

# Serious Post Extraction Complaint: A Study at Peshawar Dental College, Khyber Pukhtunkhwa

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## Abstract

**Purpose:** Dry socket is the most frequent post extraction complaint of patients, and it develops within 2 to 4 days after the extraction of tooth. This study is conducted to describe the predisposing or contributing factors associated directly or indirectly with the development of dry socket after the extraction of tooth at Oral and Maxillofacial Surgery Department of Peshawar Dental College and Hospital (PDC) Peshawar KPK.

**Methodology:** Two thousand five hundred and twenty six mandibular and maxillary extractions were done during period of one year (Jan 2013- Jan 2014). Extraction sheet was filled after extraction of maxillary and mandibular tooth. Dry socket sheet was filled when patient reported with sign and symptoms of dry socket after 2-3 days of extraction. The data from both Performa was entered into computer using SPSS version 15 (WHO) and analysis of all variables was done to determine frequency and percentages.

**Results:** The overall frequency of patients who reported with sign and symptoms of dry socket within 2-3days after extraction was 1.20%. Male to female patients was 1:1.40 and peak incidence occurred during 36-45 years age. Majority of patients were systemically fit during extraction. Patients with underlying systemic condition (Diabetes), smoking habits and female taking contraceptive pills frequently developed dry socket. Most of the teeth were carious with Endo-Perio lesions. Posterior mandibular extractions were reporting more with dry socket than maxillary teeth. Intra-ligamental anesthesia, surgical extractions (mucoperiosteal flap reflection) of tooth and patients who neglected the post extraction instructions, presented more with dry sockets.

**Conclusion:** Dry socket can be prevented by taking proper history of patient, evaluation of contributing factors and its prevention, antibiotic prophylaxis for infections, avoiding intra-ligamental and excessive use of local anesthesia, a-traumatic surgical extraction, and proper instructions given to the patient along with scheduled follow ups for first three days after extraction.

**Keywords:** Dry Socket; Mandibular Teeth; Maxillary Teeth; Contraceptive Pills; Diabetic

## Introduction

Dry socket is one of the most common post extraction complaints of patient that develops within 2 to 4 days after surgery [1,2]. It is more frequent following mandibular third molar extraction [3]. The literature shows wide variation in its incidence. It ranges from 1-4% to a maximum of 41% in mandibular third molar extraction [4].

The term dry socket was recognized by American Dentist James Young Crawford in 1896, which used it to define dry socket, as absence of blood clot in extraction wound and always associated with severe pain [5].

Dry socket occurs due to the disintegration of the blood clot by fibrinolysis and is commonly observed in patients 40 to 45 years old [5,6]. Many factors are involved in occurrence of dry socket called as contributing factors, divided as [6];

### Patient Related Factors

(Gender, systemic conditions, site of tooth, degree of difficulty with extraction, preoperative infection, negligence of post extraction instructions etc)

## Dental Surgeon Related Factors

e.g. Low experience level, faulty technique with more soft and hard tissue damage and excessive use of local anesthetics with vasoconstrictor [7,8].

## Contributing Factors

### Post Extraction Instruction Negligence

Patients younger than 20 years age rarely present (< 2%) with dry socket [3]. The better explanation enlightens with the fact of better blood circulation and/or a more efficient healing capacity of bone [3,4]. If however the young patient represents with dry socket after a-traumatic tooth extraction, the most likely cause is neglected wound care during first 12-24 hrs of extraction by excessive spitting, poor oral hygiene, frequent swishing and rinsing with mouth wash, eating, cleaning/brushing, etc [9].

### Patient Age

The frequency of dry socket increases linearly with increase age above 20 and 40 years, which may be confounded by many other factors like, an increased number extractions, smocking, underlying systemic illness (diabetes, hypertension), negligence of post-extraction wound care due to poor cognition, bad oral hygiene etc [9]. Literature shows, old age patients frequently reported with dry sockets after extraction than young individuals [4,7,10].

### Patient Gender

It has been reported that the incidence of dry socket occurs more frequently in females than males, all due to possible hormonal cause. The incidence of dry socket in female verses male was 4.1% and 0.5% respectively [4]. However other studies was reporting this incidence to be similar [9,10].

But females taking oral contraceptive medication, contradicts the above finding as they were more associated with dry socket than males [11].

Oral contraceptives have been shown an increase in plasma fibrinolytic activity (due to increased plasminogen levels) and it is hypothesized that this may contribute to instability of the blood clot in the socket.

### Smocking

A consistent relationship between smoking and dry socket is reported in the literature. After extraction, tobacco smokers demonstrated reduced filling of the wound with blood and an increased incidence of dry socket [10]. This is thought to be due to the vaso-constrictive activity of nicotine, which acts to reduce perfusion in the area [10-12].

## Traumatic Verses Atraumatic Extraction

Birn (1973) proposed that trauma to the alveolar bone or soft tissue, during the removal of a tooth leads to a localized inflammation of the socket with accompanying release of tissue activators, which act to increase the levels of plasmin in the socket, leading to lysis of the blood clot [13]. A more traumatic extraction leads to increased release of these activators. These tissue activators also release kininogenase enzymes and bradykinins, which play a key role in pain generation. However, others believe that trauma during surgery results in delayed wound healing due to traumatic thrombosis of blood vessels and hence decreased tissue resistance with resultant wound infection [5]. The surgical extractions with mucoperiosteal flap reflection in comparison to non-surgical extraction, has reported ten-fold increase in the incidence of alveolar osteitis, which may be due to the increased trauma associated with surgical extractions [9].

### Local Anesthesia with Adrenaline as Vasoconstrictor

It was previously thought that the use of local anaesthetic with vasoconstrictor may lead to increased risk of developing alveolar osteitis due to the temporary local ischaemia caused by the vasoconstrictor. However, it was found that this ischaemia lasts for approximately two hours and is then followed by a reactive hyperaemia [2,4]. This contests the role of vasoconstrictors in local anaesthetic in the development of alveolar osteitis, which is currently accepted to be inconsequential [1,14].

### Inadequate Irrigation of Socket after Extraction

Inadequate irrigation of extraction socket following removal of the tooth has been reported to be associated with increased incidence of dry socket [15,16]. This was considered, possibly, to be due to contamination of the socket by bacteria. It can be reduced with high-volume lavage of the socket using normal saline. This is no longer held to be true in various studies [17-19].

### Bacterial Infection

Bacteria are cited to play a role in the breakdown of the clot [5]. This is supported by an increased incidence of dry socket being seen in patients with poor oral hygiene, higher pre and postoperative anaerobic bacteria counts and presence of periapical infection, pericoronitis or periodontitis etc [6,7].

The major school of thought regarding the involvement of bacteria in dry socket is fibrinolysis caused by *treponema denticula*, an anerobic gram-negative bacteria, is leading cause in this process [11,17].

### Mandibular verses Maxillary Extractions

The incidence of dry socket was 2.94 times more common in mandible than in maxilla [4]. The possible explanation for this phenomenon, is the rich periosteal and endosteal supply of maxilla than in the mandible [6]. Also the maxilla is also more spongy bone than the mandible which is dense bone [9,11].

### Sign and Symptoms of Dry Socket

After the removal of the tooth, the patient reports an initial improvement or reduction in pain experienced over the first 12-24 hours and then subsequently, go on developing severe, debilitating, constant pain that continues through the night, becoming most intense at 72 hours of post extraction period [6,7]. It can be associated with foul taste and halitosis. The pain responds poorly to over-the-counter analgesic medication [1].

Clinically, an empty socket (lacking a blood clot) with exposed bone is seen on intra-oral examination. The socket may be filled with a mixture of saliva and food debris. A slough is also sometimes present. The adjacent gingival tend to be red, inflamed, tender and edematous. There is generally no evidence of suppuration, swelling or systemic infection such as a fever or systemic upset [9,14].

### Pscycological Status of the Patient

The psychological stress perceived in patient after developing dry socket is more than patients with normal healing extraction wound [20]. The non- healing state of extraction wound often alarms the patient for cancerophobia, evidenced in uneducated and low socioeconomic status population [9].

### Treatment of Dry Socket

It was postulated that the use of gauze soaked in Whitehead's varnish or cotton admixed with Zonaline, sutured into the socket for 12-72hrs would reduce the incidence of postoperative discomfort, hemorrhage and swelling [16].

Furthermore the use of antibiotics (Amoxil, Flaygle), mouthwashes (chlorhexidine), steroids and intra-alveolar medicaments (Alveogel) can also provide a remedy according to many studies [9,10,18].

However the importance of reassurance to the patient, irrigation and placement of intra-alveolar dressing for 3 days along with scheduled visits are other steps needed to be followed strictly [19,21].

This is the first study of dry socket to be conducted at the Peshawar Dental collage and Hospital, Khyber Pukhtunkhwa Pakistan. Its aim is to find out the frequency, clinical picture, contributing factors, all preventive measures and treatment options available to deal with dry socket at this institute. This study will clinically benefit the community in following manner;

- To educate under and post graduate students to understand the pathophysiology of dry socket.
- The study will provide sufficient knowledge for the clinician to follow-up the patient for severe post extraction pain experienced within first 12-24hrs of extraction is always associated with dry socket.
- This descriptive study will play important role in educating the patient about the non-healing state to be diagnosed as Dry Socket rather than cancer in low socioeconomic/ uneducated community.
- The prompt diagnosis and prudent treatment approach will terminate the undue psychological stress often perceived with patients of dry socket.

### Methodology

Total of 2526 extractions were performed for period of 1 year from May 2012 till May 2013 at the Oral and Maxillofacial Surgery Department, Peshawar Dental College KPK. Among these, 1280 were male and 1246 were female with Male to female ratio of 1:1.5.

The age range was 15-60 years (mean,  $SD \pm = 35.4$  years,  $\pm 4.45$ ). Patients reporting with empty socket, inflamed borders and sever pain within 24-72 hrs following extraction were included and those with infection, abscess, limited mouth opening (trismus) were excluded from this study. Two proformas were selected from the study of Mohammmand and Abu Younas to collect relevant data regarding dry socket [14]. One was filled before extraction (Extraction sheet) and other after the development of dry socket (Dry socket). Informed consent was taken from every patient. Instructions were given to patient after extraction and regular follow ups were scheduled after 2-3 days. Patient reporting with dry socket were thoroughly assessed clinically and radiographically to fill the Proforma.

The data from both Proforma was entered into computer using SPSS version 15 and analysis of all variable was done to determine frequency and percentages

## Results

The overall frequency of dry socket was 1.20% (29 cases of dry sockets in 2526 extractions) presented after 3-4 days with empty socket and inflamed borders of extraction wound. Among these 29 cases, male to female ratio was 1:1.41. The peak of dry socket was found during 36-45 years age (44.82%) with a mean of 35.4 ( $\pm 14.95$ ) followed by 45-55 years (24.3%) as shown in (Table 1).

Age in years	15-25 yrs	26-35 yrs	36-45 yrs	45-55 yrs	56-65 yrs
Dry socket	2 (6.89%)	4 (13.7%)	13 (44.82%)	7 (24.13%)	3 (10.34%)

**Table 1:** Dry Socket and Age Distribution

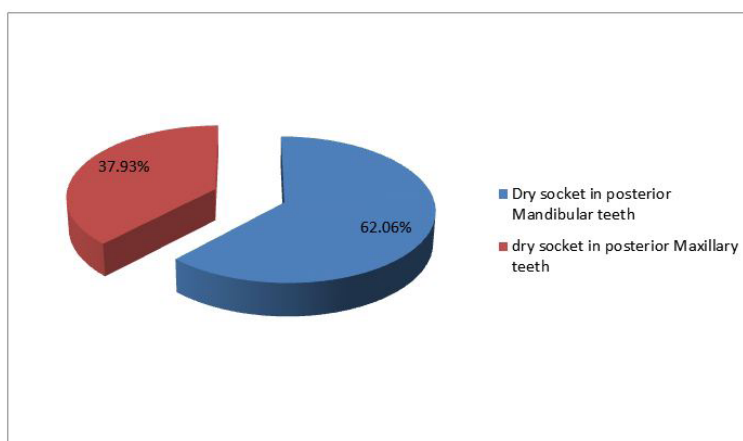
Twelve (41.37%) patients were having underlying systemic conditions, among which diabetes was the most prevalent (n=6, 20.68%) (Table 2).

History	No of patients (n)	Percentage %
<b>History of systemic diseases</b>		
None	17	58.60%
Diabetes mellitus	6	20.68%
Hypertension	4	13.79%
Ischemic heart diseases	2	6.89%
<b>Histroy of Medication</b>		
None	14	48.27%
Hypoglycemic agents	6	20.68%
Anti Hypertensive	4	13.79%
Oral contraceptive	2	6.89%
Aspirin	2	6.89%
<b>History of Smoking</b>		
Smokers	8	27.58%
Non-smokers	21	72.41%

**Table 2:** History regarding Dry Socket

Two (6.89%) were on aspirin, while 2 (6.89%) female patients were on contraceptive pills. A total of 8 (27.58%) patients were smokers. Rests of the patients (n=17, 58.60%) were fit and healthy at the time of extraction. Table 2

Among 2526 extractions, maxillary anterior (Incisors) and posterior teeth (Premolars, Molars) constituted 726 extracted teeth (28.74 %), whereas mandibular anterior and posterior teeth constituted 1800 (71.25%) of total extractions. Among 29 cases 18 (62.06%) posterior mandibular teeth (premolars, molars) presented more with dry socket than posterior maxillary extraction (n=11,37.93%) (Figure 1).



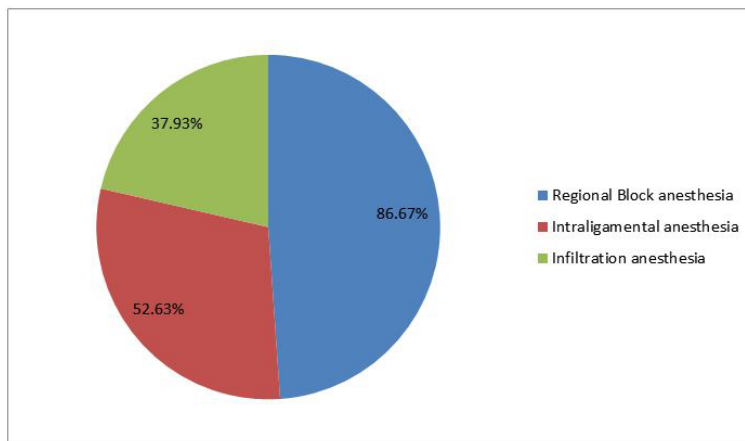
**Figure 1:** Dry socket in teeth

Most common reason for the extraction of tooth was advanced caries (n= 996) followed by periapical abscess (n=700) (Table 3).

Among 29 cases, Infiltration around the tooth (labial/ buccal and lingual/ palatal) was used almost in all patients, while regional block anesthesia (inferior dental/ lingual and mental block) was used in 15 (43.9%) extractions. Eleven (37.93%) infiltrated and 13 (86.67%) with block anesthesia developed dry socket. Intra-ligamental anesthesia was given in 19 (44.33%) cases and 10 (52.63%) cases developed dry socket. All are shown in (Figure 2).

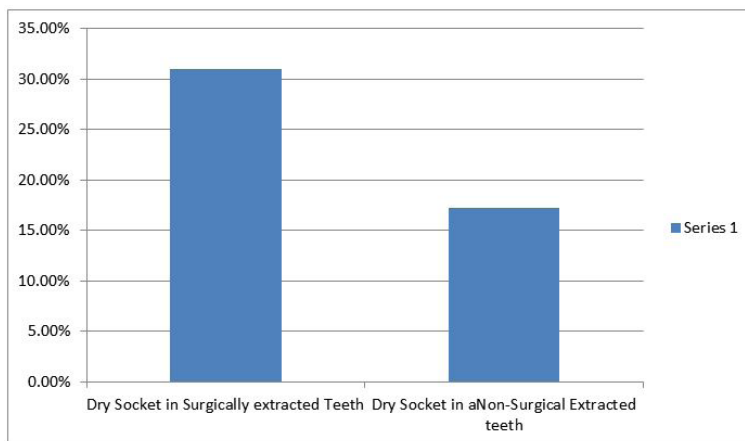
Reason for extraction of tooth	Maxillary teeth	Mandibular teeth
Advanced caries	300 (11.9%)	696 (27.55%)
Periapical infection	228 (9.02%)	472 (18.68%)
Periodontal diseases with caries	224 (8.86%)	300 (11.87%)
Periodontal diseases	75 (2.96%)	150 (5.93%)
Orthodontic extraction	20 (7.91%)	55 (2.17%)
<b>Dry socket in teeth</b>		
N=29 (1.20%)	7 (24.13%)	21 (72.41%)

**Table 3:** Teeth with Infection and Dry Socket formation



**Figure 2:** Relation of Dry Socket and Local anesthetic Technique

Among 2526 extraction 92.08% were non-surgical extractions, while 200 extractions were surgical with flap elevation and bone removal. Among 29 cases of dry socket, 9 (31.03%) cases having surgical extraction with flap elevation and bone cutting and 5 cases of non-surgical extraction, developed dry socket as shown in (Figure 3). Seventeen (55.17%) cases didn't follow post extraction instructions and developed dry socket (Figure 3).



**Figure 3:** Dry Socket. Surgical and Non-Surgical extraction

All cases (99.98%) with dry socket complaint responded well to alveogeldressing andchlorhexidine mouth wash for at least 4-5 days.

## Discussion

Dry socket is the most common post extraction complaint among patients of Oral surgery Department of different teaching hospitals. The overall incidence ranges from 0.5-5.6% minimum to as high as 30-41% [4,15,18]. According to Alexander and Silva [3,17], the occurrence of dry socket is unavoidable and ranges from 4.4% to as high as 12.5% in third molars extractions. The massive variation in the incidence of dry socket reflects the predisposing factors vary from one region to another. Yet still it is the most frequent complaint reported on 2<sup>nd</sup> or 3<sup>rd</sup> post extraction day according to the study of Khithab and his colleagues [9].

The frequency of dry socket in this study was 1.20% and showed the unavoidability of this phenomenon due to many confounding variables i.e. patients number, technique of extraction, skills of a surgeon, level of education of patient, instructions, type of tooth

extracted etc. The findings of Alexander [3] and Qudus also showed [4], the prevention of dry socket is unavoidable even in very controlled environment.

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The peak incidence of dry socket occurred at the age range of 36-45 years and is similar to the findings of Blur and Noroozi [1,2]. Another study showed the occurrence was high during fourth decade of life. Ogunlewe reported third decade for the serious post extraction complaint [22]. All these findings somehow corroborate well with this study.

This is in contrary to the claim of Upadhayaya and Humagain [18], dry socket is most frequent complaint after the age of 61 years. Also at variance with other reports but in concordance with that of Amaratunga and Senaratune, had discussed old age groups is major predisposing factor for development of dry socket [19,21].

The female presented more with the cases of dry socket and this is in accordance with the study of Upadhayaya and Humagain [19]. This is in contradiction to the study of Mohammad and Abu Younis as they claim for no gender importance in the occurrence of dry socket [14]. This study justifies with the findings of Garcia as females undergoes stress and anxiety [11], hormonal imbalances, negligence in wound care, bad oral hygiene, vigorous brushing, medications like contraceptives etc all act as contributing factor for the development of dry socket.

In this study, patient with underlying systemic conditions and those taking medications also showed significant co-relation in occurrence of dry socket. The patients with diabetes developed dry socket frequently followed by hypertensive patient. Two female taking contraceptive pills also developed dry socket.

All these findings correlate with the study of Mohammad and Abu Younis [14]. Krishman and his Colleagues also described similar predisposing factors in development of dry socket [21].

In this study patients with systemic morbidity like hypertension and diabetes developed dry socket even after a-traumatic extraction of tooth. All these facts are not proven significant in this study of Torre and Colleagues [10], who claim that underlying systemic conditions had no correlation in development of dry socket.

Although majority of male smokers developed dry socket in this study. It correlates very well with the studies of Krishman and Al Belsy providing same information regarding the use of smoking agents and relation with dry socket after extraction of tooth [15,21].

Among 29 cases of dry socket, six (19.8%) healthy young individuals of age 15-26yrs developed dry socket even after a-traumatic extraction of tooth. The major reason depicted from the findings of this study was, failure to follow post extraction instructions properly and wound care during first 24-72 hrs of extraction. The study of Alexander and Yoshi and his colleagues [3], also implement the importance of post extraction instruction and follow up as best prevention tool for the development of dry socket [23]. But on the other hand the study of AbedalWahaba nullify all these findings [24], and showed the importance of predisposing factors played significant role in the development of dry socket. This is also justified in study of Al belsy who claimed that water pipe smoking was strongly correlated to the develop serious post extraction complaint [15].

Majority of posterior mandibular extractions presented with dry socket. The wide range of study conducted by AbedalWahaba and Alexander on third molar extraction proved again that extraction of posterior teeth in comparison to anterior tooth extraction developed dry socket more frequently [3,24]. Also the findings of Qudus and his Colleagues showed the importance of mandibular site strongly related to dry socket rather than maxillary site [4].

The Meechan and his colleagues, discussed the role of anesthesia in the development of dry socket and found that hypo-vascularity due to local anesthetic agents affects the healing process [25]. Also the route chosen for anesthesia also act as predisposing factor for the development of dry socket. In this study, intraligmental and posterior mandibular block anesthesia presented more with dry socket than supraperiosteal infiltrations.

Majority of surgical flap elevation and bone cutting presented more with dry socket. The study conducted by Sawanson and M Younis also discussed the trauma induced by surgical procedure verses the non-surgical extraction and correlate well with our study findings [14,26]. The study of Vezeau also shows similar findings [6].

## Conclusion

This study shows, dry socket can be prevented via detailed history taking, antibiotic prophylaxis for infections, minimizing tissue trauma during surgical and non-surgical extractions, proper instructions and vigilant follow ups for at least 3-4 days after extraction [27].

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