


DEPARTMENT OF PERIODONTICS

REMEDIAL CLASS FOR SLOW LEARNERS – I

The following students have scored less than 30% (10/30) in the class test held on 24/11/2022. Remedial classes will be conducted for the students from 2 PM to 3 PM when they are posted in the OP.

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51	CYNTHIYA B
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Name :: M. Rohith Kumar

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Date :: 26/11/22

subject :: Periodontics



1) Junctional Epithelium:

Junctional Epithelium is defined as epithelium (microscopic structure of gingiva) present between the mucogingival junction and attached gingiva.

Junctional Epithelium is usually lined by stratified squamous keratinized epithelium. The Junctional Epithelium arise from Reduced Enamel Epithelium during the process of odontogenesis.

It is dentogingival junction.

Functions ::

It helps in attachment

It has role in protection.

maintains integrity of tooth

and periodontium

Permeability allows BCF and defense cells to pass across to protect the gingiva

## 2) Attached gingiva & <sup>significance</sup> structures...

Attached gingiva is defined as part of gingiva which is attached to marginal gingiva (continues from marginal gingiva).

It is firm, resilient and attached to underlying bone.

There is demarcation between marginal gingiva and attached gingiva called free gingival groove.

It is 1mm wide.

Attached gingiva is most prominently seen on labial and buccal mucosa.

width of attached gingiva

In anterior

maxilla  $\rightarrow$  3.5 - 4.5 mm.

mandible  $\rightarrow$  3.3 - 3.9 mm

In posteriors,

In maxilla  $\rightarrow$  1.9 mm

In mandible  $\rightarrow$  1.8 mm ..

Parts of gingiva

Attached gingiva

marginal gingiva

Interdental papillae

stippling  $\rightarrow$  surface texture of gingiva

is present between interdental papillae and attached gingiva.

The attached gingiva is measured as total depth of periodontal probe  $\rightarrow$  The pocket depth.

significance ::

On aging, the width of attached gingiva is increased. Other significance?

3) gingival fibres ::

gingival fibres are of 3 types namely

transeptal fibres

alveolar fibres

Primary fibres

Transseptal fibres

Vertical fibres

Alveolar

alveolar fibres

dentoperiosteal

Secondary fibres

Inter gingival

Inter papillary

Transgingival

fibres.

Diagram?

Alveolar fibres constitute the  
gingiva and helps in providing strength.

4) Functions of PDL:

1) helps in the attachment of  
teeth to the alveolar bone

2) helps in withstanding occlusal  
forces

3) Nutrient supply  $\rightarrow$  helps in transfer  
of nutrients to the surrounding structure.

4) Repair potential  $\rightarrow$  reparative property

PDL is through the cellular elements,  
fibroblasts, osteoblasts, cementoblasts.

5) Fibroblast helps in repair potential of  
periodontal ligament.

Support:-

PDL helps in attachment of fibres from alveolar bone to tooth surface.

4) Mechanical reconstruction:-

PDL → helps in mechanical reconstruction of tooth structure.

Helps in withstanding occlusal forces.

8) Sensory function:-

Sensory function includes transmission of stimulus from periodontal ligament.

5) Bundle bone

Bundle bone is also called alveolar

Bone proper.

Bundle bone forms soft bony part of  
It has osteoid matrix

Parts → cancellous bone -

Bundle rose . . .

1/2

6) Classification of cementum:

Cementum is a calcified, avascular mesenchymal tissue.

~~It surrounds the~~

It forms the root of the tooth.

Classification

Acellular cementum

Cellular cementum

Composition:

Organic - 45%

Inorganic - 55%

Acellular cementum:

It is the primary cementum because it forms before root formation.

Acellular cementum is devoid of cementocytes.

Cellular cementum:

Cellular cementum is also called as secondary cementum because it forms after root formation.

It has cementocytes.



Acellular cementum

Acellular afibrillar cementum

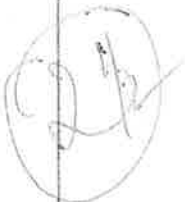
Acellular extrinsic fibre cementum

Acellular intrinsic fibre cementum

cellular cementum

cellular extrinsic fibre cementum

cellular intrinsic fibre cementum



# PERIODONTOLOGY TEST.

B. SHANMUGA PRIYA  
IVth yr BDS

(74)

26/11/22

## I. SHORT NOTES :-

- ① Junctional epithelium
- ② Attached gingiva and its significance
- ③ Gingival fibres
- ④ Functions of PDL
- ⑤ Bundle bone
- ⑥ classification of cementum.

## ANSWERS

- ① Junctional epithelium is a part of gingival epithelium.

Gingival epithelium consists of three components

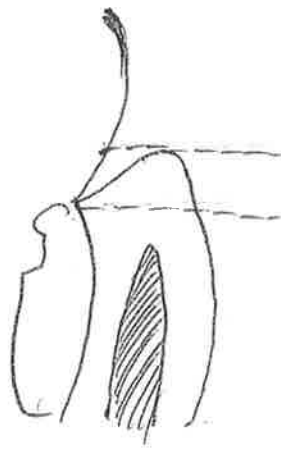
→ Oral epithelium

→ Sulcular epithelium

→ Junctional epithelium.

Junctional epithelium is derived from reduced enamel epithelium.

Junctional  
epithelium



} Sulcular epithelium }

} Oral  
epithelium }

Junctional epithelium lies beneath the sulcular epithelium

Junctional epithelium is attached to the enamel surface of the tooth.

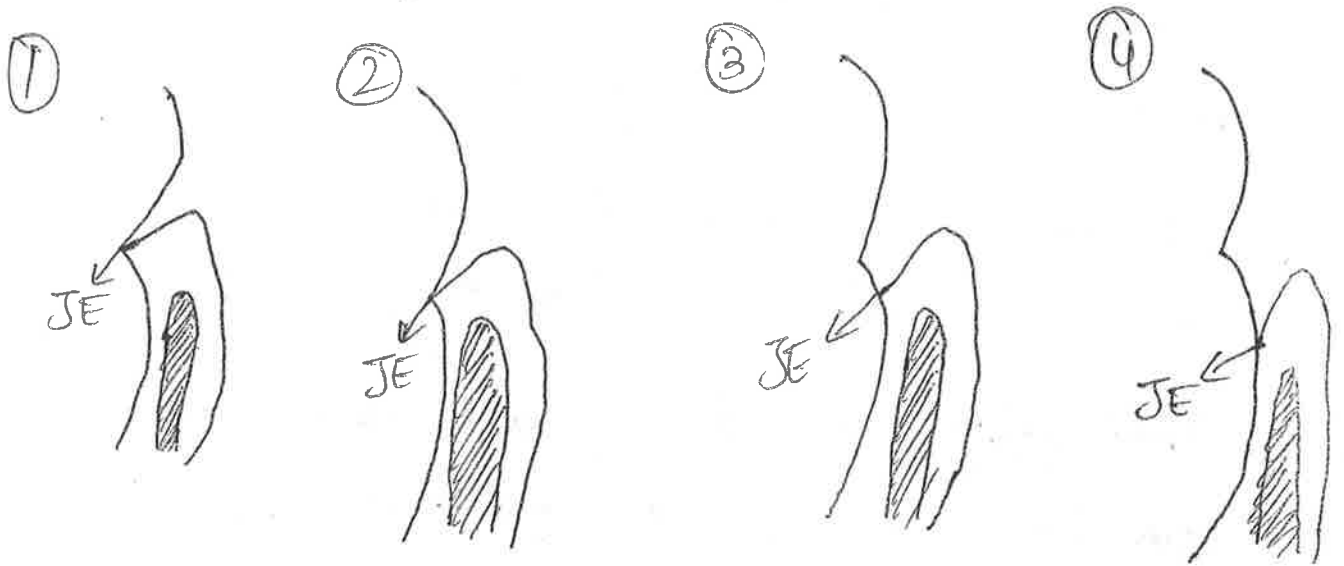
The main function of junctional epithelium is that it braces the free gingival sulcus with the tooth surface and provides rigidity to the gingival epithelium against the masticatory forces.

Microscopically, Junctional epithelium is made up of stratified squamous non-keratinized epithelium.

Types of cells present in the gingival epithelium are :-

- Keratinocyte - 90%
- Non-Keratinocytes
  - Langerhans cells
  - Merkel cells
  - Melanocytes.

Junctional epithelium is assessed in finding the passive eruption of the tooth which is a pathological event.



→ Connective tissue!

→ Lamina propria

→ Dense collagen network

→ Ground substance → proteoglycans  
 hyaluronic acid      chondroitin sulfate

→ Glycoprotein  
 Fibronectin      Laminin

→ cells present:

→ Fibroblasts

→ Plasma cells

→ Neutrophils

→ Lymphocytes

→ Mast cells

→ Macrophages

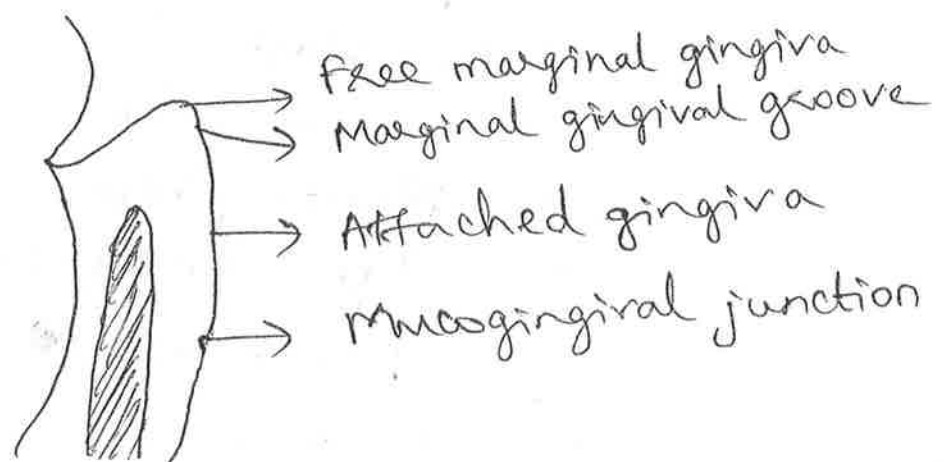
→ Phagocytes  
 cementocytes

## ② Attached gingiva.

- \* Attached gingiva is the part of gingiva from the free gingival margin till the mucogingival junction.
- \* It strongly covers the alveolar processes and acts like a collar to the tooth.
- \* Clinically, width of attached gingiva differs for various tooth as follows

	Incisor	Pre-Molar
Maxilla	3.5-4.5mm	1.9mm
Mandible	3.3-3.9mm	1.8mm

- \* Color of attached gingiva is coral pink with melanin pigmentation.
- \* Shape is determined with the contour of the proximal tooth surfaces.



### ③ Gingival fibres.

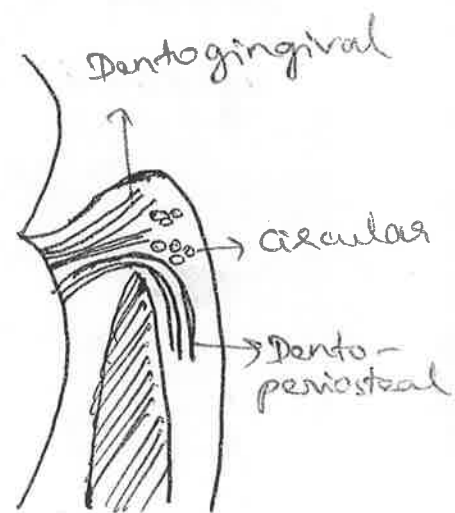
Gingival fibres helps in attaching the gingival epithelium to the tooth surface.

They are made up of type I collagen fibres.

They provide rigidity to the tooth surface and surrounding structures under masticatory forces.

There are different types of gingival fibres they are :-

- Dentogingival
- Alveolar
- Dentoperiosteal
- Transseptal
- Circular.



\* Contour - scalloped

\* Consistency - Firm and resilient

\* Surface texture - stippling present.

microscopically stippling are areas of prominences and depression on the tooth surface that is covered by the epithelium and it is a functional adaptation. Characteristic of healthy gingiva.

\* Histologically, attached gingiva is made of Keratinized squamous stratified epithelium, which has five layers:-

→ Stratum basale

→ Stratum spinosum

→ Stratum granulosum - Keratohyaline granules present.

→ Stratum corneum.

↳ shows pyknotic nuclei & lipid droplet

Connective tissue - Lamina propria

\* Significance :-

→ covers the alveolar process strongly

→ Firm and resilient to allow masticatory forces.

→ Stipplings aid in mastication

→ Protects the bone

## ④ Functions of PDL

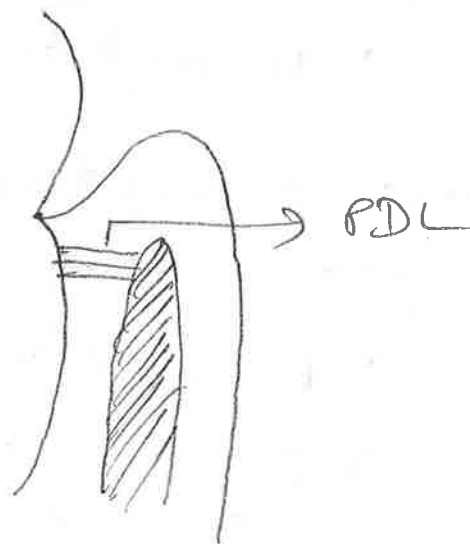
(i) Attachment of tooth to bone  
↳ terminal part is called Sharpey's fibres.

(ii) Nutritional support

(iii) Defensive function - with help of inflammatory cells like neutrophils, macrophages, lymphocytes, plasma cells.

(iv) Supports the tooth in socket under masticatory forces.

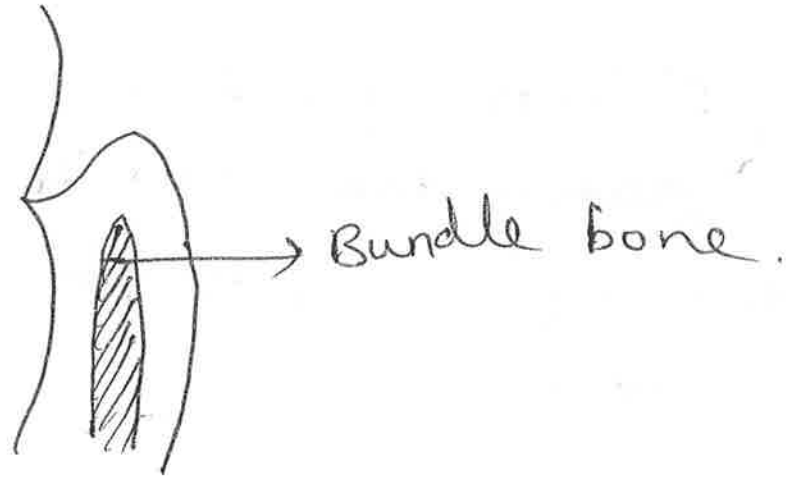
(v) Protection.





⑤ Bundle bone

Alveolar bone to which the periodontal ligament attaches to through Sharpey's fibres.



⑥ Classification of cementum

→ Acellular cementum

↳ primary cementum

↳ formed in unerupted tooth

→ Cellular cementum

↳ secondary cementum

↳ formed in erupted tooth.

↳ formed over the acellular cementum

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DATE: 15/12/22..

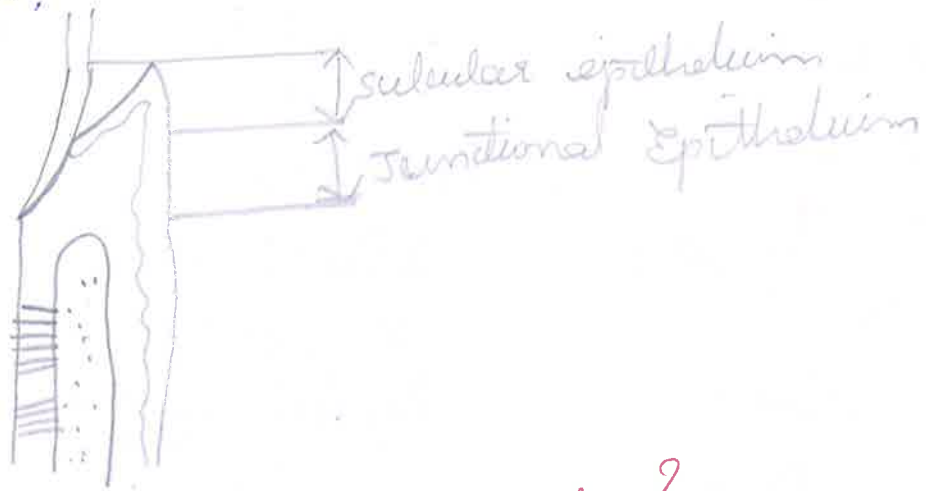
18 1/2  
30



## 1) Junctional Epithelium

It is the junction between tooth and gingiva.

Diagram



development: How does it develop?

Junctional Epithelium develops only after the tooth is completely erupted or in full occlusion.

dentogingival unit:

→ Junctional Epithelium along with gingival fibres...

# Histology:

## (i) Thickness

At early age, 3-4 layers thick

At later stages it is 10-20 layers thick

## (ii) layers of junctional Epithelium

### coronal layer

→ It is semipermeable layer  
Ex: to gut

→ histology

→ loosely arranged

### middle layer

→ It helps in attachment to tooth by hemidesmosomes present in junctional epithelium

### basal layer

→ Keratin forms from this layer.  
→ New cells comes from this layer

unique property of Junctional Epithelium  
It has 2 basement membranes

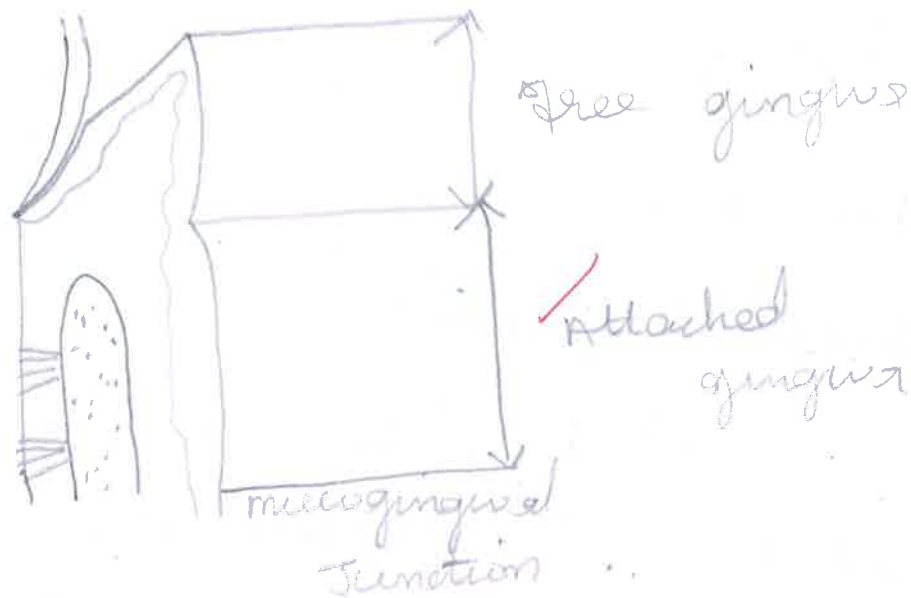
→ outer basement membrane  
→ inner basement membrane

2112

## 2) Attached gingiva :

- It is macroscopic
- shows stippling
- part of gingiva which is attached to underlying bone.

### → Diagram ..



→ Extent :  
It extends from marginal gingiva to mucogingival junction ..

### → Microscopic features :

→ Parakeratinized stratified squamous epithelium . ✓

### → Measurement clinically by

(i) Measurement test

(ii) Tension test which shows

whether attached gingiva is adequate or not.

→ significance:

(i) Acts as physical barrier to protect gingiva against masticatory forces.

(ii) Keeps marginal gingiva intact and prevents ~~from~~ deflection.

3) Functions of PDL:

(i) Physical function:

(i) Provides a soft tissue casing to protect vessels and nerves against mechanical forces.

(ii) Attachment of teeth to bone

(iii) Transmission of occlusal forces to bone

(iv) Shock absorption

(v) maintains relationship of gingiva to teeth.

## THEORIES:

### (i) TENSION THEORY:

When occlusal forces are acting, the PDL fibres get stretched and transmits the forces to alveolar bone causing elastic deformation of alveolar bone.

↓  
till the limit is reached  
↓  
Then forces are transmitted to lamellar bone.

### (ii) viscoelastic theory

Deformation/displacement of teeth is controlled by tissue fluids, fibres playing a secondary role.

When occlusal forces are acting, extracellular fluid passes from PDL to marrow space.

↓  
once tissue fluids are completed

↓  
~~steroid~~ Bundle fibres absorb shock and tighten

2  
↓  
stenosis of vessels

↓  
Back pressure of arteries

↓  
Ballooning of arteries and tissues are & replenished with fluids

(ii) FORMATIVE AND REMODELLING FUNCTIONS

The cells of PDL show formation and resorption of cementum, bone, ligament during physiologic tooth movement, during accommodation of periodontium to occlusal forces, during repair of injury.

The old cells are broken down and new cells are formed -  
Fibroblasts forms collagen -  
Residual mesenchymal cells forms cementoblasts and osteoblasts.

## iii) Nutritional and sensory functions

PDL has rich vascular supply and provides nutrition to cementum, gingiva, bone.

It has nerve supply and transmits pain, pressure, touch to higher centres.

The nerves follow course of vessels and enter PDL apically from alveolar bone through foramen plate.

↓  
A The nerve fibres divide into single myelinated fibres

↓  
later they lose myelin sheath and end in 4 types

→ free ending → pain transmission

→ Ruffini like cells → mechanoreceptors

→ Meissner corpuscles → mechanoreceptors

→ spindle vibratory and pressure endings



#### 4) Bundle bone:

It is a part of alveolar bone to which Sharpey's fibres are attached.  
→ kindhe.

It is named so because bundles of PDL fibres attach to ~~bone~~ bone and mineralise to form Sharpey's fibres.

It is restricted to lamellar bone.

It is present on distal surfaces of socket.

21/2 A unique characteristic is the scarcity of intercellular collagen fibrils.

On H&E staining, it stains darker and lighter on silver staining.

*Significance?* On radiography, due to presence of calcium salts, it appears more denser. *What is it called?*

## 5) classification of cementum

It is a avascular structure



Schroeder classified based on presence of cementocytes and fibrils or not.

### Acellular cementum

contains no cells ✓

coronal portion of root ✓

formed during root formation ✓

slow deposition ✓

### cellular cementum

cementocytes present ✓

apical portion of root ✓

formed after tooth eruption ✓

Rapid deposition ✓

## → Acellular cementum

### (i) Acellular AFibrillar cementum

→ contains no cells and no fibrils present ✓

→ Product of cementoblasts.

→ coronal portion of root.

Neucer → 1-15  $\mu$ m thickness

→ Acellular extrinsic fiber cementum  
contains extrinsic (Sharpey's) fibers as bundles and lacks cells formed from fibroblast and cementoblast.

30-230  $\mu\text{m}$  thickness.

cellular cementum

→ cellular mixed stratified cementum  
contains both intrinsic and extrinsic fibers.  
→ apical portion of root end formation area.  
→ product of cementoblasts and fibroblasts  
→ 100-1000  $\mu\text{m}$  thickness.

→ cellular intrinsic fiber cementum  
contains intrinsic fibers and cells formed from cementoblasts.

6) Gingival fibres:

connective tissue of marginal gingiva contains collagen fibres called gingival fibres.

They brace marginal gingiva against teeth.

It protects the gingiva and provides rigidity.

→ Dento-gingival fibres

→ present, buccal, lingual and interproximal areas.

→ on buccal and lingual surface, it projects from junction to crest and outer surface of marginal gingiva.

→ on interproximal surface, it projects to crest of interdental gingiva.

→ protects gingiva by attaching to tooth.

→ circular fibres

It course through facial and lingual surfaces and encircles the tooth in ring like fashion

→ Transseptal fibres

present and forms as horizontal bundles between cementum of approximating teeth

present at interproximal

areas. It protects the interdental bone and tooth to tooth contact.

→ semicircular fibres

It covers from proximal surface of one side of tooth through

buccally or lingually to proximal surface of other side.

→ Transgingival fibres

→ present in and around the tooth within attached gingiva

→ It helps in alignment of teeth in arches.