

## **Analysis of Reasons for Extraction of Endodontically Treated Teeth: A Retrospective Study**

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## **ABSTRACT:**

Endodontic therapy is a predictable treatment, resulting in up to 97% retention rate for the treated teeth. However, about 3% of endodontically treated teeth require further treatment, including extraction of the tooth, periapical surgery. The purpose of this prospective study was to analyse the factor related to extraction of endodontically treated teeth. This study was an institutional study, conducted in a private institution. The sample size for this study taken was 1068 teeth. Data regarding all the cases completed between June 2019 to March 2020 were retrieved from the case records of a private dental institution. Data that was retrieved were cross-verified by two reviewers. Data evaluation was done by assessing dental records of various reasons for extraction of endodontically treated teeth. The data collected was analysed using a Chi-square test, the data was tabulated in excel and the statistics were done in SPSS V20. Most common type of extraction was normal method followed by transalveolar extraction. Most common reason for extraction was grossly decayed followed by RCT treated followed by attrition and grade 3 mobility. The maxillary upper molars was the most common tooth to be extracted followed by mandibular molars. Endodontically treated teeth were prone to extraction mainly due to nonrestorable carious destruction and to a lesser extent to endodontic-related reasons such as endodontic failure, Vertical root fracture, or iatrogenic perforation

**KEY WORDS:** RCT treated teeth, Extraction, Factors, Reasons.

## **INTRODUCTION:**

The survival or functionality of the endodontically treated tooth is currently the emerging aspect of endodontic treatment outcome, rather than healing. Salehrabi and Rotstein analyzed 1,462,936 teeth after initial endodontic treatment for 8 years. At the end of this period, 1,420,963 (97%) teeth were retained in the oral cavity. Most untoward events, such as retreatment, apical surgery, or extraction, occurred during the first 3 years after the initial endodontic treatment. There are few studies in the literature that have analyzed the reasons for extraction of endodontically treated teeth. Fuss et al. studied 147 extracted teeth. The most common reason (44%) was a restorative consideration, with endodontic, endo restorative, and vertical root fracture (VRF) the next most frequent reasons (21%, 19%, and 11%, respectively). Vire found that 59% of 116 extractions of endodontically treated teeth were due to prosthetic reasons, 32% to periodontal reasons, and 9% to endodontic failures.

Despite progress in prevention and operative techniques, teeth extraction remains an important part of therapeutics (1). Several studies investigating the reasons for teeth extraction report predominance of carious and periodontal diseases (2). Endodontic treatment is mainly performed to prevent teeth extraction, it is important to evaluate the fate of endodontically treated teeth (3). Two longitudinal studies carried out in the United States with a long follow-up period reported retention for endodontically treated teeth in oral cavity (4). Their studies have not specified the reasons for the extractions of the missing teeth. Infact, studies reporting the factors accounting

for extraction of endodontically treated teeth are scant (5). Many found the reasons were related to the quality of the crown restoration, the endodontic treatment, to a vertical root fracture, periodontal disease were noted in a study of 116 endodontically treated teeth that in 59% of the cases, prosthodontic reasons(6) motivated the extraction followed by periodontal disease and endodontic treatment failure (7). When studying the associated factors, they noted that the periodontal causes were more prevalent among smokers than in non smokers, which corroborates the result of Johnson and Guthmiller on the impact of cigarette smoking on periodontal diseases (8). It is worthy of note that all their investigations were of retrospective design.(9) The purpose/aim of this was to prospectively investigate the reasons for the extraction of permanent endodontically treated teeth(10).

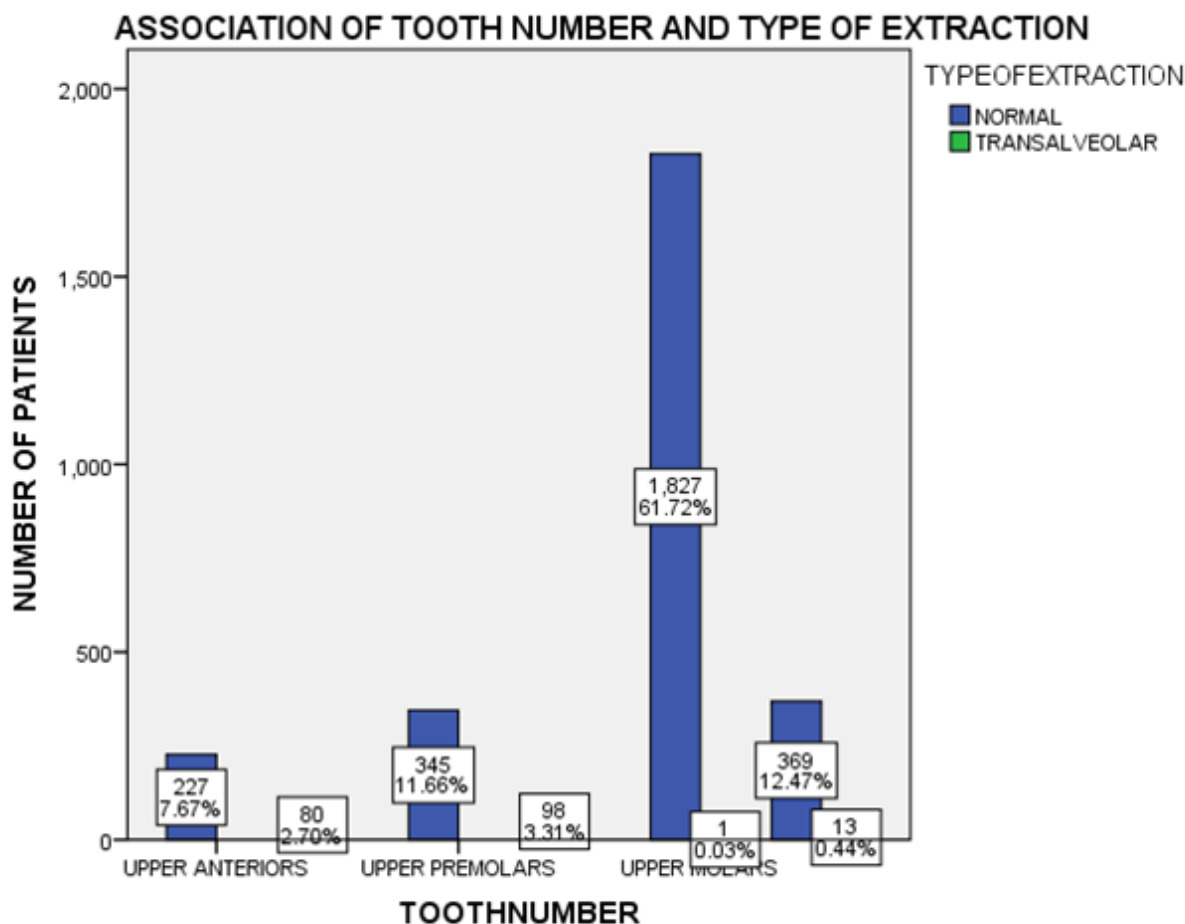
## **MATERIALS AND METHODS:**

The current study is an institutional study performed at a private dental institution. The necessary approvals in obtaining the data were obtained from the institutional board committee. All the data collected was verified by a cross examiner to avoid any missing case records. Before scheduling the study, official permission was obtained from the university. All retrospective studies arising from the data set between 01 June 2019 and 31st March 2020 will be covered by the following ethical approval number. SDC/SIHEC/2020/DIASDATA/0619-0320.

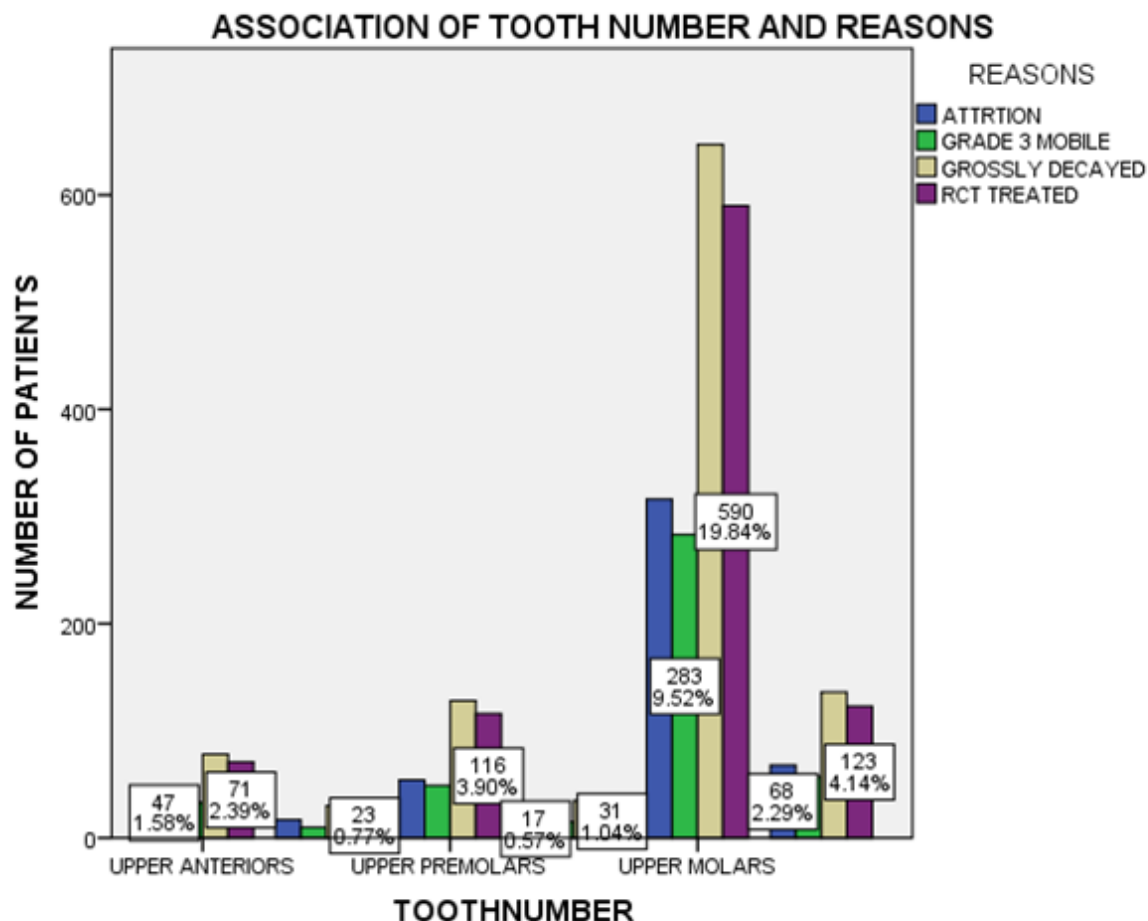
The data of patients with various reasons for extraction among all age groups of people were included for this study. Cases with incomplete data where the patients had not reported back were verified from the concerned patient case sheets or the department and excluded from the study. The final sample size for this study was 17 patients. The samples were collected from June 2019 to March 2020. All the records in the above mentioned period were verified. Cross verification of all diagnoses. All the data was obtained from the department of oral and maxillofacial surgery. All the patient related details like the Patient identification number was obtained from the department of oral and maxillofacial surgery.

The data collected was tabulated in Excel and imported to SPSS software. The incomplete data was verified by the concerned department. Possibility of bias was excluded from the study. The dependent factors include lesion, incompletely filled root canal system, no permanent restoration given, fractured RCT treated teeth and the independent factors are gender, age and tooth number. All the data was analysed using SPSS V20, after entering the data in the SPSS software the variables were verified and association was done between the teeth number, reasons, gender. Descriptive statistics were done and test proportion was done. Chi square test was done to assess the association between the variables.

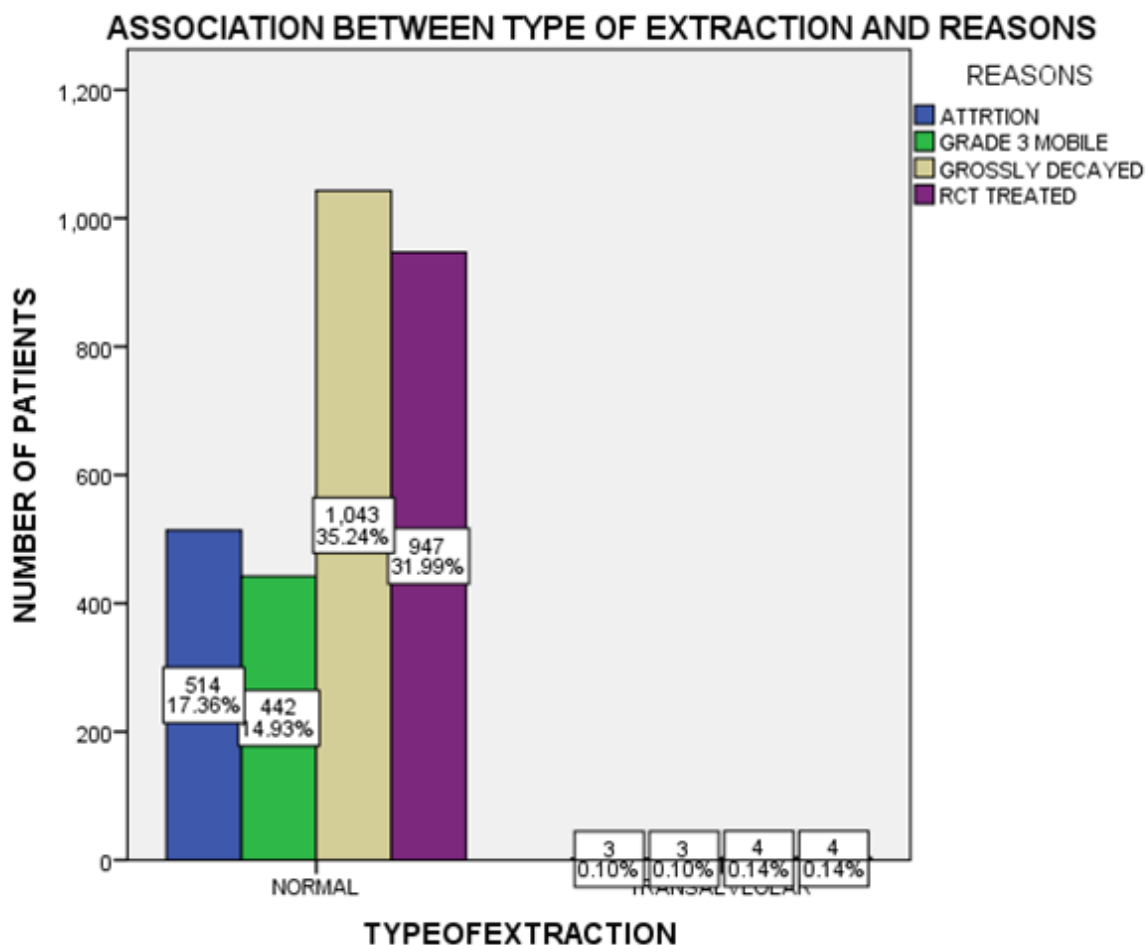
## RESULTS AND DISCUSSION:



**FIGURE 1:** Figure 1 represents the association of the tooth number and the type of extraction, represents where blue colour denotes the normal type of extraction whereas green colour denotes the transalveolar type of extraction. Using the normal method of extraction, the most common tooth to be extracted was found to be upper molars followed by upper premolars. Using the transalveolar type of extraction, the most common teeth to be extracted were the lower molars. P value <0.05 shows statistically significant association between tooth number and the type of extraction. (Chi-square value= 80.032 , p=0.000)



**FIGURE 2:** Figure 2 represents the association of the tooth number and the reasons for extraction, represents where blue colour denotes attrition, green denotes grade 3 mobile teeth, yellow denotes grossly decayed and purple denotes endodontically treated teeth. The most common reason for extraction of the upper molars was found to be attrition and grade 3 mobile teeth. The most common reason for extraction of the upper molars and upper premolars was found to be grossly decayed and rct treated teeth. P value >0.05 shows no statistically significant association between tooth number and the reason for extraction. (Chi-square value= 4.481 , p=0.996)



**FIGURE 3:** Figure 3 represents the association of the type of extraction and the reasons for extraction, represents where blue colour denotes attrition, green denotes grade 3 mobile teeth, yellow denotes grossly decayed and purple denotes endodontically treated teeth. Most commonly the normal type of extracted was resorted to when the reason for extraction was found to be attrition, grade 3 mobile teeth, endodontically treated teeth and grossly decayed teeth. When the normal type of extract was not possible for these reasons, transalveolar type of extraction was resorted to. P value  $>0.05$  shows no statistically significant association between type of extraction and the reason for extraction. (Chi-square value= 0.748 ,  $p=0.862$ )

From the patients entering college, the most common type of extraction done was normal followed by transalveolar extraction(2). Most common teeth to be extracted were the upper molars followed by lower molars, then upper premolars followed by the upper anteriors.(11)The most common reason for extraction was found to be grossly decayed followed by RCT treated followed by attrition and grade 3 mobility.(12) In the normal type of extraction, the most common reason for this type of extraction was found to be grossly decayed teeth followed by RCT treated followed by attrition and grade 3 mobile teeth.(13) In the transalveolar type of

extraction, The most common reason was grossly decayed and RCT treated teeth followed by attrition and grade 3 mobile teeth.(14)We found that in the normal type of extraction, the most common teeth to be extracted were upper molars,(15) followed by lower molars followed by upper premolars and lower anteriors. In the transalveolar type of extraction the most common teeth to be extracted were lower molars followed by upper molars.(16)We found that the most common reason for extraction of upper molars was grossly decayed followed by RCT treated followed by attrition and grade 3 mobile teeth.(17) Most common reason for extraction of lower molars was grossly decayed followed by RCT treated teeth followed by attrition and grade 3 mobile teeth.(18) Most common reason for extraction of the upper anterior was grossly decayed followed by RCT treated followed by attrition and grade 3 mobile teeth.(19) Most common reason for extraction to extraction of lower premolar was grossly decayed teeth followed by RCT treated followed by attrition and grade 3 mobile teeth , in contrast to the findings of Zadik et al , who noted that the reasons related to periodontal diseases were 5.8 times more important with smokers than with nonsmokers. The reasons related to endodontics represented 36.9% and were composed of endodontic failures (19.3%), vertical fractures (13.4%), and iatrogenic perforations and stripping (4.2%). Fuss et al found endodontic reasons in 51%, Vire noted 59% for the same reasons, and 19% were found in the study conducted by Zadik et al(20). We found that the most common reason for normal type of extraction was found to be grossly decayed tooth followed by grossly decayed tooth followed by RCT treated followed by attrition and grade 3 mobile teeth. (21) In the transalveolar type of extraction, the most common reason, grossly decayed teeth and RCT treated teeth followed by attrition and grade 3 mobile teeth.(22)

Coronal restoration was presented on 70.6% of the teeth. The relation between apical periodontitis and coronal restoration has been explored in several retrospective clinical studies suggesting that coronal restoration is a factor associated with the presence of apical periodontitis. A recent meta-analysis highlighted the difficulty when evaluating the relative contribution of coronal and endodontic seal and emphasized their synergy for periapical health . Coronal restorations were dominated by direct core build-up techniques (amalgam, composite resins, and glass ionomer cement) without post in 67.2% of the cases. Only 5.9% of teeth with root canal treatment were restored by crowns; this finding corroborates the results of Toure et al, who noted a prevalence of 0.95% of crowns in Senegal. This low prevalence of crowns might be explained by several factors including the cost, the low refund by insurance, and lack of motivation from the patient.

The overall consensus agrees with the findings of the study. The study cannot be Generalised to a larger population. It is done in a small sample size. The quality of crowns fabricated should not have marginal limitations.

#### **AUTHOR CONTRIBUTIONS:**

First author (Rushabh S.Kamdar) performed the analysis, interpretation and wrote the manuscript. Second author (Dr.Arun Murugaiyan) contributed to conception, data design,

analysis, interpretation and critically revised the manuscript. Third author (Dr.Arun Murugaiyan) participated in the study and revised the manuscript. All the three authors have discussed the results and contributed to the final manuscript.

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#### **CONFLICTS OF INTEREST:**

The authors declare no conflicts of interest.

#### **CONCLUSION:**

From the present study, we conclude that the most common type of extraction was normal type of extraction followed by transalveolar type of extraction. Most common to be extracted was the upper molars followed by lower molars, then upper premolars followed by the upper anteriors. The most common reason for extraction was found to be grossly decayed teeth followed by endodontically treated teeth followed by attrited teeth and grade 3 mobile teeth. In the normal type of extraction, the most common reason for this type of extraction was found to be grossly decayed teeth followed by endodontically treated followed by attrition and grade 3 mobile teeth. In the transalveolar type of extraction, the most common reason was found to be grossly decayed teeth and endodontically treated teeth followed by attrition and grade 3 mobile teeth.

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