

REASONS FOR EXTRACTION IN PERMANENT DENTITION A STUDY IN A TERTIARY CARE SETTING IN PAKISTAN



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OBJECTIVE: The aim of this study was to investigate the primary reasons for simple extraction of permanent teeth in Dental Section of a tertiary care hospital and to identify the most frequently extracted teeth.

METHODOLOGY: The patients selected for this study were identified by reviewing dental notes from medical records of patients who had undergone dental extraction at Dental clinic, at The Aga Khan University Hospital, Karachi. Total of 124 charts were reviewed retrospectively. Data regarding the age, gender, co morbid conditions, date of extraction, number and type of tooth extracted and the cause of exodontia were recorded in a proforma. Descriptive analysis was done using SPSS version 13.0.

RESULTS: A total of 147 teeth extracted from 77 patients were included for analysis. Out of 77 patients, 56% were females and 44% were males. Average age was 49.7 + 16 years. (11-83 years). Reasons for extraction were: 42.2% extractions were due to caries, 30.6% were extracted for periodontal reasons, 6.1 % for orthodontic reasons, 10.2% for mixed reasons, 6.1% for failed endodontics, 4.1% on account of tooth fracture and 0.7% for pre-prosthetic reasons Maxillary second molars were the most frequently extracted teeth. More posterior teeth were extracted due to caries while periodontitis was the main reason for extraction in the anterior teeth.

CONCLUSION: Caries was found to be the primary reason for exodontia of permanent teeth in all age groups, followed by periodontitis and orthodontic reasons. Maxillary molars were the most frequently extracted teeth.

KEY WORDS: Tooth extraction, dentition, permanent, Exodontia

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INTRODUCTION

Prior to the 17th century, tooth loss was considered an inevitable part of human life and was generally accepted¹. Long before dentistry emerged as a true profession, "tooth pullers" were a necessary part of most cultures¹. Tooth pullers or barber surgeons as they were called, traveled from one town to another in a carnival atmosphere, not only extracting teeth but also cutting hair, lancing boils and extracting kidney stones. As the profession of dentistry evolved during the 19th century, much of the work of dentists was still devoted to tooth extraction since restorative work was crude and painful and prevention was unknown¹. In the absence of ways to treat infection in the pre-antibiotic era, people expected to lose teeth and dentists expected to extract them. More emphasis was given to conservation of teeth with time. Development of newer materials and techniques has significantly reduced the necessity for extraction. From 1990's and onwards, tooth retention has further improved. Changes are coming with improvement in restorative work, rising attitude towards tooth retention and advances

in preventive oral health².

Studies on reasons for exodontia are important because exodontia is an indicator of dental caries and status of oral health of a population³. Caries has been found to be the main reason for tooth extraction upto 40-60 years of age and periodontal disease thereafter⁴. Lindquist⁵ (1967) found caries and periodontal disease to be equally important reasons for exodontia from 50 years of age. The purpose of this study was to investigate the primary reasons for extraction of permanent teeth in a tertiary care dental setting and to identify the most frequently extracted teeth. This study will encourage practitioners to put more emphasis on prevention and treatment of caries.

METHODOLOGY

This was a descriptive study with retrospective data collection. Patients were identified by their medical record numbers. All the patients who had registered for their treatment under the codes of "Simple extraction", "Molar extraction" and "Broken down root extraction" and who had their firm or mobile, permanent teeth extractions done at the dental clinic of The Aga Khan University Hospital, Karachi (AKUH), were included in this study.

Data was retrieved for the period of 12 weeks.

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Out of 124 dental charts reviewed, 47 were excluded due to; third molar extractions, primary teeth extractions, surgical extractions and cases with incomplete records. Variables recorded were age, gender, any co morbid conditions, month of extraction, tooth extracted and the cause of the exodontias. The primary reasons for exodontias specified were caries, periodontitis, orthodontics, dental trauma/fracture, failed restoration, pre-prosthetic reason, mixed (combination of any of the reasons) and others. Definitions of these primary reasons for extraction were modified from a study by Klock KS⁶ and are given in table I.

Label	Primary reasons	Definitions
1	Caries and sequelae of caries	Teeth removed due to caries or its sequelae making the tooth non restorable, including root remnants.
2	Periodontal disease	Teeth extracted due to loss of function, mobility, periodontal abscess and /or pain
3	Orthodontics	Teeth removed to prevent or correct malocclusion
4	Dental fracture/trauma	Teeth removed due to non-caries associated dental trauma
5	Failed restoration	Teeth extracted due to sequelae of failure of large extra or intracoronal restorations or endodontics.
6	Pre-prosthetic reasons	Teeth removed for prosthetic treatment
7	Others	Teeth removed due to economic, esthetic, occlusal reasons, on patient's request or any other reason for extraction (specify).

Table I. Definitions of primary reasons for extraction of permanent teeth⁶

Descriptive analysis of data was done using SPSS version 13.0. Frequency and percentage of etiology of extraction, age distribution, gender, tooth number and comorbids were analyzed by the primary author.

RESULTS

Total of one hundred and forty seven(147) teeth were extracted from 77 patients. Average numbers of teeth extracted per patient were 1.9. Out of these, 56% (43) were females and 44% (34) were males (Male: Female = 1:1.2). Mean age of patients was 49.7 + 16.6 years, ranging from 11-83 years. Caries and its sequelae accounted for 42.2% of extractions. Other causes of tooth extractions are given in Figure. I.

Left maxillary second molar was the most commonly extracted tooth followed by right maxillary first molar and then mandibular molars. Right and left mandibular canines were the least extracted teeth. We divided the patients into 3 age groups. Distribution of these groups was < 30 years(representing younger age group): 16.3%,

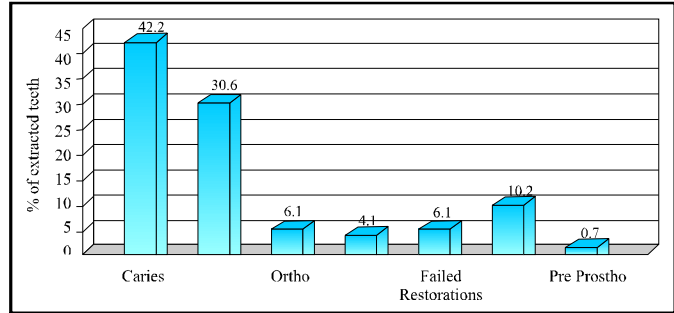


Fig I. Reasons for exodontia

31- 50 years (representing middle age group patients): 40.8% and > 50 years(representing elderly patients): 42.9 %. Age group wise distribution of etiology of extraction is given in table II.

Etiology	Patient's age in years (%)			Total (%)	n
	< 30y	31-50y	≥ 50y		
Caries	58.3	43.3	34.9	42.2	62
Periodontitis	-	40.0	33.3	30.6	45
Orthodontics	33.3	1.7	-	6.1	9
Fracture/trauma	4.2	1.7	6.3	4.1	6
Failed restoration	4.2	8.3	4.8	6.1	9
Mixed	-	3.3	20.6	10.2	15
Preprosthetic	-	1.7	-	0.7	1

Table II. Age group wise distribution of etiology.

For the sake of simplicity, we divided the permanent dentition into 6 sextants: upper right, upper anterior, upper left, lower right, lower anterior and lower left sextants. Distribution of etiology in tooth sextants is given in table III. Most of the teeth extracted due to caries were in lower left and upper left sextants, which represent posterior teeth, while the teeth extracted due to periodontitis were mostly maxillary and mandibular anterior teeth.

Etiology	Tooth sextant (%)					
	UR	UA	UL	LL	LA	LR
Caries	35.3	25.9	60.0	63.6	30.0	35.7
Periodontitis	17.6	51.9	23.3	9.1	70	14.3
Orthodontics	11.8	-	6.7	4.5	-	14.3
Fracture/trauma	2.9	3.7	3.3	4.5	-	14.3
Failed restoration	8.8	3.7	-	13.6	-	14.3
Mixed	20.6	14.8	6.7	4.5	-	7.1
Preprosthetic	2.9	-	-	-	-	-
Total	34	27	30	22	20	14

Table III. Distribution of etiology in tooth sextants

50% of our patients did not have any comorbids, while 12.2% had hypertension, 8.25% had diabetes, and

12.2 % had both diabetes and hypertension. 17% patients had some medical problems other than these two. An important finding was that patients who had diabetes had extractions mainly due to periodontitis. Relation of comorbids with etiology is given in table IV.

Etiology	Co morbid%				
	None	DM	HTN	HTN+DM	Others
Caries	40.5	0	44.4	11.1	88
Periodontitis	23	58.3	50.0	61.1	4.0
Orthodontics	12.2	0	0	0	0
Fracture/Trauma	2.7	8.3	0	6.7	0
Failed restoration	9.5	0	5.6	0	4.0
Mixed	12.2	33.3	0	11.1	0
Preprosthetic	0	0	0	0	4.0

Table IV. Relation of comorbids with etiology.

DISCUSSION

Caries turns out to be the predominant (42.2%) reason for tooth extraction among patients attending the clinics at Aga Khan University Hospital. This finding is in line with reports from various other parts of the world where different authors have studied determinants related to exodontias including the reasons for those extractions. Caries was the main reason for 35- 69 % of extractions in different studies in different countries all over the world given in table V.^{6,7,8,9,10,11,12}

Extraction due to both caries and periodontitis were more common in middle age group. The results concur with the classical view that caries and periodontitis are

equally important cause for extraction in older age groups⁵ but differs from those who found that caries as the most important cause before 40 years of age and periodontal disease above that age⁴.

Maxillary second molar was found to be the most frequently extracted tooth. Reason could be that it is a far reached tooth, which is difficult to clean. Also, it is difficult to restore complicated carious lesion in a maxillary posterior tooth as compared to similar lesion in a mandibular molar. Mandibular anterior teeth were more frequently extracted due to periodontitis. The reason is that caries is less prevalent in anterior teeth and long standing calculus in this area makes teeth more afflicted by periodontitis.

Corbet et al³ investigated reasons given for permanent tooth extraction of 8516 teeth in Hong Kong. They found that caries was most common reason for extraction (60%) followed by periodontitis. Most commonly extracted teeth were molars. Mandibular incisors were most commonly extracted due to periodontitis. Our results are also comparable with this study.

A number of patients who had extraction due to periodontitis had diabetes alone, or in combination with other comorbids, this result reflects the known association of diabetes mellitus with periodontal diseases^{14,15,16}

There is very limited literature, published in Pakistan on this subject. Rehman¹⁷ et al studied factors affecting tooth extraction among dental patients in Sandeman provincial hospital, Quetta and found caries to be the most common cause of extraction (77.6%). This rate is significantly high as compared to our study. The reason as mentioned by the author were that most patients wanted extraction due to expensive conservation treatment and

Study	Year of Publication	Country	Period	Age	Teeth	Caries	Perio.	ppt**	Ortho.	Trauma	Others
<i>Johansen</i>	1970	Norway	3 w ks	5-71+	8,757	69	23	0.8	1	0.2	7
<i>Cahen et al</i>	1985	France	4 w ks	6-70+	14,621	49	32	3	8	2	6
<i>Klock & H.Jorden</i>	1988	Norway	2 w ks	6-80+	692	35	19	4	20	-	22
<i>Cardona</i>	2001	Spain	24w ks	6-70+	4,259	49.9	33.7	3.6	1.6	0.7	10.4
<i>Sayeg H</i>	2004	Jordan	4 yrs	6-70+	3069	46.9	18	19.4	4	0.7	2.8
<i>Richard</i>	2005	South w ales	-	6-80+	558	59	29.1	1	5.5	1.2	5
<i>Aida</i>	2006	Japan	1w k	5-75+	9,115	32.7	41.8	-	1.2	10.6	13.6
<i>Anand</i>	2010	Kerala, India	-	5-70+	997	44.6	33.2	2.5	11.1	-	10
<i>Naz</i>	-	Pakistan	12w ks	6-70+	147	42.2	30.6	0.7	6.1	4.1	16.3

Table V. Reasons for tooth extractions: Comparison of results of different studies^{6,7,8,9,17,18}

lack of awareness.

Salman et al¹⁸ found that 72.7% of extractions were due to caries which is similar to our study in which caries was the most common reason for extraction.

Patients reporting to the dental clinic of The Aga Khan Hospital generally represent the more privileged group of community. The treatment rendered there, is more inclined towards conservation of teeth. If such conservative treatment requires multiple visits, patients usually refuse and do not comply for the complete treatment. In such situations only, the dentist might opt for dental extraction, which can also contribute to the rate of exodontia. The results of this study, therefore could be generalized to the entire population with caution because it may not be a true sample of community.

Screening of high risk population, implementing preventive measures and promotion of health education for early and periodic dental checkups are the strategies that need to be vigorously implemented.

CONCLUSION

Despite the advancements in preventive and restorative dentistry in Pakistan over the last two decade, caries still remains the primary reason for exodontia of permanent teeth. This is followed by periodontitis and extractions due to orthodontic reasons. Mandibular and maxillary anterior teeth are more frequently extracted due to periodontitis. Posterior teeth are more frequently extracted due to caries. Maxillary molars followed by mandibular molars are the most frequently extracted teeth. It is recommended that efforts should be made on prevention and treatment of caries to minimize tooth loss.

CLINICAL SIGNIFICANCE

The conclusions of this study from this part of the world, have added to the world wide representation of the two main reasons of exodontia in permanent dentition. This information will help clinicians in further emphasizing the need for implementing measures for preventing caries and periodontitis to avoid or at least delay tooth loss.

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