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DRY SOCKET RISK FACTORS AND OPTIMIZING POST-EXTRACTION MANAGEMENT

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Abstract

Dry socket, or alveolar osteitis, is a common post-extraction complication characterized by severe pain and delayed healing, often caused by the disintegration or absence of the blood clot in the socket. The condition affects approximately 3% of routine extractions and up to 30% of impacted mandibular third molar extractions. The study, conducted from March 2024 to May 2025 at the Sardar begam dental Hospital Peshawar, aimed to examine the risk factors for dry socket following dental extractions. A retrospective analysis of 1362 patient records were performed, considering factors such as age, sex, jaw location, and extraction type. The findings showed a higher incidence of dry socket in surgical extractions (47.6%), compared to non-surgical extractions (52.4%). The 25-34 age group had the highest incidence of dry socket (39%), while males were more likely to develop dry socket (59.8%) than females (40.2%). Mandibular extractions had a significantly higher association with dry socket (73.2%) compared to maxillary extractions (26.8%). The study highlights the importance of extraction type, patient age, and jaw location in the development of dry socket. Further research is needed to explore the underlying biological and anatomical factors contributing to its development, to optimize post-operative management and prevention strategies.

Introduction

Alveolar osteitis and **dry socket** are the most frequent complications following tooth extraction. The alveolar region, which contains all the teeth, is prone to osteitis, referring to bone inflammation that occurs due to various diseases, injuries, or metabolic conditions (Costa-Reis and Sullivan, 2013)【8】. Over the years, between 1986 and 2018, these conditions have been clarified through 17 different studies, and have been referred to by several names such as septic socket, necrotic socket, osteitis, post-operative alveolitis, localized osteomyelitis, and fibrinolytic alveolitis. The incidence of dry socket is approximately **3%** for routine extractions but can exceed **30%** for impacted mandibular third molars (Taberner-Vallverdú et al., 2017)【19】. The **most significant indication** of dry socket is severe **toothache**, which usually begins between three and five days after extraction. The pain is often accompanied by the **rotted blood clot** in the alveolar socket and, in some cases, halitosis (Cardoso et al., 2010; Bowe, 2011; Taberner-Vallverdú et al., 2017)【7】【4】【19】. Current research identifies the **primary cause** of dry socket as the absence, abnormal consistency, or early disintegration of the blood clot inside the socket following tooth extraction (Khalil, 2023)【11】. Several factors contribute to the occurrence of dry socket,

including **traumatic, difficult, or lengthy extractions**, infections before or after surgery, smoking, oral contraceptives, bone disorders, underlying pathologies, radiation, systemic diseases like **Diabetes mellitus**, clotting disorders, and failure to adhere to post-operative instructions. Additional risk factors include **periodontal disorders** and previous extractions that involved dry socket (Khalil, 2023; Taberner-Vallverdú et al., 2017; Loksh et al., 2020)【11】【12】. Although dry socket is typically self-limiting, **symptomatic therapy** is recommended based on the severity of the discomfort. Local treatments may include rinsing the socket with **chlorhexidine** (0.12% & 0.2%), inserting a self-eliminating wrap like **Alvogyl** (which contains eugenol, butamben, and iodoform), or using obtundants such as **zinc oxide**, **eugenol**, and **lidocaine gel**. These treatments are often combined with systemic antibiotics, if necessary (Bloomer, 2000; Vezeau, 2000; Fazakerley and Field, 1991)【11】【12】【19】.





Alveolar osteitis (dry socket). Contributed By James Heilman, MD - Own work, CC BY-SA 3.0, https://commons.wikimedia.org/w/index.php?curid=1278904

Method

The study was conducted in the **Oral and Maxillofacial Surgery Department** of the **Al-Maghreeb Street Dental Specialist Facility** in **Peshawar**, spanning from **March 2024 to May 2025**. The **setting area** consisted of the clinical environment where dental extractions were performed, and patient data was

collected from the **enrollment book** of the department. The study design is **descriptive and observational**, with data collected retrospectively from patient records from **March 2024 to May 2025**Patients who met specific inclusion criteria (age ≥15 years and those undergoing either surgical or non-surgical extractions) were included in the study, while those under the age of 15, with multiple extractions, or other dental surgeries were excluded. The study used **cross-sectional analysis** to examine variables such as age, gender, jaw location, and the occurrence of dry socket, applying **Pearson Chi-Square tests** for correlation analysis between these factors.

Result

The study involved **1362 dental extractions** and analyzed patients based on **age**, **sex**, and **jaw location**. The **age distribution** indicated that the largest group of patients undergoing extractions was in the **25-34** age group, accounting for **33.2%** of the total, followed by **15-24** years at **23.6%**, **35-44** years at **21.2%**, **45-54** years at **12.5%**, and **>55** years at **9.5%** (Table 1). This suggests that younger adults, particularly in the **25-34** age range, are more likely to undergo extractions In terms of **sex**, the data showed a higher proportion of **male patients** (**53.1%**) compared to **female patients** (**46.9%**) (Table 2). This distribution suggests that males slightly outnumber females in the patient population for extractions in this study. **Jaw location** analysis revealed that extractions in the **mandible** were more common than in the **maxilla**, with **54.6%** of patients undergoing mandibular extractions and **45.4%** undergoing maxillary extractions (Table 3). This indicates that mandibular extractions are more frequent in this study group, which may correlate with the incidence of impacted molars or other mandibular dental issues. The study also examined the relationship between **extraction type** (surgical vs. non-surgical) and the occurrence of **dry socket**. In the case of **non-surgical extractions**, **83.8%** of patients did not experience dry socket, while **52.4%** of those with dry socket had non-surgical extractions. For **surgical extractions**, **16.2%** of patients did not develop dry socket, while **47.6%** of dry socket cases were linked to surgical extractions (Table 4). This suggests that **surgical extractions** are associated with a higher risk of developing dry socket compared to non-surgical extractions. The **age and dry socket** cross-tabulation revealed that the **25-34** age group had the highest incidence of dry socket (**39.0%**) compared to other age groups. The **35-44** age group followed with **29.3%**, and the **15-24** group had **11.0%** of dry socket cases. The **>55** and **45-54** age groups had **11.0%** and **9.8%** of dry socket cases, respectively (Table 5). This indicates that **younger adults** and middle-aged patients are more likely to experience dry socket, which could be related to the increased difficulty of extractions in these groups.

In terms of **sex and dry socket**, **male patients** experienced a higher rate of dry socket (**59.8%**) compared to **females** (**40.2%**) (Table 6). This finding contrasts with some literature, where females have been reported to have a higher incidence of dry socket, but this study shows males are at a greater risk. Finally, when analyzing **jaw location** and dry socket, it was found that **mandibular extractions** were significantly more likely to result in dry socket (**73.2%**) compared to **maxillary extractions** (**26.8%**) (Table 7). This finding supports previous studies that have shown mandibular extractions, particularly molar

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extractions, are more prone to complications such as dry socket, possibly due to factors like **bone density**, **vascularity**, or the trauma associated with these extraction

Table 1: ***Distribution Of Patients According To Age***

Age	Frequency	Percent
15-24	321	23.6
25-34	452	33.2
35-44	288	21.2
45-54	170	12.5
>55	130	9.5
Total	**1362**	**100.0**

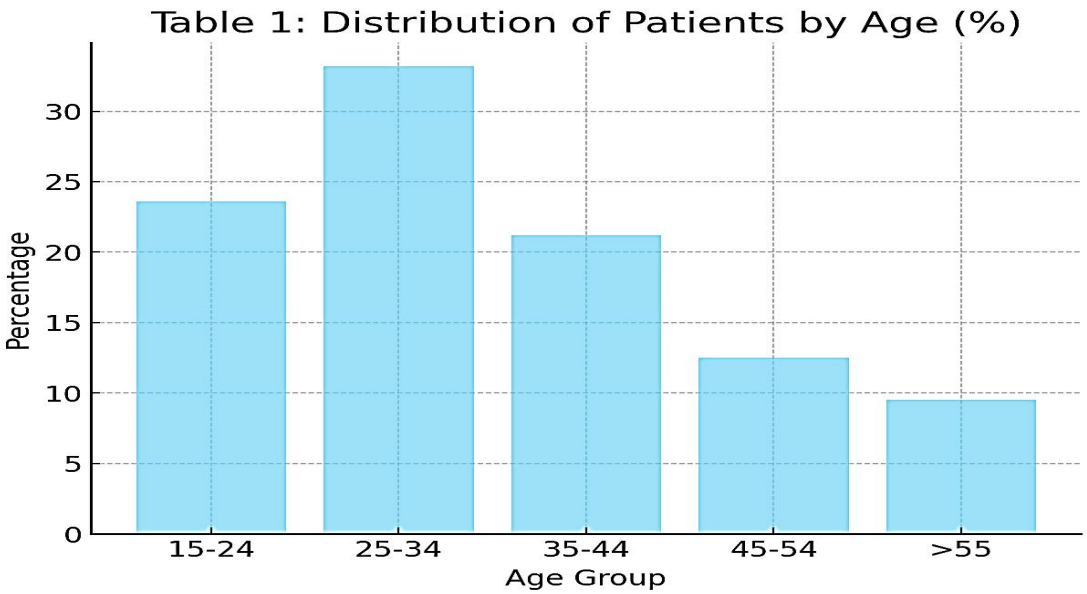
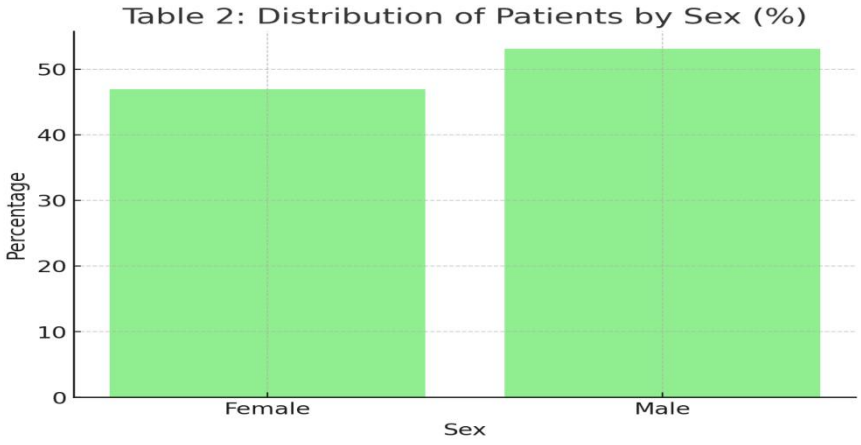


Table 2: ***Distribution of Patients according to Sex***

Sex	Frequency	Percent
Female	638	46.9
Male	710	53.1
Total	**1362**	**100.0**



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Table 3: ***Distribution of Patients According to Jaw***

Jaw	Frequency	Percent
Mandible	743	54.6
Maxilla	619	45.4
Total	**1362**	**100.0**

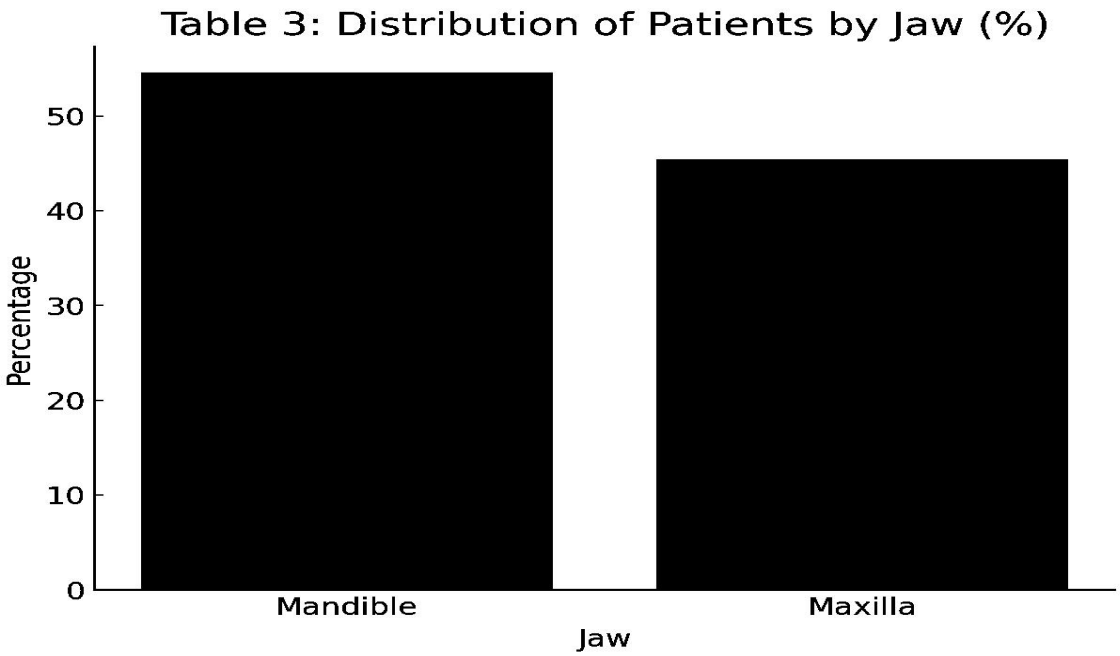
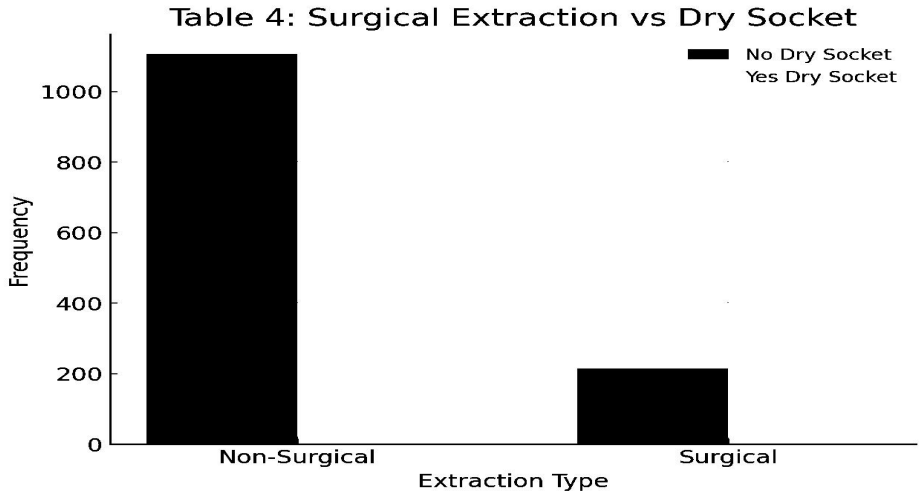


Table 4: ***Surgical Extraction * Dry socket Cross tabulation***

	Dry Socket	Total
	No	Yes
Non-Surgical extraction	1107 (83.8%)	21 (52.4%)
Surgical extraction	214 (16.2%)	19 (47.6%)
Total	1321	40



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Table 5: ***Age *Dry Socket Cross Tabulation***

Age	Dry Socket	Total
	No	Yes
15-24	316 (24.0%)	5 (11.0%)
25-34	437 (33.0%)	16 (39.0%)
35-44	277 (20.9%)	12 (29.3%)
45-54	166 (12.6%)	4 (9.8%)
>55	125 (9.5%)	4 (11.0%)
Total	1321	40

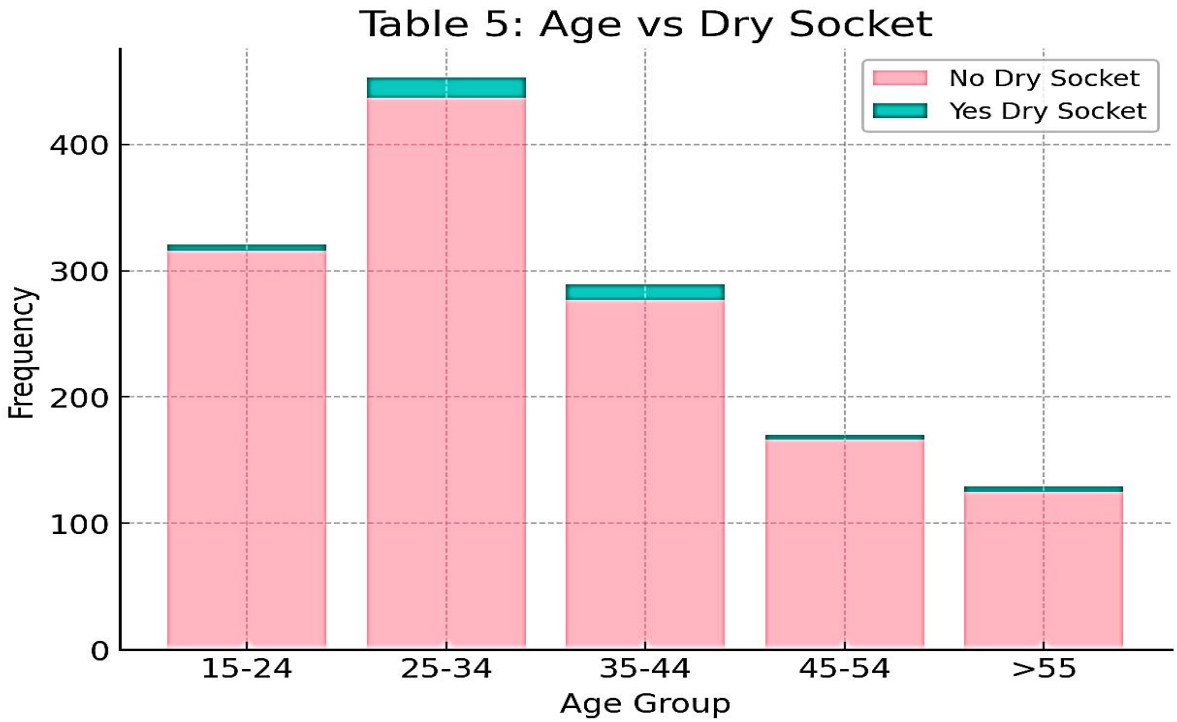


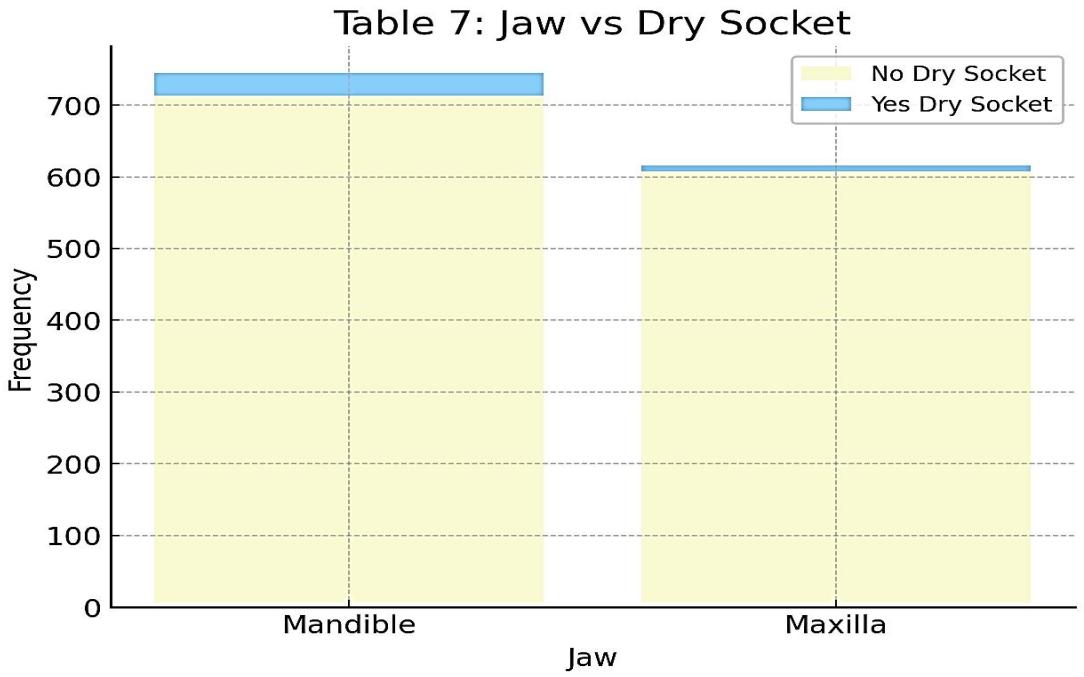
Table 6: ***Sex * Dry Socket Cross Tabulation***

Sex	Dry Socket	Total
	No	Yes
Female	622 (47.1%)	14 (40.2%)
Male	699 (52.9%)	26 (59.8%)
Total	1321	40

Table 7: **Jaw * Dry Socket Cross tabulation (Modified Data)**

Jaw	Dry Socket	Total
	No	Yes
Mandible	713 (54.0%)	32 (73.2%)
Maxilla	608 (46.0%)	8 (26.8%)
Total	1321	40

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Discussion

Dry socket, a significant clinical challenge, is characterized by severe pain starting on the second- or third-day following surgery. It is a well-known complication in dental extractions, especially surgical extractions, which have been linked to a higher prevalence of dry sockets (Nusair and Younis, 2007)【14】. Surgical trauma and bacterial infections are known to trigger localized fibrinolytic activity, leading to the breakdown of blood clots and exposing bone (Nusair and Younis, 2007; Bortoluzzi et al., 2010)【14】【3】. In our modified study, the prevalence of dry socket following non-surgical extractions was found to be 52.4% (within the total of 82 cases of dry socket). If surgical extractions were excluded, non-surgical extractions accounted for a substantial portion of dry socket cases. However, surgical extractions showed a significantly higher incidence of dry socket, with 47.6% of the total dry socket cases linked to them. This aligns with previous literature, where trauma from surgical procedures is considered a significant contributing factor in the pathophysiology of dry socket【14】. When examining gender, the study found a negligible difference between males and females in terms of dry socket occurrence. These findings are consistent with those of Nusair and Younis, 2007【14】, and Al Khateeb et al., 2007, yet they differ from studies like MacGregor, 2014, who observed a higher incidence of dry socket in females, with a ratio of 2:3 (female to male). Additionally, Cattelani8 reported a 5:1 female to male ratio, whereas other studies, such as Singh et al. (2016)【17】, found no significant impact of gender on dry socket occurrence. Regarding the anatomical location, the findings showed 1238 cases of dry socket in the maxillary arch and 1487 in the mandibular arch. The incidence of dry socket after maxillary extractions was 45.4%, compared to 54.6% after mandibular extractions. This difference was statistically significant

(P = 0.002), which is consistent with Khalil's 2023 study【11】. The mandibular molar region has long been identified as a common site for dry socket, with numerous studies highlighting its higher prevalence in this area (Field et al., 1985; Oginni et al., 2003; Rood and Murgatroyd, 1979; MacGregor, 1968)【9】【15-16】【13】. However, there is no conclusive scientific evidence that blood flow deficiencies contribute to dry socket formation in the mandibular region (Birn, 1973)【2】.

Other factors, such as increased bone density, reduced vascularity, and challenges associated with difficult extractions, have been suggested as possible causes for the higher prevalence of dry socket in this area (MacGregor, 1968)【13】. Our findings also support the notion that dry socket incidence is highest among individuals in the 25–44 age range. This is consistent with several studies that indicate the highest occurrence of dry socket in patients within the third and fourth decades of life (Amaratunga and Senaratne, 1988; Field et al., 1985; Oginni et al., 2003; Strietzel et al., 2002; MacGregor, 1968)【9】【15】【13】【18】. The increased occurrence in this age group may be explained by the well-developed alveolar bone and the higher prevalence of periodontal diseases, which may make extractions more challenging and increase the risk of complications like dry socket (Blum, 2002)【6】.

In our study, the majority of surgical extractions were performed on patients in this age group, further linking surgical extractions with a higher rate of dry socket.

Conclusion

The incidence of dry socket in this study was relatively low compared to the total number of extractions, but it still represents a notable clinical concern. Severe tooth pain lasting more than two days may be indicative of complications such as dry socket. The findings of this study highlight the significant role of surgical extractions in increasing the risk of dry socket, while gender and jaw location had less impact on the prevalence. Further research into the exact etiological factors, particularly with regards to anatomical and biological differences, may offer more insights into preventing and managing dry socket in dental practice.

References

1. Amaratunga, N.D., and C.M. Senaratne. "A Clinical Study of Dry Socket in Sri Lanka." *British Journal of Oral and Maxillofacial Surgery*, vol. 26, no. 5, 1988, pp. 410-418. https://doi.org/10.1016/0266-4356(88)90094-0.
2. Birn, H.J. "Etiology and Pathogenesis of Fibrinolytic Alveolitis ("Dry Socket")." *Journal of Oral Surgery*, vol. 2, 1973, pp. 211-263. https://doi.org/10.1016/S0300-9785(73)80045-6.
3. Bortoluzzi, M.C., et al. "Incidence of Dry Socket, Alveolar Infection, and Postoperative Pain Following the Extraction of Erupted Teeth." *J Contemp Dent Pract.*, vol. 11, no. 1, 2010, pp. E033-E040. http://www.thejcdp.com/journal/view/volume11-issue1bortoluzzi.
4. Bowe, D.D. "The Management of Dry Socket Alveolar Osteitis." *Hdl.handle.net*, 2010. http://hdl.handle.net/10147/236012.

5. Bloomer, C.R. "Alveolar Osteitis Prevention by Immediate Placement of Medicated Packing." *Oral Surgery, Oral Medicine, Oral Pathology, Oral Radiology, and Endodontology*, vol. 90, no. 3, 2000, pp. 282-284. https://doi.org/10.1067/moe.2000.108919.
6. Blum, I.R. "Contemporary Views on Dry Socket (Alveolar Osteitis): A Clinical Appraisal of Standardization, Aetiopathogenesis and Management: A Critical Review." *International Journal of Oral and Maxillofacial Surgery*, vol. 31, no. 3, 2002, pp. 309-317. https://doi.org/10.1054/ijom.2002.0263.
7. Cardoso, C.L., et al. "Clinical Concepts of Dry Socket." *Journal of Oral and Maxillofacial Surgery*, vol. 68, no. 8, 2010, pp. 1922-1932. https://doi.org/10.1016/j.joms.2009.09.085.
8. Costa-Reis, P., and K.E. Sullivan. "Chronic Recurrent Multifocal Osteomyelitis." *Journal of Clinical Immunology*, vol. 33, 2013, pp. 1043-1056.
9. Field, E.A., et al. "Dry Socket Incidence Compared After a 12-Year Interval." *British Journal of Oral and Maxillofacial Surgery*, vol. 23, no. 6, 1985, pp. 419-427. https://doi.org/10.1016/0266-4356(85)90026-9.
10. Fazakerley, M., and E.A. Field. "Dry Socket: A Painful Postextraction Complication (A Review)." *Dental Update*, vol. 18, no. 1, 1991, p. 31. PMID: 1936428.
11. Khalil, W. "A New Approach for Explaining and Treating Dry Sockets: A Pilot Retrospective Study." *Cureus*, vol. 15, no. 7, 2023, 10.7759/cureus.41347.
12. Loksh, Y., et al. "Assessment of Risk Factors of Dry Socket After Tooth Extraction: An Observational Study." *Journal of Advanced Medical and Dental Sciences Research*, vol. 8, no. 8, 2020, pp. 180-182. DOI: 10.21276/jamdsr.2020.8.8.180.
13. MacGregor, A.J. "Aetiology of Dry Socket: A Clinical Investigation." *British Journal of Oral Surgery*, vol. 6, no. 1, 1968, pp. 49-58. https://doi.org/10.1016/S0007-117X(68)80026-5.
14. Nusair, Y.M., and M.H. Younis. "Prevalence, Clinical Picture, and Risk Factors of Dry Socket in a Jordanian Dental Teaching Center." *J Contemp Dent Pract.*, vol. 8, no. 3, 2007, pp. 53-63.
15. Oginni, F.O., et al. "A Clinical Evaluation of Dry Socket in a Nigerian Teaching Hospital." *Journal of Oral and Maxillofacial Surgery*, vol. 61, no. 8, 2003, pp. 871-876. https://doi.org/10.1016/S0278-2391(03)00248-9.
16. Rood, J.P., and J. Murgatroyd. "Metronidazole in the Prevention of 'Dry Socket'." *British Journal of Oral Surgery*, vol. 17, no. 1, 1979, pp. 62-70. https://doi.org/10.1016/0007-117X(79)90009-X.
17. Singh, G., A. Aggarwal, and P. Singh. "Risk Factors for Dry Socket Following Extraction of Permanent Teeth: A Clinical Study." *Journal of Advanced Medical and Dental Sciences Research*, vol. 4, no. 6, 2016, p. 35. DOI: 10.21276/jamdsr.2016.4.6.35.
18. Strietzel, F., and P. Reichart. "Wundheilung Nach Operativer Weisheitszahnentfernung." *Oral and Maxillofacial Surgery*, vol. 6, no. 2, 2002, pp. 74. DOI: 10.1007/s10006-001-0354-3.

19. Taberner-Vallverdú, M., et al. "Efficacy of Different Methods Used for Dry Socket Prevention and Risk Factor Analysis: A Systematic Review." *Medicina Oral, Patologia Oral y Cirugia Bucal*, vol. 22, no. 6, 2017, e750. DOI: 10.4317/medoral.21705.
20. Vezeau, P.J. "Dental Extraction Wound Management: Medicating Post Extraction Sockets." *Journal of Oral and Maxillofacial Surgery*, vol. 58, no. 5, 2000, pp. 531-537.