

## Assessment of Profile and Prognosis of Peri-Apical Surgery: An Institutional Based Study

Ankita Agrawal<sup>1</sup> Rashmi Sinha<sup>2\*</sup> Suraj Kumar<sup>3</sup> Kumar Abhinav<sup>4</sup>

<sup>1</sup>Senior Resident, Department of Conservative Dentistry and Endodontics, Nalanda Medical College & Hospital, Patna, Bihar, India.

<sup>2</sup>Senior Resident, Department of Orthodontics and Dentofacial Orthopaedics, Nalanda Medical College & Hospital, Patna, Bihar, India.

<sup>3</sup>Consultant Dental Surgeon, Department of Oral and Maxillofacial Surgery, Patna, Bihar, India.

<sup>4</sup>Senior Resident, DNB Neurosurgery, Lilavati Hospital and Research Centre, Mumbai, Maharashtra, India.

### ABSTRACT

**Background:** Endodontically treated teeth have been reported to have shorter survival time than vital teeth. Hence; the present study was undertaken for assessing the profile and prognosis of peri-apical surgery.

**Materials & Methods:** A total of 50 patients who underwent peri-apical surgeries were enrolled in the present study. Complete demographic and clinical details of all the patients were obtained. Reasons for performing peri-apical surgery and tooth involved were recorded separately. Follow-up radiographic and clinical evaluation of all the patients was done for assessing the prognosis. Segregation of all the teeth was done based on the prognosis.

**Results:** Maxillary and mandibular anterior were the most common tooth involved in peri-apical surgery. Out of total 50 patients enrolled in the present study, excellent prognosis was observed in 78 percent of the patients. Peri-apical infection due to treatment failure was the most common cause for carrying out Periapical surgery.

**Conclusion:** Peri-apical surgeries when done with adequate care and following proper sterilization protocols have good prognosis.

**Keywords:** Peri-Apical, Surrey.

### 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 symptom.<sup>1-3</sup>

The use of a surgical microscope is strongly advocated in apical surgery since it allows inspection of the surgical field at high magnification

with excellent and focused illumination, detection of microstructures (additional canals, isthmus) and root integrity (cracks, fractures, perforations), distinction between bone and root, and identification of adjacent important anatomical structures. The objective of apical surgery is to surgically maintain a tooth that primarily has an endodontic lesion that cannot be resolved by conventional endodontic (re-) treatment.<sup>4-6</sup> Hence; under the light of above mentioned data, the present study was undertaken for assessing the profile and prognosis of peri-apical surgery.

### MATERIALS & METHODS

Received: May. 27, 2019; Accepted: July. 1, 2019

\*Correspondence Dr. Rashmi Sinha.

Department of Orthodontics and Dentofacial Orthopaedics, Nalanda Medical College & Hospital, Patna, Bihar, India.

Email: Not Disclosed

The present study was conducted with the aim of assessing the profile and prognosis of peri-apical surgery. Ethical approval was obtained from institutional ethical committee and written consent was obtained from all the patients after explaining in detail the entire research protocol. A total of 50 patients who underwent peri-apical surgeries were enrolled in the present study. Complete demographic and clinical details of all the patients were obtained. Reasons for performing peri-apical surgery and tooth involved were recorded separately. Follow-up radiographic and clinical evaluation of all the patients was done for assessing the prognosis. Segregation of all the teeth was done based on the prognosis. All the results were recorded in Microsoft excel sheet and were analysed by SPSS software. Chi- square test was used for assessment of level of significance.

## RESULTS

In the present study, a total of 50 patients were enrolled. 42 percent of the patients of the present study were of less than 25 years of age. 36 percent of the patients were of 25 to 45 years of age. 56 percent of the patients of the present study were males while the remaining 44 percent were females. Maxillary and mandibular anterior were the most common tooth involved in peri-apical surgery. Out of 12 cases of maxillary incisors and canines, success occurred in 9 patients. Out of 11 cases of maxillary incisors and canines, success occurred in 9 patients. Out of total 50 patients enrolled in the present study, excellent prognosis was observed in 78 percent of the patients. Peri-apical infection due to treatment failure was the most common cause for carrying out Periapical surgery.

## DISCUSSION

Endodontic treatment is usually performed in teeth with periapical lesions. In some cases, root canal treatment can result in failure. The main factors of endodontic failure are microbial infection in the root canal system and/or the periradicular area. The clinician thinks that the direct causes of endodontic failures are procedural errors such as broken instruments, perforations, overfilling, underfilling, and ledges. Nevertheless, there are some cases in which the treatment has followed the highest technical standards and yet treatment can result in failure. They include microbial factors,

Table 1: Age-wise and Gender-wise distribution

|                   |              | Number of patients | Percentage of patients |
|-------------------|--------------|--------------------|------------------------|
| Age group (years) | Less than 25 | 21                 | 42                     |
|                   | 25 to 45     | 18                 | 36                     |
|                   | More than 45 | 11                 | 22                     |
| Gender            | Males        | 28                 | 56                     |
|                   | Females      | 22                 | 44                     |

Graph 1: Tooth type

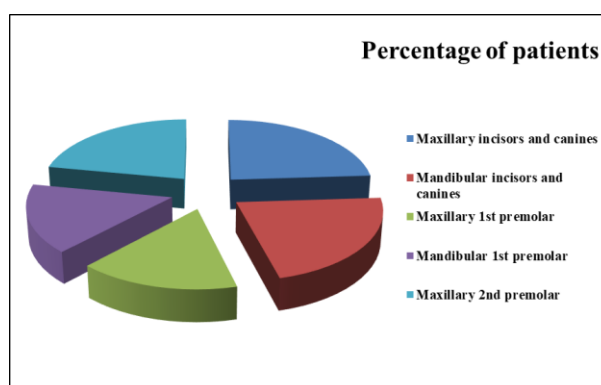


Table 2: Prognosis

| Tooth type                          | Success | Failure | Total |
|-------------------------------------|---------|---------|-------|
| Maxillary incisors and canines      | 9       | 3       | 12    |
| Mandibular incisors and canines     | 9       | 2       | 11    |
| Maxillary 1 <sup>st</sup> premolar  | 6       | 2       | 8     |
| Mandibular 1 <sup>st</sup> premolar | 7       | 1       | 8     |
| Maxillary 2 <sup>nd</sup> premolar  | 8       | 3       | 11    |
| Total                               | 39      | 11      | 50    |

Graph 2: Prognosis

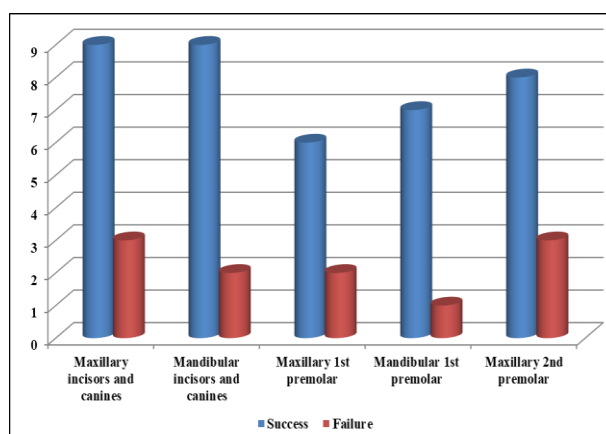


Table 3: Reasons for peri-apical surgery

| Reasons                                        | Number of patients | Percentage |
|------------------------------------------------|--------------------|------------|
| Peri-apical infection due to treatment failure | 25                 | 50         |
| Instrument breakage in apical root portion     | 19                 | 38         |
| Periapical pathology due to caries             | 6                  | 12         |

comprising extraradicular and/or intraradicular infections, and intrinsic or extrinsic nonmicrobial factors. In case of failure, one of the treatment choices is retreatment by an orthograde approach. However, when a nonsurgical attempt proves unsuccessful or is contraindicated, surgical endodontic therapy is indicated to obtain an apical seal and save the tooth.<sup>6-8</sup>

As proposed by Liebhlich periapical surgery has to be performed in a tooth with no evidence of fracture and with an adequate periodontal status (less than 25% of vertical bone loss and periodontal pockets < 5 mm). Furthermore, the tooth must retain sufficient coronary structure for prosthesis and the patient should be able to tolerate the surgery. After 3 months of surgery, if the tooth remains symptomatic surgical retreatment in expert hands or extraction has to be performed, depending on each particular case. In absence of clinical signs and symptoms, the clinician can proceed to finish the coronal restoration.<sup>6</sup>

In the present study, a total of 50 patients were enrolled. 42 percent of the patients of the present study were of less than 25 years of age. 36 percent of the patients were of 25 to 45 years of age. 56 percent of the patients of the present study were males while the remaining 44 percent were females. Maxillary and mandibular anterior were the most common tooth involved in peri-apical surgery. Out of 12 cases of maxillary incisors and canines, success occurred in 9 patients. Out of 11 cases of maxillary incisors and canines, success occurred in 9 patients. Ögütlü F et al evaluated the clinical and radiographic outcomes and periostest values of apical surgery treatment. A total of 112 teeth were included. SuperEBA and MTA were used as root-filling materials. The recorded parameters were

gender, age, location of the tooth, the presence/absence of a post, coronal restoration of the tooth, previous surgical/nonsurgical treatment of the tooth, the size of periapical lesions, histopathology of periapical lesions, smoking habits. Also the periostest values were recorded. The overall success rate was 88.4%. With regard to the evaluated variables, only one parameter (tooth type) was found statistically significant. Although the periostest values were decreased after 6 months compared to immediately postoperative measurements, the values were still significantly higher than preoperative measurements. In their study, apical surgery performed with the modern instruments has significantly successful results with 88.4% success rate.<sup>9</sup>

Out of total 50 patients enrolled in the present study, excellent prognosis was observed in 78 percent of the patients. Peri-apical infection due to treatment failure was the most common cause for carrying out Periapical surgery. Serrano-Giménez M et al analysed the most important prognostic factors when performing periapical surgery. A search of articles published in Cochrane, PubMed (MEDLINE) and Scopus was conducted with the key words “prognostic factors”, “prognosis”, “periapical surgery”, “endodontic surgery” and “surgical endodontic treatment”. The inclusion criteria were articles including at least 10 patients, published in English, for the last 10 years. The exclusion criteria were nonhuman studies and case reports. 33 articles were selected from 321 initially found. Ten articles from 33 were excluded and finally the systematic review included 23 articles: 1 metaanalysis, 1 systematic review, 2 randomized clinical trials, 6 reviews, 12 prospective studies and 1 retrospective study. They were stratified according to their level of scientific evidence using the SORT criteria. Factors associated with a better outcome of periapical surgery are patients ≤45 years old, upper anterior or premolar teeth, ≤10 sized lesions, non-cystic lesions, absence of preoperative signs and symptoms, lesions without periodontal involvement, teeth with an adequate root-filling length, MTA as root-end filling material, uniradicular teeth, absence of perforating lesions, apical resection < 3 mm, teeth not associated to an oroantral fistula and teeth with only one periapical surgery.<sup>10</sup>

## CONCLUSION

From the above results, the authors concluded that peri-apical surgeries when done with adequate care and following proper sterilization protocols have good prognosis. However; further studies are recommended.

## CONFLICT OF INTEREST

No potential conflict of interest relevant to this article was reported.

## REFERENCES

1. Baek S.H., Plenk H., Kim S. Periapical tissue responses and cementum regeneration with amalgam, SuperEBA, and MTA as root-end filling materials. *J. Endodont.* 2005;31:444–49.
2. Ferrari M. Introduction. In: M Ferrari with L Breschi, S Grandini. *Fiber posts and endodontically treated teeth: a compendium of scientific and clinical perspectives.* Wendywood: Modern Dentistry Media, 2008: 9–13.
3. Bernabé P.F., Gomes-Filho J.E., Rocha W.C., Nery M.J., Otoboni-Filho J.A., Dezan-Junior E. Histological evaluation of MTA as a root-end filling material. *Int. Endod. J.* 2007;40:758–65.
4. Sánchez-Torres A, Sánchez-Garcés MÁ, Gay-Escoda C. Materials and prognostic factors of bone regeneration in periapical surgery: a systematic review. *Med Oral Patol Oral Cir Bucal.* 2014;19:e419–25.
5. Peñarrocha M, Martí E, García B, Gay C. Relationship of periapical lesion radiologic size, apical resection, and retrograde filling with the prognosis of periapical surgery. *J Oral Maxillofac Surg.* 2007;65:1526–9.
6. Liebllich SE. Endodontic surgery. *Dent Clin North Am.* 2012;56:121–32.
7. Wu M.K., Dummer P.M.H., Wesselink P.R. Consequences of and strategies to deal with residual post-treatment root canal infection. *Int. Endod. J.* 2006;39:343–56.
8. Yazdi P.M., Schou S., Jensen S.S., Stoltze K., Kenrad B., Sewerin I. Dentine-bonded resin composite (Retroplast) for root-end filling: a prospective clinical and radiographic study with a mean follow-up period of 8 years. *Int. Endod. J.* 2007;40:493–503.
9. Ögütlü F, Karaca İ. Clinical and Radiographic Outcomes of Apical Surgery: A Clinical Study. *J Maxillofac Oral Surg.* 2018;17(1):75–83.
10. Serrano-Giménez M, Sánchez-Torres A, Gay-Escoda C. Prognostic factors on periapical surgery: A systematic review. *Med Oral Patol Oral Cir Bucal.* 2015;20(6):e715–e722. Published 2015 Nov 1. doi:10.4317/medoral.20613.