

# The Association between Teeth Loss and Oral Health Problems

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## Abstract

**Background:** The teeth play various functional roles, from the most basic functions to more subtle functions. One of the most tragic events that can happen to the teeth are loss it, as a result trauma or dental diseases. Tooth loss has esthetic, functional, positional and psychological impacts on the life of individuals.

**Objectives:** To investigate the association between tooth loss and oral health problems among partially and completely edentulous patients. Method: (Questionnaire and Clinical Examination). Self-administered questionnaire was distributed to the patients to collect information relating to demography and cause of tooth loss, in addition to mastication and speech state after tooth loss. Four clinical conditions including supra-eruption, drifting teeth, temporomandibular disorders and bone resorption were used to recognize the effects of missing teeth. Patients seeking dental treatment at General Hospital, Morzuk, Libya were recruited for the study. Criteria included age of 16 years and above with one or more missing teeth except for third molars. Results: altogether 58 participants, 31 (53.4 %) were males while 27 (46.6%) were females. The participants were aged 16–>45 years, among them, 44 patients (75.9%) are partially edentulous, and 14 patients (24.1%) were completely edentulous. The patients with complete teeth loss and the patients with missing both the anterior and posterior teeth are most groups suffer problems among patients who involved in the study. patients who loss posterior teeth are the lowest group had, suffer of health problems due to loss of teeth among all of them.

The general relationship between tooth loss and the oral health problems was positive and strong. Conclusions: there are statistically significant relationship between tooth loss and oral health problems, where the strong value of this relationship (0.614) and significance within less than (0.05).

**Key words:** *Tooth loss, consequences of tooth loss, causes of tooth loss.*

## Introduction

The teeth play various functional and aesthetic roles as essential daily activities from the most basic functions like eating and speaking to subtler functions related to good appearance<sup>1</sup>.

Teeth are anchored in the jaws by the periodontal ligament. This ligament connects the cervix (neck) of the tooth, at the junction between the crown and root, to the gingiva. Below that, the ligament connects the outer layer of the tooth root (cementum), to the adjacent bone (jawbone). The jawbone of the maxilla and mandible that support the teeth is the alveolar bone<sup>2</sup>. One of the more dramatic discoveries in the medical sciences in the twentieth century has been the realization that tooth loss

is not an inevitable consequence of aging, but the result of trauma or dental diseases<sup>3</sup>.

Tooth loss continues to be a major problem in clinical dentistry and has received significant attention in everyday dental practice<sup>4</sup>.

In most developing countries, the main reason for people to seek for dental care is pain that has become intolerable after a long period of “wait-and-see”<sup>5-6</sup>. Because of the delay in seeking treatment, the patients present with destroyed teeth

that is impossible to treat by the conventional restorative procedures. Likewise, insufficient finances limit restorative and rehabilitative dental treatment as

well as shortage of professionals and dental materials. Therefore, we can assume that, many patients have a large number of missing teeth<sup>7</sup>. The absence of one or more natural teeth often results in disability. This can trigger several positional and functional changes such as impairment in speech, mastication ability and integrity of dental arch.

Studies have shown that, tooth loss can have a substantial effect on the emotions as well as oral health and function<sup>8-9</sup>.

In the past, many patients felt that tooth loss was inevitable and were, to a certain extent, prepared for that eventuality.

Today, patients' expectations have changed and many see tooth loss as a negative event. Patients may suffer real or perceived detrimental effects following the loss of one or more teeth<sup>10</sup>.

### **Problem of Research**

Recent studies have confirmed the findings of many researchers that, both functional and psychological compromises as well as positional changes are following tooth loss if unrestored<sup>11</sup>.

These positional changes may be of sufficient magnitude to complicate restorative treatment. Therefore, the desire of patients to have an excellent prosthesis for their missing teeth may pose dental technician with many challenges to achieve ideal function and best esthetics.

Many studies are available exhibiting the causes of tooth loss, but comparatively there are fewer studies documenting the effects or consequences of tooth loss, literature is scarce about the consequences of tooth loss in our country.

There is however, paucity of information on whether patients or people with missing teeth are aware of the side effects of tooth loss on them or on the remaining teeth.

### **This study will help :**

- To understand the causes and consequences of tooth loss among our patients.
- Demonstration about the relationship between tooth loss and oral health

problems.

- Encourage our patients for replacing their lost teeth.

### **Objectives**

- To recognize the causes and effects of tooth loss.
- To investigate the association between loss teeth and oral health problem.
- To determine functional and positional changes that following tooth loss.
- To prioritize restoration and replacement of missing teeth to meet functional demands, and ensure quality dental services for all citizens

### **(Questionnaire and Clinical Examination)**

Self-administered questionnaire was distributed to the patients to collect information relating to demography and cause of tooth loss, in addition to mastication and speech state after tooth loss.

Four clinical conditions including supra-eruption, drifting teeth, temporomandibular disorders and bone resorption were used to recognize the effects of missing teeth.

Patients seeking dental treatment at General Hospital, Morzuk, Libya were recruited for the study.

Criteria included age of 16 years and above with one or more missing teeth except for third molar.

### **A. Study Design.**

A short-term study design

### **B.study Area.**

This study conducted in the prosthetic clinic at the General Hospital of Morzuk, Libya. The location of this hospital is in the city center beside the modern mosque along the main road.

### **B. STUDY SAMPLE.**

The study was conducted among the partially and completely edentulous patients who attended dental clinic at the hospital for refers or received various oral health services.

### C. Inclusion Criteria.

- The people who have missing teeth, either partially or completely edentulous.
- Age is 16 years old and above.

### D. Exclusion Criteria

- Any subject who have loss of third molars alone (considered as complete dentition).
- The patients who have teeth extraction for orthodontic purposes (treatment objectives).

### E. Ethical Considerations

Ethical clearance for this study was obtained from Dental Prosthetic Department of the Medical Technology College in Sabha University.

The study also was approved by the administration protocol of General Hospital of Morzuk, Libya. In addition, every 23 participant was informed of his or her right to refuse participation or to withdraw from the study at any moment.

## TOOLS AND TECHNIQUE OF COLLECTION OF DATA.

### 1. QUESTIONNAIRE (OPEN-CLOSE):

- Self-administered open-close questionnaire used to collect information from the patients. The questionnaire contained 13 questions, one was dichotomous, and one question had space for the participant to write the answer.

The questions in the beginning enquired about the personal information

such as age, gender, economic and education status. Thereafter, the subjects questioned about causes and duration of tooth loss, in addition to some effects that happened after tooth loss.

The subjects were of four age groups ascending from 16 to more than 45 years of age (16-25years, 26-35 years, 36-45 years, and >45 years).

### 2. Clinical Examination:

- Clinical examination conducted by using examination tools: dental chair, mouth mirror, tweezers and periodontal probe.

The examination included clinical variables such as

type of edentulousness (partial or complete), position and type of missing teeth. In addition to the consequences of tooth loss on patients' wellbeing, such as temporomandibular disorder, drifting of remaining teeth, overeruption of unopposed teeth and bone loss (resorption).

To determine the position and type of missing teeth, we used graphical representation to represent the upper and lower teeth. In addition, we have also used it to determine whether the teeth have drifting (inclining) or overeruption.

## Results

Altogether 58 participants, 31 (53.4 %) were males while 27 (46.6%) were females. The participants were aged 16 – >45 years, among them, 44 patients (75.9%) are partially edentulous, and 14 patients (24.1%) were completely edentulous. Among the study group, the patients with complete tooth loss, patients with missing both anterior and posterior teeth were suffering with more problems. The least suffering was those who lost posterior teeth.

Many oral health problems had shown high average occurrence on T-Test and strong relationship on Pearson correlation. The general relationship between tooth loss and the oral health problems was positive and strong.

## Conclusions

There is a statistically significant relationship between tooth loss and oral health

problems, where the strong value of this relationship was (0.614), and the level of significance was less than (0.05).

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#### Data Analysis

All Data was analyzed by using Statistical package for Social Science SPSS (Version 18)

. Analysis included one sample T-Test and Pearson Correlation to find the correlation between the tooth loss and oral health problems. In the analysis, the tooth loss category was used as independent variable; it is divided into four groups:

- Missing anterior teeth only.
- Missing posterior teeth only.
- Missing both anterior and posterior teeth.
- Complete teeth loss.

The dependent variable was that problems who followed the tooth loss: positional changes (overeruption and drifting teeth), functional changes (low mastication, poor aesthetic and speech distortion), bone loss (resorption) and emotional effects of tooth loss. 34 significance (0.000). Similarly, increase in tooth loss led to increase in low mastication or low chewing ability.

As for the relationship between tooth loss and speech distortion was positive with medium-strength, the level of significance reached (0.002).

With increase of teeth loss, the distortion of speech also increased.

The relationship between tooth loss and aesthetic problems (poor appearance) was positive with slight-strength correlation (1.261), the level of significance less than (0.05).

With increase of teeth loss, the aesthetic problems

also increases. The problem of drifting teeth showed a negative low correlation (reverse relationship) the level of significance was (0.037).

Increase in tooth loss led to a decrease in drifted teeth.

As for the problems of the negative emotional effects and bone loss (resorption) are showed positive correlation but low strength (weak), but indicative of the level of significance higher than (0.05), that correlation is not significance in both problems. While, the overeruption of unopposed teeth is showed a negative correlation (reverse relationship), but the significant is higher than (0.05). Therefore, the correlation is not significant.

The general relationship between tooth loss and the oral health problems (all previous problems), the correlation value was (0.614), and the level of significance was (0.000), which is less than (0.05). It is a positive and strong correlation, and with increasing teeth loss, there is also an increase in oral health problems.

## Result

Fifty-eight patients consisting of 31 male (53.4 %) and 27 (46.6%) female participated in the study. The

ages ranged from 16 to more than 45 years. The majority of participants were within the age group 26-35 years (29.3%). About half of the respondents (48.3%) had academic education or more.

About 18 (31%) of participants were their answers about first experience with tooth loss are (5-10 years ago).

Among the participants, 44 patients (75.9%) are partially edentulous, and 14 patients (24.1%) were completely edentulous. Of those with partially missing teeth some of them had, missing teeth in anterior only 16 (27.6%), and some had missing teeth only in the posterior region 14 (24.1%), while others had missing teeth in both anterior and posterior regions 14 (24.1%).

## Causes of tooth loss

The most common cause of tooth loss in this study was dental caries 27 (46.6%), followed by Periodontal disease 20 (34.5%), trauma was responsible for 9 (15.5%) cases of tooth loss, and lastly, just two patients (3.4%) had congenitally missing teeth.

**TABLE 1: CAUSES OF TOOTH LOSS**

	The causes	Frequency	Percentage	Valid Percent	Cumulative Percent
Valid	Dental caries	27	46.6	46.6	46.6
	Periodontal disease	20	34.5	34.5	81.0
	Congenitally	2	3.4	3.4	84.5
	Trauma	9	15.5	15.5	100.0
	Total	58	100	100	

The results of T-test about the consequences of tooth loss.

**I. PATIENTS WITH MISSING ANTERIOR TEETH ONLY**

**Table 2: The health problems which suffers of it patients with missing anterior teeth**

N	Oral health problems	No	Yes	Mean	S.D	P-value
		N (%)	N (%)			
1	Temporomandibular disorder (TMD)	16 (100%)	0 (0%)	1	0.000	----
2	Overeruption	16 (100%)	0 (0%)	1	0.000	----
3	Drifting teeth	12 (75%)	4 (25%)	1.25	0.447	0.041
4	Low chewing ability	15 (93.8%)	1 (6.2%)	1.063	0.25	0.000
5	Poor aesthetical effects	1 (6.2%)	15 (93.8%)	1.938	0.25	0.000
6	Speech distortion	3 (18.8%)	13 (81.2%)	1.813	0.403	0.007
7	Bone loss (resorption)	1 (6.2%)	15 (93.8%)	1.938	0.25	0.000
8	Negative emotional effects	6 (37.4%)	10 (62.5%)	1.313	0.946	0.44

From previous table, it is clear that, these patients were exposure significantly to aesthetic problems (poor appearance) and bone loss (resorption) due to loss of anterior teeth, where the mean was in both of them (1.938) and standard deviation was (0.25), the level of significance is less than (0.05).

As well as they had clearly speech distortion, where the average (1.813) and standard deviation (0.403) the connotation level of significance less than (0.05).

As for the problem of temporomandibular disorder (TMD) and overeruption of unopposed tooth, did not founded ever among them, where the mean was in both of them (1) and standard deviation was (0.000), the level of significance is less than (0.05).

**II. Patients with missing posterior teeth only**

**Table 3: The health problems that suffers of it patients with missing posterior teeth**

N	Oral health problems	No	Yes	Mean	S.D	P-value
		N (%)	N (%)			
1	Temporomandibular disorder (TMD)	13 (92.9%)	1 (7.1%)	1.071	0.267	0.000
2	Overeruption	6 (42.9%)	8 (57.1%)	1.571	0.514	0.612
3	Drifting teeth	4 (28.6%)	10 (71.4%)	1.714	0.469	0.111
4	Low chewing ability	11 (78.6%)	3 (21.4%)	1.214	0.426	0.026
5	Poor aesthetical effects	11 (78.6%)	3 (21.4%)	1.214	0.426	0.026
6	Speech distortion	14 (100%)	0 (0%)	1	0.000	----
7	Bone loss (resorption)	4 (28.6%)	10 (71.4%)	1.7143	0.469	0.111
8	Negative emotional effects	10 (71.4%)	4 (28.6%)	1.143	0.663	0.065

The previous table shown that, A few of these patients complain of low chewing ability and aesthetic problems (poor appearance) due to the loss of posterior teeth, where the average of answers was (1.214), the standard deviation (0.426) and the moral level of significance less than (0.05).

The temporomandibular disorders are very slightly among them, where the average was (1.071) and standard

deviation was (0.267), and within less significance of (0.05).

As for the problems overeruption and the drifting teeth and the negative emotional effects and the bone loss (resorption) the indicative of significance level of these problems was higher than (0.05), so can consider that the problem does not exist among them.

### III. PATIENTS WITH MISSING BOTH ANTERIOR AND POSTERIOR TEETH

**Table 4: The health problems which suffers of it patients with missing both anterior and posterior teeth**

N	Oral health problems	No	Yes	Mean	S.D	P-value
		N (%)	N (%)			
1	Temporomandibular disorder (TMD)	13 (92.9%)	1 (7.1%)	1.071	0.267	0.000
2	Overeruption	3 (21.4%)	11 (78.6%)	1.786	0.426	0.026
3	Drifting teeth	1 (7.1%)	13 (92.9%)	1.929	0.267	0.000
4	Low chewing ability	5 (35.7%)	9 (64.3%)	1.643	0.497	0.302
5	Poor aesthetical effects	2 (14.3%)	12 (85.7%)	1.857	0.363	0.003
6	Speech distortion	10 (71.4%)	4 (28.6%)	1.286	0.469	0.111
7	Bone loss (resorption)	0 (0%)	14 (100%)	2	0.000	----
8	Negative emotional effects	5 (35.7%)	9 (64.3%)	1.427	0.852	0.759

The previous table shown that, the exposure to bone loss (resorption) is very high among these patients, and they suffering from it clearly, where the average (2) standard deviation (0.000) and the level of significance less than (0.05).

Furthermore, the degree of exposure of these patients to drifting teeth, aesthetic problems (poor appearance) and overeruption of unopposed teeth was high, within significance less than (0.05).

While the degree of exposure of these patients to temporomandibular disorder (TMD) is very low, and the level of significance is less than (0.05). Moreover, about other problems in the table, it have the highest significance of (0.05).

**IV. PATIENTS WITH COMPLETE EDENTALOUS (COMPLETE TEETH LOSS)**

**Table 5: The health problems which suffers of it patients with complete teeth loss.**

N	Oral health problems	No	Yes	Mean	S.D	P-value
		N (%)	N (%)			
1	Temporomandibular disorder (TMD)	0 (0%)	14 (100%)	2	0.000	----
2	Overeruption	14 (100%)	0 (0%)	1	0.000	----
3	Drifting teeth	14 (100%)	0 (0%)	1	0.000	----
4	Low chewing ability	0 (0%)	14 (100%)	2	0.000	----
5	Esthetical effect	2 (14.3%)	12 (85.7%)	1.857	0.363	0.829
6	Speech distortion	0 (0%)	14 (100%)	2	0.000	----
7	Bone loss (resorption)	1 (7.1%)	13 (92.9%)	1.929	0.267	0.000
8	Emotional effect	5 (35.7%)	9 (64.3%)	1.357	0.929	0.175

the previous table shows that, All patients with complete teeth loss are complains about low chewing ability and speech distortion, moreover they are very clearly suffer from temporomandibular disorder (TMD), where the occurrence average of these problems were (2), while standard deviation (0.000) and the level of significance is less than (0.05).

In addition, a lot of them are suffer the problem of bone loss, where an average of this problem is (1.929), the standard deviation (0.267), and the level of significance less than (0.05).

As for the aesthetic problems (poor appearance) and negative emotional effects (psychological effects) there are no statistically significant prove the occurrence of this problems between these patients, because the level of significance of these problems was higher than (0.05).

Because the patients with complete teeth less do not have remaining teeth, considered their answers about the problems of drifting teeth and over-eruption are (NO).

**The Summary of T-Test Results**

The patients with complete teeth loss and the patients with missing both the anterior and posterior teeth are most groups that clearly suffer problems among

patients who involved in the study.

While those who loss posterior teeth only are less group suffer health problems due to loss of teeth among all of them.

**The results of Pearson Correlation**

The following results shows the general relationship between tooth loss and problems of oral health on the one hand, and then shows the relationship between tooth loss and every problem separately.

The strongest relationship was between tooth loss and temporomandibular disorder (TMD) (0.813). It is a strong positive correlation, and the level of significance (0.000), which is less than (0.05). Whenever increasing the teeth loss, increasing problem of TMD.

Then followed that, the relationship between tooth loss and low chewing ability. It is also a positive and strong correlation (0.730) and was indicative of the level of significance (0.000). Whichever, with increase of teeth loss, the problem of low mastication increasing.

As for the relationship between tooth loss and speech distortion was positive medium-strength, the level of significance reached (0.002). Whichever, with increase

of teeth loss, the distortion of speech will be increasing.

The relationship between tooth loss and aesthetic problems (poor appearance) was positive slight-strength correlation (1.261), the level of significance less than (0.05). Whichever, with increase of teeth loss, the aesthetic problems will be increasing.

As for the problem of drifting teeth, showed a negative low correlation (reverse relationship) the level of significance was (-0.037). With increase of teeth loss, will decreasing the drifted teeth.

As for the problems of the negative emotional effects and bone loss (resorption) are showed positive correlation low strength (weak), but indicative of the level of significance higher than (0.05), that correlation is not significance in both problems.

While, the overeruption of unopposed teeth is showed a negative correlation (reverse relationship), but the significant is higher than (0.05). Therefore, the correlation is not significance.

The general relationship between tooth loss and the oral health problems (all previous problems), the correlation value was (0.614), and the level of significance was (0.000), which is less than (0.05). It is a positive and strong correlation, whichever, with increasing of teeth loss, the oral health problems will be increasing.

## Discussion

Studies concerning the epidemiology in dentistry have showed that dental caries and periodontal diseases are the most prevalent pathologies that affect the oral cavity. Previous studies performed by American researchers had suggested that dental caries was the main reason for teeth extraction, and other studies accomplished in New Zealand, Sweden, and even in Brazil confirmed that caries may lead to tooth mortality<sup>12-13</sup>.

The association between positional changes and tooth loss.

- Temporomandibular disorder (TMD)

The TMD has been very clear in patients with complete teeth loss, because without teeth, the occlusion plane changed in these patients, therefore disorders such as excessive closures and other problems are exposed.

While, the remaining teeth in patients with partial teeth loss maintained at the occlusion plane in the proper place.

Therefore, the TMD is commonly in complete edentulous patients than partial edentulous patients.

This study concluded that, the correlation is strong between tooth loss and TMD, unlike that study conducted by Ciancaglini and his colleagues<sup>14</sup> who have concluded that tooth loss is of little relevance in the etiology of temporomandibular disorders.

- Over-eruption

The overerupted teeth emerged in patients with missing both anterior and posterior teeth only, maybe because this problem needing too many gaps and teeth without opposite in the jaws. The relationship between tooth loss and this problem was negative, because with increase of teeth loss will not be teeth there to occur overeruption on it after that.

- Drifting teeth

The drifting teeth common between patients with loss anterior and posterior teeth clearly, which also for occurs is required many gaps and remaining teeth in the jaws, so the proportion of occurrence it slight. Like previous problem, the correlation between tooth loss and this problem was negative, because with increase of teeth loss will not be teeth there to occur overeruption on it after that.

## THE ASSOCIATION BETWEEN FUNCTIONAL CHANGES AND TOOTH LOSS.

- Low chewing ability

The patients who suffered of low mastication on extensively were patients with complete teeth loss, as a known without teeth the chewing ability is absent.

The partial teeth loss patients who suffered of this problem were very simple; because good chewing ability is assured even with remain just (20 well-distributed teeth). Similarly, (Sarita et al., 2003)<sup>15</sup> he has found these previous results.

- Poor appearance

The aesthetic problem due to tooth loss is clearly in patients who have lost their anterior teeth. These patients have complained about their appearance after the loss

of these teeth, because the anterior teeth visible and complementary to the beauty of the face.

Because this problem is restricted by spatial conditions (place of the missing tooth), thus not experienced by all patients with tooth loss. Therefore. The correlation was positive but weak.

- Speech distortion

The patients with missing anterior teeth and with complete teeth loss are suffering from this problem significantly. Because the anterior teeth have an important role in the process of speech and produce pure sound.

Thus, the loss of the anterior or all teeth, the pronunciation and aesthetic would affected.

### **BONE LOSS (RESORPTION)**

The majority of patients' categories had loss (resorption) in their alveolar bone clearly. Because after tooth loss the bone begins to resorb immediately.

The bone loss among patients with missing posterior teeth were somewhat low. Because the bone in the posterior wider than anywhere, so it needs longer time to be absorbed.

On reverse a study by (Bhaskar)<sup>2</sup> who concluded that, bone loss is more pronounced posteriorly than anteriorly.

### **THE NEGATIVE EMOTIONAL EFFECTS OF TOOTH LOSS**

The negative emotional effects due to tooth loss are not frequently occurring among patients, because with passage of time getting used to it and accept the event, after it was initially difficult admission.

Moreover, a lot of them not care about teeth loss and did not lend attention to this issue originally. Therefore, the correlation was not significant.

The association between tooth loss and oral health problems

Most of previous problems had shown high average occurrence on T-Test and strong relationship on Pearson correlation. Therefore, the general relationship between tooth loss and the oral health problems was positive and strong.

### **CONCLUSIONS**

This study demonstrated that tooth loss causes several oral health problems. There is a statistically significant relationship between tooth loss and oral health problems, where the strong value of this relationship was (0.614), and the significance was less than (0.05).

### **Recommendations**

Based on the findings of the study, the following recommendations are made:

- Dental personnel should make an effort to identify individuals with risk of tooth loss on oral health in order to prevent tooth loss.

- The patients with tooth loss should replace their missing teeth to restore function and protect the remaining teeth.

- Improvement of dental laboratories to provide quality replacement of missing teeth at affordable costs.

- Further long-term multicenter studies to evaluate the consequence of tooth loss and assist in giving a more accurate projection of the patients' needs across the nation is mandatory.

**Ethical Clearance:** Ethical approval obtained from local Ethic Committee of Sebha University (South Libya).

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