



RESEARCH ARTICLE

DIAGNOSTIC CRITERIA FOR ENDO - PERIO DENTAL LESION

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ABSTRACT

Dental lesions can pose a diagnostic challenge in many situations. The dental tissue consists of the endodontium and periodontium. Disease of one tissue may lead to secondary disease in the other as they have embryonic, anatomic and functional interrelationships. The perio-endo lesions have seemingly unclear, overlapping symptoms, inturn making accurate diagnosis difficult. A rationale diagnosis can be arrived at only with clear understanding of various diagnostic modalities. This review, an attempt is made to provide detailed diagnostic modalities for endo-perio dental lesions with emphasis on radiographic diagnostic advancements.

INTRODUCTION

The endodontium and periodontium of the tooth are closely related. The relationship between periodontal and pulpal disease was first described by Simring and Goldberg in 1964. (Simring and Goldberg, 1964) Due to the variability of normal pathology and anatomical pathway, they pose diagnostic challenges. The dental pulp communicates with periodontal ligament by 'dentinal tubules' and lateral canals'. Most precise route of communication between the pulp and periodontium is the 'Apical foramen'. Advanced dental imaging has greatly paved way for accurate diagnosis. It is mandatory for oral physicians to update their knowledge on this enigmatic subject for better dental treatment planning.

Diagnosis: Diagnosis defined as the process where the data obtained from questioning, examining, and testing are combined by dentist to identify deviations from normal (Velayutham *et al.*, 2009). The diagnosis should be an outcome of clinical examination and radiographic evaluation. The current radiographic advancements in the dental fields help at a more specific diagnosis which in turn aid in proper treatment planning.

MATERIALS AND METHODS

Visual examination: A thorough visual examination is mandatory prior to other investigations.

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The alveolar mucosa and attached gingiva are examined for any ulcerations or inflammation. Primarily tooth decay, restorations, cracks indicate endodontic origin.

Palpation: Firm digital pressure is applied to the mucosa covering the root end. The presence of periradicular abnormalities produce a painful response to digital pressure.

Percussion: This is done to localize the origin of pain, inflammation of the peri-radicular region is elucidated as pain.

Mobility: Tooth mobility is directly proportional to integrity of attachment apparatus or extent of inflammation on in periodontal ligament. It can be caused by trauma loss of attachment, inflammation in periradicular region.

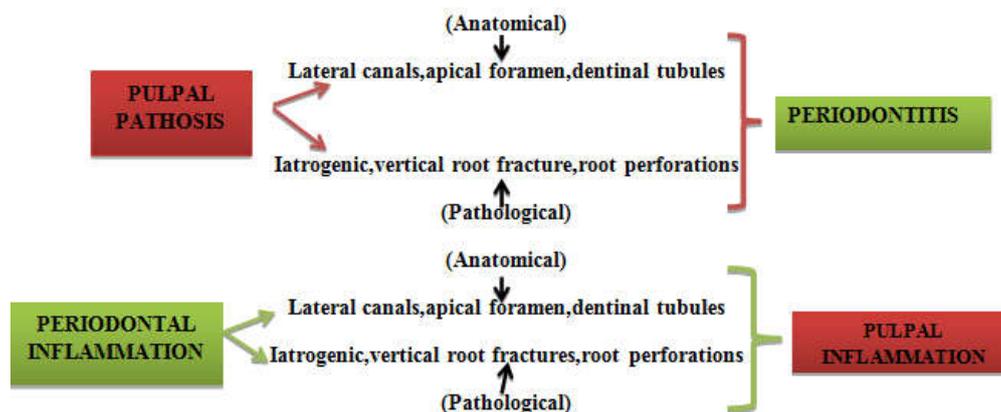
Pocket probing: It is one of the clinching diagnostic test to differentiate endo perio lesion. Deepsolitary pocket without periodontal disease indicates vertical root fractures. Loss of attachment and pockets in general indicate periodontal disease.

Pulp testing modalities

The vitality of pulp plays an important role in diagnosis of pulpo-perio lesion. Pulp testing is based on two important criteria:

- Based on nerve innervation
- Based on blood supply

Pulpo-Periodontal Pathway: (Syed Wali *et al.*, 2013)



Based On Nerve Innervation

Thermal Test

This test includes heat and cold stimuli. Cold test response to vital pulp whether the pulp is normal or abnormal and act as a 'HYDRODYNAMIC FORCES' which used to differentiate the reversible and irreversible pulpitis. In reversible pulpitis the pain will subside after the stimulus is removed and in irreversible pulpitis pain will linger after the stimulus is removed. Heat test responds to higher stimuli for pulpal and periapical pathology. This test is done under gutta percha or hot water.

Electric Pulp test: Electric pulp test plays an important role in finding whether the pulp is healthy or necrotic. The electric current passes on the tooth surface "A recent study has revealed that the optimum site for tester electrode placement on molars is on the tip of the mesio- buccal cusp (Lin J *et al.*, 2007).

Based On Blood Supply

Laser Doppler Flowmetry (Baiju *et al.*, 2011): is a non-invasive, objective and semi-quantitative method and more reliable in measuring blood flow to the pulp and transmitted to the pulp by means of fiber optic probe. It is composed of Helium Neon and Gallium Aluminium with power of 1 to 2mw. The closer the probe is positioned to the gingival margins, the higher the signal output because of the greater volume of the pulp tissue (Ramsay D S *et al.*, 1991). It is indicated in both adults and children.

Pulse Oximetry: The term 'OXIMETRY' is defined as the determination of the percentage of oxygen saturation of the circulating arterial blood and this is attended with anaesthesia. The procedure was invented by Ayagi 1970. This is totally an objective test, it consist of two light emitted diodes, one to transmit red light and other to transmit infrared light. This act as on the principle of photoelectric diode (i.e) red and infrared light to transilluminate the targeted vascular area. Kahan and co-investigators subsequently developed a customized probe, in conjunction with a commercial pulse oximeter, for pulp vitality testing (Kahan *et al.*, 1996).

Transmitted Light Photoplethsmography is a non-invasive technique used to monitor pulpal blood flow and has been

successfully applied in humans and animals studies. This test is under study.

Selective Anaesthesia Test: This test is an objective test that one teeth should be anesthetized by using infiltration and intraligament injection where there is cause of pain. Iatrogenic damage is possible during this test.

Test Cavity: This is a last test for diagnosis of healthy pulp. This is done by drilling the enamel- dentine junction of a unanaesthetized tooth with good isolation.

Radiological Examination of Dental Lesions

Periapical lesions, endodontic lesions and pulpo-periodontal lesions are monitored by conventional periapical radiography and orthopantomogram. They play a pivotal role in diagnosis of endo perio lesion. Advanced digital imaging has further improvised the diagnosis of initial periapical lesions, their exact extent and relationship with their adjacent structures. IOPA, OPG, fullmouth radiographs helps in diagnosis of periodontal lesions. Conventional radiographs indicate the amount of bone remaining height of the alveolar crest, horizontal /vertical bone loss and also the bone loss in the furcation areas.

Sinus Tracking: A semirigid RO material is inserted into a sinus track until resistance is achieved, following this a radiograph of the area is taken. This will reveal the course and origin of the sinus track. All said and done there are limitations to conventional radiographs as initial lesion are not visible till 30-60% change in mineral content of bone is present. Gingival condition cannot be assessed with the alveolar crest from a radiograph. They play an important role in framing the treatment protocol for gingival and periodontal disease (Corbett E F *et al.*, 2009).

Advanced Radiograph Imaging In Dental Lesions

The conventional radiograph detects a three dimensional structure in a two dimensional way which is a major limitation in diagnosis. The actual bone destruction on a radiograph is lesser than the actual bone loss. Endo perio lesions are small in dimension and structural noise can limit the diagnosis. Digital subtraction radiography can overcome this problem area, as it can subdue the complex anatomic background, another major advantage of digital subtraction radiograph is that bone changes of 1-5% per unit volume and significant difference in

bone height of 0.7mm can be detected, where as in conventional 30-60% (Grondahl K *et al.*, 1988) of mineral bone loss is necessary to detect changes. Digital subtraction radiograph is also a useful tool in periodontal disease as it is sensitive to 1:1 bone changes.

Cone Beam Computerized Tomography (CBCT)

CBCT was introduced in 1981. It captures images in 3D pixel units called voxels. This is a breakthrough in dental radiology as it renders geometrically correct interpretations. CBCT applications to endodontics are best at detecting the depth of the caries and periapical lesions (Patel *et al.*, 2007). CBCT shows more potential in detection of PDL bone defects, buccal and lingual defect. CBCT is superior to conventional radiography. CBCT shows accurate measurement using a probe to measure crestal bone loss. CBCT is very useful detection tool for lingual plate defects, even when the buccal plate is intact. On the whole the low dosage and superior quality make CBCT a useful tool for detecting perio defects, intrabony defects, fenestrations and periapical cysts and furcation involvement. It is also useful to know the soft tissue defects by using soft tissue CBCT. These modern diagnostic tools help us to arrive at an accurate diagnosis to improve treatment modalities.

Conclusion

EndoPerio lesions are the most commonly encountered lesions in dentistry. As an astute clinician it is utmost important to apply apt diagnostic modalities, to plan proper treatment. Apart from various pulp testing modalities, today advancement in dental radiology, especially 3 - dimensional imaging has paved way for more specific and accurate diagnosis of dental lesions.

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