

## Test

Name - Vinutha

- 1) Phosphate bonded investment material (5)
- 2) Types of casting defects (5)
- 3) Methods of strengthening porcelain (5)
- 4) Sprue (2)
- 5) Die space (2)
- 6) Pickling (2)
- 7) Casting ring loss (2)
- 8) Copy milling (2)

21  
25  
Bm

### Answers

① Phosphate bonded investment material:

⇒ These are the most widely utilized investment in dentistry.

### Uses

\* Used for casting high fusing alloys.

They are supplied as powder & liquid form.

### Composition

Powder - Ammonium diacid phosphate

Silica

Magnesium oxide

Carbon.

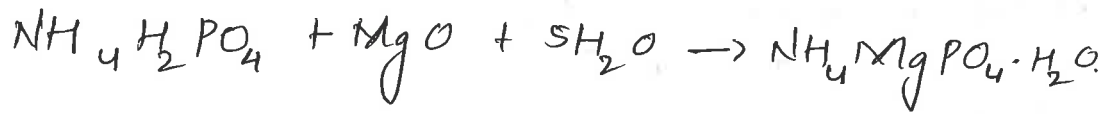
Liquid - Silica sol in water.

[ Gives higher thermal expansion ]

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## Setting Reaction

Ammonium diacid phosphate reacts with magnesium oxide to give room temperature strength.



## Manipulation

Powder / liquid ratio - 16 - 23 ml / 100 gm.

The powder is mixed with measured amount of liquid using bowl & spatula. Hand mixing for 20 sec. & mechanical mixing under vacuum is done for 90 sec. Working time is around 8-9 min. The mixed material is vibrated into the casting ring. Material is allowed to set for 30-45 min.

## Factors affecting setting time

- \* Increased L-P ratio delays setting & gives more working time.
- \* Increasing the mixing time accelerates the set.
- \* Warmer temperature accelerates the setting, & cooling the liquid prolongs working time.

## Properties of phosphate bonded investment material

### \* Expansion

Phosphate investments get their expansion from 3 sources.

- 1) Wax pattern expansion - The heat during setting allows significant expansion of the wax.
- 2) Setting expansion - Its around 0.7 to 1%.
- 3) Thermal expansion - Its around 1 to 1.5%.

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## Factors affecting expansion

- 1) Special liquid to water ratio - Greater the core<sup>n</sup> of special liquid to water, the greater the thermal & setting expansion.
- 2) Powder to liquid ratio - A greater powder to liquid ratio increases expansion.

(4)

## \* Strength

→ These materials of low strength. Wet strength ranges from 4-10 MPa.

## \* Thermal reactions

Phosphate bonded investments undergo thermochemical reaction when heated to high temperature. Silica portion remains unchanged.

## \* Flow

Investments appear to have low flow when mixed.

## \* Surface Smoothness

Current investments have improved this property.

## ② Types of casting defects

Any It is an irregularity in the metal casting process that is very undesired. Errors in the procedure often results in defective casting.

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## Types of casting defects

- A] Metal excess [ Nodules, fins, larger casting ]
- B] Metal Deficiency [ Smaller casting, Incomplete casting, Porosity ]
- C] Distortion of the casting.
- D] Chemical contamination of the casting.

### \* Casting Size mismatch

The restoration should retain its dimension after casting.

\* Too small

\* Too large.

- Dimension related problems are usually related to improper technique & failure to understand property of material

### \* Distortion

It is due to distortion of wax pattern.

- Some distortion of wax occurs when investment hardens
- Some occurs due to release of stresses.

It is minimized by

- Manipulation of wax at high temp.
- If necessary store in refrigerator.

### \* Surface roughness

#### Causes

- Type of investment - Phosphate bonded investments tend to have greater roughness.
- Composition of investment - Proportion of the quartz & binder influences the surface texture.

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→ Particle size → Larger particle size of investment produce coarse casting.

→ Improper w-p ratio.

→ Prolonged heating.

→ Overheating.

→ Too high too low casting pressure.

→ Foreign body inclusion.

### \* Surface Defects

They are caused by air or gas bubbles

Minimized by

→ Proper mixing of investment

→ Vibration of mix

→ Application of wetting agent

### \* Fin

These are narrow raised areas on casting, corresponds to crack in the investment.

Minimized by


→ Proper w-p ratio.

→ Avoid prolonged & rapid heating.

→ Adequate setting time.

### \* Porosity

It may be internal or external. It can cause discoloration of the casting.

  
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## Types of Porosity

- 1) Caused by Solidification  $\leftarrow$  Localised  
Suck back  
Microporosity.
- 2) Caused by gas  $\leftarrow$  Pinhole  
Gas inclusions  
Subsurface porosity.
- 3) Caused by air trapped in the mold.

## \* Incomplete casting

It may result when

- $\rightarrow$  Insufficient alloy used
- $\rightarrow$  Alloy not sufficiently molten.
- $\rightarrow$  Mold is not heated.
- $\rightarrow$  Low casting pressure.

## \* Contamination

- 1) Oxidation, caused by
  - $\rightarrow$  overheating
  - $\rightarrow$  Use of oxidizing zone of flame
  - $\rightarrow$  failure to use flux.
- 2) Sulfur compound.
  - $\rightarrow$  Not overheating alloy.

## \* Black casting

- $\rightarrow$  Due to overheating investment
- $\rightarrow$  Incomplete elimination of wax pattern.

4 1/2

Draw diagrams

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### ③ Methods of Strengthening Porcelain

Ans Porcelains are brittle. Minute scratches, cracks, defects, Porosity etc.

Methods are

1) Residual compressive stresses through CTE Mismatch.

\* The method is to have layers of ceramic with slight differences in the coefficient of thermal expansion.

\* The inner layer should have slightly higher CTE than outer layer.

2) Residual compressive stresses through thermal tempering.

\* The method is used in the automobile industry to strengthen glass.

\* Residual compressive stress may be created by rapidly cooling the surface of the object while it is in the hot state.

x

3) Residual compressive stress through ion exchange.

\* The ion exchange process involves 2 ions with difference in size.

\* Fracture resistance is confined to the surface of the glass to thickness of 100  $\mu\text{m}$ .

4) Dispersion Strengthening.

\* Modern glass based ceramics use dispersion strengthening.

\* The process involves dispersion of crystalline material within ceramic which interrupts the formation of cracks.

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### 5) Transformation toughening

\* It is primarily associated with yttria-stabilized zirconia core ceramics.

\* This involves stress induced transformation of the material at the tip of the crack with accompanying volume expansion.

### 6) Minimizing stress through optimal design

Sufficient thickness for the ceramic, avoiding sharp internal line angles & point angles avoiding marked changes.

### 7) Strengthening by bonding to a stronger substrate

It can be improved by bonding to a stronger substrate.

### 8) Minimizing fabrication defects & stress

Ceramics can be made stronger by proper manipulation & fabrication. Proper condensation & vacuum firing reduces porosity in the restoration.

(4)

Draw diagrams.



4] Sprue

Ans It is made of wax, plastic or metal.

2

It is a channel through which molten alloy can reach the mold in an inverted ring after the wax has been eliminated.

Functions


- \* Provides a reservoir of molten metal which compensate for alloy shrinkage during solidification.
- \* forms a channel for entry of molten alloy during casting.

5] Die Spacers

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Ans A die spacer is coated over the die which provides space for the luting cement.

- \* The relief also improves seating of the casting.
- \* These spacers improve the outflow of excess cement, decrease seating forces, improve occlusal contacts.

  
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## 6] Pickling

=> Surface of the casting appear dark with oxides & transmit. Such a surface film can be removed by process called pickling.

### Solutions used

- \* 50% HCl
- \* Phosphoric acid.
- \* Hydrofluoric acid.

(2)

## 7] Casting Ring Line

A ring line is placed inside of the casting ring. It should be short at one end.

-> Now a days nonabsorbent ring liners used. those are

- \* Fibrous ceramic aluminous silicate
- \* cellulose

(2)

### Function

- \* Allows for mold expansion.
- \* Permit easy removal of the investment.

## 8] Copy Milling

\* It is the metal structure similar to that described for ceramics.

\* It is based on the principle of scanning of a resin of the restoration milling replica out of the metal blank.

(1)

1. write composition of dentin
2. physical and chemical properties of enamel
3. write eruption sequence
4. Define enamel spindles, ground enamel
5. Neonatal lines of enamel & dentine
6. draw diagram for the following
  - lymphocytes
  - plasma cells
  - mast cells.
7. Mention histological stages of tooth development
8. Tomes process
9. Hypocalcified structures of dentine.
10. Age changes of enamel.

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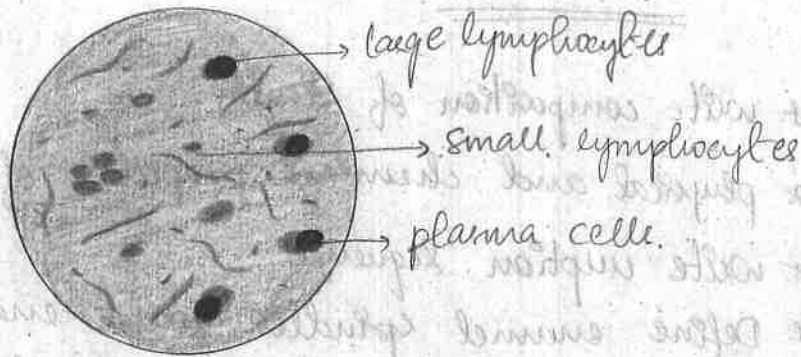
3 Ans → Eruption sequence

	permanent maxillary	permanent mandibular
I <sub>1</sub>	7-8 yrs	6-7 yrs
I <sub>2</sub>	8-9 yrs	7-8 yrs
C	11-12 yrs	9-10 yrs
P <sub>1</sub>	10-11 yrs	10-12 yrs
P <sub>2</sub>	10-12 yrs	11-12 yrs
M <sub>1</sub>	6-7 yrs	6-7 yrs
M <sub>2</sub>	12-13 yrs	11-13 yrs
M <sub>3</sub>	17-21 yrs	17-21 yrs

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6 Ans →



4 Ans → Enamel spindles

The extension of dentinal tubules from the dentinoenamel junction, towards the outer surface of enamel, they are spindle shaped in appearance.

Grained enamel

They are the optical appearing structure seen on the incisal cuspal region. They occur due to many intermingling enamel rods. This arrangement makes enamel stronger.

5 Ans → Neonatal lines of enamel and dentin

- Accentuated incremental lines
- It separates the pre-natal and post-natal enamel
- present in all deciduous teeth and first permanent molars.

10 Ans → Age changes of enamel

- Attrition
- Abrasion
- erosion
- colour change to yellow

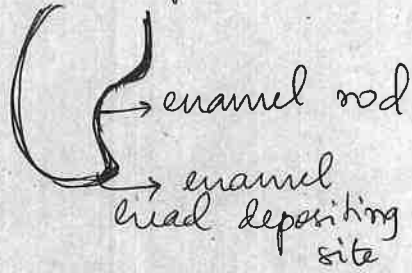


8 Ans → Tomes process

- seen after the formation of dentino-enamel junction. Ameloblast moves away from dentine and forms a process called Tomes process

- seen in maturation phase.

(2)



1 Ans → Composition of dentine

35% → organic matter → collagenous fibres & mucopolysaccharides

65% → inorganic matter → phosphates, carbonates and sulphates. (2)

7 Ans → seven histological stages of tooth development

(1) Bud stage

(2) Cap stage

(2)

(3) Bell   
 → early bell stage   
 → advanced bell stage.

9 Ans → Hypocalcified structures of dentine

→ Interglobular dentine

• star shaped

→ contour line of Owen

→ Neonatal line

(1)

2 Ans → physical properties of enamel

hardened calcified tissue

96% of inorganic hydroxyapatite crystals

(1)

  
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## Halitosis and its management.

Halitosis or oral melodor is a term used to describe noticeably unpleasant odor exhaled in breathing.

## \* Classification of Halitosis :

(i) Physiologic halitosis.

(ii) Pathologic halitosis.

- It can be : a) Oral or  
b) Extraoral.

## \* Etiology :

- Oral melodor is commonly the result of microbial putrefaction of food debris, cells, saliva and blood within the oral cavity.
- In particular proteolysis of proteins to peptides and amino acids takes place which give rise to volatile sulfur compounds (melodor substance).

## Causes of Physiologic halitosis :

- Mouth breathing.
- Medication.
- Ageing and poor dental hygiene.
- Fasting or starvation.
- Tobacco.
- Foods (onion, garlic etc.) and alcohol.

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Causes of pathological halitosis - [Oral factors]. :- P. no (2)

- a) Periodontal infection.
- b) Tongue coating harbors microorganisms.
- c) Stomatitis, Xerostomia.
- d) Faulty restorations retaining food and bacteria.
- e) Unclean dentures.
- f) Aphthous ulcers, dental abscesses.

Systemic and extra oral factors of halitosis are :-

- a] Nasal infections like rhinitis and sinusitis
- b] Diseases of G.I.T like hiatal hernia, carcinomas
- c] Pulmonary infections like bronchitis, pneumonia, tuberculosis and carcinomas.
- d] Hormonal changes during menstruation, pregnancy
- e] Systemic diseases like diabetes mellitus, hepatic failure, renal failure, dehydration and fever, cirrhosis of liver

\* Diagnosis of Halitosis:

a. Review of Medical, Dental and personal history.

b. Clinical examination:

i) Intra-oral examination:

- ① Tongue coating.
- ② Evidence of mouth breathing.
- ③ Xerostomia: Dry mucosa.
- ④ Other oral causes.

ii) Complete periodontal examination:

- ① General Personal care, state of oral hygiene.
- ② Probing for attachment levels, probing depths.
- ③ Past history of dental hygiene care

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c) Measurement of oral melodor:

The tests used to detect halitosis are:

- (i) Subjective organoleptic method.
- (ii) Gas chromatography
- (iii) Halimeter
- (iv) BANA test.
- (v) Chemiluminescence.

\* Treatment and management of oral melodor.

- Treatment of halitosis is a step by step procedure as the clinician must determine the source of melodor. i.e., oral origin or non-oral origin.

4 - Treatment for genuine halitosis with oral causes are:

- a) Reduction of anaerobic load by improving oral hygiene and periodontal health using methods such as; oral irrigation, sonic or ultra sonic toothbrush
- b) If melodor persists, tongue brushing should be advised.
- c) Chemical reduction includes:
  - Chlorhexidine mouth wash rinsing is advised for the melodor associated with periodontal disease.
- d) Conversion of volatile sulfur compounds by using:
  - (i) various metal ions such as, zinc [ $Zn^{++}$  ion]
  - (ii) Halita: It is a solution containing
    - 0.05% Chlorhexidine
    - 0.14% Zinc lactate
    - 0.05% cetyl pyridium.

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## Classify Endo-Perio lesion

According to Simon, Critch and Frank classification it is classified into:

- a) Primary endodontic lesion
- b) Primary periodontal lesion
- c) Primary endodontic lesions with secondary periodontal involvement
- d) Primary periodontal lesions with secondary endodontic involvement
- e) True combined lesions

4

a) Primary endodontic lesions :- An acute exacerbation of chronic apical lesion on root with necrotic pulp.  
 - Usually mimics periodontal abscess.  
 - Sinus tract extending to gingival sulcus disappears.

b) Primary periodontal lesion :- It is caused primarily by periodontal pathogens which progress along root surfaces  
 - Commonly due to plaque accumulation, calculus & pockets

c) Primary endodontic lesion with 2° periodontal involvement  
 :- If primary lesion remains untreated, it may become secondarily involved with periodontal involvement.

Requires both endodontic & periodontic treatment.  
 They show swelling, pain & pocket formation and bleeding and tooth mobility.

d) Primary Perio lesion with 2° Endodontic involvement  
 → Retrograde pulpitis, necrotic pulp

e) True combined lesions :- Occurs when endodontic lesions progress coronally, prognosis guarded in single teeth. Radiographically similar to vertical root fracture

## Periodontal Abscess :

- It is defined as the localized purulent infection within the tissues adjacent to the periodontal pocket that may lead to the destruction of periodontal ligament and alveolar bone

### Classification of Abscess:

I. Depending on the location of the abscess:

- (a) Gingival abscess - localized painful swelling affecting only the marginal and interdental gingiva due to impaction of foreign substance
- (b) Periodontal abscess :- It affects deeper periodontal structures including deep pockets, furcations & vertical osseous defects. - It usually located beyond mucogingival junction.

II. Depending on the ~~course~~ course of lesion :-

- (a) Acute periodontal abscess :- It is present with symptoms like pain, tenderness and sensitivity to palpation.
- (b) Chronic periodontal abscess :-
- Normally associated sinus tract.
  - Usually asymptomatic.

III. Depending on the number

- (a) Single periodontal abscess. (Related to local factors).
- (b) Multiple periodontal abscess.
- Seen in uncontrolled diabetes mellitus.

→ Medically compromised patients.

→ Patient with untreated periodontitis after systemic antibiotic therapy.

IV. Depending on the cause of acute infections:

- (a) Periodontitis related abscess.
- (b) Non periodontitis related abscess.

V. Based on periodontal tissue involved :-

- (a) Gingival Abscess (b) Periodontal abscess (c) Pericoronal abscess.

### • Xenografts :-

4) Ans. → It is a viable tissue or organ that after removal from the donor site is implanted/transplanted within the host tissue which is repaired, restored and remodelled in which the donor of the graft is from a species different from the host.  
 1/2 e.g.:- calf bone, Kiel bone, anorganic bone.

### • Instrument grasps :-

5) Ans. a) Modified pen grasp :- Most effective pen and stable grasp.  
 → The pad of middle finger rest on the shank.

2 b) Standard pen grasp :- Thumb, index finger and middle finger are used to hold the instrument as a pen is held.

c) Palm and thumb grasp :-

- Used for stabilizing during shearing sharpening
- Not recommended for periodontal instrumentation

### • Frenectomy :-

6) Ans. → It is the complete removal of the frenum including its attachment to the underlying bone.

Techniques are :- (i) Scapel technique.

(ii) Electro Surgery & (iii) Lasers.

### • Gracey ~~curette~~ Curette :-

7) Ans. - ~~Formed~~ Introduced by Dr. Clayton Gracey designed to be used on specific tooth surface that improves adaptation and deposit removal. The blade is designed offset from the terminal shank at 70°.

a. Dento gingival unit → Ans. - It is the anatomy complex formed by

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## FIRST / SECOND / THIRD INTERNAL ASSESSMENT EXAMINATION

Name : Samarth Bajpai Reg. No. ....

Class : ..... Subject : Oral medicine Date : .....

### SECTION

① classify red and white lesions. write in detail about leukoplakia.

classification :-

\* Non Scrapable / Keratotic

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→ Leukoedema

→ Lichen planus

→ Linea alba

→ Leukoplakia

→ Frictional keratosis

→ Lichenoid drug reactions

→ White hairy tongue

→ Papilloma

\* Scrapable :-

→ Candidiasis

→ Pseudomembranous

→ Radiation mucositis


→ Chemical burn

→ Traumatic ulcer

→ Erosive lichen planus

→ ANUG

→ Diphtheria

  
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# Leukoplakia

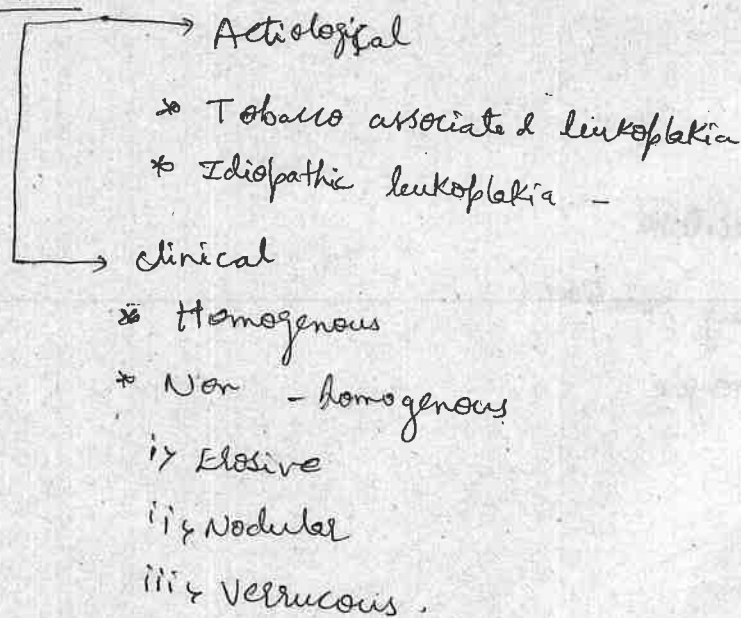
## Definition :

A whitish patch or plaque that cannot be characterized clinically or pathologically as any other disease and is not associated with any physical or chemical causative agent, except for the use of tobacco.

## Aetiology :

- \* Tobacco.
- \* Alcohol.
- \* Candida causative leukoplakia.

## Classification :



## Clinical features :

- \* Age / Sex :
  - Middle age and older age, increases with age.
  - Male > Female
  - Peak incidence > 50 years.

\* Site :-

- Mainly based on site of keeping tobacco.
- vestibule, Buccal > Palate, Alveolar ridge, lip > Tongue floor of the mouth.

\* Differential diagnosis :-

- Leukoedema
- Erosive lichen planus
- Frictional keratosis

Management :-

- Elimination of habit - Nicotine replacement therapy
- Pharmacotherapy - vit. A  
Antioxidant  
Antifungal drugs  
Cytotoxic agents -
- Pharmacodynamics therapy - Aminolaevulinic acid
- Surgery
  - Scalpel surgery
  - Cryosurgery
  - Laser surgery

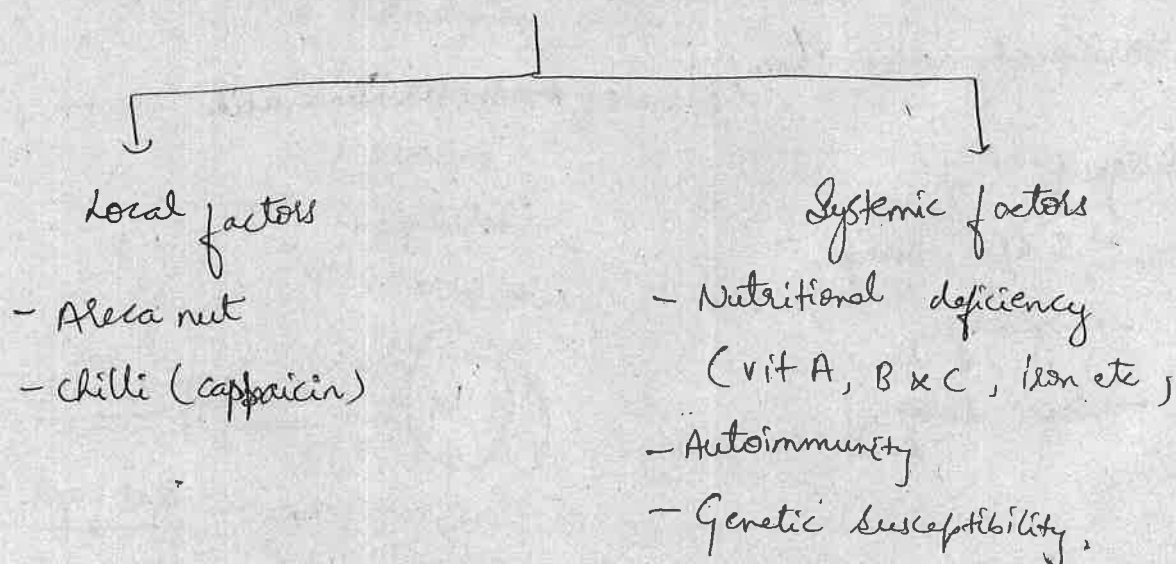
(4)

② Define OSMF, write in detail etiology, clinical features and treatment of OSMF

• Definition :-

"Oral submucous fibrosis is defined as an insidious chronic disease affecting any part of the oral cavity and sometimes the pharynx. Although occasionally preceded by and/or associated with vesicle formation, it is always associated with ~~elast~~ juxta epithelial inflammatory reaction followed by a fibroclastic change of the lamina propria with epithelial atrophy leading to stiffness of mucosa and causing trismus and inability to eat".

• Aetiology :-





## • Clinical features

→ Sex : M > F

→ Age : Younger age group - 20-40 years.

### \* Prodromal symptoms (Early OSMF)

→ Burning sensation in the mouth.

→ ulcerations.

→ Excessive salivation.

### \* Advanced OSF

#### ⊙ Blanching

→ oral mucosa becomes blanched and slightly opaque and white fibrous band appear.

→ Localised / Diffuse / Reticular.

#### ⊙ Fibrotic bands

→ Wrists - Hockey stick writh / bud shaped.

→ Rima oris.

→ Gingiva - loss of stippling.

→ Restricted Tongue movement.



## • Management :

→ Preventive measures - Advise patient to quit habit

→ medical treatment

→ Physical therapy - Physiotherapy with mouth opening exercise

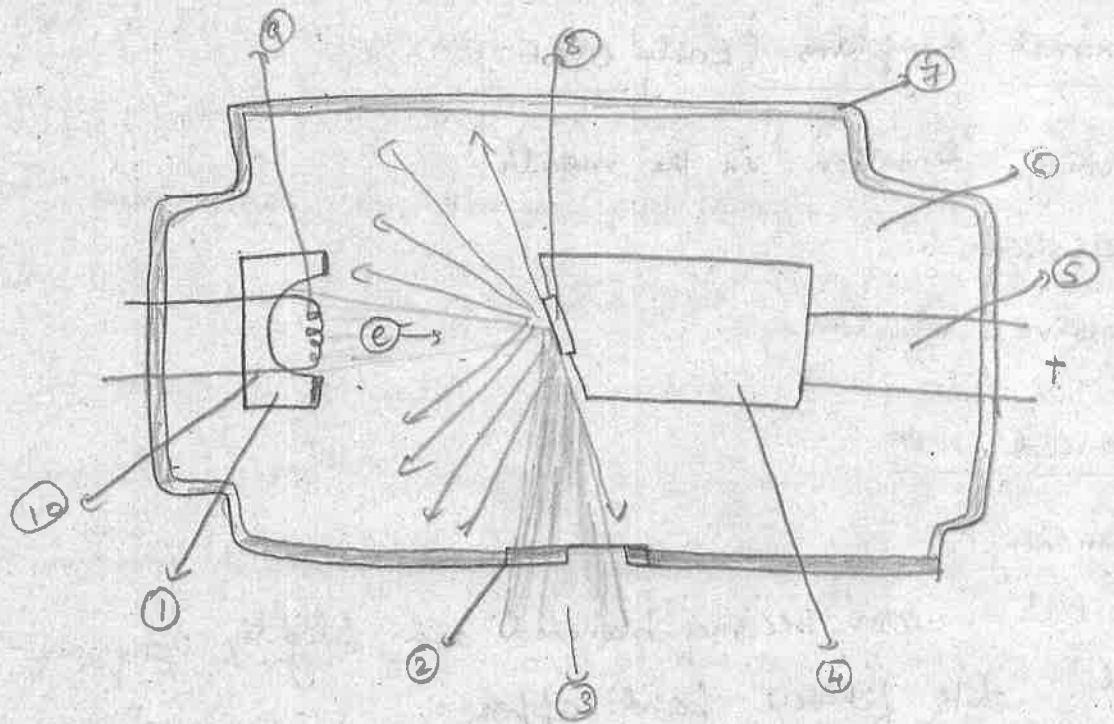
→ Surgical treatment

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③ Write a neat labelled diagram of the Dental X-ray machine and label the parts.



- ① Cathode (-)
- ② Tube window
- ③ Useful x-ray beam
- ④ Anode (+)
- ⑤ Copper stem
- ⑥ Vacuum
- ⑦ Glass envelope
- ⑧ Focal spot on tungsten target
- ⑨ Filament and electron cloud
- ⑩ Electronic focusing cup.

(H) write the clinical features and diagnosis of oral cancer.

• Clinical features :

→ Age / Gender :

male > female.

Above 65 years

→ Site : Most common tongue

other sites - Buccal mucosa, gingiva, Palate, upper lip.

→ Pattern forms

a) Exophytic growth pattern

- Surface is ulcerated

- Feels hard.

→ Verruciform, fungating, papillary surface.

b) Endophytic growth pattern

→ It is centrally depressed, irregularly shaped ulcer with surrounding "rolled" border of pink red or white mucosa.

→ Rolled border results from invasion of tumour downwards and laterally.

→ Symptoms :

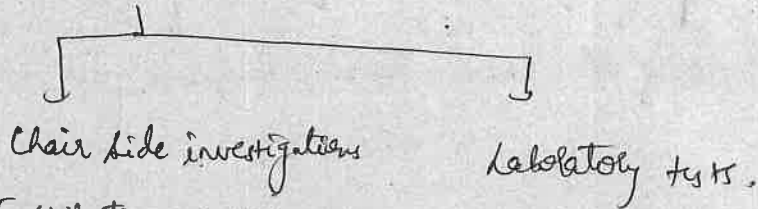
ulcer of sore that does not heal

Pain and tenderness

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## Diagnosis:



- Exfoliative cytology
- Staining.
- Fine needle aspiration.

- Biopsy.

### Exfoliative cytology:

It is study of cells which exfoliate or abrade from the mucosal surface.

Class	Inference	features
Class I	Normal	• only normal cells were observed
Class II	Atypical	• Presence of minor atypia, but no evidence of malignant changes.
Class III	Indeterminate	• It separates cancer from non cancer diagnosis • Cells display wider atypia that may be suggestive of cancer. • Biopsy is recommended.
Class IV	Suggestive of cancer	• A few cells with malignant characteristics or many cells with borderline characteristic • Biopsy recommended.
Class V	Positive for cancer	• cells those are obvious malignant

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5) Write the radiopaque landmark of maxilla.

• Anterior Nasal spine :-

→ V shaped

→ Located at or just below the junction of the inferior end of the nasal septum and the inferior outline of the nasal aperture.

• Inferior border of nasal fossa apertures

→ Appears as a radiopaque line extending bilaterally away from the base of the anterior nasal spine.

• Lateral wall of nasopalatine canal.

→ Seen as pair of radiopaque lines running vertically from the floor of the nasal aperture to the incisive foramen.

• Floor of the maxillary sinus :-

→ Maxillary sinus floor is a thin layer of cortical bone and appears as a thin radiopaque line.

• Zygomatic process and zygoma :-

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→ On periapical radiographs, the zygomatic process appears as a U shaped radiopaque line with its open end directed superiorly.

→ Inferior border of zygoma extends posteriorly from the inferior border of the zygomatic process of the maxilla to the zygomatic process of temporal bone.



• Nasolabial fold:

The line of contrast is sharp, and the area of increased radiopacity is posterior to the line.

• Pterygoid plates:

medial and lateral pterygoid plates lie immediately posterior to the maxilla.



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## FIRST / SECOND INTERNAL ASSESSMENT EXAMINATION

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Name : Chandana Kalita Reg. No. : .....

Class : IV BDS Subject : Orthodontics Date : .....

### SECTION

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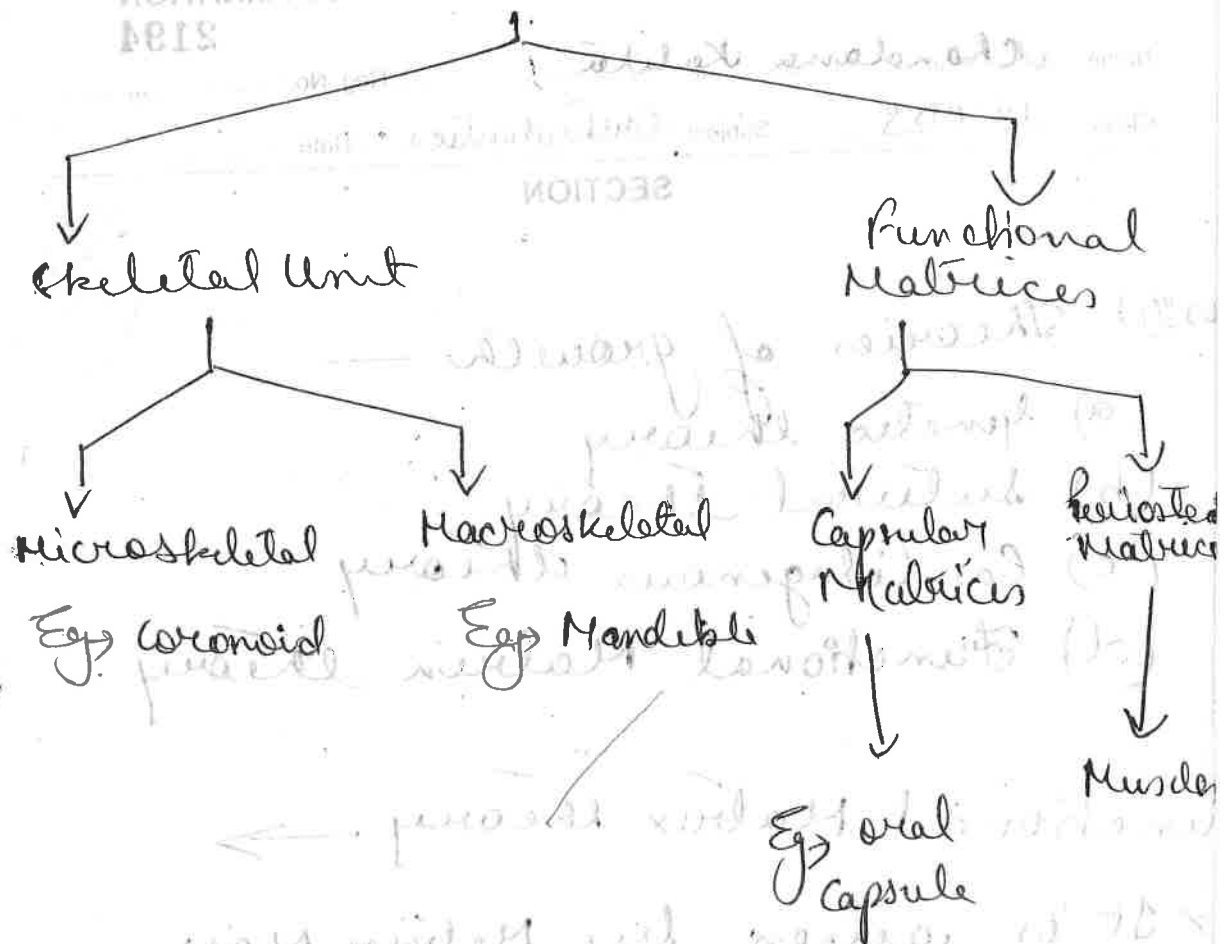
Ans: (1) Theories of growth —

- (a) Genetic theory
- (b) Sutural theory
- (c) Cartilaginous theory
- (d) Functional Matrix theory.

Functional Matrix theory →

- It is given by Melvin Moss.
- The functional matrix concept attempts to comprehend the relationship between form & function.
- The functional matrix hypothesis claims that the origin, form, position, growth and maintenance of all skeletal tissues & organs are always secondary & compensatory and necessary responses to chronologically & morphologically prior events processes that occur in specifically related non-skeletal tissue, organ or functioning spaces.

# Functional Cranial Component (Eg → Mandible)



Ans: → ② Mesio occlusion →

The mesio buccal cusp of the maxillary first permanent molar occludes distally (posteriorly) to the mesio buccal groove of the mandibular first molar.

Class III malocclusion has 2 subdivisions

(1) True class III malocclusion →  
(skeletal) which is genetic in origin due to essentially large mandible or smaller than normal maxilla.

(ii) pseudo class III malocclusion →  
(false or postural) which occurs when mandible shifts anteriorly during final stages of closure due to premature contact of incisor or the canines.

(iii) Class III sub-division

class III molar relationships on one side and the other side as a normal class I molar relationship.

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Ans: → (2) Down's Analysis →

The first published comprehensive analysis was by Downs in 1948.

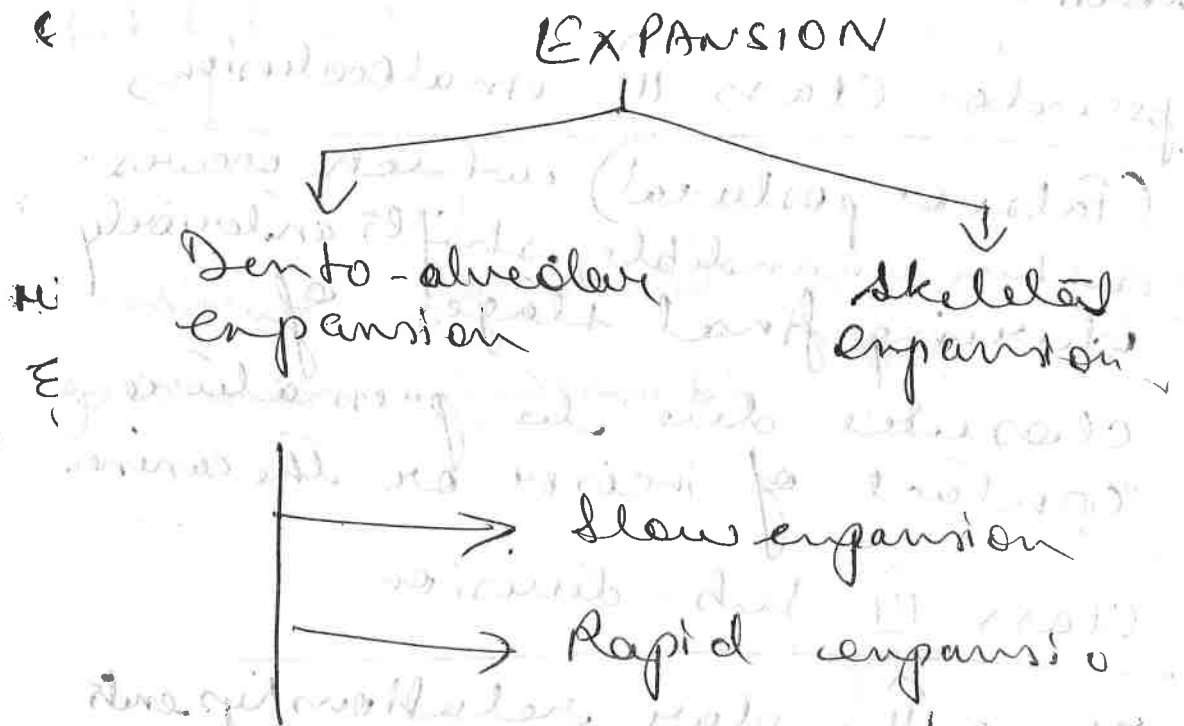
It consists of →

Ten parameters of which →

- ① five are skeletal
- ② five are dental.



Ans:  $\Rightarrow$  (3) Expansion in orthodontics  
 Arch expansion is a method of  
 gaining space  $\rightarrow$



- Effects of RME  $\rightarrow$
- > Effects on Maxilla  $\rightarrow$ 
    - ① Opening of Mid palatal suture
  - > Effects on maxillary teeth
    - ① Midline spacing between the two maxillary central incisors.
  - > Effects on Mandible
    - ① Reduction in overbite

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FIRST / SECOND / THIRD INTERNAL ASSESSMENT EXAMINATION

Name : Negin Shamim Reg. No. \_\_\_\_\_

Class : IV BDS Subject : Restorative Date : \_\_\_\_\_

SECTION

36  
70

Long Essay

① Endodontic Instrument Classification

\* Hand Instruments

Barbed broaches

K- Reamer

\* Low-rotating stainless steel rotary instrument

Peso- Reamer

Gut Gliders

\* Sonic & Ultrasonic instruments

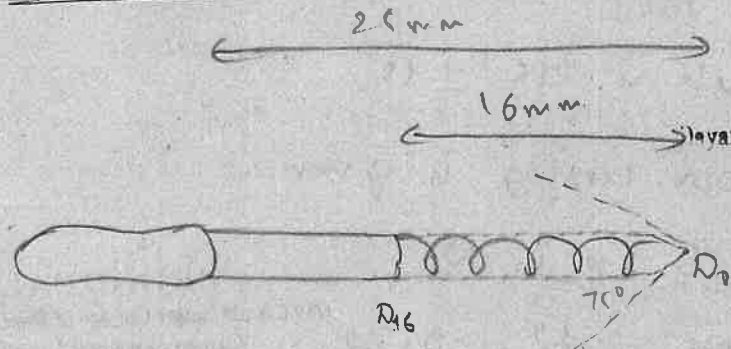
\* Engine band NiTi instrument

→ Rotary instrument

→ Reciprocative instrument

→ Instrument used for adaptation

Endodontic file



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Endodontic file - It is the file on the instrument used in the determination of working length of root canal.

Parts

- \* Flute
- \* Flute angle
- \* Taper
- \* Tip design
- \* Blade
- \* Pitch
- \* Land

Standardization of Endodontic Instrument numbering is given from the 10 to 100.

- \* From 10 to 60 the number is increased by 5 [10, 15, 20, ...]
- \* From 60 to 100 it is increased by 10 [60, 70, 80, ...]
- \* Diameter of working end is 10/100 mm

eg:  $60 = \frac{60}{100} = 0.6 \text{ mm}$

\* Angle of fluke is  $15^\circ \pm 15^\circ$

\* Different colour coding is given

\* Diameter at the tip is  $D_0$

\* Diameter at  $D_6 = \frac{3.9}{100} = 0.39$

\* So total diameter will be sum of two instrument

$$D_0 + D_{16}$$

eg  $\rightarrow D_f = 0.06 + 0.72 = 0.78 \text{ mm}$

\* Advance technique include 6, 8 and upto 140

\* From tip the diameter increase by 0.01 mm give the shape of tapering.

Colour coding of instrument

Number	Colour	$D_0$	$D_{16}$	Diameter
6	Pink	0.06	0.72	0.78
8	Grey	0.08	0.72	0.80
10	Purple	0.1	0.72	0.82
15	White	0.15	0.72	0.87
20	Yellow	0.2	0.72	0.92
25	Red	0.25	0.72	0.97
30	Blue	0.3	0.72	1.02
35	Green	0.35	0.72	1.07
40	Black	0.4	0.72	1.12
45	White	0.45	0.72	1.17
50	Yellow	0.5	0.72	1.22
55	Red	0.55	0.72	1.27
60	Blue	0.6	0.72	1.32
70	Green	0.7	0.72	1.42
80	Black	0.8	0.72	1.52
90				
100				
110				
120				
130				
140				



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## Obturation

It is the process of seal and filling the root canal using the sealer and obturating material.

### Material Used

- \* Silver point
- \* Gutta percha
- \* Resolin
- \* MTA

There are many techniques which are used for the obturating the material into the root canal

1) Cold lateral obturating technique

→ Single cone obturation

2) Warm obturating technique

→ Warm vertical obturating technique

→ Warm lateral obturating technique

3) Continuous warming obturating technique

4) Thermoplasticized Gutta percha

5) Chemically plasticized Gutta percha

6) Gutta percha carrier technique

## Lateral obturation Method

mainly used material is "mastic cone"

### Procedure

- \* Preparation of the canal is completely done by shaping and cleaning procedure
- \* Canal should be completely dried before placing the obturating material.
- \* Canal is dried by using paper point
- \* Root canal is sealed using root canal sealer like CADH, ZOE
- \* Mastic cone is placed inside the canal
- \* Spreader is also inserted into the canal
- \* By this the material is placed in all direction
- \* Spreader is used to push the material into the lateral wall of canal
- \* This will give proper seal with material and canal
- \* material is placed upto the fixed point of file placement
- \* Block the tubule in the canal.

If the master cone is small beyond the working length it can be determined by radiograph.

Master cone is placed in the canal and radiograph is taken.

If it is beyond the apex master cone is cutted or replaced.

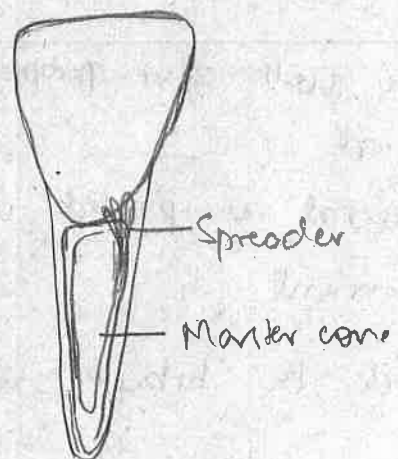
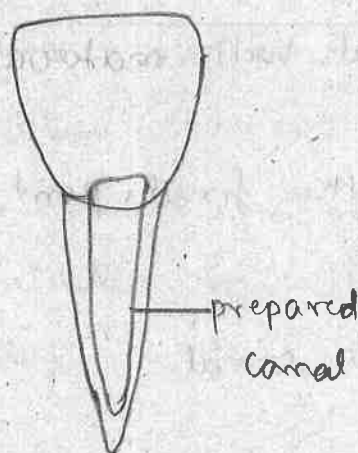
If it is not fitting or small fine master cone is used.

Master cone is the gutta-percha material has the good strength contains of

Gutta-percha, plastic wax

Lateral obturation method - It is the most commonly used method for obturation

⑥



⑥



## Short Essay

### 3) Radiographic methods of working length determination

It includes

- Xeroradiography
- Engler method
- Kuttler method
- Radio machine

Engler's method of radiograph for determining the working length

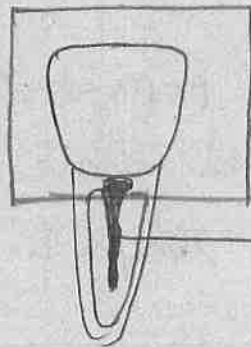
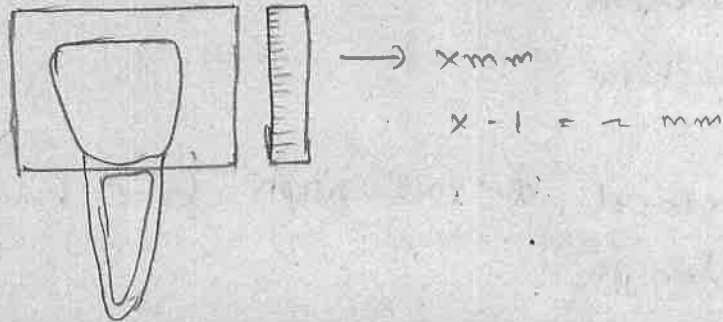
#### Procedure

- \* Radiograph is taken for the prepared tooth
- \* Length is measured from the scale
- \* Less than 1mm of steel length is marked on the endodontic file
- \* This on reading is adjusted on the instrument and silicon stop is tightened.
- \* This file is placed inside the prepared canal and radiograph is taken again
- \* If the difference between both of them is less than 1mm or 0.5 to 1mm then it will be the standard working length.



If the difference is more than 1mm less of the provision the file is forwarded to reach that length.

If the file is coming out of canal it is cutted.



file placement & radiograph taken

⑥

32

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## 17) Management of hot tooth

It is an emergency occurred during endodontic treatment

Hot tooth - It is the condition in which the tooth is unable to anaesthetize

Condition - mainly seen in mandibular 1<sup>st</sup> molar treatment

- \* During endodontic procedure with respect to 1<sup>st</sup> molar of the mandible the CIA NB is given
- \* Even after giving the block before procedure, the patient may complain of pain and sensitivity while working
- \* If the operator increase the LA and require also some complain from the patient.
- \* Even though profused anaesthetization of the Lip and tongue the effect of LA on the tooth is not found.
- \* Tooth will not respond to LA after some limit that condition is called hot tooth
- \* Frequently faced problems in clinic.

36

## Management

- \* Local infiltration of anal tooth is given
- \* Buffering action
- \* Concentration of the L.A is reduced
- \* Sodium bicarbonate is used to make the alkaline environment
- \* Buccal infiltration for anal tooth is given
- \* Treatment is stopped in BLW then continued after some time

1/2

6

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## ⑨ Root Canal Sealer

These are the material used as composite plus in prepared canal and obturating material

### Classification

Calcium hydroxide

Zinc oxide eugenol

Glass ionomer cement

Resin sealers

Resin Reinforced Zinc oxide eugenol

### Root Canal Sealer ideal property

- \* They are most acceptance property
- \* It should not irritate the peridontal tissue
- \* Non bactericidal effect
- \* Doesn't react with obturating material
- \* Chemically stable
- \* Adhesive property should be good

①



Firm order

There are orders most commonly used Applied on the root canal infuse into the canal partially or the canal wall so it will give the proper action b/c in obtaining material and canal

Best modified zinc oxide eugenol

It has high flowable property compared to all the other

Block in tubule opening

Prevent the bacterial activity if any left-over

course is there

5

⑥ Best Requirement for improved medication

\* It should be in bacteriostatic and bactericidal effect

\* It should also give internal environment

\* It should prevent the reparative dentin formation

\* Retain the temperature

\* Heat the cure of the infection will prevent

\* Pain should be removed.

## FIRST / SECOND / THIRD INTERNAL ASSESSMENT EXAMINATION

Name : ..... Reg. No. ....

Class : ..... Subject : ..... Date : .....

### SECTION

Intra canal medicament used are

- \* CaOH
- \* Chlorhexidine.

Indication for the use of CaOH

- \* If any infection is present that after removing and shaping the canal
- \* CaOH is most commonly used medicament
- \* It has the chelating action on the dentin of the can
- \* Calcium chelating ion are formed and block the leakage of any remaining infection
- \* Irrigate the area of the canal
- \* It has the both property in it - Irrigating  
- Medicament
- \* Perv form ease to place
- \* Economically easy.



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## ⑧ Root end filling material

### Endodontic surgery

- \* It is indicated if the root canal treatment is not treated non-surgically
- \* Apex of the root is curttaged and previously filled material is removed.

### material used

- \* Gutta-percha
- \* Resolin

Gutta-percha most commonly used

- less effect on the periodontal tissue
- high strength

### Short Answers

#### 1) MTA

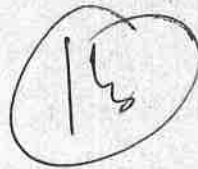
- \* Mineral trioxide A<sub>2</sub>O
- \* mainly used as obturating material
- \* Internal resorption of canal in that indicated.

*[Handwritten signature]*



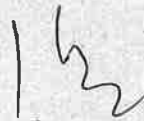
### ⑨ Peso reamer

- \* It is the slow rotating stainless steel instrument used in the shaping and cleaning of the root canal
- \* Because of its slow rotation less chances of reaching of the apical foramen
- \* self controlled by the operator
- \* Minimal destruction is caused



### ⑩ Apex locator

- \* Mainly used for the locating of the apex of the foramen of the canal (Apical foramen)
- \* There are made of different design based on the curvature of the canal.







NAME: Saijas

Dept. of Pedodontics

DATE: 12/01/21.

## 1) Space maintainers

Definition: Space maintainers are the appliances used to maintain space left behind after the shedding of deciduous teeth.

### Classification.

a) According to Hitchcock

- i) Removable or Fixed or Semi-fixed
- ii) With/without bands
- iii) Functional or Non-functional
- iv) Active or passive

Management of bilateral space loss.

→ Maxillary arch


- a) Nance palatal arch
- b) Transpalatal arch

→ Mandibular arch

→ Lingual space maintainers

a) Nance palatal arch

→ Used to prevent maxillary molars from rotating or moving forward after the extraction of primary teeth during ortho treatment

  
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Parts :

- a) Nance button
- b) Wire component
- c) Molar bands.

b) Transpalatal arch

→ Can be used like Nance appliance

Advantage:

- a) Lack of acrylic button so less tissue irritation
- b) Easily cleansible

Disadvantage:

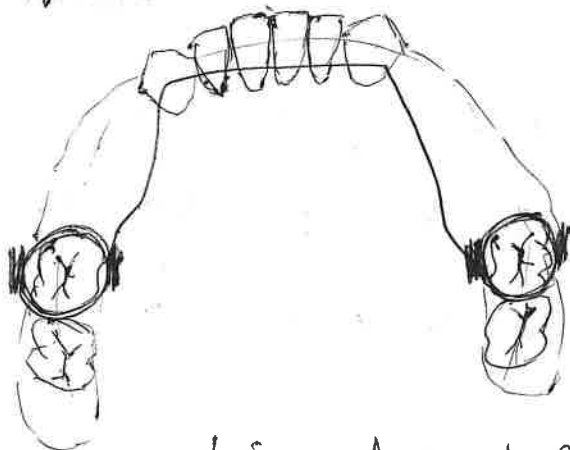
- a) Lack of anterior stop causing drifting of teeth

c) Lingual arch space maintainers

- i) Mandibular arch only
- ii) Bands on 1<sup>st</sup> permanent molars
- iii) Anterior stop present.

Indications

- i) Bilateral loss of single/multiple lower molars after the eruption of lower incisors.



Removable not written

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Lingual arch space maintainers

## 2) Development of occlusion from birth to adolescences

### Periods of occlusal development

- a) Pre-dental period
- b) Deciduous dentition period
- c) Mixed dentition period
- d) Permanent dentition period

### → Pre-dental period

→ 6 months

→ After birth

#### i) Gum pads

→ These are alveolar process at the time of birth.

→ Pink, firm and covered by a dense layer of fibrous periosteum

→ Horse shoe shaped

#### ii) Status of dentition

→ Teeth present at time of birth = Natal teeth

→ Neonatal teeth - Teeth erupting during 1<sup>st</sup> month of life.



## Deciduous dentition period

- Eruption age → 6 months to 3 yrs
- Eruption sequence

Spacing in  $A \rightarrow B \rightarrow C \rightarrow D \rightarrow E$  deciduous dentition

- Spacing usually present between deciduous teeth & called physiologic / developmental spaces
- Absence of spaces in primary dentition can cause crowding
- These physiologic spaces are called primate

Flush terminal plane

- MD relation between distal mesial distal surfaces of upper & lower 2<sup>nd</sup> deciduous molars

## Deep bite

→ Initial stages.

Can be reduced due to :

- Eruption of deciduous molars
- Attrition of incisors
- Forward mandibular growth

Mixed dentition period.

a) Begins at 6 years of age

b) Both primary & secondary teeth present

permanent  
Dentition II.

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## Phases of mixed dentition

- a) 1<sup>st</sup> transitional period
- b) Enter transitional period.
- c) 2<sup>nd</sup> transitional period.

### 1<sup>st</sup> transitional period

- a) Early shift
- b) Late shift

### Ugly duckling stage

- Transient / self correcting malocclusion seen in maxillary incisor region between 8-9 years of age.
- Seen during the eruption of permanent of canine

### Permanent dentition period

#### Eruption sequence

6-1-2-4-3-5-7

(a) 6-1-2-3-4-5-7

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## Short essay

### Q) Pit & Fissure sealants

→ Pit & fissure sealants are the materials introduced into pits & fissures of caries susceptible teeth, thus forming micromechanically bonded protective layer cutting access of caries producing bacteria from their source of nutrients.

→ Classification

→ Chemical structure

1) MMA - Methyl methacrylate

2) TEGDMA

3) BPD - Bisphenol dimethacrylate

4) BIS GMA

4

→ According to filler content

2) Unfilled

5) Filled

Procedure of application

1) Clean the tooth surface

2) Isolate & dry the tooth surface

3) Etch the tooth surface

4) Apply bonding agent

5) Material application

6) Evaluation of sealant

7) check occlusion.

8) Review of sealant application.

12) Correction of anterior cross bite

Cross bite:

It is the condition describes a malposed labiolingual relationship between one or more maxillary & mandibular teeth.

Classification of crossbite:

→ Based on location

a) Anterior crossbite

b) Posterior crossbite


Management of anterior cross bite

1) Skeletal

2) Dental & functional

→ Bite plane

Treatment ??

  
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3) Crowns used in paediatric dentistry

a) Stainless steel crowns

b) Polycarbonate crowns

(2)

4) Down syndrome

→ It is a chromosomal abnormality

→ Trisomy 21

→ Genetic disorder

→ Low IQ

→ Incomplete morphogenesis

Symptoms of down syndrome

1) Small ears

2) Small mouth

3) Flattened nose & face

4) Upward slanting eyes

5) Separated joints between the bones of skull

6) Decreased muscle tone at birth

7) Excess skin at the nape of neck

8) Short but wide hands with short fingers

9) White spots on coloured part of eye

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## (1) Behavioural management

~~Includes~~

1) Aversive conditioning techniques

Includes

1) Voice control


2) HOME (Hand over mouth exercise)

3) Physical restraint

HOME

→ Hand of the clinician is kept over the mouth of the patient as a mode of performing

2) aversive conditioning technique.

  
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## 7) Battered child syndrome

→ Physical abuse to a child is battered child syndrome

→ there might see certain speech defects

there might be :

1) Soft tissue injury

2) Thermal injury

3) Skeletal injury

4) Internal injury

→ Bruises

→ Black eye

→ Bleeding

→ Bite mark

→ Open hand print

→ Lash mark loop

→ Belt marks

→ Lip laceration

→ Multiple finger tip contusions

## Short answers

14) Ugly duckling stage

- This is self correcting malocclusion
- Seen in maxillary anterior region
- Seen during the eruption of permanent canines

15) ~~Wright's classification~~

- 1) Positive
- 2) Extremely positive
- 3) Negative
- 4) Extremely negative

16) ~~Growth spurts~~

15) ~~Wright's classification~~

- 1) Cooperative behaviour
- 2) Lacking cooperative behaviour

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## Short answers

17)

- a) Neonatal growth spurt
- b) Infantile
- c) child growth spurt
- d) Adult

19) MTA

→ Mineral trioxide aggregate

1/2

15) Primate space

→ these are also called physiologic spaces.

→ Seen in primary dentition.

1/2

2) Turner's hypoplasia

→ Defect seen in enamel of tooth where the thickness of enamel is altered.

→ Seen in Turner's syndrome

→ Occurs as a result of disruption of enamel matrix formation

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1- Define and classify pontics.

⇒ An artificial tooth on a fixed partial denture that replaces a missing tooth, restores its functions, and usually fills the space previously filled by a natural crown.

\* Classification :

[A] Based on the amount of mucosal contact —

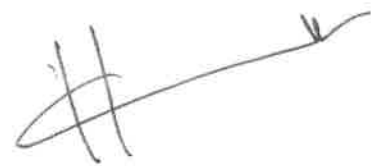
- With mucosal contact

- ① Saddle pontic
- ② Ridge lap pontic
- ③ Modified ridge lap pontic
- ④ Ovate pontic



- Without mucosal contact

- ① Bullet pontic
- ② Hygienic or sanitary pontic.



[B] Based on type of material contact —

- ① Metal & porcelain veneered pontic
- ② Metal & resin veneered pontic
- ③ All metal pontic
- ④ All ceramic pontic

[C] Based on method of fabrication —

- Custom-made pontic
- Prefabricated pontic

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① Truspontic

② Interchangeable pontic facing

③ Sanitary pontic

④ Pin facing pontic

⑤ Modified pin-facing pontic

⑥ Reverse pin-facing pontic

⑦ Harmony pontic

⑧ Porcelain fused to metal pontic

- Prefabricated custom modified pontic

2 - Principles in tooth preparation

⇒ The basic principles on which tooth preparation is done are -

(1) Preservation of tooth structure

(2) Retention & resistance

(3) Structural durability

(4) Marginal integrity

(5) Preservation of pericorona.

→ Preservation of tooth structure —

There should be minimal possible reduction done to obtain the required characteristics.

Grossly decayed tooth should be retained with the help of dowel cores, cast posts and overlays etc.

→ Retention & resistance

The ability of the preparation to prevent displacement of

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of the the restoration in a direct opposite to the path of insertion

- Retention can be classified as — Primary retention  
Secondary retention

- The following features in a preparation should be designed to strike the balance b/w retention & resistance forms —

① Taper

② Freedom of displacement.

③ Length

④ Substitution of internal features

⑤ Path of insertion

→ Structural durability

The ability of the restoration to withstand destruction due to external forces.

(a) Occlusal reduction — the occlusal strength is the most vital as the most of forces affecting the restoration, act directly on the occlusal surface.

(b) Functional cusp bevel — It is the — provided to increase the thickness of otherwise thin occluso-axial junction of the restoration.

It is prepared on palatal cusp of maxillary & buccal surface of mandibular posterior teeth.

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(c) ~~Structure~~ Axial reduction — Inadequate axial reduction may ~~lead~~ lead to over contoured proximal surfaces which can lead to periodontal problems.

Overreduction will lead to loss of retention.

→ Marginal integrity

marginal adaptation and seating of restoration affect marginal integrity.

Poor marginal adaption will lead to percolation of oral fluids.

(a) Finish line configurations — shallow bevels nearly parallel to the cavosurface should be avoided. The bevel should not produce a very acute margin, which can lead to fracture of wax.

(b) Chamfer — It is the finish line of choice for cast metal restorations.

(c) Shoulder — The finish line has a gingival finish wall  $\perp$  axial surfaces of teeth.

(d) Radial shoulder — done ~~to~~ with flat end tapered diamond and end-cutting parallel side carbide finishing bur.

(e) knife edge — It is an extremely thin fragile line. It is similar to a sloping shoulder with a very thin margin.

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→ Preservation of periodontium —

The finish lines should be ~~parallel~~ placed in an accessible region so that the margins of the restoration can be easily finished.

3 - Kennedy's classification and Applegate's rules in removable partial denture.

⇒ Edward Kennedy of New York proposed this classification (192

Class I — Bilateral edentulous areas located posterior to the remaining natural teeth, i.e.; there are 2 edentulous spaces located in the posterior region w/o any teeth posterior to it.

Class II — Unilateral edentulous area located posterior to the remaining natural teeth, i.e.; there is a single edentulous space located in the posterior region w/o any teeth posterior to it.

Class III — Unilateral edentulous areas with natural teeth anterior and posterior to it; i.e.; this indicates a single edentulous area which does not cross the midline of the arch, with teeth present on both sides.

Class IV — Single, bilateral edentulous ~~located~~ anterior to the remaining natural teeth. This is a single edentulous area, which crosses the midline of arch.

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with remaining teeth present only posterior to it.

Class V (Applegates modification) — Edentulous area bounded anteriorly & posteriorly by natural teeth but in which the anterior abutment is not suitable for support. It is basically a class III situation where the anterior abutment cannot be used for any support.

Class VI — Edentulous area in which the teeth adjacent to the space are capable of total support of required prosthesis.

### \* Applegates rules

Rule 1 — Classification should follow rather than precede extractions that might alter the original classification

Rule 2 — If the 3rd molar is missing & not to be replaced, it is not considered in the classification

Rule 3 — If the third molar is present & to be used as an abutment, it is considered in the classification

Rule 4 — If the 2nd molar missing & is not to be replaced it is not considered in the classification

Rule 5 — If the most posterior edentulous area or areas ~~are~~ always determine the classification.

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Rule 6 - Edentulous areas other than those, which determine the classification, are referred to as modification spaces and are designated by their number.

Rule 7 - The number of teeth missing in the modification spaces is not considered only the no. of additional edentulous spaces are not considered

Rule 8 - There can be no modifications areas in class IV because any additional edentulous space will definitely be posterior to it & will determine the classification

### 3 - Face (SHORT ANSWERS)

#### 3 - Face bow

⇒ It is defined as a caliper-like device which is used to record the relationship of maxilla and/or the mandible to the TMJ.

- Parts - U-shaped frame

condylar rods

Bite fork

locking device

Orbital pointer with clamp.


#### 4 - Connectors in FPD

⇒ It is the connection that exists b/w pontic & retainer  
They may be rigid or non rigid.



- Rigid connectors - ~~are~~ immovable attachments b/w the pontic & retainer. eg - solder joints

- Non rigid connectors - movable attachments with a key-keyway mechanism eg - precision attachments.

  
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# Oral Surgery

## Retest

- Q1) Define exodontia. Explain the indications and contraindications of exodontia.
- Q2) Define LA - give the ideal requirements of LA. Explain the process of nerve conduction.
- Q3) Explain the theories of nerve conduction in detail.
- Q4) Explain IANB in detail.
- Q5) Principles of exodontia.
- Q6) Local complications of LA
- Q7) Composition of LA and its functions.

ANSWERS:

A1) ~~Exodontia is defined as~~

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# Oral Surgery.

## ANSWERS:

A6) Exodontia is defined as the painless removal of whole tooth or roots, with minimal trauma to the investing tissues so that the wound heals uneventfully and there are no post-operative prostheses to be used.

### Indications:

- Highly diabetic patients
- Leukemia
- Renal failure
- Cardiac failure

### Indications:

- Used in deep carious tooth
- Used in tooth with apical pathology.
- Orthodontic purposes
- Prosthodontic purposes
- Malpositioned and overerupted teeth
- Retained deciduous teeth.
- Before irradiation therapy.
- Periodontitis
- For prophylactic measures such as in case of impacted third molars.
- For braces treatment, to make space for positioning of teeth in the arch.
- Tooth in line of fracture
- Tooth with fractured roots.

Contraindications:

- Absolute -
- 1) Diabetes
  - 2) Leukemia
  - 3) Renal failure
  - 4) Cardiac failure

Relative -

- 2 1/2
- ↳ In diabetic patients
  - ↳ In hypertensive patients (patients with mild and moderate hypertension can be treated but if systolic is more than 200mmHg and diastolic more than 110mmHg) patients are not considered.
  - ↳ In patients with
  - ↳ Patient on anticoagulant therapy
  - ↳ Patient with renal disorders.
  - ↳ Patients with hepatic disorders.

  
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A2) Local Anaesthesia is defined as the reversible loss of sensation in a circumscribed area which is due to depression of excitation of nerve endings or inhibition of conduction of peripheral nerves.

• Ideal requirements of LA:

- 1) They should not be irritating to the tissue involved.
- 2) They should not cause any permanent alteration to the nerve structure.
- 3) The systemic toxicity should be low.
- 4) It should be effective ~~at~~ regardless of whether it is applied to the mucous membrane or the tissue.
- 5) The time of onset should be short.
- 6) The duration of action should be long enough to complete the entire procedure but at the same time not long enough to delay the wound healing.

The first two properties i.e irritation and reversible nature are the most desired properties.

Apart from this, there's the Bennet's list of properties:

- 7) The potency should be sufficient anaesthetic so that no other concentrated solutions should be added.
- 8) It should be relatively free of any allergic reactions.
- 9) It should be stable in solution and should undergo



biotransformation readily in the body.

10) It should be sterile or should be able to handle the heat during sterilisation process.

→ Electrophysiology of Nerve conduction:

There are two basic steps in the electrophysiology of nerve conduction.

In a normal nerve conduction, the resting potential is  $-70\text{mV}$  due to the difference in concentration of ions.

Step 1 - <sup>slow</sup> Depolarization - Here the electrical potential becomes less negative till  $-50$  to  $-60\text{mV}$ .

1B - There is still an increase in electrical potential till it reaches the firing threshold or threshold potential. ~~The electrical potential reaches~~

1C - There is rapid depolarization where the ions intracellularly become positive and extracellularly become negative. It reaches upto  $40\text{mV}$ .

Step 2 - Repolarization.

It slowly becomes  $-ve$  intracellularly and positive extracellularly till it again reaches the normal resting potential.

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A3) Theories of Nerve conduction:

1) Acetylcholine Theory:-

→ This theory states that acetylcholine is responsible for nerve impulse conduction and neurotransmission at the synapses.

Due to lack of evidence of the concentration of acetylcholine, the theory was disregarded.

2) Calcium displacement Theory:

→ This theory stated that calcium ions from any membrane site, controls the permeability of sodium ions.

It was then disregarded because of lack of evidence of calcium ions having any direct effect to the anaesthetic.

3) Surface charge Theory

→ This theory explained that the anaesthetic went and bind to the surface of the nerve membrane.

⇒ It was later disregarded as it was proved that for local anaesthetics to have an effect, they should go inside and won't cause any change at the surface.

⇒ It didn't explain the action of benzocaine on the general action potential.

Two newer theories, taken into consideration are:

1) Membrane expansion Theory:

- This theory suggests that the local anaesthetic after injection causes bulk material deposition.
- ⇒ This then causes the  $\text{Na}^+$ ,  $\text{K}^+$  ions' movement to be reduced causing inhibition of nerve conduction.
- This explains the action of benzocaine.

2) Specific Receptor Theory

- This theory suggests that the local anaesthetic goes and binds to a specific receptor on the sodium channel gate which directly affects the permeability of sodium gate.
- ⇒ This explains the action of benzocaine.

A4) Inferior Alveolar Nerve Block


- It is also known as mandibular nerve block.
- It is the main block given in the mandible region.

Areas anaesthetized:-

- 1) Mandibular teeth
- 2) Body of the mandible
- 3) Anterior 2/3rd of tongue
- ↳ Mucous membrane and surrounding areas of anterior teeth.

Landmarks:-

- 1) ~~P~~ Pterygomandibular raphe
- 2) Coronoid process

  
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### 3) Occlusal plane of the base of the mandible.

#### Indications:

- It is given if more than 2-3 mandibular teeth are extracted.
- To anesthetize surrounding structures for root planing.
- Used along with buccal nerve block for mandibular molars.

#### Nerves anesthetized:

- Inferior Alveolar Nerve and its branches.
- Mental nerve
- Lingual nerve
- 

#### Area of Insertion:

- In between imaginary vertical line on pterygomandibular raphe, along occlusal plane of mandibular notch.

#### Technique:

- Using a 27 gauge syringe.
- Use a sterilised syringe and put pressure with your fingers around the point of insertion.
- Put the needle along the vertical line (imaginary) on pterygomandibular raphe along occlusal plane of mandibular notch.

Landmarks: Pterygomandibular space

Coronoid notch

Occlusal plane on the base of mandible.

⇒ Deposit around 0.9 to 1.2ml of anesthetic around the nerve.

Symptoms - Numbness of lower lip, anterior 2/3rd of teeth, bone and mucous membranes around surrounding teeth.

As) Exodontia Principles:

General Principle:

- Access and visual - There should be good access and clear visual of the working area.
- Force applied - It should be ~~stand~~ uniform.

① Lever Principle -

There are three components:

- 1) ~~Effort~~ Fulcrum
- 2) Effort
- 3) Load.

- ⇒ Fulcrum should be positioned between Effort and Load.
- ⇒ The effort arm should be longer than the load arm.
- ⇒ Used in: Elevation.
- ⇒ Handle of the elevator is the effort and the working end is the load.

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2) Wedge Principle:

- These can be used in elevators and ~~maxillary~~ extraction forceps.
- Here the instrument is stuck between the root and the bone
- The wedge principle is applied and it is lifted using the bone for support.
- Resistance is obtained at right angle.

3) Wheel and Axial Principle:

- It is an advanced form of Lever Principle.
- The grip of the forceps is stuck between root and bone and is made to rotate the tooth to make it loose.
- The more is the diameter, the better the grip.

A6) Complications of LA:-

- ↳ Formation of Hematoma.
- ↳ Positive aspiration may cause bleeding.
- ↳ Trismus
- ↳ Hematoma is at a higher risk in PSA nerve block than others.
- ↳ Ischemia in GP nerve block and NP nerve block.
- ↳ In Greater palatine nerve block, it may be irritable for the patient.

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A7) Lidocaine HCl - Anaesthetic agent

Adrenaline - Vasoconstrictor

NaCl - Isotonic agent

Sodium metabisulfate - Antioxidant

Methane paraben - preservative.



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1. Describe controlled water fluoridation studies.

Ans:

1. Grand Rapids - Muskegon study.
2. Newburgh - Kingston study.
3. The Brantford - Sarvia - Stratford fluoridation caries study.
4. Evanston - Oak Park study.
5. Tiel - Lulemborg fluoridation study.
6. ~~optimal water fluoride concentration.~~

Can include the definition of water fluoridation

1. Grand Rapids - Muskegon study

- On January 25th, 1945, NaF was added to the Grand Rapids water supply.
- Muskegon was the control.
- The effects of 6½ years of fluoridation in Grand Rapids reported by Arnold et al 1953.
- Results: Caries in 6yr old Grand Rapids children were half of 6yr old Muskegon children.

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2. Newburgh - Kingston study:

- On May 2nd 1945, NaF was added to the drinking water of Newburgh on the Hudson river.
- Control: Kingston town.
- After 10 yrs of fluoridation, caries rate fallen from 23.5% to 13.9%.

3. The Brantford - Sarنيا - Stratford fluoridation caries study =

- In Canada, Brantford & Ontario, fluoride was added to water supply in June 1945.
- Control = Sarنيا
- Community of Stratford was auxiliary control because it had 1.3ppm fluoride in drinking water.
- After 17 yrs of fluoridation in Brantford, caries experience was similar to Stratford, 55% lower than Sarنيا.

4. Evanston - Oak Park study:

- In January 1946, a fluoridation experiment began in Evanston, Illinois.
- Control = Oak Park.

- After 14 yrs of fluoridation in Evanston, 49% reduction in DMF values.

5. Tiel - Culemborg fluoridation study:

- In March 1953, drinking water in Tiel was fluoridated (1.1 ppm)

- Control = Culemborg (0.1 ppm)

- After 13 yrs of fluoridation, the no. of anatomical sites of teeth affected by dental caries was 58% lower in Tiel than in Culemborg.

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2. Choking effect?

Ans: When NaF solution is applied on the tooth surface as a topical agent, it reacts with hydroxyapatite crystals in enamel to form  $\text{CaF}_2$  which is the main end product of the rxn. As a thick layer of  $\text{CaF}_2$  gets formed, it interferes with the further diffusion of  $\text{F}^-$  from the topical fluoride solution to react with hydroxyapatite & blocks further entry of  $\text{F}^-$  ions. This sudden stop of the entry of fluoride is termed as "choking off effect".

3. Scot - Sanchis method?

Ans: The test is based on the rxn bet<sup>n</sup> fluoride & the red zirconium Alizarin lake. Fluoride forms a colourless complex ion & liberates free alizarin sulphuric acid, which is yellow in acid solution. As the amount of fluoride increases the colour produced varies from yellow to red. It is an obsolete method to estimate fluoride conc. in drinking water.

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4.

Classify fluoride delivery system. Write in detail about fluoride delivery methods.

Ans!

### Fluoride delivery methods

#### Topical fluorides

#### Systemic fluoride

I. water fluoridation:

(i) Community water fluoridation.

(ii) School water fluoridation.

(iii) Salt fluoridation

(iv) Milk fluoridation

(v) Fluoride tablets  
drops/lozenges.

#### Professional

• Neutral NaF

• SnF<sub>2</sub>

• APF

• Varnish

#### Self-applied

• Dentifrices

• Mouth-washes

• Fluoride gels

①

Topical fluorides = These are placed directly on the teeth.

Topical fluorides allow interaction of F<sup>-</sup> with minerals in the teeth.

- Indications:
1. Caries.
  2. Children shortly after period of tooth eruption.
  3. Those who take medication that decrease salivary flow or have received head & neck radiation.

4. After periodontal surgery when roots of teeth are exposed.
5. Patients of with fixed or removable - prosthesis
6. Patients with eating disorder having poor oral health.
7. Mentally & physically challenged individuals.

• Types: (a) Professionally applied products = Dispensed by dental professionals in dental office & involves the use of high  $F^{\ominus}$  concentration products, ranging from 5000 & 19000 ppm, which is equivalent to 5-19 mg F/ml.

(b) Self applied products = Bought & dispensed by individual patient but at the recommendation of a dental personnel.  
Eg: dentrifices, mouthwash, gels.

These are low  $F^{\ominus}$  concentration products ranging from 200 to 1000 ppm or 0.2 - 1.0 mg fluoride/ml

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## Professionally applied fluorides :-

### 1. Neutral sodium fluoride:

- A min<sup>m</sup> of four applications with a 2% NaF solution, carries ~~to~~ reduction of about 30%.

- Method of preparation = It is prepared by dissolving 20g of NaF powder in 1l of distilled water in plastic bottle.

- Method of application:

• Knutson technique = sodium fluoride reagent is pure & uncontaminated, pH of 7.

• Treatment in series of 4 appointments.

(i) 2% NaF painted on air-dried teeth.

The solution is allowed to dry for 3-4 min.

(ii) Procedure repeated for each of the isolated segments until all teeth are treated.

(iii) 2nd & 4th fluoride application scheduled at intervals of approximately one week.

(iv) The 4 visit procedure is recommended for ages 3, 7, 11 & 13 years, coinciding with the eruption of different groups of primary & permanent teeth.

- Advantages: (i) Taste well accepted by patients  
(ii) Doesn't cause discolouration of tooth.

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- Disadvantages: (i) Patient has to make 4 visits within a short period of time.

## 2. Stannous fluoride:

- Has been used at 8% and 10% concentration.

- Method of preparation = Solution of stannous fluoride is not stable.

To prepare 8%  $\text{SnF}_2$  solution, the content of one capsule (0.8g) is dissolved in 10ml of distilled water in a plastic container & the solution is shaken briefly.

- Method of Application = Muller's Technique:-

$\text{SnF}_2$  is applied using paint-on technique & the solution is kept for 4 min.

Repeat applications are made every 6 months or more frequently if the patient is susceptible to caries.

Advantages = (i) Patient compliance.

(ii) Administrative difficulties are avoided.

- Disadvantages = (i) The mater is not stable.

(ii) 8% solution is quite astringent & disagreeable in taste, its application is unpleasant.

(iii) Tooth pigmentation.

(iv) Gingival irritation.

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### 3. Acidulated Phosphate Fluoride:-

- Introduced in 1960's by Brudevold & his co-workers.

- Method of preparation = An aq. sol<sup>n</sup> of APF prepared by dissolving 20g NaF in 1l of 0.1M H<sub>3</sub>PO<sub>4</sub> & to this added 50% hydrofluoric acid + ~~add 50~~ to adjust the pH at 3.0 & F<sup>-</sup> ion conc at 1.23%.

It is called Brudevold's solution.

- Method of application = Paint-on technique:-

• It is recommended for application at 6 or 12 month intervals.

• Patient should sit upright in the chair.

• Oral prophylaxis is done.

• Teeth to be treated are completely isolated & thoroughly dried with air.

• Clinical application of APF gels should be done using trays that fit the patient's upper & lower dental arches. A disposable foam-lined tray is preferred.

• The amount of F<sup>-</sup> is less than 5ml.

• It is reapplied every 15-30s so as to keep the teeth moist with fluoride sol<sup>n</sup> throughout the 4 min period.

• The patient is instructed not to drink or rinse his mouth for at least 30 min.



- Advantages :
- (i) Requires only 2 applications a year.
  - (ii) The gel preparation can be self-applied & thus the cost of application also gets reduced.
  - (iii) APF is stable.

- Disadvantages :
- (i) Acidic, sour & bitter in taste.
  - (ii) Cannot be stored in glass containers.
  - (iii) Increased chair side time making the method more expensive.

Self Applied fluorides :-

1. Dentifrices = The first clinical trial of fluoride dentifrice by Bibby 1942.

Fluoride dentifrices play a significant role in caries reduction.

Eg: NaF, SnF<sub>2</sub>, monofluorophosphate, amine fluoride dentifrices.

2. Fluoride mouthrinses = Eg: NaF  
 • Advantages of daily rinsing = 0.05% NaF

conc. used to provide both a topical & systemic benefit when indicated for individual patients.

3. Fluoride Gels = Eg: neutral NaF, APF, SnF<sub>2</sub>.  
 Gels are either applied on trays or brushed on teeth.

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### Systemic Fluorides :-

- Provides low conc. of  $F^-$  to the teeth over a long period of time.
- Types - (i) Community water fluoridation.  
(ii) Salt fluoridation.  
(iii) Milk fluoridation.  
(iv) Fluoride tablets/drops/lozenges.

1. Community water fluoridation = It is defined as controlled adjustment of the conc. of fluoride in a communal water supply so as to achieve maximum caries reduction & a clinically insignificant level of fluorosis.

Drinking water containing 1ppm fluoride has marked caries preventive action.

$F^-$  compounds used in water fluoridation are - Fluorspar, NaF, silicofluorides, sodium silicofluoride, Hydrofluosilicic acid, ammonium silicofluoride.

2. Salt fluoridation = It is the controlled addition of  $F^-$ , usually sodium or potassium fluoride, during the manufacture of salt for human consumption.

Level of fluoride = 200, 250, 350 mg of fluoride/kg salt.

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2. Milk fluoridation = It is the addition of a measured quantity of fluoride to bottled or packaged milk to be drunk by children.

The conc. of  $F^-$  in milk is 5ppm

Describe

5. MOA of fluoride

Ans: MOA of fluoride

(i) Increase enamel resistance (or) reduction in enamel solubility.

(ii) Increase rate of post-eruptive maturation.

(iii) Remineralization of incipient lesions.

(iv) Interference with plaque microorganisms.

(v) Modification in tooth morphology.

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6. What is defluoridation of water? Describe Nalgonda Technique.

ANS: Defluoridation is the process of removing excess naturally occurring fluoride ~~from~~ from drinking water in order to reduce the prevalence & severity of dental fluorosis.

Methods - (i) Based upon ion exchange process or adsorption.

(ii) based upon addition of chemicals to water during treatment (Nalgonda Technique).

Nalgonda Technique of defluoridation - developed by National Environmental Engineering Research Institute (NEERI) at Nagpur in 1974.

- Mechanism

The unit holds 22l of water, which is filled into the upper chamber.

The <sup>stages</sup> steps are -

- (a) Rapid mix
- (b) Flocculation
- (c) Sedimentation
- (d) Filtration

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-> Salient features:

1. NO regeneration of media.
2. NO handling of caustic acids & alkalis.
3. Readily available chemicals used in conventional municipal water treatment are required.
4. Adaptable for domestic use.
5. Simplicity of design, construction, operation & maintenance.
6. Highly efficient removal of  $F^-$  to desirable levels.
7. It is effective when dissolved solids are above  $1500\text{mg/l}$  & hardness above  $600\text{mg/l}$ .
8. Little wastage of water & least disposal problem.
9. Needs min<sup>m</sup> mechanical & electrical equipment.
10. NO energy except muscle power for domestic equipment.

- Indications :-

1. Raw water fluoride ranging from  $1.5\text{mg}$  to  $20\text{mg F/l}$ .
2. Absence of acceptable, alternate low fluoride source within transportable distance.

  
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3. Total dissolved solids are below 1500 mg/l. Desalination may be necessary when the total dissolved solids exceed 1500 mg/l.

Adaptability for domestic use  
Simplicity of design, construction, operation & maintenance  
Highly efficient removal of TSS to desirable levels

When dissolved solids are present in water, it causes hardness & scaling of pipes & heat exchangers.  
Needs minimum mechanical or electrical equipment for domestic use.  
No energy except electric power for domestic equipment.

Indications:-  
Raw water fluoride ranging from 1.0 to 2.0 mg/l  
Absence of acceptable, alternative low fluoride source within reasonable distance

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