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Original Research Article

Patterns of and Reasons for Permanent Tooth Extractions in a Saudi Population

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Abstract
Aim: *The aim of this study was to detect the patterns of and reasons for permanent tooth extractions in a Saudi population in the Kingdom of Saudi Arabia.*
Materials and Methods: *557 Saudi patients aged ≥10 years residing in the Kingdom of Saudi Arabia with at least one permanent tooth extracted or diagnosed for extraction were randomly selected. One reason for each tooth was documented whether by asking the patient why his/her tooth was extracted or by clinical and radiographic examination. The data obtained were documented in a patient examination form then statistically analyzed using Chi-Square Test or Fisher-Freeman-Halton Test and T-Test.*
Results: *The highest percentage of tooth extractions was observed in the age group 10-29 years (36%). Tooth extractions due to caries were more in females compared with males, but they due to periodontal disease were more in males compared with females. There was a significant relationship between the reasons for tooth extractions and the extracted teeth types $p < 0.05$, so caries was (66.4%), followed by eruption problems (17.5%), periodontal disease (7.1%), orthodontics (5%), prosthodontics (1.9%), pericoronitis (1.6%), and trauma (0.5%); also, the most frequently extracted tooth type was the molars (75.7%), followed by premolars (18.1%), and anterior teeth (6.2%); mandibular and maxillary third molars were the most frequently extracted teeth (19.9%) and (19.5%), followed by the mandibular and maxillary first molars (13.3%) and (8.4%), respectively; however, the least frequently extracted teeth were the mandibular canines (0.7%), followed by the maxillary lateral incisors (0.9%). Of all teeth types, premolars were the most commonly extracted teeth due to orthodontics, and mandibular anterior teeth were the least frequently extracted teeth due to caries. Caries was the main reason for tooth extractions in all age groups. Tooth extractions due to caries, eruption problems, and orthodontics were more in patients≤ 40 years than in patients > 40 years; however, tooth extractions due to periodontal disease were more in patients > 40 years than in patients ≤ 40 years.*
Conclusion: *Caries is epidemic; it's advised to intensify efforts towards dental sealants and fluoride application with implementing dental preventive and educational programs in order to raise the public awareness of oral hygiene instructions and natural dentition.*
Keywords: *Tooth/Teeth, Types, Extractions, Reasons, Age, Gender*

Introduction

Tooth extraction doesn't only cause dysfunction of the masticatory system, but it also has negative social and psychological impact on the patient. Extraction of permanent teeth happens because of various reasons including dental caries, periodontal disease, orthodontic treatments, traumatic injuries, eruption problems, prosthetic indications, pericoronitis, and patient's request.[1-23] Because substantial proportions of the population of Saudi Arabia continue to have teeth extracted, the patterns of and reasons for such loss should be a matter of concern to researchers. With the revolutionary changes facing human societies in the 21st century in lifestyle, dietary habits, education, and the rise of recent oral health educational and preventive programs in many countries, such as Saudi Arabia, it is important to keep searching for the patterns of and reasons for tooth extractions in order to find out the common global phenomena and to implement factual and effective dental public health preventive policies avoiding random ineffective schemes. The aim of this study was to detect the patterns of and reasons for permanent tooth extractions in a Saudi population in the Kingdom of Saudi Arabia.

Materials and Methods

Ethical approval

The study was registered with the research center of Riyadh Elm University (FRP/2019/15) and received ethical approval from the institutional review board of the same institution (RC/IRB/2019/53).

Selection of the content for analysis and statistical analysis

557 Saudi patients aged ≥10 years residing in Saudi Arabia with one or more permanent teeth extracted or diagnosed for extraction were randomly selected. The study was conducted from March 2019 to May 2019. After taking the patient consent on an informed consent statement form for clinical studies, each patient was clinically examined for extracted or diagnosed for extraction maxillary and mandibular permanent teeth. Also, radiographic examination was used including panoramic, periapical, and bitewing radiographs. The criteria for extraction categories (reasons for tooth extractions) were adapted based on Murray et al[3] 1996, and one reason for each tooth was recorded whether by asking the patient why his/her tooth was extracted or by clinical and radiographic examination for the tooth diagnosed for extraction. The criteria for extraction categories (reasons for tooth extractions) based on Murray et al[3] 1996 with some modifications were as the following:

Caries: As well as initial and recurrent caries, this category includes all sequelae of caries, including extracted roots, where the crown was lost through caries and teeth fracturing due to weakening by caries. Failed root treatments, initially treated because of caries, should also be placed in this category.

Periodontal disease: Where pain, loss of function or pocketing requires that the tooth be extracted.

Orthodontic: Teeth extracted to prevent or correct malocclusion, be they impacted, incompletely erupted or supernumerary.

Prosthodontic: Teeth which are extracted because their removal facilitates a better prosthetic restoration.

Trauma: This category should include teeth lost only as a result of trauma, including jaw fractures (fractured restorations should be placed in the caries category).

Pericoronitis: Persistent inflammation around third molars which necessitates removal of one or all third molars.

Eruption problems (referred to as impacted in the original reference of Murray et al[3]): Removal of unerupted or partially erupted tooth.

The data obtained were documented in a patient examination form then statistically analyzed using Chi-Square Test or Fisher-Freeman-Halton Test when appropriate to test the association between categorical variables (age, reason, tooth type) and Independent Samples T-Test to test the differences in the mean number of extracted teeth per patient by gender. All statistical analyses were performed using the IBM SPSS Statistics 20 data processing software. The significance level was set at $p < 0.05$.

Results

A total of 2563 permanent teeth were extracted or diagnosed for extraction from 557 patients. The sample of 557 patients consisted of males n=261 (46.9%) and females n=296 (53.1%), and the patients were of the following age groups: 10-29 years n=247 (44.3%), 30-40 years n=158 (28.4%), 41-50 years n=87 (15.6%), and ≥51 years n=65 (11.7%).

Extracted Teeth Types

Chi-Square Test showed that there was a significant difference in the percentages (number of observations) of the extracted teeth types p=0.000 <0.05 (df =15, a=5% (one side test, right), with referring to Chi-Square statistical tables, $\chi 2$ tab= 24.996 < $\chi 2$ cal= 2458.909). Therefore, the most frequently extracted tooth type was the molars (75.7%), followed by premolars (18.1%), and anterior teeth (6.2%). The most frequently extracted teeth were the mandibular third molars (19.9%), followed by the maxillary third molars (19.5%), the mandibular first molars (13.3%), the maxillary first molars (8.4%), and the mandibular and maxillary second molars (7.6%) and (7.1%), respectively. However, the least frequently extracted teeth were the mandibular canines (0.7%), followed by the maxillary lateral incisors (0.9%) (Table 1, Chart 1). Furthermore, Mode=38 which indicated that the left mandibular third molars were the most frequently extracted tooth type.

Table 1: Distribution of Extracted Teeth Types

Teeth Types	Count (n)	Percent (%)
Maxillary Third Molar	500	19.5
Mandibular Third Molar	509	19.9
Maxillary Second Molar	181	7.1
Mandibular Second Molar	194	7.6
Maxillary First Molar	216	8.4
Mandibular First Molar	340	13.3
Maxillary Second Premolar	159	6.2
Mandibular Second Premolar	106	4.1
Maxillary First Premolar	132	5.2
Mandibular First Premolar	66	2.6
Maxillary Canine	25	1.0
Mandibular Canine	19	0.7
Maxillary Lateral Incisor	24	0.9
Mandibular Lateral Incisor	27	1.1
Maxillary Central Incisor	30	1.2
Mandibular Central Incisor	35	1.4
Total	2563	100

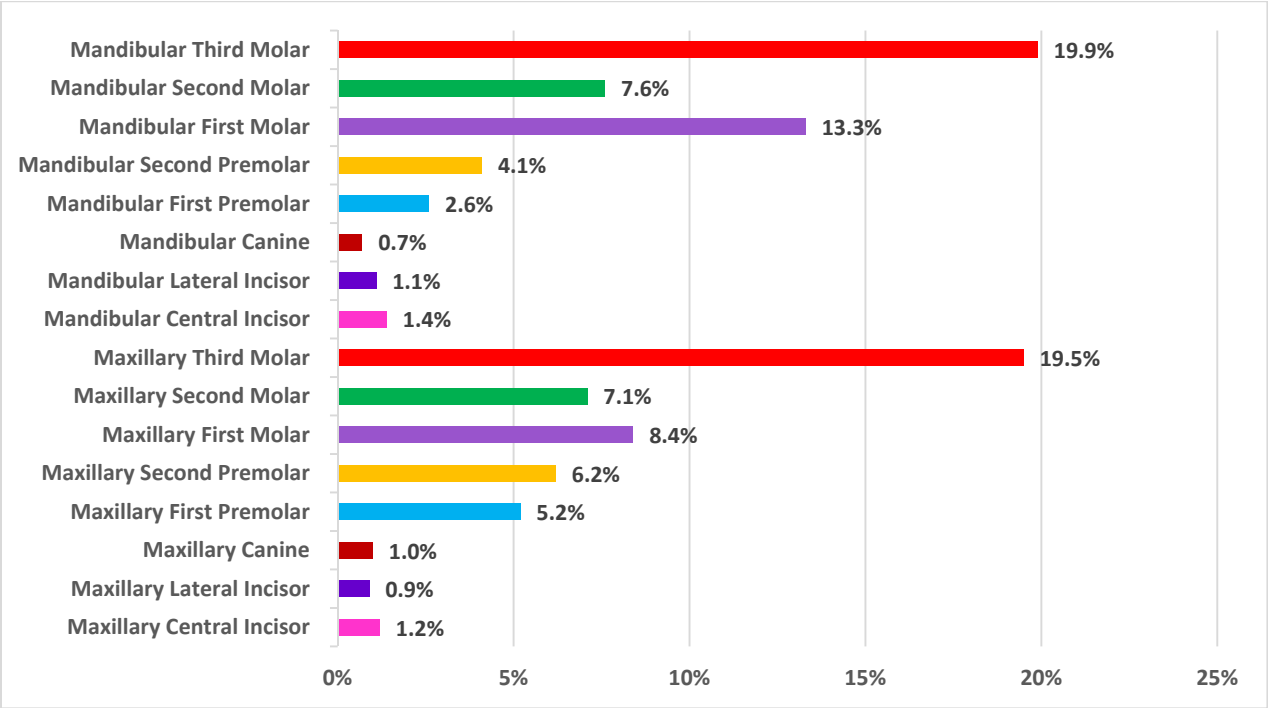

Chart 1: Distribution of Extracted Teeth Types

Reasons for Tooth Extractions and Extracted Teeth Types

Fisher's Exact Test showed that there was a statistically significant relationship between the reasons for tooth extractions and the extracted teeth types p=0.000<0.05. The Contingency Coefficient value was (70.3%) with p=0.000 <0.05. Therefore, the reasons for tooth extractions were distributed as the following: caries (66.4%), followed by eruption problems (17.5%), periodontal disease (7.1%), orthodontics (5%), prosthodontics (1.9%), pericoronitis (1.6%), and trauma (0.5%) (Table 2, Chart 2). In addition, Mode=1 which indicated that caries was the most common reason for tooth extractions according to this study encoding.

Molars: First molars, second molars, and third molars were the most commonly extracted teeth due to caries of all teeth types (Table 2).

Third molars: Of all reasons for tooth extractions, the main reason for mandibular third molars extractions was caries (44.6%), followed by eruption problems (43.8%), and pericoronitis (6.3%); also, of all reasons for tooth extractions, the main reason for maxillary third molars extractions was caries (48.2%), followed by eruption problems (44.2%). However, mandibular third molars were the most commonly extracted tooth type due to eruption problems (49.7%) and pericoronitis (80%) of all teeth types, and maxillary third molars were the second most commonly extracted tooth type due to eruption problems (49.2%) of all teeth types.

First and second molars: Of all reasons for tooth extractions, caries was the predominant reason for mandibular and maxillary first and second molars extractions (92.1%) and (93.7%), followed by periodontal disease (5.6%) and (4.3%), respectively. In addition, mandibular first and second molars were the most frequently extracted tooth type due to caries (28.9%) of all teeth types, and maxillary first and second molars were the second most frequently extracted tooth type due to caries (21.9%) of all teeth types.

Incisors: Of all reasons for tooth extractions, the main reason for mandibular incisors extractions was periodontal disease (83.9%), followed by prosthodontics (9.7%), and caries (6.5%); also, of all reasons for tooth extractions, the main reason for maxillary incisors extractions was periodontal disease (42.6%), followed by caries (35.2%), and trauma (18.5%). In addition, mandibular incisors were the most commonly extracted tooth type due to periodontal disease (28.4%) of all teeth types, and maxillary incisors were the most commonly extracted tooth type due to trauma (83.3%) of all teeth types.

Canines: Of all reasons for tooth extractions, maxillary canines were extracted due to periodontal disease (32%) and trauma (4%); however, of all reasons for tooth extractions, the main reason for mandibular canines extractions was periodontal disease (73.7%), followed by prosthodontics (15.8%), and caries (10.5%). Furthermore, of all teeth types, mandibular canines were more frequently extracted due to periodontal disease than maxillary canines (7.7%) and (4.4%), respectively. Also, of all teeth types, mandibular canines were more frequently extracted due to prosthodontic reasons than maxillary canines (6.1%) and (2%), respectively. In addition, maxillary canines were the second most frequently extracted tooth type due to trauma (8.3%) of all teeth types.

Premolars: Of all reasons for tooth extractions, the main reason for maxillary premolars extractions was caries (77.7%), followed by orthodontics (17.5%), and periodontal disease (3.8%); also, of all reasons for tooth extractions, mandibular premolars were extracted due to orthodontics (23.3%) and periodontal disease (14%). However, of all teeth types, mandibular premolars were more frequently extracted due to periodontal disease (13.1%) than maxillary premolars (6%). Also, maxillary premolars were the most commonly extracted tooth type due to orthodontics (39.8%) of all teeth types, and mandibular premolars were the second most commonly extracted tooth type due to orthodontics (31.2%) of all teeth types.

Mandibular anterior teeth were the least commonly extracted teeth due to caries of all teeth types canines (0.1%) and incisors (0.2%), respectively (Table 2).

Reasons for Tooth Extractions and Age Groups

Chi-Square Test showed that there was a statistically significant relationship between the reasons for tooth extractions and the age of the patient p=0.000<0.05 (df=18, a=5% (one side test, right), with referring to Chi-Square statistical tables, $\chi 2$ tab= 28.869 < $\chi 2$ cal= 544.300). The Contingency Coefficient value was (41.9%) with p=0.000 <0.05. Therefore, of all reasons for tooth extractions, caries was the main reason for tooth extractions in all age groups 10-29:55.2%; 30-40:75.2%; 41-50:74.9%; and ≥51:66.9%, and periodontal disease was the second most common reason for tooth extractions in older age groups ≥51:24.1% and 41-50:9.5%, while eruption problems were the second most common reason for tooth extractions in the youngest age group 10-29:27.9% (Chart 3).

Table 2: Reasons for Tooth Extractions According to Extracted Teeth Types

Tooth Type	Jaw	Caries n	Periodontal Disease n	Orthodontic n	Prosthodontic n	Trauma n	Eruption Problems n	Pericoronitis n	Total n
Third Molar	Maxillary	241	3	18	9	0	221	8	500
	Mandibular	227	1	17	9	0	223	32	509
Second& First Molar	Maxillary	372	17	2	6	0	0	0	397
	Mandibular	492	30	0	9	0	3	0	534
Premolar	Maxillary	226	11	51	2	1	0	0	291
	Mandibular	104	24	40	2	0	2	0	172
Canine	Maxillary	15	8	0	1	1	0	0	25
	Mandibular	2	14	0	3	0	0	0	19
Incisor	Maxillary	19	23	0	2	10	0	0	54
	Mandibular	4	52	0	6	0	0	0	62
Total	Count (n)	1702	183	128	49	12	449	40	2563
	Percent (%)	66.4%	7.1%	5%	1.9%	0.5%	17.5%	1.6%	100%

In addition, of all age groups, it was observed that the percentages of tooth extractions because of periodontal disease were higher in patients > 40 years of age than in patients ≤ 40 years of age 10-29:9.3%; 30-40:2.2%; 41-50:26.2%; and ≥51:62.3%; however, of all age groups, the percentages of tooth extractions because of caries were higher in patients ≤ 40 years of age than in patients > 40 years of age 10-29:29.9%; 30-40:29.2%; 41-50:22.3%; and ≥51:18.6%; also, of all age groups, the percentages of tooth extractions because of orthodontic reasons were higher in patients ≤ 40 years of age than in patients > 40 years of age and were the highest in the age group 10-29 years as the following:10-29:74.2%; 30-40:16.4%; 41-50:6.2%; and ≥51:3.1%; in addition, of all age groups, the percentages of tooth extractions because of eruption problems were higher in patients ≤ 40 years of age than in patients > 40 years of age and were the highest in the age group 10-29 years as the following: 10-29:57.2%; 30-40:26.9%; 41-50:9.4%; and ≥51:6.5%; furthermore, of all age groups, the percentages of tooth extractions due to pericoronitis were the highest in the age group 10-29 years (70%). Finally, of all age groups, the percentages of tooth extractions due to prosthodontic reasons were the highest in the age group 41-50 years (44.9%) (Table 3).

Table 3: Reasons for Tooth Extractions and Age Groups

Age Group, Years		Reasons for Tooth Extractions							Total
		Caries	Periodontal Disease	Orthodontic	Prosthodontic	Trauma	Eruption Problems	Pericoronitis	
10-29	Count	509	17	95	12	4	257	28	922
30-40	Count	497	4	21	8	2	121	8	661
41-50	Count	379	48	8	22	3	42	4	506
≥51	Count	317	114	4	7	3	29	0	474
Total	Count	1702	183	128	49	12	449	40	2563
	%	66.4%	7.1%	5%	1.9%	0.5%	17.5%	1.6%	100%

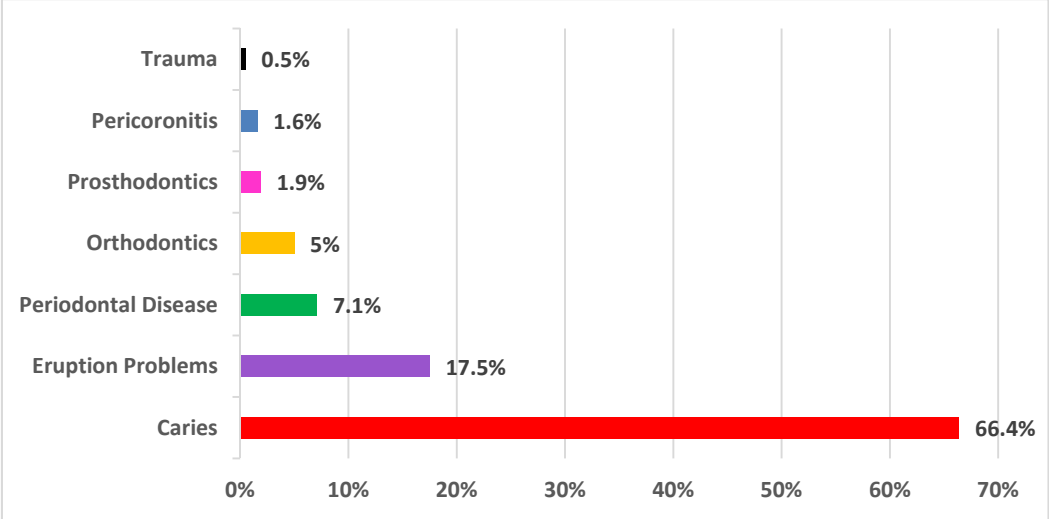

Chart 2: Reasons for Permanent Tooth Extractions

Extracted Teeth Types and Age Groups

Chi-Square Test showed that there was a statistically significant relationship between the extracted teeth types and the age of the patient $p=0.000<0.05$ (df=15, a=5% (one side test, right), with referring to Chi-Square statistical tables, $\chi 2$ tab= 24.996 < $\chi 2$ cal=247.676). The Contingency Coefficient value was (29.7%) with $p=0.000<0.05$. Therefore, the highest percentage of tooth extractions was observed in the age group 10-29 years n=922 (36%), followed by 30-40 years n=661 (25.8%), 41-50 years n=506 (19.7%), and ≥ 51 years n=474 (18.5%).

Third molars: Third molars were more frequently extracted in patients ≤ 40 years of age than in patients > 40 years of age (10-29:43.3%; 30-40:29.1%; 41-50:16.6%; and ≥51:11%).

Second molars: Second molars were more frequently extracted in patients ≤ 40 years of age than in patients > 40 years of age (10-29:26.4%; 30-40:30.7%; 41-50:21.6%; and ≥51:21.3%).

First molars: First molars were most frequently extracted in the age group 10-29 years 39.6%.

Canines: Canines were more frequently extracted in patients > 40 years of age than in patients ≤ 40 years of age (≥51:54.5%; 41-50:34.1%; 30-40:2.3%; 10-29:9.1%).

Incisors: Incisors were more frequently extracted in patients > 40 years of age than in patients ≤ 40 years of age (≥51:47.4%; 41-50:37.1%; 30-40:5.2%; 10-29:10.3%).

Premolars: Premolars were most frequently extracted in the age group 10-29 years 32.4% (Table 4).

Table 4: Extracted Teeth Types and Age Groups

Extracted Teeth Types		Age Group, Years				Total
		10-29	30-40	41-50	≥51	
Maxillary/Mandibular Third Molar	Count	437	294	167	111	1009
Maxillary/Mandibular Second Molar	Count	99	115	81	80	375
Maxillary/Mandibular First Molar	Count	220	138	103	95	556
Maxillary/Mandibular Premolar	Count	150	107	97	109	463
Maxillary/Mandibular Canine	Count	4	1	15	24	44
Maxillary/Mandibular Incisor	Count	12	6	43	55	116
Total	Count	922	661	506	474	2563
	%	36%	25.8%	19.7%	18.5%	100%

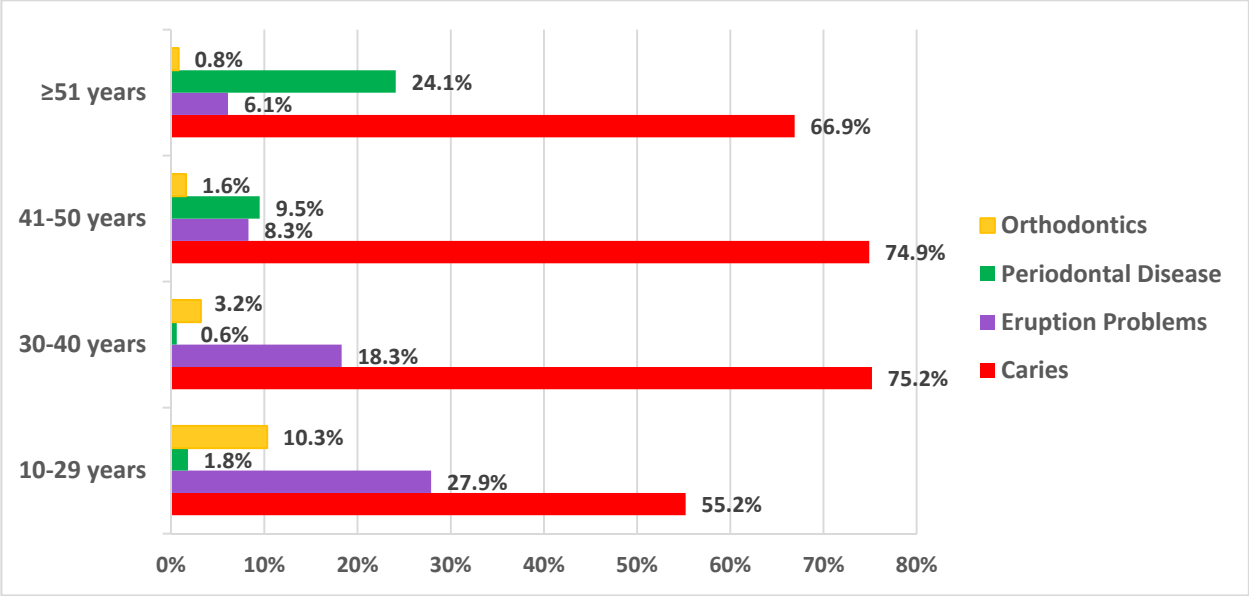

Chart 3: Age Groups by the Four Common Reasons for Tooth Extractions

Extracted Teeth Types and Gender

T-Test showed that there was an insignificant difference in the mean number of extracted teeth between males and females p=0.117>0.05.

Reasons for Tooth Extractions and Gender

Chi-Square Test showed that there was a statistically significant relationship between the reasons for tooth extractions and the gender of the patient (male/female) p=0.000<0.05 (df=6, a=5% (one side test, right), with referring to Chi-Square statistical tables, $\chi 2$ tab= 12.592 < $\chi 2$ cal=47.406). The Contingency Coefficient value was 13.5% with p=0.000 <0.05. When comparing males with females, it was observed that tooth extractions were more in females than in males due to caries (56.5%) females and (43.5%) males, orthodontics (77.3%) females and (22.7%) males, and pericoronitis (82.5%) females and (17.5%) males; however, tooth extractions were more in males than in females due to periodontal disease (52.5%) males and (47.5%) females. On the other hand, when comparing the reasons for tooth extractions within the same gender category, it was observed that, of all reasons for tooth extractions, caries was the predominant reason in males (66.1%). Also, when comparing the reasons for tooth extractions in the same gender category, it was observed that, of all reasons for tooth extractions, caries was the predominant reason in females (66.6%) (Table 5).

Table 5: Reasons for Tooth Extractions and Gender

Reasons for Tooth Extractions		Gender		Total
		Male	Female	
Caries	Count	741	961	1702
Periodontal Disease	Count	96	87	183
Orthodontics	Count	29	99	128
Prosthodontics	Count	19	30	49
Trauma	Count	5	7	12
Eruption Problems	Count	224	225	449
Pericoronitis	Count	7	33	40
Total	Count	1121	1442	2563
	%	43.7%	56.3%	100%

Discussion

The results of this study were consistent with literature which considered dental caries and periodontal disease important reasons for tooth loss.[1-13,15,16,18,20-23] In addition, of all reasons for tooth extractions, this study with almost all studies indicated to dental caries as the main and leading reason for tooth extractions.[1,2,4,5,7-13,15,16,19-23] Although Murray et al[3,18] found that periodontal disease was the leading cause of tooth extractions, their study showed that caries was an important cause of tooth loss at all ages.[3] In addition, in Germany and in Saudi Arabia, Reich and Hiler[8] and Al-Safadi et al[23] were in line with the present study and found that caries was the main cause of tooth extractions in all age groups. Furthermore, the present study was in accordance with literature and observed that, of all age groups, tooth extractions because of caries were more in patients ≤ 40 years of age than in patients > 40 years of age,[1,2,4,6,8-12,20-23] while tooth extractions because of periodontal disease were more in patients > 40 years of age than in patients ≤ 40 years of age.[1-4,6-13,20-23] Also, Cahen et al[22] found that removal of impacted teeth was the highest in the age group 21-30 years. In addition, in Scotland and in Canada, McCaul et al[21] and Murray et al[3] agreed with the present study that tooth extractions due to pericoronitis occurred in young age groups 21-30 years in Scotland and 13-19 years in Canada. In accordance with the results of the present study, two other studies done in Canada and in Germany found that third molars were the most frequently extracted teeth.[8,18] Also, in accordance with literature, this study found that mandibular third molars were more frequently extracted than maxillary third molars,[2,13,15,16] and mandibular first molars were more frequently extracted than maxillary first molars.[2,4,7,9,11,13-16,19,20,23] In addition, this study found with four other studies done in Greece, Kuwait, Nigeria, and Sudan that molars (lower molars) were the most frequently extracted teeth, while canines (lower canines) were the least frequently extracted teeth[7,9,11,13]; also, in the United Arab Emirates, molars were found to be the most frequently extracted teeth, while canines were the least commonly extracted teeth.[17] In the same context, the present study along with many studies mentioned that molars were mainly extracted due to caries.[1,2,4,7-13,15,16,19,20,22,23] Also, Baqain et al[2] found that mandibular incisors were the least commonly extracted teeth due to caries. Furthermore, this study found with two other studies done in Jordan by Sayegh et al[4] and Baqain et al[2] that extractions because of orthodontic reasons mostly involved the premolars, whereas mandibular incisors were mainly and most commonly extracted because of periodontal disease. Also, a study done in France by Cahen et al[22] was consistent with the present study and found that extractions because of orthodontic reasons mostly involved the premolars, whereas mandibular anterior teeth were more frequently extracted because of periodontal disease than maxillary anterior teeth. In addition, in India, Anand and Kuriakose[12] found that first premolars were mainly extracted because of orthodontic treatments, and maxillary premolars were mainly extracted because of caries besides orthodontics; this result was consistent with the present study. Moreover,

this study agreed with studies done in Kuwait, India, Brazil, Saudi Arabia, Scotland, and France that tooth extractions because of orthodontics occurred more in young patients <30 years than in patients ≥30 years.[9,10,12,16,20-23] Also, in Nigeria, tooth extractions because of orthodontics were more in young patients ≤ 30 years of age than in patients > 30 years of age.[11] In addition, in Jordan, Sayegh et al[4] agreed with the present study that maxillary incisors were the most commonly extracted tooth type due to trauma; also, in Nigeria, Saheeb and Sede[11] indicated that trauma mainly accounted for extraction of anterior teeth. In Kuwait, Al-Shammari et al[9] found that anterior teeth of both jaws (canines and incisors) were more commonly extracted due to periodontal desease; in addition, in Sudan, Khalifa et al[13] referred to periodontal disease as the main reason for mandibular incisors loss; furthermore, in Brazil, Caldas et al[1] found that mandibular incisors were more often removed because of periodontal disease. Moreover, the present study agreed with the two studies done in Kuwait and Greece by Al-Shammari et al[9] and Chrysanthakopoulos[7] that females lost more teeth due to caries, while males lost more teeth due to periodontal disease in Greece; females lost more teeth due to caries and orthodontics, while males lost more teeth due to periodontal disease in Kuwait. In Saudi Arabia, Alaboudi et al[15] found an insignificant difference in the mean number of extracted teeth between males and females.

The present study was consistent with Alesia and Khalil[16] study done in Saudi Arabia (patients aged from 10 to >70 years) as the following:

▪The highest percentage of extractions was observed in young subjects aged 10-29 years (present study) and 10-30 years (Alesia and Khalil). ▪The four most common reasons for tooth extractions were caries, eruption problems, periodontal disease, and orthodontics; caries was the main and leading reason for tooth extractions. ▪Molar teeth were mainly extracted because of dental caries. ▪Anterior teeth were extracted due to caries, periodontal disease, and prosthodontics. ▪The most commonly extracted tooth type was the molars, followed by premolars, and anterior teeth. ▪Third molars were the most frequently extracted teeth and were mainly extracted due to caries, followed by eruption problems, such as impaction; the majority of third molars extractions occurred in young age groups 10-29 years (present study) and 21-30 years (Alesia and Khalil). ▪Premolars were the common tooth type extracted due to orthodontic reasons and were most frequently extracted in young age groups 10-29 years (present study) and 10-20 years (Alesia and Khalil). ▪ Maxillary lateral incisors were among the least frequently extracted teeth: the second least frequently extracted teeth (0.9%) (present study) and the least frequently extracted teeth (0.7%) (Alesia and Khalil). ▪ Mandibular third and first molars were more frequently extracted than maxillary third and first molars, while maxillary first premolars were more frequently extracted than mandibular first premolars. ▪Tooth extractions because of caries were more in females compared with males.

The present study was consistent with Al-Safadi et al[23] study done in Saudi Arabia (patients aged ≥10 years) as the following:

▪The four most common reasons for tooth extractions were caries, eruption problems, periodontal disease, and orthodontics; caries was the main reason for tooth extractions in all age groups. ▪There was an insignificant difference in the mean number of extracted teeth between males and females. ▪The highest percentage of extractions was observed in young subjects aged 10-29 years. ▪The percentages of extracted teeth due to caries were higher in patients ≤ 40 years than in patients > 40 years. ▪The percentages of extracted teeth due to periodontal disease were higher in patients > 40 years than in patients ≤ 40 years. ▪The percentages of extracted teeth due to orthodontics were higher in patients ≤40 years than in patients >40 years and were the highest in patients 10-29 years. ▪ The percentages of extracted teeth due to eruption problems and pericoronitis were the highest in patient 10-29 years. ▪Tooth extractions because of

caries were more in females compared with males, while they due to periodontial disease were more in males than in females. ▪Tooth extractions because of orthodontics and pericoronitis were more in females compared with males. ▪Caries was the predominant reason for tooth extractions in both males and females.

Fernández-Barrera MÁ et al[24] clarified that tooth extraction should ideally be the last alternative choice among dental treatment options, and clinicians should be careful in deciding whether a tooth especially a healthy tooth should ever be removed; also, they added that the best interest of the patient has to be the driving force for the decision of extracting a tooth.

Conclusion

The results of this study indicated that dental caries was the main reason for tooth extractions in all age groups. Molars were the most commonly extracted teeth due to caries. Therefore, it's important to intensify efforts towards dental sealants and fluoride application. In addition, mandibular incisors were the most commonly extracted teeth due to periodontal disease, and premolars were the most commonly extracted teeth due to orthodontics. Tooth extraction should be the last alternative choice, and dentists must consider ethical principles and acceptable standards and protocols of diagnosis and treatment in the sense that the patient's interest is priority. Dental educational symposia and programs are recommended.

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Conflict of Interest: None declared

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