Original Article

The Incidence of Dry Socket Following Non-Surgical Extraction of Mandibular Molars in A Teaching Hospital

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ABSTRACT

Objective: This study aims to determine the incidence of dry socket following non-surgical extraction of mandibular molars in a hospital setting.
Study Design: Cross-sectional study
Place and Duration of Study: This study was conducted at the Oral and Maxillofacial Surgery / Community and Preventive Dentistry, Azra Naheed Dental College, The Superior University, Lahore from March 2024 to June 2024.
Methods: A sample of 120 patients who underwent mandibular molar extraction was assessed for the development of a dry socket over a one-week postoperative period. Nominal variables were analyzed using the Chi-Square Test.
Results: The incidence rate of dry socket was found to be 12.5 %. Risk factors such as poor oral hygiene, and lack of post-operative care were positively associated with dry socket development. Treatment: Treatment involved debridement of the extraction site and placing an obtundent dressing containing eugenol, with 10.8% of patients experiencing symptom relief within 48 hours.
Conclusion: The study concludes that while dry socket remains a significant postoperative issue, proper patient education on postoperative care can reduce its incidence and improve patient outcomes.
Key Words: Tooth extraction, Molars, Dry socket, Alveolar osteitis, Eugenol

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INTRODUCTION

Tooth extraction, one of the most common dental procedures, is performed for various reasons such as severe decay, any kind of periodontal disease or impaction. While the procedure is generally straightforward, it can sometimes lead to complications, one of the most notable being alveolar osteitis or dry socket. Dry socket occurs when the blood clot that formed in the socket post-extraction is prematurely dislodged, exposing the underlying bone. This dislodgement of the blood clot hinders the healing process and causes severe pain to the patient, often described as a throbbing sensation that aggravates to the ear, eye or temple.

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In addition to this, patients may also experience bad breath, bad taste, or tenderness around the extraction site[(1).] The occurrence of dry socket varies by tooth type and location[(2).] Generally, about 94.92% of mandibular first molars and 90.17% of mandibular second molars have two distinct roots[(3).] The incidence of dry socket varies depending on the tooth and its location. It is approximately 21.11% for mandibular first molars, 14.4% for second molars, and 25.5% for third molars[(2).] Dry sockets more commonly occur in the mandible than the maxilla, due to the relatively poor blood supply of the mandible and also because food debris tends to gather in lower sockets more readily than upper one[(4).] Several factors increase the risk of developing dry socket, including improper tissue manipulation and heat produced during bone removal by rotary instruments during extraction, and the use of oral contraceptives, which can interfere with the normal blood clotting process due to elevated estrogen levels. Inadequate postoperative care, such as failing to follow instructions regarding salt water rinsing , and any pre-existing oral infections like periodontitis or pericoronitis also contribute to the risk[(5).] The exact etiology of dry socket is not well known but It has been suggested that the increased local fibrinolytic activity appears to be the main etiological factor in developing dry socket. This increase in fibrinolytic activity can be triggered by direct trauma to the alveolar bone cells or by indirect

activators secreted by bacteria, leading to the premature breakdown of the blood clot[6].

Treatment for dry socket focuses mainly on pain management and promoting healing. Dentists usually begin by cleaning the socket from any food debris, followed by copious irrigation with saline[7]. An obtundent dressing, containing eugenol, is then placed within the socket to lower pain, protect the exposed bone and contain the blood clot within the socket. This dressing is replaced every 24 to 48 hours depending on the patients' symptoms. Patients are advised to strictly follow postoperative care. More severe cases might require prescription of analgesics and/ or antibiotics if infection is present[8]. Dry socket is generally a manageable condition, and with proper care, most patients recover without long-term complications. The primary objective of this study is to determine the incidence of dry socket following lower molar extraction in a hospital setting. By examining a sample size of 120 patients, this research aims to identify the prevalence of this complication and correlate it with various risk factors.

METHODS

This Cross-sectional study aimed to determine the incidence of dry sockets in lower molar extraction. Ethical approval for the study was obtained from Azra Naheed Dental College, The Superior University, Lahore. Informed Consent was obtained from each participant before they were included in the study.

-Patient Selection

Inclusion Criteria:

- Indication of tooth removal
  - Non-restorable tooth
  - Irreversible pulpitis
  - Acute apical abscess
  - Non-restorable fully erupted 3rd molars
- Age: Individuals between 18 to 55 years old
- Patients scheduled for atraumatic extraction of first, second, and third molar

Exclusion criteria:

- Patients with comorbidities
  - Diabetes
  - Hypertension
  - Cardiac disorders
  - Asthma
  - Bleeding disorders
- Broken Dental Roots
- Others
  - Smokers
  - Pregnant or lactating women
  - Patients require surgical extraction of molar

Sample Collection: Data collection began after obtaining informed consent from patients who met the inclusion criteria. A single operator performed the extraction on patients aged 18 to 55, including both male and female participants.

Using an aseptic technique, a 27-gauge long dental needle was used for the inferior alveolar, lingual, and long buccal nerve blocks. The anesthetic administered was 2% lignocaine with adrenaline using standard dental cartridge of 1.8ml, with 1.3ml used for the inferior alveolar nerve block and lingual nerve block, and 0.5ml for the long buccal nerve block. An atraumatic extraction was performed using lower molar extraction forceps. The socket was thoroughly cleaned with 10cc normal saline and then packed with wet sterile gauze.

Post-Operative: Patients were advised to follow specific post-operative care instructions after the extraction. They were instructed to keep the gauze in place for 45 minutes, avoid rigorous spitting for 48 hours, and refrain from using a straw during this period. Additionally, they were advised to avoid hot food or liquids for 24 to 48 hours. For post-operative medications, patients were prescribed antibiotics, including (Tab Co-amoxiclav 625mg BID) and (Tab Metronidazole 400mg TDS) for 3 days and analgesics (Tab Diclofenac Sodium 100mg BID) were also prescribed for 3 days.

Follow-up: Patients were assessed on the 3rd and 4th days post extraction for signs and symptoms of dry socket, such as severe pain, the absence of a blood clot, or exposed bone in the socket. All findings were documented in a structured questionnaire.

Data Analysis: Statistical analysis was conducted using SPSS software. Qualitative variables, such as the gender, blood clot evidence and exposed bone were analyzed using the Chi-Square test and presented as percentages and frequencies. Quantitative variable such as pain were evaluated. Mean and standard deviation were calculated for patient age. The incidence rate of dry socket was determined by dividing the number of diagnosed cases by the total number of extractions.

RESULTS

This study included a total of 120 patients undergoing extractions, of which 55(45.83%) were males and 65 (54.16%) were females. Age range was 18-55 years and means (SD) was 35.6 (9.8) years (Table 1).

Table No. 1: Demographic characteristics

Category	Frequency (n)	Percentage
Total Patients	120	100%
Males	55	45.83%
Females	65	54.16%
Age	Minimum	Maximum
	18	55
	Mean	SD
	35.58	9.848

The presenting complaints during follow-up were as follows: mild pain in 1 patient (0.83%), moderate pain in 3 patients (2.5%), severe pain in 15 patients (12.5%), and no pain in 101 patients (84.2%)(Figure no 1).

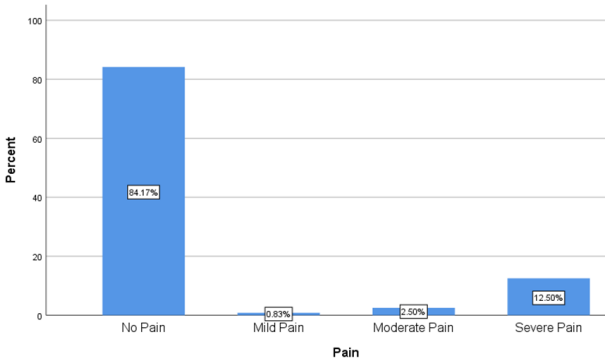

Figure No. 1: Category of pain with percentage.

Table No. 2: Swelling or redness

		Frequency	Percentage
Valid	Yes	105	87.5%
	No	15	12.5%
	Total	120	100.0%

Table No. 3: Evidence of a blood clot at the extraction site

		Frequency	Percentage
Valid	Yes	21	17.5%
	No	99	82.5%
	Total	120	100.0%

Table No. 4: Stratification of dry socket with age

Age	Dry Socket	Frequency	Percentage
15-35 Years	Yes	07	5.83%
	No	54	45%
36-55Years	Yes	08	6.6%
	No	51	42.5%

Dry socket was found in 15(12.5%) of the patients(Tablre no 6). The distribution of dry socket cases was slightly higher in females (13 out of 65, 20%) compared to males (2 out of 55, 3.6%)(Table no 5).

Table No. 5: Stratification of dry socket with gender

Gender	Dry Socket	Frequency	Percentage
Male	Yes	03	2.5%
	No	52	43.33%
Female	Yes	12	10%
	No	53	44.16%

Table No. 6: Dry Socket (Visible bone at the extraction site)

		Frequency	Percentage
Valid	Yes	15	12.5%
	No	105	87.5%
	Total	120	100.0%

The patient presented 3 to 5 days after tooth extraction with swelling or redness in 21 (17.5%) cases (Table 2), and with the absence of a blood clot at the extraction site in 15(12.5%) cases(Table no 3).

DISCUSSION

This study aims to evaluate the incidence of dry socket following non-surgical extraction of mandibular molars in a hospital setting. The comprehensive analysis identifies risk factors, highlights experiences of postoperative pain, and offers valuable insights for oral surgery clinicians and researchers[9].

Dry Socket is a common complication after mandibular molar extractions typically presented with pain on the third or fourth day after extraction. On examination, the hallmark finding is the exposure of the bony socket with almost complete loss of blood clot. This condition causes dull, aching pain, throbbing in nature and radiating to ears[10].

The study revealed an incidence rate of 12.8%, consistent with the existing literature indicating that dry socket is a common complication following mandibular molar extractions ranging from 5% to 30%, with peak occurrences in the first postoperative week. This value is lower than the values reported in a study in Iran where the frequency of alveolar osteitis formation post removal of mandibular tooth was 23.45%[11]. The results highlight the multifactorial etiology of dry socket, with patient-specific risk factors such as poor oral hygiene, inadequate postoperative care, and physiological differences playing a crucial role[10,12].

Female patients exhibited a higher prevalence (20%) compared to males (3.6%). This disparity aligns with earlier studies attributing the higher incidence in females to hormonal factors, such as elevated estrogen levels due to oral contraceptive use, which impair clot stability by increasing fibrinolytic activity[13].

Age stratification further revealed a slightly higher incidence in the 36–55-year age group (6.6%) compared to the 15–35-year group (5.83%). This may be linked to age-related changes in healing capacity and systemic health. This observation aligns with prior research suggesting that older patients are more prone to Alveolar osteitis[14].

The association between the absence of a blood clot and dry socket was a significant marker, as 12.5% of patients exhibited this symptom. Factors such as aggressive rinsing, spitting, and trauma during extraction can disrupt clot formation, leading to the condition[15].

Pain was the most prominent symptom during follow-up visits, with severe pain reported in 12.5% of patients, moderate pain in 2.5%, and mild pain in 0.83%. Effective pain management is crucial not only for patient comfort but also for promoting optimal wound healing[16]. The gradual decrease in pain scores over time suggests a positive healing trajectory, with patients experiencing a reduction in discomfort as the extraction site undergoes expected reparative processes.

This finding is consistent with the existing literature on postoperative pain following molar extractions[17,18]. The intense pain in individuals with dry socket may stem from elevated TNF-α levels, a pro-inflammatory cytokine that delays healing, reduces bone formation, and heightens pain perception[19]. Other notable findings include swelling and redness, observed in 17.5% of patients. These symptoms are indicative of localized inflammation, possibly exacerbated by poor oral hygiene or residual debris in the socket. Removal of debris is poorer in lower sockets than upper teeth and this leads to increased bacterial load.

The management strategy employed, involving obtundent dressings with eugenol, proved effective, as 10.8% of affected patients experienced symptom relief within 48 hours. Additionally, thorough irrigation prior to dressing placement was integral to treatment success[20,21].

The study underscores the critical role of patient education in mitigating the risk of dry socket. Despite providing postoperative instructions, the relatively high incidence indicates a need for improved communication and patient compliance. Visual aids, follow-up reminders, and verbal reinforcement of care instructions may enhance adherence and reduce complications.

CONCLUSION

To reduce the risk of dry socket, gentle manipulation of oral tissues should be ensured and the extraction site should be properly cleaned.

The treatment for dry socket involves irrigating the exposed bony socket and placing a medicated dressing which contains eugenol, which obtunds the pain from the bone tissue; benzocaine a topical anesthetic agent; and a carrying vehicle such as balsam of Peru[10].

Author's Contribution:

Concept & Design or acquisition of analysis or interpretation of data:	Shahzada Faiz Ahmad Khan, Affan Jabbar, Muhammad Asif Shahzad
Drafting or Revising Critically:	Zubair Ahmad Khan, Ayma Syed, Iram Pervaiz
Final Approval of version:	All the above authors
Agreement to accountable for all aspects of work:	All the above authors

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