Sheet#: 1
Refer to slide: 1
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**Anatomy and histology of the periodontium
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Why do we talk about anatomy?

You can be an artist and you can do class I, cavity,.. etc. But if you want to be a doctor, you have to know everything, including physiology, anatomy, histology…etc.

Dacorte once said: divide each difficulty into as many parts as feasibly and necessary and resolve it.

Medicine is all about this state, but the problem with it is that those feasible and necessary parts will even have more parts.

Periodontal condition will determine our treatment plan, if we could maintain the tooth or not, use a crown, restorable tooth or not.

Periodontium includes:
1) Gingiva 2) cementum 3) PDL 4) Alveolar bone

All are connective tissue except the gingival which is both a connective tissue and epithelium tissue. Their origin Is the ectoderm (neural crest -> migration -> walls), and that’s why these compound differ from other parts of the body.

PDL: a connective tissue that resemble the connective tissue found in a fetus (same percentage of cells, fibers..etc).

To determine Tx, we should know:

* Structure (macroscopically, microscopically {*histologically}(*
* Development
* Physiology

Which help determine the diagnosis and prognosis (def: expectation over long term)

GINGIVA:
part of the mucosa of the GI tract and oral cavity, and is masticatory (keratinized), unlike the lining type which is non-keratinized, it covers the bone till the mucogingival junction.

Free gingival: keratinized (masticatory process) -> not attached to the underlying tissue. Gingiva covers the alveolar process and surrounds the cervical part of the tooth.

The part that surrounds the tooth is called “epithelium”, whereas the one on the opposing side is called “gingival”.

Free gingival margin -> free gingiva-> Gingival groove-> attached gingival -> alveolar mucosa -> oral cavity

“sulcular epithelium, junctional epithelium

Q) What maintains the junction between the gingival and the tooth surface?
Hemodesmosomes

Marginal gingival form free gingival margin -> marginal groove (unattached)

Gingival: forms barrier agains microorganisms (most important function) as a defense mechanism.

Marginal gingival can be separated by periodontal probe, (1.5-2 mm) can be normal to the CEJ.

Gingival sulcus depth is zero, in germ-free animals. Histologically, its depth ranges from 07-1.8 mm, averaging 2 mm. 3 mm probing depth is considered healthy.

INTERDENTAL PAPILLAE:
Shape depends on the contacts between teeth, shape of teeth, width of proximal surface, course of CEJ.

We have 2 types:

1. Pyramidal
2. Col (covered by non keratinized epithelium, feature is common with juntional epithelium(protective function))

ATTACHED GINGIVA:
Film/tightly bound to underlying priostium/ resilient/stipplings (orange-shape appearance)

Stippling usually disappears with inflammation, but if we can’t see it doesn’t mean that th gingival is inflamed. They aren’t always related.

Width=span (cervical-apical), it increases with age.

Lingually, gingival terminates to the lingual alveolar mucosa. (Mandible -> lining epithelium).

Palatallt there is no demarcation, since the palat is a masticatory mucosa.

EPITHELIUM:
Stratified squamous epithelium

1. Oral epithelium (free and attached gingival)
2. Gingival epithelium
 a. sulcular
 b. junctional (no rete pege -> healthy situation)
* Rete peges increase surface area to increase exchange (nutrition), and for cells to pass through for signaling purposes.
* Keratinization is differentiation process (ortho and para) decreases in activity.

a. basement membrane
lamina lucida/lamina densa/ fibers

b. desmosomes exist in junctional epithelium

Plasma proteins/ antibodies/antimicrobes

Oral epithelium

* Towards oral cavity
* Smaller size
* Intercellular space is smalles
* More desmosomes

Juntional epithelium

* Towards the tooth
* Larger cell size (maintin dynamic physiologic contact.)
* Larger intercellular space
* Less desmosomes

Fibroblast/mast cells/macrophages/collagen fibers/ oxytalon (elastic)

FIBERS:

* dentogingival fibers (coronal/horizontal/ apical)
* Interpapillary fibers
* Alveolar gingival fibers
* Transverse fibers?

Ground substance: contains cells/ fibers help in diffusion and cellular activity.

Describe the gingival:

* Colour (vascularity)
* Width
* Keratinization
* Any pigmentation Size (condition of gingival + vascular supply)
 a. Increase size -> hypertrophy
 b. Increase number of cells -> hyperplasia
* Contour (shape of teeth, alignment, bone level and proximal surface)
* Shape (interpapillae -> broad/ narrow)
* Consistency (collagen fibers)

Alveolar mucosa is movable.

PDL:
Has a glass appearance, connects tooth to root, increases with age.

Fibers:

1. Oblique fibers
2. Alveolar
3. Horizontal
4. Apical
5. Interradicular

(Fibers form with eruption and take their final position with apical third of the root formation)

Fibers come from both bone and cementum and then meet in the way.

Sharpe’s fibers: the part of PD fibers that’s is embedded in either cementum or bone.

CELLS:
Rest cells of Malassez (may have role in cyst formation)

PDL:

* maintains tooth against forces
* nutritional function
* sensory function
* transmitting occlusal forces to bone

CEMENTUM:
no nerves, no vessels

Acellular extrinsic fibers, cellular internsic fibers, cellular mix cementum (fibroblast from PDL and cementoblast)

Coronally very thin, thick apically.

CEJ:
alveolar bone

Maxillary -> palatally -> thicker

Mandible -> anteriorly -> lingually -> thicker
 -> posteroirly -> buccally -> thicker

D -> continuous bone loss

F -> window with no bone

Bone formation: osteoblast

Osteoclast has a different origin
osteoclast -> resorption -> osteoblast -> osteoid -> mineralization.

BLOOD SUPPLY:
supra-periosteal blood vessel (arterial plexus)

LYMPHATIC SYSTEM
~*know the drainage~*

Upper gingival -> deep cervical

Lower anterior gingival -? Submadibular

NERVE SUPPLY:
maxilla:
infraorbital : 5-5 (mainly canines)
infraoribital and posterior superior: premolars
superior palatine: palatally anteriors
greater palatine: palatally posteriors

 Mandible:
mental: mental foramen to mental foramen
buccal nerve: lower 6 and behind it.
sublingual nerve: lingually.