Condition requiring endodontic treatment to maintain the integrity of periodontium

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Received: May 10, 2019 | Published: June 05, 2019

Pulp and periodontium have common embryonic connections as well as anatomic and functional interrelationships. The two entities are so well connected that we can consider them as a single continuous system. (1) There are various pathways for the exchange of infectious elements and irritants from the pulp to periodontium or vice versa, leading to the development of endodontic periodontal lesions.1 The pulp periodontal complex always presents challenges to the clinician as far as diagnosis and prognosis of the involved teeth are concerned as it is difficult to catch the source of infection in many clinical pictures. It is very essential to make a correct diagnosis so that the appropriate treatment can be provided.2 In this article we are trying to simply the diagnosis of endo-perio lesions and also trying to focus on the need elective endodontic treatments prior to periodontal treatment (Diagram 1 & 2).

Diagram 1 and 2 showing various anatomical and pathological connections between pulp and periodontium.

Introduction

The pulp and periodontium have common embryonic connections as well as anatomic and functional interrelationships. The two entities are so well connected that we can consider them as a single continuous system. (1) There are various pathways for the exchange of infectious elements and irritants from the pulp to periodontium or vice versa, leading to the development of endodontic periodontal lesions.1 The pulp periodontal complex always presents challenges to the clinician as far as diagnosis and prognosis of the involved teeth are concerned.

Pulp and periodontal tissue can communicate through various natural or pathologic pathways. These could be as follows:

(1) Pathways of developmental origin (anatomical pathways)
• Apical foramen, accessory canals/lateral canals
• Congenital absence of cementum exposing dentinal tubules
• And Developmental grooves3

(2) Pathways of pathological origin
• Spaces on root surface created by insertion of Sharpey’s fibers
• Root fracture following trauma
• Idiopathic root resorption (internal and external)
• Loss of cementum due to external irritants

(3) Pathways of iatrogenic origin
• Exposure of dentinal tubules while performing SRP(scaling and root planning)
• Lateral root perforation during endodontic procedures
• Root fractures during endodontic procedures

Simring and Goldberg1 were the first to describe the relationship between pulpal and periodontal disease as “endo-perio lesion.” The
of apical foramen and where the tooth is significantly mobile a prior endodontic treatment may be needed. The pulp is vital in this condition.

C. Primary Periodontal Lesion with Secondary Endodontic Involvement. Progression of the periodontal disease and the pocket leads to pulpal involvement via either a lateral canal foramen or the main apical foramen. Pulp subsequently becomes necrotic and infected. In such cases, it is advisable to treat both tissues but endodontic treatment has to done before periodontal intervention.9

D. Combined Endodontic-Periodontal Lesion. Tooth has a pulpless, infected root canal system and a coexisting periodontal defect. An attempt should be made to identify the primary cause of a combined lesion but this may not always be possible. In such cases, it is not essential to determine which disease entity occurred first as the treatment will involve both endodontic and periodontal management. Any one of the treatment modality would not help and the tissue will not heal adequately. It is generally advisable to treat both tissues concurrently in order to create the most favorable environment for healing.7

E. Iatrogenic periodontal lesion. Root perforations, root fracture, coronal leakage and chemical injuries to the periodontium due to endodontic or conservative procedures may lead to they are likely to cause necrosis of the cementum, in ammnation of the periodontal ligament, and subsequently root resorption.8

In all the above mentioned cases an endodontic treatment is required prior to periodontal therapy. Whenever endodontic treatment is indicated along with periodontal therapy, the best sequence of treatment is that endodontic treatment should precede the periodontal therapy as it has been shown that if the toxic materials from the root canal is removed, reattachment of soft tissue is improved.9 also by doing this the severe intraoperative sensitivity can be avoided if the pulp content is removed first. More areas where endodontic treatment is needed before periodontal interventions are where:

6) Root amputation is required to gain periodontal healing

Root amputation may be a viable treatment for a severe periodontal defect that affects one root of a multi-rooted tooth. In several cases, the pulp may appear to be normal but elective RCT is warranted. Root amputation is also indicated in a multi-rooted tooth that has an extensive external root resorption affecting a single root.10

7) Surgical removal of some odontogenic and non-odontogenic bone lesions approximating the root apex

Elective RCT of teeth with normal pulps prior to surgical interference of some bone lesions approximating the root apex may be indicated because of the high possibility of apical injury which in turn may compromise the vascular supply of the related vital teeth during curettage of the lesion.11 The same principle can also be applied to teeth scheduled for extensive periodontal surgery where the root apex is certainly involved.12

8) In the management of juvenile periodontitis, prior to tooth hemisection Elective RCT has also been reported as an adjunct component in the management of juvenile peri-odontitis, prior to tooth hemisection,13 and for traumatized vital teeth with discoloration resistant to external bleaching.14
Clinical considerations and diagnosis of endo-perio lesions

It is easier to determine the origin of the lesion when a pulp vitality test is positive because this will rule out an endodontic etiology. However, pulp tests may not be always reliable. This consideration is particularly relevant when challenges to pulpal status arise from periodontal diseases such as partial necrosis of a pulp as in multirooted tooth or when areas of pulpal necrosis are associated with areas of pulpal inflammatory involvement in the single rooted tooth. Therefore, accurate diagnosis can be made by careful history taking, thorough oral hard and soft tissue examination. The following steps help in diagnosing the exact lesion (Table 1).

| Visual (magnifying instrument and operative microscope can be effective) | Retrograde periodontal lesion | Primary periodontal lesion | Primary periodontal secondary endodontic | Combined lesions | Iatrogenic periodontal lesion |
|---|---|---|---|---|
| Soft tissue-presence of sinus opening Tooth-preservation of decay/ large restoration/ fractured restoration or tooth/ | Inflamed gingiva/ gingival recession around multiple teeth Accumulation of plaque and subgingival calculus around multiple teeth Inact teeth | Presence of plaque, subgingival calculus and swelling around multiple teeth | Plaque, calculus and periodontitis will be present in varying degrees Swelling around single or multiple teeth | Inflammation of marginal gingiva, periodontal ligament and necrosis of cementum may occur due to iatrogenic trauma to the periodontium. |
| erosions/abrasions/ cracks/ discolorations/ poor RCT | Presence of swelling indicating periodontal abscess | Presence of pus, exudate | Presence of pus, exudate | Root perforation, fracture/ misplaced post coronal leakage from the restoration margins. |
| Pain | Sharp | Usually dull ache | Sharp only in acute condition | Sharp only in acute periodontal abscess | Dull ache usually |
| Palpation (a positive response to palpation may indicate active periradicular inflammatory process) | It does not indicate whether the inflammatory process is of endodontic or periodontal origin | Pain on palpation | Pain on palpation | Pain on palpation |
| Percussion (it indicates the presence of a periradicular inflammation that may be either from pulpal or PDLI origin) | Normally tender on percussion | The sensitivity of the proprioceptive fibers in an inflamed periodontal ligament will help identify the location of the pain | Tender on percussion | Tender on percussion |
| Mobility (tooth mobility is directly proportional to the integrity of the attachment apparatus or to the extent of inflammation in the PDLLigament) | Fractured roots and recently traumatized teeth often present high mobility | Localized to generalized mobility of teeth | Generalized mobility | Generalized mobility with higher grade of mobility related to the involved tooth |
| Pulp vitality using cold test, electric test, blood flow test, and cavity test (an abnormal response may indicate degenerative changes in the pulp) | A lingering response- irreversible pulpitis No response-necrotic pulp (non-vital) | The pulp is vital and responsive to testing | Pulp vitality may be positive in multirooted teeth | Usually negative because of non-vital pulp. Vitality tests may give a positive response in multirooted teeth |
| Citations: Khaled Y, Pahuja BK. Condition requiring endodontic treatment to maintain the integrity of periodontium. J Dent Maxillofacial Res. (2019);2(3):54-58. DOI: 10.30881/jdsmr.00030 |
Conclusion

1) A strong co-relation has been found between periodontal disease and inflammatory and degenerative changes in the pulp. 2) The sharp shooting pain almost always requires endodontic treatment only exceptions are the cases of acute periodontal abscess which is easy to diagnose. 3) The dull acheing pain may indicates only periodontal involvement or chronic pulpitis or a combination of the two. 4) The clinical symptoms of pulpitis commonly seen in periodontal patients are mostly intraoperative than pertaining to the disease itself as vigorous root planning may open some dentinal tubules leading to the persistent sensitivity and pain. 5) Pulp vitality test is of lower significant value in combined endo-perio cases as there are high chances of getting false positive results. 6) There are a large number of oral conditions where elective endodontic treatments are needed to maintain the integrity of the periodontal tissue. 7) By elective endodontic treatment we refers to RCT of either a normal pulp or a doubtful pulp prior to restorative procedures or calcified pulp canal (calcific metamorphosis) or an injured pulp following traumatic dental injuries such as avulsion and some luxation injuries.
References