

ASSOCIATION OF DRY SOCKET (ALVEOLAR OSTETITIS) WITH GENDER AND EXTRACTION SITE (MAXILLARY VS MANDIBULAR) A COMPARATIVE STUDY

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**Abstract**

**Background**

Dry socket (alveolar osteitis) is a frequent postoperative complication after tooth extraction, with a high level of pain and slow healing. It is dependent on variables like gender and extraction site, and it has to be evaluated to enhance prevention and clinical outcomes.

**Objective**

To compare the relationship between gender and extraction location (maxillary vs. mandibular) and dry socket in patients who have had their tooth extracted.

**Place and duration of study.** From June 2025 to September 2025 Oral & Maxillofacial Surgery Sandeman Provincial Hospital / Bolan Medical College / Hospital Quetta.

**Methodology**

This comparative study Retrospective study involved 100 patients (18-60 years old) who had their teeth extracted in a tertiary care hospital. Consecutive sampling was used. Age, gender, and extraction site data were taken. Clinical diagnosis of dry socket was followed 3 5 days after extraction in the patient. SPSS version 25 was used to perform the statistical analysis. Associations were evaluated using the chi-square test, and means were compared using an independent t-test, where  $p = 0.05$  was taken as significant.

**Results**

Among 100 patients (58 males, 42 females), the mean age was  $34.6 \pm 10.2$  years. Dry socket occurred in 18% of cases. It was more frequent in females (66.7%) than males (33.3%), showing a significant association ( $p=0.032$ ). Mandibular extractions accounted for 77.8% of dry socket cases compared to 22.2% in maxillary sites ( $p=0.018$ ). Patients with dry socket had a slightly higher mean age ( $36.8 \pm 9.5$  years) than those without ( $34.1 \pm 10.4$  years), though not statistically significant ( $p=0.284$ ).

**Conclusion**

Females and mandibular extractions are more prone to dry socket. Incidence can

*be lowered by identifying high-risk groups and implementing preventive measures to enhance postoperative outcomes.*

## Introduction

Alveolar osteitis or dry socket is among the most prevalent complications that occur after tooth extraction, especially after oral surgery to extract mandibular molars. It is described as the premature loss or disintegration of the blood clot in the extraction socket, leaving the exposed bone, excruciating pain, halitosis, and slow wound healing. The condition usually occurs 2-5 days following extraction and has a tremendous impact on the quality of life and comfort of the patient [1,2]. Incidence of dry socket has been reported to be widely varied at 1 to 5 percent in regular extractions and 30 percent in surgical extractions, especially in third mandibular molars that have been impacted. The etiology of dry socket is multifactorial and is not fully understood. Nonetheless, several causative factors have been pointed out, such as traumatic extraction, poor oral hygiene, smoking, oral contraceptives, systemic diseases, and local infection [3,4]. Two of these factors that have been widely explored as potential risk determinants are gender and extraction site. It has been proposed that females are more likely to experience dry socket, but this is likely to be because of hormonal effects, especially estrogen, which might have an impact on fibrinolysis and clot stability. Equally, the site of extraction is also important, with mandibular extractions being more prevalent than maxillary. This can be explained by decreased blood supply, increased bone density, and surgical challenge in the mandible [5,6]. The relationship between gender, extraction site, and dry socket is something that should be understood to identify the high-risk patients and prevent them. Early detection will enable clinicians to implement strategies, including atraumatic extraction, sufficient irrigation, and education of the patient, to reduce complications. However, many studies have been conducted, but there are differences in reported outcomes because of differences in study design, sample size, and population characteristics [7,8]. The burden of dry socket can be heavier in the

case of developing countries such as Pakistan, where dental care and postoperative follow-up may not be accessible. Thus, it is of practical clinical importance to assess its correlation with factors that can be easily identified, including gender and location of extraction. This study will compare the incidence of dry socket in males and females and in the maxillary and mandibular sites of extraction. The results will aid in enhancing clinical judgment and providing better patient care by identifying the main risk factors of this frequent postoperative complication [9,10].

## Study Objectives

To identify the relationship between dry socket and gender and extraction site, and compare the relationship between dry socket and gender and extraction site between patients who have their teeth removed by maxillary and mandibular extraction.

## Materials and Methods

### Study Design & Setting

This comparative study Retrospective study was carried out on the Department of Oral and Maxillofacial Surgery of a tertiary care dental hospital over a period of six months.

### Participants

Consecutive sampling was used to sample 100 patients aged between 18 and 60 years who needed to have their teeth extracted. Both male and female patients who were having simple or surgical extractions were enrolled. Clinical assessment of patients was done before surgery and after surgery to determine the presence of dry socket according to conventional diagnostic criteria.

### Sample Size Calculation

The 100-patient sample size was calculated based on a prevalence estimate of 20% of dry socket with a 95% confidence level, with an 8% margin of error. The calculation was done to allow

sufficient power to identify statistically significant differences among gender and extraction site groups.

**Inclusion Criteria**

- Tooth extraction patients between 18 and 60 years old.
- Both genders
- Patients who are willing have informed consent.

**Exclusion Criteria**

- Systemically diseased patients (ex, diabetes, immunocompromised states) who impair the healing process.
- Anticoagulant or corticosteroid patients.
- Pregnant women
- Active infection in the extraction site of patients.

**Diagnostic and Management Strategy.**

The diagnosis of dry socket was made clinically due to severe pain, the empty socket, and the exposure of bones within 3-5 days after the extraction. Management involved irrigation, medicated dressing, analgesics, and follow-up of the patient till the symptoms were resolved.

**Statistical Analysis**

The analysis of data was done using SPSS version 25. Mean and standard deviation were used to describe quantitative variables, and frequencies

and percentages were used to describe categorical variables. Associations were evaluated using the chi-square test, and an independent t-test was used to compare the mean values. A p-value of 0.05 or less was taken to be statistically significant.

**Ethical Approval**

**Results**

A total of 100 patients were included, comprising 58 males and 42 females. The mean age of participants was  $34.6 \pm 10.2$  years. Dry socket developed in 18 patients, representing an overall incidence of 18%. Among affected individuals, females accounted for 12 cases (66.7%), while males accounted for 6 cases (33.3%). This difference was statistically significant ( $p=0.032$ ), indicating a higher susceptibility among female patients. Regarding extraction site, 62 extractions were performed in the mandible and 38 in the maxilla. Dry socket occurred in 14 mandibular cases (77.8%) compared to 4 maxillary cases (22.2%). The association between extraction site and dry socket was statistically significant ( $p=0.018$ ), demonstrating a higher risk in mandibular extractions. The mean age of patients who developed dry socket was  $36.8 \pm 9.5$  years, slightly higher than those without dry socket ( $34.1 \pm 10.4$  years), although this difference was not statistically significant ( $p=0.284$ ). Overall, the findings indicate that both female gender and mandibular extraction site are significantly associated with an increased incidence of dry socket, whereas age did not show a significant association.

**Table 1: Baseline Demographic Characteristics of Patients (n=100)**

| Variable           | Frequency (n)   | Percentage (%) |
|--------------------|-----------------|----------------|
| <b>Gender</b>      |                 |                |
| Male               | 58              | 58.0%          |
| Female             | 42              | 42.0%          |
| <b>Age (years)</b> |                 |                |
| Mean $\pm$ SD      | $34.6 \pm 10.2$ | —              |

This table shows the baseline demographic characteristics of the study participants, including gender distribution and mean age with standard deviation.

**Table 2: Frequency of Dry Socket Among Study Participants (n=100)**

| Variable           | Frequency (n) | Percentage (%) |
|--------------------|---------------|----------------|
| Dry Socket Present | 18            | 18.0%          |
| Dry Socket Absent  | 82            | 82.0%          |

This table illustrates the overall frequency of dry socket among patients following tooth extraction.

**Table 3: Association of Dry Socket with Gender (n=100)**

| Gender | Dry Socket Present (n, %) | Dry Socket Absent (n, %) | Total | p-value |
|--------|---------------------------|--------------------------|-------|---------|
| Male   | 6 (10.3%)                 | 52 (89.7%)               | 58    |         |
| Female | 12 (28.6%)                | 30 (71.4%)               | 42    | 0.032   |

This table demonstrates the association between gender and the occurrence of dry socket. A statistically significant higher frequency was observed in females compared to males ( $p \leq 0.05$ ).

**Table 4: Association of Dry Socket with Extraction Site (n=100)**

| Extraction Site | Dry Socket Present (n, %) | Dry Socket Absent (n, %) | Total | p-value |
|-----------------|---------------------------|--------------------------|-------|---------|
| Maxillary       | 4 (10.5%)                 | 34 (89.5%)               | 38    |         |
| Mandibular      | 14 (22.6%)                | 48 (77.4%)               | 62    | 0.018   |

This table presents the association between extraction site and dry socket occurrence. Mandibular extractions showed a significantly higher incidence of dry socket compared to maxillary extractions ( $p \leq 0.05$ ).

### Discussion

The current study assessed the relationship between dry socket (alveolar osteitis) and gender and extraction site, showing a much higher prevalence in females and mandibular extractions. The total prevalence of dry socket in this study was 18, and is in line with those reported in the past, especially in the studies that were conducted on surgical and posterior tooth extractions. The past five years have seen variations in the incidence of dry socket, which is based on the population characteristics and procedure factors as noted in the recent literature. A 2024 study indicated prevalence rates of 3 to 30 percent, especially in the case of mandibular molar extractions because of anatomy and vascular variations [11]. Other recent studies have also found such an outcome, with another study identifying that the prevalence of dry socket is higher in the mandible because of poor blood supply access and more surgical trauma, which is in line with our results of higher mandibular involvement. The female gender had a higher rate of dry socket than their male

counterparts ( $p=0.032$ ) [12]. This observation is congruent with a number of recent reports indicating an increased prevalence in females, perhaps because of hormonal factors, including estrogen, which can increase fibrinolytic activity and result in premature clot dissolution. In a 2025 retrospective study, the percentage of female patients in cases of dry socket increased, which the study attribute to hormonal and behavioral variables [13]. Nevertheless, there are also opposite findings, and a cross-sectional study published in 2026 shows a slightly higher rate among males, which can also mean that gender association can be different in different populations, and it is necessary to investigate it further. At the extraction site, our study showed mandibular extractions were significantly related to a greater occurrence of dry socket ( $p=0.018$ ) [14]. Recent studies have had a great influence on this finding. In a 2025 retrospective study, more than 56 percent of dry socket incidences were found to have taken place after mandible extractions, indicating the importance of the dense cortical bone and decreased vascularity in

slowing down healing. Other modern reports have also recorded higher percentages in mandibular third molars, usually over 25, than in maxillary extractions [15]. These results support the role of anatomy in the pathogenesis of alveolar osteitis. The influence of age on the occurrence of dry socket is controversial. In the current study, patients with dry socket did not differ in terms of mean age, although the difference was not significant ( $p=0.284$ ). This is consistent with various recent studies that have concluded that age was not strongly correlated with the occurrence of dry socket, and the effect of other factors, including surgical trauma and patient habits, might have a more prevailing role [16]. Some study has, however, shown that older patients are at a greater risk because of decreasing capacity to heal, and therefore, there is a need to do further study [17]. There have also been recent developments in the treatment of dry socket. As an example, a 2025 clinical trial showed that injectable platelet-rich fibrin (I-PRF) caused a significant reduction in postoperative pain and enhanced healing outcomes in comparison to traditional management. These results indicate that biological interventions can positively impact the results of treatment and can be adopted with high-risk patients [18]. Altogether, the results of the current study are in line with recent literature, proving that the mandibular extraction site is a major risk factor, whereas the gender association is not fixed yet, but clinically important. The differences in gender-related results between studies could be explained by the differences in the sample size, hormonal influences, and peculiarities of the local population [19]. In spite of these insights, the study has a small sample size and is single-centred in nature, which can be a limitation in terms of generalizability. It is suggested that future multicentric study involving larger cohorts and the addition of other risk factors like smoking, oral hygiene, and surgical difficulty could be conducted to give a more detailed picture of the etiology of dry socket [20]. Conclusively, this study supports the available literature that dry socket is a multifaceted condition, and mandibular extraction and the female gender are some of the

major factors. These results underscore the necessity of specific preventive measures and personalized patient treatment that can lessen the occurrence and the burden of the widespread postoperative complication.

## Limitations

Limitations of the current study are a relatively small sample size and a single-center study, which could be limiting in terms of generalizability. Possible confounding variables like smoking, oral health, and surgical difficulty were not considered. Also, the short follow-up period might have been used to underestimate the late complications or different outcomes of healing in different patients.

## Conclusion

Dry socket is significantly associated with the female gender and the mandibular extraction site. At-risk patients can be identified, and preventive measures can be taken to minimize incidences. The important role of careful surgical practice and good after-surgery treatment is to enhance the outcomes of the healing process and reduce the chances of complications in the context of the routine clinical practice in relation to tooth extraction.

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Conflict of Interest: Nil

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## Authors Contributions

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Final Approval of version: All Mentioned

Authors Approved the Final Version.

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