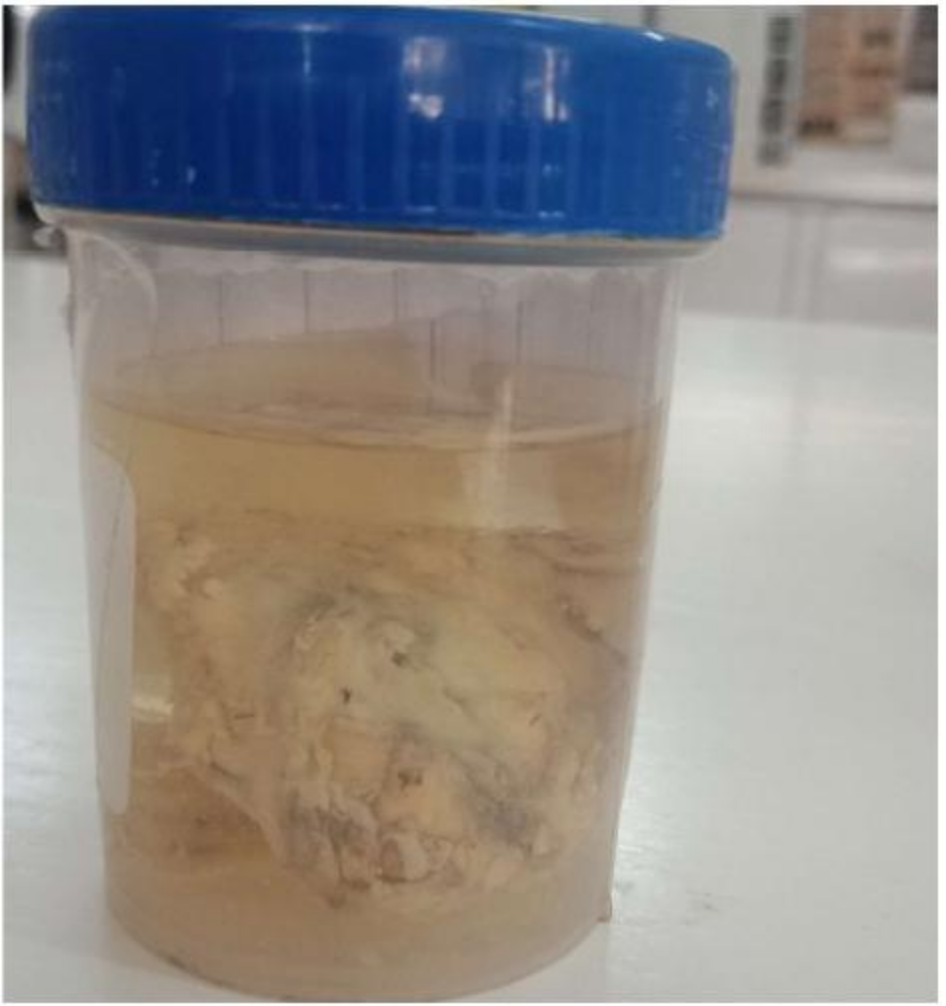
SMOOTH SURFACE CARIES

20

ROOT CARIES

21

CYST SPECIMEN



TUMOR SPECIMEN

PERIAPICAL GRANULOMA

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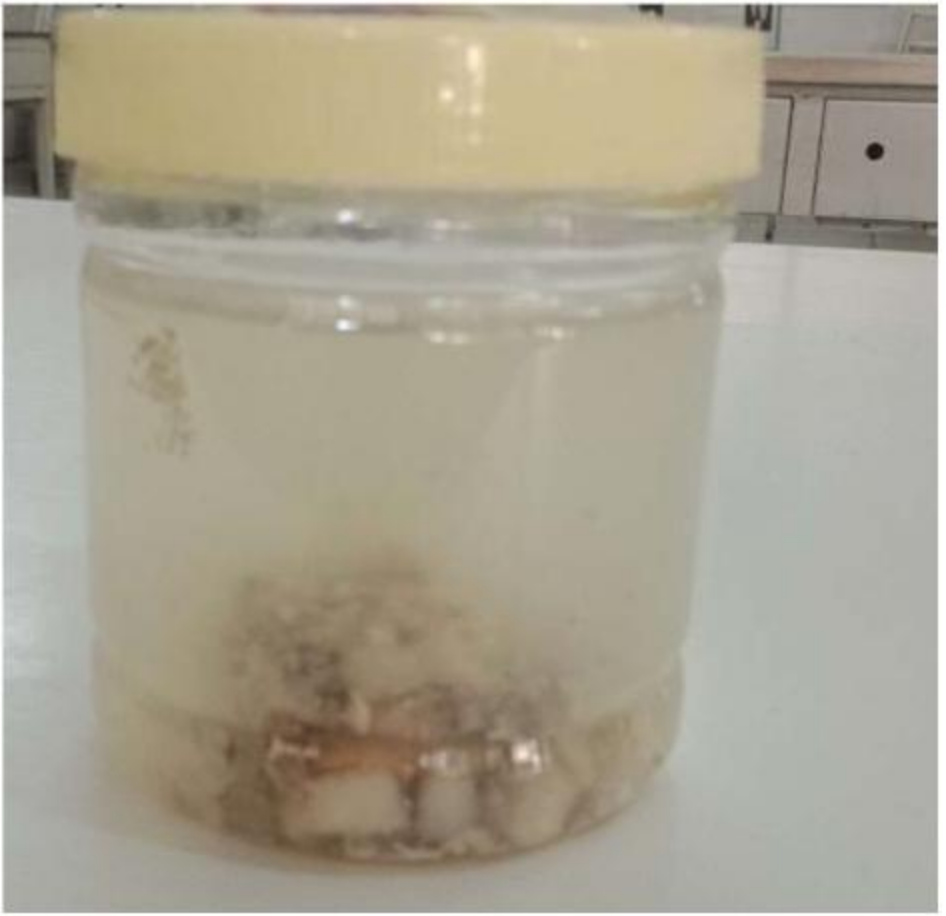
FIBROMA

25



MALIGNANT SPECIMEN

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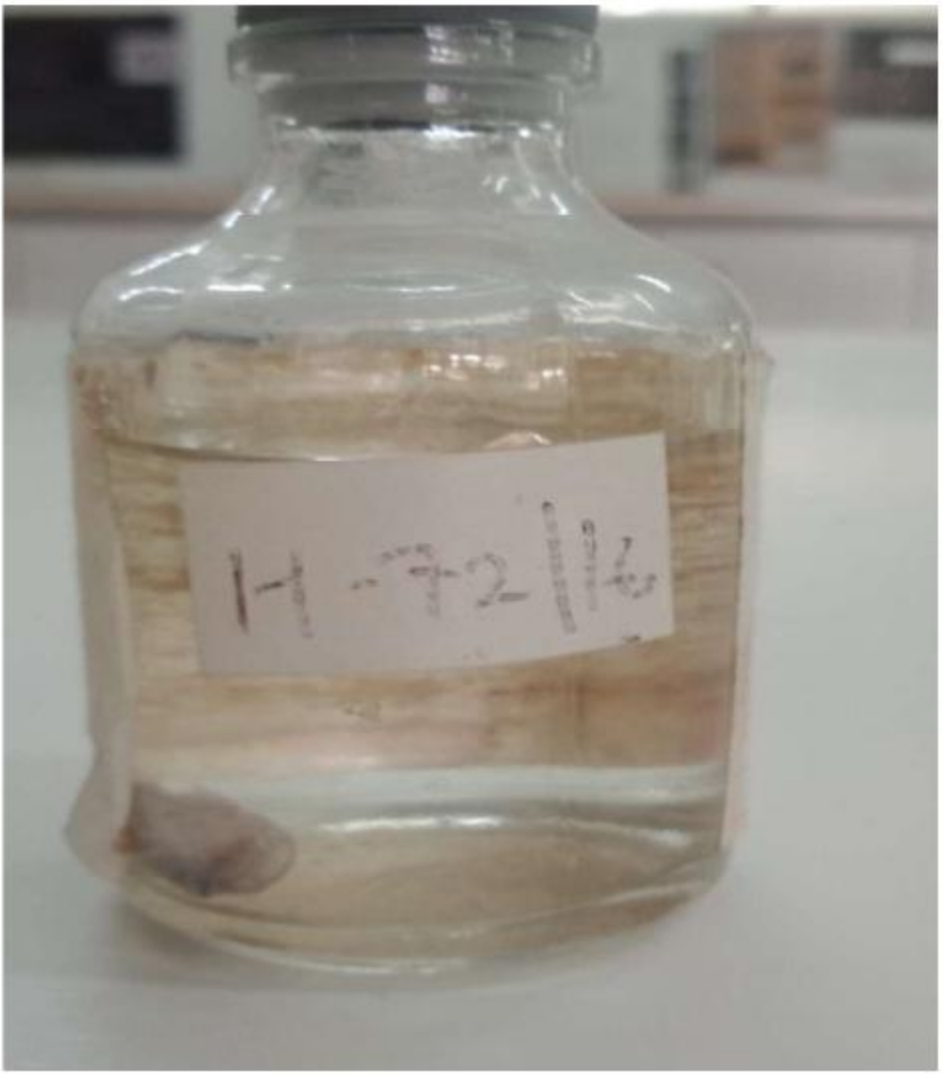

PLEOMORPHIC ADENOMA SPECIMEN