

ORIGINAL RESEARCH

Evaluation of outcome of Targeted Endodontic Microsurgery: A retrospective analysis

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ABSTRACT

Background: This study was done to conduct the Retrospective assessment of Targeted Endodontic Microsurgery.

Material and methods: A database was searched for potential cases, and 20 patients were selected. Trained endodontists completed a calibration exercise before evaluating radiographs, and then a retrospective outcomes assessment took into account follow-up clinical and radiographic findings to assign one of three healing designations: complete healing, reductive healing, or failure. All the results were recorded in Microsoft excel sheet followed by a statistical analysis using SPSS software.

Results: The combined clinical and radiographic data led to 12 cases being designated as having complete healing, 7 cases being designated as having reductive healing, and 1 case being designated as failing, which resulted in a success rate of 95%. **Conclusion:** Targeted endodontic microsurgery leads to successful outcomes. It would be prudent to do controlled clinical tests with follow-up over an extended period of time.

Keywords: microsurgery, endodontic, targeted.

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INTRODUCTION

Endodontic surgery is a recommended treatment option in persistent and recurrent apical periodontitis involving exposure of the periapical lesion through osteotomy, curettage of the lesion, and root-end resection.¹ A good access to the apex of the tooth and the lesion is important for a successful outcome. Endodontic microsurgery helps in enhanced magnification, illumination, and visualization with postsurgical healing rate of 35% faster than conventional endodontic surgery.² Cone beam computed tomography (CBCT) plays an important role in the surgical endodontics as it helps in measuring the position of the roots, proximity of vital structures, size, location, and extent of the periapical lesion preoperatively.³ Using such a surgical approach has some drawbacks, such as a significant amount of bone loss due to the large osteotomy size and unintentional damage to important vital structures.⁴ Moreover, it can cause apical or coronal deviations during root-end resection, which can consequently lead to suboptimal results and complications. Precision is crucial in the performance of root-end surgery. With diverse applications of digital workflows in dentistry, targeted endodontic surgery is currently trending for its minimal invasiveness and promising results. Endodontic microsurgery using modern techniques such as high-

power magnification, ultrasonic root-end cavity preparation, and the use of biocompatible root-end filling material has demonstrated favorable outcomes, with a success rate of approximately 90%.^{4,5} Hence, this study was done to conduct for assessment of Targeted Endodontic Microsurgery (TEMS).

MATERIAL AND METHODS

The present study was done to conduct for assessment of Targeted Endodontic Microsurgery. A database was searched for potential cases, and 20 patients were selected. Trained endodontists completed a calibration exercise before evaluating radiographs, and then a retrospective outcomes assessment took into account follow-up clinical and radiographic findings to assign one of three healing designations: complete healing, reductive healing, or failure. All the results were recorded in Microsoft excel sheet followed by a statistical analysis using SPSS software.

RESULTS

The research featured a total of 20 participants, with 15 males and 5 females participating. The average age of the participants was 46.8 years. Out of 20 patients, 3 were of the procedures were re-surgeries, and they were performed on both the mesial facial (MF) and distal facial (DF) roots of a maxillary first and a maxillary second molar. Bone grafting was performed

on six teeth using the patient's own crushed bone. The combined clinical and radiographic data led to 12 cases being designated as having complete healing, 7 cases being designated as having reductive healing,

and 1 case being designated as failing, which resulted in a success rate of 95%.

Table 1: Gender-wise distribution of subjects.

Gender	Number of subjects	Percentage
Males	15	75
Females	5	25
Total	20	100

Table 2: Outcome

Outcome	Number of subjects	Percentage
Complete healing	12	60
Reductive healing	7	35
Failure	1	5
Total	20	100

DISCUSSION

Limitations and disadvantages of endodontic surgery have become evident due to the rapid advancement in technology. However, based on the application of CBCT, CAD, and 3D printing technology in conjunction with microsurgery, these problems can be solved.⁶ An alternative noninvasive diagnostic approach such as MRI could be further explored to be used with CAD and 3D printing technology.⁷ Hence, this study was done to conduct the Retrospective assessment of Targeted Endodontic Microsurgery. The research featured a total of 20 participants, with 15 males and 5 females participating. The average age of the participants was 46.8 years. Out of 20 patients, 3 were of the procedures were re-surgeries, and they were performed on both the mesial facial (MF) and distal facial (DF) roots of a maxillary first and a maxillary second molar. Bone grafting was performed on six teeth using the patient's own crushed bone. In recent years, a considerable number of clinical studies have evaluated the outcome of endodontic microsurgery and investigated prognostic factors that could affect the outcome. However, available information concerning endodontic micro-resurgery, defined as microsurgery performed after failed prior apical surgery, is rare. Only a few studies have reported the clinical outcome of micro-resurgery in a relatively small number of cases. Von Arx et al⁸ reported 1-year and 5-year success rates of 77.8% (14/18) and 68.8% (11/16), respectively, for micro-resurgery; these were comparable with the rates reported for primary microsurgery (1-year success rate, 84.4% [146/173]; 5-year success rate, 76.6% [118/154]). However, the micro-resurgery cases in their study accounted for only 10% of the overall inception cohort. In another study by Saunders⁹, the success rate for micro-resurgery was 63.8% (30/47), which was lower than that for primary microsurgery (84.3% [193/229]). The combined clinical and radiographic data led to 12 cases being designated as having complete healing, 7 cases being designated as having reductive healing, and 1 case being designated

as failing, which resulted in a success rate of 95%. On the other hand, Song et al¹⁰ reported a considerably higher success rate of 92.9% (39/42) for micro-resurgery; however, they did not compare the outcome of micro-resurgery with that of primary microsurgery. Considering these conflicting results and the assessment of a limited number of cases, we believe it is necessary to evaluate the outcome of endodontic micro-resurgery in a larger sample of patients and compare the findings with those for primary endodontic microsurgery. Buniag AG et al, study was to assess clinical outcomes of TEMS surgeries at least 1 year after treatment. This limited retrospective outcomes assessment is an early indication that TEMS-guided trephine bur root-end resection leads to similar success as is established for freehand carbide and diamond bur resection. Controlled clinical trials with long-term follow-up are warranted.¹¹ Kim D et al, retrospective study was to evaluate and compare the outcome of endodontic micro-resurgery with that of primary endodontic microsurgery and determine prognostic factors affecting the outcome of micro-resurgery. The findings of the study suggest that the outcome of endodontic micro-resurgery is comparable with that of primary endodontic microsurgery.¹²

CONCLUSION

The results of this restricted retrospective outcomes evaluation provide an early indication that TEMS-guided trephine bur root-end resection leads to successful outcomes.

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