Type of study: *Original research*

Most Frequently Extracted Permanent Tooth in Patients Below 18 Years of Age Visiting a University Hospital in Chennai –A Retrospective Study

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Abstract

The extraction of permanent teeth should not be an insignificant act, specially in children, because of the terrible repercussions on eruption phenomena, the harmony of the arches, the primary capabilities of chewing, swallowing, breathing and phonation. Loss of permanent teeth has negative consequences functionally, psychologically and socially, especially for children and adolescents. The aim of this study is to analyse the most frequently extracted permanent tooth and to evaluate the reasons for extractions in patients below 18 years of age visiting a university hospital in Chennai in a period of 10 months from June 2019 March 2020. The data of 7415 patients was reviewed and patients from 6-18 years of age undergoing permanent teeth extraction were selected for this study. Chi-square test was used to detect the significance between age, gender, reasons, and extracted tooth number. P value less than 0.05 was considered statistically significant. In this study we observed that the most frequently extracted permanent teeth in patients from 6-18 years of age are upper premolars, followed by lower first molars and the main reason for extractions were therapeutic & dental caries. Within the limits of this study, the most frequently extracted permanent teeth in patients from 0-18 years of age is upper premolars, followed by lower first molars and the main reason for extractions were therapeutic & dental caries.

Keywords: *extraction, prevalence, dental caries, permanent tooth, children.*

Introduction

Preservation of primary and permanent teeth from getting prematurely lost is the most essential goal directed towards the treatment provided for a pediatric dental patient [1,2], as any teeth will participate in the stimulation and development of the dental arches, aid in normal occlusal relationship, maintain esthetics, assist in speech development and functional mastication as well as enhance the improvement of quality of life. [3]

The extraction of permanent teeth should not be an insignificant act, specially in children, because of the terrible repercussions on eruption phenomena, the harmony of the arches, the primary capabilities of chewing, swallowing, breathing and phonation.[4] The first tooth to appear into oral cavity is the first permanent molar at the age of 6-years, hence called the 6-year molar. The first permanent molar is the strongest and the largest among all the teeth.. It is the keystone of the occlusion; it determines the shape of the lower part of the face and conditions the position and health of the other permanent teeth. [5]

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Tooth loss has diverse harmful effects on an individual e.g. impairment of masticatory function, unpleasant aesthetics, impaired phonetics, temporomandibular dysfunctions, psychological issues, social withdrawal and decrease in confidence level [6]. Common indications for extraction of permanent teeth includes dental caries and its sequelae (e.g. pulpitis and periapical infections), periodontal diseases, orthodontic treatment, malpositioned or impacted teeth, tooth fracture, retained deciduous teeth,supernumerary teeth, prosthetic considerations, and preparation for radiotherapy [7–12]

One of the most effective ways in declining the prevalence of dental caries and its sequelae is by using fluoride.[13–15] If dental caries is not treated on time, it might lead to progression of caries into the pulpal region which might require invasive treatment using rotary instruments.[16–21] If the caries is still not arrested and treated, it might lead to further complications which might indicate extraction of the teeth.

The decision to extract permanent teeth must be reasoned and incorporated into a global treatment plan that often requires collaboration with various other dental specialties.The analysis of the causes of permanent tooth loss is of interest to practitioners and decision-makers in order to develop control techniques to be integrated into overall dental public health programs.[22,23] It is from this perspective that an indirect approach based on the search for reasons for these permanent tooth losses by extraction has been developed and used in many countries. [24]

In the past decade a limited number of epidemiologic investigations have been conducted to determine the reasons given by dentists for extractions of permanent teeth and the majority of these studies have been carried out in European countries, such as Finland, France, Scotland, England and Wales, Norway, and Germany

To organize and implement adequate strategies for the prevention and the treatment of oral diseases more information is required about the reasons for extraction of permanent teeth. Tooth mortality provides some of the necessary information on the prevalence of dental diseases, on the availability of dental treatments, on the attitude towards dental extractions, and it is crucial for the planning of dental health services.

This study was carried out with the aim to determine the most frequently extracted permanent teeth in patients ranging from 6-18 years of age and also to evaluate the various reasons and pattern of tooth loss to assess any changing trends that will help in improving the level of oral hygiene and dental awareness among patients , thereby reducing their early extractions and consequent adverse sequelae.

Materials and Methods

Study Design and Setting:

This retrospective study examined the records of patients from June 2019-March 2020 undergoing treatment at a University Dental College in Chennai.

Data Collection:

Out of the patient records of 7415 children and adolescents who visited the hospital between June 2019 to March 2020, 528 patient's records undergoing permanent teeth extraction between the age group of 6-18 years were selected for this study.

The approval for this university setting study was obtained from the Institution Ethics Boards[SDC/SIHEC/2020/DIASDATA/0619-0320]. Sampling bias was minimised with the verification of photographs. Relevant data such as patient's age, gender, extracted teeth number, and reason for extraction were taken into consideration . Repeated and incomplete patient records were excluded from the study to prevent possibility of bias.

Statistical Analysis

Data was recorded in Microsoft Excel 2016 (Microsoft Office 10) and later exported to the Statistical Package for Social Science for Windows (Version 20.0, SPSS Inc., Chicago, Illinois, USA) and subjected to statistical analysis. Percentages, frequency of parameters were employed in the analysis. Chi-square test was used to detect the significance between age, gender, reason , and extracted teeth number.

Results and Discussion

In the present study, a total of 528 patients were selected as the final sample population after screening of 7415 patient records. In the study sample the percentages

of patients between 6-12 years and 12-18 years are 17.8% and 82.2% respectively. (Graph 1)

Out of the total patients screened, male patients were 47.7% and female patients were 52.3%. (Graph 2) .In the present study, the most frequently extracted permanent teeth were upper premolars, followed by lower premolars, and lower first molars (Graph 3)

Among both the age groups and both genders, upper premolars were the most frequently extracted permanent teeth followed by lower premolars, and lower first molars.(Graph 4 & 6).The most common reason for extraction among both the age groups and both genders, were therapeutic extractions, decayed teeth/dental caries and root stumps. (Graph 5 & 7)

Increasing the knowledge about the pattern and reasons for teeth extractions are often useful to dental practitioners so as to provide better information about dental disease prevalence, dental care availability, and attitudes towards teeth mortality [25,26]

This study was done to determine the most frequently extracted permanent teeth in patients below 18 years of age . The age of the patients selected was 6 – 18 years of age. Majority of the patients (82.2%) were within the age group of 12-18 years . These findings were similar with previous studies [24]. Children in the 12-15 age group acquired more extractions than others. This indicates that the number of permanent teeth extracted increases with age. Pain & decayed teeth were the main reason for consultation and concerned the majority of patients. Studies by several authors [27,28] have produced similar results. This is linked to an economic scenario and/or a lifestyle that is not compatible with a "preventive-conscious" approach. Difficulties in access to dental care, lack of dental facilities, lack of financial resources or lack of information and education on oral health may additionally constitute a barrier to systematic dental visits or consultations as soon as the first signs of dental complication appears.

The difference in the number of permanent teeth extraction between males (47.7%) and females (52.3%) was not significant .Though in several studies it was revealed that females have a higher proportion for extraction than males.[4] The reason for this might be the low self-care and especially dental care in our female population. It could also be due to lack of awareness, dependency and difficult approach to dental facilities. Several studies revealed that the presentation of males who were seeking treatment by extraction was larger than females [29] which may indicate carelessness and the ignorance of boys to maintain good oral hygiene.

The results of this study indicates that therapeutic extractions for orthodontic treatment and extractions due to dental caries are the main causes of tooth extractions with upper and lower first premolars being the most extracted teeth followed by lower first molars respectively. These findings are in correspondence with several studies. Orthodontic treatment is more often considered a priority when standard levels of prosperity are high. The findings of Agerholm et al 1986 revealed lower proportions of extractions for young people being essential due to caries and higher proportions of orthodontic extractions in S.England compared to Wales and N. England. [30]

Stephens et al reported that, in patients under 20 years of age, extraction for orthodontic purposes accounted for 33% of extractions in a certain Canadian population.[31] Murray et al, in a survey of Ontario general dental practitioners, reported that orthodontic considerations were the main reasons for permanent tooth loss in childhood. [32]

Extractions for orthodontic reasons were more common in mandibular and maxillary premolars [22,33]

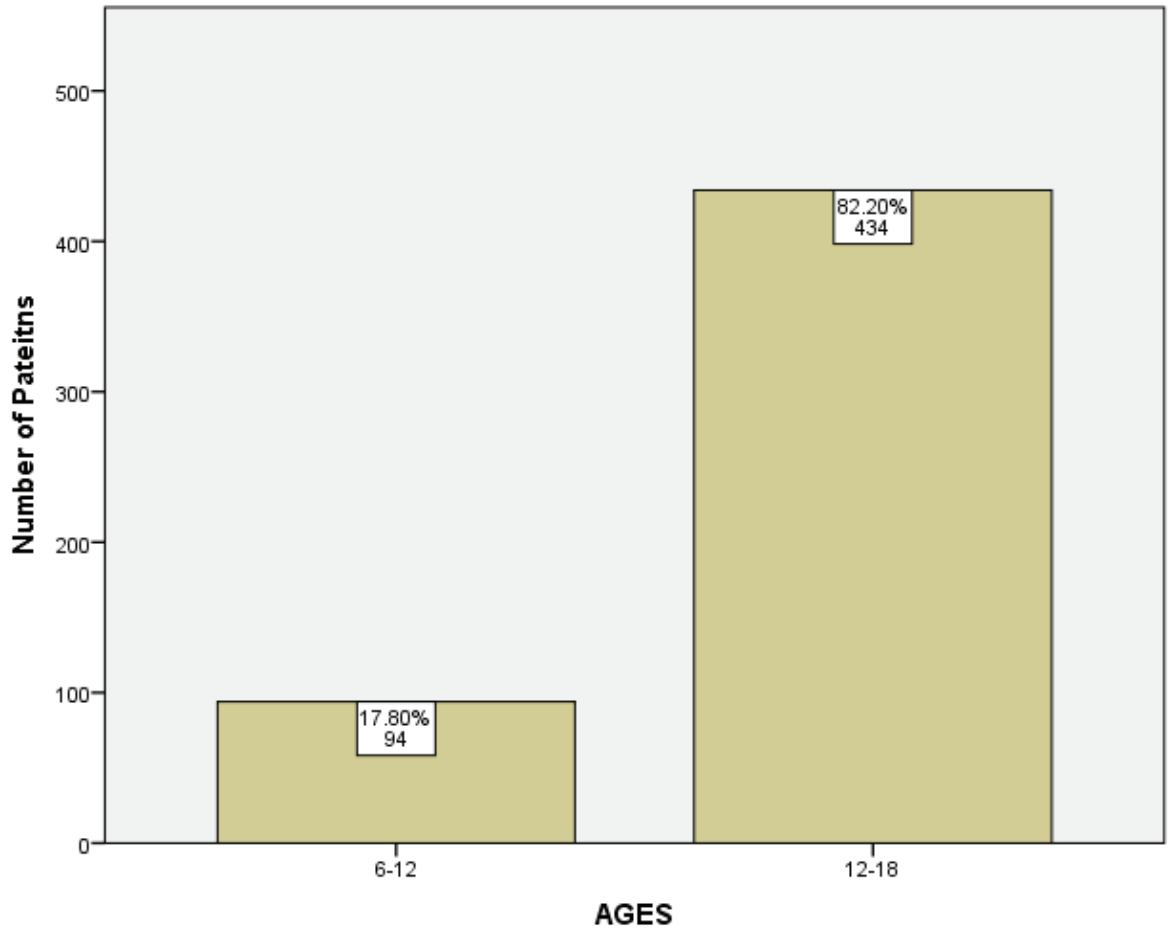
Concerning dental caries, the first permanent molar was the foremost affected tooth as being the earliest permanent tooth to erupt, in addition to its morphological features facilitate the accumulation of food and plaque, which can favor the bacterial invasion that ends to development of caries.[29]

The single predominant reason for tooth loss however appears to vary in several parts of the world, being primarily a function of socio-economic status, dietary and oral hygiene practices among other factors.[34]

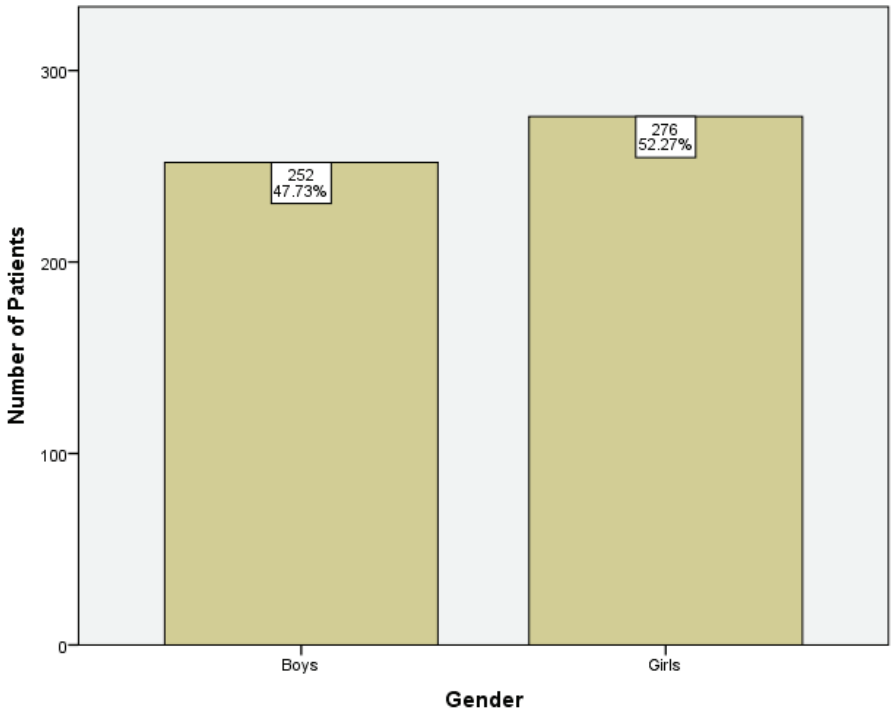
Although the study has some limitations like population bias, as the samples are of one particular population and does not represent all the ethnic groups or populations from around the world. A new study with a population group which is larger and more ethnically

diverse than the current one. Additional information regarding the results can be obtained which will hold more validity.

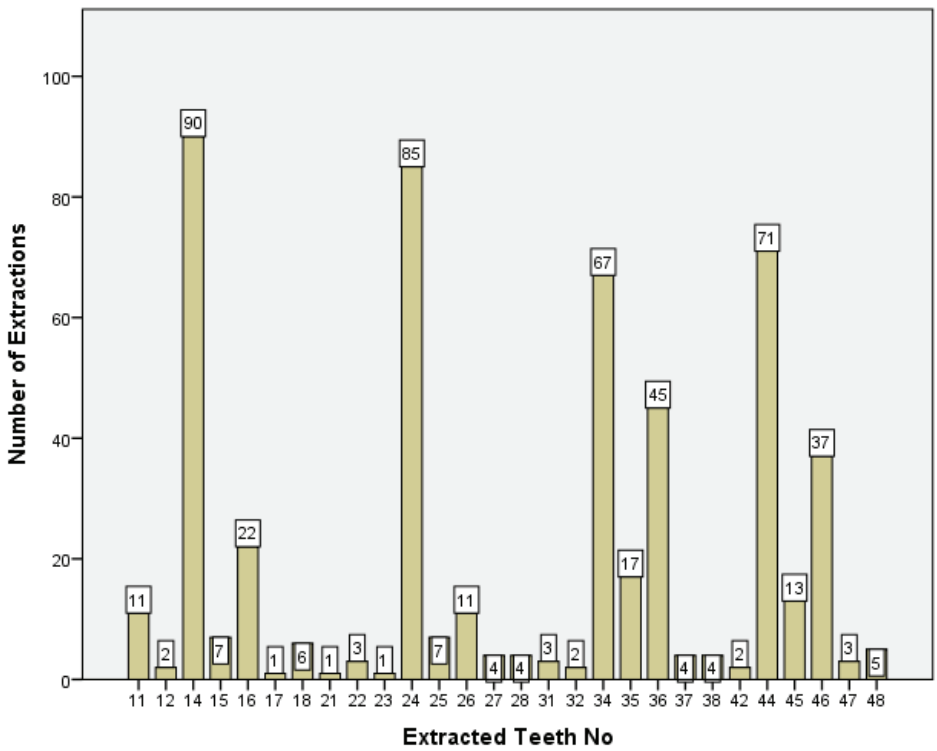
It is also recommended that community awareness programs should be initiated and people must be emphasized for vigorous oral hygiene maintenance. Government authorities must facilitate the dental organizations for community awareness campaigns. A proper health system including efficient dental care programs focusing on prevention and treatment of these diseases should be created and developed on a larger scale.



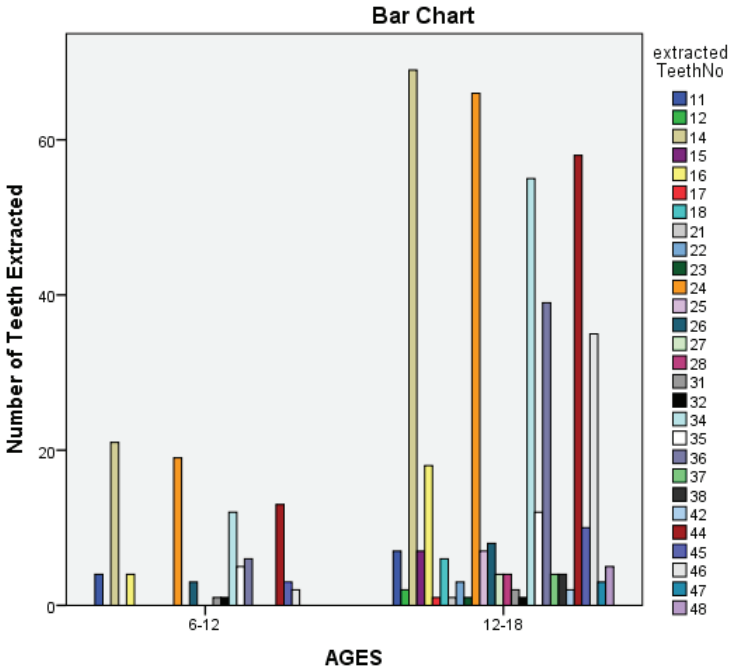
GRAPH 1: Age distribution of children in the study sample. X-axis denotes the age groups and Y-axis denotes the number of patients. The percentages of patients between 6-12 years and 12-18 years are 17.8% and 82.2% respectively.



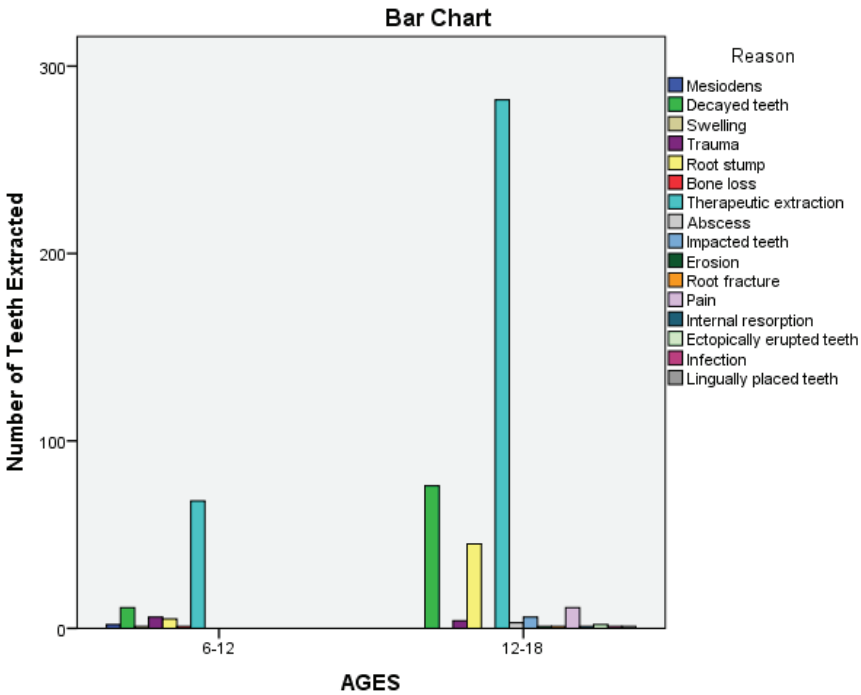
GRAPH 2: Gender distribution of children in study sample. The X-axis denotes the gender and Y-axis denotes the number of patients. The percentages of male patients were 47.73% and female patients were 52.27%.



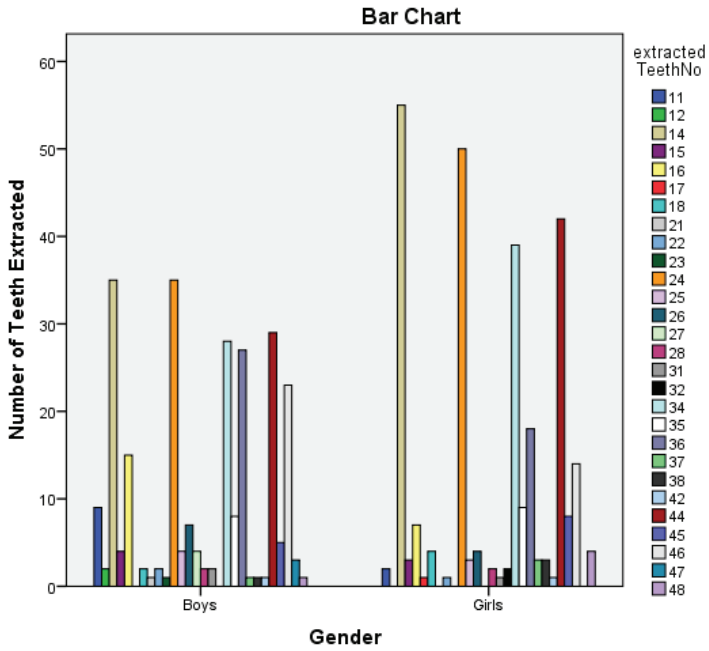
GRAPH 3: The graph denotes the total number of extractions done for each permanent tooth. X-axis denotes the teeth extracted in the FDI notation system and Y-axis denotes the number of extractions. The most frequently extracted permanent teeth were upper premolars, followed by lower premolars, and lower first molars



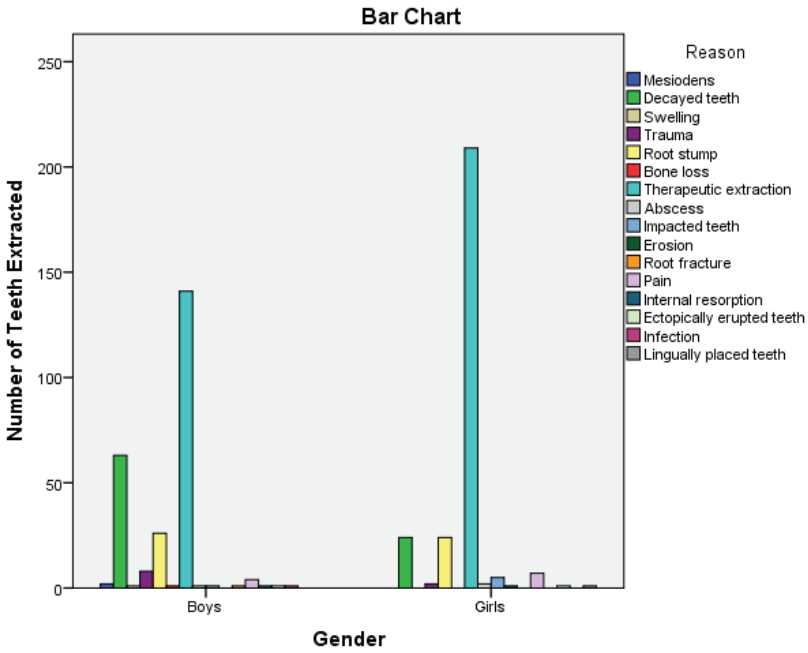
GRAPH 4: The graph represents the association between individual permanent teeth extracted at different age groups. X-axis denotes the age groups and Y-axis denotes the number of individual teeth extractions. There was no difference in individual teeth extracted at different age groups.Chi square test was done and the association was found to be not significant.(p value was =0.053 p>0.05 statistically not significant).



GRAPH5: The bar chart compares the various reasons for extraction of teeth at different age groups. X-axis denotes the age groups and Y-axis denotes the number of teeth extractions due to various reasons. Therapeutic extraction was the most common reason for extraction at different age groups. Chi square test was done and the association was found to be significant. (p value = 0.001 <0.05 statistically significant).



GRAPH 6: The graph compares the number of extraction of individual teeth(represented in the FDI system) with gender. X-axis denotes the gender and Y-axis denotes the number of individual teeth extractions. Females underwent higher number of extractions especially of upper first premolars compared to males. Chi square test was done and the association was found to be significant. (p value = 0.029 <0.05 statistically significant).



GRAPH 7: The graph represents various reasons for extraction between different genders. X-axis denotes the gender and Y-axis denotes the number of teeth extractions due to various reasons. Therapeutic extractions was the common reason for extraction among both the genders.Chi square test was done and the association was found to be significant. (p value = 0.001 <0.05 statistically significant).

Conclusion

Within the limits of the study, the most frequently extracted permanent teeth in patients from 6-12 years of age is upper first premolars, followed by lower first premolars, and lower first molars. The main reason for extractions were therapeutic & dental caries. This study will further pave the way for better diagnosis and treatment planning, and will also help in creating awareness.

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Conflict of Interest: The author reports no conflicts of interest.

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Ethical Clearance: It is taken from "Saveetha Institute Human Ethical Committee" (Ethical Approval Number- SDC/SIHEC/2020/DIASDATA/0619-0320)

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