



## Incidence of loss of permanent teeth among patients and its impact in orthodontics treatment.

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### Abstract

**Aims:** This study aims to evaluate oral status, the of loss of permanent teeth among patients and its impact of the loss of teeth on the orthodontic treatment. **Methods:** The study sample consisted of 368 consecutively attending subjects who fulfilled the criteria for the study. mainly up on clinical examination and personal fulfilled interview questionnaire during clinical examination on number of patients attending to public dental clinics for orthodontic treatment in first six months of (2023) from January to June. **Results:** A total of 368 patients had 1650 teeth lost. females higher proportion than males in extraction of teeth by 71% and 29% respectively. highest Age group in tooth loss were 25-34 years with 41%, followed by age group 15-24 years 21%. the most common cause of tooth loss within all age groups was dental caries with highest value 41.1%. The results showed that the highest percentage of tooth lost in the mouth was first molar with 37% followed by third molars 21%. **Conclusion:** Loss of the first permanent molar has a negative impact on orthodontic treatment time in cases of space closure. The treatment time is longer when there are more tooth losses and arches involved.

### Introduction:

It is widely acknowledged that it is imperative to maintain good oral health before physical health deteriorates and dependency becomes an issue. These circumstances pose significant challenges to the preservation of oral health. Although there have been notable advancements in oral health among children, tooth loss remains a prevalent concern in the field of dental public health for adults.<sup>1</sup> The primary objective of the dental profession is to prevent tooth loss.<sup>2</sup> As it is the ultimate indicator of success or failure in dentistry and dental health programs.<sup>3</sup> Success can be measured by the decrease in edentulism rates and an increase in the number of retained teeth.<sup>4</sup> Tooth loss is a definitive event in the life cycle of a tooth and is commonly observed in individuals who neglect their oral hygiene. Tooth extraction is predominantly performed in response to the need for immediate treatment, and when there is a substantial backlog of treatment required, patients often opt for tooth extraction as the primary approach instead of restorative procedures.<sup>1</sup> Indications for tooth extraction include dental caries and its associated complications (pulpitis and

periapical infections), periodontal diseases, fractured teeth, misaligned teeth, impacted teeth, orthodontic treatment, retention of deciduous teeth, prosthodontic considerations, supernumerary teeth, and preparation for radiotherapy.<sup>5</sup> The loss of teeth has a detrimental impact on quality of life, often to a significant extent, and is also linked to poor overall health<sup>6</sup>. Studies on tooth loss have indicated that while edentulism is on the decline, a considerable number of adults still experience tooth loss.<sup>1</sup> Tooth extraction is a definitive event in the life cycle of a tooth and is frequently observed in individuals who neglect their oral hygiene. Tooth extraction is predominantly performed in response to the need for immediate treatment, and when there is a substantial backlog of treatment required, patients often opt for tooth extraction as the primary approach instead of restorative procedures.<sup>8</sup> Indications for tooth extraction include dental caries and its associated complications (pulpitis and periapical infections), periodontal diseases, fractured teeth, malpositioned teeth, impacted teeth, orthodontic treatment, retention of deciduous teeth, prosthodontic considerations, supernumerary teeth, and preparation for radiotherapy.<sup>9</sup> Recent studies have shown that tooth loss due to periodontal reasons is more prevalent compared to dental caries. Ong et al. discovered that dental caries and periodontal reasons are equally responsible for tooth loss in the Asian population.<sup>10</sup> Phipps et al. and Murray et al. have reported significantly higher numbers of tooth loss due to periodontal reasons compared to dental caries in the United States and Canada.<sup>11</sup> Dental caries has been identified as the most common reason for tooth extraction in the Japanese,<sup>12</sup> Chinese,<sup>13</sup> and Sri Lankan populations.<sup>14</sup> The loss of teeth has a detrimental impact on quality of life, often to a significant extent, and is also linked to poor overall health.<sup>15</sup>

Studies conducted on tooth loss have demonstrated that despite a decline in edentulism, a significant proportion of adults continue to experience tooth loss.<sup>8</sup> This phenomenon not only affects the functionality of chewing, but also has an impact on the aesthetic aspect of an individual. However, there is a scarcity of data available regarding tooth loss in India. A study carried out in South India on adults aged over 60 years revealed an average of 10.98 missing teeth in the total count of Decayed, Missing, and Filled Teeth (DMFT).<sup>16</sup>

Consequently, orthodontic treatment in adults with tooth loss may become more intricate, resulting in longer treatment duration. It is common in orthodontic practice to encounter adult patients who have experienced premature loss of permanent molars and therefore require some form of orthodontic intervention.<sup>17</sup> The preservation of the edentulous space leads to the deterioration of alveolar bone, which hinders the closure of space and may necessitate the consideration of dental implants.<sup>18</sup> In cases of early loss of the first lower permanent molar, orthodontic repositioning of neighboring teeth in the edentulous area has proven to be an exceptional treatment alternative.<sup>19,20</sup>

### Materials and methods:

The materials and methods used in this paper were mainly up on clinical examination and personal fulfilled interview questionnaire during clinical examination. Random cluster sample of patients (from both gender) attended different public dental clinics in Misurata popularity. The study sample consisted of 368 consecutively attending subjects who fulfilled the criteria for the study. And were had a past dental history of dental extraction of permanent tooth/teeth. With help of statistician the sample was taken depending on number of Misurata population and number of patients attending to public dental clinics in first six months of (2023) from January to June. and that of an interview questionnaire in Arabic language to facilitate communication with the patients.

### Results:

A total of 368 patients had 1650 teeth lost. In this study most of patients were females higher proportion than males in extraction of teeth by 71% and 29% respectively. Age group 25-34 years with a total 152 patient 41%, followed by age group 15-24 years 21%, age group 35-44 years 20%, 45-54 years with 12%, 55-64 years 4% and age group 65 years 2% as showed in table 1.

Age group (years)	Frequency	male		Female	
		N	%	n	%
15-24	78	14	13	64	24
25-34	152	48	45	104	40
35-44	73	24	23	49	19
45-54	43	12	11	31	12
55-64	15	4	4	11	4
65	7	4	4	3	1
total	368	106	29	262	71

Table 1: Distribution of age group and gender.

“n” denotes the number of male and female patients .

In this study, the most common cause of tooth loss within all age groups was dental caries with highest value 41.1%, followed periodontal diseases by 28.7% and

impaction 26.2% where other reason like trauma, tooth abnormality and treatment failure were less than 4%. Figure 1.

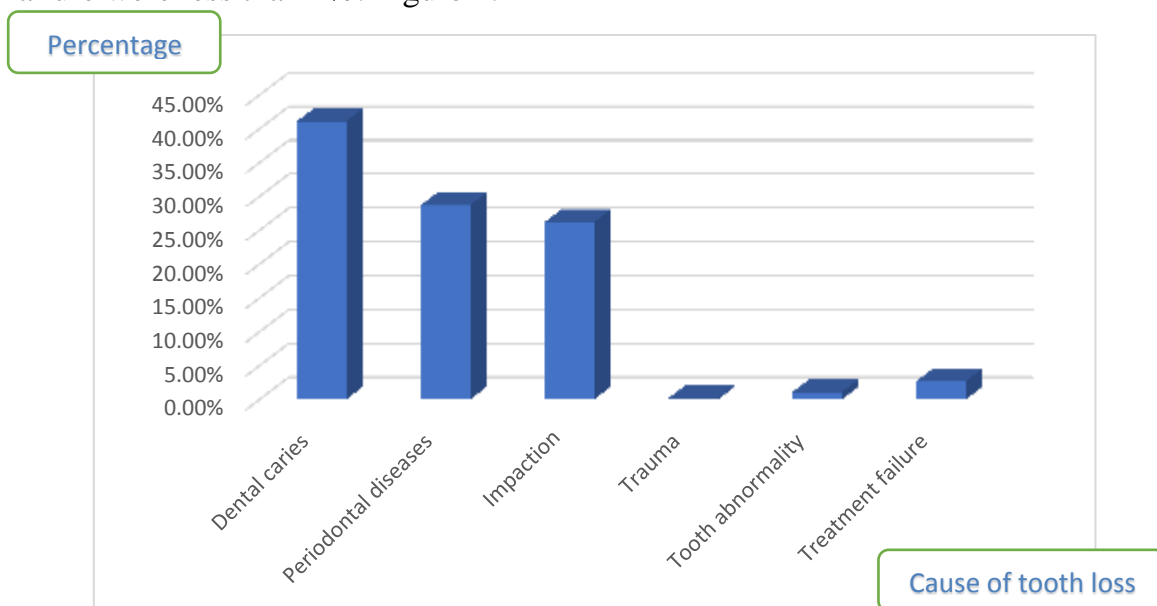


Figure1: most common cause of tooth loss.

The results showed that the highest percentage of tooth lost in the mouth was first molar with 37% followed by third molars 21%, second molars 15%, second premolars 13% and first premolars 8%. Whereas central incisors, lateral incisors and canines with same proportions 2%. Figure 2.

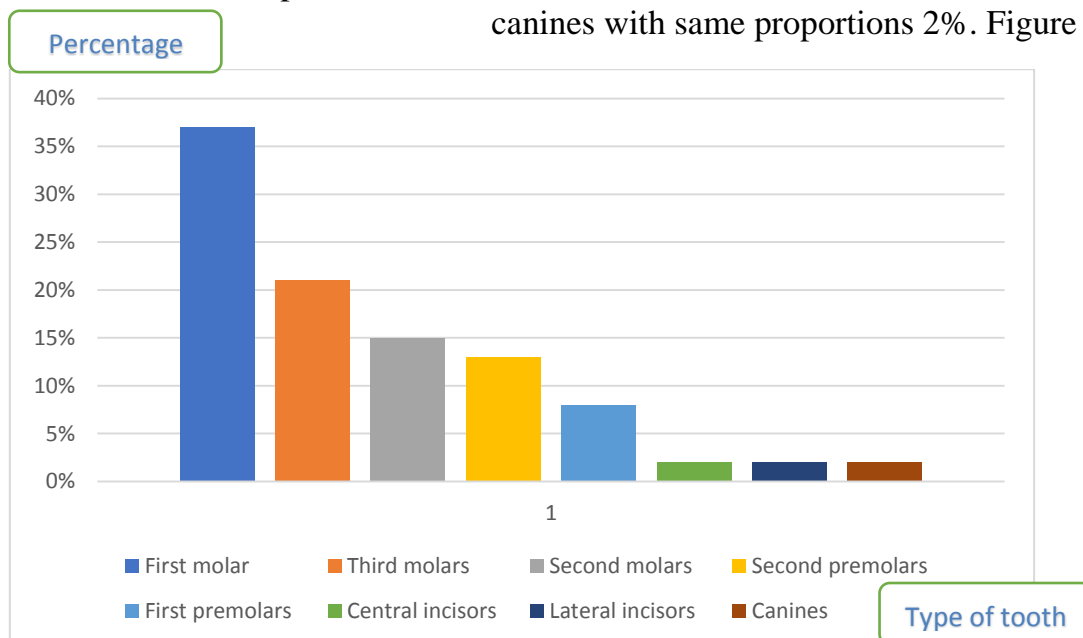


Figure 2 : percentages of loss of each tooth type in the mouth.

## Discussion:

The results of the current study concluded that female patients had a higher percentage of extracted teeth than male with a clear number by 71% and 29% respectively. This finding is not in agreement with the majority of previous studies conducted in different country like Kuwait where that study showed Male patients had a higher number of extracted teeth with (54.5%), than females, (45.5%).<sup>21</sup>

The mean number of tooth loss in the present study was higher among age group 25-34 years with a total 152 patient (41%) followed by age group 15-24 years (21%) and age group 35-44 years (20%) where the old patients more than 55 years had the lowest percentage about 6%, which the opposite in study was conducted in Kuwait where showed The mean number of tooth loss was higher among older population of age groups of 51 years and higher<sup>21</sup>

According to the results of the present study, periodontal disease, dental caries in addition to impaction remain the main causes for permanent tooth extraction in adults. the findings showed that dental caries was the highest reason for tooth loss among patient by 41.1% meanwhile periodontal diseases 28.7% and impaction reach about 26.2% which were similar to other study in Greece that showed The percentages of teeth extracted due to dental caries and periodontal disease were overall 45.6% and 32.1%, respectively.<sup>22</sup>

Also, our findings reveals that the most frequently extracted teeth were first molars with 37% followed by third molars 21% where others were less than 15 % for each. In Italy, other study illustrate that molars were most commonly extracted due to caries (54.6% of all of the molars extracted), and only one third of them had to be extracted due to periodontal disease.<sup>23</sup>

It is common in the field of orthodontics to encounter adult patients who exhibit premature loss of their permanent molars and consequently require orthodontic intervention. The preservation of the edentulous space leads to a reduction in the volume of the alveolar bone, which in turn adversely affects the closure of the space and the potential for dental implants. In cases where the first lower permanent molar is lost early, orthodontically repositioning the adjacent teeth within the edentulous region has been demonstrated to be an outstanding treatment alternative. The closure of the space poses a considerable challenge for orthodontists due to the prolonged duration of treatment, patient discomfort, tissue tolerance, and stability. The primary objective is to move the teeth without any inclination, thereby making vertical control a significant concern. The broader surface area of the roots of the lower permanent molars impedes the closure of spaces and often results in undesirable tooth movement, such as the lingual tipping of the incisors. Hence, in this type of treatment, it is crucial to have proper control over the segment of the dental arch that serves as an anchor for the space closure. The movement of the lower permanent molars is even more intricate when compared to the movement of the upper

permanent molars due to the mandible's thick cortical bone and limited trabecular bone. Additionally, the roots of the lower molars are wider in the buccal-lingual direction. Unilateral first molar extractions caused dental midline deviations in both arches, but this was more prominent in the mandibular arch. Unilateral first molar extraction during growth and development can result in remarkable skeletal asymmetry, especially in the lower third of face.<sup>24</sup>

### **Recomendations:**

- 1-Dental care is very important
- 2-Dental treatment and preservation of teeth, which must not be extracted.
- 3-Clinical checkup forever 6 months.
- 4-In next research must use widely range of age of sample.

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## معدل فقدان الأسنان الدائمة بين المرضى ومدى أثره على الخطة العلاجية في تقويم الأسنان.

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المستخلص:

**الأهداف:** تهدف هذه الدراسة إلى تقييم حالة الفم وفقدان الأسنان الدائمة لدى المرضى وتأثير فقدان الأسنان على علاج تقويم الأسنان. **طرق البحث:** تكونت عينة الدراسة من 368 فرداً حضروا على التوالي والذين استوفوا معايير الدراسة. يعتمد بشكل أساسي على الفحص السريري واستبيان المقابلة الشخصية الذي تم استيفاءه أثناء الفحص السريري على عدد المرضى الذين يراجعون عيادات الأسنان العامة لعلاج تقويم الأسنان في الأشهر الستة الأولى من (2023) من يناير إلى يونيو. **النتائج:** 368 مريضاً فقدوا 1650 سنناً. نسبة الإناث أعلى من الذكور في خلع الأسنان بنسبة 71% و 29% على التوالي. وكانت أعلى فئة عمرية في فقدان الأسنان هي 25-34 سنة بنسبة 41%، تليها الفئة العمرية 15-24 سنة بنسبة 21%. السبب الأكثر شيوعاً لفقدان الأسنان في جميع الفئات العمرية هو تسوس الأسنان بنسبة أعلى بلغت 41.1%. وأظهرت النتائج أن أعلى نسبة فقدان الأسنان في الفم كانت للرحى الأولى بنسبة 37% يليها الضرس الثالث بنسبة 21%. الاستنتاج: فقدان الضرس الدائم الأول له تأثير سلبي على زمن المعالجة التقويمية في حالات إغلاق الفراغ في القوس السني. يكون وقت العلاج أطول عندما يكون هناك المزيد من فقدان الأسنان وكذلك يسبب مشاكل عظمية على مستوى الفكين، وكذلك يسبب الإطباق السني الغير صحيح للفكين.