

Periodontal Examination and Diagnosis

((Proper diagnosis is essential to intelligent treatment))

Pockets

Is defined as pathologically deepened of gingival sulcus may occur by coronal movement of the gingival margin (gingival pocket), or apical displacement of gingival attachment (periodontal pocket) or combination of the above.

Gingival pocket : Also known as **pseudopocket** or **false pocket**, seen in gingivitis formed by gingival enlargement (increased gingival bulk) without apical migration of the junctional epithelium.

Periodontal pocket : True pocket seen in periodontitis, occurs with apical migration of junctional epithelium and destruction to the supporting periodontal tissues. It can classify into:

Suprabony pocket : bottom of the pocket is coronal to the underlying alveolar bone.

Infrabony pocket: bottom of the pocket is apical to the crest of the alveolar bone

The Signs and Symptoms and probing is the only reliable method of detecting pockets

Clinical signs

1- Color changes (bluish-red marginal gingiva or a bluish-red vertical zone that extends from the gingival margin to the attached gingiva)

2- Rolled edge separating the gingival margin from the tooth surface.

3-Enlarged, edematous gingiva may suggest their presence.

4-The presence of bleeding, suppuration, may also denote the presence of a pocket

Periodontal pockets are generally **painless**, but they may give rise to **symptoms** such as:-

- 1- Localized or sometimes radiating pain
- 2- The sensation of pressure after eating that gradually diminishes.
- 3- Foul taste in localized areas,
- 4- Sensitivity to hot and cold,
- 5- Toothache in the absence of caries is also sometimes present.

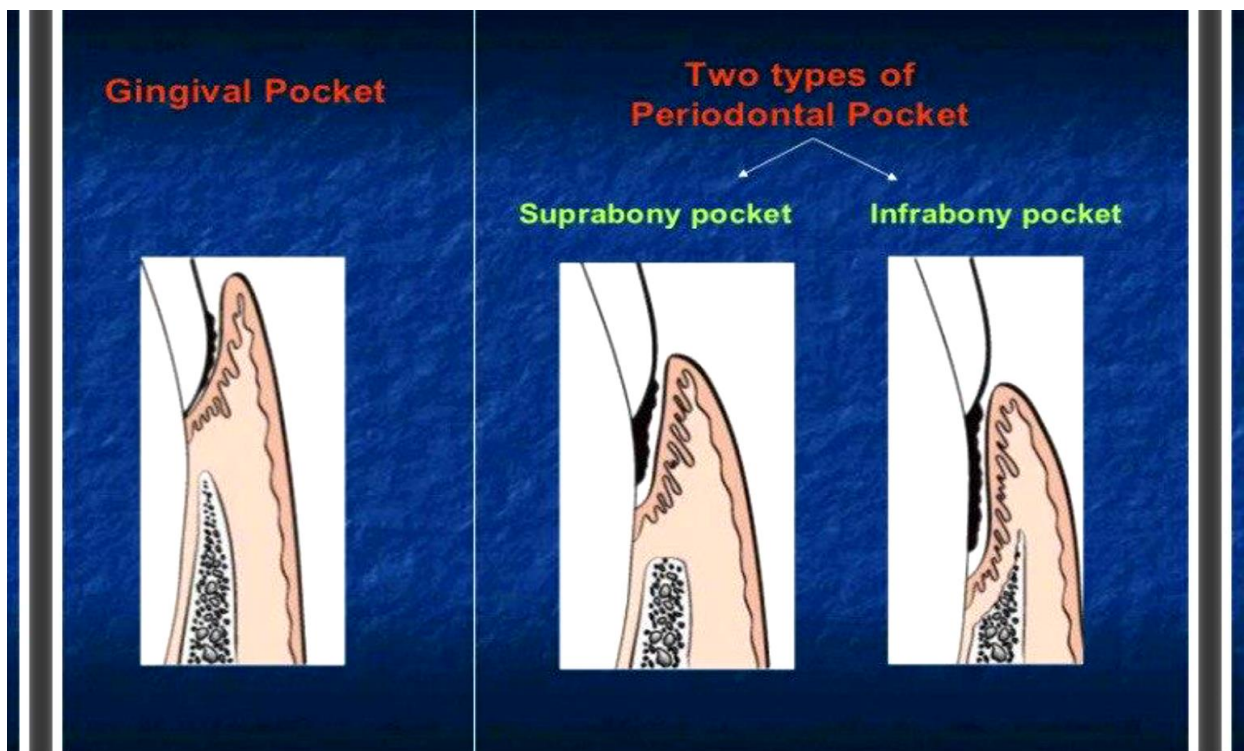


Fig. Gingival pocket Vs. Periodontal pocket

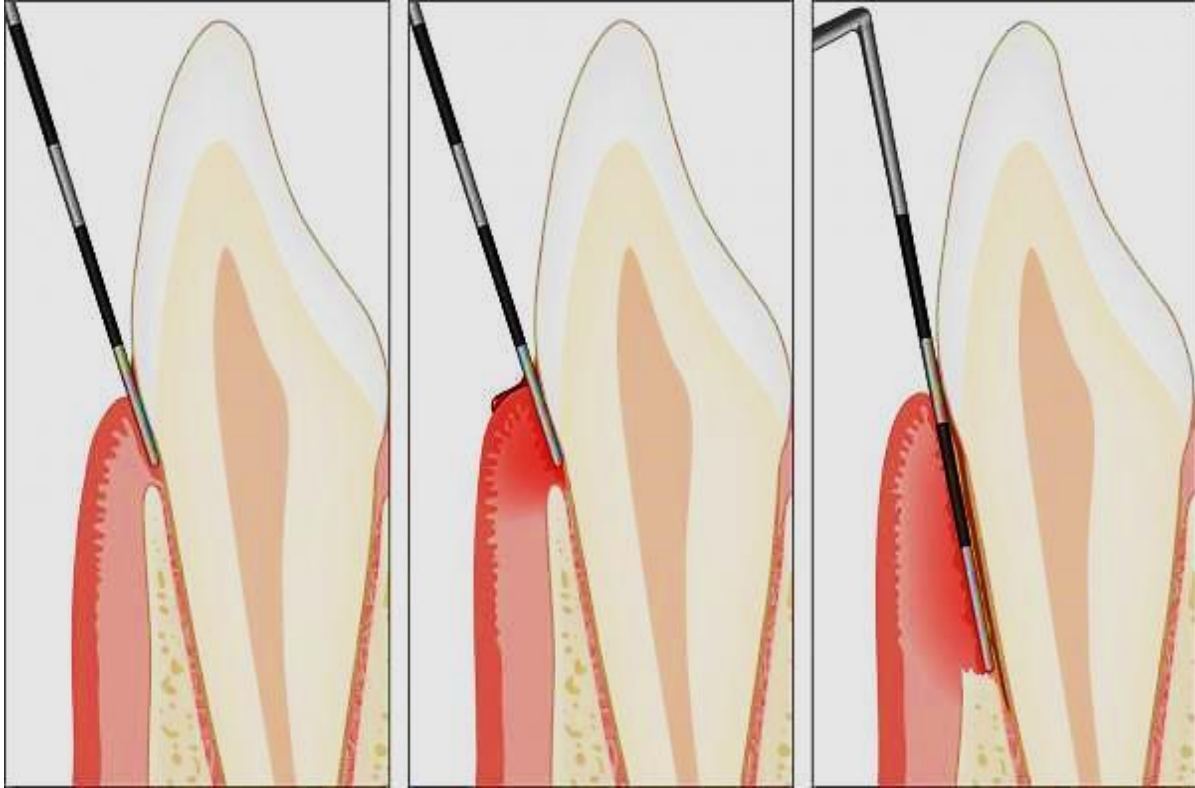


Fig. Gingival health and diseased.

Detection of Pockets

The only accurate method of detecting and measuring periodontal pockets is careful exploration with a periodontal probe. Pockets are not detected by radiographic examination. The periodontal pocket is a soft-tissue change. Radiographs indicate areas of bone loss in which pockets may be suspected, but they do not show pocket presence or depth, and consequently they show no difference before and after pocket elimination unless bone has been modified. Gutta-percha points or calibrated silver points can be used with the radiograph to assist with determining the level of attachment of the periodontal pockets.

There are two different pocket depths:

- (1) The biologic or histologic depth
- (2) The clinical or probing depth

The biologic depth is the distance between the gingival margin and the base of the pocket (i.e., the coronal end of the junctional epithelium). This can be measured only in carefully prepared and adequately oriented histologic sections.

The probing depth is the distance to which a probe penetrates into the pocket.

Probe penetration can vary, depending on the

- 1-force of introduction,
- 2-the shape and size of the probe tip,
- 3- the direction of penetration,
- 4-the resistance of the tissues,
- 5-the convexity of the crown,
- 6-the degree of tissue inflammation.

The probing forces have been explored by several investigators forces of **0.75 N** have been found to be well tolerated and accurate.

Probing Technique

The probe should be inserted parallel to the vertical axis of the tooth and “walked” circumferentially around each surface of each tooth to detect the areas of deepest penetration in addition, special attention should be directed to detecting the presence of interdental craters and furcation involvements.

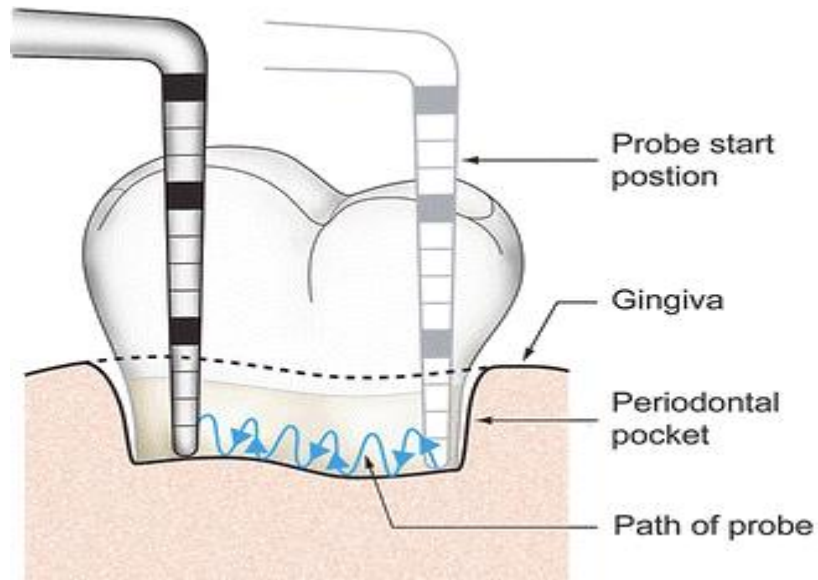
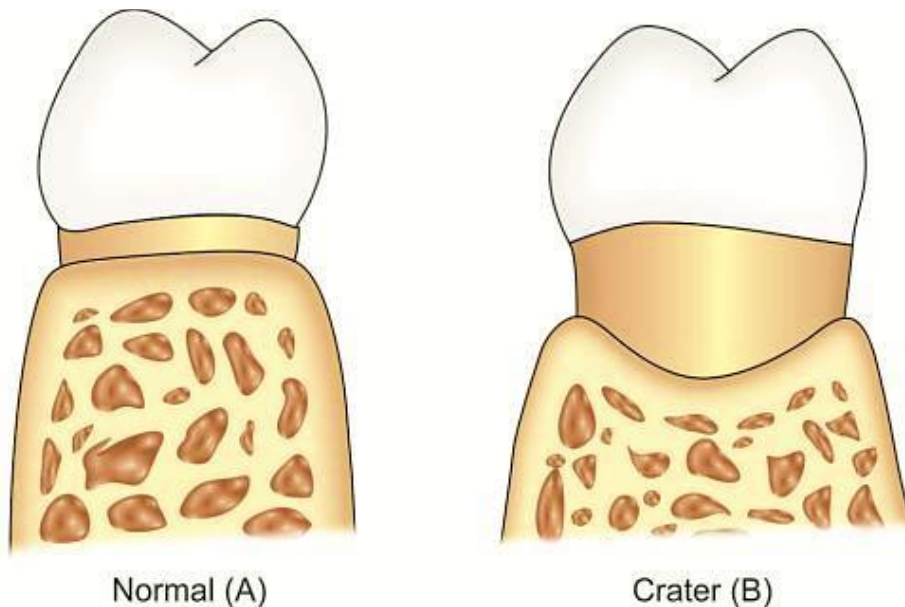


Fig. probing technique

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



Normal (A)

Crater (B)

Fig. Interdental crater.

In multi-rooted teeth, the possibility of furcation involvement should be carefully explored. The use of specially designed probes (e.g., **Nabers probes**) allows for an easier and more accurate exploration of the horizontal component of furcation lesions.

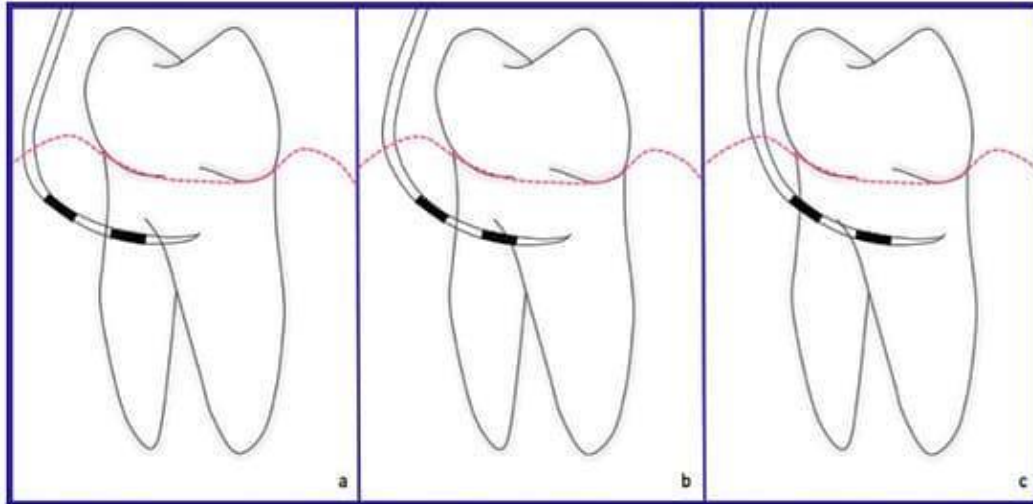


Fig. Furcation involvement.

Level of Attachment Versus Pocket Depth.

Pocket depth (PD) is the distance between the base of the pocket and the gingival margin. It may change from time to time, even in patients with untreated periodontal disease, as a result of changes in the position of the gingival margin. Therefore, it may be **unrelated** to the existing attachment of the tooth.

The level of attachment (clinical attachment level (**CAL**)) is the distance between the base of the pocket and a **fixed point** on the crown, such as the cementoenamel junction (**CEJ**). Changes in the level of attachment can be the result of a gain or loss of attachment, and they can afford a **better indication** of the degree of periodontal destruction or gain.

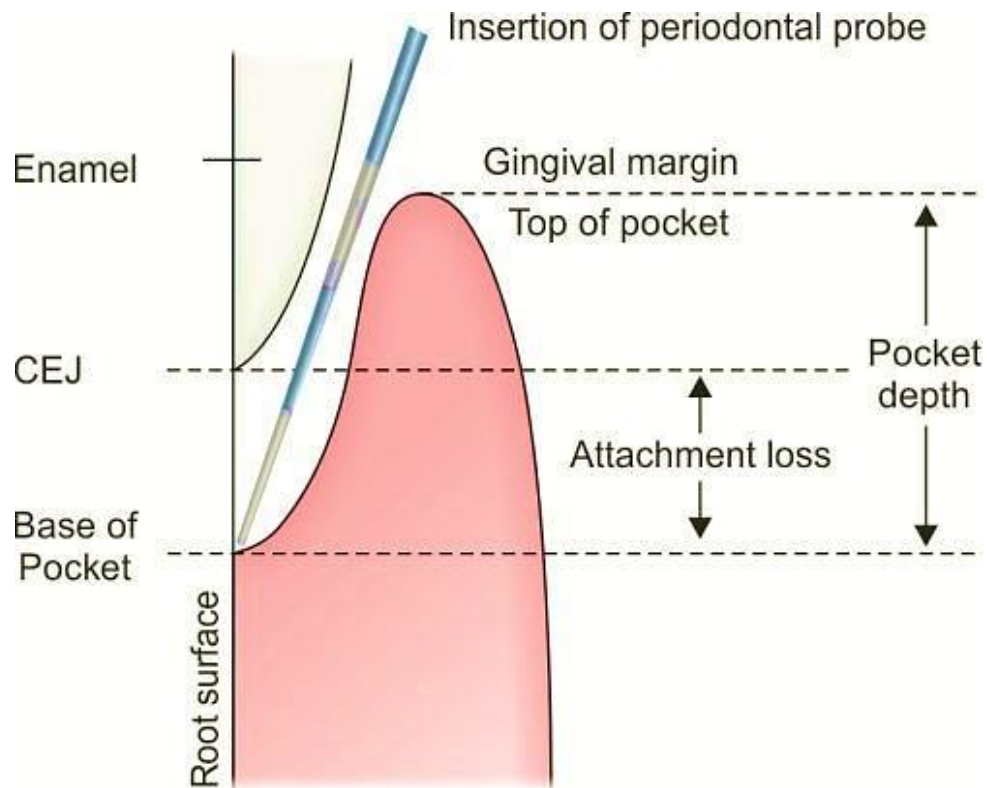


Fig. Level of Attachment Vs. Pocket Depth.

Determining the Level of Attachment

- ☒ When the gingival margin is located **on the clinical crown**, the level of attachment is determined by **subtracting** from the depth of the pocket (the distance from the gingival margin to the CEJ). If both are the same, the loss of attachment is zero.
- ☒ When the gingival margin **coincides** with the CEJ, the loss of attachment equals the pocket depth.
- ☒ When the gingival margin is located **apical** to the CEJ, the loss of attachment is greater than the pocket depth. Therefore, the distance between the CEJ and the gingival margin should be added to the pocket depth.

Amount of Attached Gingiva

It is important to establish the relationship between the bottom of the pocket and the mucogingival line. The width of the attached gingiva is the distance between the mucogingival junction and the projection on the external surface of the bottom of the gingival sulcus or the periodontal pocket. The width of the attached gingiva is determined by subtracting the sulcus or pocket depth from the total width of the gingiva (i.e., the gingival margin to the mucogingival line). This is done by stretching the lip or cheek to demarcate the mucogingival line while the pocket is being probed.

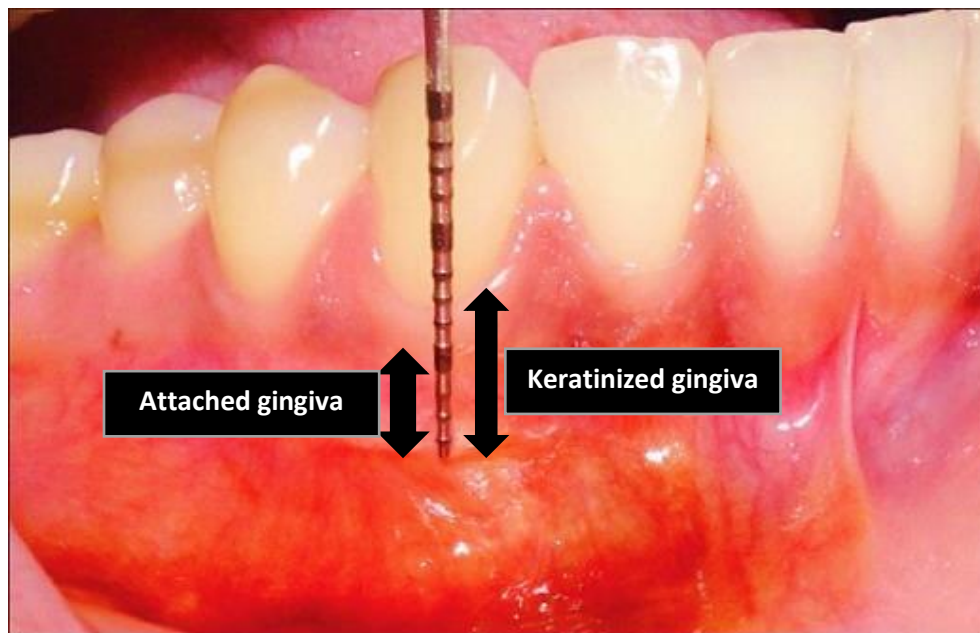


Fig. The width of attached and keratinized gingiva.

The amount of attached gingiva is generally considered to be insufficient when the stretching of the lip or cheek induces the movement of the free gingival margin.

Alveolar Bone Loss

Alveolar bone levels are evaluated via both **clinical and radiographic** examination. Probing is helpful for determining the following:

- (1) the height and contour of the facial and lingual bones, which are obscured on the radiograph by the roots
- (2) the architecture of the interdental bone.

Trans-gingival probing which is performed after the area is anesthetized, is a more accurate method of evaluation, and it provides additional information about bone architecture.



Fig. Trans-gingival probing.

Is there a difference between horizontal and vertical bone loss?

- If the level of the bone is essentially equal interdentally, it is called horizontal bone loss and measured as the percentage of bone lost (e.g., 20% of the original bone height is lost).

- Vertical/angular bone loss occurs when one tooth has lost more bone than the tooth next to it and is suggested when the bone crest is more apical to the CEJ adjacent to one tooth than to the other



Fig. 1- Angular bone loss, 2-Furcation involvement, 3-Horizontal bone loss.

Suppuration.

The presence of an abundant number of neutrophils in the gingival fluid transforms it into a purulent exudate. Clinically, the presence of exudate in a periodontal pocket is determined by placing the ball of the index finger along the lateral aspect of the marginal gingiva and applying pressure in a rolling motion toward the crown

Periodontal Abscess.

A periodontal abscess is a localized accumulation of exudate within the gingival wall of a periodontal pocket. Periodontal abscesses may be acute or chronic. The acute periodontal abscess appears as an ovoid elevation of the gingiva along the

lateral aspect of the root . The gingiva is edematous and red, with a smooth, shiny surface. The shape and consistency of the elevated area vary; the area may be domelike and relatively firm, or it may be pointed and soft. In most cases, exudate may be expressed from the gingival margin with gentle digital pressure.

The acute periodontal abscess is accompanied by symptoms such as

- ❖ Throbbing, radiating pain, and tenderness of the gingiva to palpation.
- ❖ Other symptoms may include sensitivity of the tooth to palpation; tooth mobility and lymphadenitis;
- ❖ Less frequently, systemic effects such as fever, leukocytosis, and malaise.
- ❖ Occasionally the patient may have symptoms of an acute periodontal abscess without any notable clinical lesion or radiographic changes.

The **chronic periodontal abscess** usually presents a sinus that opens onto the gingival mucosa along the length of the root. There may be a history of intermittent exudation. The orifice of the sinus may appear as a difficult-to-detect pinpoint opening, which, when probed, reveals a **sinus tract** that leads deep into the periodontium.

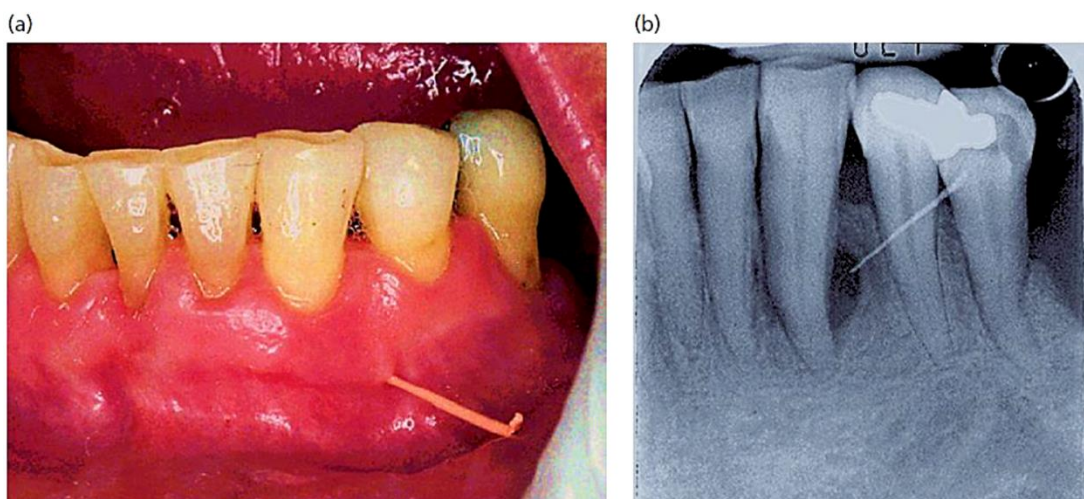


Fig. Chronic periodontal abscess (sinus tract).

The chronic periodontal abscess is usually asymptomatic. However, the patient may report episodes of dull, gnawing pain; a slight elevation of the tooth; and a desire to bite down and grind the tooth.

Periodontal Abscess and Gingival Abscess

The principal differences between the periodontal abscess and the gingival abscess are location and history .

The gingival abscess is confined to the marginal gingiva, and it often occurs in previously disease-free areas. It is usually an acute inflammatory response to the forcing of foreign material into the gingiva.

The periodontal abscess involves the supporting periodontal structures, and it generally occurs during the course of chronic destructive periodontitis.

Periodontal Abscess and Periapical Abscess.

If the tooth is **non-vital**, the lesion is most likely periapical. However, a previously nonvital tooth can have a deep periodontal pocket that can abscess. Moreover, a deep periodontal pocket can extend to the apex and cause pulpal involvement and necrosis. Radiographic findings are helpful for differentiating between a periodontal lesion and a periapical lesion. Ordinarily, a radiolucent area along the lateral surface of the root suggests the presence of a periodontal abscess, whereas apical rarefaction suggests a periapical abscess.

Periodontal abscess	Periapical abscess
1-Associated with a preexisting periodontal pocket.	1-The offending tooth may have large restoration. The tooth may have no periodontal pocket or, if present, it probes as a narrow defect.
2-Tests show vital pulp.	2-Tests show nonvital pulp.
3-Swelling usually includes gingival tissue, with fistula in lateral wall of the tooth.	3-Swelling is often localized to the apex, with a fistulous tract reach to apical region.
4-Pain is usually dull and localized.	4-Pain is often severe and difficult to localize.
5-Sensitivity to percussion may or may not be present.	5-Sensitivity to percussion is noted.

Fig. Comparison between periodontal and periapical abscess.