

A Review On Clinical Diagnosis –“Nip In The Bud”

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ABSTRACT

Periodontal diagnosis is an important label that clinicians place on patients periodontal condition or disease. A well-structured and detailed history with a comprehensive and complete examination helps establish an accurate diagnosis. The patient's prognosis and treatment plan are almost entirely dependent on accurate clinical diagnosis. Despite extensive research into developing novel techniques for improved diagnostic quality, clinical diagnosis remains the mainstay of diagnosis. A thorough understanding of the patient's history and findings aids in the development of a personalised treatment plan that addresses all of the patient's specific needs. This article provides details; on the history of the patient with respect to medical, dental, personal, family aspect as well as thorough clinical examination assessing different components of the periodontium.

I. Introduction

Periodontal diagnosis should determine whether disease is present, identify its type, extent, distribution, severity and to provide an understanding of the underlying pathologic processes and their cause. The correct determination, discriminative estimation and logical appraisal of the condition found during examination as evidenced by signs and symptoms of health and disease.¹ Diagnosis must therefore include a general evaluation of the patient and consideration of the oral cavity. This article aims to review the detailed periodontal case taking of the patient seeking periodontal care to help in clinical decision making. Patients are thoroughly examined at the first and second visit and based upon the examination, treatment plan has been advised.¹

II. First visit

Overall appraisal of the patient, Medical history, Dental history, Intraoral radiographic survey, Casts, Clinical photographs, Review of initial examination.

Overall appraisal of the patient

This includes consideration of the patient's mental and emotional status, temperament, attitude, physiologic age, gender, sex, residence and occupation.²

Medical History

The medical history aids the clinician in the diagnosis of oral manifestations of systemic disease. The importance of the medical history should be explained to the patient because patients often omit information that they cannot relate to their dental problems. The role that some systemic diseases, conditions, or behavioral factors may play in the cause of periodontal disease. The powerful influence that oral infection may have on the occurrence

and severity of a variety of systemic diseases and conditions.³Details on any hospitalization, surgery along with patient's medications should be provided (e.g., anesthetic, hemorrhagic, or infectious complications). A history should be taken of all the patient's medical problems (e.g., cardiovascular, hematologic, endocrine). Any possibility of occupational disease should be noted and abnormal bleeding tendencies should be noted. Information should be provided regarding onset of puberty and, for female patients, menopause, menstrual disorders, hysterectomy, pregnancies, and miscarriages. The patient's family medical history should be also be taken, including bleeding disorders and diabetes.³

Dental history

A preliminary oral examination is done to explore the source of the patient chief complaint and to determine whether immediate emergency care is required for knowing any current illness. The dental history should address a list of dental visits, patient's oral hygiene regimen should be noted, including tooth brushing frequency, time of day, method, type of toothbrush and dentifrice, and duration of use before brush replacement, as well as other methods of mouth care.²Any orthodontic treatment should be noted. If the patient is experiencing pain, nature and duration and how the pain is provoked and relieved should be noted. Bleeding gums, bad taste in mouth, loose teeth, difficulty in chewing and history of previous periodontal problems should be investigated.²

Intraoral radiographic survey

The radiographic survey should consist of a minimum of 14 intraoral films and four posterior bitewing films. Panoramic radiographs are a simple and convenient method that provides an overall picture of the distribution and severity of bone destruction in periodontal disease. A complete intraoral series is required for periodontal diagnosis and treatment planning. Full-mouth intraoral radiographic series (14 periapical films and 4 bite-wing films) used as an adjunct in periodontal diagnosis. Panoramic radiograph shows temporomandibular joints and "cystic" spaces in the jaw.⁴

Casts

Casts indicate the position of the gingival margins and the position and inclination of the teeth, proximal contact relationships, and food impaction areas. Casts also serve as visual aids in discussions with the patient and are useful for pretreatment and post-treatment comparisons, as well as for reference at checkup visits.²

Clinical photographs

Color photographs are not essential, but they are useful for recording the appearance of the tissue before and after treatment. With the advent of digital clinical photography, record keeping for mucogingival problems has become important.²

Review of initial examination

A correlated examination is made of the radiographs and casts to relate the radiographic changes to unfavorable conditions represented on the casts. The clinical findings in the oral cavity constitute the basis for diagnosis.²

III. Second visit

Extraoral examination

Head and neck examined for facial asymmetries, lip competency, altered pigmentation or discoloration, swellings, abscess or draining sinuses, ulcerations, lymph node and temporomandibular joint.⁵

Intraoral examination

Examination of the buccal mucosa, tongue, floor of the mouth, frenum, throat, palate, tori, teeth and gingival areas has to be done. Oral hygiene should also be examined, where oral cavity is checked for extent of accumulated food debris, plaque, material alba, and tooth surface stains. The revealing solution can be used to detect plaque that would otherwise go undetected. Gingival inflammation associated with plaque, material alba, and calculus has to be done.⁶

Examination of Oral Cavity

The lips, floor of the mouth, tongue, palate, and oropharyngeal region should all be examined, as well as the quality and quantity of saliva.

Oral Malodor:

Oral malodor, also called fetor ex ore, fetor oris, and halitosis.⁷ Foul or offensive odor emanating from the oral cavity. Mouth odors may be of diagnostic significance, and their origin may be oral or extraoral.⁷

Diagnosis of halitosis can be done by: Medical history, Clinical/laboratory examination, Clinical method (Self-examination, Organoleptic rating Laboratory method), Laboratory method (Portable volatile sulphide monitor, Gas chromatography), Dark-Field/Phase contrast Microscopy, Saliva incubation test, Chair side test such as halimeter and microbial-enzymatic N-benzoyl-DL-arginine-2-naphthylamide (BANA) test - Halimeter is a hydrogen sulfide portable analyzer which detects hydrogen sulfide and methyl mercaptan which are the degradation products of proteins and volatile sulfur compounds by gram negative anaerobic bacteria.⁸ BANA test is an alternative strategy to detect plaque in the tongue coating. A trypsin-like enzyme is present in *Treponema denticola*, *P. gingivalis*, and *Tannerella forsythus*. These produce VSCs and Volatile fatty acids. This enzyme can be detected by the hydrolysis of the trypsin substrate benzoyl-DL-arginine naphthylamide.⁹

Examination of the Teeth

The teeth are examined for caries, developmental defects, anomalies of tooth form, wasting, hypersensitivity, proximal contact relationship. Wasting is defined as any gradual loss of tooth substance resulting in the formation of smooth, polished surfaces, regardless of the mechanism by which this loss may occur. Wasting disease of the teeth includes erosion, abrasion, attrition and abfraction. Dental stains should be carefully examined to determine their origin. Root surfaces exposed by gingival recession may be hypersensitive to thermal changes or tactile stimulation. Proximal contact relationships form open contacts permit food impaction. *Hirschfeld* classified food impaction according to etiological factors as follows:¹⁰ Class I - occlusal wear, Class II - loss of support proximally, Class III - extrusion beyond occlusal plane, Class IV - congenital tooth abnormalities, Class V - improper restorative design. In the initial or intra-socket, stage the tooth moves within the confines of the periodontal ligament (PDL). This is associated with viscoelastic distortion of the PDL and redistribution of the periodontal fluids, inter-bundle content, and fibers. This initial movement occurs with forces of about 100g. The secondary stage occurs gradually and entails elastic deformation of the alveolar bone in response to increased horizontal forces.¹¹ When a force of 500 g is applied to the crown, the resulting displacement is about 100 to 200 μm for incisors, 50 to 90 μm for canines, 8 to 10 μm for premolars, and 40 to 80 μm for molars. Periotest instrument is designed to measure the mobility of implants and the natural teeth. The tooth or the implant is percussed 16 times (4 times/second). The degree of attenuation (scale ranges from -8 through +50) is recorded digitally and acoustically and then scaled into 4 degrees of tooth mobility.¹¹ Millers mobility index is used to evaluate the grade of mobility¹²: GRADE 0 - Physiological mobility measured at the crown level. The tooth is mobile within the alveolus to approx 0.1- 0.2 mm in a horizontal direction, GRADE I - Increased mobility of the crown of the tooth to at the most 1 mm in a horizontal direction, GRADE II - Visually increased mobility of the crown of the tooth exceeding 1 mm in a horizontal direction, GRADE III - Severe mobility of the crown of the tooth both in horizontal and vertical directions impinging on the function of the tooth. Periodontal findings that suggest the presence of trauma from occlusion include excessive tooth mobility, particularly in teeth showing radiographic evidence of a widened periodontal space vertical or angular bone destruction, intrabony pockets and pathologic migration, especially of the anterior teeth. Pathologic migration of the teeth was also examined. Pathologic migration of anterior teeth in young persons may be a sign of localized aggressive periodontitis.¹³ Sensitivity to percussion is a feature of acute inflammation of the PDL. Gentle percussion of a tooth at different angles to the long axis often aids in localizing the site of inflammatory involvement. Examination of the dentition with the jaws closed can detect conditions such as irregularly aligned teeth, extruded teeth, improper proximal contacts, and areas of food impaction, all of which may favor plaque accumulation.¹⁴

Examination of the Periodontium

Periodontal chart is prepared in order to evaluate the periodontium, where presence of plaque and calculus, gingival examination, pocket probing depth, furcation involvement, mobility were assessed.²

Gingival examination

Firm but gentle palpation should be used for detecting pathologic alterations in normal resilience, as well as for locating areas of pus formation. Features of the gingiva to consider are color, size, contour, consistency, surface texture, position, ease of bleeding, and pain. It is also important to note the distribution of gingival disease and whether it is acute or chronic. In clinical terms, gingival inflammation can result in two types of tissue responses. Edematous tissue response is characterized by a smooth, glossy, soft, red gingiva. In the fibrotic tissue response, some of the characteristics of normalcy persist; the gingiva is more firm, stippled, and opaque, although it is usually thicker, and its margin appears rounded.¹⁵ Colour of gingiva is determined by several factors including the number and size of blood vessels, epithelial thickness, degree of keratinization and presence of pigment containing cells.¹⁶ Change in colour is an important clinical sign of gingival disease. Colour changes in acute gingival inflammation can be due to acute necrotizing ulcerative gingivitis (ANUG), herpetic Gingivostomatitis, Chemical treatment or due to heavy metals such as bismuth, arsenic, mercury, lead and silver. Contour and form of gingiva depends on shape of teeth, alignment in the arch, location & size of the area of proximal contacts and dimensions of the embrasures. In chronic inflammation the surface is either smooth & shiny or firm & nodular, depending on whether the dominant changes are exudative or fibrotic.² Alteration in size is a common feature of gingival disease. Gingival enlargement can be classified as inflammatory, drug induced, associated with condition or systemic diseases, neoplastic enlargement, false enlargement.¹⁷ Changes in position of gingiva lead to formation of gingival recession.²

Miller's classification of gingival recession:¹⁸ Class I - marginal tissue recession does not extend to mucogingival junction, there is no loss of bone or soft tissue in the interdental areas, Class II - marginal tissue recession extends to or beyond the MG, there is no loss of bone or soft tissue in interdental areas, Class III - marginal tissue recession extends to or beyond MGJ, there is bone and soft tissue loss interdentally or malpositioning of the tooth Class IV - marginal tissue recession extends to or beyond the MGJ. There is severe bone and soft tissue loss interdentally or severe tooth malpositioning

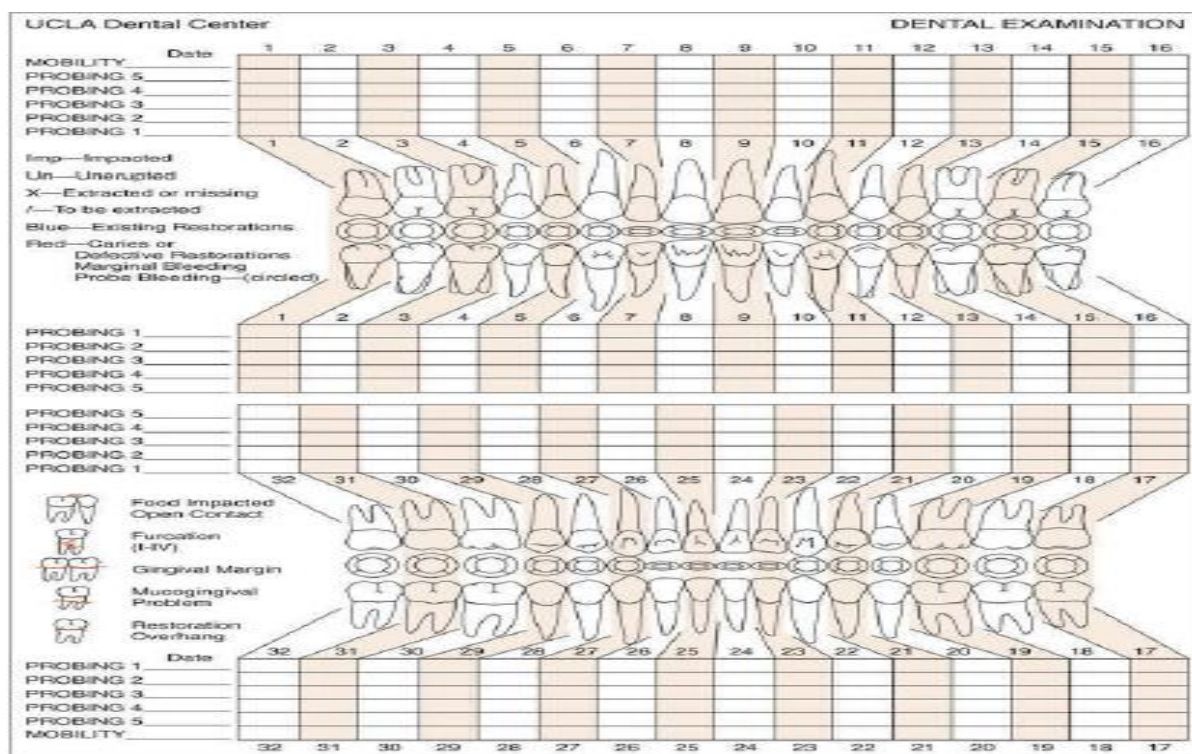


Figure 1: Periodontal chart by University of California, Los Angeles²
 [Courtesy:Newman et al 2011]²

Sulcus bleeding index

Sulcus bleeding index was introduced by Muhlemann and Son in 1971¹⁹

Score 0 - Health looking papillary and marginal gingiva no bleeding on probing

Score 1 - Healthy looking gingiva, bleeding on probing

Score 2 - Bleeding on probing, change in color, no edema

Score 3 - Bleeding on probing, change in color, slight edema

Score 4 - Bleeding on probing, change in color, obvious edema

Score 5 - Spontaneous bleeding, change in color, marked edema.

Periodontal Pockets

Examination for periodontal pockets must include consideration of the presence and distribution on each tooth surface, pocket depth, level of attachment on the root, and type of pocket.² It was classified as suprabony and intrabony pocket. Color changes, a “rolled” edge isolating the gingival margin from the tooth surface, or enlarged, edematous gingiva, as well as the presence of bleeding, suppuration, and loose, extruded teeth, can all indicate the presence of a pocket.² Periodontal 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. The probing depth is the distance to which an ad hoc instrument (probe) penetrates into the pocket. The depth of penetration of a probe in a pocket depends on such factors as size of the probe, force of its introduction, direction of penetration, resistance of the tissues, and convexity of the crown. Because peri-implantitis can cause pockets to form around implants, probing around the implants is part of the examination and diagnosis. To

prevent scratching of the implant surface, plastic periodontal probes should be used instead of the usual steel probes used for the natural dentition.²

Furcation involvement

Furcation was graded by Glickman²⁰

Grade I: Incipient or the early stage; pocket is suprabony; early bone loss may have occurred with an increase in the probing depth; radiographic evidence not found.

Grade II: May involve one or more furcations of the same tooth; cul de sac; definite horizontal component; vertical bone loss may be present; radiograph may or may not depict changes.

Grade III: The opening may be filled with soft tissue and may not be visible. Radiographs depict the defect as a radiolucent area in the crotch of the tooth.

Grade IV: The furcation opening is clinically visible; tunnel exists between the roots of affected teeth

Determination of disease activity

It involves examination of the amount of attached gingiva, alveolar bone loss, degree of gingival recession, palpation, suppuration, periodontal abscess, necrotizing ulcerative gingivitis (NUG) and necrotizing ulcerative periodontitis (NUP).²

IV. Laboratory aids to clinical diagnosis

Nutritional deficiencies correlated with clinical findings. Clinical findings are suggestive, but definitive diagnosis of nutritional deficiencies and their nature requires combined information revealed by the history, clinical and lab finding and therapeutic trials. Patient on low residue, non-detergent diets often develop gingivitis because the prescribed food lacks cleansing action and the tendency for plaque and food debris to accumulate on teeth is increased. Patients with salt free diets should not use saline mouthwashes and should not be treated with saline preparations without consulting the physician. Proper blood tests have to be taken to evaluate any abnormalities, presence of blood dyscrasias and generalized infections.²

V. Periodontal screening and recording system

This method is designed for easier and faster screening and recording of the periodontal status of a patient by a general practitioner or a dental hygienist. It uses a specially designed probe that has a 0.5mm ball tip and is color-coded from 3.5 to 5.5 mm. The patient's mouth is divided into six sextants. Each tooth is probed, by walking the probe around the entire tooth to examine at least six points around each tooth. The deepest finding is recorded in each sextant, along with other findings.²¹

Code 0

In the deepest sulcus of the sextant, the probe's colored band remains completely visible. Gingival tissue is healthy and does not bleed on gentle probing. No calculus or defective margins are found. Only appropriate preventive care is required for these patients.

Code 1

The colored band of the probe remains completely visible in the deepest sulcus of the sextant; no calculus or defective margins are found, but some bleeding after gentle probing is detected. Treatment for these patients consists of subgingival plaque removal and appropriate oral hygiene instructions

Code 2

The probe's colored band is still completely visible, but there is bleeding on probing, and supragingival or subgingival calculus and/or defective margins are found. Treatment should include plaque and calculus removal, correction of plaque-retentive margins of restorations, and oral hygiene instruction

Code 3

The colored band is partially submerged. This indicates the need for a comprehensive periodontal examination and charting of the affected sextant to determine the necessary treatment plan. If two or more sextants score, comprehensive full-mouth examination and charting are indicated

Code 4

The colored band completely disappears in the pocket, indicating a depth greater than 5.5mm. Comprehensive full-mouth periodontal examination, charting, and treatment planning are needed

VI. Conclusion

Periodontal disease is subjective, and its advancement can be episodic, making it difficult to determine which sites to test and when to test them. As a result, accurate clinical judgement is required for diagnosis. As a result, diagnostic procedures for identifying the disease must be systematic and organised.

REFERENCES

1. Preshaw PM. Detection and diagnosis of periodontal conditions amenable to prevention. *BMC oral health*. 2015;15(1):1-5.
2. Newman MG, Takei H, Klokkevold PR, Carranza FA. *Carranza's clinical periodontology*. Elsevier health sciences; 2011;14.
3. Kim J, Amar S. Periodontal disease and systemic conditions: a bidirectional relationship. *Odontology*. 2006;94(1):10-21.
4. Shah N, Bansal N, Logani A. Recent advances in imaging technologies in dentistry. *World journal of radiology*. 2014;6(10):794-807.
5. Fan K. Extra Oral Examination of the Dental Patient. *Primary Dental Journal*. 2020;9(1):21-6.

6. Armitage GC. The complete periodontal examination. *Periodontology* 2000. 2004;34(1):22-33.
7. Ratcliff PA, Johnson PW. The relationship between oral malodor, gingivitis, and periodontitis. A review. *Journal of periodontology*. 1999;70(5):485-9.
8. Aylıkçı BU, Çolak H. Halitosis: From diagnosis to management. *Journal of natural science, biology, and medicine*. 2013;4(1):1-14.
9. Loesche WJ, Kazor C. Microbiology and treatment of halitosis. *Periodontology* 2000. 2002;28:256-79.
10. Khairnar M. Classification of food impaction-revisited and its management. *Indian J Dent Adv*. 2013;5(1):1113-9.
11. Muhlemann HR. 10 years of tooth-mobility measurements. *The Journal of Periodontology*. 1960;31(2):110-22.
12. Miller PD Jr. A classification of marginal tissue recession. *Int J Perio Rest Dent* 1985;5(2):9-13.
13. Khorshidi H, Moaddeli MR, Golkari A, Heidari H, Raoofi S. The prevalence of pathologic tooth migration with respect to the severity of periodontitis. *Journal of International Society of Preventive & Community Dentistry*. 2016;6(S2):122-5.
14. Jernberg GR, Bakdash MB, Keenan KM. Relationship between proximal tooth open contacts and periodontal disease. *Journal of Periodontology*. 1983;54(9):529-33.
15. Cekici A, Kantarci A, Hasturk H, Van Dyke TE. Inflammatory and immune pathways in the pathogenesis of periodontal disease. *Periodontology* 2000. 2014;64(1):57-80.
16. Renganath MJ, Ramakrishnan T, Vidya Sekhar MN, Ebenezer M, Anithadevi S. Black to Pink: A Case Report of Treating Gingival Hyperpigmentation. *Int J Cur Res Rev*. 2017;9(3):14-17.
17. Agrawal AA. Gingival enlargements: Differential diagnosis and review of literature. *World Journal of Clinical Cases: WJCC*. 2015;3(9):779-788.
18. Miller Jr PD. A classification of marginal tissue recession. *Int. J. Periodont. Rest. Dent*. 1985;5:9.
19. Muhlemann HR. Gingival sulcus bleeding-a leading symptom in initial gingivitis. *Helv Odontol Acta*. 1971;15:107-13.
20. Glickman, I. *Clinical Periodontology: Prevention, Diagnosis, and Treatment of Periodontal Disease in the Practice of General Dentistry*, 4th ed.; Saunders: Philadelphia, PA, USA, 1972;242–245.
21. Covington LL, Breault LG, Hokett SD. The application of periodontal screening and recording™(PSR) on amilitary population. *Journal of Contemporary Dental Practice*. 2003;4(3):21-30.