TATYASAHEB KORE DENTAL COLLEGE AND RESEARCH CENTRE
NEW PARGAON – 416 113

Tal.: Hatkanangale Dist.:Kolhapur (Maharashtra State)

National Dental Commission

INFORMATION REGARDING INSTITUTIONAL COMPLIANCE

4. Clinical Compliance

4.2 Student clinical work registers are updated regularly.

'SERVICE IS RELIGION'

WARANA HEALTH MOVEMENT Est: 1992

TATYASHEB KORE DENTAL COLLEGE & RESEARCH CENTRE, NEW PARGAON

DEPARTMENT OF PEDODONTICS & PREVENTIVE DENTISTRY

Certified that this is a bonafide Record of work done by

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SCOPE OF PEDIATRIC DENTISTRY

Pediatric Dentistry :-

It is defined as an age defined speciality that provides both primary and comprehensive preventive and therapeutic oral health care for infants and children through adolescence including those with special health care needs.

⊙ Aims and Objective of Pedodontics :-

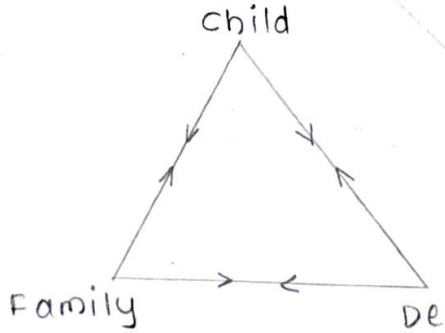
- Health of a child as a whole.
- More specifically we are concerned with oral health.
- Early diagnosis and prompt treatment.
- Restoring the mouth to good health.
- To observe and control the necessary developing dentition of child patient.
- Relief of pain.

Pedodontic Triangle –

Pedodontic triangle was first explained and conceptualised by GZ Wright in 1975 and was later modified by McDonald et al.

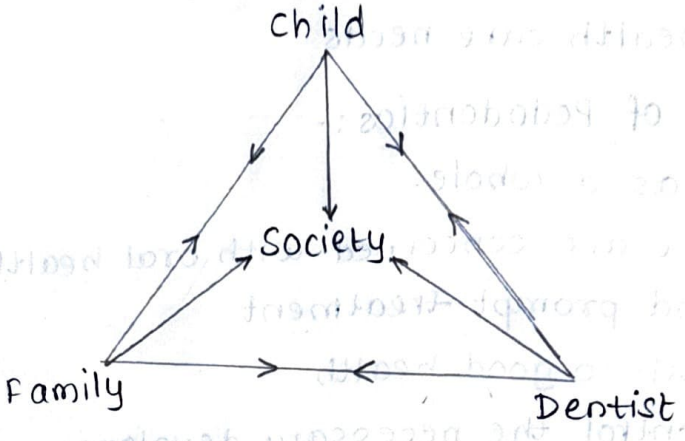
1. Conventional Model :-

- Patient doctor relation in adults is linear but in pedodontics the relation is triangular.
- This is because in pedodontics, the parent and the child both are involved and child is at the apex of triangle as he is focus of attention



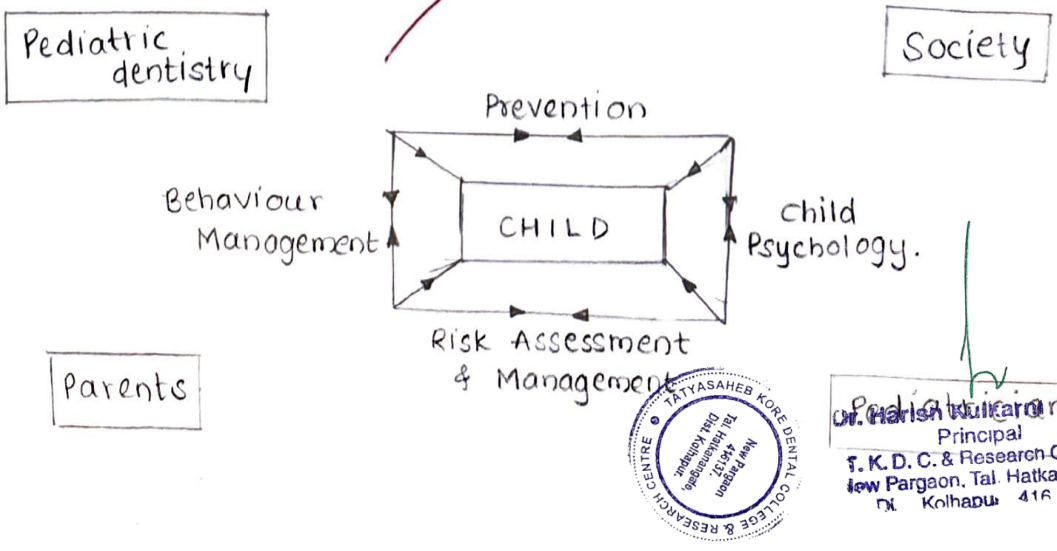
2. Modified Model :-

- It is given by McDonald et al.
- As community has become a major part of all component of environment therefore, recently a new parameter has also been added that is society.



3. Pediatric Dentistry Treatment Model :-

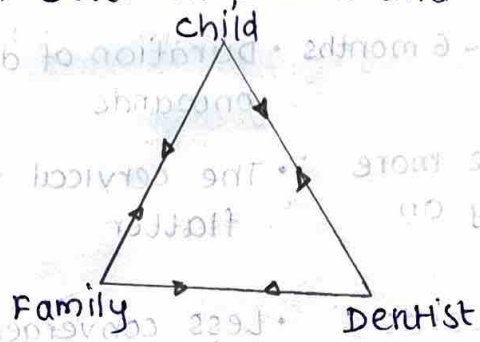
- Pediatric dentistry is an amalgamation of all branches of dentistry and most of its components have been either derived from or associated with each other dentistry branches but the four principles that stand out in this speciality and preventive risk assessment and management, child psychology.
- Vivek Petal have proposed a new model based on the pedodontic triangle and have terminated it pediatric treatment model.
- It presents the former triangle as a square which has the pediatric dentist, pediatrician, family and society playing important roles and definitely the child patient is the centre of attention.



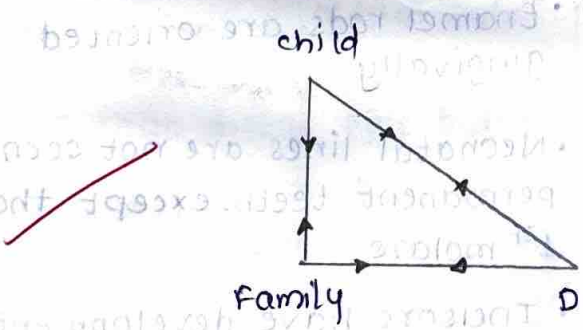
Scope of Pediatric Dentistry -

- Pedodontics encompasses a variety of disciplines, techniques procedures and skills that logically share a common basis with other specialities, but are modified, transformed on adapted to the special health care needs.
- Pedodontics dentistry concentrates on the integration of appropriate didactic and clinical knowledge from various specialities into a framework of quality oral health care for children.

- **Isosceles Triangle:**
  - Authorative parent
  - More interaction between parent and the dentist.



- **Right angled triangle.**
  - Neglegent parent.
  - More interaction between child patient & dentist.



ASSIGNMENT NO: 2.

Morphology difference between primary teeth and permanent teeth

PRIMARY TEETH	PERMANENT TEETH.
• Number of teeth in primary dentition is 20.	• Number of permanent teeth is 32.
• Primary teeth are light in colour, bluish white in colour also called as milk teeth as its refractive index is same as milk.	• These are darker in colour, grayish or yellowish in colour.
• Duration of dentition:- 6 months to 5 1/2 years	• Duration of dentition :- 6 years onwards.
• The cervical ridges are more pronounced especially on buccal aspect.	• The cervical ridges are flatter.
• More convergence towards occlusal surface i.e narrow occlusal table.	• Less convergence towards occlusal surface.
• Enamel is thinner, about 1mm thicker throughout.	• Enamel is thicker, about 2-3 mm
• The enamel rods at the cervical slopes occlusally from DEJ	• Enamel rods are oriented gingivally.
• Neonatal lines are seen.	• Neonatal lines are not seen in permanent teeth except the 1st molars.
• Incisors have no developmental grooves or mamelons.	• Incisors have developmental grooves and mamelons on newly erupted teeth.
• The roots are larger and more slender	• The roots are shorter and bulbuous.
• Furcation is more towards cervical areas so that root trunk is smaller	• Placement of furcation is apical thus root trunk is larger.
• These show more attrition.	• Permanent teeth shows less attrition comparatively.
• More organic content is seen in enamel	• Organic content is less than primary teeth.

• Dentinoenamel junction is flat.	• Dentinoenamel junction is scalloped.
• Primary teeth undergo physiologic resorption.	• Permanent teeth do not undergo physiologic resorption only pathologic changes take place.
• Primary teeth has abundant blood supply as compared to permanent teeth.	• The blood supply is comparatively less.
• Broad contact areas are seen between the teeth.	• A single contact point is present between the teeth.
• Response to external stimuli is the typical inflammatory reaction.	• Response in permanent teeth is through calcific scarring
• Density of innervation is less so teeth are less sensitive to operative procedure.	• Density of innervation is greater thereby leading to more sensitivity.
• Pulp chamber is larger in relation with crown size.	• Pulp chamber is smaller in size in relation to crown size.
• The pulp horns are closer to the outer surface. Mesial pulp horns extends to a closer to the surface than distal pulp horns.	• The pulp horns are comparitively away from outer surface.
• Root canals are more ribbon like. The radicular pulp follows a thin, tortorous and branching path.	• Root canals are well-defined with less branching.
• Accessory canals present at inter-radicular furcation	• Accessory canals present at apical region of roots.
• Roots have enlarged apical foramens. Thus, the abundant blood supply demonstrates a more typical inflammatory response.	• Foramens are restricted. Thus reduced blood supply favours calcific response and healing by calcific scarring.
• Incidence of reparative dentin formation beneath carious lesion is more extensive and more irregular	• Reparative dentin formation is less.

Clinical Significance of Morphology of Primary Teeth.

- Thickness of enamel and dentin is less in proximal teeth. Hence the spread of caries from enamel to pulp can be faster in primary teeth.
- In posterior, primary teeth, the distance from external surface of tooth to pulp is less in proximal teeth.
- Hence any proximal caries in primary teeth must be radiographed and extends of pulpal involvement.
- Pulp horns are very highly placed in teeth eg:- The tip of mesiobuccal pulp horn of mandibular 1st primary molar is at dentinoenamel junction it has deep central pit.
- Hence, caries on mesial pit in a mandibular 1st primary molar should be treated with caution. Aggresive removal of caries lead to pulp exposure.
- Prominent buccal cervical ridge on mandibular 1st primary molar may provide some resistance for placement of a stainless steel crown.
- During cavity preparation, the oblique ridge in maxillary 2nd primary molar should be preserved unless undermined by caries.
- Conical roots of primary anterior teeth facilitate easy removal However, flared roots of primary molar removal dictate the tooth to be removed with care.
- Understanding tooth morphology is of great importance to restore the normal form of tooth which is required for function.
- Knowledge of teeth morphology can enable the dentist to identify when there are multiple extracted teeth or in period of mixed dentition.
- In Class II cavity preparation bevelling is done unseparated dentin is removed through GMT.
- They are unsuspected because enamel rod are directed gingivally whereas in case of deciduous dentition occlusally placed enamel rods, so no bevelling required

ASSIGNMENT NO:-3.

Chronology and eruption age:

- The regular sequence of eruption suggest that it is under genetic control while some is an event highly subjected to nutrional, hormonal and disease state.
- At birth jaws contain partly calcified crown of 20 deciduous teeth and beginning of calcification of permanent first molars.
- Eruption of deciduous dentition begins at an average of 7 1/2 months of age and terminates at about 29 months of age.
- At the age of 6 years, the jaws contain more teeth than any other time, 48 teeth are filling the jaws in total.
- The age 6 to 12 years is a period of mixed dentition; it is the most complicated period of dental development and one in which malocclusion is most likely to develop.
- The mixed dentition stage is when deciduous teeth are lost and permanent teeth start to erupt.
- The permanent 3rd molar do not begin calcification until the 9 years and their eruption starts from 16 years ~~ow~~ onwards till the completion of dentofacial growth and development.

Primary Dentition:-

⊙ Maxilla-

Tooth	Hard tissue formation	Crown completion	Eruption	Root completion
Central Incisor	4 months in utero.	4 months	7 1/2 months	1 1/2 years.
Lateral Incisor	4 1/2 months in utero	9 months	9 months	2 years
Canine	5 months in utero	9 months	12 months	3 1/2 years
1st molar	5 months in utero	6 months	14 months	2 1/2 years.
2nd molar	6 months inutero	11 months	24 months	3 years.

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⊙ Mandible:

Tooth	Hard tissue formation	Crown completion	Eruption	Root completion.
Central Incisors	4½ months in utero	4½ months	6 months	1½ years
Lateral Incisors	4½ months in utero	4 months	7 months	2 years
Canine	5 months in utero	9 months	16 months	3½ years
1st molar	5 months in utero	5½ months	12 months	2½ years
2nd molar.	6 months in utero	10 months	20 months	3 years.

Permanent Dentition :-

⊙ Maxilla –

Tooth	Hard tissue formation	Crown completion	Eruption	Root completion
central incisor	3-4 months	4-5 years	7-8 years	10 years
Lateral incisor	10-12 months	4-5 years	8-9 years	11 years
canine	4-6 months	6-7 years	11-12 years	13-15 years
1st premolar	1½ -1¾ year	5-6 year	10-12 year	12-13 year
2nd premolar	Birth	6-7 year	10-12 year	12-14 year.
1st molar	2½ - 3 years	7-8 year	10-11 year	9-10 year
2nd molar	7-9 years	7-8 year	12-15 year	14-16 year
3rd molar	7-9 years	12-16 year	17-24 year	17-25 year

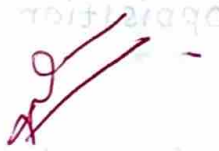
⊙ Mandible –

Tooth	Hard tissue formation	Crown completion	Eruption	Root completion
Central Incisor	3-4 months	4-5 years	6-7 years	9 years
Lateral Incisor	3-4 months	4-5 years	7-8 years	10 years
Canine.	4-5 months	6-7 years	9-10 years	12-14 years
1st premolar	1¾ - 2 years	5-6 years	10-11 years	12-13 years
2nd premolar	2¼ - 2½ years	6-7 years	11-12 years	13-4 years
1st molar	Birth	2½ - 3 years	6-7 years	9-10 years
2nd molar	2½ - 3 years	7-8 years	11-13 years	14-15 years
3rd molar	8-10 years	12-16 years	17-21 years	18-25 years

Nolla's stages of Tooth development -

- In 1992, Nolla has given an arbitary description of tooth formation divided into 11 stages. These are numbered as 0 to 10.
- This is useful in dental age estimation for medico legal or forensic purposes.
- They show progression from initial appearance of erupt through the last stage of apical root closure for developing tooth.

0 → Absence of crypt
1 → Presence of crypt
2 → Initial calcification
3 → One-third of crown completed
4 → Two-third of crown completed
5 → Crown almost completed
6 → Crown completed
7 → One-third of root completed.
8 → Two-third of root completed
9 → Root almost completed - open apex
10 → Apical end of root completed.



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ASSIGNMENT NO :- 4

Eruption and Shedding of Teeth –

⊙ Eruption –

Eruption is defined as movement of teeth through the bone of jaw and overlying mucosa to appear and function in oral cavity.

- Eruptive movement begin with the onset of most formation before the teeth are seen in oral cavity.
- Movement leading to eruption of teeth can be divided into 3 phases :-

Phase 1 :- Pre-eruptive phase.

Phase 2 :- Prefunctional eruptive or eruptive phase.

Phase 3 :- Functional eruptive or post-eruptive phase.

(1) Pre-eruptive phase :-

- It is a preparatory to eruptive phase.
- During this phase, growing tooth moves into direction to maintain its position in expanding jaws.
- Bodily movement is movement of entire tooth germ. It causes bone resorption in direction of tooth and bone oppisition behind it.
- Ecentric growth refers to growth in one part of tooth while rest of tooth remains constant.
- During early pre-eruptive phase, successional permanent tooth develop lingual and near occlusal level of primary precedors.
- But at end of this phase, teeth are positioned lingually and near the apical third of primary anterior teeth.

(2) Eruptive phase :-

- The eruptive phase begins with initiation of root formation and ends when teeth reach occlusal contact.

Root begin their formation as a result of proliferation of both epithelial root sheath and mesenchymal tissue of dental papilla and dental follicle.

↓

Erupting tooth moves through bone of crypt and the connective tissue of oral mucosa

↓

The reduced enamel epithelium covering the crown comes in contact with the oral epithelium.

↓

Tip of crown enter the oral cavity by degrading the membrane and breaking through the center of double layered epithelium.

↓

Crown erupts further and lateral border of oral mucosa now becomes the DEJ.

↓

Reduced enamel epithelium now surrounding like a cuff becomes known as functional or attachment epithelium.

↓

Erupting tooth continues to move occlusally as a result of active eruption, exposing more clinical crown.

↓

Separating of attachment epithelium from crown resulting apical shift of attachment epithelium.

(3) Post-eruptive phase :-

- Begins when teeth reach occlusion and continue for long as each tooth remains in oral cavity.
- Alveolar process increase in height and root continue to grow.
- Occlusion is established.
- Alveolar bone density increases, principal fibres of periodontal ligament establish themselves into separate groups.
- Latter in life, attrition may wear down occlusal surface of teeth
- Slight occlusal movement the teeth tend to move anteriorly on mesial wall of socket & bone opposition on distal wall.
- These movements include those to accomodate growing jaws to compensate for occlusal wear and interproximal wear.

Shedding -

- The physiologic process resulting in elimination of deciduous dentition is called shedding or exfoliation.

⊙ Pattern of shedding -

Shedding of deciduous teeth is result of progressive resorption of roots of tooth and their supporting tissue.

- The pressure generated by growing and erupting permanent tooth dictate pattern of deciduous tooth resorption.

1) Resorption Of Anterior Teeth -

- Position of permanent anterior tooth germ is lingual in apical third of roots of primary teeth.
- Resorption is in occluso-labial direction.
- Later the crown of permanent tooth lies apical to root of primary teeth causes resorption to proceed horizontally
- Horizontal resorption allows permanent tooth to erupt into position of primary teeth.

2) Resorption of Posterior Teeth -

- Growing crowns of premolars are situated between roots of primary molars.
- Initiation is resorption of inter-radicular bone followed by resorption of adjacent surface of root of primary tooth.
- Alveolar process is growing to compensate for lengthening roots of permanent teeth.

- Primary molars are more occlusally, it allows premolar crowns to be more apical.
- Premolar continue to erupt until primary molars roots are entirely resorbed and teeth exfoliate.
- Premolars then appear in place of primary molars.

Theories of Eruption -

1) Root elongation theory -

According to this theory, most obvious mechanism of eruption would be that crowns of teeth are pushed into oral cavity by virtue of growth and elongation of roots.

Evidence - Root of tooth elongates as crown erupts into oral cavity

Evidence against - Rootless teeth often erupts without concomitant elongation of root, submerged teeth continue formation of their roots but do not erupt.

2) Pulpal Constriction Theory -

It states growth of root dentin and subsequent constriction of pulp may occur due to sufficient pressure to move the tooth occlusally.

Evidence - pulp constriction by growth of root dentin.

Evidence against - pulpless teeth erupts at same rate as normal teeth.

3) Growth of periodontal tissue -

⊙ Pull by surrounding connective tissue -

Connective tissue surrounding the tooth may function in pulling the tooth into oral cavity.

Theory is invalidated by histological examination of direction of periodontal fiber during tooth eruption.

⊙ Alveolar bone growth -

Growth of alveolar bone may push the tooth out of its alveolus and into the oral cavity.

- Histological sections & ray show that bone does not touch the tooth mechanisms can operate only upon single conical roots but not on multirooted teeth

4) Presurre from muscular action -

Action of musculature of cheeks & lips upon alveolar process might serve to squeeze the crown of tooth out into oral cavity like a pumpkin seed from between the fingers.

- This process continues until tooth in occlusion being halted by antagonism of teeth.
- Theory fails to ~~eruption~~ explain to eruption in cases of unilateral facial paralysis.

5) Resorption of alveolar crest -

It serves to expose the crown of tooth into oral cavity this theory is not tenable since histological examination shows that alveolar crest is the size of most rapid and continuous growth of bone.

6) Hormonal Theory -

Arthur Keith suggests that hormones secreted by thyroid and pituatary glands might govern the eruption of teeth.

- Theory does not attempt to eruption mechanism of eruption of teeth and only points out the fact hormones may affect eruption of teeth

7) Foreingn body theory -

States that a calcified body such as tooth tends to be exfoliated by tissues just as does any foreign body.

8) Cellular proliferation theory -

Noyes pointed out tremendous pressure, which is evolved from cellular proliferation, provides growing plant with sufficient force break through hard obstacles.

- Similarly, osmotic pressure and forces resulting from cellular proliferation in pulp and surrounding tissues may account for eruption of teeth

9) Vascular Theory -

This theory points out the fact that tissues, which lie between developing tooth and bony surrounding possess a very rich vascular supply.

- He said that blood pressure exerted in vascular tissue like between the developing teeth and bony surrounding active mechanical factor in the process known as eruption of teeth
- Evidence - submerged teeth often erupts under influence of hyperemia It causes supraeruption of teeth.

10) Blood vessel thrust theory -

Eruption involves the blood supply to tooth like vascularity theory.
- Blood generates force by hydrodynamic and hydrostatic forces within vessels.

11) Periodontal ligament contraction theory -

The contractile element within periodontal ligament, collagen constriction and due to fibroblasts are responsible
- Actual force required to move tooth is linked to contractility of fibroblasts.
- Fibroblasts are placed onto silicon, they crawl about in doing so create wrinkles or folds in rubber indicating traction forces are associated with locomotion.
- A model system consisting of well lined by perforated mesh and containing gel placed with fibroblasts and sliced of root dentin not only there, is three dimensional network established by also network generates sufficient force to raise slice from bottom to top.

12) Dental follicle theory -

Dental follicle theory is essential to achieve the bony remodelling required to accomodate tooth movement, from this tissue that ~~as~~ osteoblastic differentiation.

ASSIGNMENT NO :-5

TOOTH NUMBERING SYSTEM :-

- Tooth designation system have been used for more than hundreds of years and were first reported in early literature.

(1) Zigmondy - Palmer System :

- The most popular system of tooth designation for much of the 20th century was developed by Adolph Zigmondy.
- In this system, the dentition is divided into quadrants and symbols are used to designate in which quadrant the tooth is found.

  ⌞ → upper left quadrant.
  ⌟ → upper right quadrant.
  ⌜ → Lower left quadrant
  ⌝ → Lower right quadrant.

- A number is placed between these brackets which denotes position of tooth from midline.
- Palmer notation is simple, easy to use and most often used by dentists.
- Major drawbacks is inability to record them using conventional keyboard input and word processing software.

• Deciduous dentition -

Maxillary right | Maxillary left

E D C B A	A B C D E
E D C B A	A B C D E

Mandibular right | Mandibular left

• Permanent dentition -

Maxillary right | Maxillary left

8 7 6 5 4 3 2 1	1 2 3 4 5 6 7 8
8 7 6 5 4 3 2 1	1 2 3 4 5 6 7 8

Mandibular right | Mandibular left

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(2) Universal Numbering System

- It was first suggested by Pareidt in 1882 and uses number 1-32 for permanent teeth and uppercase letters A through T for primary teeth.
- In this system each tooth is assigned a unique number or alphabet allowing easier use on keyboards and word processing software used by ADA.

• Deciduous dentition -

A	B	C	D	E	F	G	H	I	J
T	S	R	Q	P	O	N	M	L	K

• permanent dentition -

1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16
32	31	30	29	28	27	26	25	24	23	22	21	20	19	18	17

(3) FDI (World Dental Fedration Notation)

- The FDI system was developed in 1971, a system to identify teeth with a number system is called the FDI two digit Notation. also known as ISO-3950 notation
- Each tooth is given two digit number.
  - 1st digit - Dentition, arch & quadrant
  - 2nd digit - Position of tooth relative to midline.
- In permanent dentition is divided into quadrants '1, 2, 3 & 4'.
- Any primary dentition is divided into quadrants '5, 6, 7 & 8'.
- FDI system is internationally accepted and followed in many countries.
- It is ideal for verbal communication and visual sense.

• Deciduous dentition -

55	54	53	52	51	61	62	63	64	65
85	84	83	82	81	71	72	73	74	75

• Permanent dentition -

18	17	16	15	14	13	12	11	21	22	23	24	25	26	27	28
48	47	46	45	44	43	42	41	31	32	33	34	35	36	37	38

ASSIGNMENT NO: 6.

Development of Dentition -

- Development of tooth is complex process initiated, mediated and controlled by interaction between ectoderm and supporting ectomesenchyme.
- Tooth development begins at 3rd week of intrauterine life after developing oral cavity.
- First sign of tooth development is proliferation of oral ectodermal cells to form epithelial thickening called primary epithelial band it projects into ectomesenchyme.
- Primary epithelial band is formed by 6th week of intrauterine life. It continues to proliferate.
- By 7th week two subdivisions arise
  1) Buccal - vestibular lamina
  2) Lingual - Dental lamina.
- The vestibular lamina proliferate further and forms wedge-shaped structure.
- The central cells enlarge and further undergo degeneration forming 'V-shaped' cleft or vestibule.
- The vestibule separate the cheek and lip from tooth bearing area.
- Dental lamina contributes to formation of tooth.

Dental Lamina :-

- Localised proliferation in initial weeks of ~~proliferation~~ intrauterine life acts primary proliferation activity at 10 specific regions.
- Enamel organ of deciduous dental lamina of upper and lower dental arches between 6th - 8th week of intrauterine life.
- Dental lamina develops into tooth buds - 10 deciduous teeth in each arch.
- Lingual extension are called as successional lamina.
- Successional lamina of central incisor develops at 5th month in uterus and 2nd premolar at 10th month of age.
- Permanent molar develop from distal extension of dental lamina - accessional lamina.
- Permanent 1st molar bud develop at 4th month of intrauterine life and second molar at 1st year and third molar at 4th & 5th years of life.

- Average period of activity of dental lamina is 5 years. Few remnants cells may persist known as cell rests of serre's and may be seen in connective tissue of gingiva.

Stages of development of tooth –

Ten specific location of dental lamina

↓

Ten knob like small swelling

↓

Buds

↓

Tooth germs.

Tooth germ components –

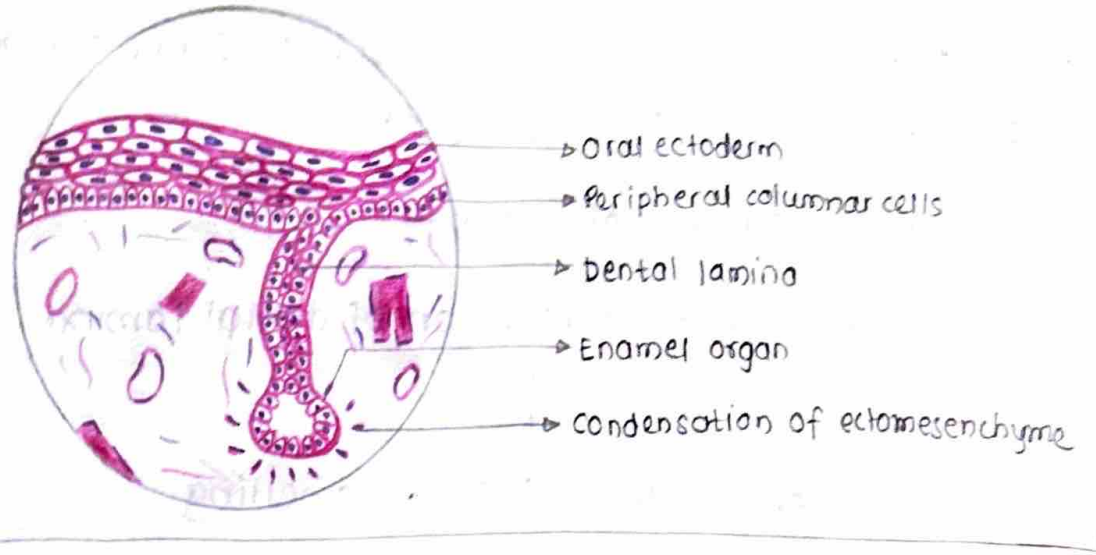
Enamel organ - Enamel formation.
Dental papilla - Dentin & pulp.
Dental follicle - cementum, periodontal ligament, alveolar socket.

Morphological stages –

1) Bud stage
2) Cap stage → Early → Late.
3) Bell stage → Early → Late

(1) BUD STAGE –

- Primordia for teeth are seen as structure budding off from basal layer of oral ectoderm.
- These buds later forms enamel organs.
- Cells living in periphery are cuboidal while centrally located cells are polyhedral in shape.
- Ectomesenchymal cells undergo condensation forming dental lamina.
- Peripheral portion encloses enamel organ and dental papilla called dental sac.

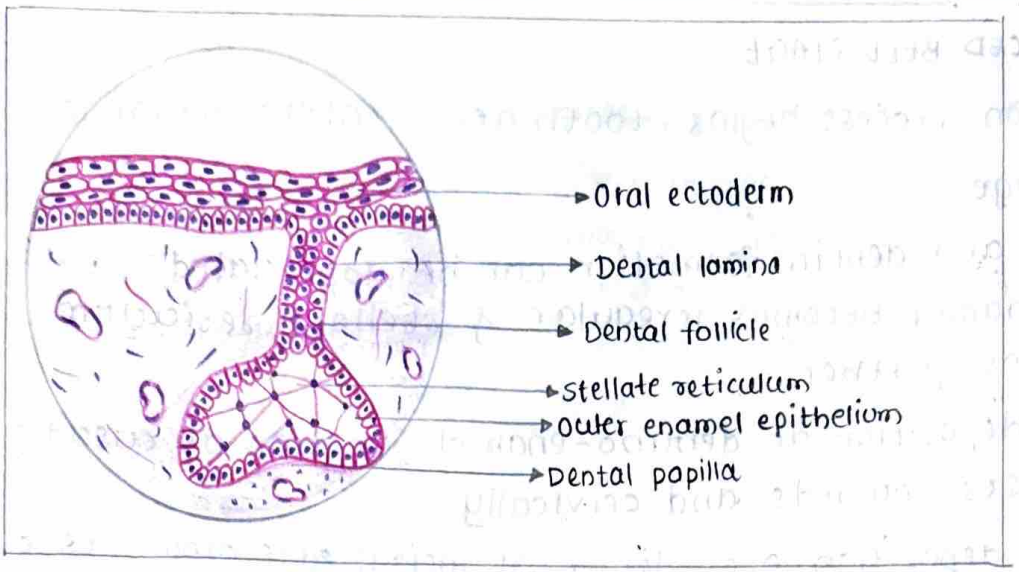


(2) CAP STAGE –

- Enamel organ increases in size by proliferation of cell growth is unequal so it takes shape of cap shaped structure.
- Convex surface faces the oral cavity.
- Tooth germ appears cap like enamel organ.
- Both are enclosed in sact like dental follicle.
- central cells are polyhedral in early stage and stellate shaped in later stage.
- three types of cells are seen –
  - Inner enamel epithelium – Low columnar
  - outer enamel epithelium – cuboidal cells.
  - central part – stellate reticulum.

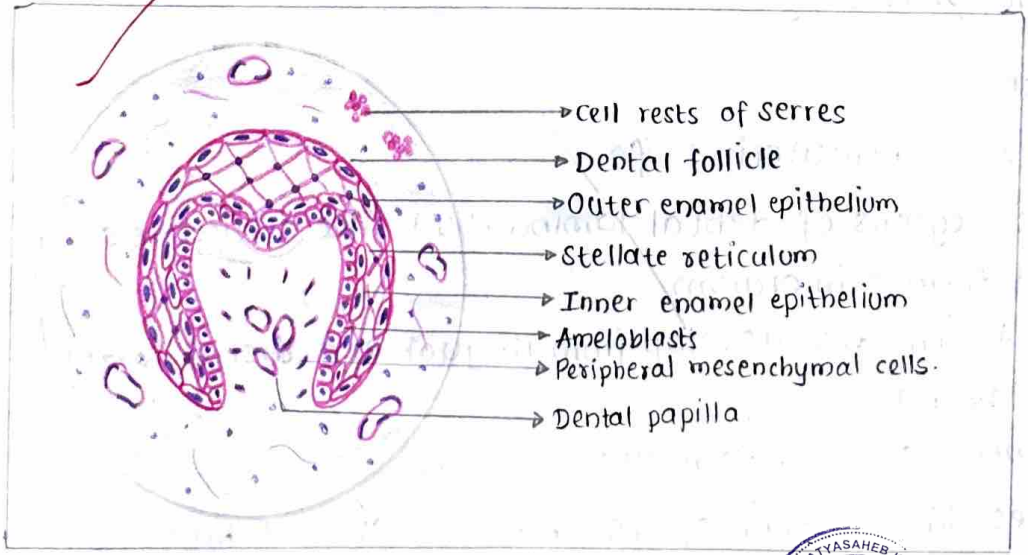
⊙ Stellate reticulum.

- These are star-shaped cells.
- They provide nutrition to neighbouring cells, transitory structure of enamel organ (enamel knot, enamel cord, enamel septum, enamel niche)
- They also provide mechanical protection, act as shock absorber.
- Dental papilla is main source of nutrition to inner enamel epithelium dental follicle it encloses enamel organ & dental papilla.



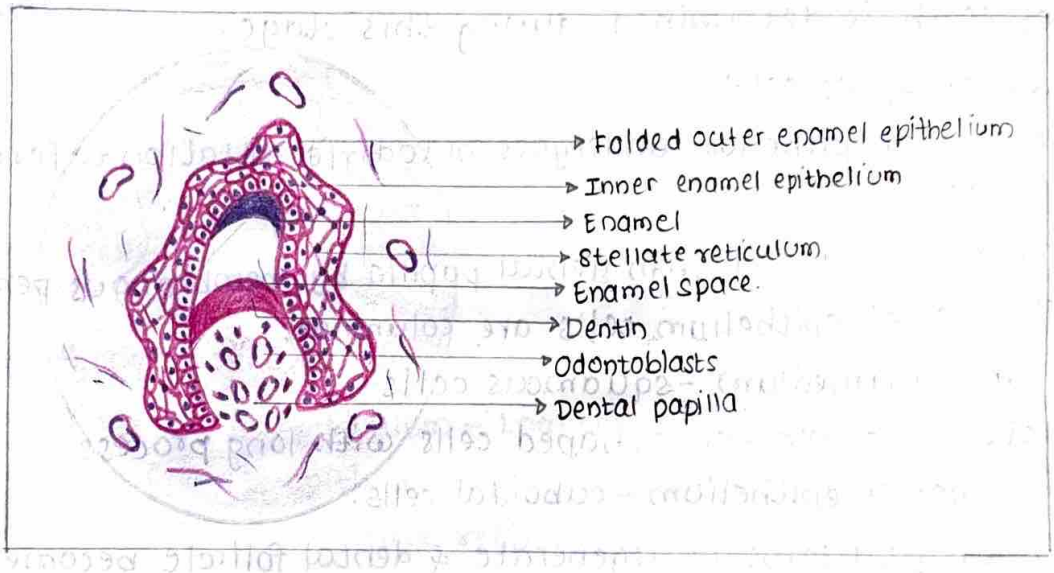
(3) EARLY BELL STAGE -

- Enamel organ enlarges and evaginates, deepens further and resembles bell.
- Shape of tooth is determined during this stage.
- 4 distinct group of cells.
  1) Inner enamel epithelium undergoes histodifferentiation to form ameloblast.
  - Ameloblast separated from dental papilla by membranous performativa
  - Inner enamel epithelium cells are columnar.
  2) Stratum intermedium - squamous cells.
  3) Stellate reticulum - star shaped cells with long process.
  4) Outer enamel epithelium - cuboidal cells.
- Dental lamina begins to degenerate & dental follicle becomes more distinct.



(4) ADVANCED BELL STAGE

- Apposition process begins; tooth germ enters advanced bell stage.
- Enamel and dentin formation can be appreciated.
- Outer enamel becomes irregular & stellate reticulum collapses further.
- Dentin deposition at dentino-enamel junction at cusp tip progresses inwards and cervically.
- Enamel deposition over dentin at incisal edge progresses outward and cervically.
- When both reach at cervical region, root formation begins by HERS.



Physiologic phases –

(1) Initiation –

- At 6th week of intrauterine life.
- At specific regions of dental lamina, bud like structures develop and form primordium.
- Permanent teeth also develop from lingual and distal extension of dental lamina.
- commencement of tooth formation is seen.
- This decides the number of tooth to be formed & their location in arch.
- Clinical significance – congenital absence of tooth, supernumerary tooth, ectopic tooth formation.

(2) Proliferation -

- Process begins at bud stage continues through bell stage.
- Provides adequate cell for development of tooth germs.
- contributes to determination of shape of crown.
- Clinical significance - Failure of toothgerm to develop, formation of tooth defective in size and shape.

(3) Morphodifferentiation -

- Physiologic process which ensure normal shape and size of developing tooth.
- Begins in cap stage and becomes maximum at early bell stage.
- Tooth germ is changed from an undifferentiated stage to more differentiated bell stage.
- Enamel organ develops an invagination.
- Shape of crown is defined and established in early bell stage to more differentiated bell stage
- Membrana performativa is formed.
- It continues in advance bell stage during root formation.
- Clinical significance - Peg shaped lateral incisors, microdontia, macrodontia.

(4) Histodifferentiation -

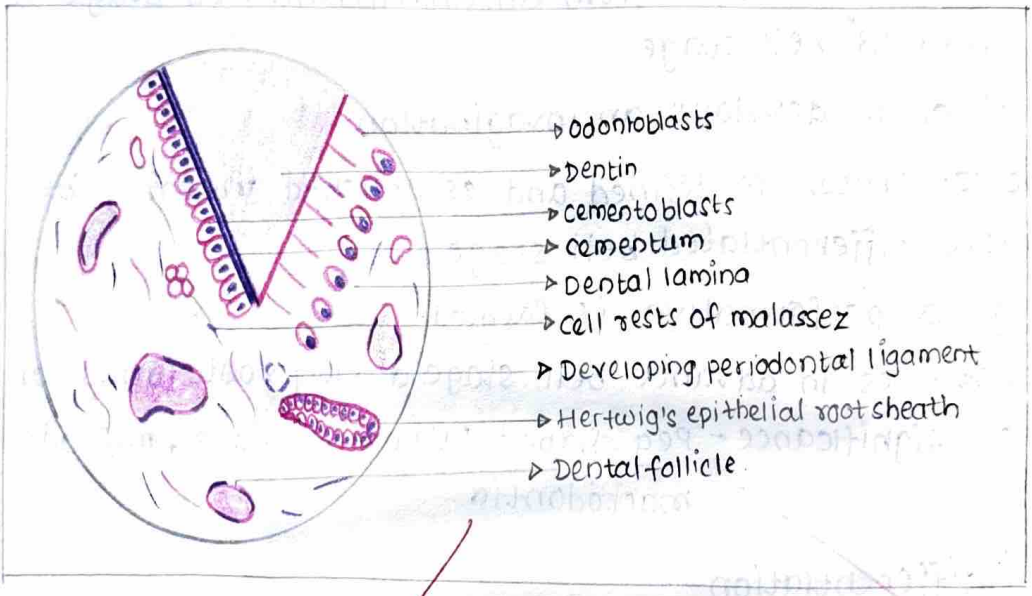
- Physiologic process in which cells undergo morphologic and functional changes to perform their function.
- Begins in cap stage and maximum in bell stage.
- Inner enamel epithelial cells differentiation into ameloblast.
- Dental papilla differentiate into odontoblast.
- Clinical significance - Amelogenesis imperfecta, dentinogenesis imperfecta.

(5) Apposition :-

- This process of rythmic deposition of dental hard tissue is called apposition.
- Once DEJ is established, successive deposition of organ mattix which gets mineralised to dental hard tissue.
- Clinical significance - Enamel hypoplasia

Root formation –

- Root formation begins in advance bell stage after enamel & dentin formation reaches cervical region.
- Enamel organ at cervical loop proliferate to give rise to Hertwigs epithelial root sheath (HERS)
- HERS ~~is~~ determines number, size, shape of root.
- HERS has two layers-
  i) Inner layer of columnar cells derived from inner enamel epithelium.
  ii) Outer layer of cuboidal cells derived from outer enamel epithelium.



ASSIGNMENT NO. 7

Development of occlusion.

- Development of occlusion is genetically and environmentally conditioned process, which shows a great deal of individual variation.
- The various stages of occlusal development are:-

1) Predentate jaw relationship.
2) Deciduous dentition preriod
3) Mixed (Transitional) dentition period
4) Permanent dentition period.

(A) Predentate period —

- This is a period from birth to eruption of the first deciduous teeth in the cavity.
- The alveolar process at the time of birth is called as gum pads.
- They are horseshoe-shaped pads that are pink, firm and covered with layer of dense periosteum.
- They are divided into two (labiobuccal and lingual) by dental groove.
- The gum pad is further divided into 10 segments by transverse groove, each segment has one developing tooth sac.
- Important landmark in gum pads is lateral sulcus, which is
- the transverse groove, between canine and first molar.
- This is helpful in predicting interarch relation at a very early stage.
- The maxillary gum pads ~~are~~ is wider and longer than the mandibular thus when they are approximated, there is complete overjet all around.

(B) Deciduous dentition period —

- The initiation of primary teeth occurs during first 6 weeks of intrauterine life and first primary teeth erupts at the age of 6 months.

- Spacing :-

- Spaced dentition ⟶ given by Baume.
- It is supposed to be good, as spaces in between the teeth can be utilized for adjustment of permanent successors, which are always larger in size compared to deciduous teeth.

- Primate space :-

- Exist between the maxillary lateral incisors and the canines (present mesial to maxillary deciduous canines) and mandibular canines and first deciduous molars (present distal to mandibular deciduous canines)
- These spaces are also called as anthropoid or simian spaces as they were initially found in our ancestral simian species.

- Physiologic space :-

- Present in between all the primary teeth and play an important role in normal development of permanent dentition.
- The total space present may vary from 0 to 8 mm with the average 4mm in the maxillary arch and 17 mm with the average of 3mm in mandibular arch.

- Non-spaced Dentition -

- This dentition is highlighted by lack of space between primary space either due to small jaw or larger teeth.

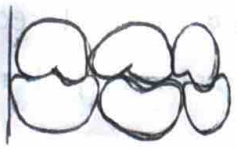
Terminal planes :-

- The mesiodistal relation between the distal surfaces of maxillary and mandibular second deciduous molar is called as terminal planes.

(1) Flush terminal plane -

a. The distal surface of the deciduous second maxillary and mandibular molars are in a straight plane and therefore situated in same vertical plane.

b. It is usually most favourable relationship to guide the permanent molars into Class I. It is seen in 74%.

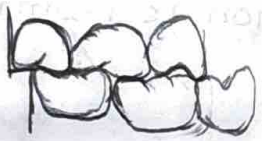


Flush Terminal plane.

(2) Mesial step plane –

a. The distal surface of deciduous second mandibular molar is more distal to that of deciduous second maxillary molar. Invariably, this guides the permanent molars into class I relationship.

b. However, a few can proceed into half cusp Class III during molar transition and further into full class III relationship with continued mandibular growth. It is seen in 14%.

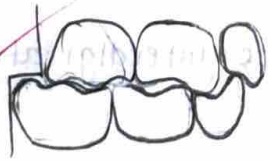


Mesial Step plane

(3) Distal step plane –

a. The distal surface of deciduous second mandibular molar is more distal to that of the deciduous second maxillary molar.

b. This relationship is unfavourable as it guides the permanent molars into distal occlusion. seen in 10%.



Distal step plane

Anterior Teeth Relationship –

1. Overbite –

It is the distance, which is incisal edge of the maxillary incisors overlaps vertically past the incisal edge of mandibular incisors. The average overbite in primary dentition is 2mm.

2. Edge to edge bite –

When the incisal edges of the two incisors are in the same plane, this is also called as zero overbite.

- This is most common due to attrition, lengthening of ramus and downward – forward growth of mandibular.

3. Overjet –

It is the horizontal distance between the lingual aspect of maxillary incisors and the labial aspect of mandibular incisors when the teeth are in centric occlusion.

- The average in primary dentition is 1–2mm

Canine Relationship –

– The relationship of the maxillary and mandibular deciduous canines is one of the most stable in primary dentition.

- Class I → The mandibular canine interdigitates in embrasure between the maxillary lateral incisors & canine.
- Class II → The mandibular canine interdigitates distal to embrasure between the maxillary lateral incisor and canine.
- Class III → The mandibular canine interdigitates in any other teeth.

(c) Mixed Dentition Period –

The period during which both the primary & permanent teeth are present in the mouth together is known as mixed dentition.

First Transitional Period-

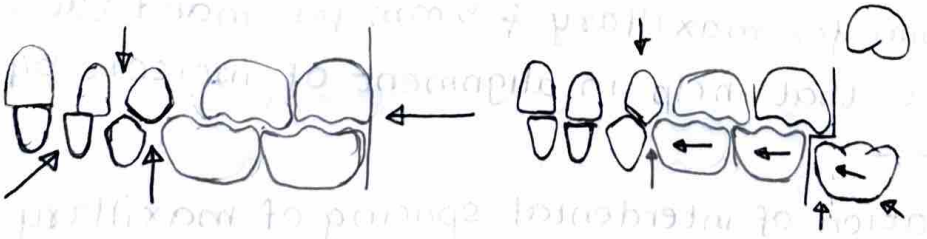
This is characterised by emergence of 1st permanent molar & exchange of deciduous incisors with permanent incisors

- Emergence of 1st permanent molars-
  - ~~The~~ The anteroposterior relation between the two opposing 1st molar after eruption depends on their positions
  - Previously occupied within the jaws. Sagital relation between maxilla & mandible & occlusal ~~rela~~relationship is established by the cone & funnel mechanism with the upper palatal cusp sliding into lower occlusal fossa.
  - The mandibular molars are the first to erupt at around 6 years of age. Their position & relation is dependent on the relation of 2nd deciduous molars as they are guided into dental arch by the distal surfaces of theese teeth.
  - If the second deciduous molar is in flush terminal plane then the erupting permanent molar will also be in same relation
  - For this, to change into class I relation, the molar has to move 2-3 mm in forward direction, this is accomplished by —

(1) Early Mesial Shift -

The eruptive phase of first permanent molars are strong enough to push the deciduous molars forward in the arch.

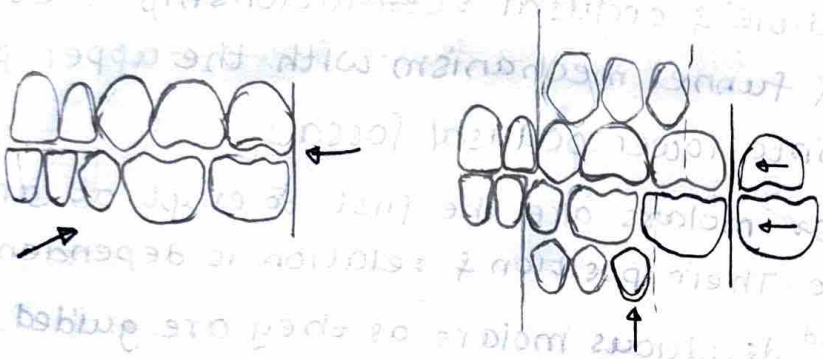
- Thereby utilising the primate space & thus establishing class I relationship.



Early Mesial Shift

(2) Late Mesial shift –

- Many children lack primate space & have a non-spaced dentition & thus erupting permanent molars are not able to establish class I relation even as they erupt.
- In these cases, the molars establish class I relation by drifting mesially & utilisation of leeway space after exfoliation of deciduous molars & this is called late mesial shift.



Late Mesial Shift

- Exchange of incisors
- The deciduous incisors are placed by permanent incisors during this phase.
- This period of transition is from 6.5 to 8.5 years.
- The permanent incisors are larger as compared to their primary counterparts & thus require moree space for their alignment.
- The difference between space available & space required is called incisal liability.
- This is 7mm for maxillary & 5mm for mandibular arch.
- some factors that help in alignment of incisors by gaining space are:-

1) Utilisation of interdental spacing of maxillary
2) Increase in intercanine arch width
3) Increase in intercanine arch length.
4) Change in interincisal angulation.

Intertransitional period :-

- In this period the maxillary and mandibular arches consist of permanent molars that sandwich the deciduous canines & molars.
- This phase lasts for 1.5 years & is relatively stable.
- Only few changes in the morphology of deciduous teeth are seen because they undergo attrition.

Second Transitional Period :-

- This phase characterised by replacement of deciduous molars & canines by premolars & permanent cuspids & the eruption of maxillary lateral incisors & canines.
- This takes place around 9-11 years of age & is very critical for the alignment of erupting permanent teeth.

Replacement of Deciduous molars & canines -

- The combine mesiodistal width of permanent canine & premolars is less than of deciduous canine & molars.
- This extra space is called 'Leeway space of Nance' & is utilised by mandibular molars to establish class II relationship through late mesial shift.
- It is 1.8 mm in maxillary arch & 3.4 mm in mandibular arch.

Eruption of Maxillary Canine -

- As the permanent maxillary canine erupt, they displace the root of maxillary lateral incisors mesially.
- This force is transmitted to the central incisors and their roots are also displaced mesially.
- Thus, the resultant force caused the distal divergence of crown in an opposite direction leading to midline spacing.
- This is called ugly duckling stage or 'Broadbent phenomenon'.
- This condition corrects itself after the canines have erupted. The canines after eruption apply pressure on crown of incisors thereby causing them to shift back to original position.

(c) Permanent Dentition :-

- The entire permanent dentition is formed within the jaws after birth except for the cusps of first molar which are formed before birth.
- Some changes that can be seen in permanent dentition are:
  - Horizontal overbite decrease
  - Dental arches become shorter
  - Vertical overbite decrease upto age 18yrs by 0.5mm
  - Overjet decrease by 0.7mm between 12 & 20 years.

⊙ Key of Occlusion –

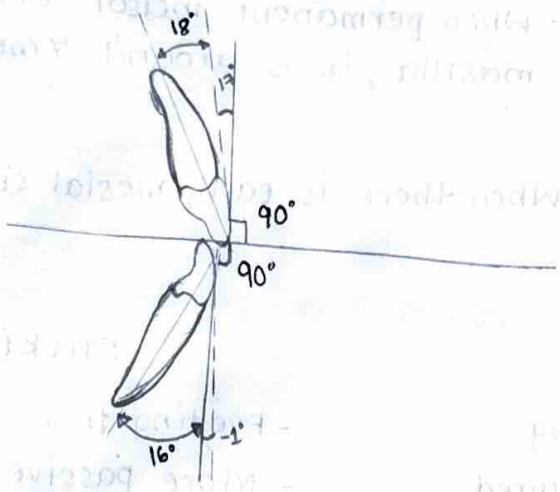
- The permanent dentition after establishing itself is governed by various factors.
  - Molar interarch relationship
  - Mesiodistal crown angulation
  - Labiolingual crown inclination.
  - Absence of rotation

⊙ Molar interarch relationship –

- The distal surface of distobuccal cusp of upper first permanent molar made contact and occluded with the mesial surface of mesiobuccal cusp of lower second molar.
- Mesiodistal cusp of upper first molar fell within the grooves between the mesial & middle cusp of lower first permanent lower molars.
- The canine and premolars ensure a cusp-embrasure relationship bucally & a cusp-fossa relationship lingually.

⊙ Mesiodistal crown angulation –

- crown angulation refers to angulation of the long axis of crown not to angulation of long axis of entire tooth.
- The gingival part of the long axis of crown must be distal to occlusal part of axis.
- Crown inclination is determined by the resulting angle between 0° to 90° to occlusal plane & 0° line tangent to middle of labial or buccal clinical crown.



- Tight contacts -
  ↳ Permanent dentition should have close contact to optimize space. Persons who have genuine tooth size discrepancies. pose special problems but in the absence of such abnormalities.

- Curve of Spee -
  ↳ Occlusal plane should be flat with curve of spee not exceeding 1.5 mm. There is a natural tendency for curve of spee to deepen with time.

Self correcting Anamolies -

1) Predentate period -
- Retrognathic mandibular : Differential and forward growth of mandible.
- Anterior open bite : Eruption of primary incisors
  Infantile swallow pattern -
  1) Eruption of teeth
  2) change of diet.

2) Deciduous dentition -
- Anterior deep bite.
  1) When attrition of incisor edges of incisors occur
  2) When permanent molar erupts
  3) When mandible grows forward to downward

- Physiologic spaces - When permanent incisor erupt they use the spaces in maxilla, it is around 7mm and in mandible is 5mm.

- Primate space - When there is early mesial shift & late mesial shift.

Suckling	Sucking
- From breast feeding	- Feeding from bottle
- Active process required	- More passive activity
- Requires mother and infant participation	- No mother dependent.
- Creates haemetically sealed negative pressure within, mouth positions and stabilize nipple centrally, draw tongue under mothers/lactiferous sinuses.	- creates partial neural pressure vaccum within mouth, rubber, nipple fill mouth, milk flows into mouth without tongue action, even if lips are not sealed around nipple.
- Peristaltic action of tongue propels milk back to post pharynx	- Much of peristaltic tongue action prevented
- Soft palate rises, closing off airway during swallowing	- Less effective elevation of soft palate, greater risk of aspiration
- contraction and relaxation is seen of buccal musculatore.	- Not seen.

Retained Infantile Swallow	Mature Infantile Swallow
- Tongue is placed between incisors	- Tongue is placed at incive papilla
- Temporalis does not contact during swallowing.	- Temporalis contacts during swallowing.
- No horseshoe shaped arch	- Horse shoe shaped arch
- Incisors are proclined	- Not proclined.
- only cheek applies force	- Cheek & tongue both apply force
- crossbite is seen in posterior teeth	- Not seen
- Malocclusion is seen	- Not proper occlusion seen.
- Maxillary arch is more constricted	- Less constricted.

8. TEETHING

Definition –

It is a process by which an infant first teeth sequentially erupt and appear in the oral cavity

Signs and Symptoms –

- Pain
- General irritability / malaise
- Mucous membrane inflammation
- Drooling / Sialorrhoea
- Facial flushing / circumoral rash
- Biting
- Suckling / Gum rubbing
- Disturbed sleep
- Bowel upset
- Loss of apetite
- Ear rubbing on same side as erupting teeth.

Management –

1) Pharmacological
2) Non-pharmacological
3) Alternative volistic medicine

1) Pharmacological –

a) Topical agents
b) Lignocane based products
c) Choline salicylate based products
d) Systemic analgesics.

2) Non-pharmacological –

a) Peeled cucumber, frozen banana
b) Hard non-sweetened rusk
c) Teething risks
d) Pacifiers

3) Alternative Volistic Medicine -

a) Accupressure
b) Armotherapy
c) Homeopathy
d) Massage

Teething Disturbances -

1) Eruption Hematomal cyst :

- Bluish purple , elevated area , few weeks before 1% of permanent tooth.
- Primary second molar, secondary 1st molar - common.
- self limited , so no treatment needed

2) Eruption Sequestrum,

- Cementum like material formed within dental follicle
- Seen at 1st molar eruption
- spontaneously resolve without noticeable symptoms
- In cases where , eruption sequestrum causing local irritation and has surfaced thorough mucosa it may be easily removed.

3) Ectopic Eruption :

- Arch length inadequacy
- Retained primary dentition
- Premature loss of deciduous teeth
- Non-spaced primary dentition.

4) Natal and Neonatal teeth :

- Defined by masseter and savara
- Natal : present at birth
- Neonatal : Erupt during 1st 20 days of life
- More in females
- Natal : Neonatal → 3:1
- Most affected - lower primary central incisors.

Heblings Classification -

Category 1 - A shell like crown structure loosely attached to alveolus by rim of oral mucosa or no root.

category 2 - Solid crown loosely attached to alveolar by oral mucosa little or no root.

category 3 - Incisal edge of crown just erupted through oral mucosa

category 4 - Mucosal swelling with tooth unerupted but palpabable.

Treatment:

1) CHX - 3 times a day

2) Extraction - Natal: Vitamin K prophylactic
Vitamin K synthesizes clotting factor which helps in stopping bleeding after extraction.

Neonatal - Vitamin K may not be needed as gut flora develops within 10 days → synthesize.

Vit. K → Liver → Synthesize.

clotting factor.

Extraction indicated - threat of aspiration and problem during breast feeding

Complications -

- Traumatic ulceration of ventral surfaces of tongue
- Riga fede disease as histologically it was described by them
Also called neonatal sublingual traumatic ulceration

• Non-eruption teeth:

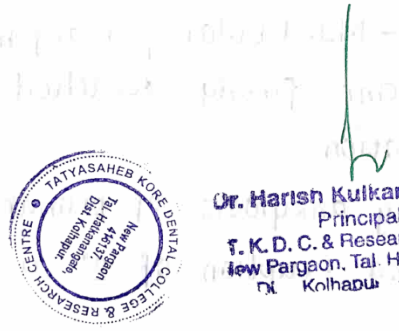
Etiology - Premature loss of teeth

Treatment - Incision
- Gum massage

• Ankylosed teeth -

- Most common - Mandibular primary molars
- Tooth root become firmly attached to alveolar bone before their normal exfoliation.
- Extensive bony ankylosis of primary tooth may prevent normal exfoliation and eruption of 2° successors.

- **Epstein Pearls -**
  - Midpalatine raphae. Remnants of epithelial tissue trapped along raphae as feotus grows.
- **John nodules -**
  - Formed along buccal and lingual aspect of dental ridges and on palate away from raphae. Remnants of salivary gland tissue.
- **Dental lamina cyst -**
  - Crest of maxillary and mandibular dental ridges. Remnants of dental lamina.



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9. DENTAL CARIES

* Introduction -

- caries is defined as microbial disease of the calcified tissues of teeth that leads to demineralisation of inorganic components and subsequent breakdown of the moieties of enamel and dentin.

- **Definition** – Dental caries is an irreversible microbial disease of calcified tissues of teeth, characterized by demineralization of inorganic portion and destruction of organic substances of tooth, which leads to cavitation.

- **Classification -**

A] According to occurence -

1) Incipient - initial primary caries often reversible
2) Recurrent - secondary caries
3) Residual - caries left due to mistake of dentist.

B] According to speed -

1) Acute - fast spreading
2) chronic - slow spreading

C] According to location -

1) Pit & fissure
2) Smooth surface
3) Root surface

D] According to direction -

1) Forward caries - when caries in V-shaped that is base pointed toward DEJ
2) Backward caries - When more extensive destruction is toward DEJ with small apex

E] According to age -

1) Early childhood caries
2) Adolescent caries
3) Senile caries

E) According to surface -

1) Simple - one surface involved
2) Compound - two surfaces involved
3) Complex - more than two surfaces involved

G) According to type of surface -

1) occlusal
2) Proximal

Theories of Dental Caries -

1) Miller chemicoparasitic theory :

- A synthesis of ideas that acid and micro-organisms were involved by etiology of dental caries.

Process -

- The micro-organism of mouth by secretion of enzymes or by their own metabolism, degrade fermentable carbohydrate food material so as to form acids.
- The enamel is destroyed by acid of fermentation and disintegrated enamel is subsequently mechanically removed by forces of mastication.
- After penetration of enamel the dissolution of dentin is brought about by is some manner with organisms penetration along dentinal tubules.
- The final breakdown of dentin results from the secretion of proteolytic enzymes that digest the organic part of dentin and form a cavity.
- Miller summarized his theory as follows:
  Dental decay is chemicoparasitic process consisting of two stages - decalcification or softening of the tissues and ~~classificati~~ dissolution of softened residue.

Critique of theory -

- Unable to explain predilection of specific sites on tooth to dental caries.
- The initiation of caries on smooth surfaces was not accounted for by this theory.
- Does not explain why some populations are caries free
- Phenomenon of arrested caries is not explained

- The concept of tooth resistance while logical did not have any experimental support.

2) Proteolytic theory:

- The surface coverings found on the tooth, in grooves and pits are organic in nature also enamel contains small but significant amount of organic material
- They described caries like lesions that were initiated by proteolytic activity at slightly alkaline pH and considered that the process involved depolymerisation and liquefaction of organic matrix of enamel.

3) Proteolytic - Chelation theory:

- This theory was proposed by Schartz et al in 1995
- According to this theory a simultaneous microbial degradation of organic components and dissolution of the minerals of tooth by process of chelation.

Critique of theory –

- The infecting streptococcus could not hydralyse gelatin, casein, collagen or chondritin. Although proteolysis of organic matrix of dentin may indeed occur after demineralisation, there is no satisfactory evidence to support claim that the initial attack on enamel is proteolytic
- Gnotobiotic studies showed that caries can occur in absencer of proteolytic enzymes.
- Chemical analysis of early caries enamel show rise in nitrogen content and a fall in specific gravity that indicate persistence or increase in ~~oo~~ organic matter

4) Other theories -

- Legend of worm
- Humoral theory
- Vital theory
- Chemical theory
- Surftase theory
- complexing and phosphorylation theory
- Sucrose chelation theory
- Autoimmunity theory

* Stephan's curve -

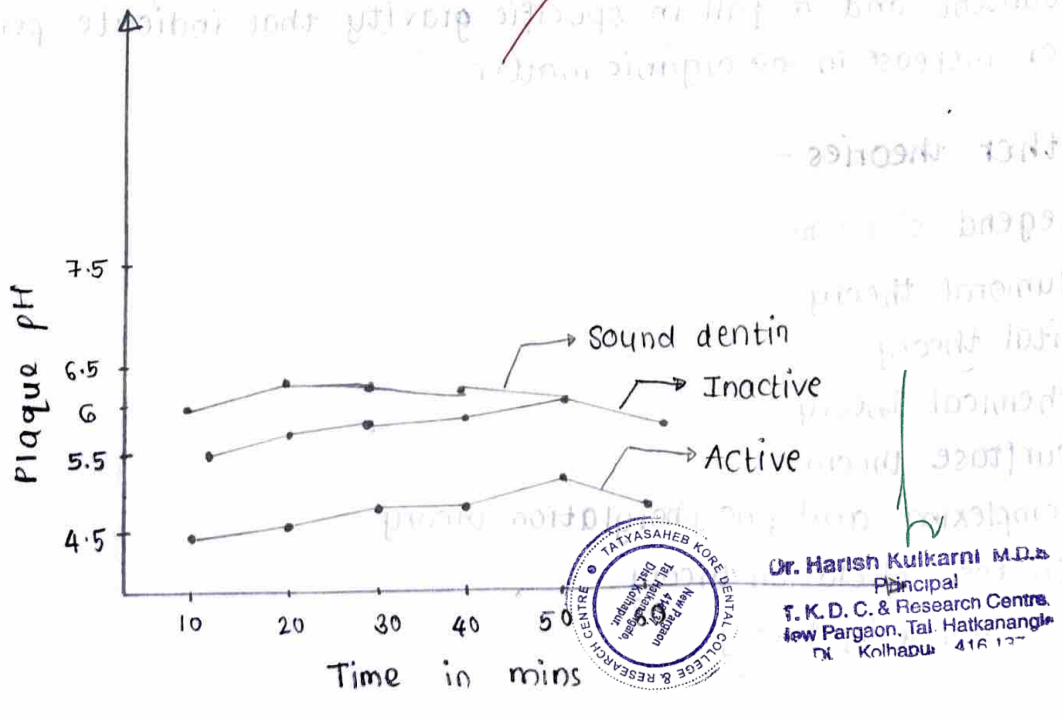
- In 1940's Dr. Robert Stephan, suggested that there was continuous change in salivary pH following consumption of foods and beverages, especially with fermentable carbohydrates.

- **Resting plaque pH** - This describes that plaque has not been exposed to fermentable carbohydrates for approximately 2 hours and generally has a pH of between 6 and 7.
  - this resting plaque pH value for an individual tend to be stable and may remain so for long periods.

- **Decrease in plaque pH** - After exposure of dental plaque to fermentable carbohydrates, the pH decreases due to part of composition of dental plaque.
  - In general, if more acidogenic, aciduric bacteria is present in plaque, the pH would lower more rapidly. The rate of pH decrease is also dependent on the speed with which plaque bacteria are able to metabolize dietary carbohydrate.

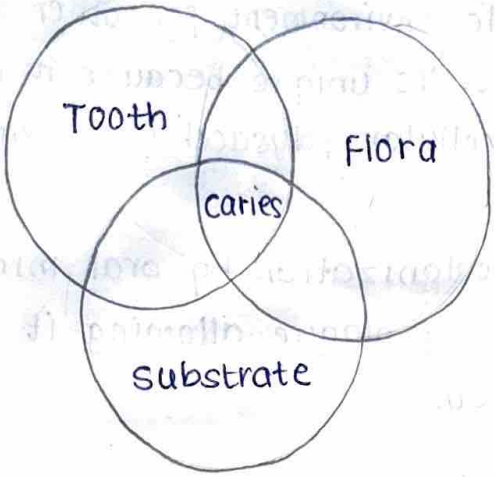
- **Critical pH** - The pH at which saliva no longer remains saturated with calcium and phosphate, thereby permitting hydroxyapatite in dental enamel to dissolve.
  - It is highest pH at which there is net loss of enamel from teeth which is generally accepted to be about 5.5 for enamel.

- **Increase in plaque pH** - The low pH remained for same time, taking 30 - 60 min to return to its normal pH.
  - Differences were seen between caries free group and caries active group with latter group having significantly lower plaque pH.

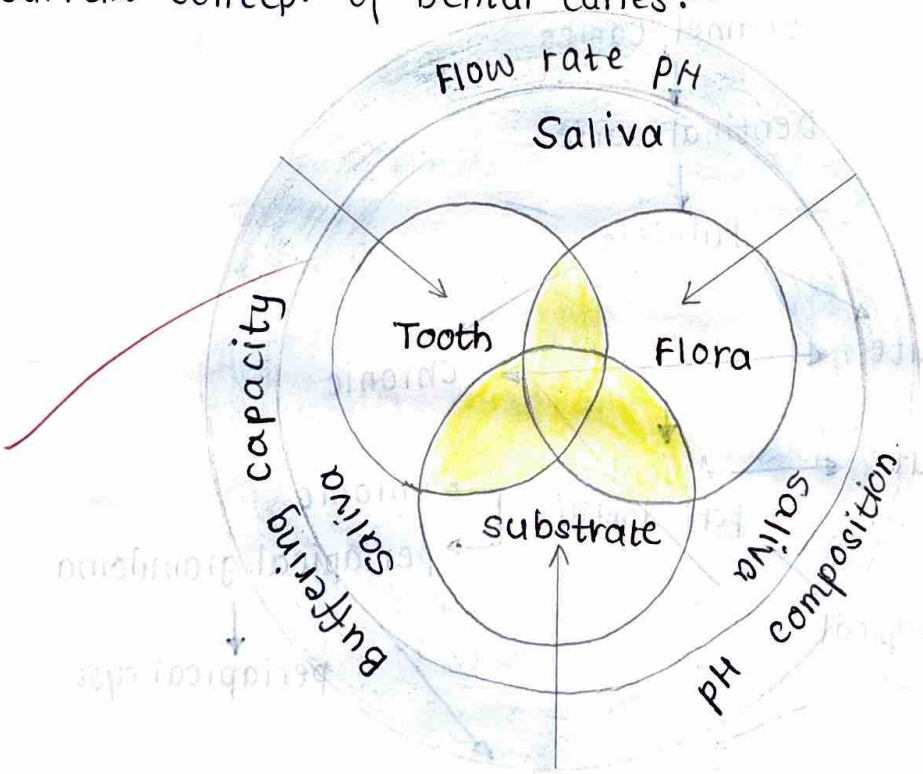


* Current concept of Dental caries :-

1] Keyes model :-



2] Current concept of Dental Caries :-

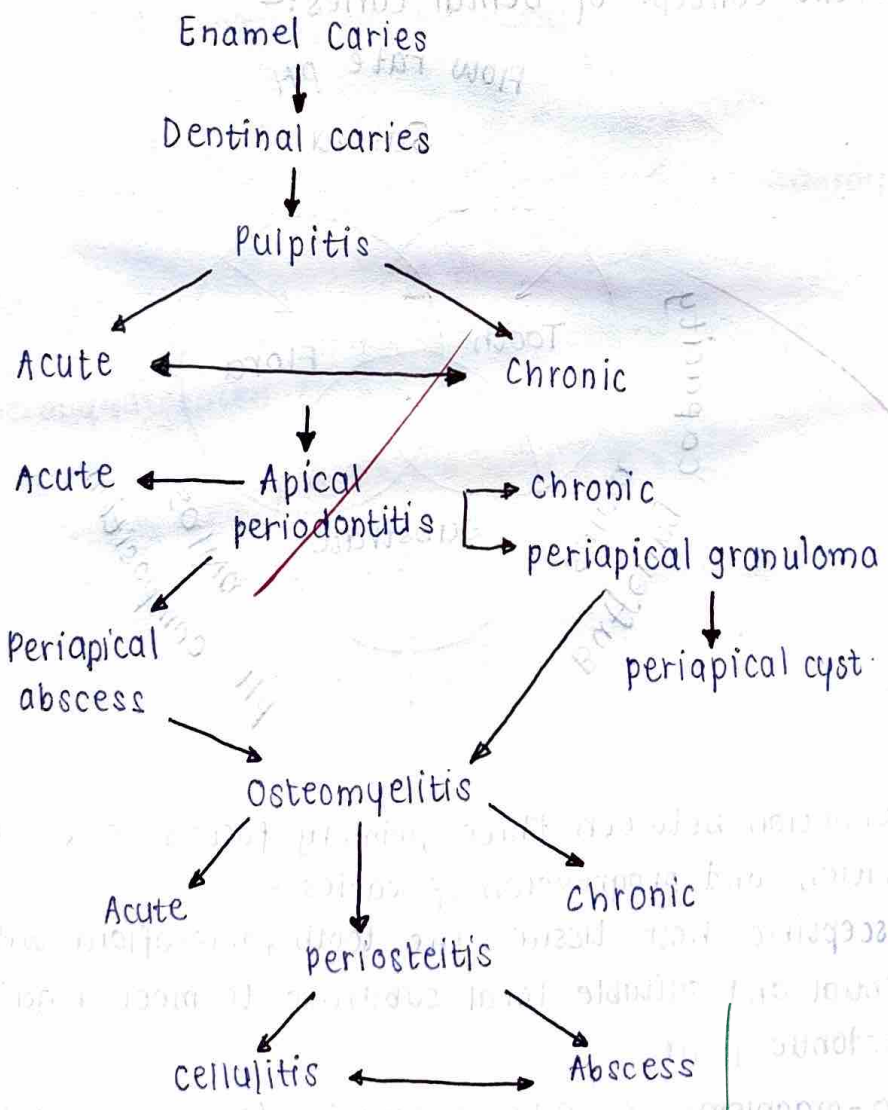


- Interaction between three primary factors is essential for initiation and progression of caries :-
  A susceptible host tissue, the tooth; microflora with a carcinogenic potential and suitable local substrate to meet requirements of pathodontic flora.
- Micro-organisms are a pre-requisite for caries initiation.
- A single type of organism is capable of inducing caries.
- The ability of producing acid-producing organisms are carcinogenic
- Organisms vary greatly in their capacity (virulence) to produce caries.

@ Sucrose is called as an arch criminal:-

- The dietary sugars all diffuse rapidly into the plaque and are fermented to lactic acid or other acids or can be stored as intracellular polysaccharides by the bacteria prolonging fall in pH and promoting a suitable environment for other aciduric and acidogenic bacteria sucrose is unique because it is the substrate for production of extracellular polysaccharides and unsoluble matrix polysaccharide.
- Thus, sucrose favours colonization by oral micro-organisms and increases thickness of plaque allowing it to adhere in larger quantities of teeth.

* Sequelae of Dental Caries -



Infected Dentin	Affected Dentin
• Superficial dentin layer	• Deep dentinal layer
• Invaded by bacteria	• Not attacked by microbes.
• Remineralisation cannot take place	• Remineralisation can occur.
• Stained by 0.5% fuschin or 1% acid red solution.	• Cannot be stained.
• Lacks sensation	• Sensitive to instrument
• Soft necrotic and flakes away with instrument	• Softer than normal dentin dis-coloured but does not flake easily; firm and leathery.
• Gentle scraping can remove it easily	• Medium pressure gentle scraping can remove it easily
• Intertubular layer is demineralised with irregularly scattered crystals	• Only partly demineralised.
• Indistinct collagen bands	• Distinct collagen bands.

* Histology Of Dental Caries -

A) Histopathology of Enamel Caries :-

- A radiographically detectable initial enamel lesion when examined histologically will show carious process penetrating to underlying dentin, although dentinal tissue is not involved by bacteria.
- A carious lesion on smooth surface of enamel is conical shape with its broad base on enamel and the apex towards dentin. When lesion reaches enamel-dentin junctions, it spreads laterally along junction, thus undermining normal enamel
- Light microscopy studies of carious lesions of enamel without cavitation have revealed 4 distinct zones, which represent varying degree of hard tissue transformation.

① Translucent zone -

- The advancing front of carious lesion is represented by translucent zone.
- The first discernible signs of enamel breakdown are seen at this area
- Enamel alternation in this zone or pores at junction site such as prism boundaries.

② Dark Zone –

- The dark zone lies deep to body of lesion and just superficial to translucent zone.
- This zone is positively bifringement & has a pore volume of 2-4%. This molecular siezing effect permits micropores to remain filled with air.
- Light passing through this zone causes brown discolouration of dark zone.

③ Body of Lesion –

- Deep to relatively unaffected enamel surface layers is body of carious lesion.
- Ground sections, when viewed in transmitted light reveal enhanced striae of Retzius and cross-striations in enamel prisms.
- This zone, unlike normal enamel is positively bifringent denoting significant degree of mineral loss.
- The body of lesion has minimum pore volume of 5% at its periphery and even is small subclinical lesions, there is 25% pore volume.

④ Surface Zone –

- An important feature of initial carious lesion is presence of an apparently intact enamel surface overlying an area of subsurface demineralisation
- Quantitative studies of the surface layer, 20-100mm thickness, indicate that partial demineralisation (subsurface) equivalent to about 1-10% loss of mineral salts has taken place.
- the surface zone has been defined as the zone of negative bifringence superficial to the positively bifringent body of lesion.

B] Histopathology of Dentinal Caries –

- As the carious lesion invades dentin, dentinal tubules become involved.
- This is divided into 5 zones –
  1) Zone of decomposed dentin
  2) Zone of bacterial invasion
  3) Zone of demineralisation

4) Zone of dentinal sclerosis

5) Zone of fatty degeneration.

- Translucent zone is identical to sclerosed dentin
- Presumably sclerosis is an attempt to block advancing caries lesion.
- Narrow zone of demineralisation affecting intertubular matrix is seen occlusion of dentinal tubules is also seen in sclerotic dentin.
- Probably due to reprecipitation of crystalline material that had dissolved during carious process.
- Zone of bacterial invasion → lumen of tubule is distended giving ballooned or dilated appearance variously described as liquefaction foci.
- These dilations eventually coalesce, forming outermost zone - decomposed dentin.

Additional changes → cleft formation at right angle to tubules or follow contour lines of owen and of dead tracts.

EARLY CHILDHOOD CARIES

Definition –

- Complex disease involving maxillary primary incisors within a month after eruption and spreading rapidly to other primary teeth is called childhood caries
- The disease of early childhood caries is presence of 1 or more decayed, missing or filled tooth surface in any primary tooth in child 71 months of age or younger.
- In children younger than 3years of age any sign of smooth surface caries is indicative of severe early childhood caries from ages 3 through 5, 1 or more navitated, mission or filled smooth surface in primary maxillary anterior teeth or a decayed, missing or filled score of ≥4, ≥5 or ≥6 surfaces constitutes early childhood caries

Classification of Early Childhood Caries –

- **Type I** – Mild to Moderate
  - Existence of isolated carious lesion involving molar and number of carious teeth increases as cariogenic incisors challenge persists.
  - cause is usually combination of cariogenic semisolid food and lack of oral hygiene.
  - Seen in 2-5 years old.
- **Type II** – Moderate to severe
  - Labiolingual carious lesion affecting maxillary incisors. Mandibular incisors are not affected use of feeding bottle or breast feeding or combination of both without or with poor oral hygiene seen soon after eruption.
- **Type III** – Severe
  - Carious lesion affecting all teeth including lower incisors cause is cariogenic food and poor oral hygiene condition is rampant.

⊙ Other names–

1) Nursing caries – By winter(1966)
2) Tooth clearing neglect – By Moss (1999)
3) Infant & early childhood dental decay – By Harris (1994)
4) Early childhood caries – By Davies
5) Maternally derived Streptococcus mutans disease (MDSMD)

⊙ Clinical Features - Garcia Goday Classification.

Stage	Clinical Stoge	Age	Features
Stage I	Initial reversible	10-18 months	cervically & occasionally interproximal areas of chalky white demineralisation NO pain.
Stage II	Damaged carious	18-24 months	Lesion in maxillary anterior teeth may spread to dentin & show yellowish-brown discolouration. Pain on having cold food items.
stage III	Deep Lesion	24-36 months	Depending on time of eruption cariogenic of sweethen & frequency of its use, this stage can be reached in 10-14 months also molar are affected. Frequent complain of pain pulpal involvement in maxillary incisors.
stage IV	Traumatic	36-48 months	Teeth become so weakened by caries that relatively small forces can fracture them. History of trauma. Molars with pulpal problems. Non-vital maxillary incisors.

Etiology -

Etiology of ECC is similar to other types of coronal smooth surface caries biology may differ in some respect.

1) Plaque:

- When fermentable carbohydrates are present, lactate is mainly produced - pH drop in plaque
- Bacteria and alkaline product provide contribution to pH rise in plaque & base generating metabolism of plaque bacteria considered by many to be significant determinant for cariogenicity of plaque.
- Presence of visible plaque & its early accumulation have been related to caries occurence among children.

2) Mutans: Streptococci:

- It possesses a wide range of cariogenic traits they synthesize α-1,3 rich water insoluble glucans
- Larger production of acid driving demineralisation reversibly adhere to pellicle through synthesize of glucans mediated by glucosyntransferases

- Generally require non-shedding surface to colonize infection rate increases with age as well as number transmission is likely to be mediated via saliva.

3) Infant feeding patterns -

- Studies have examined reported bedtime bottle use in children with or without maxillary anterior decay.
- Length of contact with bottle at night time is also important children who are exclusively breastfeed also appear to be susceptible to caries.

4) Tooth brushing -

- Major problem confronting the investigation of relationship between toothbrushing & ECC is methodological tissue of assessing frequency of brushing, quality of plaque control, actual level of oral hygiene.

5) Salivary factors -

- Main host defense against dental caries
- clearonce of food & buffering of acid generated by dental plaque mediate adhesion & colonization as bacteria on tooth surface aid in elimination of bacteria.
- Contain antimicrobial proteins - lysozymes, lactoferin agglutinins - macins, aglutinating glycoprotein.

6) Sugars -

- Sucrose, glucose & fructose in fruit juices & vitamin C as well as solids are probably main sugars associated with caries
- Sucrase only substrate used for bacterial generation of plaque dextran.
- Increased sucrose intake increases acidity of the plaque dextran
- ~~Increased sucrose in~~

7) Oral clearance of carbohydrate -

- Sleep time consumption of sugar is another common characteristic increase length of contact between plaque & substrate characteristically localized to maxillary primary incisors & 1st molar.

8) Bovine Milk -

- Milk decreases solubility of enamel & results have been extended by intraoral cariogenicity test protection by milk appear to work are decreasing demineralization as enamel increasing calcium & phosphate concentration in plaque

9) Human Milk -

- Compared to bovine milk human breast milk has lower mineral content, higher concentration of lactose & less protein.

10) Fluorides -

- Topical fluoride's effect are complex changes in mineral phase.
- At low concentration can affect demineralisation process by decreasing rate of substrate surface dissolution enhances deposition by fluoridated apatite in surface zone.

* Secondary Etiological Factors -

1) Immunological factors -

- Hard tissue are immunologically inactive, host defense mechanism involved in dental caries is centered on prevention of colonisation and pathogenic activity of cariogenic bacteria.
- Immune mechanisms include specific immune factors derived from saliva or serum.
- Secretary immunoglobulin A may inhibit bacterial adherence or agglutination as well as neutralization of the bacterial enzymes.

2) Tooth Maturation defects:

- Tooth is most susceptible to caries in period immediately after eruption & prior to final maturation.
- combination of recently erupted immature enamel in environment of cariogenic flora with frequent ingestion of fermentable carbohydrates

3) Race and Ethinicity:

- Increased risk of that could be associated with cultural norms including concern for oral health
- Pre-natal diet that contribute to enamel hypoplasia minorities may experience significant barriers to dental care including cost of care & availability of accessible services

4) Aid fruit drink-

- Acid in fruit juices and soft drinks may decreases oral pH presence of sugars in drink.
- This fall in pH likely to enhance fermentation of carbohydrates causes more profound enamel demineralisation.

5) Stress-

- Brown studied relationship between caries & stress demonstrated a positive relationship between parents anxiety about dental treatment and childhood caries.
- stress affects immunology, coping skills or preventive oral health behaviour.

Prevention of ECC -

- Early screening for signs of caries development, showing risk of developing ECC
- High risk children should be targeted with professional preventative program that includes fluoride supplements, sealants, diet counselling and chlorhexidine.

Rapid Scale -

- Readiness assessment of parents concerning infant dental decay scale was developed to assess parents stage of change, precomtemplative, contemplative or action with regard to child's dental health.
- openess to health information.
- valuing dental health
- convinence & change difficulty
- child permesiveness

• Community based education-

- Increase knowledge of mother about ECC to improve dietary and nutritional habits of infants & mother.
- self-care habits & dietary practice improves oral hygiene habits of infants leading to prevention of ECC.

Prevention of transmission of cariogenic bacteria -

- Cariogenic bacteria are transmitted from mothers to infant program included provision of dental education, oral hygiene instruction, dental treatment, tooth cleaning, application of 2% sodium fluoride, fluoride varnish

- Program started when child was 3-8 moth in age

Professional & home based preventive approaches -

- Diet counselling to prosthodontic rehabilitation of patient. Restoration accomplished by GIC & composite endodontic therapy done as indicated followed by placement of crown and grossly decayed teeth are extracted.

- **Fluoride use according to H_2O fluoride levels:**

Age	F^- H_2O level (mg F/day)		
	<0.3	0.3-0.7	>0.7
0-2	0.25	0	0
2-3	0.50	0.25	0
3-16	1	0.50	0

- **Risk base treatment methodology:**

NO ECC signs/Low risk status	Signs of ESCC/High risk status
• Fluoridated dentrifices • Review of dietary and oral hygiene	• Fluorides varnish • sealants • Chlorhexidine mouthwash • Xylitol pacifiers • Fluoridated supplements and dentrifices. • Dietary counselling.

RAMPANT CARIES

- Massler defined rampant caries as suddenly appearing widespread, rapidly spreading, burrowing type of caries resulting in early involvement of pulp and affecting those teeth, which are usually regarded as immune to decay.
- Winter et al (1966) defined rampant caries as caries of acute onset involving many or all teeth in areas that are usually not susceptible.
- It is associated with rapid crown destruction with frequent pulpal involvement.

• **Etiology –**

Salivary Deficiency :

A. Due to radiation therapy

B. In stressed children who have tranquilizers

C. Xerostomia.

- Acidogenic bacteria, dental plaque, tooth structure susceptible to dissolution
- Genetical
- Habits
- Feeding sweetened milk through night.
- Sweetened pacifiers
- Nursing of child through habit
- Diet - In between meal snacking of cariogenic food.
- Sucrose in diet.

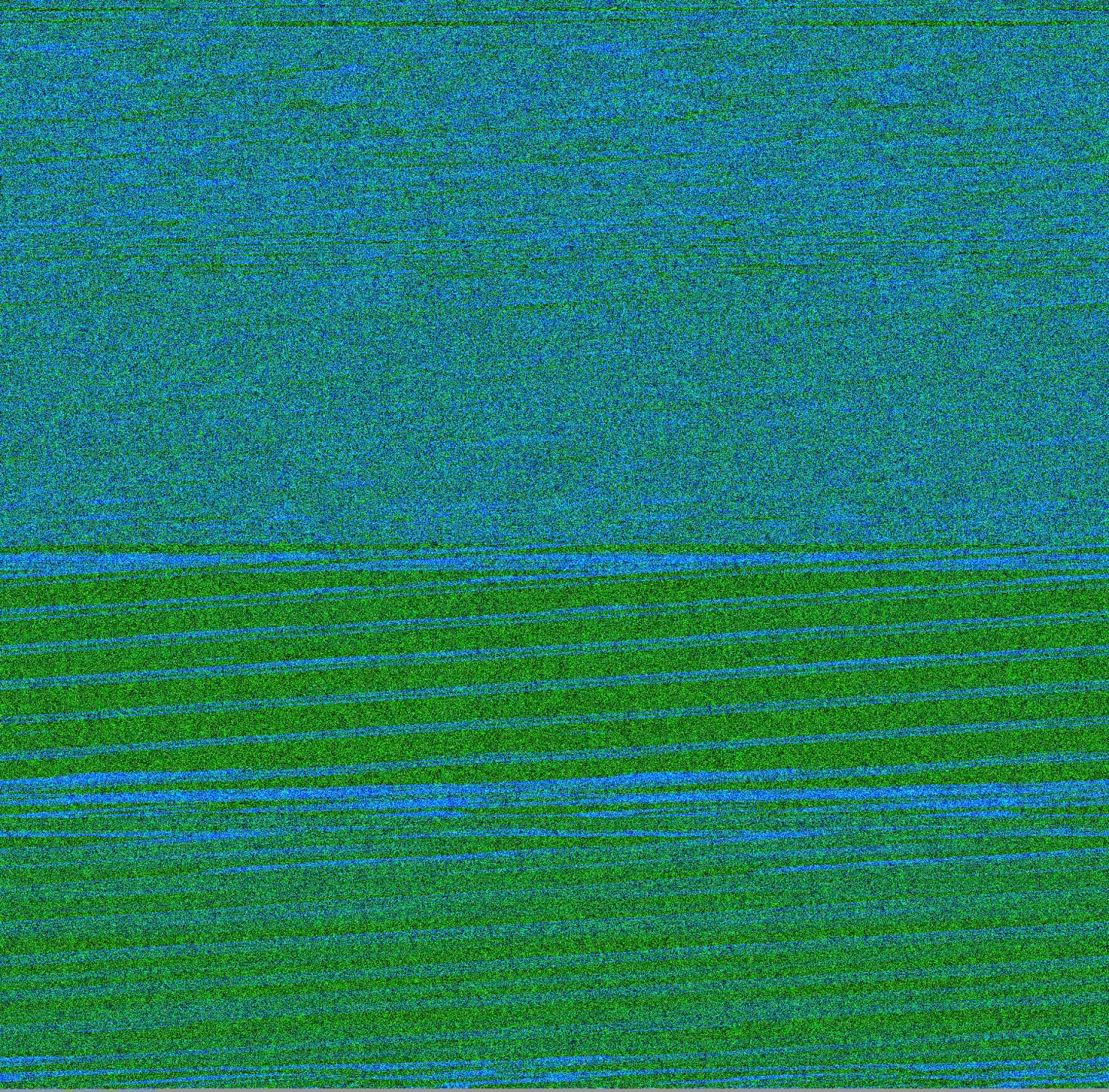
• Psycological factors –

- Emotional disturbance, repressed emotional fear this causes decreased salivary flow

 # Clinical features –

1) The initial lesion:

- Labial surface of maxillary incisors, close to gingival margins as a whitish area of decalcification or pitting of enamel surface shortly after eruption.
- Soon these lesions –
  1) Pigmented to light yellow
  2) Extend laterally to proximal surfaces
  3) Downward to incisal edge.



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Type	0-2 years	2-3 years	3-18 years	>18 years
Dietary fluoride supplement	-	0.25 mg F/day	0.5	-
Operator applied	APF topical soln or gel, 1.23% fluoride applied 4 times a day	APF topical soln or gel 1.23% fluoride 4 times a day.	APF topical soln 1% gel 23% fluoride 4 times a day	APF topical soln 1% gel 23% F, 4 times a day.
Self applied	-	-	Self application of gel tray daily for 4 weeks then continue with daily F rinse	Self application of gel tray daily for 4 weeks then continue with daily F rinse (0.05% NaF)

Age Specific Prevention of Rampant Caries -

1) 0-5 years :

- Oral hygiene instructions to parents
- Tooth brushing with prenatal supervision
- 6 months recall

2) 5-12 years :

- Toothpaste
- Fluoride tablets upto 8 years if in area without water fluoridation
- Mouth rinse
- Professional topical fluoride application every 6 months.

3) 12 years and above :

- Interdental cleaning with floss
- Sealants.

Difference between Rampant caries & Early Childhood Caries.

Rampant caries	Nursing Bottle caries.
• Acute, widespread, rapid	• Specific form of rampant caries
• All ages	• Infants, toddlers.
• Primary + Permanent dentition	• Primary dentition involved.
• Etiology → Multifactorial	• Bottle feeding, pacifiers dipped in honey, etc.
• Tlt → Pulp therapy	• Tlt → Topical fluorides.
• Prevention → Dental health education	• Prevention → Dental health education.
• Acute, generalised spread of caries and pulpal involvement of all teeth	• Acute, generalised spread of caries & pulpal involvement of selected teeth of dentition.

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PULP AND PERIAPICAL DISEASES

- Dental pulp occupies center of each tooth and consists of soft connective tissue.
- Primary teeth have 20 pulp organs, their shape confines to tooth.

Pulp disease –

- Dental pulp responds to changes in environment in same way as any other loose connective tissue.

• Etiology of Pulp Diseases –

- Most common cause of pulp and periapical disease is presence of micro-organisms within involved tooth.

• Other factors –

A] Physical :

I) Mechanical – Trauma
- Pathological
- Crack through body of tooth
- Barometric changes

II) Thermal – Heat from tooth preparation
- Exothermic heat from setting of cement.

III) Electrical – Galvanic current.

B] Chemical – Phosphoric acid
- Acrylic monomer, etc.
- Erosion.

C] Bacterial – Toxins associated with caries
- Microbial colonization

Clinical Classification of Pulp Diseases –

1) Inflammatory diseases of pulp –
- Acute Reversible Pulpitis
- Chronic Reversible Pulpitis

Irreversible Pulpitis –
i) Symptomatic Irreversible Pulpitis
ii) Asymptomatic Irreversible Pulpitis
iii) Chronic Hyperplastic Pulpitis

2) Pulp Degeneration -

i) calcific degeneration

ii) Fibrous degeneration

3) Pulp Necrosis

Classification of Periradicular Diseases -

I] Symptomatic Periradicular disease:

- Primary symptomatic Apical Periodontitis.
- Secondary symptomatic Apical Periodontitis
- Symptomatic Alveolar Abscess

II] Asymptomatic peri-radicular disease:

- Asymptomatic Apical Periodontitis
- Asymptomatic Alveolar Abscess
- Condensing Osteitis.

III] Histological classification -

- Apical granuloma
- Apical abscess
- Apical cyst.

i) Reversible Pulpitis -

- Pulp with reversible pulpitis has mild inflammation and is capable of healing once the irritating stimulus has been removed.
- Pain is only felt when a stimulus is applied to tooth
- Pain ceases within in few seconds or immediately upon removal of stimulus
- This is due to movement of dentinal fluid towards pulpal tissue.
- Pain is sharp and short in nature never spontaneous.
- No radiographic changes evident in periapical region

• Treatment:

- Grossman stated - Best treatment is prevention. Removal of noxious stimulus will ~~not~~ allow pulp to return to healthy state.

2) Irreversible Pulpitis –

- Pulp is damaged beyond repair and even removal of noxious stimulus will not allow it's proper healing.
- Pulp generally degenerates progressively, causing necrosis and reactive destruction.
- classic symptoms of irreversible pulpitis is lingering pain induced by thermal stimulus.
- Initial reaction is very sharp pain to hot or cold stimulus followed by dull ache or throbbing pain for minutes to hours after stimulus is removed
- Pain increases on bending or lying down
- Spontaneous pain is another hallmark feature.
- If periapical tissue is involved, tooth is tender on percussion.
- Radiographs are not useful in diagnosis by helpful in identifying possible cause of disease.

• **Treatment** – Pulpectomy.

3) Chronic Hyperplastic Pulpitis (Pulp Polyp) –

- Hyperplastic pulpitis is productive inflammatory response of pulp.
- Involves chronically inflammed young pulp; widely exposed by caries on its occlusal aspect.
- characterised by proliferative growth of inflammed connective tissue rising out of carious crown.
- Tissue is firm, insensitive to touch and ocassionally may cause mild discomfort during mastication.
- Often covered with epithelium, it resembles pyogenic granuloma of gingiva from which it may be easily differentiated by lifting it away from the walls with spoon excavator to views of pedicle of origin.
- Tooth respond to pulp testing which is often delayed.
- No significant radiographic changes.

• **Treatment** –

- Bodily decayed that restoration impossible extraction indicated
- Tooth can be restored, pulpectomy or endotherapy are recomended prior to restoration.

4> Dento-alveolar abscess -

- Symptomatic (acute) apical abscess is an inflammatory reaction to pulpal infection and necrosis characterized by rapid onset, spontaneous pain, tenderness of tooth to pressure, pus formation and eventful sweeting of associated tissues

• Causes -
Trauma / chemical / mechanical irritation / bacterial invasion of dead pulp tissue.

• Symptoms - Tenderness of tooth, severe throbbing pain, attendent swelling of overlying soft tissue as swelling extends become more painful elongated and mobile Pus starts to form beneath swelling fever, chills, foul breath, headache and malaise.

• Diagnosis - Clinical examination, subjective history of patients conformed by means of pulp test & thermal test.

- In an abscess, the concentration of micro-organisms is unusually large.
- Streptococcus, staphylococci are recovered.

• Treatment - Establishing drainage
controlling systemic reaction.

5> Apical Periodontitis -

- It is painful inflammation of periodontal tissues. Usually results of microbes spreading from root canal to periapical tissues.
- other reasons include - trauma, irritation to periapical area.
- Patient will generally complain of discomfort to bitting or chewing.
- Sensitivity to percussion is hallmark diagnostic test.
- Tooth is not sensitive to hot or cold.
- Depending on cause of inflammation it may be distinct radiolucency.

• Treatment -

- Determination of cause of relieving symptoms pulpal involvement → endodontic treatment indicated.

6) Periapical Abscess -

- Refers to painful localization of pus in periapical connective tissue
- characterized by rapid onset, spontaneous pain, pus formation and often swelling of associated tissues.
- Depending upon location apices of tooth & muscle attachment swelling will usually develop in buccal vestibule on lingually, palatal or fascial space infection.
- Percussion testing produces response that is usually excusively sensitive.
- Palpation testing may produce a sensitive response.
- Tooth gives negative response to vitality test.
- Radiographically, PDL space may be normal slightly widened, demonstrate as distinct radiolucency.

• Treatment -

- Endodontic treatment with drainage control of systemic manifestations

PREVENTIVE PEDODONTICS

* Oral prophylaxis –

Removal of plaque, calculus and stains from exposed and unexposed surface of tooth by scaling as preventive measure for control of focal irritation.

Plaque – Dental plaque is defined clinically as structured, resilient yellow-grayish substance that adheres tenaciously to intraoral hard surfaces, including removable and fixed restorations.

Calculus – Calculus consists of mineralised bacterial plaque that forms ~~of~~ on the surfaces of natural teeth and dental prosthesis.

Stains – Pigmented deposits on tooth surfaces are called as dental stains.

Materia alba – It is a concentration of micro-organisms, desquamated epithelial cells, leukocytes and mixture of calivary proteins, lipids with few or no food particles and it lacks regular internal pattern observed in plaque.

Oral debris – Loss of food particles collected above the cervical third and proximal embrasure of teeth.

* FLUORIDE:-

- Term fluoride is derived from word fluore meaning to flow. Atomic weight is 19 and atomic number is 9
- Fluoride is primarily absorbed from stomach.
- In plasma fluoride exists as ionic fluoride and nonionic bound fluoride.
- Fluoride concentration is most soft tissues is lower than plasma level exception healthy kidney where because of urine production, on occasional fluoride accumulation may result.
- Excretion is via kidney.
- There exists a steady state between concentration of fluoride in plasma and urine, i.e they are parallel to each other very closely.

Metabolism of fluoride

Diet

Digestive tract → Faeces

Digestive juice ←
Milk ←
Soft tissue ←
Urine ←

Circulating plasma fluoride →
- Placenta & foetus
- Saliva
- Teeth
- Bone
- Sweat

Water Fluoridation -

- It is defined as upward adjustment of concentration of fluoride ion in public water supply in such a way that concentration of fluoride ion in water may be consistently maintained at 1 ppm by weight
- USPH (1986) fluoride optimum concentration → 0.7 - 1.2 ppm
- Saturation, dry feeder, solution feeder system are equipments.

Advantages

1) Large number of people are benefitted
2) Least expensive
3) consumption is regular
4) Systemic & topical effects

Disadvantages

1) Interference with human rights
2) Other modes aren't considered
3) common source of water
4) Supply may not be present

• School Water Fluoridation -

Advantages

1) Good results in reducing caries
2) Minimal equipment
3) Not expensive

Disadvantages

1) Children do not get benefit until they go to school
2) Not all children go to school in poor countries like India.
3) Amount of water drank can't be regulated.

• Salt Fluoridation -

Advantages

1) Fluoridated salt is safe
2) Prevent dental caries by systemic & topical action
3) No supervision of setup / distribution of system
4) Low ~~system~~ cost
5) Depends on individual acceptance & rejection.

Disadvantages

1) No precise control over indicated consumption, since intake varies greatly among people.
2) International efforts to decrease sodium uptake.
3) Lowest when need for fluoride is greatest in early years of life.

Milk Fluoridation -

- Calcium fluoride, sodium fluoride, $Na_2(PO_4)$, Disodium silico-phosphate are used compounds.
- Less expensive than water fluoridation

Dietary fluoride suplements –

Age	< 0.3 ppm F	0.3 – 0.6 ppm F	> 0.6 ppm F
Birth – 6 month	0	0	0
6 month – 3 yrs	0.25 mg	0	0
3 yrs – 6 yrs	0.50 mg	0.25 mg	0
6 yrs ≥ 16	1 mg	0.50 mg	0

Topical fluorides –

Professionally applied	Self-applied
1) Neutral NaF	1) Toothbrushing dentrifices
2) Stannous fluoride	2) Toothbrushing solutions
3) Acidulated phosphate fluoride	3) Toothbrushing prophylaxis
4) Amine fluoride	4) Mouthrinses.
5) Fluoride varnishes	
6) Fluoride gas	

1) NaF

• Method of application:

Cleaning & polishing of teeth

↓

Quadrants are isolated with cotton rolls and teeth are dried thoroughly.

↓

NaF is then applied with cotton applicators on 1 quadrant

↓

Permitted to dry on teeth for about 4 min

↓

Procedure is repeated for remaining quadrants

↓

Patient is instructed to avoid eating, drinking or rinsing for 30mins so as to prolong availability of fluoride to react with tooth surfaces → 2nd, 3rd, 4th applications are given at weekly intervals 6, 7, 11, 13 years of age.

2) Stannous Fluoride -

Stannous fluoride with hydroxyapetite in addition to fluoride & forms a new crystalline product (stannous fluorophosphate)

↓

Rapid penetration of tin & fluoride in 30secs Therefore continuous reapplication after 15-30sec needed

↓

In addition to stannous trifluorophosphate 3 more additional products are formed viz stannous hydroxyphosphate, CaF_2, calcium trifluorostannate.

3) Acidulated phosphate fluoride -

After thorough prophylaxis, teeth are isolated with cotton rolls on both lingual & buccal sides

↓

For applications of gel, position pt. upright & provide caliva ejector

↓

Place enough gel to fill 1/3rd of trough area of tray so that it is sufficient to cover dental arches

↓

Place loaded tray over arch & squeeze buccal & lingual surfaces forcing gel between them and allow tray to remain in mouth for 4mins.

↓

Recomended frequency of APF topical application is semi annual

• For Varnish,

After prophylaxis, teeth are dried

↓

Do not isolated with cotton rolls as varnish being sticky has tendency to stick to cotton.

↓

A total of 0.3-0.5 ml varnish is required to cover full dentition.

↓

Application is done first on lower arch (as saliva collects around it) & then on upper arch with help of single tufted small brush starting with proximal surfaces

↓

After application patient is made to sit with mouth open for 4 mins. before spitting.

↓

Patient should be clearly instructed not to rinse or drink anything solid but take liquids & semisolids only till next morning.

A special emphasis on instructions is needed to maintain contact with varnish and tooth surface for about 18 hours for prolonging interaction between varnish and enamel.

* Fluoride Dentrifices –

Age (in years)	Recommendation.
Below 4 years	Not recommended
4-6 years	Once daily with fluoride paste & twice without paste
6-10 years	Twice daily with fluoridated paste & once without paste
Above 10 years	Twice daily with fluoridated paste

* Fluoride Toxicity :-

Acute toxicity - Nausea, vomiting, abdominal pain, excessive salivation, mucosal doses of fluoride at one time, cardiac arythmia, generalised weakness

Chronic toxicity - Ingestion of variant doses of fluoride over prolonged period of time.

2 types → Dental
→ Skeletal fibrosis

Dental fluorosis: Developmental disturbance of dental enamel, caused by successive exposure to high concentrations of fluoride during tooth development, leading to enamel with lower mineralised content & increased porosity

- It can be hypoplasia / hypomataration of tooth enamel.

⊙ Clinical features:

- Snow cap phenomenon:

1) Thin white striae across enamel surface
2) cloudy, paper-white areas are scattered over surfaces.
3) Brown stains
4) Chalky white teeth
5) Pits on tooth
6) Dark brownish discolouration of tooth

Skeletal Fluorosis - May be mild, moderate, severe

Age	Fluoride content in dentrifices
3 - 5 years	500ppm
5 - 8 years	upto 1000ppm
8 years	above 1000ppm

PIT AND FISSURE SEALANTS

- **Introduction –**
  - Caries potential is directly related to the shape and depth of pits & fissures.
  - The success of fluorides in caries prevention on smooth tooth surfaces have made caries primarily disease of pits and fissures of teeth.
  - Narrow isolated ~~ee~~ crevices & grooves that harbour food and micro-organisms are the most important anatomical feature leading to development of occlusal caries.

Definitions –

- A fissure sealant is a material that is placed in pits and fissures of teeth in order to prevent or arrest the development of dental caries.
- Pit & fissures are enamel faults, narrow shafts or cracks at some length whose blind ends are directed more or less towards DEJ.
- Pits are small pin-point depressions located at junction of developmental grooves or at terminal of those grooves whereas fissures are long clefts between cusps or ridges.

Classification:

1] Based on Generation –

1) First Generation –
- Polymerized with UV light of 350 nm wave length.
- Absorbs UV light excessively and prevents complete polymerisation of sealant.

2) Second Generation –
- They are self cured or chemically cured.
- Most of them were unfilled increased wear & abrasion resistance can be achieved by filled once.

3) Third Generation -

- Visible light cured of 430-490 nm wavelength. May be unfilled or filled.

4) Fourth Generation -

- With addition of fluoride for added benefit.

B] According to ~~pressure~~ presence of filler -

1) Filled
2) Unfilled

C] According to chemical structure of monomer used.

1) Methyl methacrylate (MMA)
2) Trimethylene glycol dimethacrylate (TEGDM) Bisphenol Dimethacrylate
3) BisGMA products of Bisphenol A and glycidyl methacrylate (GMA)
4) Propyl Methacrylate urethane (PMU)

D] Based on curing -

1) Autopolymerisation.
2) Light cure.

• Indications:

1) Deep retentive pits and fissures, which may cause wedging of explorer.
2) Stained pits & fissures with minimum appearance of decalcification
3) No radiographic or clinical evidence of proximal caries.
4) Possibility of adequate isolation.
5) Questionable enamel caries in pits & fissures.
6) caries free ~~patt~~ pit & fissures.
7) If patient desires
8) Caries pattern indicative of more than one lesion per year
9) Morphology of pit at risk of [illegible].

10) Factors associated with increased caries incidence.

11) Routine dental care with active preventive dentistry program

12) community-based sealant program.

- **Contraindication**-

1) Well coalesced, self cleansing pit & fissures
2) Radiographic or clinical evidence of interproximal caries
   tooth not fully erupted
3) Isolation not possible
4) Life expectancy of tooth is limited.
5) Dentinal caries
6) Lack of preventive practices

Clinical technique for placement –

Step 1: Tray set up

- Prior to start of procedure, a tray with all necessary instruments, supplies and equipment should be prepared.
- Mouth mirror, slow speed handpiece, explorer, toothbrush, cotton pliers, material isolation device, saliva ejector, curing pliers, curing light, syringe tip.

Step 2: Isolation of tooth:

- The tooth should be isolated from salivary contamination by use of rubber dam or by cotton rolls and suctioning.
- Rubber dam should be used in fully erupted teeth and cotton rolls can be used where that is not possible.
- This procedure is very technique sensitive so moisture control is essential to achieve optimum bond strength.

Step 3: Tooth Preparation:

- There are different methods of enamel surface preparation prior to etching & sealant application. Earlier concept was to treat surface with slurry of pumice & water

Step 4: Acid Etching tooth surface:

- Apply etching agent to the tooth surface using a fine brush a minisponge according to manufacturers recommendations.
- 37% phosphoric acid is recommended.
- Gently rub etchant applicator over tooth surface including 2-3mm of cuspal inclines & reaching into any buccal or lingual pits & grooves that are present.
- Periodically add fresh etchant to tooth surface.
- Gel form of etchant is preferred as it is more effective & it flow can be controlled.
- Etching time → 15-60 sec.
- Acid etching on surface enamel has shown to produce degree of porosity
- First narrow zone of enamel is removed by etching. In this plaque & pellicles are dissolved fully reated inert mineral crystal in surface of enamel are also removed, resulting in more reactive surface, increase in surface area & decrease in surface tension that allows resin to wet enamel surface more readily.
- This zone is 10 µm in depth.
- second zone is 20µm in depth.
- Third zone is quantitative porous zone with small porosities and 20 µm deep.

Step 5: Rinse & Dry Etched tooth surface.

- Rinse etched tooth surface for 30 seconds with air water spray.
- Dry tooth for 15 sec with compressed air
- The dried etched enamel should have frosted white appearance.
- If salivary contamination has occured re-etch for 10 sec & repeat procedure.

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Step 6: Application of Bonding agent -

- Application of halogenated bonding agent after etching displaces saliva from enamel thereby improving sealant wetting of surfaces & increases bond strength both in saliva-contaminated enamel.

Step 7: Application of sealant -

- The sealant kits have their own dispensers some preloaded that directly apply sealant to tooth structure.
- In mandibular teeth, apply sealant distally and allow it to flow mesially with converse being true fo maxillary teeth.
- Then using fine brush or applicator, carry a thin layer up cuspal inclines to seal secondary & supplemental fissures.

Step 8: Cure the sealant -

- cure according to manufacturer recomended times for curing.
- For light cured sealants, polymerisation should be initiated quickly often sealant is placed on the etched surface to help minimize potential contamination.

Step 9: Explore the sealed tooth surface & evaluate occlusion.

- Explore entire tooth surface for pits & voids that may have not been sealed.
- Evaluate occlusion of sealed tooth surface with articulation paper to determine if any excessive sealant is present.

Step 10: Recall and Re-evaluation -

- Recall & check patient at subsequent visits.

ATRAUMATIC RESTORATIVE TREATMENT

Definition:-

A dental caries treatment procedure involving removal of soft mineralised tooth tissue using hand instruments alone followed by restoration of tooth with adhesive restorative material.

Advantages:-

- No need of injection
- No scary second making instruments
- Less chances of bleeding
- Less expensive
- Fast procedure for better child co-operation
- Removal only of caries.

Disadvantages:-

- ART restorations are not long lasting
- fundamental principles of cavity preparation are not follow
- Less wear resistance & low strength.
- Hand fatigue due to hand instrumentation.

Procedure:-

Tooth is isolated with cotton rolls

↓

Cleaning of tooth surface

↓

Lesion is slightly widened by hand instruments to remove unsupported enamel using enamel hatchet

↓

Caries are removed by spoon excavator

If necessary provide pulpal protection

↓

cavity is acid etched

↓

Mixed glass ionomer is inserted into cavity

↓

cavity is slightly overfilled

↓

Bite is checked & excess material is removed

↓

Filling is covered with petroleum jelly.

GLASS INOMER CEMENT

- Glass inomer cements are adhesive tooth-coloured anticariogenic restorative materials which originally used for restoration of eroded areas.
- The first reliable glass inomer system was formulated in 1972 by Wilson and Kent and was known ASPA.
- It is named glass inomer because, powder is a type of glass and setting reaction and adhesive bonding to tooth structure is due to ionic bond.

Synonyms-

- Polyalkenoate cement
- GIC
- ASPA (Alumino silicate polyacrylic acid)

Classification -

- ISO classification:
  - a) Luting
  - b) Bases and Liners
  - c) Restorations
- According to modifications -
  - a) Conventional GIC
  - b) Resin modified GIC
  - c) Metal-modified GIC
- According to application -
  1) Luting
  2) Restorative
  3) Base & liner
  4) Pit & fissure sealant
  5) Orthodontic purpose

6) Core build up
7) Fluoride releasing
8) Atraumatic restorative treatment
9) Pediatric.

Composition –

⊙ Powder :

- The powder is an acid-soluble calcium fluoro-aluminosilicate glass.

1) Silica (SiO_2) – 41.9%.
2) Alumina (Al_2O_3) – 28.6%.
3) Aluminum fluoride – 1.6%.
4) Calcium fluoride – 15.7%.
5) Sodium fluoride (NaF_2) – 9.3%.
6) Aluminium phosphate ($AlPO_4$) – 3.8%.

⊙ Liquid :

- Originally liquid was a 50% aqeous solution of polyacrylic acid
- Modern glass inomer liquids are in form of copolymers.
  1) Polyacrylic acid - 50%.
  2) Tartaric acid - 13%.
  3) Water
- Mixing time → 45 seconds.
- Setting time → 7 minutes for luting type
  → 4-5 minutes for restorative type

Setting reaction of GIC –

Powder & Liqu

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↓

Surface of GI particles is attaked with H^+ ion of acid

↓

Acid soluble glass is attacked by polyacids releasing Ca^{++}, Al^{+++}, Na^{+}, F^{-}

↓

Initially Ca and later Al replaces hydrogen on carboxyl groups of polyacid to make Ca and Al polysalts.

↓

Acid attacks Ca-rich sites and metal ions migrate aqeous phase of cement towards acrylic acid

↓

chains get cross-linked leading to formation of Ca polyacrylate & gelatin

↓

The salts hydrate to form gel matrix while unreacted portion of glass particles are surrounded by silica gel that arises from loss of surface cations

↓

The set cement consist of unreacted glass surrounded by silica gel bound together by matrix of hydrated calcium.

↓

Na^{+} ion replaces H^{+} ion of carboxylic group whereas remaining from NaF, F^{-} ion thus life free within matrix and are able to conduct f^{-} release.

Indications –

- Non-stress bearing
- Class III & V restoration in adults
- Class I & II restoration in primary dentition.
- Temporary & caries control restoration.
- Crown margin repairs.
- Cement base under amalgam, resin, ceramics, direct and indirect gold.
- Core build up when atleast 3 walls of tooth remaining (after crown preparation)

Contraindications -

- High stress application
- Class IV & II restorations
- Cusp replacement.
- Core buildup with less than 3 sound walls remaining.

Advantages -

- Bonds to enamel & dentin
- significant F^- release & recharge ability
- CTE ≅ tooth structure.
- Tooth coloured
- Low thermal conductivity

Disadvantages -

- Opacity higher than resin
- Less polishability than resin
- Poor wear resistance.
- Brittle, poor tensile strength
- Poor longevity in xerostomic patients

* Modifications -

1) Metal modified GIC:-

- Silver alloy admix, miracle mix ← Other names
- Ag amalgam alloy particles mixed with glass particles
- simmons used - core building
  - High caries index
  - Poor esthetic and do not burnish

2) Cermet:-

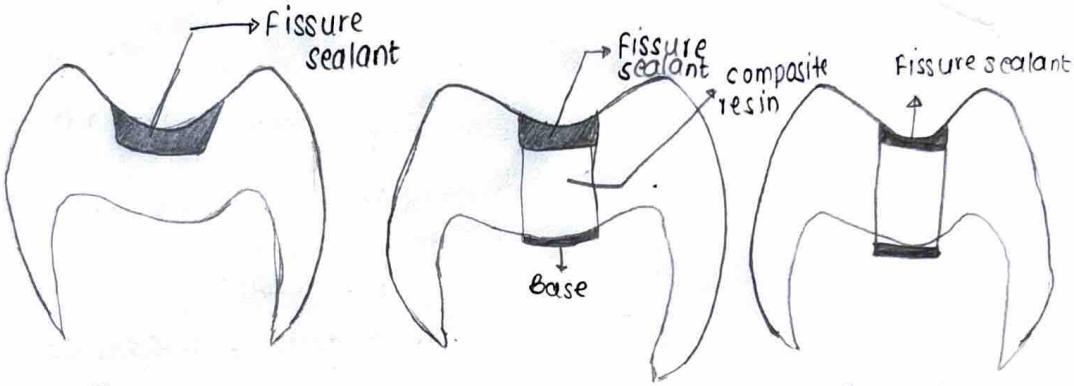
- By Mclean and Grasser
- Improved resistance to abrasion
- Higher flexural strength
- Strength is still insufficient to replace amalgam alloys and their use is confined to low stress-bearing cavity preparations.

3) Resin - modified GIC:-

- Visible light cure / hybrid GIC
- Fundamental acid base curing reaction is supplemental by a second curing process which is light / chemically initiated.
- Dual cure or Tricure cements.

PREVENTIVE RESIN RESTORATION

- They are natural extension of use of occlusal sealants.
- Integrates preventive approach of sealant therapy for caries susceptible pit and fissure with therapeutic restorations of incipient caries between composite resin that occur on same occlusal surface.
- Types of PRR based on extent and depth of caries / lesion determined by exploratory preparation. Simson has classified them as →



- **Type A -**
  - Suspicious pits and fissures where caries removal is limited to enamel.
  - Local anaesthesia is required.
  - Speed of 1/4 , 1/2 round bur is used to remove decalcified enamel.
  - Sealant is placed
- **Type B -**
  - Incipient lesion is dentin that is small and confined.
  - No LA needed.
  - Appropriate base placed in areas of dentin exposure, compression is placed and remaining pit & fissure are covered with sealant.
- **Type C -**
  - More extensive dentinal involvement and requires restoration with proper composite material
  - Appropriate base is placed over dentin
  - Pits & fissures are covered with sealant & LA is required.

NON-PHARMACOLOGICAL BEHAVIOUR MANAGEMENT

- Means by which dental health seam effectively and efficiently performs treatment for child and same time instills very positive dental attitude.

Factors influencing child's behaviour in dental office:

1) Medical history
2) Maternal influence
3) Family & peer influence
4) Dental office environment
5) Growth and development
6) Personal factors
7) Environmental factors
8) Other variables.

- Mental attitude -
  - Overprotective
  - overindulgence
  - Underaffectionate
  - Rejecting
  - Authoritarian

Classification of child's behaviour in dental office -

1) Co-operative
2) Tense co-operative
3) Outwardly apprehensive
4) Fearful
5) Stubborn / Defiant
6) Hypertensive
7) Handicapped
8) Emotionally immature

Pre-appointment behaviour modifications -

1) Audiovisual modelling - for stimulation of new behaviour
2) Pre-appointment mailing - contact with parents

1. Communication - May relax the youngster
2. Non-verbal communication - Gains patient's attention
3. Descriptive praise - Emphasize specific co-operative behaviour
4. Signaling - Raising hand, finger etc.
5. Use of second language - eg air → wind, rubber dam → raincoat
   X-ray machine → camera

6. Positive previsit imagery

7. Tell-show-do: Teach patient aspects of visit & familiarize the patient with instruments.

8. Densensitization: Perceived links between stimulus & anxiety response is weakened.

9. Direct observation: Familirize patient with dental setting

10. Behaviour shaping: Explain necessity for procedure.

11. Contigency management :- Positive reinforcement
- Negative reinforcement
- Ommission / timeout.
- Punishment.

12. Externalization - Decrease perception of unpleasantness.

13. Distraction - To relax patient.
- To decrease anxiety during treatment
- Placebo effect
- Audio distraction

14. Assimilation & coping - Behavioural
cognitive.

15. Parental presence / absence - establish authority

16. Retraining - For fabricating positive values to replace negative

17. Memory reconstructing - Improves patient behaviour at subsequent dental visits.

18. Relaxation breathing - Benefits fearful patient
Progressive muscle relaxation.

19. Visual imagery - To establish authority / dreaming

20. Voice control - To establish authority

21. Use of poetry & drawings

22. Hypnosis - To decrease nervousness & apprehension.

23. Hand-over-mouth technique - Patient soon begins to gain attention.

24. Protective stabilization - For patient lacking maturity & for physically / mentally disabled patient.

⊙ Behaviour management:

It is the means by which the dental health team effectively and efficiently performs dental treatment for a child & thereby instills a positive dental attitude.

⊙ Behaviour modification:

Attempt to alter human behaviour and emotion in a beneficial manner. & in accordance with the laws of learning.

⊙ Behaviour guidance:

Is a continum of individualised interaction involving the dentist & patient directed towards communication & education which ultimately builds trust & allays fear & anxiety.

i) Communication :-

By involving the child in conversion, the dentist not only learns about the patient but also may relax the youngster.

There are two ways:

a) Verbal → spoken language to gain confidence.

b) Non-verbal → Expression without words like welcome hand-shake, patting, eye contact.

- Communication with children aged 2-7 years should be based on piagetian concept (Animism - giving life to an inanimate object)

ii) Non-verbal communication :-

It is the reinforcement & guidance of behaviour through appropriate contacts, posture, facial expression and body language. It enhances effectiveness of other communicative management techniques.

iii) Descriptive praise :-

The praise emphasizes specific co-operative behaviour

eg: - Thank you for sitting still.

iv) Signaling :-

Signaling allows the patient to communicate with the dental team during the treatment by means of previously established signals with specific meanings.

v) Euphemisms :-

- Address the child at his/her level of comprehension. This does not suggest the use of baby talk but rather employing words that have meaning to a child.

Air → Wind

Impression material → Pudding, mashed potatoes

Bur → Brush on pencil.

Caries → sugar bugs

Explorer → Tooth counter

Rubber dam → Rain coat

Stainless steel crown → Hat for tooth

X-ray → camera

Handpiece → Whistling train.

vi) Tell - Show - Do :-

- It was given by Harold Addleston in 1959.
- The dentist tells the child ~~wat~~ what is going to be done in words the child can understand. Second the dentist demonstrate to child exactly how the procedure will be conducted.
- Finally the practioner performs the procedure exactly as it was described & demonstrated.

a) Tell :

- Verbal explanations of procedures in phrases appropriate to the developmental level of the child.
- Tell the child before you do it, when you are doing it & after you have done it.

b) Show:

- Demonstration of the visual, auditory, olfactory & tactile aspects of the procedure in carefully defined non-threatening setting.
- The dentist can demonstrate on himself or an inanimate object.

c) Do:

- Without deviating from the explanation and demonstration, the dentist proceeds directly to perform the previewed operation.

vii) Ask-Tell-Ask:

- The technique involves inquiring about the patients visit & feelings towards or about any planned procedure.
- Explain the procedure throughout the demonstration in a non-threatening language.
- Again inquire the patient & understand how he/she feels about impending treatment.

viii) Tell-Play-Do

- It is based on the learning theory where interchange of thought and two-way interchange of ~~thought~~ information takes place.
- This is done by performing dental treatment on dental imitating toys where child understands the dentists frame of reference & feels more comfortable & develops co-operative behaviour.

ix) Desensitization:

- It means to take away ones sensitivity to a type of behaviour.
- This is used in children having pre-established fears and unco-operative behaviour.
- Wolpe used relaxation as the inhibitor of anxiety - visual imagery of anxiety provoking stimuli.
- The technique calls for a hirerachy of fear stimuli whereby patient conquers fear or anxiety towards low-anxiety or moderate anxiety stimuli before approaching the more dramatic stimuli.

Howitt & sticker addresses the hireracby of anxiety evoki
Stimuli as

Injection → exposure to dental environment → drill → rub
dam → hand instruments → oral prophylaxis

x) Modelling:

- Based on psychologic principle that much of one's learning or behaviour acquisition occurs through observation of su model performing a specific behaviour.
- Modelling has been used as technique to eliminate or minimiz fear of dentistry in children by allowing the child to observe an older sibling undergoing treatment.
- Types of modelling.
  a) Audovisual
  b) Live modelling by sibling or parent

xi) Direct observation:

- Patients are shown a video or are permitted to directly observe a young co-operative patient undergoing dental treatment.

xii) Behaviour shaping:

- A process which slowly develops a behaviour by reinforc successive approximation of the desired behaviour until the desired behaviour is expressed.
- The dental assistant or dentist is teaching child how to behave.
- Young children are led through procedure step by step the have to be communicative & co-operative to absorb information that may be complex for them.

xiii) Contigency Management :-

- Based on B.F. Skinner's operant conditioning.
- The presentation of positive reinforcers and withdrawl of negative reinforcers is termed contigency management.
- It includes :
  - Positive reinforcers
  - Negative reinforcers
  - Ommission or time out
  - Punishment.

a) Positive reinforcers :-

- Its presentation increases frequency of desired behaviour.

b) Negative reinforcers :-

- Its contigent withdrawl increases the frequency of a behaviour

c) Material :-

- Stickers, pencils, small toys.
- Rewards are given after dental procedures.

d) Social :-

- Praise, positive, facial expression, handshake, smile, hug, pat on shoulder.

e) Activity :-

- Opportunity of participating in a preferred activity like cartoon show, visit to park.

xiv) Externalization :-

- It is process by which attention is focused away from the sensation associated with dental treatment by involving verbal or dental activity.

XV) Distraction:-

- Newer method of behaviour management in which the patient is distracted from the sounds and/or sight of dental treatment thereby reducing anxiety.

- Use stories & fairy tales.
- Use slow instrumentation music.
- Audio distraction.
- Audio-visual distraction.

XVi) Assimilation & coping:-

- Coping refers to cognitive & behavioural efforts made by individuals to master, tolerate or reduce stressful situations.
- Behavioural coping → Physical or verbal activities in which the child engages to deal with stress.
- cognitive coping → Efforts which involve manipulation of emotions. These are not visible to dentist but play a critical role in child's ability to deal with the treatment.

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CASE HISTORY -1

PERSONAL INFORMATION -

1. Patient's Name :- Aaradhya Aapaso shinde.
2. Date :- 02/05/2024
3. OPD NO:- 92312
4. Age/sex :- 9yrs/Female.
5. Weight :- 22kgs
6. Date & place of Birth : 21 April
7. Religion :- Hindu
8. Education :- 3rd std.
9. Name of person accompanying :- Aapaso shinde (Father)
10. With whom does the child live :- Parents.
11. Residential address :- Kasbawadi
12. Contact No. :- 9699331362

Chief complaint -

Patient complains of pain in upper left back tooth region of jaw since 6 months.

History of Present Illness -

1. Pain → Pain is dull aching, intermittent and aggrevates on cold food.
2. Swelling → No relevant history
3. Fever → No relevant history
4. Trauma → No relevant history

Prenatal History -

1. H/O illness during pregnancy → No relevant history
2. H/O specific medicines during pregnancy → No history
3. H/O fluoride supplements during pregnancy → No history
4. H/O Vitamin/calcium supplements → History of calcium & iron supplements.

Natal History :—

1. Type of delivery : C-section
2. Term : Full term (9 months)
3. H/o birth asphyxia , Jaundice ,-blood transfusions → No history

Post-natal History :—

1. Developmental milestones : Normal
2. H/O Immunization : All vaccinations completed.

Past Medical History :—

No relevant history.

Family History :—

No relevant history.

Past Dental History :—

No relevant history

Personal Habits :—

1. Oral Hygiene methods : commercially available toothpaste & toothbrush.
2. Methods of cleaning : Horizontal scrub method
3. Frequency & Duration : 2 times for 5 mins.
4. Time of cleaning teeth : Morning & after dinner
5. Unassisted type of brushing
6. Use of other oral hygiene aids : No

Dietary Habits :—

1. Source of water : Bore well
2. Type of diet : Mixed

⊙ Details about daily dietary habits:

Time

8 am → Breakfast (Milk & biscuit)

1:00 pm → Lunch (chapati & bhaji)

5:00 pm → Milk

9:00 pm → Dinner (chapati, bhaji & rice)

⊙ Details about in between meal snacking

- Frequency: 1 time
- Time of intake: Evening
- Sugar in solid form: chocolate
- Sugar in liquid form: Milk & sugar

⊙ Sweet score:

2 x 5 → Liquid

1 x 15 → Sticky

25 → Watchout zone.

Local Examination:-

1. Shape of Head → Mesocephalic
2. Facial form → Mesoprosopic
3. Face symmetry → Bilaterally symmetrical
4. Facial profile → concave.
5. TMJ Examination → Non-tender, No deviation.
6. Lymph nodes examination → Non-tender, Non-palpable
7. Speech → Normal
8. Lip competency → Incompetent

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Intra-Oral Examination.

1. Adverse oral habit → No history
2. Soft tissue examination → No abnormality detected.
3. Hard tissue examination →

16	55	54	53	12	11	21	22	63	64	65	26
46	85	84	83	42	41	31	32	73	74	75	36

Type of dentition: Mixed

Molar relationship: Angle's class II relationship

Overjet = 2mm Overbite = 1mm

Pit & fissure caries ∈ 55, 46, 36, 65, 75, 74, 85

Smooth surface caries ∈ 63

Deep occlusal ∈ 26, 16

Dental age: 7 years.

Provisional Diagnosis:—

chronic irreversible pulpitis ∈ 16, 26

Investigations:—

IOPA ∈ 26

Radiographic Diagnosis:

This is an IOPA of maxillary left back tooth region of jaw

Teeth seen:— 24, 65, 26

Area of interest:— ~~64~~ 26

Crown portion:- Radiolucency involving enamel, dentin & pulp

Root portion:- 2 root canals are seen.

Radiographic Diagnosis:-

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Final Diagnosis :-

Chronic irreversible pulpitis $\bar{c}$ 26

Dental caries $\bar{c}$ 55, 46, 36, 65, 75, 74, 85, 63

Treatment plan :-

I. Emergency phase:

II. Planned phase:

A) Preventive phase:

- Oral hygiene counselling
- Diet counselling
- Oral prophylaxis
- Topical fluoride application.

B) Restorative phase:

- Restoration $\bar{c}$ 55, 46, 36, 65, 74, 84, 75, 63

c) Endodontic phase:

- Vital pulp therapy $\bar{c}$ 16
- Pulpectomy $\bar{c}$ 26

D) Surgical phase:

E) Orthodontic phase:

F) Maintainence phase:

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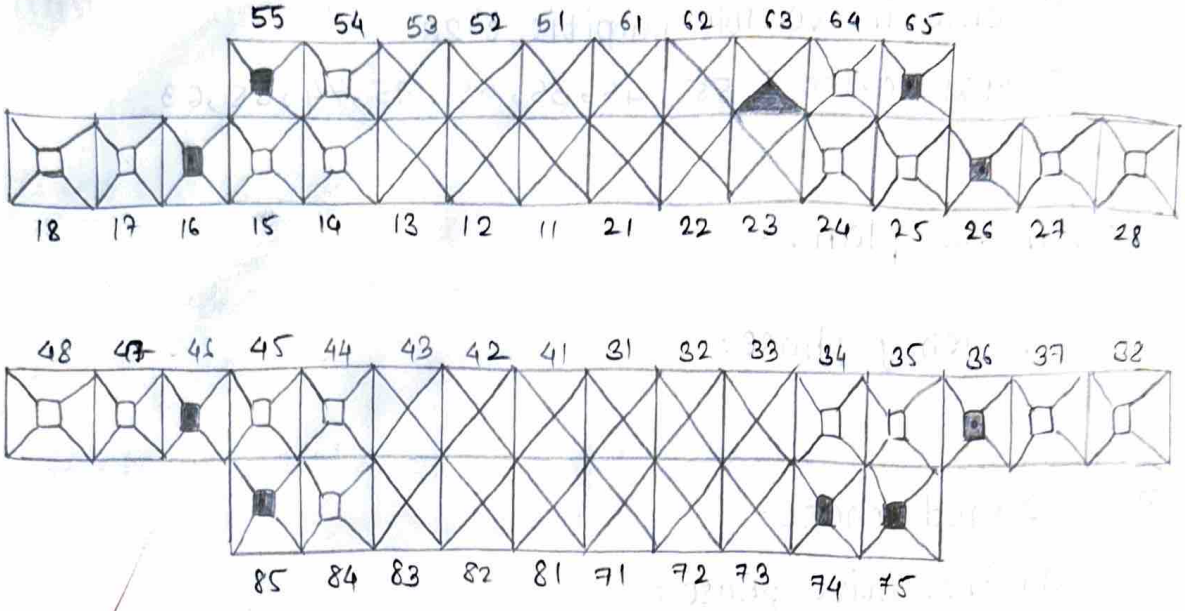

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CASE HISTORY-2

PERSONAL INFORMATION :-

1. Patient's name : Rohit Madne
2. Date : 02/05/2024.
3. OPD No. : 6540
4. Age/Sex : 11/Male
5. Weight : 25 kgs
6. Date & place of Birth : 3rd March
7. Religion : Hindu
8. Education : 5th std
9. Name of person accompaning : Khandu Madne.
10. With whom does the child live : Parents
11. Occupation : Farmer
12. Residential address : Kameri
13. Contact No. : 9730451343l

Chief complaints :-

Patient complains of pain in lower right back tooth region of jaw since 5 days.

History of Present Illness :-

1. Pain → Pain is throbbing, intermittent, sudden and aggrevates on hot & cold food
2. Swelling → No relevant history
3. Fever → No relevant history
4. Trauma → No relevant history

Pre-natal History :-

1. H/O illness during pregnancy → No relevant history
2. H/O specific medicines during pregnancy → No relevant history
3. H/O fluoride supplements during pregnancy → No relevant history
4. H/O high vitamin/calcium supplements → Iron & calcium supplements

Natal History :-

1. Type of delivery → Normal
2. Term : Full term (9 months)
3. H/o birth asphyxia , jaundice , blood transfusion → No relevant history

Post natal history :-

1. Developmental milestones → Normal
2. H/o immunization → All vaccinations are completed

Past Medical History :-

No relevant history

Family History :-

No relevant history

Past Dental History :-

No relevant history

Personal Habits :-

1. Oral Hygiene methods : commercially available toothbrush & toothpaste
2. Method of cleaning teeth : Horizontal scrub method.
3. Frequency & Duration : Once daily
4. Time of cleaning teeth : Morning
5. unassisted type of brushing

Dietary Habits :-

1. Source of water : Muncipal corporation.
2. Type of diet : Mixed

⊙ Detail about daily dietary habits :

Time	Item
8:00 am	Breakfast (Tea & biscuit)
12:00 pm	Lunch (Chapati , bhaji , rice & dal)
4:00 pm	Milk.
9:00 pm	Chapati & bhaji

Details in between meals:

1. Frequency → 2 times
2. Sugar in solid form → chocolates
3. sugar in liquid form → Milk & tea

⊙ Sweet score: –

5 x 2 = 10 → Liquid form
10 x 2 = 20 → solid form
30 → Watchout zone.

Local Examination :–

(A) Extra-oral Examination:

1. shape of head → Mesocephalic
2. Facial form → Mesoprosopic
3. Face symmetry → Bilaterally symmetrical
4. Facial Profile → straight.
5. TMJ → Non-tender, No deviation.
6. Lymph nodes → Non-tender, non-palpable.
7. Speech → Normal
8. Lip competency → competent.

(B) Intra-oral Examination:

1. Adverse Habits → NO relevant history
2. Soft tissue examination → NO relevant history
3. Hard tissue examination → ~~NO relevant his~~

16	55	14	53	12	11	21	22	63	64	65	26
46	85	84	43	42	41	31	32	33	74	75	36

Molar relationship → Angle's class I relationship

Overjet – 2mm Overbite – 1-2mm

Pit & fissure caries c 36

Deep occlusal caries c 46.

Dental age : 10-11 years.

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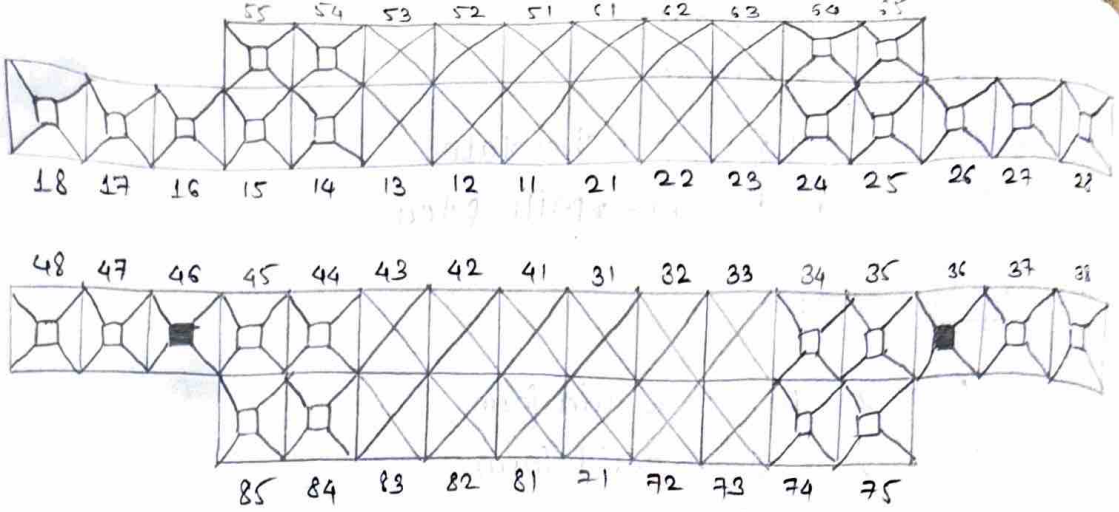

Provisional Diagnosis :—

Symptomatic irreversible pulpitis c̄ 46

Dental caries c̄ 36

Investigations :—

IOPA ō 46

Radiographic Interpretation :

The IOPA is of mandibular right back tooth region of jaw

Teeth seen — 85, 46

Tooth of interest — 46

Crown portion - Radiolucency involving enamel & dentin.

Root portion - 2 root canals are seen.

Tooth & bud seen c̄ 47 ⟶ Nolla's stage 6.

Radiographic Diagnosis ⟶

Final Diagnosis :—

symptomatic irreversible pulpitis c̄ 46

Dental caries c̄ 36

Treatment Plan :—

I. Emergency Phase :

—

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II. Planned Phase:

(A) Preventive phase -

- Oral hygiene counselling
- Diet couselling
- Oral prophylaxis
- Pit & fissure sealants.

(B) Restorative phase -

- Restoration $\bar{c}$ 36

(C) Endodontic phase -

- RCT $\bar{c}$ 46

(D) Surgical phase -

(E) Orthodontic phase -

(F) Maintainence phase -

CASE HISTORY - 3

PERSONAL HISTORY :—

1. Patient's name : Avani Mahale
2. Date :- 04/05/2024.
3. OPD No. :— 7177
4. Age/sex : 10 years/Female
5. Weight : 25 kgs.
6. Date & place of birth : 21st July
7. Religion : Hindu
8. Education : 5th std.
9. Name of person accompaning : Sarita Mahale
10. With whom does the child live : Parents
11. Occupation of parents : Buisness (Parlour)
12. Residential address : Kasba Bavda.
13. Contact No. : 9970966397.

Chief complaint :—

Patient complains of fractured tooth in upper front region & pain & swelling in upper front region since 1 week

History of present illness :—

1. Pain → Pain is sharp shooting, spontaneous, sudden aggrevates on cold intake and relieves on medication
2. Swelling → Intraoral swelling present on gingiva
   Time of appearance → Before pain
   Location, extent → c 11, 21
   Swelling regressed gradually
   H/O hot fermentation → NO
   Swelling associated with pain/fever → NO.

3. Fever → No relevant history

4. Trauma → No relevant history

Pre-natal History :—

1. H/O illness during pregnancy → No relevant history
2. H/O specific medications during pregnancy → No relevant history
3. H/O fluoride supplements during pregnancy → No relevant history
4. H/O vitamin/calcium supplements → No relevant history.

Natal History :—

1. Type of delivery → c-section.
2. Term → 9 months (Full term)
3. H/O birth asphyxia, jaundice, blood transfusion → No relevant histo

Post-natal History :—

1. Developmental milestones → Normal
2. H/O immunization → All vaccinations completed.

Medical History :—

No relevant history.

Family History :—

Patient's father was diabetic & hypertensive

Past Dental History :—

Patient has undergone extraction under LA without any complication 1 year ago.

Personal Habits :—

1. Oral hygiene methods: Commercially available toothbrush & toothpaste
2. Method of cleaning teeth: Horizontal scrub method
3. Frequency & duration: 2 times.

4. Time of cleaning → Morning

5. Unassisted type of tooth brushing

Dietary habits:—

Time		
8:00	→	Breakfast (Pohe), Milk)
12:00pm	→	Lunch (chapati, bhaji, rice, dal)
5:00 pm	→	Fruits
9:00 pm	→	Dinner (Bhakri, bhaji)

⊙ Details in between meals:

1. Frequency → 1 time.
2. Sugar in liquid form → Milk.

⊙ Sweet score :—

1 x 5 = 5 → Liquid form.

Local Examination :—

(A) Extra-oral Examination:

1. Shape of head → mesocephalic
2. Facial form → Mesoprosopic
3. Face symmetry → Bilaterally symmetrical
4. Facial Profile → Straight
5. TMJ → Non-tender, No deviation.
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(B) Intra-oral Examination:

1. Adverse Habits: → No relevant history
2. Soft tissue examination → No relevant history

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Treatment Plan :-

I) Emergency phase :-

Access opening c̄ 11

Antibiotic and analgesic prophylaxis

II) Planned phase :-

A) Preventive phase -

- oral prophylaxis
- Diet counselling
- Topical fluoride application.

B) Restorative phase -

—

C) Endodontic phase -

RCT c̄ 11, 21.

D) Surgical phase -

—

E) Orthodontic phase -

—

F) Maintainence phase -

Recall after 6 months to check for integrity of previous restorations.

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CASE HISTORY

Sr. No.	Patient's Name	Date	Signature
01.	92312 Aradhya Shinde	02/05/24	
02.	6540 Rohit Madne	02/05/24	
03.	7177 Avani Mahale	04/05/24	
04.	7871 Aditi Powar-Patil	05/05/24	
05.	8046 Sarthak Gaikwad	08/05/24	
06.	24549 Tasmiya Mujawar	21/09/24	
07.	23661 Shreya Patil	26/09/24.	
08.	20295 Swara Kamble	30/09/24	

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WORK DONE

Preventive Treatment

OPD No. ~~Sr. No.~~	Work Done		Date	Signature
60317	Adhiraj Kamble	Oral prophylaxis done	05/06/2023	
21444	Poorva Mangave	GIC restoration $\bar{c}$ 75 done	09/06/2023.	
61373	Poorti Kengar	Oral prophylaxis done	13/06/2023	
62278	Aryan Farakate	Oral prophylaxis done	20/6/23	
62592	Saundarya chavan	Oral prophylaxis done	27/6/23	
63457	Vishwaraj Patil	GIC restoration	29/06/23.	
		$\bar{c}$ 74 done.		
63617	Vedant Mohite	Oral prophylaxis done	30/06/23.	
8046	Sarthak Gaikwad	PFS $\bar{c}$ 45 done	08/05/24	
24549	Tasmiya Mujawar	PFS $\bar{c}$ 36,46 done	21/09/24.	

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WORK DONE

Restorations & Endodontic Treatment

Sr. No.	Work Done	Date	Signature
92312	Aaradhya Shinde. GIC restoration	02/5/24	
	$\bar{c}$ 75 done		
8504	Janhvi Chalke caries excavation followed by	15/05/24.	
	caOH base &		
	GIC restoration		
	$\bar{c}$ 64 done		

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