Diagnosis of periodontal diseases

- It is the art of identifying a condition or disease and differentiating it from other condition. –FA Carranza

- It is the art of chronological organisation and critical evaluation of the information obtained of the patients history, clinical examinations and lab investigations so as to identify the disease type and etiology.

- A correct diagnosis leads us to a correct treatment plan.

Case history

- Case history can be defined as a systematic collection of data from the patient regarding his/her personal, medical, family or any other data which helps in case analysis, diagnosis and treatment.

- Case history is the first and probably the most important step in treatment of the patient.

- A properly taken case history always leads to a provisional diagnosis which is almost every time correct and coincide with the final diagnosis confirmed by special investigations.

Biographic and Demographic information:

- Name-
- Age-
- Gender-
- Social status-
- Address-
- Occupation-

Chief complaint

- Symptoms described and recorded in patients own words.
  - bleeding gums;

Tikrit University College of Dentistry
http://cdn.tu.edu.iq/
➢ loose teeth;
➢ Spreading of the teeth with the appearance of spaces
➢ Foul taste in the mouth
➢ Itchy feeling in the gums
➢ Pain of varied types and duration, including:
  • Constant, dull, gnawing pain;
  • Dull pain after eating;
  • Deep radiating pains in the jaws;
  • Acute throbbing pain;
  • Sensitivity when chewing; sensitivity to hot and cold;
  • Burning sensation in the gums;

MEDICAL HISTORY
• Importance of medical history should be explained to patients as they usually omit information due to lack of awareness.
• So patient should be made aware of role of systemic disease and condition in periodontal conditions.
• A complete history of hospitalization and surgery should be provided.
• Any history of allergy or adverse drug reaction should be provided.
• Any other medical problems.
• Abnormal bleeding tendencies.
• A list of all medications taken by the patient.
• Patient’s family medical history.

DENTAL HISTORY
• A list of dental visits should be supplied, including:
Frequency, date of most recent visit, oral prophylaxis by dentist including frequency and date of most recent cleaning.

- Patient’s oral hygiene regimen should be noted, including:
  - Tooth brushing frequency, method, type of tooth brush.
- Patient’s general dental habits such as clenching and grinding habit.
- Orthodontic treatment.
- Any sort of previous periodontal problems.
- Reasons for previous tooth loss.

**Personal history**

- Diet
- Adverse habits-smoking, alcohol
- Oral hygiene practices

**Intraoral Radiographic Survey**

- The radiograph is a valuable aid in the diagnosis of periodontal disease, determination of prognosis and evaluation of the outcome of the treatment. It is an adjunct to the clinical examination not a substitute for it.

- The radiographic survey should consist of a minimum of 14 intra oral films and 4 posterior bite-wing films.
Panoramic radiographs are a simple and convenient method of obtaining a survey view of the dental arch and the surrounding structures. They provide an informative overall radiographic picture of the distribution and severity of bone destruction with periodontal disease, but a complete intraoral series is required for periodontal diagnosis and treatment planning.

**CASTS**

- Indicate position of gingival margin, inclination of the teeth, proximal contact relationships, food impaction areas.
- Visual aid in discussion with patient.
Clinical photographs
- Color photographs are useful for recording the appearance of the tissue before and after treatment.

Extra oral examination
a) Any facial asymmetry
b) TMJ Disorders
c) Regional lymph nodes


Intra oral examination

1. Oral hygiene status:

The cleanliness of the oral cavity is appraised in terms of the extent of accumulated food debris, plaque, and tooth surface stains. Disclosing solution may be used to detect plaque that would otherwise be unnoticed.

2. Oral Malodor:

Oral malodour or halitosis, is a foul or offensive odor that emanates from the oral cavity. Mouth odors may be of diagnostic significance, and their origin may be either oral or extraoral.

3-Hard tissue examination

1. No of teeth present
2. Missing teeth
3. Caries
4. Developmental defects
6. Filled teeth
7. Pathological migration
8. Proximal contacts
9. Occlusal classification
10. Prematurities
11. Fremitus test
Wasting disease of teeth
1. Attrition: occlusal wear resulting from functional contact with opposing teeth.
2. Abrasion: loss of tooth substance induced by mechanical wear.
3. Erosion: loss of tooth substance by a chemical process that does not involve bacterial action.
4. Abfraction: results from occlusal loading surfaces causing tooth flexure and mechanical microfractures and tooth substance loss in the cervical area.

Pathological migration
Refers to the tooth displacement that results when the balance among the forces hold the teeth in position is altered.

Etiology
1. Abnormal forces
2. Tongue thrusting habits
3. Premature tooth contacts
4. Aggressive periodontitis
5. Loss of tooth
4-Soft tissue examination

a) lips
b) buccal mucosa
c) palate
d) floor of the mouth
e) tongue

5- Examination of periodontium

- Clinical examination
- Radiographic examination

✓ The periodontal examination should be systematic, starting in the molar region in either the maxilla or the mandible and proceeding around the arch.

1-Plaque and Calculus: The presence of supragingival plaque and calculus can be directly observed, and the amount can be measured with a calibrated probe. For the detection of subgingival calculus, each tooth surface is carefully checked to the level of the gingival attachment with an explorer. Warm air may be used to deflect the gingiva and to aid in the visualization of the calculus.

<table>
<thead>
<tr>
<th>Score</th>
<th>Criteria</th>
</tr>
</thead>
<tbody>
<tr>
<td>0</td>
<td>No plaque in gingival area</td>
</tr>
<tr>
<td>1</td>
<td>Film of plaque adhering to free gingival margin and adjacent area of tooth, plaque may be noticed by running a probe across tooth surface</td>
</tr>
<tr>
<td>2</td>
<td>Moderate accumulation of soft deposits within gingival pocket, on gingival margin, and or on adjacent tooth surface, which can be seen by naked eye</td>
</tr>
<tr>
<td>3</td>
<td>Abundance of soft matter within gingival pocket and/or on gingival margin and adjacent tooth surface</td>
</tr>
</tbody>
</table>
2-Gingiva

The gingiva must be dried for accurate observation

i) color-coral pink or coffee brown
   ➢ reddish, dark red, bluish red

ii) size-snuggly fits around the tooth
   ➢ increased in size/enlarged

iii) Contour-scalloped/knife edge
   ➢ rounded, rolled or accentuated

iv) Consistency-firm and resilient
   ➢ soft and edematous

v) Surface texture -stippling seen as orange peel appearance
   ➢ stippling is lost-soft and shiny.

vi) Position -0.5 to 1mm coronal to CEJ
   ➢ Recession-apical to CEJ
   ➢ Gingival overgrowth-coronal to CEJ

vii) Bleeding on probing -Running the periodontal probe along the gingival sulcus- wait 15-30 secs.

viii) Exudation -digital pressure in apical to coronal direction.
3-Mucogingival problems

a- Adequacy of attached gingiva-

Distance between the mucogingival junction to the external protruberance of the base of the periodontal pocket or the gingival sulcus

-3.5 to 4.5 mm –maxillary anteriors
-3.3 to 3.9 mm –mandibular anteriors

1.9 in maxillary premolar area
1.8 in mandibular area

**Clinical importance:** the attached gingiva is firmly adherant to the underlying periosteum and takes the forces of mastication preventing damage to the underlying blood vessels and nerves also it protects the underlying vital structures from various other insults.
TESTS FOR ASSESSING WIDTH OF ATTACHED GINGIVA

✓ Direct measurement
✓ indirect measurement
✓ pull test
✓ roll test
✓ Schiller potassium iodide stain

b- Frenal attachments

Frenal attachment can be of 4 types:

a) mucosal
b) gingival
c) papillary
d) papillary penetrating

Tension test-
To know the adequacy of attached gingiva/or frenal attachment
Test is positive if the marginal gingival moves on retracting the lips upward and forwards and vice versa if the marginal gingiva doesn't move the test is said to be negative.

c- Gingival recession

• Apical migration of the marginal gingiva away from the CEJ along the root surface.
Etiology

• Anatomical factors-thin alveolar bone
• Trauma-tooth brush, nail biting
• Aberrant frenum attachment
• Physiological factors-orthodontic treatment
• Pathological factors—local irritants-plaque and calculus, operative procedures

Miller’s classification

• **Class I**- marginal tissue recession that does not extend to the mucogingival junction. There is no loss of bone or soft tissue in the interdental area.
• **Class II**- marginal tissue recession that extent to or beyond the mucogingival junction. There is no loss of bone or soft tissue in the interdental area.
• **Class III**- marginal tissue recession that extent to or beyond the mucogingival junction, in addition there is bone or soft tissue loss interdentally or malpositioning of the tooth.
• **Class IV**- marginal tissue recession that extent to or beyond the mucogingival junction, with severe bone loss & soft tissue loss interdentally or severe malpositioning.
4-Measurement of Periodontal pocket

- A PERIODONTAL POCKET is defined as a pathologically deepened gingival sulcus.

- The only accurate method of detecting and measuring periodontal pocket is careful exploration with a periodontal probe.

- Radiographs does not reveal pockets.

- Gutta percha points or calibrated silver points can be used with the radiographs to assist in determining the level of attachment of periodontal pockets.

Pocket Probing

The probe should be inserted parallel to the vertical axis of tooth and walked circumferentially around each surface of the tooth to detect the areas of deepest penetration with the use of a standardized force of 25 g.
• Special attention should be directed to detecting the presence of interdental craters and furcation involvements.

• 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.

• 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.
Level of attachment versus pocket depth

- Pocket depth – distance between base of pocket and gingival margin.
- Level of attachment – distance between base of pocket and a fixed point on crown such as CEJ.

Determining level of attachment

When gingival margin is located on anatomical crown level of attachment determined by subtracting the distance from GM to CEJ from PD.

When gingival margin coincide with CEJ the loss of attachment equals PD.

When GM is located apical to CEJ, loss of attachment is greater than PD and thus distance between CEJ and GM should be added to PD.
5-Mobility

- The degree of looseness of the tooth beyond physiological movement.
- Physiological movement is that which occurs during normal function (100-150 gms).
- Physiological mobility is defined as movement up to 0.2mm horizontally and 0.02 axially.

Causes for mobility:

a) Loss of support (bone loss)

b) Trauma from occlusion

c) Spread of inflammation from gingiva to peri-apex or from pulp to peri-apex.

d) Pregnancy

e) Hormonal contraceptives

f) Cysts, tumors

Mobility checked as tooth is held firmly between handles of 2 metallic instrument and an effort is made to move in all directions.

Grading:

Grade I - slight more than normal up to 1mm buccolingually.

Grade II – moderate mobility (< 2mm) buccolingually and mesiodistally.

Grade III – severe mobility buccolingually / mesiodistally combined with vertical displacement.
6- Furcation involvement

- Furcation:
  The anatomic area of multirooted tooth where the root diverges

- Furcation involvement:
  Invasion of the periodontal disease process into the furcation area with resorption of bone.

Radiographs and Nabers probe used for diagnosis
GRADE 1
Incipient or early lesion
- The pocket is suprabony, involving soft tissue.
- Slight bone loss in furcation.
- No radiographic changes.

GRADE 2
- Bone is destroyed on one or more aspects of the furcation, permitting partial penetration of naber's probe (cul-de-sac).
- Radiographic may or may not reveal grade 2 involvement.

GRADE 3
Interradicular bone is completely lost but the facial or the lingual surfaces are covered by the gingiva (through and through tunnel).
- Radiolucent area between the roots

GRADE 4
Interradicular bone is completely lost, the gingival tissues recede apically so that the furcation is seen clinically.

- Radiographic appearance of periodontal disease

Normal interdental septum
- Radiographic evaluation of bone changes in periodontal disease is based mainly on the appearance of the interdental septa, because the relatively dense root structure obscures the facial and lingual bony plates.
- The interdental septum normally presents a thin radiopaque border adjacent to the periodontal ligament and at the crest referred to as lamina dura that appears radiographically as a continuous white line.
• The angulation of the crest of the interdental septum is generally parallel to a line between the cemento enamel junctions of the approximating teeth.

• The bone height is within 2mm of the cemento enamel junction (CEJ).

• Alveolar crests are more pointed anteriorly.

**Periodontitis**

• Fuzziness and disruption of lamina dura crestal continuity is earliest sign.

• Patterns of bone destruction may be either horizontal (parallel to line drawn between adjacent CEJs) or vertical (more bone destruction on interproximal aspect of one tooth than on the adjacent tooth).

• The height of interdental septum is progressively reduced.
Furcation involvement

1. Diminished radiodensity and thickening of the periodontal space in the furcation area.

2. The slightest radiographic change in the furcation area should be investigated clinically, especially if there is bone loss on adjacent roots.
Periodontal abscess

A discrete area of radiolucency along the lateral aspect of the root.

However, the radiographic picture is often not typical, therefore the radiograph alone cannot be relied on for the diagnosis of a periodontal abscess.
Localized aggressive periodontitis

- It is characterized by:

1. Initially, bone loss in maxillary and mandibular incisor and/or first molar areas, usually bilaterally, resulting in vertical arch like destructive pattern.

2. As the disease progresses, loss of alveolar bone may become generalized but remain less pronounced in premolar areas.
The accentuated bone destruction in anterior and molar is considered to be characteristic of the disease.

**Trauma from occlusion**

It can produce radiographically detectable changes in thickness of lamina dura, morphology of the alveolar crest, width of the pdl space, and density of the surrounding cancellous bone.

These radiographic changes listed are not pathognomic of trauma from occlusion and must be interpreted in combination with clinical findings.

- In injury phase, The trauma from occlusion produce loss of lamina dura that may be noted in apices, furcations and marginal area
- In repair phase, of trauma from occlusion there is an attempt to strengthen the periodontal structure to better support the increased load by condensation of perialveolar cancellous bone

Root resorption may also result from excessive forces on periodontium, particularly those caused by orthodontic appliance.
Figure 5 - Note occlusal trauma with considerable increase in periapical bone density (circle) and in the bone crest (green arrow).

References:

Carranza’s Clinical Periodontology 12\textsuperscript{th} edition. Part2, chapter 29.