

Association of Gender in Patients with Extractions of Endodontically Treated Teeth

Running Title: Gender variations in Endodontically treated teeth extractions

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Abstract:

The key to successful endodontic treatment is to thoroughly debride the canal system of infected or necrotic pulp tissue and microorganisms, and to completely seal the canal space, thus preventing the persistence of infection and/or reinfection of the pulp cavity. The aim of this study is to provide clinical data on the prevalence of endodontically treated tooth extractions.

8547 patients visiting Saveetha Dental College were used as the samples in this study to assess the extraction of its endodontically treated tooth or non endodontically treated tooth with ethical permission and approval for the project. Collected data was tabulated in Excel and statistical analysis was performed using Chi-square test. The results show that endodontically treated tooth extraction is 70% while non endodontically treated tooth extractions is 30% with male predominance. There is no association seen with gender and extractions of endodontically treated tooth tooth extraction statistically.

Keywords: endodontic treatment, extraction, oral surgery, root canal.

Introduction

The key to successful endodontic treatment is to thoroughly debride the canal system of infected or necrotic pulp tissue and microorganisms, and to completely seal the canal space, thus preventing the persistence of infection and/or reinfection of the pulp cavity. (Lin, Skribner and Gaengler, 1992) (Jesudasan, Abdul Wahab and Muthu Sekhar, 2015) Root canal treatment fails when the treatment is carried out inadequately. (Christabel *et al.*, 2016) However, there are some cases in which the treatment has followed the highest standards yet still results in failure. (Mp and Rahman, 2017) Undoubtedly, several major and minor factors had at various times been associated with endodontic failure. (Rhodes, 2005) (Marimuthu *et al.*, 2018) Root canal treatment usually fails when the initial procedure falls short of minimum acceptable technical standards. (Sundqvist *et al.*, 1998) (Packiri, Gurunathan and Selvarasu, 2017) Often the clinician is misled by the notion that procedural errors, such as broken instruments, perforations, bulky restoration, underfilling, ledges and so on are the direct cause of endodontic failure. (Mp, 2017; Patil *et al.*, 2017) In most cases, procedural errors do not jeopardize the outcome of endodontic treatment unless a concomitant infection is present. (Rao and Santhosh Kumar, 2018; Abhinav *et al.*, 2019) In truth, a procedural accident

often impedes or makes it impossible to accomplish appropriate intracanal procedures. (Kumar and Sneha, 2016; Kumar, 2017) Thus, there is potential for failure of root canal treatment when a procedural accident occurs during the treatment of infected teeth. (Udoye *et al.*, 2018) (Kumar, Patil and Munoli, 2015) Nevertheless, there are some cases in which the treatment has followed the highest technical standards and yet failure results. Scientific evidence indicates that some factors may be associated with the unsatisfactory outcome of well-treated cases. They include microbial factors, comprising extraradicular and/or intraradicular infections, and intrinsic or extrinsic non microbial factors. (Vire, 1991) (Sweta, Abhinav and Ramesh, 2019) Despite progress in prevention and operative techniques, teeth extraction remains an important part of therapeutics. (Patturaja and Pradeep, 2016) Several studies investigating the reasons for teeth extraction report predominance of carious and periodontal diseases. (Aida *et al.*, 2009) Because endodontic treatment is performed mainly to prevent tooth extraction, it is important to evaluate the fate of endodontically treated teeth.

Analysis of the reason for all extractions of endodontically treated teeth carried out by Vire (1991) has revealed three types of failures; unrestorable tooth fractures, involvement in periodontal problems and

endodontic failures. Endodontic failures were less frequent and are commonly caused by bacterial recontamination of the root canal from the oral cavity, due to loss of temporary restorations or leakage of an inadequate final restoration. Failure of a root-filled tooth can be due to less than optimal endodontic therapy but inadequate or unsuccessful restorative treatment (Vijayakumar Jain *et al.*, 2019)

Materials and Methods

Study Setting

This retrospective study was conducted under a hospital based university setting. The archived patient records of the department of Oral Maxillofacial Surgery, Saveetha Dental College were collected and the data was assessed from the time period of June 2019 - April 2020. During this time period a total of 86000 case records were collected. The inclusion criteria were the patients who had undergone extractions while the exclusion criteria were treatment procedures apart from extractions, incomplete and censored dental records and absence of radiographic evidence of extractions. The main advantages of this study were that the data was all prevalidated and the main disadvantages were that it was an unicentric study and only a single ethnicity of the population was studied. The internal validity of the study was established as the data was collected from a verifiable and standardised database. The external validity is established as the data is from a clinical setup which is duplicatable.

Sample Size calculation

From this record of 86000 cases, on purposive convenience sampling a total of 8547 patients who underwent extractions were decided to be included in the study.

Data Collection

Data includes gender and endodontically treated tooth extractions or non endodontically treated tooth extractions. The selected samples were examined by three people; 1 reviewer, 1 guide and 1 researcher. The patient data were picked up from the case sheets and the variables recorded were the gender and the extractions of endodontically treated tooth and extractions of non endodontically treated tooth. The collected data was tabulated in the excel sheet. Statistical analysis was done using SPSS software (version 9.0.3).

Statistical Analysis

The descriptive statistics were used to determine the frequencies and percentage of the gender of the patients who had undergone extractions. Chi square test was used to evaluate the gender association in extractions done in endodontically treated teeth. The outcome data was represented in the form of a bar graph.

Ethical Approval

Ethical permission and approval for the project was obtained from the Institutional Review Board of Saveetha Institute of Medical and Technical Sciences, Chennai, India on Date 25/04/2020. (SDC/SIHEC/2020/DIASDATA/0619-0320)

Results and Discussion.

The Study sample size is 8547 patients with 2583 patients who underwent extraction of root canal treated tooth and 5964 who underwent extraction of non-endodontically treated tooth. (Graph 2)

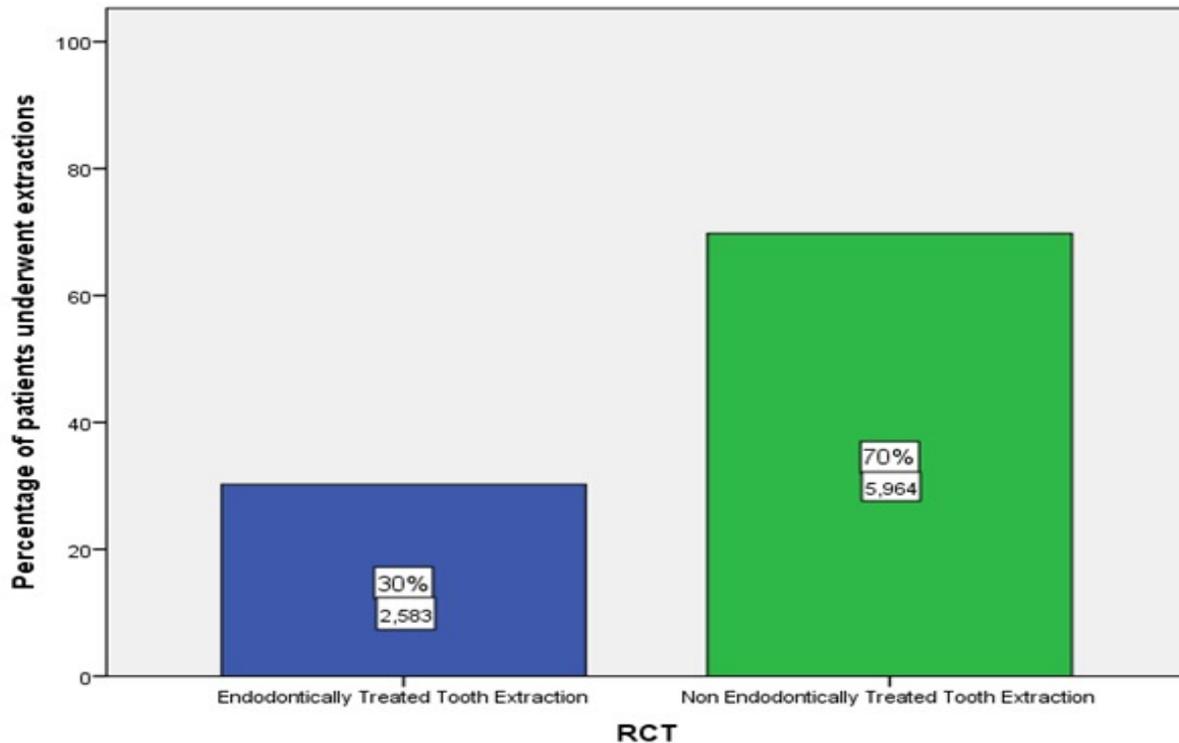


Fig 2: Bar chart shows the extractions of endodontic ally treated tooth and non-endodontic ally treated tooth among the study population. X-axis represents the endodontic ally treated(Blue) and non-endodontic ally treated tooth(Green) extractions and Y-axis represents the percentage of patients who had undergone extractions. The majority of the extraction was non endodontic ally treated tooth extraction which is 70% followed by endodontic ally treated tooth which is 30%.

Graph One shows patients who underwent extraction of endodontically treated tooth according to gender. It is seen that the majority of the extractions done was non endodontically treated tooth with male predominance. It is of prime importance that a dental health care provider to take careful steps in diagnosing dental disease and planning the rehabilitation process. A lot of factors do contribute to selecting one plan over the other. In this study, it was observed that extraction of endodontically treated tooth is less comparatively to extraction of non-endodontically treated tooth. In a study conducted by Toure B et al (Touré *et al.*, 2011) shows that the mandibular first molar without the crown was the most frequently extracted tooth and

the reason was periodontal disease, endodontic failure and non restorable tooth damage caused by fracture or dental caries. Analysis between gender showed no significant difference for reasons of extraction. A study conducted by Udoye CL et al, (Udoye *et al.*, 2018) showed that endodontically treated tooth were predominantly extracted because they were non-restorable, due to recurrent caries. Similarly, a study conducted by Bamise CT et al, proved the same. In another study by Z. Fuss et al, (Fuss *et al.* 1999) it is reported that out of the 564 extracted permanent teeth (study sample), 147 had been endodontically treated previously in this group.

Limitations to this study includes limitation to geographic area, data may have discrepancies and single ethnicity was used.

This study can be utilised to larger scope of exploration in regards to extraction of endodontically treated tooth with a more widely carried out study in different parts of the world not just confined to a single geographical location. Advantages of this study were that this was a case control study with age and gender matched controls to provide best results with high internal validity, reasonable data and disadvantage of the study was this was a unicentric study with geographic limitations, limited sample size and has lower external validity. The dietary factors, feeding and oral hygiene factors were not taken into consideration while interpreting the results. Future scope of this study includes larger sample size which is not confined to a particular geographic area and to assess the treatment options.

Conclusion

Within the limits of the study, there is no association seen with gender and extractions of endodontically treated tooth statistically. However proper endodontic treatment during the treatment phase can potentially benefit the clinician and the patient in the long run and can prevent failure of the endodontic treatment which can lead to extraction of the teeth.

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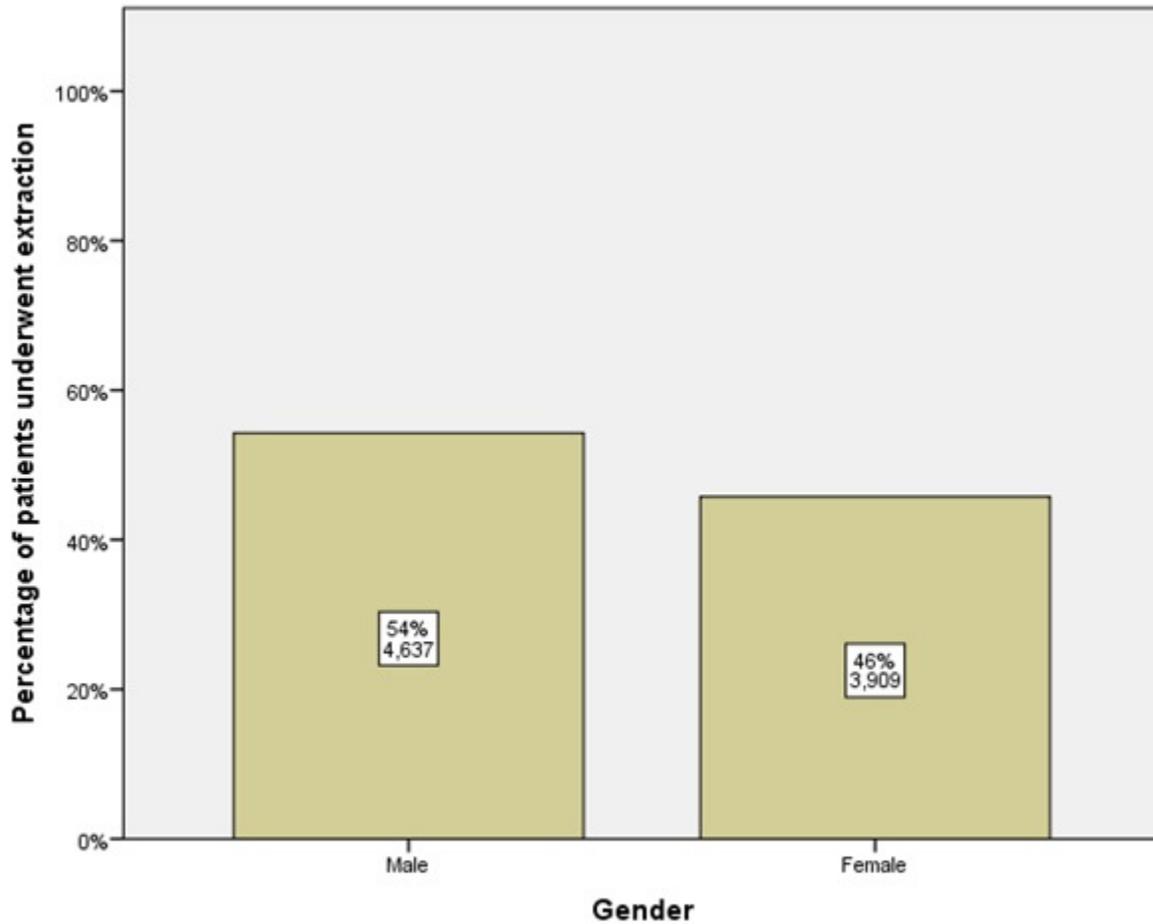


Figure 1 : Bar chart showing the percentage of patients who underwent extractions against gender distribution. X-axis gives the gender and Y-axis gives the percentage of patients who underwent extractions. The majority of the extractions was undergone by male with 54% and followed by female 46%.

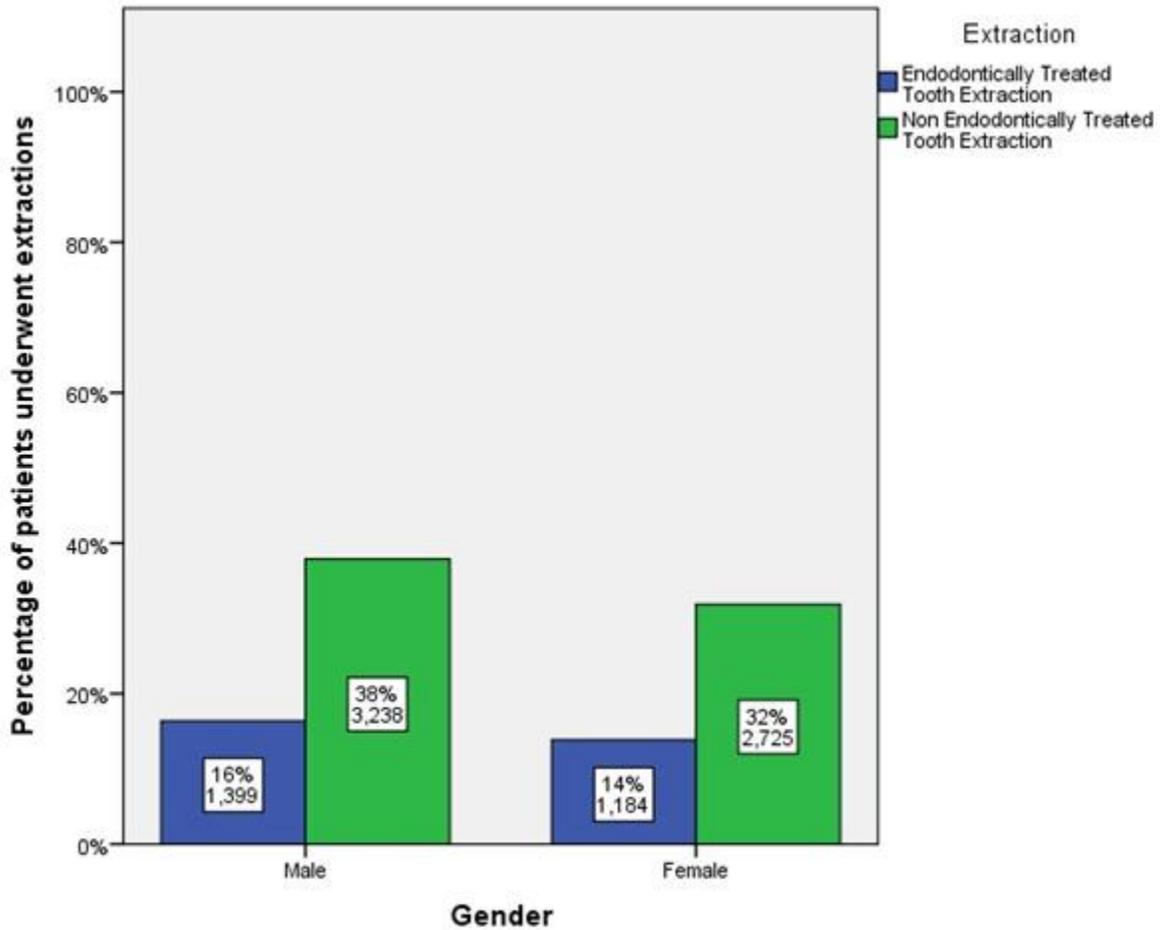


Fig 3: Bar graph depicts association of extractions based on gender distribution. X-axis represents gender distribution, Y-axis represents the percentage of patients who have undergone extractions. Endodontically treated tooth extractions (Blue) and non endodontically treated tooth (Green) extractions were seen more commonly in males compared to females. Chi-Square test shows $p=0.8$ ($p>0.05$ -statistically not significant) which implies that there is no association between gender and extractions.