Periodontology- fourth stage

First semester-Periodontal pocket
Lec-9

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Out Line

1.Definition.

2.Classification.

3. Clinical Features

3.Periodontal pocket detection.

4.Probing technique

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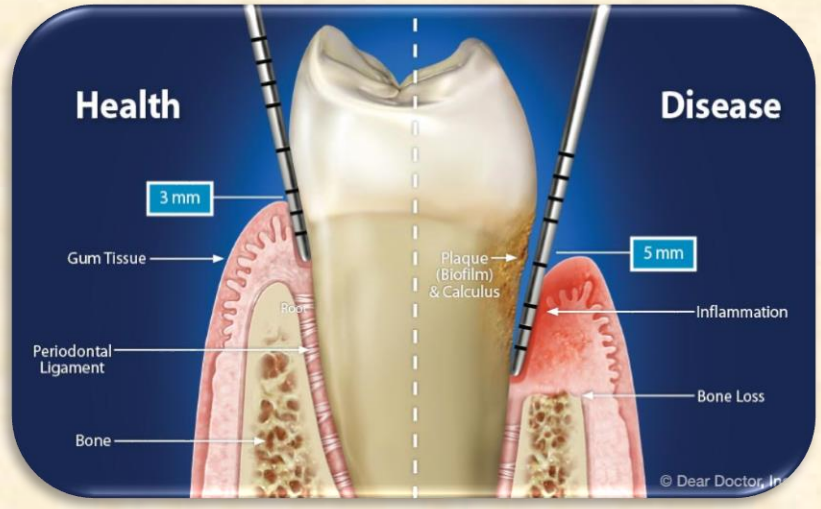
Definition

- **Gingival Sulcus :** is the shallow crevice or space around the tooth bounded by the surface of the tooth on one side and the epithelium lining the free margin of the gingiva on the other side. A healthy sulcular depth is 3 millimeters or less.

- **periodontal pocket**, which is defined as a pathologically deepened gingival sulcus.

✓ Deepening of the gingival sulcus may occur as a result of coronal movement of the gingival margin, apical displacement of the gingival attachment, or a combination of the two processes.

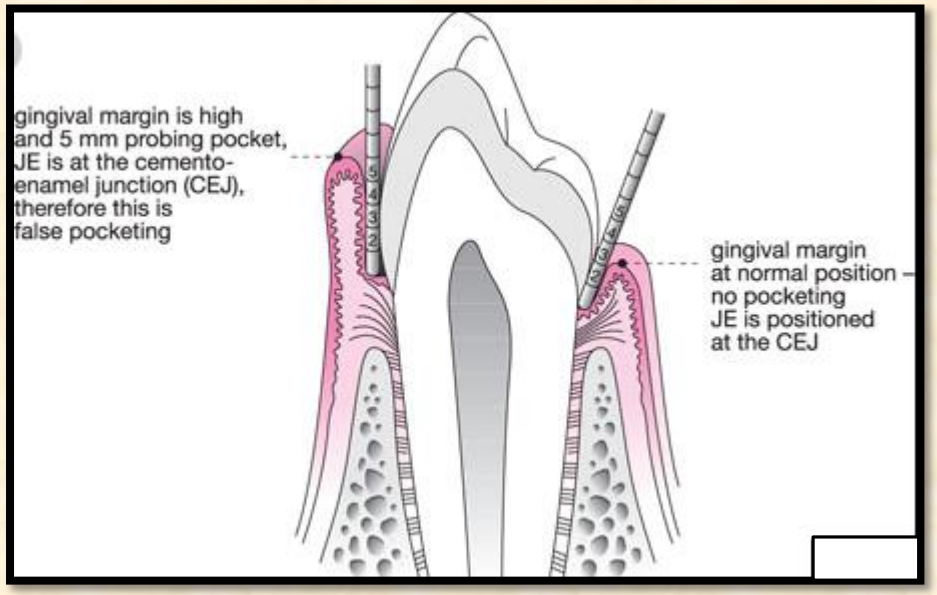


Classification

1. **According to its location as follows:**

A. Gingival pocket (also called "pseudo-pocket") is formed by gingival enlargement without destruction of the underlying periodontal tissues. The sulcus is deepened because of the increased bulk of the gingiva.

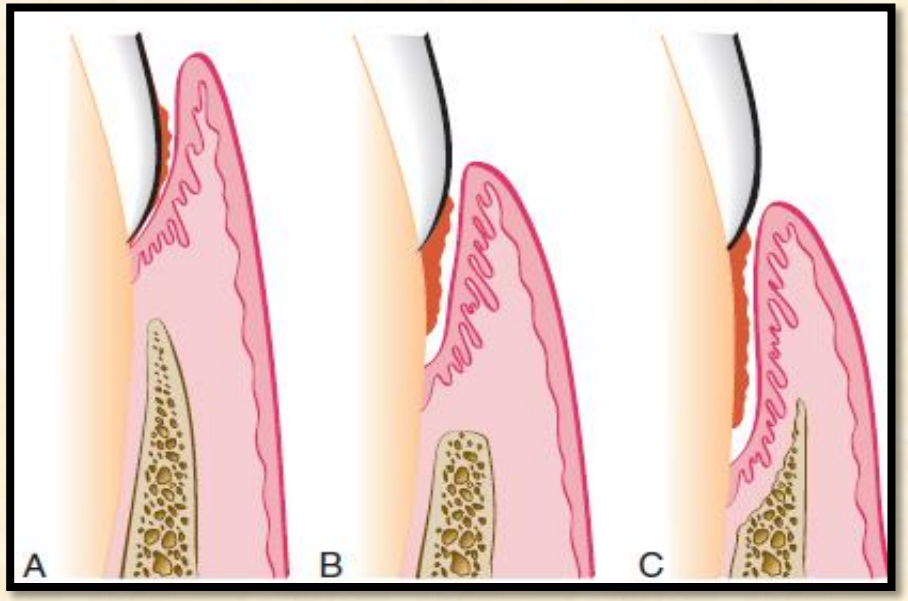
B. Periodontal pocket produces destruction of the supporting periodontal tissues, leading to the loosening and exfoliation of the teeth.



2. *According to its location to alveolar bone:*

- ***Intrabony* (*infrabony, subcrestal,* or *intraalveolar*)** occurs when the bottom of the pocket is apical to the level of the adjacent alveolar bone.

• ***Suprabony* (*supracrestal* or *supraalveolar*)** occurs when the bottom of the pocket is coronal to the underlying alveolar bone.



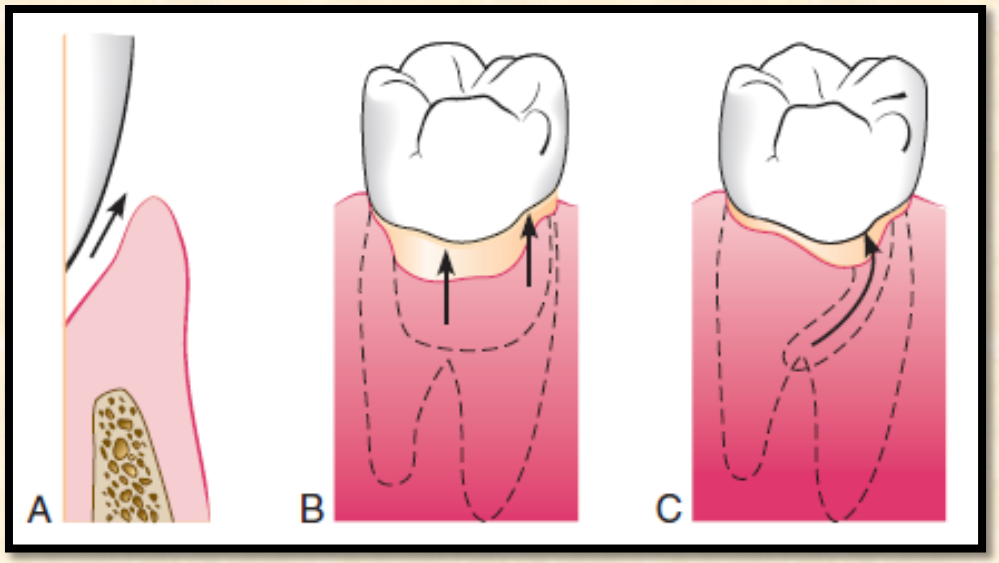
(A) Gingival pocket,(B) Suprabony pocket.
(C) Intrabony pocket.

3. According to involved tooth surfaces

(A) Simple pocket: involve one surface

(B) Compound pocket: involve more than one surface

(C) Complex pocket: originating on one tooth surface and twisting around the tooth to involve one or more additional surfaces.



Clinical Features

✓ Clinical signs that suggest the presence of periodontal pockets include:

- A bluish red thickened marginal gingiva.
- A bluish red vertical zone from the gingival margin to the alveolar mucosa.
- Gingival bleeding and suppuration.
- Tooth mobility.
- Diastema formation.
- Symptoms such as localized pain or pain “deep in the bone.

Diagnosis/detection of pocket

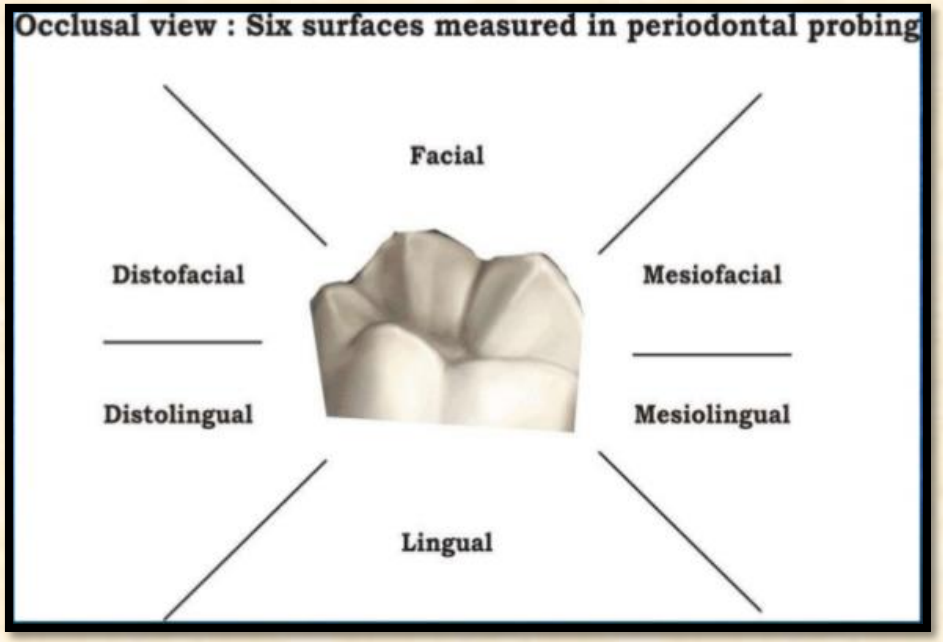
1. Careful exploration with periodontal probe. (This method is accurate).

2. Radiographic: pockets are not detected by the radiographic examination because Pockets are soft tissue changes.

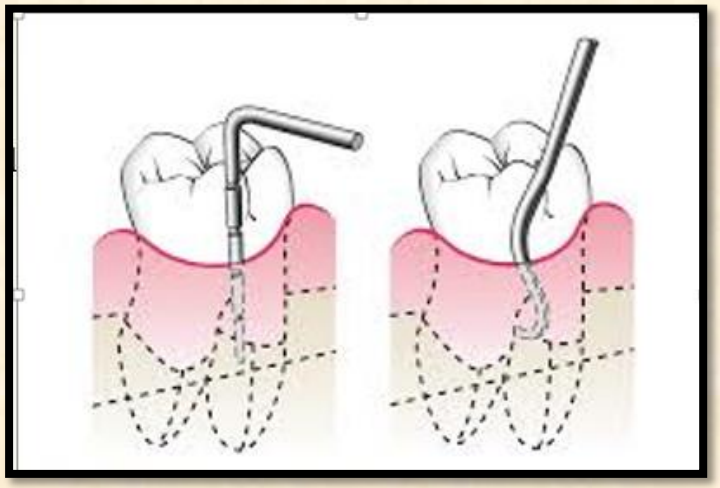
- A calibrated silver points or gutta percha points can be used with radiographic to assist in determining the level of attachment of periodontal pocket.

Probing techniques

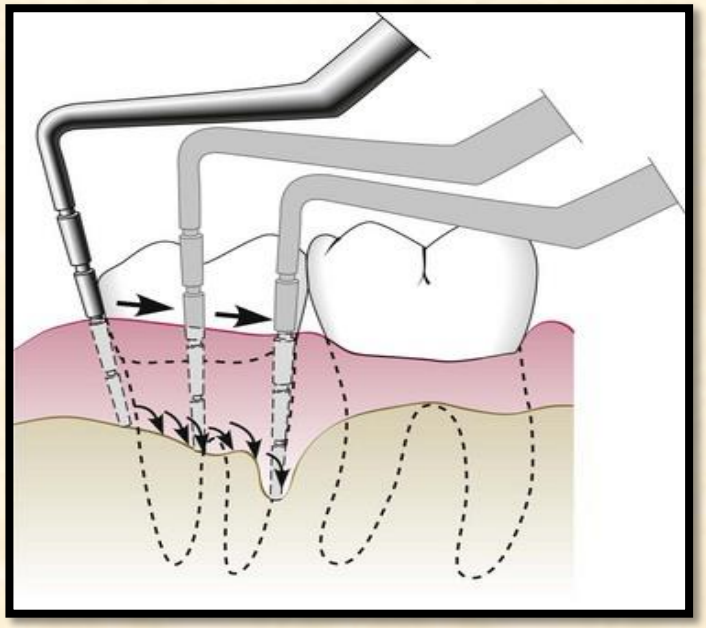
- Occlusal view :Six Surfaces measured in periodontal probe.



- In multirooted teeth, the possibility of furcation involvement should be carefully explored with specially designed probe (eg. Nabers probe).



- ✓ The probe should be inserted parallel to the vertical axis of the tooth and walked circumferentially around each tooth to detect the area of deepest penetration.



- To detect crater :the probe should be placed obliquely from both facial and lingual surfaces, so as to explore the deepest point of the pocket located beneath the contact point.

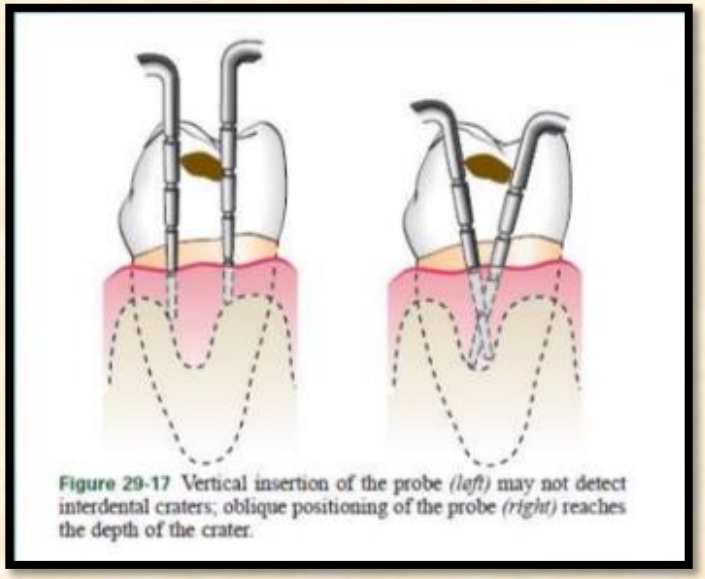


Figure 29-17 Vertical insertion of the probe *(left)* may not detect interdental craters; oblique positioning of the probe *(right)* reaches the depth of the crater.

Table: Correlation of Clinical and Histopathologic Features of the Periodontal Pocket

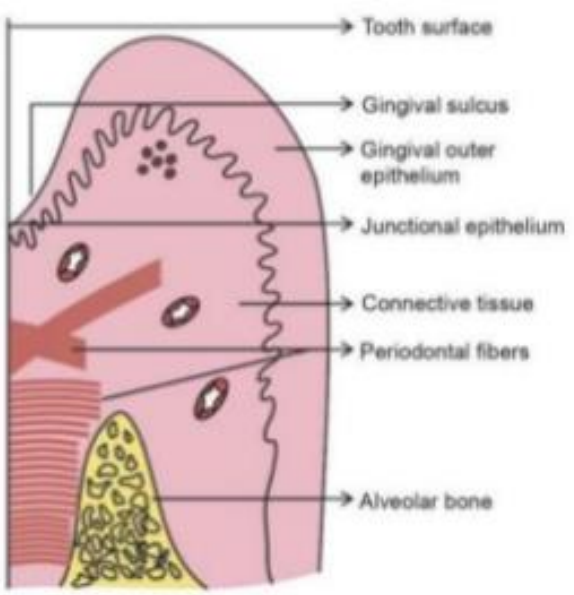
Clinical Features	Histopathologic Features
(A)1.The gingival wall of the pocket presents various degrees of bluish red discoloration. 2. Flaccidity. 3. smooth, shiny surface. 4. pitting on pressure.	1. caused by circulatory stagnation 2. Due to the destruction of gingival fibers and surrounding tissues 3. due to atrophy of the epithelium and edema . 4. Due to edema and degeneration.
(B)Less frequently, the gingival wall may be pink and firm	In such cases, fibrotic changes predominate over exudation and degeneration

Clinical Features	Histopathologic Features
(C) Bleeding is elicited by gently probing the soft-tissue wall of the pocket	Due to1-increased vascularity. 2- thinning and degeneration the epithelium. 3- proximity of engorged vessels to the inner surface
(D) probing is generally painful	caused by the ulceration of the inner aspect of the pocket wall
(E) pus may be expressed with the application of digital pressure.	Due to suppurative inflammation

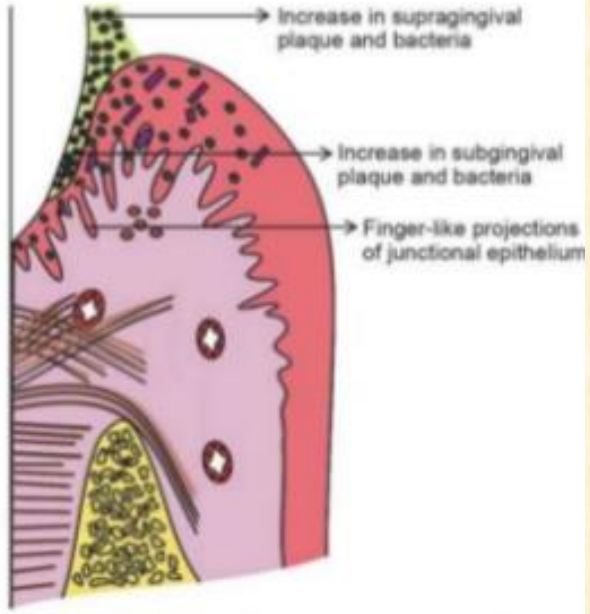
pathogenesis

- The initial lesion in the development of periodontitis is the inflammation of the gingiva in response to a bacterial challenge. Changes involved in the transition from the normal gingival sulcus to the pathologic periodontal pocket are associated with different proportions of bacterial cells in dental plaque.

- ✓ Accumulation of microorganisms on the supra gingival tooth surface and its extension into gingival sulcus.
- ✓ Inflammatory changes in the connective tissue wall of the gingival sulcus

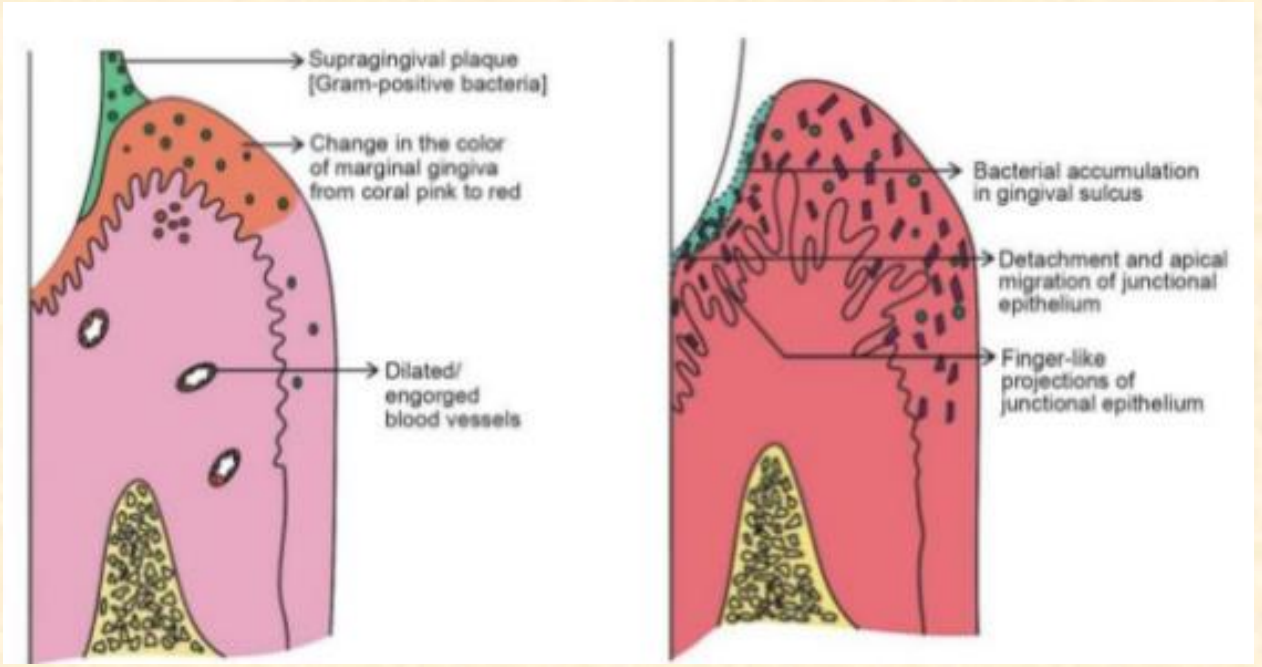


(1) Schematic illustration of normal gingiva



(2) Accumulation of supragingival plaque

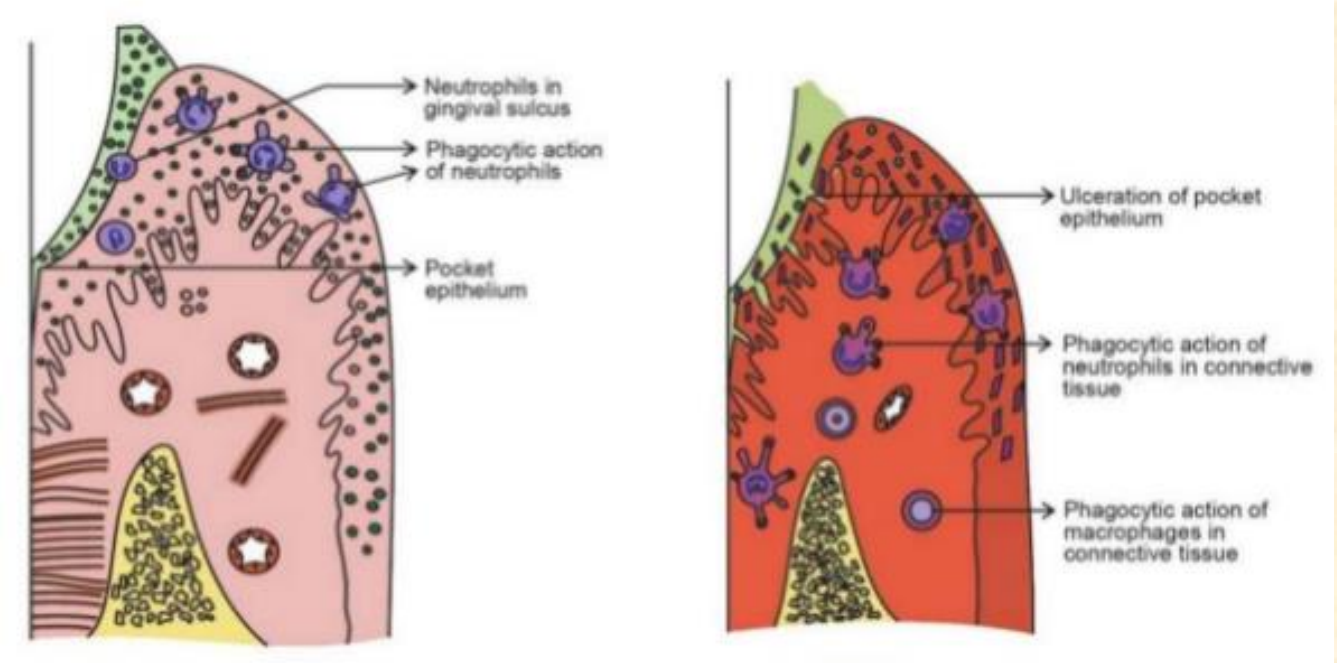
- ✓ Cellular and fluid inflammatory exudate causes degeneration of the connective tissue including the gingival fibers.
- ✓ Collagen fibers gets destroyed apical to the junctional epithelium and the area becomes occupied by the inflammatory cells and edema.
- ✓ The coronal portion of the junctional epithelium detaches from the root as the apical portion migrates.



(3) Extension of supragingival plaque into the gingival sulcus

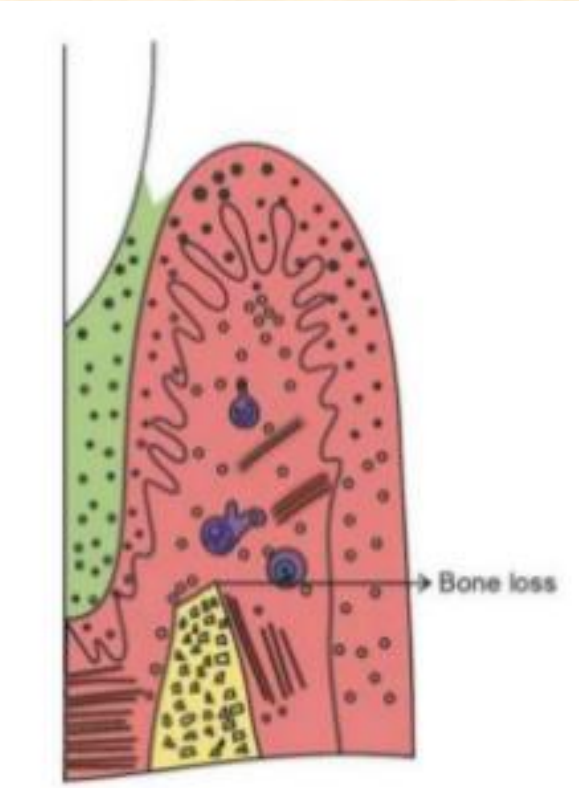
(4) Detachment and apical migration of junctional epithelium

- ✓ Polymorphnuclear neutrophils invade the coronal end of the junctional epithelium in increasing number.
- ✓ With continued inflammation the gingiva increase in bulk and the crest of the gingival margin extends coronally.



(5) Phagocytic action of neutrophils **(6) Ulceration of pocket epithelium**

- ✓ The junctional epithelium continues to migrate along the root and separate from the root.



(7) Periodontal pocket is established

Two mechanism of collagen loss

1. Collagenases and other enzymes secreted by fibroblasts, PMNs & Macrophages-MMPs became extracellular & destroy collagen.

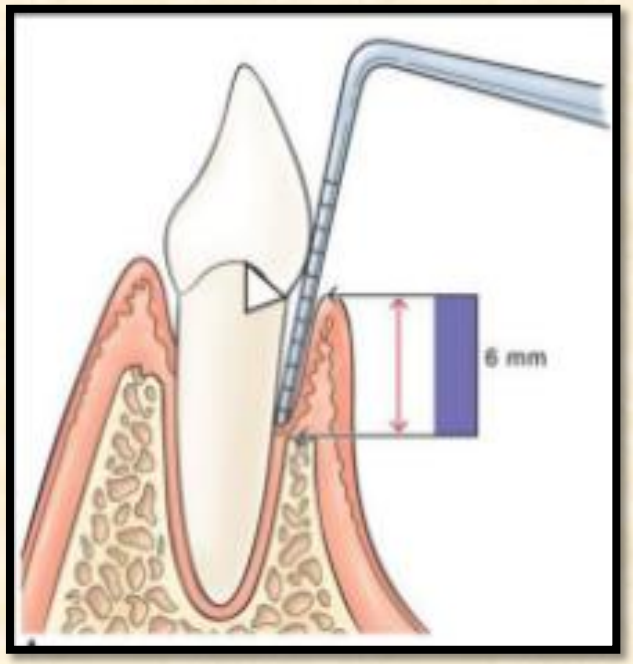
2. Fibroblasts phagocytize collagen fibers by extending cytoplasmic processes to the ligament–cementum interface and degrading the inserted collagen fibrils and the fibrils of the cementum matrix.

Histopathology

1. Soft tissue wall.

A. Epithelial changes: The epithelium of the lateral wall of the pocket presents striking proliferative and degenerative changes.

- Epithelium becomes degenerated and atrophied.
- Inner aspect of the lateral pocket walls becomes ulcerated.
- Pus occurs in the pocket with suppurative inflammation of the inner wall.



B. connective tissue changes

- The connective tissue is edematous and densely infiltrated with plasma cells (approximately 80%) ,lymphocytes and a scattering of PMNs.
- Blood vessels are increased in number , dilated and engorged particularly in sub epithelial connective tissue layer.
- The connective tissue exhibits varying degrees of degeneration. In addition to exudative and degenerative changes.

2. *Hard tissue wall of the pocket*

- Root surface forms the medial wall of the pocket. As the pocket deepens, collagen fibers embedded in the cementum are destroyed, and cementum becomes exposed to the oral environment .

- The root surface that get expose to the oral environment as a result of periodontal attachment loss, undergoes following changes (structural, chemical, cytological).

3. Pocket Contents

1. Microorganisms,
2. gingival fluid,
3. food remnants,
4. salivary mucin,
5. desquamated epithelial cells,
6. leukocytes,
7. Purulent exudate.

- ***Pus is a common feature of periodontal disease, but it is only a secondary sign***. It is not an indication of the depth of the pocket or the severity of the destruction of the supporting tissues.

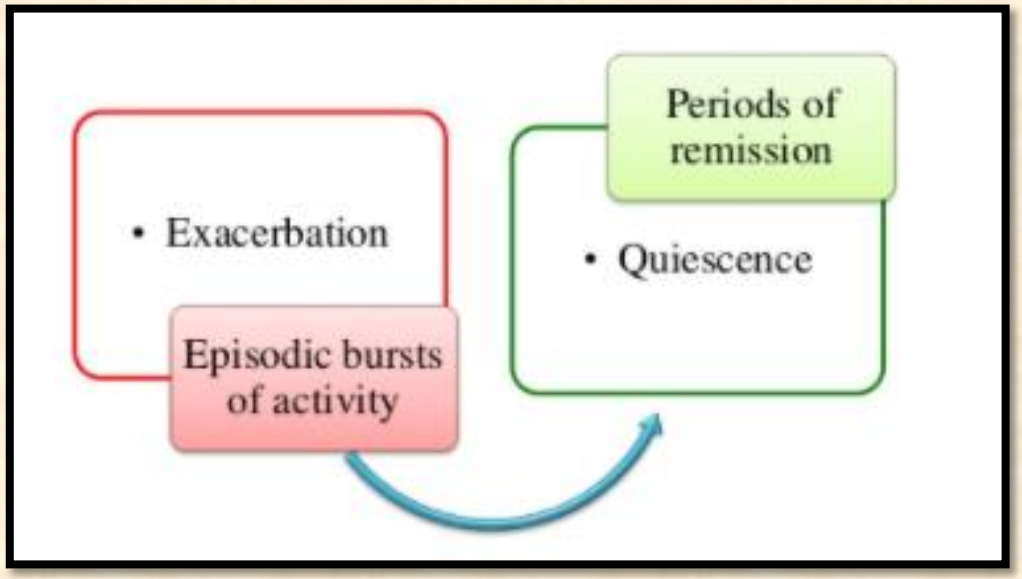
Periodontal Disease Activity

Periods of quiescence

- Characterized by a reduced inflammatory response
- little or no loss of bone and connective tissue attachment.

Periods of exacerbation

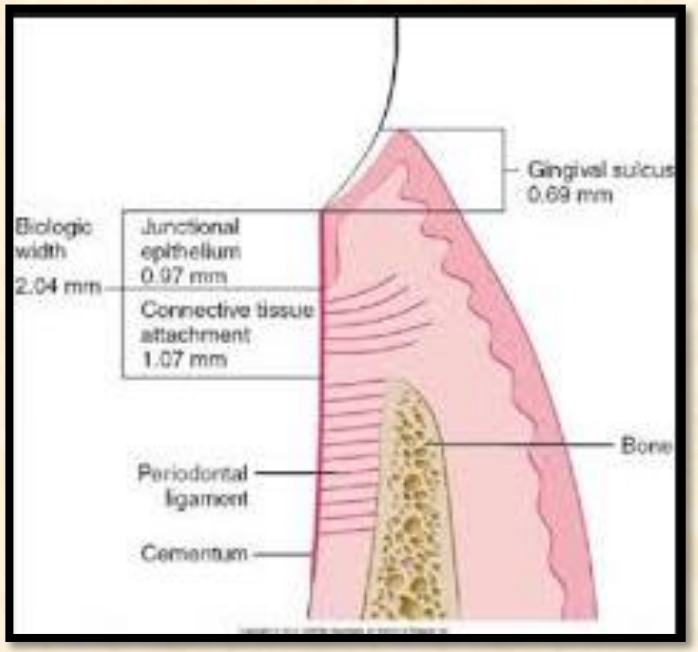
- bone and connective tissue attachment are lost and the pocket deepens.



Pocket probing

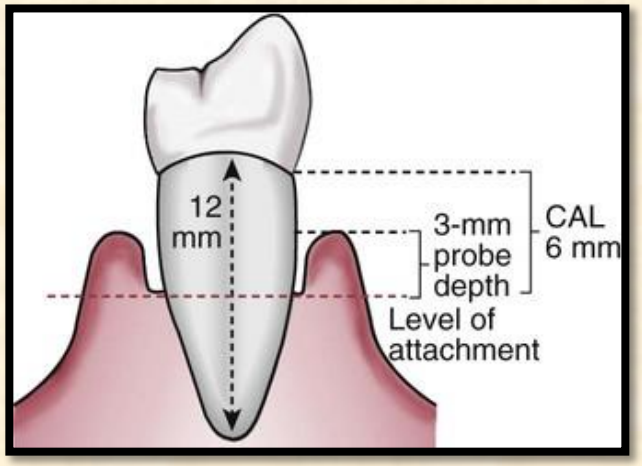
We have two different pocket depths:

1) **Biologic or histologic depth**: is defined as a dimension of the soft tissue attached to the portion of the tooth coronal to the crest of the alveolar bone. Measured histologically(accurate measurement but not used routinely).



- Sulcus depth: 0.69mm
- **Epithelium attachment: 0.97mm**
- **Connective tissue attachment:1.07mm**

2) **Clinical or probing depth**: distance to which a probe penetrates into the pocket.



✓ The standardized force used for penetration of probe is 25 pounds (0.75 N).

Management of periodontal pocket

- ***Treatment of pocket depends on the types of pocket***

Pseudo/gingival pocket

Scaling and root planing

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Re-evaluation and maintenance

↓ Persistent pocket

↓

Gingivectomy and gingivoplasty

True/periodontal pocket

Scaling and root planing

↓

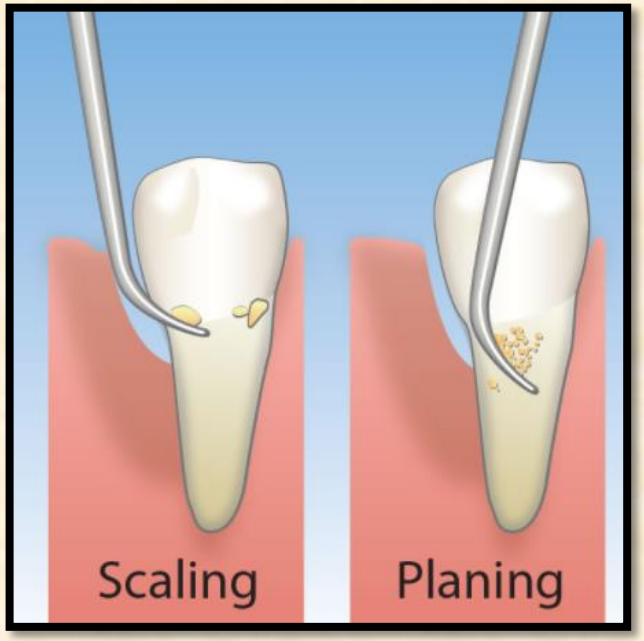
Re-evaluation and maintenance

↓

Removal of the pocket wall

↓

Removal of the tooth side of the pocket



Treatment of suprabony and infrabony pocket

Suprabony

Anterior teeth

↓

Scaling + root planing and maintenance

↓

Persistent pocket

↓

curettage

↓

Moderate to sever pocket

↓

Flap surgery utilizing cervicular incisions

Posterior teeth

↓

Scaling + root planing and maintenance

↓

Persistent pocket +inadequate access

↓

Flap surgery

Infrabony

↓

New attachment procedure