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Original article

Trends in the Reasons for Permanent Tooth Extractions in Sebha, Libya (1998–2025): A Comparative Analysis of Two Clinical Samples

Sherifa Jaeidah[1], Wenisa Arrish[2*]

[1]*Department of Oral and Maxillofacial Surgery, Dental School of Sebha University, Libya*
[2]*Department of Preventive and Community Dentistry, Dental School of Sebha University, Libya*
Corresponding Email. wen.arrish@sebhau.edu.ly

Abstract
This study was conducted to determine the reasons for dental extraction of permanent teeth in Sebha in 2025 and to describe changes in reasons for dental extraction in Sebha city/Libya, over 27 years, based on two clinical surveys collected in 1998 and 2025. This cross-sectional study was conducted at Sebha University's dental general practice, and dentists recruited over 7 months documented clinical data for 525 patients, aged 15 to 60, who had dental extractions. Age, sex, education, attendance pattern, request type, reason for extraction, and tooth type were among the clinical variables that were included. The data collected were analyzed and compared with the data of the 1998 survey. Caries remains the primary cause of extractions (83.1%), followed by periodontal disease (9.4%). After comparison between two surveys in 1998 and 2025, there were trend changes related to the age, sex, education, where dental extractions became more common in the 30-60 age group (67.4%) and in women than men (38.6% for males and 61.3% for females), and in those with a university degree (48.4%). Caries remains the most common reason for dental extractions in Sebha city, Libya, based on a comparison of data from two surveys that were carried out more than 27 years apart. The percentage of dental extractions, however, is increasing for both age groups, becoming more common as people age, and is more common among women and those with a university education. This study highlights the significance of caries and periodontal disease prevention programs for adults.
Keywords. Tooth Loss, Permanent Teeth, Reasons For Extraction, Sebha University, Libya.

Introduction

Tooth loss is one of the most important indicators of a population's oral health (1). Dental extraction is a common technique that all dentists perform as a therapeutic option for a variety of conditions, including dental caries, periodontal disease, prosthodontic or orthodontic issues, endodontic failure, and fractures. (2). Understanding the causes of dental extraction is crucial for putting into practice effective oral disease prevention strategies and oral health awareness campaigns.

Epidemiological studies investigating the reasons behind permanent tooth extractions have been carried out globally. In several countries, dental caries emerged as the leading cause of permanent tooth extractions, along with its repercussions, followed by periodontal disease (3). Libya is among those countries where past research indicated that the foremost reason for permanent extractions was dental caries, followed by periodontal disease (4).

Two studies carried out in Sebha city/Libya in 1998 and in 2024, both of which found that dental caries was the main cause of dental extraction in the city (5,6). however, no comparison had been made between the two studies to know how the patterns in dental extraction have changed over time. This study aimed to determine the reasons for the extraction of permanent teeth in Sebha in 2025 and to describe changes in reasons for extraction over 27 years based on two cross-sectional studies.

Methods

This cross-sectional study was carried out over the course of seven months (November2024-May2025) at the general dental practice of the dental school of Sebha University. Ethical approval was taken from the Scientific Ethics Committee at Sebha University (Ref No. 2025-1).

All individuals receiving permanent dental extractions between the ages of 15 and 60 were included. The data collection sheet form was designed using the same format as the 1998 study in order to make comparisons easier (5). The form contains information on the patient's demographic variables such as sex, age, education level, type of request, dental attendance pattern, the reason for tooth extraction, and the type of tooth extracted. The reasons for tooth extraction were categorized as follows: dental caries, periodontal causes, orthodontic causes, prosthodontic reasons, endodontic treatment failure, fracture, and impaction. Sheet forms were filled out by internship students after each dental extraction. Data were analyzed using SPSS software Version 17. The demographic data and the reasons for tooth extraction were presented as numbers and percentages. Data were then compared to those from a 1998 study.

Results

A total of 525 forms were collected from the patient records of dental school clinics. Analysis of these forms showed that about 322 (61.3%) of the teeth extracted were from females and 203 (38.6%) were from males.

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The teeth extractions were most commonly in the 30-60 age group (67.4%) for both males (27.2%) and females (40.2%) (Table 1).

Table 1. Distribution of patients by sex and age.

Sex	**Age**		**Total**
	15-30	30-60	
Male	60 (11.4%)	143 (27.2%)	203 (38.6%)
Female	111 (21.2%)	211 (40.2%)	322 (61.3%)
Total	171 (32.6%)	354 (67.4%)	525

According to data Table 2, Caries was the primary cause of extractions (81.3%). An estimated 9.5 % of extractions were due to periodontal disease, (4.9%) of extractions were for prosthetic reasons, 0.6%) were for orthodontic causes (2.1%) were due to endodontic failure. fracture and impaction were responsible for (1.3% and 0.2 %) of extractions, respectively.

Table 2. Distribution of tooth extraction causes for males and females

Gender	**Dental caries**	**Periodontal disease**	**Prosthodontic causes**	**Orthodontic causes**	**Endodontic failure**	**Fracture**	**Impaction**
Male	n 163 % 31.1	n 22 % 4.2	n 8 % 1.5	n 3 % 0.6	n 4 % 0.7	n 3 % 0.5	n 0 % 0
Female	n 264 % 50.2	n 28 % 5.3	n 18 % 3.4	n 0 % 0	n 7 % 1.3	n 4 % 0.8	n 1 % 0.2

Table 3. Distribution of reasons for extractions according to age.

Reason	**Age**		**Total**
	15-30	30-60	
Dental caries	157 (30%)	270 (51.4%)	427 (81.3%)
Periodontal causes	1 (0.2%)	49 (9.3%)	50 (61.3%)
Orthodontic causes	2 (0.4%)	1 (0.2%)	3(0.6%)
Prosthodontic	3 (0.6%)	23 (4.4%)	26(4.9%)
Fracture	3 (0.6%)	4 (67.4%)	7(1.3%)
Endodontic failure	5 (1%)	6 (1.14%)	11(2.1%)
Impaction	0 (0%)	1 (0.2%)	1(0.2%)
Total	171 (32.6%)	354 (67.4%)	525

Interestingly, most of the people who needed extractions were highly educated (48.4%), and most of the extractions were done on the request of dentists (66%) (Table 4).

Table 4. Distribution of extraction according to education and request type

Extraction	**Education**			**Total**
	Primary	University	None	
Patient requested	51(9.7%)	91(17.3%)	35(6.7%)	177(34%)
Dentist requested	84(16%)	163 (31%)	101(19.2%)	348(66%)
Total	135(25.7%)	254(48.4%)	136(25.9%)	

The effect of dental attendance patterns on the number and distribution of extractions is displayed in (Table 5). It reveals that irregular attendees accounted for 89.1% of tooth extractions, with dental caries being the most frequent cause among regular and irregular attendees (8% and 73.3%, respectively).

Table 5. Distribution of extraction causes according to dental attendance

Tooth extraction reason	**Regular attenders**		**Irregular attenders**	
	n	**%**	**n**	**%**
Dental caries	42	8	385	73.3
Periodontal causes	6	1.1	44	8.3
Orthodontic causes	0	0	3	0.6
Prosthodontic causes	4	0.8	22	4.2
Fracture	2	0.4	5	0.9
Endodontic failure	3	0.5	8	1.5
Impaction	0	0	1	0.2

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Furthermore, an analysis also addressed the types of teeth that were extracted (Table 6). In the dental clinic at Sebha University, molars (63.6%) and premolars (24.2%), respectively, were the most frequently extracted teeth among patients. The molars were most often extracted due to caries (53.9%) the then due to periodontal causes (5.3%), and endodontic failure (1.9%). The anterior and premolar teeth were most often extracted for prosthodontic reasons (1.7%). Endodontic failure was more common in molar teeth (1.9%). The teeth were rarely extracted due to orthodontic and impaction reasons (0.6% &0.2% respectively).

Table 6. Distribution of extraction causes according to the types of teeth

Reason	Type			Total
	Anterior	Premolar	Molar	
Dental caries	40 (7.6%)	104 (19.8%)	283 (53.9%)	427 (81.3%)
Periodontal causes	13 (2.4%)	9 (1.7%)	28(5.3 %)	50 (9.5%)
Orthodontic causes	0 (0%)	1 (0.2%)	2 (0 .4%)	3 (0 .6%)
Prosthodontic	9 (1.7%)	9 (1.7%)	8 (1.5%)	26 (5%)
Fracture	1 (0.2%)	3 (0.6%)	3 (0.6%)	7 (1.3%)
Endodontic failure	1 (0.2%)	0 (0%)	10 (1.9%)	11 (2.1%)
Impaction	0 (0%)	1 (0.2%)	0 (0%)	1 (0.2%)

The primary differences between the surveys conducted in 1998 and 2025 are listed in (Table 7). There were 600 patients investigated in the 1998 survey compared to 525 patients in the 2025 study. Dental extractions in the 2025 study were more common in the 30-60 age group (67.4%), and in 1998 were more common in the 15-30 age group (66%). For both studies, the most common teeth to be extracted were molars 1998 (67%) and 2025 (63.6%) and followed by premolars 1998 (23%) and 2025 (24.2%), then anterior teeth in 1998 (10%) and in 2025 (12.2%).

Interestingly, in 2025 survey found that women had a higher percentage of dental extractions than men (38.6% for males and 61.3% for females), while in 1998, the opposite was true (68% for males and 32% for females). Dental extractions are still more common among irregular visitors to dental clinics than among regular ones (91% in 1998 and 89.1% in 2025), and most of the dental extractions were based on the dentist's request (58% in 1998 and 66% in 2025). Additionally, in the 2025 survey, 48.4% of those with a university degree had more extractions than in 1998 (12%). In the 2025 survey, the caries and periodontal diseases remained the most frequent reasons for dental extractions; however, the numbers were higher than in the 1998 analysis (Figure 1).

Table 7. Comparison of 1998 and 2025 data

Variables	1998	2025
Number of patients	600	525
Number of extractions at age 15-30	66%	32.6%
Number of extractions at 30-60	34%	67.4%
Proportion of extractions for irregular attenders	91%	89.1%
Proportion of extractions for regular attenders	9%	10.8%
Proportion of extractions for males	68%	38.6%
Proportion of extractions in females	32%	61.3%
Type of education that has a higher extraction percentage	None education	University
Proportion of extractions based on patient request	42%	34%
Proportion of extractions based on the dentist's request	58%	66%
The type of teeth that were more commonly extracted	Molar teeth	Molar teeth
Proportion of teeth extracted for caries	54%	81.3
Proportion of teeth extracted for periodontal reasons	41%	61%
Proportion of teeth extraction for prosthodontic reasons	0.2%	4.9%
Proportion of teeth extracted for orthodontic purposes	0.1%	0.6%
Proportion of teeth extracted for fracture	38.3%	1.3%
Proportion of teeth extracted for impaction	8.5%	0.2%

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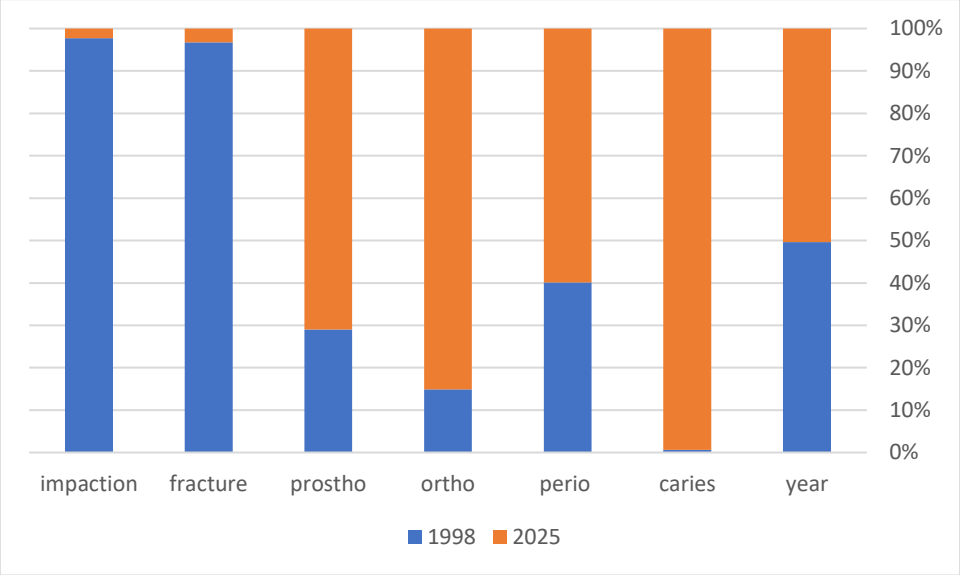

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Figure 1. Comparison of the Percentage Distribution for Dental Extractions In 1998 And 2025

Discussion

The current study followed a very similar format to the one conducted in 1998. In both studies, a simple clinical survey was carried out on two age groups of patients who underwent dental extractions at a general dental clinic over the course of seven months, and dentists in both studies completed the survey forms in a similar way.

As in the 1998 study, Caries followed by periodontal reasons were the main reasons for dental extractions in 2025. In 2025, Caries accounted for the majority of dental extractions in both age groups, and dental extractions due to periodontal disease were more common among those aged 30 to 60, which is consistent with the findings of numerous recent studies conducted in Italy (7), Kuwait (8), Greece (9), and Nepal (10). However, compared to 1998, the frequency of dental extractions carried on due to caries was higher in 2025. Furthermore, the present study revealed that dental extractions were more common among patients 30-60 years of age, and these findings, however, deviate from the 1998 study's findings and indicate that the prevalence of dental extractions has changed from those under 30 to those over 30 years of age. This change in dental extraction trend was similar to the finding of a similar comparison study made in England and Wales in 1997 (11). One explanation for this could be that young adults today are more inclined to favor non-extraction dental operations in order to preserve their teeth in their mouths for as long as possible (12).

Dental extractions due to prosthodontic reasons were in the third position after caries and periodontal reasons, and it was estimated that 4.9% of the reasons, and this finding was similar to that of a 2024 study at the same institution (6). Comparing this finding with 1998 survey revealed that the third reason for dental extraction was fracture 38.3 This disparity might be linked to the services and expenses offered at general dental clinics used to collected data for both studies in comparison; although prosthodontic treatment at the dental school clinic in 2025 study is more affordable than at the Red Crescent clinic in 1998, patients with broken teeth tend to choose specialists at the Red Crescent dental clinic for these treatments.

According to the survey's data, orthodontic causes and tooth impaction continued to be the least common reasons for dental extractions, even though the percentage of extractions for orthodontic reasons increased in the 2025 survey, and this could be linked to the growing awareness of several dental treatment options and highlight social desire for beauty (2). The percentage of dental extractions due to dental impaction was higher in the 1998 study than in the current study, which could be interpreted as the data in the current study were collected from a dental clinic that did not have the resources to surgically remove impacted teeth.

The current study also revealed that women had more dental extractions than men, which was in line with earlier research conducted in the same clinical practice in 2024 that found that females had a higher rate of tooth extractions due to dental caries (76.62 %) than males (34.8 %) (6). However, this finding contradicts the study in comparison, in which dental extractions were predominant in males. Although the cause of this gradient is yet unknown, numerous countries have observed that women experience greater tooth loss than men, and it could be explained as that they are less motivated to take care of their teeth, miss appointments for treatments, get distracted by housework, lack access to transportation, and worry about their personal or health-related issues (10,13).

Interestingly, most of the dental extractions were for people holding a university degree or were university students, and this result is similar to previous studies in Saudi (2) and Kuwait (8). In the 1998 survey, most

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of the dental extractions were for non-educated people. The fact that numerous other factors affect health, and education is not an independent determinant of health, may help to explain this shift in trend (14).
Regarding the distribution of dental extractions by type of request and by type of attendance pattern of the patients, the results of the 2025 study did not differ from those of the comparative study, where most of the dental extractions were based on the dentist's request and for irregular attenders. This consistent pattern regarding the predominance of tooth loss in irregular attenders was similar to earlier studies, and it highlights how crucial it is to raise awareness among people about the importance of routinely visiting the dentist in order to avoid dental problems like tooth loss (15).
According to an analysis of the data from the two studies that were compared, the most frequently extracted teeth were molars. Earlier researchers have offered several reasonable explanations for this pattern, including the presence of deep pits and fissures, an early eruption time, and the fact that the fissures are inaccessible to brushing and chewing, making them vulnerable to tooth decay (16).
The limitations of the study were that it included only individuals who had been to a single general dental clinic and that the study was limited to only dental reasons for dental extractions; more research is needed to include more general and private dental practices and to also explore non-dental reasons for dental extractions in Sebha city.

Conclusion

According to a comparison of the results of two surveys that were conducted more than 27 years apart, caries is still the leading cause of dental extractions in Sebha City/ Libya. However, the percentage of dental extractions is rising for both age groups, becoming more prevalent in later life, and is more common among women and university-educated individuals.

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Conflict of interest
No conflicts of interest need to be disclosed

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