



Original article

Reasons for Tooth Extraction among Libyan Adults: Multi-Center Cross-Sectional Study

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Abstract

Background: Tooth loss can be due to many causes, which results in many bad consequences on the dentition function and esthetics.

Aims: This study was aimed to assess reasons and patterns of tooth extraction among Libyan adults.

Subjects and Methods: This cross-sectional study was conducted in six Libyan cities (Benghazi, Derna, Misurata, Tripoli, Zintan, and Hoon) representing different geographical provinces of the country. Data was collected over 6-month period (from September 2016 to March 2017) using an especially designed form recruiting Libyan patients aged ≥ 17 years of age who visited the participating dental practices and who provided a verbal consent to take a part in the study. The reasons for tooth extraction were classified as: dental caries, severe periodontitis, trauma, impaction, orthodontics reasons, prosthodontics reasons, associated with a pathological lesions (such as cysts), failed root canal treatment, and retained primary or supernumerary teeth. Variables studied were patient's age, gender, educational level, occupation status and type of dental clinic. SPSS software were used for data analysis and the appropriate statistical tests were applied at (p value set at 0.05).

Results: The mean age of participants was 38.6 years with standard deviation (SD) of 14.83. A total of 2958 permanent teeth were extracted. The main reason for tooth extraction was dental caries 1912 (64.6%), followed by severe periodontitis 270 (9.1%), tooth impaction 231 (7.8%), prosthodontic reasons 172 (5.8%) and failed root canal treatment 157 (5.3%). The most common teeth extracted were the lower right third molar 235 (7.9%), lower left third molar 227 (7.75) and lower left first molar 187 (6.3%) respectively. The most common age group of female patients was 21-30 years as they had 779 (26.3%) teeth extracted. Low education level was the most frequent risk factor for tooth extraction 1663 (57.2%) in this group of patients.

Conclusion: The result of this study indicated that dental caries and periodontal diseases still the major causes of tooth loss among Libyan adults

Key Words: Dental Extraction; Dental Caries; Libyan Patients; Clinical Study.

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INTRODUCTION

Due to increased life expectancy and the consequent need to keep healthy dentition to maintain normal personal health, good esthetic and function through maintaining healthy dentition until old ages has been brought to attention by many epidemiological studies that showed that dentate population is increasing ¹⁻³. Tooth extraction to manage dental pain is an easy option, but should be considered as the last option in the treatment list. However, the rate of teeth extraction in developing countries was disastrous ^{4,5,6,7}, which can lead to changes in the dietary habit of the individuals and negatively affect the general health, oral health and their related quality of life (QOL) ⁸.

Identifying the reasons of tooth extraction is the first step in assessing the health needs to inform dental health policies. Several studies have been carried out worldwide to determine the reason of tooth extraction (Table 1). The main reason of permanent tooth extraction in many countries was dental caries and its sequels, followed by periodontal disease ⁹⁻¹⁵, which have almost the same proportion in Greece, Brazil, Japan and Kuwait as the prime causes of tooth extraction ^{16, 17, 18, 19}. However, dental caries and its sequels are generally the main reasons for tooth extraction in many young aged people while periodontal disease was main reason for tooth extraction in people over 40 years old ^{20, 21, 22, 23, 24}.

In Libya there were two studies that have been carried out to evaluate the reason and pattern of tooth extraction. The first study was done by Hassan et al 1998 ²⁵ who reported that dental caries (54%) was the most common reason for tooth extraction and the periodontal disease (41%) was the second reason for permanent tooth extraction in Sebha city. The second study was carried out by Byahatti and Ingafou, 2008 ¹⁵ where the dental caries (55.9%) was also the main reason for tooth extraction and periodontal disease (34.4%) was the second cause in Benghazi city. However, these data were collected from one city for each study in Libya. Almost one decade has been passed since their reports and there might have been some changes since then. In addition, to the best of our knowledge there is no published nationwide study so far assessed the epidemiological reasons for tooth extraction among Libyan adults. Therefore, the aim of this study was to assess the reasons and the patterns of tooth extraction among Libyan adults.

MATERIALS AND METHOD

Study subjects

Verbal consent was obtained from each participant after they get information about the objectives of this study. Participation was voluntary, and no incentive was offered. In all phases of the study, patient privacy and confidentiality were fully respected and maintained. This Multi-center Cross-sectional study was conducted in six Libyan cities over a period of six months (from September 2016 to March 2017). Libya is an oil-rich country with about 5.922 million estimated populations in 2012 ²⁶. The dental care services in Libya have public and private sectors, which contained the majority of practicing dentists. The dental services in the public sector in majority provide the basic dental services such as tooth extraction, scaling, and few of them extend their services to dental fillings. Libya has three major parts (West, East and South parts). The majority of Libyan people live in the coastal cities of the Mediterranean. Six cities were selected in this study (Tripoli, Misurata, Zintan, Benghazi, Derna and Hoon). This selection was primarily based on Geographic location, the size of population. This study included patients aged 17 years or above, who presented to the dental clinic in the selected cities with the presenting complaint of *"I want to remove (extract) my tooth"* were included in this study, while it excluded the patients below 17 years, or those with mental and physical problems unable to carry out their self-tooth care.

Sampling and data collection procedures

All consecutive patients came to the dental clinic in the selected cities with a complaint of *"I want to remove my tooth"* were included in this study until the minimum sample size was achieved. Each participated dentist provided instructions on the objective of the study, the methods to be used of data collection and how to fill the forms. Dental examination was done in a dental unit under good dental chair light, using mouth mirror and dental explorer. No diagnostic aid such dental x-ray was used in this study.

Data were collected through clinical examination and interviews using especially designed form contained information on patient's demographic variables such as age; gender; education level; dental attendance pattern; occupation; place of birth; type of dental clinic; type of tooth and the reason for its extraction. The reasons for tooth extraction was categorized as:

- 1 Economic considerations (tooth can be restored but the patient is unable to pay for the treatment).
- 2 Availability of the treatment in public clinic (Tooth can be restored but treatment is not available).
- 3 Non restorable decayed tooth.
- 4 Incurable periodontal diseases (tooth become loose due to reasons such as severe bone loss).
- 5 Trauma.
- 6 Impaction.
- 7 Orthodontic reasons.
- 8 Prosthodontic reasons.
- 9 Pathology such as cystic lesions.
- 10 Failed restoration such as bridge or failed RCT.
- 11 Retained primary teeth.
- 12 Supernumerary teeth.
- 13 Other reasons.

Data analysis

The collected data were analyzed using SPSS software Version 25. Numbers and percentages were used to describe the distribution of study sample, reason of tooth extraction. Binary Logistic regression models were fitted at (p value =0.05), to compare gender differences in different age groups.

Table 1 result of national wide studies of reasons for extraction

Country	Year of publication	% Extracted for periodontal diseases	% Extracted for caries	Author (s)
Pakistan	2016	85.3	7.6	Haafsa Arshad et al.
Iran	2016	74.5	29.5	Seyed Ahmed et al.
India	2016	43.9	31.3	Laxman et al.
Nigeria	2014	77.9	13.3	Olanrewaju et al.
Greece	2013	37.3	35.0	N.A Chrysanthakopoulos et al.
Iran	2013	51	14.4	M. Jafarian et al.
Saudi Arabia	2013	50.2	8.24	Khalil Alesia et al.
Jordan	2013	57	12	Hind F. Nsour et al.
Nigeria	2013	55.2	23.1	Anyanechi C
Sudan	2012	66.9	21.9	Nadia Khalifa et al.
Brazil	2012	38.4	32.3	Andreia Affonso et al.
Libya	2011	55.9	34.42	Byahatti S.M et al.
Saudi Arabia	2010	53	22	Reghunathan et al.
Nepal	2010	45.7	39	L.P. Dixil et al.
South Africa	2009	47.9	22.6	RR Lesolang et al.
Japan	2006	43.4	41.8	Jun Aida
Kuwait	2006	43.7	37.4	K F. Al-Shammari et al.
South Wales/UK	2005	59	20.1	W. Richards et al.
Kenya	2004	52.6	27.6	B.O. Sanya et al.
Brazil	2003	70.3	15.1	Arnaldo de Franc et al.a
Scotland	2001	54.7	16.7	L.K. McCaul et al.
Libya	2000	54	41	A.K. Hassan et al.

RESULTS

Demographic variables

The Demographic variables of our patients are presented in (Table 2). The mean age was 38.6 years with SD of 14.83 in which a total of 2958 permanent teeth were extracted.

The number of female patients was 1556 (52.6%) and they had had more teeth extractions than their male counterparts 1402 (47.4%) tooth extractions. Most of extractions were carried out in public dental clinics 1567 (53.0%) compared to private dental clinics

1391 (47.0%). The majority of patients attended to dental clinic for tooth extract were new patients 2008 (67.9%). General dentists mostly carried out these tooth extractions (68.7%). More than half of the participants 1663 (57.2%) had low educational level. Tooth extractions were predominately common in the age groups 21-30 years 779 (26.3%) and 31-40 years, 711 (24.0%).

Reasons for tooth extraction

The reasons of tooth extraction among patients are presented in table (3). It was shown that dental caries and its sequels are the most common reason for tooth extraction 1912 (64.6%) followed by sever periodontitis 270 (9.1%), tooth impaction 231 (7.8%), prosthodontic reasons 172 (5.8%) and failed RCT in 157 patients (5.3%).

The number of individual tooth extraction

The numbers of tooth extraction for individual tooth are presented in table (4). It shown that the most common tooth extracted was lower right third molar 235(7.9%) followed by lower left third molar 227 (7.75%) and lower left first molar 187 (6.3%).

The relationship between the number of tooth extractions within different age groups in both gender is presented in Table (5). It shows that with controlled gender, patients aged (21-30 years old) had 3.48 times tooth extraction experience than the patients aged (17-20 years old) with p-value (0.000) and (95% CI 2.43-4.99).

The risk factors for tooth extractions

As shown in table (6), female patients had more tooth extraction 1556 (52.6%) for different reasons than male patients 1402 (47.4%). However, the male patients had more tooth extraction due to sever periodontitis and trauma 181 (6.1%); 39 (1.3%)) respectively, than female patients. On the other hand, tooth extraction due to server periodontitis was

common in the age group of (over 40 years 239 (20.2%), than the age group below 40 years 31 (1.8%). Low educated patients had more tooth extraction 1663 (57.2%) than high educated patients 1245 (42.8%), However, the higher educated patients shown more tooth extraction due to Trauma, impacted teeth, failed RCT reasons 27 (0.9%), 140 (4.8%), 90 (3.1%)) respectively, compared to low educated patients 23 (0.8%), 88 (3.0%), 67 (2.3%)). Tooth extraction for Orthodontics reason s were more common among female patients 62 (2.1%) than male patients 20 (0.7%), also, student 61 (2.1%) had more tooth extraction for orthodontic reasons than other occupation status. Although, most of tooth extraction procedures were done in public clinics 1567 (53.0%) than in private clinics 1391 (47.0%), it shown that tooth extraction due to impaction, orthodontics, pathological and filed RCT reasons (171 (5.8%), 65 (2.2%), 33 (1.1%), 93 (3.1%)) respectively, more than in public clinics than in private clinics (60 (2.0%), 17 (0.6%), 22 (0.7%), 64 (2.2%) respectively. Also, specialist dentists had more tooth extraction for impacted reasons 143 (58.0%) compared to general dentists 97 (42.0%).

The distribution of the causes of tooth extraction among individual tooth numbers

As shown in (Table 7), despite of the fact that the lower right third molar is the most common tooth extracted within the different causes of tooth extraction (235/2958), in our study, the lower left first molar was the most common teeth extracted due to dental caries (151/1912) than others. For sever periodontitis, the upper right first molar was the most common tooth extracted (23/270). Moreover, the first molars are the most common teeth extracted due to failed RCT (65/157). Also, it shown that upper premolar teeth were mostly extracted for orthodontic reasons (47/82) than lower premolars (13/82).

Table 2: Demographic variables

Variable	Frequency	Percent
Dentist		
Specialist	927	31.3%
General Dentist	2031	68.7%
Patient status		
New	2008	67.9%
Regular	693	23.4%
Referred	257	8.7%
Age Group		
17-20	271	9.2%
21-30	779	26.3%
31-40	711	24.0%
41-50	608	20.6%
51-60	322	10.9%
≥61	254	8.6%
Gender		
Female	1556	52.6%
Male	1402	47.4%
Dental Clinic		
Public	1567	53.0%
Private	1391	47.0%
Educational Level		
≤ High School	1663	57.2%

Variable	Frequency	Percent
> High School	1245	42.8%
Occupation		
Employee	1259	42.6%
Un-employed	645	21.8%
Self-employed	321	10.9%
Retired	168	5.7%
Unknown	124	4.2%
Student	438	14.8%
Cities		
Tripoli	613	20.7%
Misurata	505	17.1%
Zintan	407	13.8%
Hoon	269	9.1%
Benghazi	504	17.0%
Derna	660	22.3%
Permanent Residence		
Urban	2729	92.3%
Rural	229	7.7%
Place of Birth		
Urban	2599	88.1%
Rural	352	11.9%

Table 3: Frequency distribution for reason of tooth extraction

Causes	Frequency	Percentages
Dental caries & its sequels	1912	64.6%
Sever periodontitis	270	9.1%
Tooth impaction	231	7.8%
Prosthodontics reasons	172	5.8%
Failed RCT	157	5.3%
Orthodontics reasons	82	2.8%
Pathological lesion	55	1.9%
Trauma	51	1.7%
Retained primary tooth	10	0.3%
Other reasons	18	0.6%

Table 4: Frequency distribution of individual tooth extraction

Tooth type	Frequency	Percentage	Maxillary Arch		Mandibular Arch	
			<i>Right</i>	<i>Left</i>	<i>Right</i>	<i>Left</i>
Central incisor	102	3.4%	36	26	20	20
Lateral incisor	107	3.6%	40	26	23	18
Canine	143	4.8%	48	40	30	25
First premolar	333	11.3%	127	99	55	52
Second premolar	339	11.5%	107	99	85	48
First molar	640	21.6%	143	142	168	187
Second molar	491	16.6%	111	124	125	131
Third Molar	792	26.8%	155	175	235	227
Retained primary	11	0.4%	5	3	2	1
Total	2958	100.0%	772	734	743	709

Table 5: The relationship between numbers of teeth extracted and age in both gender

Age groups	Male	Female	Total	Percentage	P-Value	OR	95%CI	
							Lower	Upper
17-20	93	178	271	9.2%	0.000			
21-30	358	421	779	26.5%	0.000	3.488	2.43	4.99
31-40	328	383	711	24.1%	0.000	2.143	1.59	2.87
41-50	278	330	608	20.6%	0.000	2.128	1.58	2.86
51-60	174	148	322	10.9%	0.000	2.163	1.59	2.92
≥61	164	90	254	8.6%	0.011	1.55	1.10	2.17
Total	1395	1550	2945	100%				

Table 6: The risk factor for tooth extractions

Variable	Dental Caries%	Periodontal Diseases %	Trauma%	Impacted Teeth %	Orthodontic Reasons %	Prosthodontic Reasons %	Pathological Reason%	Failed RCT%	Retained primary teeth%	Other reason%	Total
Sex											
Male	906(30.6%)	181(6.1%)	39(1.3%)	78(2.6%)	20(0.7%)	82(2.8%)	21(0.7%)	61(2.1%)	4(0.1%)	10(0.3%)	1402(47.4%)
Female	1006(34.0%)	89(3.0%)	12(0.4%)	153(5.2%)	62(2.1%)	90(3.0%)	34(1.1%)	96(3.2%)	6(0.2%)	8(0.3%)	1556(52.6%)
Age in Year											
17-20	166(5.6%)	2(0.1%)	1(0.0%)	24(0.8%)	55(1.9%)	1(0.0%)	4(0.1%)	12(0.4%)	4(0.1%)	2(0.1%)	271(9.2%)
21-30	541(18.4%)	4(0.1%)	23(0.8%)	129(4.4%)	19(0.6%)	2(0.1%)	20(0.7%)	31(1.1%)	3(0.1%)	7(0.2%)	779(26.5%)
31-40	523(17.8%)	25(0.8%)	10(0.3%)	53(1.8%)	3(0.1%)	21(0.7%)	15(0.5%)	52(1.8%)	3(0.1%)	6(0.2%)	711(24.1%)
41-50	377(12.8%)	93(3.2%)	10(0.3%)	15(0.5%)	0(0.0%)	60(2.0%)	9(0.3%)	41(1.4%)	0(0.0%)	3(0.1%)	608(20.6%)
51-60	190(6.5%)	59(2.0%)	6(0.2%)	9(0.3%)	5(0.0%)	39(1.3%)	3(0.1%)	16(0.5%)	0(0.0%)	0(0.0%)	322(10.9%)
≥61	103(3.5%)	87(3.0%)	1(0.0%)	1(0.0%)	5(0.2%)	49(1.7%)	4(0.1%)	4(0.1%)	0(0.0%)	0(0.0%)	254(8.6%)
Education level											
≤High school	1054(36.2%)	192(6.6%)	23(0.8%)	88(3.0%)	58(2.0%)	143(4.9%)	26(0.9%)	67(2.3%)	6(0.2%)	6(0.2%)	1663(57.2%)
>High school	816(28.1%)	74(2.5%)	27(0.9%)	140(4.8%)	24(0.8%)	29(1.0%)	29(1.0%)	90(3.1%)	4(0.1%)	12(0.4%)	1245(42.8%)
Occupation											
Unemployed	460(15.6%)	63(2.1%)	3(0.1%)	37(1.3%)	7(0.2%)	24(0.8%)	11(0.4%)	39(1.3%)	0(0.0%)	1(0.0%)	645(21.8%)
Employee	818(27.7%)	100(3.4%)	35(1.2%)	91(3.1%)	9(0.3%)	99(3.4%)	18(0.6%)	76(2.6%)	2(0.1%)	11(0.4%)	1259(42.6%)
Self employed	221(7.5%)	30(1.0%)	8(0.3%)	19(0.6%)	5(0.2%)	9(0.3%)	8(0.3%)	17(0.6%)	1(0.0%)	3(0.1%)	321(10.9%)
Retired	68(2.3%)	65(2.2%)	2(0.1%)	1(0.0%)	0(0.0%)	28(0.9%)	3(0.1%)	1(0.0%)	0(0.0%)	0(0.0%)	168(5.7%)
Unknown	84(2.8%)	9(0.3%)	0(0.0%)	13(0.4%)	0(0.0%)	12(0.4%)	2(0.1%)	3(0.1%)	1(0.0%)	0(0.0%)	124(4.2%)
Student	259(8.8%)	2(0.1%)	3(0.1%)	70(2.4%)	61(2.1%)	0(0.0%)	13(0.4%)	21(0.7%)	6(0.2%)	3(0.1%)	438(14.8%)
Pts. Status											
New Pts	1400(47.3%)	188(6.4%)	34(1.1%)	131(4.4%)	24(0.8%)	72(2.4%)	28(0.9%)	109(3.7%)	7(0.2%)	15(0.5%)	2008(67.9%)
Regular pts	397(13.4%)	66(2.2%)	14(0.5%)	51(1.7%)	19(0.6%)	83(2.8%)	19(0.6%)	40(1.4%)	2(0.1%)	2(0.1%)	693(23.4%)
Refereed pts	115(3.9%)	16(0.5%)	3(0.1%)	49(1.7%)	39(1.3%)	17(0.6%)	8(0.3%)	8(0.3%)	1(0.0%)	1(0.0%)	257(8.7%)
Clinic Type											
Public	1068(36.1%)	179(6.1%)	25(0.8%)	60(2.0%)	17(0.6%)	120(4.1%)	22(0.7%)	64(2.2%)	5(0.2%)	7(0.2%)	1567(53.0%)
Private	844(28.5%)	91(3.1%)	26(0.9%)	171(5.8%)	65(2.2%)	52(1.8%)	33(1.1%)	93(3.1%)	5(0.2%)	11(0.4%)	1391(47.0%)

Table 7: Distributions of the causes of tooth extraction among individual tooth number

FDI tooth number	CAUSES										Total
	Dental caries	Periodontitis	Trauma	Impaction	Orthodontic reasons	Prosthodontics	Pathology such as cystic lesion	Failed RCT	Retained primary tooth	Other reasons	
11.0	8	9	8	0	0	11	0	0	0	0	36
12.0	15	13	2	0	1	6	2	1	0	0	40
13.0	26	10	2	2	0	7	0	1	0	0	48
14.0	76	7	2	0	22	7	3	10	0	0	127
15.0	71	14	4	0	0	7	3	8	0	0	107
16.0	94	23	2	0	0	6	2	14	0	2	143
17.0	85	10	0	0	1	5	2	6	0	2	111
18.0	113	5	1	29	1	4	1	0	0	1	155
21.0	7	6	1	0	0	7	1	4	0	0	26
22.0	14	1	1	0	0	8	0	2	0	0	26
23.0	16	7	5	3	2	5	0	2	0	0	40
24.0	58	4	2	1	25	7	0	2	0	0	99
25.0	78	5	0	0	1	6	2	7	0	0	99
26.0	104	17	1	0	0	4	3	12	0	1	142
27.0	99	11	3	0	0	4	3	3	0	1	124
28.0	127	9	2	29	1	4	0	0	0	3	175
31.0	3	12	1	0	0	4	0	0	0	0	20
32.0	6	7	0	0	0	5	0	0	0	0	18
33.0	7	7	1	0	1	7	1	1	0	0	25
34.0	33	5	0	0	6	7	1	0	0	0	52
35.0	34	5	1	0	0	4	2	2	0	0	48
36.0	151	3	1	0	0	1	9	22	0	0	187

FDI tooth number	CAUSES										Total
	Dental caries	Periodontitis	Trauma	Impaction	Orthodontic reasons	Prosthodontics	Pathology such as cystic lesion	Failed RCT	Retained primary tooth	Other reasons	
37.0	104	13	0	0	0	1	3	10	0	0	131
38.0	127	4	2	81	4	3	2	4	0	0	227
41.0	5	6	0	0	1	8	0	0	0	0	20
42.0	7	6	2	0	0	6	0	2	0	0	23
43.0	11	8	0	1	2	6	0	2	0	0	30
44.0	30	9	1	0	7	6	0	2	0	0	55
45.0	51	14	1	0	2	6	3	8	0	0	85
46.0	131	10	2	0	0	2	3	17	0	3	168
47.0	97	4	3	0	0	2	5	14	0	0	125
48.0	124	6	0	85	4	6	4	1	0	5	235
52.0	0	0	0	0	1	0	0	0	0	0	1
53.0	0	0	0	0	0	0	0	0	1	0	1
55.0	0	0	0	0	0	0	0	0	3	0	3
63.0	0	0	0	0	0	0	0	0	2	0	2
65.0	0	0	0	0	0	0	0	0	1	0	1
75.0	0	0	0	0	0	0	0	0	2	0	2
85.0	0	0	0	0	0	0	0	0	1	0	1
Total	1912	270	51	231	82	172	55	157	10	18	2958

DISCUSSION

This study shows that dental caries and periodontal diseases are still the main reasons of tooth extraction (74%). According to the present study dental caries and its sequels are the most common reason for tooth mortality (64.6%), within different age groups, gender, education level and others variables. This finding is in an agreement with other studies conducted elsewhere ^{27, 28}. However, younger and middle aged patients lost their teeth due to dental caries than other age groups, which is in agreement with previous studies ^{29,30}.

In an agreement with other studies ^{31, 32}, severe periodontitis (9.1%) was the second most common cause of tooth extraction. However, in patient's age group over 40 years it was shown that they had more tooth extraction due to periodontitis than patient less than 40 years' age group for the same reason. This observation is in line with other studies ³³. Male patient had more tooth extractions due to severe periodontitis than female patients, which explained by fact that male people have more risk factors such as smoking than females. Interestingly, however, the number of teeth extraction were more in females (52.6%) than males (47.4%), as a reflection of the fact that females are more likely to consume sugary foods which is a primary cause of dental caries, and the usually use more dental services. However, this remains a hypothesis which requires further assessment in the Libyan context.

Tooth extraction for orthodontic reasons was recorded as a second reason for tooth extraction in age group 17-20 years, with the premolar teeth being the more frequent teeth to be extracted for this reason, which is not surprising and is in line with previous studies ^{34,35}.

Tooth extraction due to dental caries was carried out mainly for the lower first molar teeth than any other tooth, which might be explained on the fact that the mandibular teeth are more susceptible to dental caries than maxillary teeth. Conversely, Tooth extraction due to severe periodontitis was more observed among upper first molars than the rest of other maxillary teeth. It also noted that public dental clinics had more tooth extraction procedures than private clinics and this finding could be attributed to the low economic status of the dental patients using public health services.

Conclusion: the results of this study has indicated that dental caries and periodontal diseases are still representing the major cause of tooth loss among Libyan population despite of the advances in technology that used in dentistry and the increased

number of dental practitioners in Libya.

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