

Diagnosis of periodontal diseases

Proper diagnosis is essential to intelligent treatment. Periodontal diagnosis should first determine whether disease is present then identify its type, extent, duration, distribution and severity.

Periodontal diagnosis is determined after careful analysis of the case history and evaluation the clinical signs and symptoms, as well as the result of various tests (probing, mobility assessment, radiographs, blood test, and biopsies).

The following is a recommended sequence of procedures for the diagnosis of periodontal diseases.

Overall Appraisal of the patient. This includes consideration of the patient's mental, emotional status, attitude and physiologic age.

- **Medical History**

The importance of the medical history should be explained to the patients because patients omit information that they cannot relate to their dental problems. The patient should be made aware of:

1. The presence of conditions that may require special precautions or modifications in treatment procedure.
2. The possible role that some systemic diseases, conditions, may play in the cause of periodontal disease
3. The possibility that oral infections may have a powerful influence on the occurrence and severity of certain systemic disease

The Medical history should include reference to the following:

- Is the patient under the care of a physician, and if so what is the problem? Its duration and nature.
- Details on hospitalization and operation including diagnosis, kind of operation, and complications.
- Medical problem hematologic, endocrine, infectious, cardiovascular
- The medications taking with special inquiry should be made regarding the dosage and duration of therapy with anticoagulant and corticosteroids.
- History of allergy recorded like fever, asthma, sensitivity to food.
- Family medical history including bleeding disorders and diabetes or others.
- Abnormal bleeding tendencies such as nose bleeding, abnormal ecchymosis, prolonged bleeding from minor cut and excessive menstrual bleeding.

Dental History

Current illness some patients may be unaware of any problem but many may report bleeding gum; loose of teeth; spreading of the teeth with the appearance of spaces where none existed before, foul test in the mouth.

Sensitivity when chewing, sensitivity to cold & hot, and extreme sensitivity to inhaled air. A preliminary oral examination is done to explore the source of the patient's chief complaint and to determine if emergency treatment is required.

The Dental History should include reference to the following:

- **A list** of visit to the dentist, frequency, date of the last visit, nature of treatment and cleaning by a dentist.
- The patient's oral hygiene regimen including tooth brushing (frequency, method, type of tooth brush and dentifrices) mouth wash, interdental brush, water irrigation and dental floss.
- Any orthodontic treatment, duration & termination date.
- Pain in the teeth or in the gingiva (nature, duration& how its relieved)
- Gingival bleeding (spontaneously , on brushing or eating)
- A bad test in the mouth.
- Do the teeth feel "loose" or insecure? Is there difficulty in chewing? Any tooth mobility should be recorded.
- The patient's general dental habits such as grinding or clenching of the teeth during the day or at night. Do the teeth or jaw muscles feel "sore" in the morning? Are there other habits such as tobacco smoking or chewing, nail biting, or biting on foreign objects?
- History of previous periodontal problems, including the nature of the condition and if previously treated, the type of treatment received (surgical or nonsurgical) and approximate period of termination of previous treatment
- Does the patient wear any removable prosthesis? Does the prosthesis enhance or is it a detriment to the existing dentition or the surrounding soft tissues?
- Does the patient have implants replacing any of the missing teeth?

Intraoral Radiographic Survey

The radiographic survey should consist of a minimum of 14 intraoral films and four posterior bite-wing films. Panoramic radiographs are a simple and convenient method of obtaining a survey view of the dental arch and surrounding structures. They are helpful for the detection of developmental anomalies, pathologic lesions of the teeth and jaws, and fractures as well as dental screening examinations of large groups. They provide an informative overall radiographic picture of the distribution and severity of bone destruction in periodontal disease, but a complete intraoral series is required for periodontal diagnosis and treatment planning.

Radiographic image tend to underestimate the severity of bone loss, the difference between the alveolar crest height and the radiographic appearance range from 0-1.6mm mostly accounted for x-ray angulation.

Casts

Casts from dental impressions are useful adjuncts in the oral examination. They indicate

- The position of the gingival margins (recession)
- The position and inclination of the teeth
- Proximal contact relationships, and food impaction areas.
- They provide a view of the lingual-cuspal relationships.

Casts are important records of the dentition before it is altered by treatment. Finally, casts also serve as visual aids in discussions with the patient and are useful for pretreatment and posttreatment comparisons, as well as for reference at recall visits. They are also helpful to determine the position of implant placement if the case will require their use.

Clinical Photographs

Color photographs are useful for recording the appearance of the tissue before and after treatment.

Oral Examination

Oral Hygiene

The extent of accumulated food debris, plaque, and tooth surface stains. Disclosing solution may be used to detect plaque that would otherwise be unnoticed. The amount of plaque detected, however, is not necessarily related to the severity of the disease present. For example, aggressive periodontitis is a destructive type of periodontitis in which plaque is minimal. Qualitative assessments of plaque are more meaningful, and their value in diagnosis.

Oral Malodor

Oral malodor, also termed fetor ex ore, fetor oris, or halitosis, is foul or offensive odor emanating from the oral cavity. Mouth odors may be of diagnostic significance, and their origin may be either oral or extraoral. It may indicate patient with systemic diseases (Liver disease, DM, tonsillitis ,oropharynx& stomach)

Examination of Lymph Nodes

1. Because periodontal, periapical, and other oral diseases may result in lymph node changes, the diagnostician should routinely examine and evaluate head and neck lymph nodes.
2. Lymph nodes can become enlarged and/or indurated as a result of an infectious episode, malignant metastases, or residual fibrotic changes.
3. Inflammatory nodes become enlarged, palpable, tender, and fairly immobile. The overlying skin may be red and warm.
4. Patients are often aware of the presence of “swollen glands.” Primary herpetic gingivostomatitis, necrotizing ulcerative gingivitis (NUG), and acute periodontal abscesses may produce lymph node enlargement.

Examination of the Teeth and Implants

- The teeth are examined for caries, poor restorations, developmental defects, anomalies of tooth form, wasting, hypersensitivity, and proximal contact relationships.
- The stability, position, and number of implants and their relationship to the adjacent natural dentition is also examined.

Periimplantitis

- ***Can create pockets around implants. Probing is important in diagnosis***
- ***To prevent scratching the implant surface we should use plastic instrument.***

Dental Plaque & Calculus

- + Supragingival plaque and calculus can be directly observed.
- + Detection of subgingival calculus each tooth surface is carefully checked to the level of gingival attachment
- + Warm water is useful to deflect the gingiva and aid in visualization of calculus.

Wasting Disease of the Teeth

Wasting is defined as any gradual loss of tooth substance characterized by the formation of smooth, polished surfaces. The forms of wasting are:

erosion, abrasion, attrition & Abfraction.

- ***Erosion:***

- also called corrosion, is a sharply defined wedge-shaped depression in the cervical area of the facial tooth surface
- The surfaces are smooth, hard, and polished. Erosion generally affects a group of teeth.
- In the early stages, it may be confined to the enamel, but it generally extends to involve the underlying dentin, as well as the cementum.
- The etiology of erosion is not known. Decalcification by acidic beverages, or citrus fruits, combined with the effect of acid salivary secretion are suggested causes.

- ***Abrasion :***

- ***R***efers to the loss of tooth substance induced by mechanical wear other than that of mastication.
- Abrasion results in saucer-shaped or wedge shaped indentations with a smooth, shiny surface.
- Abrasion starts on exposed cementum surfaces rather than on the enamel and extends to involve the dentin of the root. A sharp “ditching” around the cemento-enamel junction appears to be the result of the softer cemental surface, as compared with the much harder enamel surface.

Tooth brushing with an abrasive dentifrice, Aggressive tooth brushing and hard tooth brush are the most common causes.

Horizontal brushing at right angles to the vertical axis of the teeth results in the severest loss of tooth substance.

- ***Attrition:***

- Is occlusal wear resulting from functional contacts with opposing teeth. Such physical wear patterns may occur on incisal, occlusal, and approximal tooth surfaces.
- A certain amount of tooth wear is physiologic, but accelerated wear may occur when abnormal anatomic or unusual functional factors are present.
- Occlusal or incisal surfaces worn by attrition are called facets.
- When active tooth grinding occurs, the enamel rods are fractured and become highly reflective to light. Thus shiny, smooth, and curvilinear facets are usually the best indicator of ongoing frictional activity.
- If dentin is exposed, a yellowish brown discoloration is frequently present
- Facets vary in size and location depending on whether they are produced by physiologic or abnormal wear. Facets are usually not sensitive to thermal or tactile stimulation.
- Attrition has been correlated with age when older adults are considered.

The angle of the facet on the tooth surface is potentially significant to the periodontium. ** Horizontal facets tend to direct forces on the vertical axis of the tooth, to which the periodontium can adapt most effectively. ** Angular facets direct occlusal forces laterally and increase the risk of periodontal damage.

Abfraction:

** Results from occlusal loading surfaces causing tooth flexure and mechanical microfractures and tooth substance loss in the cervical area.

Examination of the Periodontium

The periodontal examination should be systematic, starting in the molar region in either the maxilla or the mandible and proceeding around the arch. This prevents overemphasis of unusual findings at the expense of other conditions that although less striking, may be equally important. It is important to detect the earliest signs of gingival and periodontal disease.

Gingiva

The gingiva is the keratinized mucosa that surrounds the teeth. It forms a collar around each tooth. The gingiva is typically coral pink in color and can be readily distinguished from the adjacent dark red alveolar mucosa by its lighter pink color. In dark-skinned persons the gingiva may contain melanin pigment to a greater extent than the adjacent alveolar mucosa. Localized gingival inflammation is confined to the gingiva in relation to a single tooth or group of teeth. Generalized gingival inflammation involves the entire mouth. Features of the gingiva to consider are: color, size, contour, consistency, surface texture, position, ease of bleeding, and pain .

Color changes in the gingiva.

The normal gingival color is —coral pink. Gingiva becomes redder when there is an increase in vascularization or the degree of epithelial keratinization becomes reduced or disappears. Thus, chronic inflammation intensifies the red or bluish red color; this is caused by vascular proliferation and reduction of keratinization owing to epithelial compression by the inflamed tissue

Changes in the size of the gingiva.

The normal size depends on the sum of the bulk cellular and intercellular elements, and their vascular supply. In disease, the size is increased, which can be termed as gingival enlargement. The factors responsible for this are increase in fibers and decrease in cells as in the non-inflammatory type. Whereas in the inflammatory type there will be increase in cells and decrease in fibers

Changes in the consistency of the gingiva.

Both chronic and acute inflammations produce changes in the normal firm, resilient consistency of the gingiva. In chronic gingival inflammation both destructive (edematous) and reparative (fibrotic) changes coexist, and the consistency of the gingiva is determined by their relative predominance

Gingival Index (GI) (Loe, 1967) measures the degree of gingival inflammation. Tissues surrounding each tooth divided into 4 gingival scoring units: distal facial papilla, facial margin, mesial facial papilla, lingual gingival margin.

Score of gingival index

Score 0 Normal gingiva

Score 1 Mild inflammation — slight change in color, slight edema. No bleeding on probing

Score 2 Moderate inflammation — redness, edema and glazing. Bleeding on probing

Score 3 Severe inflammation — marked redness and edema. Ulceration. Tendency to spontaneous bleeding

The GI may be used for the assessment of prevalence and severity of gingivitis in populations, groups and individuals.

Gingival bleeding. Gingival bleeding varies in severity, duration and the ease with which it is provoked. Bleeding on probing is easily detectable clinically and therefore is of great value for the early diagnosis and prevention of more advanced gingival inflammation. Gingival bleeding on probing is one of the earliest visual signs of inflammation. It can appear earlier than color changes or any other visual signs of inflammation. It also provides an additional advantage, by being a more objective sign that requires less subjective estimation by the examiner. Gingival bleeding on probing also helps us to determine whether the lesions are in an active or inactive state.

Bleeding on probing (BOP). A periodontal probe is inserted to the —bottom of the gingival/periodontal pocket by applying light force and is moved gently along the tooth (root) surface. If bleeding is provoked upon retrieval of the probe, the site examined is considered —BoP — positive and, hence, is inflamed.

Plaque Index:

Clinical plaque indices are used to evaluate the level and rate of plaque formation on tooth surfaces, and to test the efficacy of oral care products for removal and prevention of plaque deposits from these surfaces. A number of different indices have been described

- which was introduced by Silness and Loe in 1964
 - ❖ Used on all teeth (28, wisdom teeth are excluded) or selected teeth (6 teeth) .
 - ❖ No substitution for any missing tooth.
 - ❖ Used on all surfaces (4)(M, B, D, L).
 - ❖ This index measures the thickness of plaque on the gingival one third of the teeth.
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- **0** No plaque
 - **1** A film of plaque adhering to the free gingival margin and adjacent area of the tooth, which can not be seen with the naked eye. But only by using disclosing solution or by using probe.
 - **2** Moderate accumulation of deposits within the gingival pocket, on the gingival margin and/ or adjacent tooth surface, which can be seen with the naked eye.
 - **3** Abundance of soft matter within the gingival pocket and/or on the tooth and gingival margin.
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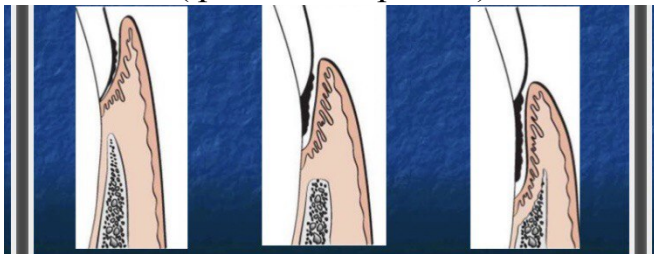
Calculus Index (CI)

Calculus is mineralized material on the tooth surface. The calculus index refers to the amount of calculus on a tooth.

- CI 0 — No observable calculus.
- CI 1 — Supragingival calculus covering not more than 1/3 of the exposed tooth surface.
- CI 2 — Supragingival calculus covering more than 1/3 but not more than 2/3 of the exposed tooth surface or presence of flecks of subgingival calculus.
- CI 3 — Supragingival calculus covering more than two-thirds of the exposed tooth surface or a continuous heavy band of subgingival calculus around the cervical portion of the tooth.

Depth of sulcus. The normal sulcus depth usually 1–3 mm

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.



pockets are generally painless but may give rise to symptoms such as localized or sometimes radiating pain or sensation of pressure after eating, which gradually

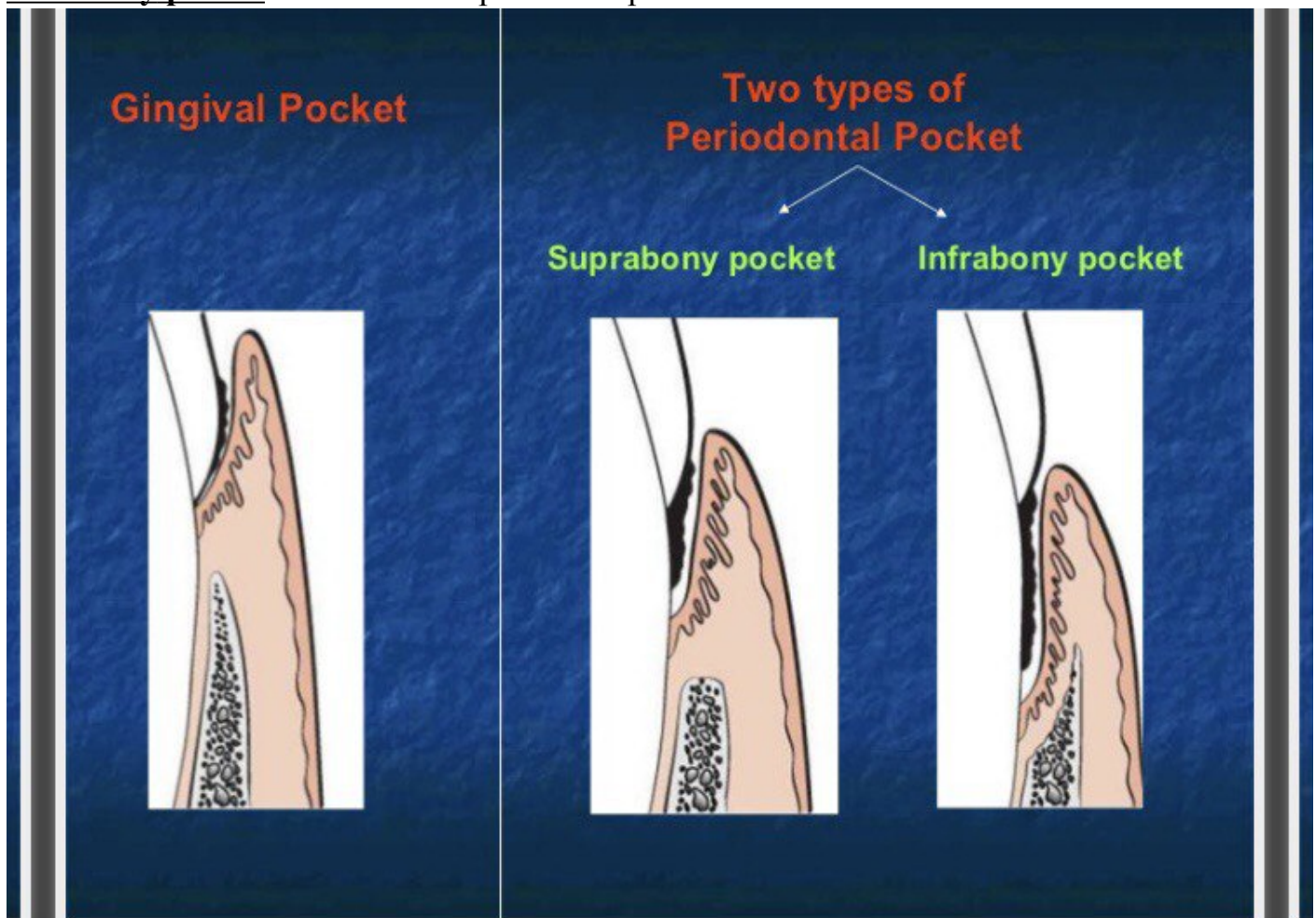
diminishes. A foul taste in localized areas, sensitivity to hot and cold, and toothache in the absence of caries is also sometimes present. a “rolled” edge separating the gingival margin from the tooth surface; or an enlarged, edematous gingiva, may suggest their presence. The presence of bleeding, suppuration, and loose, extruded teeth may also denote the presence of a pocket

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



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

Assessment of probing pocket depth (PPD). For effective treatment planning, the location, topography, and extent of periodontal lesions must be recognized in all part of the dentition. It is, therefore, mandatory to examine all sites of all teeth for the presence or absence of periodontal lesions. 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. This turn means that single-rooted teeth have to be examined at four sites at least (e. g. mesial, buccal, distal, and oral) and multirooted teeth at six sites at least (e. g. mesiobuccal, buccal, distobuccal, distooral, oral, and mesio-oral) *The probing depth, that is the distance from the gingival margin to the bottom of the gingival sulcus/pocket, is measured to the nearest millimetre by means of a graduated periodontal probe.*

Clinical Attachment Level (CAL) : is amore accurate indicator of the periodontal support around the tooth than probing depth alone

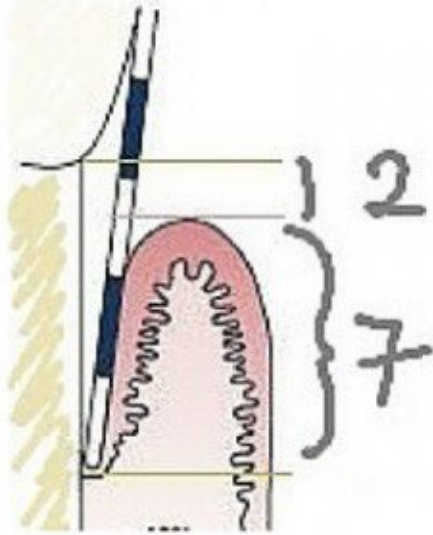
CAL is measured from a fixed point on the tooth that doesn't change, the CEJ.

To calculate CAL, two measurements are needed:

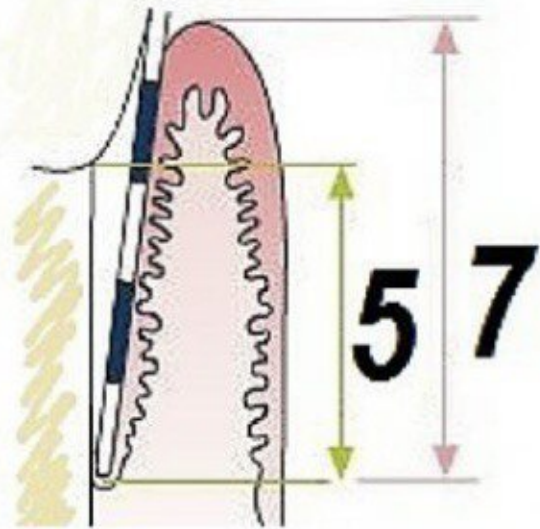
- In recession : probing depth + gingival margin to the CEJ (add)
 - In tissue overgrowth : probing depth – gingival margin to the CEJ(subtract)
- . Changes in the level of attachment can be the result of gain or loss of attachment and afford a better indication of the degree of periodontal destruction or gain

Periodontology

CAL, Subtract OR Add?



In recession: (+)



Overgrowth: (-)