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Review Article

A Comprehensive Review of Periodontal-Endodontic Lesion Diagnosis and Management

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ABSTRACT

There are morphological, functional, and developmental roots to the link between the periodontium and pulp. The growth of ectomesenchymal cells produces the dental papilla and follicle. The importance of this communication and its implications for the onset of the disease and subsequent treatment must be understood by clinicians. Therefore, in this study, we will evaluate the appropriate literature discussing periodontal-endodontic lesions. From 1990 to 2021, the PubMed database was searched for relevant articles using the following keywords: “combined periodontal-endodontic lesion”, “periodontal treatment”, “root canal therapy”, “combined lesions”, and “perio-endo lesion”. Several etiologic factors have played a role in the development of endodontic and periodontal diseases. However, it has been suggested that the most plausible cause is the idea of microbial participation. After periodontal disease causes various pathological abnormalities in the pulp, which are aided by lateral or auxiliary canals, bacteria develop plaque on the denuded root surfaces. Finally, physicians must understand that endodontic treatment is more predictable than the two diseases in periodontal–endodontic lesions. However, the successful completion of periodontal therapy is a prerequisite for the success of endodontic treatment. For successful long-term results, both viewpoints of periodontal and endodontic disorders must be treated comprehensively.

Keywords: Periodontal-endodontic lesion, Periodontal treatment, Root-canal therapy, Periodontal-endodontic lesion evaluation

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Introduction

The tooth, the pulp tissue inside it, and its supporting structures are the components that make up the dental unit. Those structures form a single biologic unit, notwithstanding their morphological differences. Because of their close closeness, these structures have an impact on each other in both pathological and good functioning points [1, 2].

The periodontium and pulp have a connection that has morphological, functional, and developmental roots. The growth of ectomesenchymal cells produces the dental papilla and follicle. The pulp is derived from the follicle, while the periodontium is derived from the dental papilla [3].

The pulp and periodontal tissues are closely related, making it easy for illness to spread between them. Since advanced periodontitis and infected root canals have many significant microbiological similarities, several research studies have supported this finding [1, 4–7]. Furthermore, the existence of a link between the periodontal tissues and the pulp is further supported by the striking parallels in the composition of the cellular infiltrates in the two diseases [8, 9]. Consequently, these results support the hypothesis that there might be cross-communication between the pulp and periodontal tissues.

Three main routes contribute to the formation of periodontal-endodontic lesions: (1) dentinal tubules, (2) lateral and accessory canals, and (3) apical foramen. Periodontal disease's main problem is that it is a slowly progressing condition that frequently leads to the atrophy of the tooth pulp. The disease's rate of progression may be influenced by other variables. Deep root planning is one example of a periodontal care strategy that has been demonstrated to hasten pulpal inflammation and exacerbate interconnected disease processes [4, 10].

The periodontal-endodontic lesion arises by extending periodontal damage apically and merging it with an existing periapical or endodontic lesion on the edge. Clinicians must realize the significance of this communication and its impact on illness onset and subsequent care. Therefore, in this study, we will evaluate the appropriate literature concerning periodontal-endodontic diseases.

Materials and Methods

The literature search was carried out within the PubMed database using the keywords: "combined periodontal-endodontic lesion", "periodontal treatment", "root canal therapy", "combined lesions" and "perio-endo lesion" from 1990 to 2021. In addition, the Google Scholar database was used for further literature searches. Following the review of abstracts, the papers related to the present study were manually chosen. Regarding the inclusion criteria, the papers were chosen according to the inclusion of one of the following topics: combined periodontal-endodontic lesion, and periodontal treatment. Exclusion criteria included all other papers lacking any of these topics as their main endpoint.

The results of the literature search were gathered. The abstract of each paper was reviewed by the team and all papers that did not address the primary endpoint were excluded. The full text of the selected papers was then screened and findings of each paper were summarized.

Results and Discussion

The effect of periodontal lesions on the pulp

The growth of periodontal-endodontic lesions has been attributed to a variety of causative factors. However, it has been said that the most plausible culprit is the idea of microbial participation. Bacterial plaque on the denuded root surfaces is created when the periodontal disease causes various pathological pulp abnormalities that are aided by accessory or lateral canals. Retrograde pulpitis is another term used in the literature to describe this phenomenon [10–13]. The influence of periodontal diseases on the pulp may cause atrophic alterations. Pulpal hypoplasia, mineralization dystrophy, fibrosis, inflammation, and resorption are a few examples of degenerative changes that can also happen [4, 5].

The impacts of endodontic infection on the periodontium

Numerous investigations have demonstrated that intrapulpal infections might have an impact on the stimulation of epithelial down-growth along a denuded dentin surface [2, 14]. Furthermore, studies that created periodontal defects in infected teeth have shown that the epithelium is one-fifth more abundant in infected teeth than in non-infected teeth. Also, compared to infected teeth, non-infected teeth were more likely to have connective tissue with 10% greater coverage [8, 12, 13]. Pulpal infections must thus be addressed first in the care strategy, followed by periodontal regeneration procedures [15].

Assortment of periodontal–endodontic lesions

Simon *et al*. [16] created one of the most widely used classification schemes for periodontal–endodontic lesions. Periodontal-endodontic lesions may be divided into five groups based on their categorization, which are: (1) initial endodontic lesion, (2) initial periodontal lesion, (3) initial endodontic lesion with secondary periodontal engagement, (4) initial periodontal lesion with secondary endodontic engagement, and (5) true combined lesion [16-18].

Diagnosis of periodontal-endodontic lesions

For a skilled physician, identifying early periodontal and endodontic diseases is usually not difficult. Pulpal vitality is the major characteristic that distinguishes primary endodontic lesions from periodontal lesions [14, 19]. Primary endodontic lesions are non-vital because the pulp is diseased, unlike primary periodontal lesions. Vital pulp is fairly straightforward to recognize since it responds to tests. A few clinical investigative techniques that can be used to identify periodontal-endodontic lesions are displayed in **Table 1** [12].

Table 1. Detective processes that may be applied to diagnose periodontal–endodontic lesions

Procedures	Clinical features/ findings
Soft tissues inspection	Inflammatory changes
	Ulcers
	Formation of sinuses
Palpation	Peri-radicular anomalies
	Compared with control teeth

Mobility	Loss of periodontal support
	Roots fractures
	Evidence of traumatic changes
	Peri-radicular abscesses

Treatment of periodontal-endodontic lesions

Before beginning any restoration procedure, it is critical to assess the tooth's prognosis to control periodontal-endodontic lesions [2]. The patient's welfare requires that the intervention's cost-effectiveness be taken into account. In cases when the review determined that an intervention was reasonable due to the patient's capacity or expense, extraction is regarded as the preferred course of therapy [15].

The lesion could be healed with traditional endodontic therapy alone if the pulp is infected and not vital. Even when peri-radicular and periodontal abscesses are present, surgical endodontic treatment may not always be required [6].

First, the first line of treatment for periodontal-endodontic diseases should be a trial period of adequate oral hygiene. Patients find it challenging to maintain their oral hygiene when developing grooves or poorly executed restorations are managed [7, 15]. Only when a successful hygienic therapy has ended may surgical intervention be initiated. In addition to surgical methods, periodontal treatment may be used to try to promote pulpal regeneration [13, 14].

Conclusion

In summary, physicians must understand that endodontic therapy is more predictable than the two illnesses in lesions that are both periodontal and endodontic. However, success with endodontic treatment is contingent upon the completion of periodontal therapy. For successful long-term results, both viewpoints of periodontal and endodontic disorders must be treated comprehensively.

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