### PERIODONTICS/ lecture #15 (8.Feb.2016)

\* Written by: Deema AlQudah & Siwar AlAshhab.

(NB: There is no need to go back to the slides as they are included in this sheet.)

### **Periodontal Treatment Planning and Prognosis**

- The primary difference between gingivitis and periodontitis is clinical attachment loss
  → Plaque-induced, inflammatory attachment and bone loss.
- There is no such a thing as attachment loss without bone loss, pocketing without bone loss, pocketing with bone loss; if you have a periodontal pocket, it could be:
  - 1. **True pocket**: the base of the pocket on the **root surface**. (Deepening due to apical migration of the <u>junctional epithelium</u>)
  - 2. **Pseudo-pocket**: the base of the pocket on the **crown/enamel**. (Pseudo: coronal migration of the gingival margin; <u>marginal gingiva</u>)

The proper terms to use when you are establishing a diagnosis: (Important!) **Disease categories:** 

• <u>Plaque-induced gingival diseases:</u>

#### **Gingival Diseases**

Chronic marginal gingivitis Acute necrotizing ulcerative gingivitis Acute herpetic gingivostomatitis Allergic gingivitis Gingivitis associated with skin diseases Gingivitis associated with endocrine-metabolic disturbances Gingivitis associated with hematologic-immunologic disturbances Gingival enlargement associated with medications Gingival tumors

(Gingivitis associated with endocrine-metabolic disturbances; gingivitis that happens during puberty or pregnancy.)

#### • Different types of periodontitis:

TABLE 50-1 Features of Types of Fenodolitids							
Parameter	Chronic	Aggressive	Prepubertal	LAP	NUP		
Age (years)	35+	20-35	<11	11–19	15–35		
Calculus	Moderate to abundant	Scanty to moderate	Scanty	Moderate	Scanty		
Disease progression	Slow	Rapid	Rapid	Rapid	Rapid		
Distribution	Generalized; associated with etiologic factors	Generalized; no consistent pattern	Primary molars and incisors	First molars and incisors, and no more than two other teeth	?		
Prevalence	US: >50% Sri Lanka: 81%	US: 4%-5% Sri Lanka: 11%	?	<0.50%	?		
Racial predilection	No	No	No	More common in blacks	No		
Familial tendency	No	?	Yes	Yes	?		
Gender distribution	More severe in men	?	?	?	?		
PMN/macrophage defects	No	Yes	Yes	Yes	Yes		
Association with systemic problems	No	Some cases	Yes	Yes	Yes		
Response to therapy	Very good	Variable	Poor	Good	Variable		

TABLE 30-1	Features	of Types	of Periodontitis
ADLE 30-1	realures	or types	orrenouonuus

(Prepubertal = periodontitis as a manifestation of a systemic disease  $\rightarrow$  patients with significant systemic conditions)

## **RADIOGRAPHIC EXAMINATION**

- You have to know the normal in order to be able to identify the abnormal.
- Types of bony defects (supra- , infra- or intra-) are classified according to <u>number of walls.</u>



- The picture above shows <u>vertical</u> bone loss. (Not parallel + more than 2 mm away from the CEJ.)

- Almost always any bony defect is more than one type. For example, the most coronal part is one-walled defect, as you go deeper is becomes two-walled defect, in the deepest part is three-walled defect. Thus, most of the time we don't have one isolated type of defect, usually we have a combination of two or even three types of defects, based on the number of walls.



- The picture above shows **<u>NO abnormality</u>**.
- The crest of the interproximal bone is usually parallel to an imaginary line between the CEJ on adjacent teeth, if the crest of the interproximal bone is (1) <u>parallel</u> to this imaginary line and (2) is <u>not more than 2 mm away</u> from it then there is no bone loss.
- For example, parallel but 4 mm away  $\rightarrow$  Horizontal bone loss.
- Horizontal bone loss = supra-bony defect/pocket
  Vertical bone loss = intra/infra-bony defect/pocket
- The ideal x-ray to check the level of interproximal bone is bitewing x-ray; because a bitewing x-ray is perpendicular to the crest of the bone unlike with a periapical x-ray where you cannot perform the parallax technique ideally. → <u>The BW x-ray depicts</u> the height of the crestal alveolar bone more accurately than the PA x-ray.
- Vertical bitewings are used when performing radiography for patients with periodontal diseases and are used in cases where the periodontal bone resorption is severe.
- Vertical bitewings are better than horizontal bitewings, why? Because when significant bone loss is present (>4-5mm bone loss), the bone level will not appear if a horizontal bitewing was taken, that's why it is preferable to take vertical bitewings.
- Vertical bitewings give us more room to identify the level of the bone in cases of advanced bone loss.



The picture above shows a standard case of **horizontal bone loss**.



- The picture above is an example of a **vertical bone loss**. (Note here that there is a horizontal bone loss on the distal surface of 5 compared to the mesial surface, then there is a vertical bone loss on the mesial surface of 6.)



- The picture above shows vertical bitewings.

Always keep in mind that you are looking at a **two-dimensional image**. Some defects are obscure especially in the posterior area. Why some defects are masked? Due to the thick bone. <u>Anatomical features such as the oblique ridge might mask the bone loss so that the defect will not appear on the radiograph, but when you take a cone beam radiograph you can detect such defects.</u>



## **RADIOGRAPHIC CHANGES IN PERIODONTITIS**

1. Bone loss (horizontal/vertical)



- 2. Evidence of radiographic calculus (Supra-/sub- gingival calculus)
- 3. Widening of PDL space in mobile teeth



- 4. Lamina dura is usually seen lining the sockets, lamina dura on crest of the bone is called crestal lamina dura. Studies have shown that **the absence of crestal lamina dura is not sensitive enough for disease** (in the past its absence was considered a sign of inflammation not bone loss) but **the presence of crestal lamina dura is specific for lack of disease**.
- An x-ray the shows crestal lamina dura  $\rightarrow$  No disease
- An x-ray that lacks a crestal lamina dura → could go both ways; disease or no disease. There are so many different variables; different projections and bone densities...etc.
  - 5. Periodontal abscess

Radiographic appearance in periodontal abscess:



- The periodontal abscess is most likely draining through the pocket. (Gingival crest)
  - **6.** Furcation area: you have to check for the presence or absence of bone loss in the furcation area.

(Bone loss in the furcation area but when you probe clinically, the probe will not go into the furcation area  $\rightarrow$  the reason behind that is that the **pulpal floor is perforated in a heavily restored tooth** or in pediatrics, when there is necrosis, the lesion is seen in the furcation area of primary teeth due to the abundance of accessory canals in that area and most of the infections occur in the interradicular area. Another scenario, if the tooth was not restored, it might be due to **occlusal trauma; bone loss without attachment loss.**)

You have to keep in mind that the projection of the x-ray might mask the presence of bone loss on the x-ray, that's why <u>you always have to correlate between what you see</u> radiographically and what you have clinically. (How? By using **Naber's probe** to check the furcation area)

- <u>The facial and lingual aspects are not visible on x-rays</u>; you cannot tell which is missing.
- Widened PDL due to occlusal trauma → such a tooth is mobile (upon clinical examination):





• No bone loss is seen in this x-ray

, this tooth is either a 7 or 8,

but when we check the cone beam, there is bone loss, thus, the thick ascending ramus is obscuring the defect on the conventional radiograph:



- <u>CBCT reveals a three-wall defect that is otherwise obscure on conventional x-ray.</u>

### **RISK ASSESSMENT**

Risk: anything that increases the likelihood of an individual to develop the disease.

- **Risk factor (Established)**: may been environmental, behavioral or biologic factor that when present increases the likelihood that an individual will develop the disease, and can be modified such as diabetes. (How to modify diabetes? By controlling it.)
- **Risk determinant**: risk factors that cannot be modified, such as age and gender.
- Both, risk factor and risk determinant, mean the same with the difference that **risk** determinant is non-modifiable whereas risk factor is modifiable.

### NON-Established risk factors:

- **Risk indicators**: are probable or putative risk factors; we don't have enough evidence to show that it's associated with the disease.
  - For example: we have indicators that tell us that maybe obesity is related to periodontitis, but it is **not an established risk factor** based on longitudinal and international studies, thus, it is a **probable** or **putative** risk factor → <u>POSSIBLE</u> <u>BUT NOT ESTABLISHED.</u>
- **Risk marker:** associated with increased risk for the disease but do not cause the disease. (**Not associated directly with the disease but it indicates a higher risk of the disease.**)

#### In <u>periodontitis</u>:

- Established risk factors (MODIFIABLE):
  - 1. Tobacco smoking
  - 2. Uncontrolled diabetes
  - Specific microbiota: AA (Aggregatibacter actinomycetemcomitans) + Red complex (Porphyromonas gingivalis - Tannerella forsythia - Treponema denticola)
  - 4. Non-specific microbial tooth deposits (plaque accumulation)
- Risk determinants (NON-MODIFIABLE):
  - 1. Genetic factors/background  $\rightarrow$  e.g. family history

- 2. Age
- 3. Gender
- 4. Socioeconomic status from a population-based perspective (community level)
- 5. Stress (you can probably modify it)
- Risk indicators (NOT ESTABLISHED):  $\rightarrow$  possible direct association  $\checkmark \checkmark \checkmark$ 
  - 1. HIV/AIDS → nowadays, if the patient is on a good retroviral therapy, he is not necessarily on a greater risk for periodontitis.
  - 2. Osteoporosis  $\rightarrow$  NO hard evidence
  - 3. Infrequent dental visits = lack of dental care

#### (Risk indicators increase the biological susceptibility of developing the disease.)

- Risk markers/Predictors: → do NOT play a role in the etiology of a future disease.
  - 1. Previous history of periodontal disease → a history of periodontal disease indicates a higher risk but is **NOT DIRECTLY** related to future disease.
  - 2. Bleeding on probing <u>as a percentage</u> (%); if it was greater than 50% → predicts that the patient is more susceptible to periodontitis (higher risk), **but bleeding on probing is NOT what will cause periodontitis**, it is only a marker/predictor.
  - For example, two patients, one brushes his teeth once a week and the other brushes his teeth twice a week, and both of them have kind of the same periodontal conditions; slight gingivitis and bleeding. Who has a higher risk of developing periodontitis? The second patient, he practices plaque control but still has an inflammation → marks that he might be at greater risk.



Copyright © 2012, 2006 by Saunders, an imprint of Elsevier Inc.

From the previous chart:

Different schemes for estimating the risk of periodontal diseases, there are so many different models, but generally these are the main risk factors and determinants and how they play into the assessment of the patient's response to treatment whether you have a positive response or a negative response, thus, when you have a negative response, you have to reevaluate the risk factors and determinants.

**PROGNOSIS** a <u>prediction</u> of the probable course, duration, and <u>outcome of a disease</u> based on a general knowledge of the pathogenesis of the disease and the presence of risk factors for the disease.

- Always remember that when we are talking about periodontal diseases, the prognosis is a prediction <u>AFTER therapy</u>.
- Assignment of prognosis is a dynamic process, especially in periodontitis.
  → Meaning that the initial impression when you first see the patient is not enough; the initial assessment is very likely to change based on the outcome of the initial treatment.
- Risk vs. Prognosis: (Important!)
  - In prognosis, I am dealing with <u>an existing disease</u>.
  - In Risk, I am considering <u>a future disease.</u>

There are different classification systems, two of them:

- 1. Based on <u>tooth mortality</u>  $\rightarrow$  McGuire system (currently used in our clinics)
  - → The likelihood for the patient to lose his teeth (prognosis); the prediction of tooth mortality/loss.
  - → Patients with **periodontitis**.

<u>Not gingivitis</u>, WHY? Because with gingivitis the prognosis is always good; there is no likelihood for the patient to lose any of his teeth.

• More specific categories.

### 5 different categories:

- **Good** prognosis: Control of etiologic factors and adequate periodontal support ensure the tooth will be easy to maintain by the patient and clinician.
- **Fair** prognosis: Approximately 25% attachment loss and/or Class I furcation involvement (location and depth allow proper maintenance with good patient compliance).
- **Poor** prognosis: 50% attachment loss, Class II furcation involvement (location and depth make maintenance possible but difficult).
- Questionable prognosis: >50% attachment loss, poor crown-to-root ratio, poor root form, Class II furcation (location and depth make access difficult) or Class III furcation involvements; >2+ mobility; root proximity (accessibility to perform instrumentation to the root surface it renders a tooth with a questionable prognosis). Does not mean extraction.

- **Hopeless** prognosis: Inadequate attachment to maintain health, comfort, and function. No other option than <u>tooth extraction.</u>

Prognosis is one of the most difficult things to do, because your treatment pan is based on the prognostic evaluation of a specific tooth. It is very tricky and there are many factors you have to consider  $\rightarrow$  not a one way decision.

- 2. Based on <u>periodontal stability</u> (due to some difficulty with the classical system) → Quoc system
  - → The likelihood of stabilizing the progression of the inflammation or the periodontal disease.
- Less categories + more straight forward + less complicated.√√√
- **Favorable** prognosis: Comprehensive periodontal treatment and maintenance will stabilize the status of the tooth. Future loss of periodontal support is unlikely.
- **Questionable** prognosis: Local and/or systemic factors influencing the periodontal status of the tooth may or may not be controllable. If controlled, the periodontal status can be stabilized with comprehensive periodontal treatment. If not, future periodontal breakdown may occur.
- **Unfavorable** prognosis: Local and/or systemic factors influencing the periodontal status cannot be controlled. Comprehensive periodontal treatment and maintenance are unlikely to prevent future periodontal breakdown.

## **Overall vs. Individual Tooth Prognosis**

(Your decision is made either based on the overall prognostic factors or tooth level prognostic factors; individual decision related to one tooth.)

- <u>Overall prognostic factors:</u>
- 1. Age
- 2. Disease severity
- 3. Patient compliance with treatment and maintenance
- 4. Plaque control
- 5. Finances
- Overall prognostic factors (systemic & environmental):
- 1. Smoking
- 2. Systemic disease
- 3. Genetic factors
- 4. Stress

- Tooth (local) prognostic factors:
- 1. CAL → degree of attachment loss on that specific tooth → the most important local prognostic factor.
- 2. PD  $\rightarrow$  the presence of pocketing complicates the case.
- 3. % bone loss (synonymous with CAL)
- Type of bone loss → the management of vertical bone loss is easier, higher probability of performing regenerative procedures. (Bone grafting cannot be done in cases of horizontal bone loss.)
- 5. Furcation invasion → multi-rooted teeth always have worse prognosis than single-rooted teeth.
- 6. Crown-Root ratio
- 7. Sub-gingival restorations
- 8. Anatomic factors: CEP, root form, concavities and grooves
- 9. Mobility
- 10. Position in the arch
- 11. Caries and restorability
- 12. Endodontic status
- 13. Prosthetic Tx plan
- 14. Tooth malposition
- When we assign prognosis, we usually do it tooth by tooth.

## **PROGNOSIS OF GINGIVAL DISEASE**

• <u>Gingival disease induced by plaque only:</u>

Good with the control of local factors

Example: plaque control, removal of calculus, overhanging restorations

• <u>Gingival disease associated with systemic modifiers:</u>

**Good to fair**, depending heavily on the control of the systemic condition or disease Example: DM, pregnancy, medication, malnutrition

### **PROGNOSIS OF PERIODONTITIS**

• Chronic periodontitis:

#### Ranges from **good to poor/questionable Depends** on many prognostic factors <u>mainly CAL.</u>

• <u>Aggressive periodontitis:</u>

Localized: ranges from good to poor/questionable Generalized: ranges from good to poor/questionable but more challenging • Periodontitis as a manifestation of systemic disease:

Fair to poor

• <u>Necrotizing ulcerative diseases:</u>

Varies; depends on involvement of bone and extent of destruction

# TREATMENT PLANNING

- **Short-term goals**: control inflammation, eliminate local factors, eliminate pocketing, correct restorations.
- Long-term goals: establish healthy, functional and esthetic dentition

Except for emergencies, no Tx should be initiated until a Tx plan has been established. **To extract or not to extract?** 

- Much easier question to answer in the past!!
- With the advent of implant dentistry, careful consideration of options is necessary
- Generally:
- If it is so mobile that function becomes painful. It can cause acute abscesses during therapy. There is no use for it in the overall treatment plan.

# PHASES OF PERIODONTAL THERAPY

Tx of emergencies:

- Dental or periapical
- Periodontal

### <u>Phase I</u>

- Diet control (in patients with rampant caries)
- Removal of calculus and root planning
- Correction of restorative and prosthetic irritational factors
- Excavation of caries and restoration (temporary or final, depending on whether a definitive prognosis for the tooth has been determined and the location of caries)
- Antimicrobial therapy (local or systemic)
- Occlusal therapy
- Minor orthodontic movement
- Provisional splinting and prosthesis

### **Re-evaluation**

- Pocket depth and gingival inflammation
- Plaque and calculus, caries

### Phase II

- Periodontal surgery, Implant surgery
- Endodontic surgery

### <u>Phase III</u>

- Final restorations
- Fixed and removable prosthesis

### Phase IV

### - Periodontal maintenance

- Plaque and calculus
- Gingival condition (pockets, inflammation)
- Occlusion, tooth mobility
- Other pathologic changes



## PRESENTING THE TX PLAN

- Be specific. Avoid vague statements. Begin your discussion on a positive note. Present the entire treatment plan as a unit. Explain why "doing nothing" or holding onto hopelessly diseased teeth as long as possible is inadvisable Perio-systemic link.
- Restorative care is limited by the uncertain condition of the supporting structures.
- Failure to eliminate periodontal disease might affect healthy adjacent teeth.