

AN OVERVIEW ON PERIODONTAL – ENDODONTIC LESIONS DIAGNOSIS AND MANAGEMENT: A LITERATURE REVIEW

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ABSTRACT

The relationship between the periodontium and pulp can be traced back to embryonal, anatomical, and functional origins. Dental papilla and follicle are products of the proliferation of ectomesenchymal cells. Clinicians need to recognize the importance of this communication and its consequences on disease development and later management. Therefore, in this paper, we will review the proper literature discussing the Periodontal – endodontic lesions. 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. Multiple etiologic factors have contributed to the development of Periodontal – endodontic lesions. Nevertheless, the concept of microbial involvement has been reputed as being the most likely culprit. Plaque that is formed by Bacteria on the denuded root surfaces, which occurs after periodontal disease induces different pathological malformations in the pulp which is facilitated by lateral or accessory canals. To conclude, doctors need to comprehend that endodontic therapy is rather foreseeable than the two diseases in periodontal–endodontic lesions. Nevertheless, the achievement of success of endodontic treatment is dependent on the fulfillment of periodontal treatment. The comprehensive therapy of both perspectives of periodontal – endodontic lesions is important for effective long-run outcomes.

Key words: Periodontal-endodontic lesion, Periodontal treatment, Root-canal therapy, Periodontal-endodontic lesion evaluation

Introduction

The structures that makeup the dental unit include the tooth, the pulp tissue within it, and its supporting structures. Although structurally separate, those structures makeup one biologic unit. As a result of the proximity between them, these structures affect one another in aspects related to healthy functioning and pathological ones [1, 2].

The relationship between the periodontium and pulp can be traced back to embryonal, anatomical, and functional origins. Dental papilla and follicle are products of the proliferation of ectomesenchymal cells. The follicle and dental papilla are the precursors of the pulp and the periodontium, respectively [3].

Due to the close relation between periodontal tissues and the pulp, contagion of disease could easily occur among them. Many studies have demonstrated this observation, as many substantial microbiological resemblances exist between advanced periodontitis and infected root canals [1, 4-7]. In addition, close similarities between the cellular infiltrates' makeup in both lesions also enforce the existence of a relationship among the periodontal tissues and the pulp [8, 9]. Therefore, the possibility of a cross-communication

between the pulp and periodontal tissues is feasible as supported by these studies.

Among the reasons for the development of periodontal-endodontic lesions, three pathways are of most significance, which are: (1) dentinal tubules, (2) lateral and accessory canals, and (3) apical foramen. The major issue with periodontal disease is that it is a slowly advancing illness that, in many cases, result in dental pulp atrophy. Other factors might influence the acceleration of the disease. For example, periodontal management options such as deep root planning have been shown to accelerate pulpal inflammation and thus aggravate inter-related disease processes [4, 10].

The periodontal-endodontic lesion develops by extension of either periodontal destruction apically combining with an existing periapical lesion or an endodontic lesion marginally. Clinicians need to recognize the importance of this communication and its consequences on disease development and later management. Therefore, in this paper, we will review the proper literature discussing Periodontal – endodontic lesions.

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 search. Following the reviewing 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

Multiple etiologic agents have contributed to the development of Periodontal – endodontic lesions. Nevertheless, the concept of microbial involvement has been reputed as being the most likely culprit. Plaque that is formed by bacteria on the denuded root surfaces, which occur after periodontal disease induce different pathological malformations in the pulp which is facilitated by lateral or accessory canals. This process is also known in the literature as retrograde pulpitis [10-13]. Atrophic changes can be resulted from the impact of periodontal lesions on the pulp. Several degenerative alterations can occur, too; for example, pulpal hypoplasia, mineralization dystrophy, fibrosis, inflammation, and resorption [4, 5].

The impacts of endodontic infection on the periodontium

Many studies have shown that the promotion of down-growth of the epithelium along a denuded dentin surface can be influenced by intra-pulpal infections [2, 14]. In addition, experiments that induced defects in the periodontal of infected teeth have demonstrated a one-fifth increase in the epithelium when compared to non-infected teeth. Moreover, the non-infected teeth were more likely to form connective tissue that has 10% more coverage than infected teeth [8, 12, 13]. Hence, infections of the pulpal must be priorities during the management plan, before performing periodontal regenerative processes [15].

Assortment of periodontal – endodontic lesions

One of the most wildly used systems to classify periodontal–endodontic lesions was proposed by Simon, Glick, and Frank in their 1972 work [16]. According to their classification, periodontal – endodontic lesions can be classified into 5 classes, 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

The detection of initial periodontal and endodontic lesions is typically not very challenging for a well-trained clinician. The main differencing factor between primary endodontic and periodontal lesions is pulpal viability [14, 19]. In contrast to primary periodontal lesions, the pulp is infected in primary endodontic lesions, thus is non-vital. Vital pulp is responsive to testing, therefore, it is very easy to identify. **Table 1** shows some clinical detective processes that may be applied to diagnose periodontal-endodontic lesions [12].

Table 1. Detective Processes that May be Applied to Diagnose Periodontal – endodontic Lesions

Procedures	Clinical features/ findings
Soft Tissues Inspection	Inflammatory changes
	Ulcers
Palpation	Formation of Sinuses
	Peri-radicular anomalies
	Compare with control teeth
Mobility	Loss of periodontal support
	Roots fractures
	Evidence of traumatic changes
	Peri-radicular abscesses

Treatment of periodontal-endodontic lesions

It is vital to evaluate the prognosis of the tooth before the start of any restoration work to manage periodontal-endodontic lesions [2]. The cost-effectiveness of the intervention must be considered for the well-being of the patient. If during the evaluation, it was considered that an intervention is reasonable for reasons of cost or patient’ ability, extraction is considered the treatment of choice [15].

Traditional endodontic therapy alone could resolve the lesion if the pulp is non-vital and infected. Sometimes, surgical endodontic therapy is not needed, even in cases where peri-radicular and periodontal abscesses are present [6].

Firstly, a trial period of good oral hygiene should be the initial step of the management of periodontal-endodontic lesions. Management of any poorly performed restorations or any developmental grooves makes it difficult for the patients to maintain their oral hygiene [7, 15]. Surgical intervention should only be commenced after the conclusion of a successful hygiene therapy. In addition to surgical approaches, the promotion of pulpal regeneration maybe attempted through periodontal therapy [13, 14].

Conclusion

To conclude, doctors need to comprehend that in periodontal – endodontic lesions, the endodontic therapy is highly foreseeable than the two diseases. Nevertheless, the achievement of success of endodontic treatment depends on the fulfillment of periodontal treatment. The comprehensive therapy of both perspectives of periodontal – endodontic lesions is important for effective long-run outcomes.

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References

- Jin Y, Chen B, Ni YH, Yan FH. Time lapse between endodontic and periodontal treatments of combined periodontal-endodontic lesion: a systematic review. *Hua Xi Kou Qiang Yi Xue Za Zhi*. 2018;36(2):167-73.
- Meriç P, Buduneli N, Kanmaz B, Gürlek Ö, Çömlekoğlu E, Calvert G, et al. Cholinergic signalling mechanisms and early implant healing phases in healthy versus generalized aggressive periodontitis patients: A prospective, case-control study. *J Clin Periodontol*. 2019;46(11):1155-63.
- Schmidt JC, Walter C, Amato M, Weiger R. Treatment of periodontal-endodontic lesions--a systematic review. *J Clin Periodontol*. 2014;41(8):779-90.
- Goyal L, Gupta N, Gupta ND. Autologous platelet-rich derivatives along with alloplastic bone substitute in the management of complex perio-endo cases. *J Indian Soc Periodontol*. 2020;24(2):182-5.
- Kavarthapu A, Malaiappan S. Management of periodontic-endodontic lesion in aggressive periodontitis-9 months follow-up: Report of a case. *Indian J Dent Res*. 2019;30(1):149-53.
- Hamed MT, Mously HA, Alamoudi SK, Almubarak SA, Naguib GH. Determining the Correlation between Oral Hygiene and Periodontal Conditions around Different Types of Restorations Using Radio-graphic Evaluation. *Int J Pharm Res Allied Sci*. 2019;8(4):184-92.
- Shahraki HA, Saberi EA, Maserrat V, Moghadam MD, Nejad SM. In Vitro Comparison of Apical Micro Leakage in Root Canal Prepared Wave One and Reciproc Files. *J Biochem Technol*. 2020;11(2):65-70.
- Alquthami H, Almalik AM, Alzahrani FF, Badawi L. Successful Management of Teeth with Different Types of Endodontic-Periodontal Lesions. *Case Rep Dent*. 2018;2018:7084245.
- Pico-Blanco A, Castelo-Baz P, Caneiro-Queija L, Liñares-González A, Martín-Lancharro P, Blanco-Carrión J. Saving Single-rooted Teeth with Combined Endodontic-periodontal Lesions. *J Endod*. 2016;42(12):1859-64.
- Makino-Oi A, Ishii Y, Makino K, Kondo A, Uekusa T, Ishizuka Y, et al. Treatment of Severe Chronic Periodontitis with Surgical and Prosthetic Intervention: A 9-year Follow-up Case Report. *Bull Tokyo Dent Coll*. 2017;58(4):237-46.
- Dhous S, Laslami K, Rouggani F, El Ouazzani A, Jabri M. Endo-Perio Lesion and Uncontrolled Diabetes. *Case Rep Dent*. 2018;2018:7478236.
- Herrera D, Retamal-Valdes B, Alonso B, Feres M. Acute periodontal lesions (periodontal abscesses and necrotizing periodontal diseases) and endo-periodontal lesions. *J Periodontol*. 2018;89 Suppl 1:S85-s102.
- Jivoinovici R, Suciú I, Gheorghiu I, Suciú I. Clinical radiological aspects of primary endodontic lesions with secondary periodontal involvement. *J Med Life*. 2017;10(1):70-5.
- Oh SL, Fouad AF, Park SH. Treatment strategy for guided tissue regeneration in combined endodontic-periodontal lesions: case report and review. *J Endod*. 2009;35(10):1331-6.
- Gomes MS, Blattner TC, Sant'Ana Filho M, Grecca FS, Hugo FN, Fouad AF, et al. Can apical periodontitis modify systemic levels of inflammatory markers? A systematic review and meta-analysis. *J Endod*. 2013;39(10):1205-17.
- Simon JH, Glick DH, Frank AL. The relationship of endodontic-periodontic lesions. *J Periodontol*. 1972;43(4):202-8.
- Al Attas MA, Edrees HY, Sammani AMN, Madarati AA. Multidisciplinary management of concomitant pulpal and periodontal lesion: A case report. *J Taibah Univ Med Sci*. 2017;12(5):455-60.
- Jivoinovici R, Suciú I, Dimitriu B, Perlea P, Bartok R, Malita M, et al. Endo-periodontal lesion--endodontic approach. *J Med Life*. 2014;7(4):542-4.
- Kumar KA, Chakravarthy M, Selvarajan S, Ramakrishnan T, Ari G. Use of an amniotic membrane as a novel barrier in a tooth with a questionable prognosis. *J Indian Soc Periodontol*. 2017;21(3):237-40.