

Prognosis and Histological Diagnosis of Periapical Lesions treated by Periapical Surgery

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Abstract:

Background: The objective of this research was to investigate the samples obtained from periapical surgery and their histological diagnosis as well as their radiographic dimensions.

Material and methods: After performing tissue curettage, a total of 40 biopsies were taken during periapical surgery and subjected to histological examination, resulting in diagnoses of granuloma, cyst, or scar tissue. The size of the lesions was measured both before the surgery and after 1 year also. The progression was evaluated at a year mark post-surgery, following the criteria established by von Arx and Kurt. Statistical analysis included assessing inter-variable correlations using analysis of variance, followed by Tukey test, and determining the Pearson coefficient.

Results: The study involved 40 participants, consisting of 10 females and 30 males, with an average age of 35.4 years (ranging from 16 to 54 years). Among the samples, 18% were identified as apical scar, 72% as granulomas, and 10% as cystic lesions.

Conclusion: Cysts, along with large abnormalities, exhibit the least favorable progression, and the prognosis for periapical lesions is contingent upon the specific lesion type and its radiographic dimensions.

Keywords: periapical lesions, periapical surgery, histology.

Introduction:

Treating endodontically treated teeth with persistent periapical lesions can be a complex and demanding process. Challenges may arise from undetected extra canals, obstructions of the canals, cracks, the formation of ledges, broken instruments, and the presence of irreparable posts within the canals, all of which can complicate retreatments. While canal retreatments can yield successful results, there are instances where lesions do not heal, surgical options as surgery periapically or removal of teeth become the only viable choices.¹⁻³ Frequently, periapical injuries continue to exist because the infection is incompletely cleared, and in such cases, the management is deemed failure.⁴ Periapical abnormalities can persist even after a tooth has undergone precise cleaning and restoration of the root canal, leading to periodontitis without any noticeable symptoms, as indicated by a radiolucent area.⁵ 6 major predictors have been identified as reasons for the absence of signs associated with periapical periodontitis following rct: Persistent intraradicular infection, foreign bodies giant cells reactions triggered by filling materials, actinomycosis, endogenous crystals of cholesterol which injures the tissue periapically, true

cyst, and formation of scar.⁶ Therefore, the objective of this study was to investigate the connection between the prognosis of seventy samples obtained through periapical surgery and their histological diagnosis as well as their radiographic dimensions.

Material and methods:

In this study, a total of 40 participants were included. The lesion periapically was eliminated with curettage, followed by a minimally beveled apicoectomy procedure. To create the retrograde cavity, ultrasonic technology with ultrasound tips customized for various variations of root and anatomical was employed. The filler was consistently placed and compacted in the cavity. During the periapical surgery, biopsies were performed, and these biopsy specimens were promptly placed in a ten percent solution of formaldehyde with a 1:10 ratio for fixation. Subsequently, these preserved samples were subjected to processing using an automated processor and then embedded in paraffin. Panoramic radiographs were taken before and after surgery using a digital orthopantomogram. Descriptive statistics were used to calculate all the mean values, and percentages for the relevant variables. Analysis of

variance was done to examine between the parameters,

Results:

The study involved 40 participants, consisting of 10 females and 30 males, with an average age of 35.4 years (ranging from 16 to 54 years). Among the samples, 18%

followed by Tukey test and the Pearson coefficient.

were identified as apical scar, 72% as granulomas, and 10% as cystic lesions. The results from the Tukey testing revealed that cysts had a less favorable prognosis compared to other types of lesions, and it was significant that the type of lesion had an impact on its progression at the 1 year mark.

Table 1: Gender-wise distribution of subjects.

Gender	Number of subjects
Males	10
Females	30
Total	40

Discussion:

Periapical injuries, which arise from necrosis of the pulp, are highly prevalent abnormalities observed in the alveolar bone. When the pulp is exposed to bacteria, which serve as foreign body, it can trigger both non-specific inflammatory and specified immune responses within the periradicular tissues, ultimately leading to the development of lesions periapically.^{7,8} The cyst or granuloma has been identified as a predictor that could potentially negatively impact the result of root.⁹⁻¹¹ In the present study, a less favorable prognosis was noted for surgically managed lesions periapically that were diagnosed as cysts on histological basis. Matsumoto et al¹² reported that the prediction for treating large lesions periapically was less favorable compared to that of smaller lesions. According to Harrison and Jurosky¹³ if lesion's size is small, it's feasible to completely remove the pathological tissue. In contrast, when the lesion is larger in size, there is a higher likelihood of incomplete curettage, making the procedure less successful. Conversely, Rahbaran et al.¹⁴ propose that size of the lesion does not exert a significant impact on the management's success. Similarly, both Strindberg¹⁵ and Sjögren et al¹⁶ discovered insignificant probabilities in healing rates between lesions that were initially large or small in size than 5 mm. Çalışkan¹⁷ observed that the failure rate of teeth with lesions ranging from 11-18 mm in diameter was slightly higher compared to teeth with lesions measuring 7-10 mm. In the present study, large sized lesions were linked to a less favorable predictions, as indicated by findings from other researchers.¹⁸⁻²⁰

Conclusion:

The prognosis of a periapical lesion depends on its type and radiographic dimensions, with cysts and large sized lesions typically exhibiting a more adverse progression.

References:

1. Sjögren U, Figdor D, Persson S, Sundqvist G. Influence of infection at the time of root filling on the outcome of endodontic treatment of teeth with apical periodontitis. *Int Endod J.* 1997;30:297–306.
2. Çalışkan MK, Kaval ME, Tekin U, Ünal T. Radiographic and histological evaluation of persistent periapical lesions associated with endodontic failures after apical microsurgery. *Int Endod J.* 2016;49:1011–9.
3. Çalışkan MK. Nonsurgical retreatment of teeth with periapical lesions previously managed by either endodontic or surgical intervention. *Oral Surg Oral Med Oral Pathol Oral RadiolEndod.* 2005;100:242–8.
4. Sundqvist G, Figdor D. Endodontic treatment of apical periodontitis. In: Orstavik D, Pitt Ford TR, editors. *Essential endodontology.* Oxford, UK: Blackwell; 1988. pp. 242–77. [Google Scholar]
5. Carrillo-García C, Vera-Sempere F, Peñarocha-Diogo M, Martí-Bowen E. The post-endodontic periapical lesion: histologic and etiopathogenic aspects. *Med Oral Patol Oral Cir Bucal.* 2007;12:E585–90.
6. Nair PN. On the causes of persistent apical periodontitis: a review. *Int Endod J.* 2006;39:249–81.
7. Liapatas S, Nakou M, Rontogianni D. Inflammatory infiltrate of chronic periradicular lesions: an immunohistochemical study. *Int Endod J.* 2003 Jul;36(7):464-71.
8. Ricucci D, Mannocci F, Ford TR. A study of periapical lesions correlating the presence of a radiopaque lamina with histological findings. *Oral Surg Oral Med Oral Pathol Oral RadiolEndod.* 2006 Mar;101(3):389- 94.
9. Ricucci D, Bergenholtz G. Histologic features of apical periodontitis in human biopsies. *Endod Topics* 2004;8:68-87.
10. Nair PN. On the causes of persistent apical periodontitis: a review. *Int Endod J.* 2006 Apr;39(4):249-81.
11. Pinheiro ET, Gomes BP, Ferraz CC, Sousa EL, Teixeira FB, SouzaFilho FJ. Microorganisms from canals of root-filled teeth with periapical lesions. *Int Endod J.* 2003 Jan;36(1):1-11.
12. Matsumoto T, Nagai T, Ida K, et al: Factors affecting successful prognosis of root canal treatment. *J Endod* 13:239, 1987.
13. Harrison J, Jurosky K: Wound healing in the tissues of the periodontium following periradicular

- surgery. The excisional wound. *J Endod* 18:76, 1992
14. Rahbaran S, Gilthorpe MS, Harrison SD, et al: Comparison of clinical outcome of periapical surgery in endodontic and oral surgery units of a teaching dental hospital: A retrospective study. *Oral Surg Oral Med Oral Pathol* 91:700, 2001
 15. Strindberg LZ: The dependence of the result of pulp therapy on certain factors. An analytic study based on radiographic and clinical follow-up examinations. *Acta Odontol Scand* 14:1, 1956
 16. Sjögren U, Hagglund B, Sundqvist G, et al: Factors affecting the long-term results of endodontic treatment. *J Endod* 16:3, 1990
 17. Çaliskan MK: Prognosis of large cyst-like periapical lesions following nonsurgical root canal treatment: A clinical review. *Int Endod J* 37:408, 2004
 18. Gay Escoda C: Cirugía periapical de los molares inferiores. *Rev Actual Estomatol* 353:33, 1986
 19. Molven O, Halse A, Grung B: Incomplete healing (scar tissue) after periapical surgery, radiographic findings 8 to 12 years after treatment. *J Endod* 22:264, 1996
 20. Wang Q, Cheung GSP, Ng RPY: Survival of surgical endodontic treatment performed in a dental teaching hospital: A cohort study. *Int Endod J* 37:764, 2004