

(2) Hunter Schreger's bands:

1) Definition:

- Optical phenomenon seen clearly in longitudinal ground sections by using **oblique reflected light** under the light microscope.

2) Description:

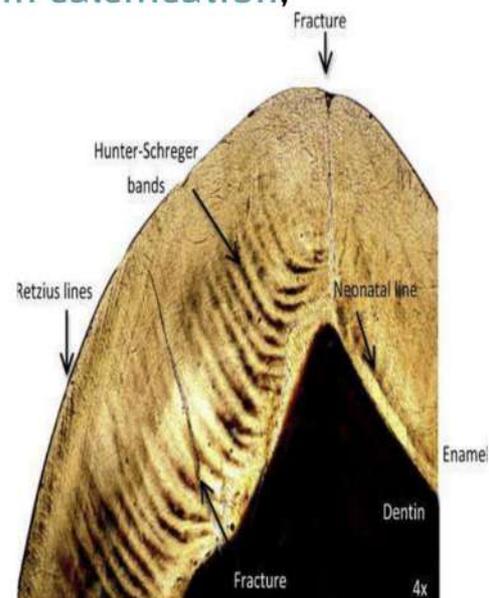
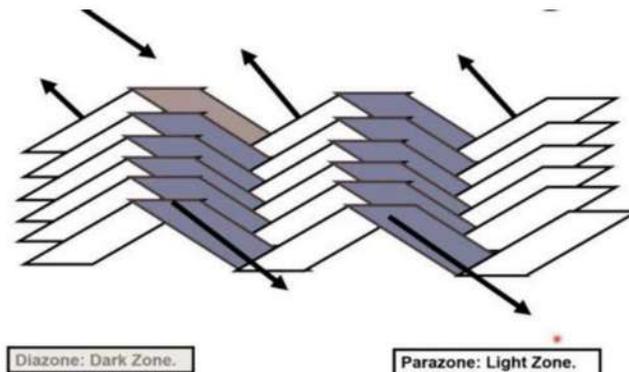
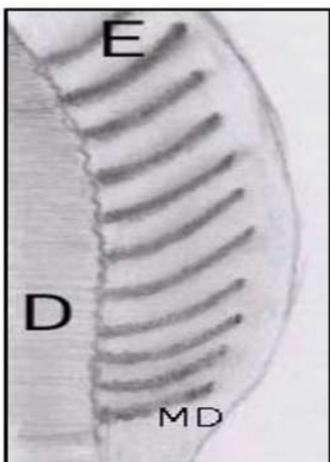
- They are **dark and light alternating bands** start at the D.E.J. outward and **end shortly before reaching the outer surface** of enamel.

3) Site:

- They are found in middle and cervical thirds of the crown (= **cervical 2/3**) and **absent in the region of gnarled enamel**.

4) Explanation (Causes):

- This phenomenon is the result of:
 - a) The **undulated wavy course of enamel rods** reflects the light at the peaks (Light bands = parazones) and **absorbs** light at the bottoms (Dark bands = Diazones).
 - b) This undulation disappears at the outer surface and become complex at the gnarled enamel so Hunter-Shreger bands cannot be seen under the incisal edge or cusp tip.
 - c) These bands may be also due to **variation in calcification, permeability and organic content**.



(3) Incremental lines of enamel:

a) Cross striations

b) Brown striae of Retzius

c) Neonatal line

a) Cross striations (short increment):

1) Definition:

- Periodic bands across the enamel rods at right angles to their long axis. (Cross striation)

2) By L.M:

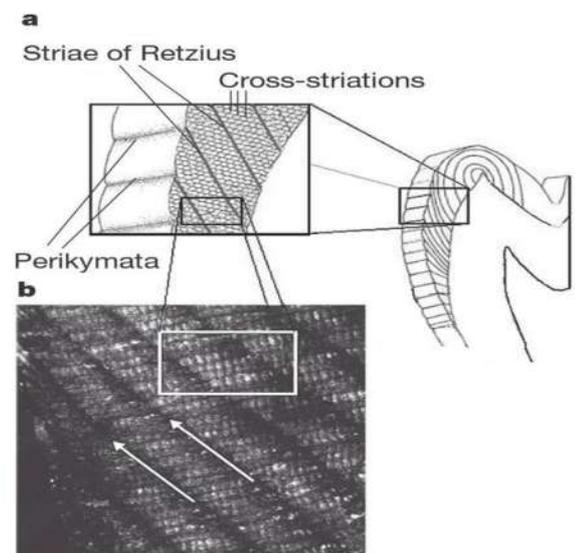
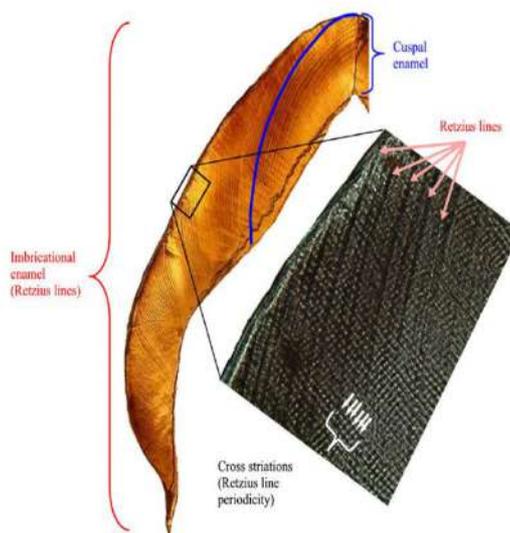
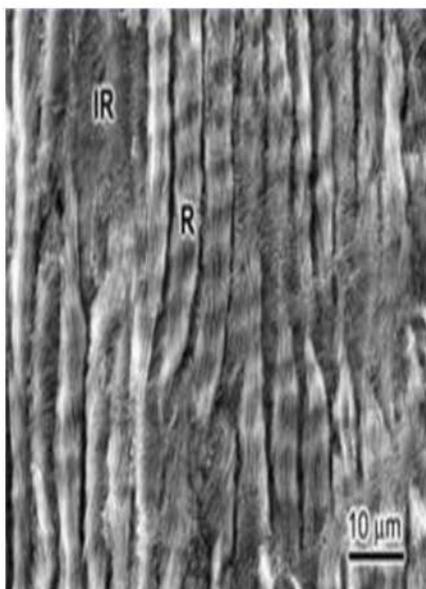
- more visible by mild etching (mild decalcification). Appear as dark lines of about 4μ apart.

3) By E.M:

- alternating constriction and expansion of the rods at and in between the cross striations are seen forming segments of about 4μ in length.

4) Explanation:

- This pattern reflects the rhythmic formation of enamel matrix and represents the daily rate of enamel matrix secretion.



b) Brown striation of Retzius (long increment):

1) Definition:

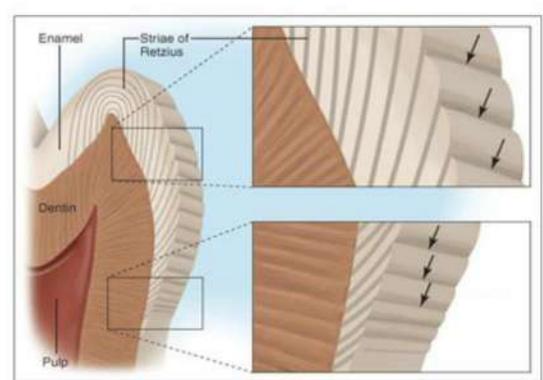
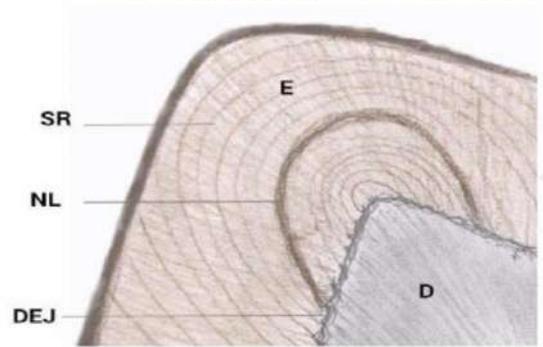
- They are incremental growth lines. In longitudinal sections, they appear as a series of brown bands extend obliquely from the D.E.J. to the outer surface of enamel.

2) arrangement:

- At the incisal edge and cusp tip they arise from the D.E.J. then. Go upward and outward surrounding the tip of dentine and come to D.E.J. again so, they do not reach the outer surface of enamel.
- Then towards the cervical line the incremental lines reach the outer surface of enamel in a series of transverse depression called perikymata.
- In cross section they appear as concentric rings resembling the growth rings in a cross section of a tree

3) The causes of these incremental lines may be:

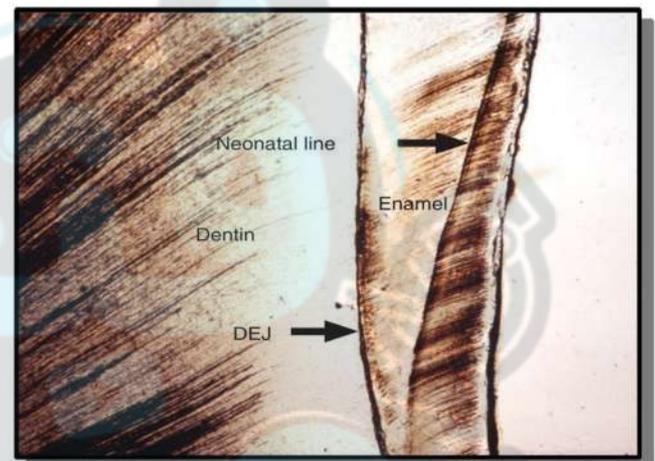
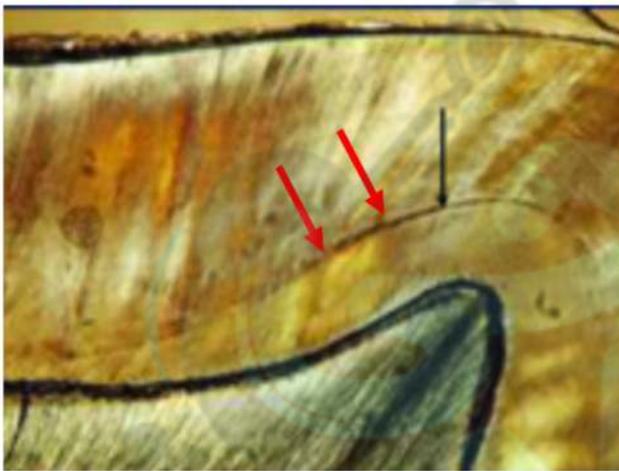
- the weekly rhythmic formation of enamel causing structural alteration of the rods, i.e., periods of ameloblasts activity and rest.
- Possible decrease in the number of crystals in these lines.
- Bending of enamel rods as they cross an increment.
- Change in diameter of "Tomes' process during matrix formation.
- Accentuated lines are produced by systemic disturbances which affect enamel formation.



c) Neonatal line:

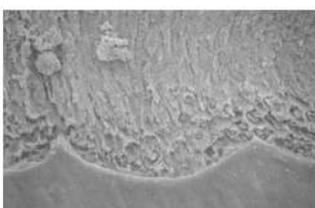
1) Definition:

- It is an accentuated line of Retzius which reflects the marked physiologic sudden changes occurring at birth.
- It mainly appears in deciduous teeth and first permanent molars (6th).
- It separates enamel formed before birth (prenatal enamel) from that formed after birth (post-natal enamel).
- The quality of the prenatal enamel is usually better than that of the post-natal enamel which is due to more protected environment and constant nutrition of the fetus.



(4) Dentino-enamel junction:

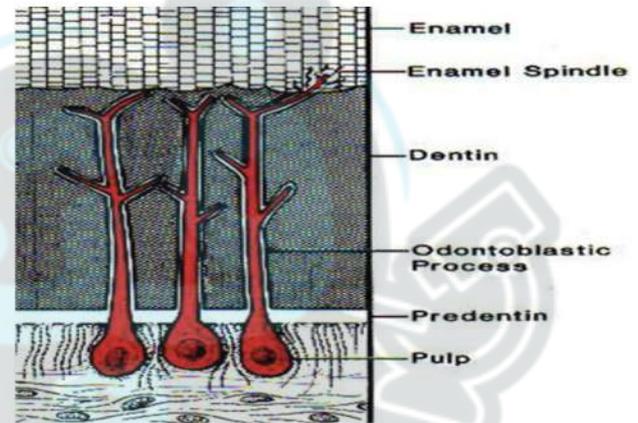
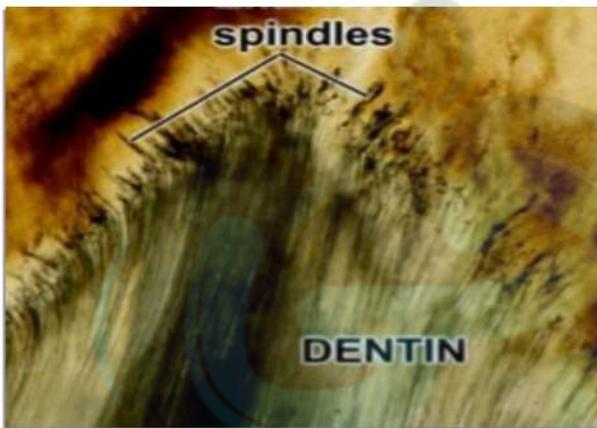
- In ground section D.E.J. appears as scalloped line where the convex side is toward the dentin.
- The presence of undercuts assures the union between enamel and dentine. But if we take a very small slice of the tooth at D.E.J. the enamel remains attached to the dentine without the presence of these undercuts. Also, occasionally the D.E.J. is smooth.
- So, it was found that the interdigitation between the apatite crystals of both enamel and dentin at the D.E.J. gives the firm attachment of enamel to the underlying dentin.



(5) Enamel spindle:

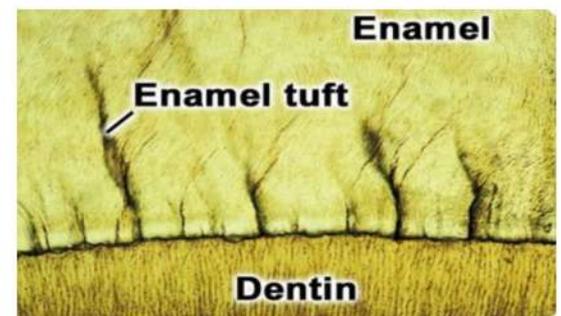
Non calcified [Soft tissue]

- It is an odontoblastic process which extends in between the cells of inner enamel epithelium to a short distance before the formation of enamel.
- They appear in ground section (L.S. & T.S.) as pointed or rounded process. It is black because the protoplasmic process of the odontoblast is burned during the preparation of the section (so, it becomes an empty space and appears black).
- They have right angle to the dentine surface and occur in great number under the tip of the cusps or incisal edge because odontoblasts are crowded at this region.



(6) Enamel tuft:

- It always appears in thick transverse ground section.
- It is a hypocalcified group of rods.
- They arise from D.E.J. to about 1/5 to 1/3 of the enamel thickness as tufts of grass.
- It takes this shape because of the wavy course of the enamel rod for several layers leading to this tuft form.
- These hypomineralized areas are weak points in enamel reduced its resistance to caries because carious lesion often spreads horizontally in enamel at the D.E.J.
- The tuft occurs more than lamella.

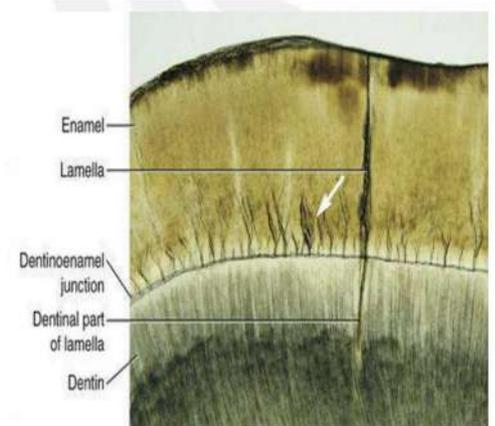
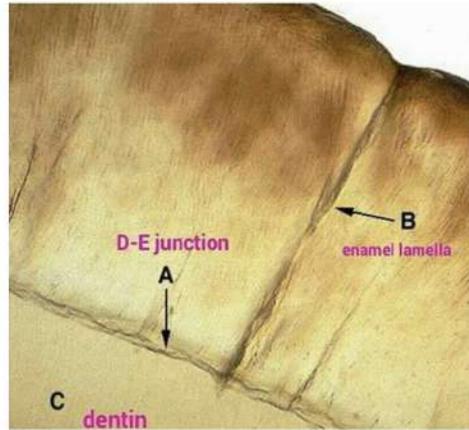
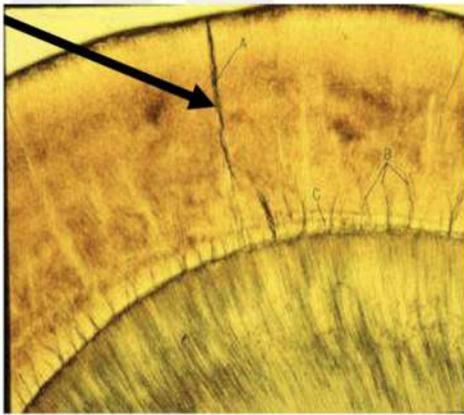


(7) Enamel lamellae:

[Fissure = Ununion of Enamel]

- They are hypomineralized or unmineralized leaf-like structural defects run through enamel.
- They extend from the enamel surface inward to varying distances in enamel and may reach the D.E.J and may extend to dentine.
- It appears in both longitudinal and transverse ground sections.
- Enamel lamella could act as caries spread way.
- They are classified according to their etiology Into:

	Type A lamellae	Type B lamellae	Type C lamellae
	true lamellae	False lamellae	False lamellae
	Developmental	Non developmental	Non developmental
Tooth:	Unerupted	Unerupted	Erupted
Time:	Before mineralization	before eruption, after complete formation	after eruption
Cause:	poorly calcified enamel rod and inter-rod substance.	crack	crack
Extension:	limited to the enamel.	may reach the D.E.J	may extend to dentin.
Content:	Enamel Matrix (Proteins)	the surrounding tissue e.g. the reduced dental epithelium or the adjacent C.T. of the dental sac forming cementum.	s saliva and food debris
Stimuli:	Mild	Moderate	Sever
Occurrence:	Less common	Less common	More common



d) An accidental crack:

- incidence: during ground section preparation.
- Content: The crack does not contain any material.
- ✚ To differentiate between true lamella and false lamella (crack) we do careful decalcification! the lamella will remain where crack will disappear.