

COMPARATIVE EVALUATION ON REASONS FOR ENDODONTIC RETREATMENT - AN INSTITUTION BASED RETROSPECTIVE ANALYSIS

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ABSTRACT

Aim: of this retrospective study was to evaluate the comparative reasons for endodontic retreatment.

Materials and method: Data of the patients was retrieved from patient management software from June 2019 - March 2021. 672 patients were viewed and assessed for retreatment, the reason for the retreatment and in which tooth it was done. The variables were tabulated in excel and exported to SPSS for statistical analysis. The results were generated in the form of bar graphs.

Results: It is observed that 39.9% are maxillary anteriors, 8.9% are maxillary premolars, 12.8% are maxillary molars. 7.3% are mandibular anteriors, 8.5% are mandibular premolars and 22.5% are mandibular molars. The reasons for the endodontic retreatment were incomplete obturation, symptomatic RCT, lesion, missed canals and other reasons. The most common reason for the retreatment was incomplete obturation and maxillary anterior teeth were the most common teeth to go under endodontic retreatment.

Conclusion: The prevalence of endodontic retreatment in this study was most common in maxillary anterior teeth due to incomplete obturation.

Keywords: Endodontic retreatment, incomplete obturation, Lesion, Missed canals, Symptomatic RCT.

Introduction

Clinicians are regularly faced with different choices after failure of root canal treatment. The patients usually prefer to retain their original teeth, hence non-surgical retreatment should be

the treatment of choice. The new generation of endodontic instruments, magnification, materials and technology with the basic principles of endodontic retreatment have helped in the retention of the patient's natural tooth structure to form and function, decreasing the need for expensive prosthetic replacement. Surgical approach can be adopted in obstructed, calcified or non-negotiable canals.

Evolutionary introduction of the microscope has enhanced vision and magnification allowing the success for untreated root canal systems, poorly obturated root canals, coronal microleakage, cracked tooth, obstruction, perforation or an instrument fracture indicating non healing associated with the previous treatment (1).

Intraradicular infection occurs most frequently when the original does not meet the acceptable technical standards, missed canals, inadequate cleaning and shaping and obturation of the root canal system. To gain entry into the root canal system, coronal access is required (2). The dentist may be familiar with various techniques to remove coronal restoration and safely remove a variety of post systems hence making endodontic retreatment a success (3). Retreatment ensures that the entire root canal system and any communicating channels are thoroughly cleaned and the root filling is of good quality and is placed under optimal asepsis in every canal. Damage to the root level walls must be considered during evaluation of endodontic retreatment. Compromising crown- to root ratio and mobility resulting from chronic periodontitis are some of the contraindications (4). External resorptive root defects, vertical root fractures, inadequate root canal space should not be considered for retreatment (5).

Endodontic failures can attribute to inadequacies in cleaning, shaping, obturation, infections or reinfection of the root canal system when the coronal seal is lost after completion of root canal treatment. Leakage and bacterial contamination are the major reasons for failure of endodontic treatment (6). Non-surgical endodontic retreatment efforts are aimed toward eliminating microleakage. The idea for retreatment is to remove the root canal space as a source of irritation (7).

The healing capacity of endodontic lesions is dependent on certain variables including diagnosis, complete access, identification of canals and techniques directed toward 3-dimensional cleaning, shaping and obturation (8). Some of the aspects to aim for a successful treatment are symptomatic patient and function equally well on both sides, healthy periodontium, radiographic healing or progressive bone fill over time, restorative excellence principles should be satisfied (9). Retreatment is usually performed after previous treatment has produced definitive signs and symptoms of failure like persistent pain or symptoms in a RCT treated tooth, incomplete or deficient existing root treatment, procedural errors and non-healing periapical lesions (10).

Our team has extensive knowledge and research experience that has translate into high quality publications(11–20),(21–24),(25–29),(30)

Materials and methods

The study was done in a university setting. The study was also approved by the Institutional Ethics Board. Two reviewers are involved in this study. Data of patients who visited saveetha dental college during the time period June 2019 to April 2021 were reviewed. The data of patients who underwent endodontic retreatment was collected. The sample size was 672. The case sheets were viewed separately. To minimise the sampling bias, all the available data was included and no sorting was done. Internal validity included patients who underwent retreatment and external validity included non probability inclusion. Data was tabulated and reviewed one by one by an external reviewer. Data was exported to SPSS software and variables were defined. Chi square test was done and results were generated in the form of bar graphs.

Results

The results of the study is presented as bar diagram below. The majority of the different reasons for endodontic retreatment of all age groups were prepared to an apical size of 671 and its association with tooth number [Figure 1] was statistically significant .

Discussion

After associating data and statistical analysis, it is observed that 39.9% are maxillary anteriors, 8.9% are maxillary premolars, 12.8% are maxillary molars. 7.3% are mandibular anteriors, 8.5% are mandibular premolars and 22.5% are mandibular molars. The reasons for the endodontic retreatment were incomplete obturation - 46.1%, symptomatic RCT - 14.7%, lesion - 27.7%, missed canals - 8.2% and other reasons - 3%, which was not listed. The most common reason for the retreatment was incomplete obturation and maxillary anterior teeth were the most common to go under endodontic retreatment.

Periapical conditions could present as a persistent periapical radiolucency following root canal treatment that can be persistent intraradicular microorganism, infection, foreign body reaction, and true cyst (31). It's been stated that, there can be but one correct diagnosis for treating every disease. The presence or absence of endodontic disease is determined according to clinical and radiographic findings (32). The clinical examination should include an extraoral and intraoral examination and thorough periodontal evaluation (33). Visual examination is greatly aided by magnification and illumination which allows the clinician to identify very fine root fractures. Exposed dentin from recession and probing defects may be the result of an endodontic infection draining through the sulcus (34).

The presence of occlusal wear facets indicates the presence of occlusal trauma (35). Apical periodontitis is frequently asymptomatic and diagnosed primarily by the radiographic appearance (36). In cases with previous endodontic therapy, radiographs are very useful in evaluation of caries, defective restoration, periodontal health, quality of the obturation, missed canals, perforation, fractures, resorption and canal anatomy (37) Most useful tests are periradicular test that include percussion, bite and palpation. These tests are of greater importance when evaluating teeth that have been previously treated with endodontic therapy because of lack of significant and consistent evidence that can be gained from pulp vitality

tests. If a tooth indicates percussion tenderness, it may be due to persistent endodontic disease (38).

Pulp vitality tests are of little importance when examining teeth with previous endodontic therapy. However, if the patient's chief complaint reveals the need for these tests, it must be performed (39).

When vital tissues remain in the canals of a previously root filled tissue either due to a missed canal or improperly cleaned canal, patients may complain of sensitivity to heat or cold.

Usually the response is negative in previously treated with endodontic therapy. The positive response usually means there is responsive pulp tissue remaining in the tooth (40).

Retreatment access is called coronal disassembly because of the frequent need to remove the previous coronal and radicular restorations. Following initial endodontic therapy, most teeth require and receive a full coverage restoration and often that restoration is supported by a post and core. Coronal - radicular access for retreatment is much more complicated in these cases when compared with endodontically treated teeth that have been minimally restored. Some factors influencing restorative removal are preparation type, restoration design and strength, restorative material, cementing agent, removal devices (41).

Endodontic retreatment differs from root canal treatment in many aspects and various procedures have to be followed which include coronal disassembly, post removal and filling material removal within the canal depending on the conditions of the tooth. A high percentage of the teeth that are indicated for retreatment have been restored and the restoration has to be considered before retreatment can be initiated. The coronal restoration or the post and core can be removed or retained. Each such option is related to specific conditions and has its own advantages and disadvantages. Filling materials from the root canal should be removed by using proper technique and resources (42). The main cause of initial treatment failure is bacterial persistence within the root canal, or coronal penetration or leakage after treatment. This would indicate that if the dentist can disinfect the root canal system and achieve a tight seal both apically and coronally during retreatment, the success rate would increase. Given the anatomical complexity of the root canal system, the objective of endodontic therapy would be to reduce the bacterial load to levels compatible with host healing (43).

Dentists or endodontists should be trained to establish a diagnosis from an endodontic and restorative perspective, encompassing not only an endodontic vision of the tooth to be retreated but also a restorative vision. This means that they should evaluate whether retreatment is viable from a pathological point of view and also consider whether the dental element will be suitable for adequate restoration and fully functional in the oral environment after endodontic therapy. As part of this diagnosis process, the tooth needs to be evaluated to rule out any vertical root fracture (VRF) that may be contributing to the endodontic failure that has presented (44).

Conclusion

Although retreatment is associated with certain disadvantages like it results in thinning of dentin walls, weakening or perforation of the root canal wall, ledges in the canal wall, separation of instruments and the need for replacement of a well fitting fabricated crown but it

is much better than fixed prosthesis and also cost effective. Within the limits of this study, it is evident that maxillary anteriors are the most prevalent that have undergone endodontic retreatment and the most common reason is incomplete obturation. However further studies must be done with a larger sample size to get better results.

Conflict of interest:

Authors of this study declare no conflict of interest

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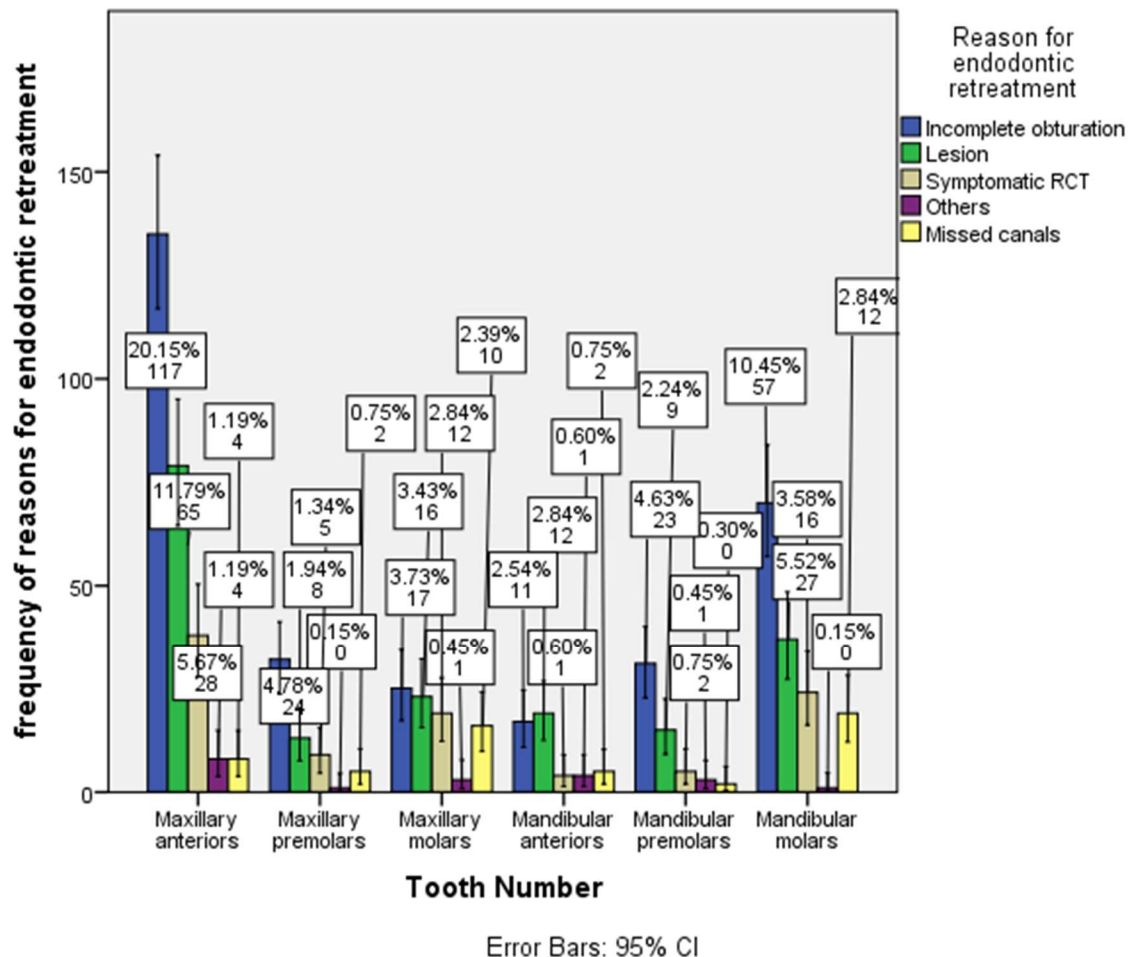


Figure 1 : Bar chart showing association between teeth number on the x-axis and the reasons for endodontic retreatment on the y-axis. It is seen that maxillary anteriors have undergone the most endodontic retreatment (39.9%). The most common reason for the retreatment was due to incomplete obturation (20.15%). The blue colour indicates incomplete obturation, green indicates lesions, beige indicates symptomatic RCT, yellow indicates missed canals and purple indicates other defects. On the chi-square test, P value = 0.001 which is statistically significant, hence maxillary anteriors underwent more retreatment procedures.