









## Prevalence and Severity of Dental Attrition in a Sample of Kurdish Patients in Erbil City

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### Abstract:

Tooth attrition is a non-caries lesion worn off the tooth's incisal and occlusal surface and belongs to the wasting disease group. This study aims to determine the prevalence and severity of tooth attrition concerning gender, age groups, and tooth-grinding habits in a sample of Kurdish patients in Erbil. The research encompasses 176 cases from both genders (88 males, 88 females) clinically examined for attrition. The result demonstrates that 93% of all participants have at least one sign of attrition. In other words, 97% of patients within the age group of 40 years and older suffered from the prevalence of dental attrition. Meanwhile, the number decreases to only 90% of patients for the age group of less than 40 years.

Furthermore, the mean attrition scores of males and females were 0.85 and 0.76, respectively. Patients who experienced tooth grinding exhibited a higher mean of attrition than those who did not. To sum up, this study proves that older individuals had more severe attrition affecting both enamel and dentine, while younger ones predominantly showed enamel-only attrition. Males experienced higher attrition rates than females, and bruxism correlated with increased attrition.

**Keywords:** Attrition; Tooth Grinding; Tooth Sensitivity; Night Guards; Tooth Wear Index.

## 1. Introduction

The attrition is wearing incisal and occlusal surfaces, which occurs from functional contact with opposing teeth. Tooth wear is physiological to a certain extent, but rapid wear may happen when abnormal anatomic or unusual functional factors are present [1]. Individuals suffering from bruxism often delay seeking dental care until they encounter issues related to the temporomandibular joint (TMJ) and masticatory muscles. This delay in seeking treatment renders them particularly susceptible to the onset of temporomandibular dysfunction [2]. Attrition is often found in older individuals and often as a result of bruxism, which could result from either night bruxism, day bruxism, or both [3].

Tooth attrition may not present symptoms in patients unaware of it, and it is only revealed during a routine clinical examination. However, it may also be symptomatic and force the patient to consult a dentist and get dental advice and treatment [4].

The main signs and symptoms typically found in patients who have attrition are tooth grinding at night, upper and lower jaw pain, fatigue, limited mouth opening while waking up, teeth feeling loose, toothache in the gingiva, headaches in the temporal region, grinding or clenching of the teeth while awake, tooth fractures – natural teeth or restorations, tooth mobility, pulp necrosis – as loads cause restriction of blood supply, linea alba and traumatic ulcers [3]. Assessing the frequency of dental attrition in a particular population is essential for identifying factors that increase the risk, establishing preventive strategies, and delivering suitable dental treatments.

Many studies have been conducted in different areas of the world on dental attrition, and the vast age range of the population studied [5]. However, there remains a significant need for greater understanding of tooth attrition within our society. Thus, the choice was taken to carry out a cross-sectional study to determine the frequency and degree of tooth wear, both incisal and occlusal, among individuals in Erbil.

This study aims to determine the prevalence and severity of tooth attrition concerning gender, various ages, and tooth-grinding habits in a sample of Kurdish patients in Erbil. The alternative hypothesis (H1) said there is an association between age, gender, and tooth-grinding habits. Furthermore, this study will contribute to the existing literature on dental attrition by providing specific prevalence data for our city, where such information is currently limited.

## **2. Methodology**

### **2.1 Sample Selection**

At the Faculty of Dentistry, Tishk International University in Erbil, a cross-sectional study was randomly carried out among patients seeking dental treatment for different causes. A total of 176 participants, ages 18 to 73, willingly volunteered to participate in the research.

Participants were asked to answer a simple structured questionnaire to provide information about their ages and bruxism habits. Afterward, all the included individuals were subjected to a thorough clinical periodontal examination, including tooth attrition. The study took place from September 1, 2022, to November 1, 2023.

Regarding age, the subjects were divided into two groups, i.e., group A (less than 40 years) and group B (Equal and above 40 years).

### **2.2 Subjects Selection**

#### **2.2.1 Inclusion Criteria:**

1. Age range: includes individuals between 18 to 75 years old.
2. Individuals who were residents of Erbil city.
3. Individuals who provide informed consent to participate in the study.

#### **2.2.2 Exclusion Criteria:**

1. Patients with fewer than 20 teeth.
2. Extensive restoration, cast restoration, and cuspal coverage.
3. Presence of fixed or removable partial denture.
4. Patients with severe tooth decay or dental anomalies.

### **2.3 Clinical Examinations**

Each patient was checked for tooth attrition. Clinical oral examinations were conducted under proper lighting and with sterile diagnostic instruments (disposable mirror and explorer probe). In the study, each patient underwent evaluation by one of the three examiners assigned to them. To mitigate bias and ensure reliability, these examiners engaged in discussions to identify and address any potential mistakes while checking the patients and collecting information. As Smith and Knight in 1984 [6], an index is used to assess attrition, which has been modified from the tooth wear index. Attrition degree was evaluated based on several criteria, as shown in (Table 1).

Table 1: Attrition Assessment Criteria

Score	Surface	Criteria
0	O/I	No alteration in the surface properties of enamel
1	O/I	Deterioration of enamel surface properties (partial loss of enamel structure)
2	O	Partial enamel loss, revealing dentin on less than 33% of the surface.
	I	Enamel degradation results in dentin exposure.
3	O	Enamel loss resulting in dentin exposure on over 33% of the surface
	I	Significant degradation of enamel and dentin without exposing the pulp or secondary dentin.
4	O	Severe degradation of tooth enamel, direct exposure of the tooth pulp, or exposure of the underlying secondary dentin
	I	Exposure of the pulp or secondary dentin.
O–Occlusal, I–Incisal		

## 2.4 Statistical Analysis

The data have been statistically analyzed using IBM SPSS Statistics 23. An Independent Sample T-test was applied for statistical analysis of the differences between genders, age groups, and tooth grinding variables about tooth attrition.  $P$ -value  $< 0.05$  was considered statistically significant.

## 3. Results

### 3.1 Sample Distribution:

The sample comprised 176 patients, 88 males (50%) and 88 females (50%). The mean age was 37.3, which ranged from 18 to 73 years old. The average age for males stood at 36.6 years, ranging from 18 to 62 years old, while females averaged 37.9 years, ranging from 19 to 73 years old.

### 3.2 Prevalence of Attrition According To Age:

Among 176 patients in the study, 164 individuals (93%) presented at least one sign of tooth attrition. Patients in the age group less than 40 years (109 patients) showed a 90% prevalence of attrition, and 97% of patients in the age group equal to and above 40 years (67 patients) had tooth attrition (Table 2).

Table 2: Prevalence of attrition

Age groups	Sample size	Attrition
Group A	109	99 (90%)
Group B	67	65 (97%)
Total	176	164 (93%)

### 3.3 Frequency Distribution Of Attrition Score:

Patients showed an attrition score between 0.5 and 2.0 was 63.5%; in 32.3%, the lowest score of less than 0.5 was seen. The highest score of higher than 2.0 was seen in 4.2% (Table 3).

Table 3: Dispersion of attrition score

Attrition score	Frequency	Percent
<0.5	53	32.3%
0.5-1.0	53	32.3%
>1.0-1.5	30	18.2%
>1.5-2	21	13%
>2.0-2.5	5	3%
>2.5	2	1.2%
0.5 - 2	104	63.5%

### 3.4 Attrition Severity Based on Age Group:

Mean attrition scores of patients under 40 years were lower (0.6) compared to patients whose ages were 40 years or older (1.14). There was a statistically significant difference ( $P$  values  $<0.05$ ) in the mean attrition between these two age groups (Table 4).

Table 4: Attrition score of age groups

Age groups	Sample size (N)	Attrition score (mean)	SD	P value
Group A	109	0.6	0.49±	0.001
Group B	67	1.14	0.69±	

### 3.5 Attrition Severity Based on Gender:

The average attrition score for males and females in both age groups was 0.85 and 0.76, respectively. Based on our analysis, There was statistically no significant difference ( $P$  values  $<0.05$ ) in the mean attrition between males and females (Table 5).

Table 5: Attrition score of male and female

Gender	Sample size (N)	Attrition score (mean)	SD	P value
Male	88	0.85	0.59±	0.318
Female	88	0.76	0.66±	

### 3.6 Attrition Severity Based on Tooth Grinding:

The mean attrition score of patients with tooth grinding was (1.11), and patients who did not have tooth grinding was (0.66). There was a statistically significant difference ( $P$  values  $<0.05$ ) in the mean attrition between these two groups (Table 6).

Table 6: Attrition score of tooth grinding

Tooth grinding	Sample size (N)	Attrition score (mean)	SD	P value
Yes	57	1.11	0.67±	0.001
No	119	0.66	0.55±	

## 4. Discussion

This study examines the prevalence of tooth attrition in a sample in Erbil City, focusing on how it relates to age, gender, and grinding one's teeth. Tooth attrition, or the gradual loss of tooth structure due to wear, can have severe consequences for general and oral health. Developing focused preventive and therapeutic efforts requires understanding the prevalence of the condition in a given community.

Managing attrition in therapeutic settings can be challenging because rehabilitative treatment does not address the underlying neurological cause. Patients must comprehend the underlying cause of their disease and be willing to wear a protective splint for a lifetime. Long-term splint wearing is crucial for patients undergoing complex and extensive treatments [7].

Excessive tooth wear can result in several problems, including reducing apical-coronal dimensions of tooth structure, dentin exposure, hypersensitivity, in many extreme cases, pulpitis, pulp necrosis, canal exposure, reduction of occlusal vertical dimension (OVD), and an ugly appearance [8].

Professional interest in the difficulties encountered in treating patients with dental wear has increased due to the potential of severe consequences that could also impair a person's quality of life. It is better to mention that frequently encountered a combination of variables is the reason for the tooth wear. Therefore, identifying the contributing causes is crucial for attrition management. Therefore, the study aimed to determine the prevalence, severity, and causative variables of dental attrition.

We chose to use the attrition index modified by the tooth wear index of Smith and Knight for this investigation because it is widely understood, comparable, and commonly used [6]. Following a clinical examination to assign a score to each tooth, the total score of all the teeth inspected was divided by the total number of teeth. The resultant number was used to calculate the attrition score. This attrition score indicated the subject's attrition severity.

The population under investigation had an attrition prevalence rate of 93% in the current study, with younger participants (group A) showing a 90% prevalence and older subjects (group B) showing a 97% prevalence. Our result for younger participants (group A) is unlike the results of the study conducted by Rius-Bonet in 2023 among young adults in Catalonia [9]. In their study, which included 178 participants (88 women and 90 men) with a median age of 22 years, 74.7% of them showed signs of attrition.

All age group participants had toothwear. However, the degree of attrition differed. A minimum attrition score of less than 0.5 was observed in 32.3% of the participants in the present study. This contradicts research by Sangeeta Yadav in India in 2011, which found that only 5.4% of participants had the lowest score of less than 0.5 on a standard attrition index 0–4 scale [10].

In light of our examination, we reject the null hypothesis ( $H_0$ ), indicating there was a statistically significant difference ( $P$  values  $<0.05$ ) in the mean attrition between these two age groups. It was found in the current study that the mean attrition score grew along with the age. This was comparable to past that showed attrition rises with age [11]. This shows that attrition gets worse with aging. According to reports, tooth wear is a process that varies with age. The cumulative influence of longer-lasting etiological factors, or higher functional activity, was the cause of this age-related rise in attrition [11, 12].

Based on our analysis, we fail to reject the null hypothesis ( $H_0$ ), as there was no significant difference in the mean attrition between male and female participants. However, it should be noted that the present study discovered a higher attrition rate among male participants compared to female participants. Across all age groups, male subjects exhibited more significant attrition than female subjects. Previous research by Sangeeta Yadav in India in 2011 [10] showed similar results. Additionally, when comparing our study with other research conducted in our country, a study by Al-Obaidi WA and Ghafour SM. In 2005 in Baghdad reported that boys had a higher rate of attrition than girls, which aligns with our findings [13].

A study conducted in Saudi Arabia reported a tooth wear prevalence of 86.7%, which closely aligns with our findings. They also noted that tooth attrition was more prevalent in males than females and older patients compared to younger ones, which mirrors our results [14]. Men may have a higher attrition score because of their more vital ligaments, larger muscle fiber mass, and better masseter function, which all contribute to a higher biting force. Males had more negative habits than females, which may have caused attrition [10].

According to the results of the current study, we reject the null hypothesis ( $H_0$ ), indicating there was a statistically significant difference ( $P$  values  $<0.05$ ) in the mean attrition between these two groups, patients who self-reported having bruxism had a higher attrition rate than those who did not. Additionally, the examination revealed notable distinctions between the two cohorts (individuals who self-reported as bruxers and those who did not). The current discovery, which indicates a strong correlation between dental attrition and awareness of bruxism, aligns with other research that found a connection between tooth wear and self-reported bruxism among 102 volunteered Greek subjects [15]. However, it should be mentioned that other research has not found a link between self-reported bruxism activity and tooth wear [16].

Since no medications are available to halt teeth grinding, patients should consider wearing a tailored night guard device before turning in for the night. By reducing the impact of the grinding forces, this device protects the temporomandibular joints (TMJs), muscles, and teeth. We must discuss a few of the study's design shortcomings. The small sample size may have overestimated some correlations between predisposing factors and tooth attrition.

## 5. Conclusion

Middle and elderly age groups (group B) exhibited the highest prevalence of attrition compared to younger age groups (group A). Among younger individuals, attrition primarily affected only the enamel, while in older age groups, attrition involved both enamel and dentine. Additionally, as individuals aged, the intensity of attrition increased. Male participants demonstrated higher levels of attrition compared to females, with males experiencing more severe cases. Moreover, the attrition rate showed a notable increase in patients identified as bruxers compared to non-bruxers.

## 6. Author's Contribution:

It is confirmed at this moment that all designated writers have thoroughly reviewed and endorsed the article. Furthermore, we affirm that each author has contributed to the paper. We now affirm that all writers have given their approval about the order in which they are listed in the paper.

## 7. Conflict of Interest:

This paper does not have any conflict of interest.

## 8. Acknowledgment:

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