Etiology for Tooth Extraction among Individuals of Different Age Groups in Chennai

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Abstract
Background: Dental extractions are often performed when teeth have become challenging to restore as a result of tooth decay, periodontal disease or dental trauma. However, despite advances in dental therapy, individuals hesitate to save teeth thereby prolonging periods of edentulism which if unreplaced may pose difficulties in restoring esthetics and function.
Aim: To extrapolate reasons for tooth extraction among individuals of different age groups in a population in Chennai.
Materials and methods: A questionnaire survey was designed to evaluate the reasons of extraction which was carried out among 221 patients with 500 tooth extractions having been performed for these individuals for varying reasons such as periodontitis, dental caries, and trauma, orthodontic, prosthetic and endodontic failures.
Results: 500 extractions performed in 221 patients revealed that 113 (22.6%) teeth extracted was due to dental caries, 186 (37.2%) was extracted due to periodontitis, 94(18.8%) due to orthodontic problems, 75(15%) due to impaction and 32(6.4%) due to other causes.

Conclusion: In this study out of 500 teeth extractions, 186 (37.2%) teeth were extracted due to periodontitis which was also noted to be the major cause for tooth extraction in males over 31 years of age. The next most common cause of tooth etractions were due to teeth affected by dental caries and pulpitis(22.6%). In females, the latter was the major for tooth extraction, followed by periodontitis with the number of extractions increasing in individuals between the age groups 21 to 40 years. Among all age groups the most commonly extracted tooth were the lower posterior teeth.

Keywords: caries, exfoliated teeth, exodontia, periodontal disease, tooth loss

Introduction

Loss of teeth has become a major oral health problem worldwide and is attributed to caries, periodontal disease, trauma, impaction and orthodontic problems. The removal of teeth is one of the most commonly performed dento-alveolar procedures in oral and maxillofacial surgery.(1) Studies on tooth mortality can provide valuable information regarding the patterns of oral disease in individual populations. Preventive strategies have to be implemented to minimize tooth loss due to oral diseases.(2) Studies concerning the epidemiology of oral disease has shown that dental caries and periodontal diseases are the most prevalent conditions that affect the oral cavity.(3) Most of these surveys were designed to investigate the etiology, severity and distribution of tooth loss based on the patient demographics and tooth type.(3,4) Dental caries and periodontal disease are the foremost reasons for extraction of permanent teeth(5,6) while extraction due to orthodontic treatment replaced caries as the most common reason for extracting teeth in individuals younger than 20 years of age.(6) In cases of trauma, extensive tooth injury may require extraction. Assessment of tooth mortality data in different parts of the world is essential to evaluating the adequacy of dental care and preventive oral health programs. Studies indicate that populations with poorer socioeconomic conditions have higher prevalence of the condition and extent of teeth mortality, which increases with the age of the individual.(7-9) Prior to the introduction of antibiotic use, chronic tooth infections were frequently associated with a variety of health-related conditions resulting in the removal of such diseased teeth as a common treatment option for such conditions.(10) Understanding the reasons for tooth extracted may improve oral health outcomes. Tooth loss has various harmful effects on an individual which may include the impairment of masticatory function,

unpleasant aesthetics, poor phonetics, temporomandibular dysfunctions, psychological issues, social withdrawal and decrease in confidence.(11) The impact of tooth loss also includes decreased function of speech and mastication especially in the elderly.(12,13) Several complications may also occur during extraction of teeth, including damage to adjacent teeth, retained roots, fractured jaws in individuals with osteoporosis and nerve injury during the extraction of mandibular third molars. Therefore, the aim of this study was to elucidate the reasons for the extractions of tooth among different age groups in males and females while analysingteeth that were most commonly extracted.

Materials and methods:

The present study was undertaken to extrapolate the reasons for tooth extraction in different age groups among a convenient sample size of 221 patients in a dental hospital in Chennai, India. The reasons for extractions were categorized into caries and pulpitis, periodontal disease, orthodontic problems, impacted teeth and other causes (cysts or tumour of the tooth, prosthetic removal, fractured tooth, supernumerary tooth). Demographic data and information regarding the etiology for tooth extraction was collected and entered in the pro forma. The subjects were divided into seven groups from between 0-80years of age which included those belonging to the ages of 0-10 years, 11-20 years, 21-30 years, 31-40 years, 41-50 years, 51-60 years, 61-70 years and 71-80 years.

The type of the tooth extracted was based on its location which was designated as maxillary anterior, maxillary posterior, mandibular anterior or mandibular posterior. The data was analysed and tabulated for male and female subjects based on the different reasons for tooth extraction. Comparisons between different age groups and commonly extracted tooth among different age groups were also analyzed.

Results:

Table1 describes the predominant causes of extraction of the 500 teeth extracted. 113 (22.6%) teeth extracted was due to dental caries, 186 (37.2%) was extracted due to periodontitis, 94(18.8%) due to orthodontic problems, 75(15%) due to impaction and 32(6.4%) due to other causes.

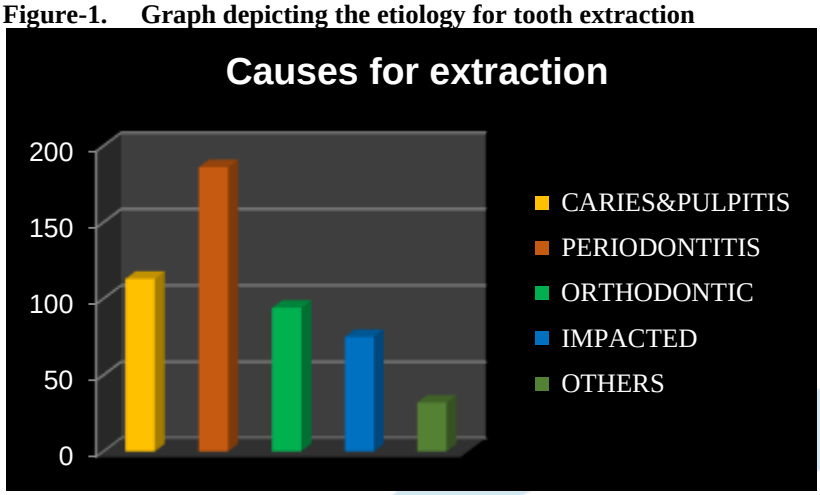
Table1: Etiology for the tooth extraction

Etiology	**Total no (n)**	**%**
Caries and pulpitis	113	22.6
Periodontitis	186	37.2
Orthodontic	94	18.8
Impacted	75	15
Others	32	6.4

Table 2: Tooth extraction causes listed by gender and age groups

Etiology	**Females**							
	0-10	11-20	21-30	31-40	41-50	51-60	61-70	71-80
Caries and pulpitis	3	3	16	15	11	9	3	0
Periodontitis	0	0	6	5	16	29	17	3
Orthodontic	0	5	37	3	0	0	0	0
Impacted	0	2	30	5	0	0	0	0
Others	1	2	5	3	3	1	0	0
	Males							
Caries and pulpitis	3	3	16	7	7	6	9	2
Periodontitis	0	0	3	9	28	20	42	8
Orthodontic	0	3	42	4	0	0	0	0
Impacted	0	2	34	2	0	0	0	0
Others	1	1	6	5	4	0	0	0

Figure-1. Graph depicting the etiology for tooth extraction



Dental caries and pulpitis were found to be a significant cause for extraction among female patients over 20 years and it was also the most significant cause of extraction for the combined age groups of 21-40 years. In addition, periodontitis was the major cause of tooth extraction in males which increased with age and among combined age groups of 31-80 years. In patients ranging between 21-40years, orthodontic problems was found to be a cause for tooth extraction. Impactions were a major cause of tooth loss in patients ranging between the age groups of 21-40 years. Other causes for extraction were equally distributed among all the age groups.

Figure 2: Etiology for tooth extraction in various age groups among males

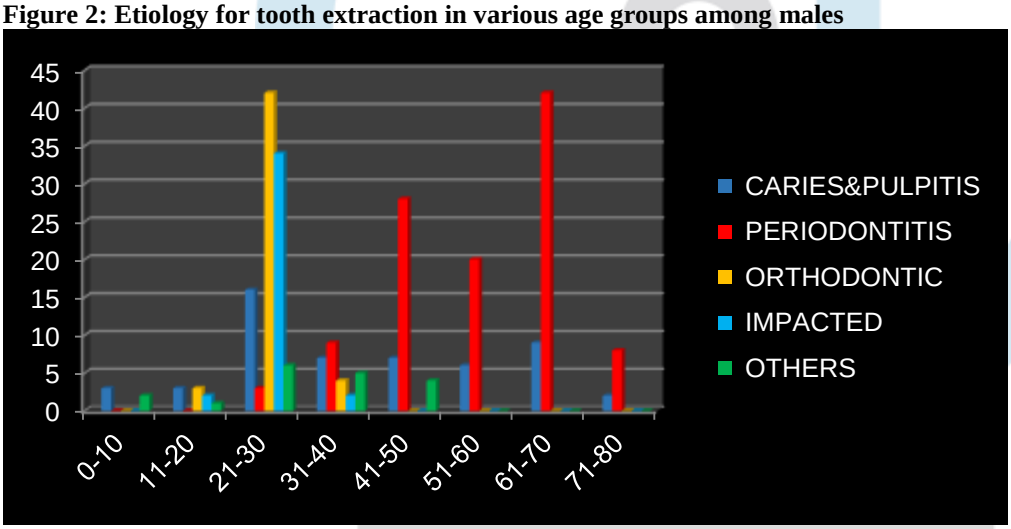


Figure 3: Etiology for tooth extraction among various age groups in females

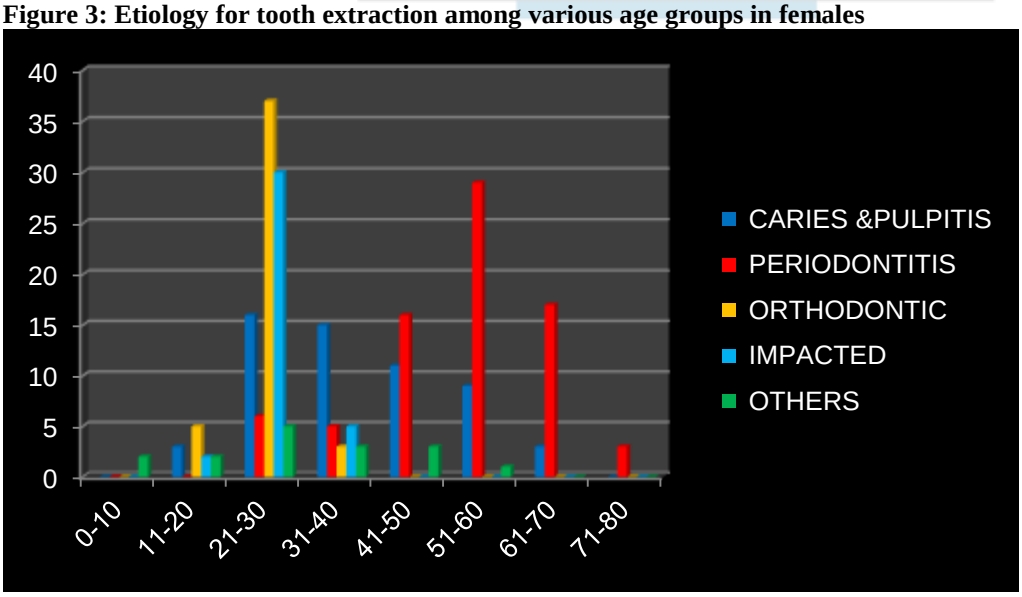


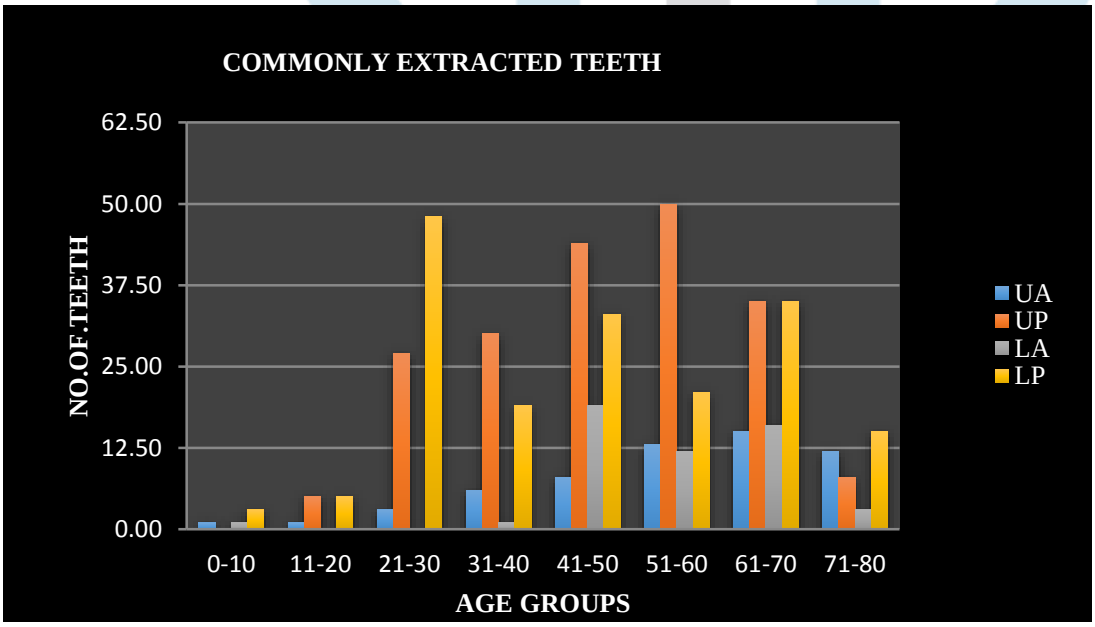
Table 3: Description of extracted teeth categorized by age and tooth groups

AGE GROUP (Years)	Max.Ant	Max.post	Man.Ant	Man.post
0-10	1	2	1	3
11-20	1	5	0	8
21-30	3	27	0	48
31-40	6	30	4	19
41-50	8	44	19	33
51-60	13	50	12	21
61-70	15	35	16	35
71-80	12	8	6	15

(Max.Ant- Maxillary anteriors, Max.Post- Maxillary posteriors, Man.Ant- Mandibular anteriors, Man.Post- Mandibular posteriors)

Table 3 describes the most commonly extracted tooth type in different age groups. Maxillary posterior teeth were commonly extracted in patients ranging between 31-60 years which was closely followed by mandibular posterior teeth. Between the age group of 61-70 years, both mandibular and maxillary posteriors had the same incidence of extraction. However, among the oldest age group of 71-80 years, mandibular posterior teeth were most frequently extracted followed by maxillary posterior teeth. Maxillary anterior teeth were commonly extracted in the age groups of 51-60 years and 71-80 years while mandibular anterior teeth were most often extracted among patients aged between 41-50 years but was barely appreciable in individuals younger than 30 years of age

Figure 4: Graph depicting extracted teeth groups among various age groups (UA: maxillary anteriors, UP: maxillary posteriors, LA: mandibular anteriors, LP: mandibular posteriors)



Discussion

Tooth loss is the dental equivalent of mortality. The end result of oral disease can reflect both the patient's own attitude to dental hygiene and the availability and accessibility of oral health care.(4) Great variation exists in the frequency and causes of tooth extraction in different countries.(5) Research suggest that the incidence of dental caries and periodontal diseases has progressively increased with the advent and availability of refined sugar in the average diet.(6) In Singapore, a survey of the reasons for tooth extraction showed that the percentage of teeth extracted for periodontal reasons and caries was about the same. In Brazil, 70% of tooth extraction was found to be due to caries, while extraction due to periodontal disease accounted for only 15% of tooth loss.(6,7) Dental practices in southern Wales indicated that caries was the main reason for tooth extraction (59%) in patients attending routine

dental treatment while periodontal disease was the second most common reason (29%).(8) A survey perfomed in Tehran proposed that dental caries and its complications were the leading reason for extraction followed by periodontal.(9) Furthermore, extractions performed in male patients were more due to periodontitis becahave been associated with the deleterious effects of tobacco and arecanut.(10) The current study also suggests that male patients lose more teeth than female patients as a result of periodontitis while female patients lose teeth to both caries and periodontitis. This has been previously discussed as the main causes of tooth loss as the result of such extraction.(11, 12) However, other studies indicate that periodontitis is the main reason for extraction of teeth as compared to dental Caries (13). Other results suggest that 62% of extractions of permanent and primary teeth were due to caries, with periodontal disease being the main reason for extraction in patients over 40 years of age(14-16), which was similar to the results in this study. These differences may be attributed to global variances in diet, socio-economic factors, level of dental awareness as well as water fluoridation. This study also showed that posterior teeth were more frequently extracted compared to anteriors which in accordance to previous studies.(17-19) In a study by Daameh et al, incisors were most frequently extracted in older individuals due to periodontitis(20), with mandibular anterior teeth being most periodontal involvement.(21) In this study incisors were the second most common teeth to be extracted after molars which was due to the effect of periodontitis on those teeth. A more likely reason for the high periodontal extraction in anterior teeth is due to the fact that they are less susceptible to caries, retained for a longer duration in the mouth, and then may be subjected to the risk of periodontal disease(21,22). Maxillary premolars and molars in males were most commonly extracted tooth as a result of periodontal disease, but as was the case for caries, the presence of caries was the main reason for loss of all maxillary teeth in females.(23) The majority of extractions of third molars has been shown to occur in the age group 21–30 years (48.2%), while most of the extracted first premolars (58%) occurred in the age group 10–20 years (24), which was in accordance with this study. This may have been due to impacted third molars and teeth that had to be extracted for orthodontic treatment especially in patients between the age groups of 21-40 years. Irregular tooth brushing and irregular visits to dentists significantly increased the number of third molar extractions due to caries and periodontal disease compared with those who reported regular tooth brushing and making regular dental visits.(25) Therefore, regular dental visits would be the best way of reducing need for more invasive and uncomfortable procedures such as extractions.(26) Studies have also reported that subjects with higher education levels had comparatively fewer tooth extractions than those with incomplete or lower education levels. This relationship is in agreement with other studies in which tooth loss was associated with a low level of education.(27) Retention of a complete dentition throughout lifetime should be the primary goal of the dental professional. Dental hygienists, including therapists and dental nutritionists, would help in the development of a sound oral hygiene and dietary changes, which in effect would reduce the occurrence of dental caries and periodontal diseases. In addition, community water fluoridation is one among the most cost-effective methods for preventing tooth decay. Globally, studies denote reduction of dental caries about 40-50% in deciduous dentition and 50-65% in permanent teeth.(28) Despite the fluoride-related preventive efforts in primary schools as a national protocol since 1997 (29, 30), dental caries remains as the major problem in a proportion of the population. Regular dental checkups are still not a routine pattern of behaviour for all individuals as evidenced by the levels of periodontitis observed which has been linked to various systemic diseases.

Conclusion:

Dental extractions are a cause of anxiety for patients both in terms of pain management and the edentulous space created post-extraction. Possible complications also include alveolar osteitis, infection, haemorrhage, paresthesia and less common iatrogenic effects. Avoiding extractions therefore suggests that prevention of tooth loss is a herculean challenge due to the various causes. The results of this present study indicate that periodontitis is the major cause for tooth extraction in males with caries and periodontitis among female patients. Strategies for efficient methods to screen and impart dental education for both etiologies with prolonged periods of follow-up is the need of the hour and must be seriously considered to improve the quality of life for such patients.

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