



A decision analysis for periapical surgery

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Abstract

Background: This study was conducted to analyse and evaluate the factors that affect the decision-making process for periapical surgery.

Material and methods: This study evaluated clinical and radiographic information from individuals who had periapical surgery in the past. Technical, biological, and combination considerations were used to categorize the variables that went into the decision to perform periapical surgery.

Results: In this study, persistent clinical symptoms (26%) were the biological element in common. Cyst (14%) was the other biological component. The failure of earlier endodontic therapy or retreatment accounted for 70% of all technical causes. The most frequent likely cause of cyst formation was discovered to be coronal restoration. Histopathological analysis revealed that these cysts were radicular cysts. One tooth was affected in 57 patients, two teeth in 12, three teeth in 11, four teeth in 10, five teeth in 5, six teeth in 4, and seven teeth in one patient. 29% of all apical lesions were larger than 5 mm.

Conclusion: To avoid needless surgical treatments, it is crucial to inform and urge the subjects to undergo endodontic retreatment.

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Introduction

Endodontic treatment is usually performed in teeth with periapical lesions. However, in some cases the pathology persists. Thus, periapical surgery has to be performed. It is considered to be the last treatment option before the extraction of a tooth. The main objective of periapical surgery is to seal the root canal system, thereby enabling healing by forming a barrier between the irritants within the confines of the affected root and the periapical tissue. The success of periapical surgery is usually determined by both radiological signs and clinical signs and symptoms.^{1,2}

The decision to perform periapical surgery should be based on comprehensive examination of the patient's dental, oral and medical conditions. In fact, however, treatment decisions are often based on the preferences and experience of the clinician. Moreover, patients often tend to choose the least costly option, i.e. tooth extraction, overlooking the functional, aesthetic and psychological results of tooth loss.³ Few previous studies have assessed the relative importance of the different factors involved in the decision to perform periapical surgery.⁴ Despite the fact that case and treatment selection represent the first stage of treatment, only three retrospective studies to date have investigated the decision-making process involved in periapical surgery,^{5,6} which has been examined mainly in terms of contemporary microsurgical techniques and prognostic factors.^{7,8}

Hence, this study was conducted to analyse and evaluate the factors that affect the decision-making process for periapical surgery.

Material and methods

Overall, 100 subjects were included. The patients who underwent apical surgery formed the basis of this retrospective analysis. Records comprised initial clinical examinations, primary symptoms, history of the referred tooth, account of treatment given prior to referral, and general medical status in addition to referral letters and existing radiographs. Patients without records or with radiographs of low quality were not included in the study. Oral and maxillofacial surgeons looked over patient files. The American Society of Anaesthesiology used a classification system for patients' physical conditions. A transparent, flexible ruler (mm) and an x4 magnifying lens were used to visually inspect radiographs to determine their quality. Technical, biological, and combination criteria were used to categorize the aspects in this study that affected the decision to perform periapical surgery. Root-canal treatment, post, coronal restoration, damaged tools, extruded material, calcification, and other technical

problems were among them. The biological aspects included periradicular abnormalities such as cysts and persistent clinical complaints. Technical and biological aspects were merged when they occurred simultaneously and played a role in the same decision-making process.

The Statistical Package for the Social Sciences software, version 21.0, was used to conduct the statistical analysis. Descriptive statistics were employed to examine the frequencies' pertinent significance.

Results

Table 1: gender-wise distribution of subjects.

Gender	Number of subjects	Percentage
Males	75	75%
Females	25	25%
Total	100	100%

Overall, 100 subjects were included out of which 75 were males and 25 were females. Mean age of subjects was 29.7 years.

Table 2: factors deciding apical surgery.

Factors	Number of cases
Biological	40
Technical	10

In 40% of patients, apical surgery was recommended for biological grounds, and in 10% for technical ones.

In this study, persistent clinical symptoms (26%) were the biological element in common. Cyst (14%) was the other biological component. The failure of earlier endodontic therapy or retreatment accounted for 70% of all technical causes. The most frequent likely cause of cyst formation was discovered to be coronal restoration. Histopathological analysis revealed that these cysts were radicular cysts. One tooth was affected in 57 patients, two teeth in 12, three teeth in 11, four teeth in 10, five teeth in 5, six teeth in 4, and seven teeth in one patient. 29% of all apical lesions were larger than 5 mm.

Discussion

Periapical surgery has always been considered as the last option prior to tooth extraction, with an unpredictable outcome. Today this technique has evolved so that we can discuss the periapical microsurgery, obtaining very good results and predictable healing of many periapical lesions associated with endodontic pulp pathology.

Von Arx et al.⁹ published a literature review to clarify which are the most influential factors for the success of periapical surgery. They divided the studied factors in patient-related, tooth-related and treatment-related factors.

Regarding the patient-related factors, age and gender constitute the studied items in the literature. Only 2 studies^{10,11} have found age to be an outcome predictor. Barone et al.¹⁰ found a healing rate in patients older than 45 years of 84%, compared with 68% for younger patients. On the contrary, Kreisler et al.¹¹ obtained the best results (95%) in patients aged between 31 and 40 years of age, compared with the total population. However, definitive conclusions cannot be drawn as most articles do not provide reliable or significant data on the importance of age. Likewise, gender seems not to be an outcome-related factor because only one study¹² found a statistically significant difference at 6 months between males and females, which had a success rate of 60% and 40%, respectively.

In this study, overall, 100 subjects were included out of which 75 were males and 25 were females. Mean age of subjects was 29.7 years. In 40% of patients, apical surgery was recommended for biological grounds, and in 10% for technical ones. Persistent clinical symptoms (26%) were the biological element in common. Cyst (14%) was the other biological component. The failure of earlier endodontic therapy or retreatment accounted for 70% of all technical causes. The most frequent likely cause of cyst formation was discovered to be coronal restoration. Histopathological analysis revealed that these cysts were radicular cysts. One tooth was affected in 57 patients, two teeth in 12, three teeth in 11, four teeth in 10, five teeth in 5, six teeth in 4, and seven teeth in one patient. 29% of all apical lesions were larger than 5 mm.

A study made by Kim et al.¹³ found that endodontic originated lesions had a 95.2% success rate while endoperiodontaloriginated lesions had serious problems for healing, obtaining a success rate of 77.5% at 12 months after periapical surgery. Besides, the fact that the teeth do not show mesial or distal bone loss increases the healing rate. This seems to be due to the risk of short and long-term apical reinfection by bacteria moving toward the apex. A study made by von Arx et al.⁷ showed that a mesial-distal crestal bone level less than 3 mm was a positive prognostic factor because a 78.2% successfully healed cases were obtained after 5 years. Contrarily, a lower success percentage of 52.9% was obtained in teeth with more than 3 mm from the cemento-enamel junction.

Teeth with a good coronal restoration are more likely to complete healing after periapical surgery, than those without a good coronal seal.¹⁰ However, Song et al.¹⁴ in a retrospective

study concluded that the possibility of re-infection of a tooth with a poor coronal seal can be avoided if a good apical seal is obtained.

Conclusion

Endodontic surgery was chosen over additional endodontic therapy in a considerable majority of patients who had at least one prior endodontic treatment on the teeth that received periapical surgery because clinical complaints persisted despite this treatment. The choice of therapy may be influenced by the clinician's preferences as well as the patient's previous negative dental treatment experiences.

References

1. von Arx T, Jensen SS, Hänni S. Clinical and radiographic assessment of various predictors for healing outcome 1 year after periapical surgery. *J Endod.* 2007;33:123–28.
2. von Arx T, Alsaeed M, Salvi GE. Five-year changes in periodontal parameters after apical surgery. *J Endod.* 2011;37:910–8.
3. Von Arx T, Roux E, Bürgin W. Treatment decisions in 330 cases referred for apical surgery. *J Endod.* 2014;40:187–91.
4. El-Swiah JM, Walker RT. Reasons for apicectomies. A retrospective study. *Endod Dent Traumatol.* 1996;12:185–91.
5. Abramovitz I, Better H, Shacham A, Shlomi B, Metzger Z. Case selection for apical surgery: a retrospective evaluation of associated factors and rational. *J Endod.* 2002;28:527–30.
6. Beckett H. Impact of a restorative dentistry service on the prescription of apical surgery in a district general hospital. *Ann R Coll Surg Engl.* 1996;78:369–71.
7. Von Arx T, Jensen SS, Hänni S, Friedman S. Five-year longitudinal assessment of the prognosis of apical microsurgery. *J Endod.* 2012;38:570–9.
8. Lieblisch SE. Current concepts of periapical surgery. *Oral Maxillofac Surg Clin North Am.* 2015;27:383–92.
9. von Arx T, Peñarrocha M, Jensen S. Prognostic factors in apical surgery with root-end filling: a meta-analysis. *J Endod.* 2010;36:957–73.
10. Barone C, Dao TT, Basrani BB, Wang N, Friedman S. Treatment outcome in endodontics: the Toronto study--phases 3, 4, and 5: apical surgery. *J Endod.* 2010;36:28–35.

11. Kreisler M, Gockel R, Aubell-Falkenberg S, Kreisler T, Weihe C, Filippi A. Clinical outcome in periradicular surgery: effect of patient- and tooth-related factors--a multicenter study. *Quintessence Int.* 2013;44:53–60.
12. Peñarrocha-Diago MA, Ortega-Sánchez B, García-Mira B, Maestre-Ferrín L, Peñarrocha-Oltra D, Gay-Escoda C. A prospective clinical study of polycarboxylate cement in periapical surgery. *Med Oral Patol Oral Cir Bucal.* 2012;17:e276–80.
13. Kim E, Song JS, Jung IY, Lee SJ, Kim S. Prospective clinical study evaluating endodontic microsurgery outcomes for cases with lesions of endodontic origin compared with cases with lesions of combined periodontal-endodontic origin. *J Endod.* 2008;34:546–51.
14. Song M, Jung IY, Lee SJ, Lee CY, Kim E. Prognostic factors for clinical outcomes in endodontic microsurgery: a retrospective study. *J Endod.* 2011;37:927–33.