

## **Diagnosis And Interdisciplinary Management Of Endo Perio Lesions.**

**Suhael Ahmed,<sup>1</sup> Mousa Mohammed S Alyahya<sup>2</sup>, Rama Abdullah Alkudhairy,<sup>2</sup> Lamia Abdullah Mohammed Alzahrani,<sup>3</sup> Sultan Althenyan,<sup>4</sup> Abdullah Alhathlol<sup>4</sup>, Rakan Aleisa<sup>4</sup>, Abdulaaly Ahmed Alotaibi,<sup>5</sup> Ali Salem Alsalem<sup>6</sup>, Omar Abdulkarim Altorbaq<sup>7</sup>, Naif Saleh Alosily,<sup>6</sup> Nora Ibrahim Ababtain<sup>8</sup>**

*<sup>1</sup>Riyadh elm university, Kingdom of Saudi Arabia*

*<sup>2</sup>AlMustaqbal University, Kingdom of Saudi Arabia*

*<sup>3</sup>College of Dentistry, Princess Nourah Bint Abdulrahman University, Riyadh, Saudi Arabia*

*<sup>4</sup>College of Dentistry, King Saud bin Abdulaziz University for Helath Sciences, Riyadh, Kingdom of Saudi Arabia*

*<sup>5</sup>Majmaah University, Kingdom of Saudi Arabia*

*<sup>6</sup>Ministry of Health, Qasim Health Cluster, Kingdom of Saudi Arabia*

*<sup>7</sup>General Dentist, Ministry of Health, Qassim, Kingdom of Saudi Arabia*

*<sup>8</sup>General Dentist, Kingdom of Saudi Arabia*

### **ABSTRACT**

For many years, the connection between endodontic and periodontal disorders has been the focus of conjecture, misunderstanding, and debate. More than 50% of nonvitality of teeth today are caused by pulpal and periodontal issues. A pathogenesis for an endo perio lesion can range from being pretty basic to being fairly complex. When it comes to diagnosing and predicting the prognosis of the afflicted teeth, these lesions frequently cause difficulties for the doctor. Making the right diagnosis is crucial for determining the best course of treatment. The doctor should have a good awareness and scientific knowledge of these lesions in order to provide an accurate diagnosis. To treat these lesions, restorative, endoontic, or periodontal therapy may be required, either separately or in combination. In order to get the best results,

this presentation will highlight the diagnostic, clinical guidelines, and decision-making processes in the treatment of these lesions from an endodontist's perspective.

### **Key words**

endo perio lesions, management, diagnosis

### **INTRODUCTION**

It is possible to think of the pulp periodontal connection as a singular continuous system or as a single biologic entity with numerous channels of communication. These structures' interactions affect one another in times of health, function, and sickness.(1,2) When both systems are compromised, they are referred to as genuine endo perio lesions. They can be impacted separately or jointly. Today, endodontic and periodontal issues account for more than 50% of tooth non vitality. They provide difficulties for the doctor in terms of the diagnosis and prognosis of the affected teeth. Making the right diagnosis is crucial for determining the best course of treatment. Simring and Goldberg made the initial discovery of the link between the pulp and periodontium in 1964.(1,3) Since then, lesions brought on by inflammatory substances that are to variable degrees present in both periodontium and pulpal tissues have been referred to as "endo perio lesions." The pulp and periodontium are connected on an embryonic, anatomical, and functional levels. Endodontic periodontal lesions can form as a result of the transfer of irritants and pathogenic agents from the pulp to the periodontium through a number of different paths.

Living pathogens (bacteria, fungi, and viruses) as well as nonliving pathogens are the primary etiological contributors for endo perio lesions. In addition to these, a number of other contributory factors, including trauma, root resorptions, perforations, and dental abnormalities, are crucial in the development and progression of such lesions.(3) The pulp's state has a significant impact on how susceptible it is to microbial invasion. Microbial

invasion is exceedingly difficult to succeed in a critical pulp. Oral microbes have a difficult time penetrating the surface of a healthy pulp, and they may even be completely blocked. In contrast, bacteria quickly penetrate and colonize a necrotic pulp. Inflammatory byproducts of pulpal origin may leak out through these pathways when the pulp becomes necrotic and cause the adjacent alveolar bone and cementum to resorb as well as start/trigger an inflammatory vascular response in the periodontium, destroy periodontal tissue fibers, and initiate or trigger an inflammatory vascular response in the pulp. The aggressiveness of the microorganisms, the duration of the illness, and the host defense mechanism all have a role in the nature and scope of periodontal damage. Retrograde pulpitis is the term used to describe the opposite effect of a necrotic pulp on the periodontal ligament. The impact of periodontal disease on the tooth pulp has been a source of debate in the dentistry literature for the past century. The pulp has a large capacity for survival thanks to its highly developed vascular system, which includes a network of capillary beds, precapillary sphincters, and arteriovenous shunts.(3,4) According to clinical observations, it is uncommon to encounter a virgin tooth (one without decay, restorations, fracture, or perforation) that has periapical pathosis and whose source of the pulp's necrosis is unknown. Numerous investigations have shown that pulp is unaffected by periodontal disease or its after effects.(4) On the other side, studies have shown that periodontal disease has an atrophic and degenerative effect on the pulp, including a reduction in pulp cell quantity, an increase in dystrophic calcifications, fibrosis, as well as a direct inflammatory effect. Therefore, pulpitis and pulpal necrosis should be thought of as possible symptoms of periodontal disease and its therapies.(1) However, it has been argued that periodontal disease has little to no impact on the pulp unless it reaches the tooth's apex, that the dental pulp is resilient enough to withstand serious trauma, and that both periodontal disease and periodontal therapy have a small impact on the pulp. Even though there are numerous studies that contradict one another.(1) Artifacts produced as a result of insufficient

fixation are still viewed as pathological evidence. They advised a careful examination of the studies written before 1975 as well as some after to determine whether their descriptions of alleged pulp pathosis are actually just histology artifacts.(5) In the past, debate has focused on how periodontal disease affects the dental pulp, but more recently, the impact of pulpal necrosis on the beginning and progression of marginal bone loss has received attention. The possible impact of a tooth with necrotic pulp or a tooth that has undergone root canal therapy has been considered as a risk factor in the beginning, advancement, and resolution of periodontal disease pockets.(1) According to numerous studies, a pulpless tooth with a periapical lesion encourages the creation of periodontal pockets, the development of periodontal disease, and interferes with the healing of a periodontal lesion following periodontal therapy. Additionally, it has been discovered that excessive instrumentation during root canal shaping and cleaning, as well as the extrusion of irrigants, sealant, and gutta percha points, may cause periapical trauma and prevent the growth of new bone, cement, and connective tissue.(1) Therefore, when periodontal therapy must be followed by endodontic therapy, measures should be taken.

Nomenclature distinguishes between lesions of the apical periodontal tissues linked to endodontic pathology and lesions caused by periodontal pathogens, as found in chronic periodontitis. The two are simple to distinguish when the site is distinct and the lesion is discrete. when they jointly impact the periodontium's marginal and apical regions, necessitating the need of differential diagnostics to determine their underlying etiology.(1) The diagnosis of primary endodontic disease and primary periodontal disease is typically straightforward if a patient has been closely watched over time. However, once the lesions reach their final stage, they typically present with similar clinical and radiographic features, making the differential diagnosis more difficult. For instance, both a long-standing periodontal lesion that has advanced to the apex and a progressive periapical lesion with

subsequent involvement of periodontal tissues will exhibit identical clinical and radiographic symptoms.(6) An endodontic etiology can be ruled out when a pulp vitality test is positive, making it simpler to identify the cause of the lesion. However, pulp testing might not always be trustworthy. This factor is especially important when issues with pulpal state are caused by periodontal illnesses, such as partial necrosis of the pulp in a tooth with many roots caused by persistent periodontal infections.(7) A further diagnostic challenge arises if pulpal necrosis is accompanied by inflammatory involvement of the periodontal tissue. These pulpal lesions in this case typically develop at the tooth's apex, but they can also happen anywhere that the lateral and furcal canals enter the periodontium. Because of this, a precise diagnosis can be made through a complete history taking, oral hard and soft tissue examination, pulp testing techniques, and periodontal probing. (7)

## **MATERIALS AND METHOD**

This study has been approved by the ethical committee of riyadh elm university research center with registration number "FRP/2022/491/899".

An electronic search of the English literature from January 2000 to April 2022 will be performed in PubMed/MEDLINE, Web of science and Scopus databases using the following keywords endo perio lesions, diagnosis, management. PRISMA 2020 guidelines was used to describe the selection process of searched article.

## **DISCUSSION**

### **Gingival disease in its early stages**

Only periodontal therapy should be used to treat primary periodontal disease. However, the prognosis of primary periodontal lesions is not as good as primary endodontic lesions. In this situation, the prognosis relies on the severity of the periodontal disease, the effectiveness of periodontal therapy, and patient response.(3) First, hygiene phase therapy should be used to

treat primary periodontal lesions. Therefore, it is necessary to eliminate the lesion-related poor restorations and developing grooves. If periodontal surgery is deemed required, it should be done after the hygiene phase of therapy is finished. Due to the fact that strong surgical periodontal operations may remove cementum and expose dentinal tubules, which in turn transport irritants and induce pulpal inflammation and necrosis of the dental pulp, the existence of an intact cementum layer is crucial for the protection of the pulp. Therefore, during periodontal care, doctors should exercise caution, refrain from using irritants, and use ultrasonic and rotary scaling tools sparingly.(1,3)

### **Primary endodontic disease and secondary periodontal lesions**

In comparison to teeth affected exclusively by primary endodontic disease, teeth with various lesions require a different course of therapy and have a different prognosis.(6) The degree of the secondary periodontal involvement plays a major role in the prognosis for treatment of initial endodontic disease. Endodontic and basic hygiene phase therapy should be used as the initial treatments for teeth with these diseases. In this instance, multiple visit endodontics should be used, and injecting medication into the canal has proven to be quite effective in lowering inflammation and promoting repair.(1) In two to three months, treatment outcomes should be assessed, and only then may additional periodontal therapy be considered. This course of therapy gives enough time for initial tissue healing and a more accurate evaluation of the periodontal health. Additionally, it lessens the chance of introducing bacteria and associated waste products while periodontal repair is still in its early stages.(8) It has been indicated that extensive removal of the periodontal ligament and underlying cementum during interim endodontic therapy may have a negative impact on periodontal healing and should be avoided. Only a portion of the lesion may heal up to the level of the secondary periodontal lesion with endodontic treatment alone, so combined endodontic and periodontal treatments should be performed in cases where healing with endodontic therapy alone does

not occur.(1,3) The extent of the marginal periodontal damage and the success of the periodontal treatment determine the prognosis if the endodontic treatment is effective. Iatrogenic harm from the implantation of pins or posts or root canal therapy, such as root perforation or fracture, may also result in primary endodontic diseases with secondary periodontal involvement. Treatment for root perforations is based on the cause of the condition. The results of treating root perforations rely on the size, location, timing of diagnosis and therapy, the extent of periodontal disease, the sealer's capacity for sealing, and its biocompatibility.(1,3)

It is well known that prompt perforation closure and effective infection management are crucial for the treatment's success. To seal root perforations, a number of materials have been suggested, including mineral trioxide aggregate, reinforced zinc oxide eugenol cement, glass ionomer cements, and Vitremer.(9) Additionally, initial endodontic diseases with secondary periodontal involvement may show up as root fractures. These frequently have posts and crowns and are seen on teeth that have had their roots treated. Treatment options vary depending on the type of fracture, its size, where it occurred, and its location. For instance, a single-rooted tooth with lesions brought on by a vertical root fracture has a hopeless prognosis and should be extracted, whereas molars can be treated with root resection or hemisection.(1) But several case studies of novel treatments and methods used to keep anterior teeth in place are recorded in the literature, with different degrees of effectiveness. Either the fractured segment was removed by the doctor, or they tried to connect the root using a biocompatible substance. Therefore, the merits of keeping the tooth root in place should be carefully assessed versus extraction and replacement with a denture, bridge, or implant before choosing any complex or lengthy reconstructive treatment.(10)

**Genuine combined lesions, secondary endodontic lesions, and primary periodontal lesions**

Endodontic and periodontal regenerative therapies are required for primary periodontal disease with secondary endodontic involvement and for real combined endodontic periodontal disorders. Without a concurrent regenerative surgery, the success rate of the endodontic periodontal mixed lesion has been reported to vary from 27% to 37%. Three types of combined lesions can be distinguished: the first are teeth with two distinct lesions, one endodontic (typically periapical) and the other periodontal, with no communication; the second are teeth with one lesion that includes both endodontic and periodontal pathoses; and the third are teeth with endodontic and periodontal lesions that were previously separate but are now communicating.<sup>(3)</sup> The initial management of true mixed lesions should be that of primary endodontic lesions with secondary periodontal involvement. Palliative periodontal treatments and root canal therapy must be finished before surgery. True mixed lesions frequently have a poor or even hopeless prognosis, especially if they are chronic and widespread periodontal lesions.<sup>(1,3)</sup> The effectiveness of periodontal therapy largely determines the prognosis of combination disorders. Although root amputation, hemisection, or bicuspidization may allow the root configurations to be sufficiently changed so that some of the root structure can be saved, the operator must take into account a number of factors prior to root resection, including tooth function, root filling, anatomy, restorability, bone support around the healthy root, and patient compliance.<sup>(11)</sup> A tooth that needs to have its root removed always needs to have a root canal, thus the surgery must be carefully planned, especially with regard to the time of the root treatment. The tooth should ideally have its root filled before surgery. By enhancing skeletal support for a tooth that is compromised, which can be done by directed tissue regeneration and bone grafting, the prognosis of the tooth can also be improved (GTR). These cutting-edge treatment solutions are based on long-term outcomes of traditional periodontal and endodontic therapy. With the help of the microscope, these regeneration techniques have been discovered to have a success rate of 77.5% when



treating mixed lesions. Since the 1980s, when GTR therapy was initially introduced, both human and animal studies have shown varying degrees of bone and attachment apparatus regeneration. As a supplemental treatment for the management of endodontic periodontal lesions, GTR therapy has also been used in endodontic procedures. (12)

Decisions and treatment plans for the use of regeneration techniques are made at many stages, including preoperative, post-root canal, intraoperative, and postoperative. At each step, factors affecting patient-specific, defect-specific, and healing outcomes should be taken into account. The presurgical evaluation entails determining and confirming the pulp's non-vital status, the scope and severity of periodontal disease, and the therapeutic prognosis of the anticipated regenerative operation.(13) When the periodontal regenerative procedure's therapeutic prognosis is found to be favorable, endodontic therapy should be offered. After a successful root canal procedure, tooth mobility should be further evaluated to see whether splinting is necessary because root canal therapy helps to limit the mobility of the afflicted tooth. Before undergoing GTR, Cortellini et al. suggested splinting the movable tooth.(12)

The shape of the periodontal defect, the type of defect, the material of choice to fill the defect and speed healing, control of the patient's oral hygiene, and wound stabilization should all be considered in the intraoperative assessment. Furthermore, these lesions require ongoing monitoring. However, cutting-edge diagnostic procedures like cone beam computer tomography, pulse oximetry, and polymerase chain reaction, which can be used to identify specific bacteria, may be valuable in assisting with a correct diagnosis. To get a good prognosis, cases need to be thoroughly discussed.(8)

## **CONCLUSION**

A perio endo lesion can have a wide spectrum of etiology, from one that is extremely simple to one that is relatively complex. The clinician must have a good awareness and scientific

knowledge of these abnormalities in order to provide an accurate diagnosis. A practitioner must provide restorative, endodontic, or periodontal therapy, either alone or in combination, notwithstanding the segmentation of dentistry into the several areas of specialization. Therefore, a multidisciplinary strategy should be used to treat these lesions in the best way possible.

## REFERENCES

1. Sunitha V R, Emmadi P, Namasivayam A, Thyegarajan R, Rajaraman V. The periodontal - endodontic continuum: A review. *J Conserv Dent.* 2008;11(2):54-62. doi:10.4103/0972-0707.44046
2. M Zehnder , S I Gold, G Hasselgren. Pathologic interactions in pulpal and periodontal tissues. *J Clin Periodontol.* 2002 Aug;29(8):663-71. doi: 10.1034/j.1600-051x.2002.290801.x.
3. Singh P. Endo-perio dilemma: a brief review. *Dent Res J (Isfahan).* 2011;8(1):39-47.
4. C Yu, PV Abbott. An overview of the dental pulp: its functions and responses to injury. *Australian Dental Journal Supplement* 2007;52:(1 Suppl):S4-S16
5. Taqi SA, Sami SA, Sami LB, Zaki SA. A review of artifacts in histopathology. *J Oral Maxillofac Pathol.* 2018;22(2):279. doi:10.4103/jomfp.JOMFP\_125\_15
6. Al-Fouzan KS. A new classification of endodontic-periodontal lesions. *Int J Dent.* 2014;2014:919173. doi:10.1155/2014/919173
7. Chen E, Abbott PV. Dental pulp testing: a review. *Int J Dent.* 2009;2009:365785. doi:10.1155/2009/365785
8. Cho YD, Kim KH, Lee YM, Ku Y, Seol YJ. Periodontal Wound Healing and Tissue Regeneration: A Narrative Review. *Pharmaceuticals (Basel).* 2021;14(5):456. Published 2021 May 12. doi:10.3390/ph14050456

9. Estrela C, Daniel de Almeida Decurcio, Rossi-Fedele G, Silva JA, Guedes OA, Borges AH. Root perforations: a review of diagnosis, prognosis and materials. *Braz Oral Res.* 2018 Oct 18;32(suppl 1):e73. doi:10.1590/1807-3107bor-2018.vol32.0073.
10. Parirokh M, Zarifian A, Ghoddusi J. Choice of Treatment Plan Based on Root Canal Therapy versus Extraction and Implant Placement: A Mini Review. *Iran Endod J.* 2015;10(3):152-155. doi:10.7508/iej.2015.03.001
11. Sharma R, Hegde V, Siddharth M, Hegde R, Manchanda G, Agarwal P. Endodontic-periodontal microsurgery for combined endodontic-periodontal lesions: An overview. *J Conserv Dent.* 2014;17(6):510-516. doi:10.4103/0972-0707.144571
12. Kwon EY, Cho Y, Lee JY, Kim SJ, Choi J. Endodontic treatment enhances the regenerative potential of teeth with advanced periodontal disease with secondary endodontic involvement. *J Periodontal Implant Sci.* 2013;43(3):136-140. doi:10.5051/jpis.2013.43.3.136
13. Holland R, Gomes JE Filho, Cintra LTA, Queiroz ÍOA, Estrela C. Factors affecting the periapical healing process of endodontically treated teeth. *J Appl Oral Sci.* 2017;25(5):465-476. doi:10.1590/1678-7757-2016-0464