A Retrospective Study on The Prevalence of Dry Socket in Patients Who Attended a Polyclinic for Extraction

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Abstract

Dry socket is one of the most common post-operative complications following extraction of permanent teeth. The aetiology of dry socket is a subject of debate; it is probably multifactorial. However, its pathogenesis remains unclear.

The aim of the present study was to evaluate the prevalence of dry socket following extraction of permanent teeth at Dental Polyclinic of Kulliyyah (Faculty) of Dentistry, International Islamic University Malaysia.

Retrospective reviews of records of 3,452 extractions of permanent teeth for various reasons from June 2009 to July 2012, were studied. Information regarding biography of the patient, indications for extraction, extraction site (upper or lower arch), extraction technique and procedure were retrieved and analysed.

There were 3,452 dental extractions carried out within the study period. The overall prevalence of dry socket was 1.13%. The prevalence of dry socket with regard to gender was 1.3% in males, and 1% in females. The peak prevalence (2.24%) was in the group of patients aged below 20 years. The prevalence of dry socket cases recorded from surgical removal of impacted teeth group was 5.8%. Data evaluation based on site of extraction showed that the prevalence in the upper jaw was less (0.98%) than that in the lower jaw (1.26%). Following surgical extractions, the prevalence of dry socket was 6.88%, while in simple extraction, the prevalence was 0.77%.

These results strongly suggest that the aetiology of dry socket is multifactorial, and that the healing potential of the patient ultimately determines the severity and duration of the condition. The incidence of dry socket was higher in male patients, age group of 21 – 30 years, extractions due to caries, extraction of lower teeth, and in surgical extractions.

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Introduction

The most common complication of wound healing after extraction of a tooth is dry socket or alveolar osteitis. The term *alveolar* refers to the part of maxilla or mandible that supports all teeth.[1] *Osteitis* means inflammation of the bone due to infection, damage or metabolic disorder. [2]

Dry socket is characterized by onset of severe pain few days after extraction, bad taste in the mouth and halitosis. On clinical examination, there is usually no clot in the socket (empty socket) but the mucosa around the socket is inflamed. Occasionally, the pain may radiate from the socket to the ipsilateral ear, temporal region or the eye. These signs and symptoms may last from 10 to 40 days.[3]

Occurrence of dry socket is unpredictable due to the fact that the causative factors vary from patient to patient. However, there are several predisposing factors for dry socket. These factors are excessive extraction trauma, limited local blood supply, local anaesthesia, oral contraceptives, osteosclerotic disease and radiotherapy.[4]

The present study was aimed at determination of the prevalence of dry socket in

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patients who attended Kulliyyah (Faculty) of Dentistry clinic of the International Islamic University Malaysia (IIUM) for extraction.

Literature Review

Dry socket (also termed alveolar osteitis, fibrinolytic alveolitis and alveolotis sicca dolorosa) is a well-recognized complication of extraction. It is characterized by increasingly severe pain that usually starts on the second or third post-operative day, in and around the extraction site, and lasts for 10 to 40 days. In addition to the pain, the patient may have foul breath. Usually, clinical examination reveals a socket devoid of a clot, often with visible, bare, bony socket wall. The normal post-operative blood clot is absent in the tooth socket. A wide variation exists in reported incidence of dry socket (1 - 65%), usually due to inconsistency in diagnostic criteria, variation in antimicrobial prophylaxis, and heterogeneity of study samples. The true incidence probably lies somewhere between 3% and 20% of all extractions.[5]

Dry socket occurs when the normal wound healing process is disrupted. Normal wound healing starts with an extraction socket rapidly filling with blood which normally clots and remains *in situ*. Later-on, post-extraction haemorrhage occurs from mucosal rather than bony vessels. After a few days, the wound contracts and the clot begins to organize. After a month, the socket becomes epithelialized and the area soon appears clinically healed, although radiographically it will still be evident several months later.[6]

In a study conducted by Jordanian Dental Teaching Centre, the overall prevalence of dry socket was 4.8%.[7] Patient's age, gender and indications for extraction had no association with development of dry socket. The prevalence of dry socket in female patients was 4.3% (14 dry sockets in 327 extractions) while in male patients, the prevalence was 5.1% (26 dry sockets in 511 extractions). The difference in prevalence was not statistically significant (p=0.553). For age group association, the highest prevalence was in age group of 18 - 33 years (7.9% i.e. 21 dry sockets in 266 extractions), when compared to patients in the age group of 34 – 49 years (2.7% i.e. 7 dry sockets in 263 extractions), and patients older than 50 years (4.3% i.e. 12 dry sockets in 281 extractions). None of the patients under 18 years of age developed dry sockets. These differences were not statistically (p=0.383).

Several reports in the literature support the general axiom which suggests that the older the patient, the greater the risk of dry socket.[8] It has been shown that the frequency of dry socket increases in patients with pre-existing local infections such as pericoronitis and advanced periodontal disease (RUD, n.d.).

Dry socket occurs very frequently following the extraction of a molar, particularly a lower molar, but the incidence is decreased when a premolar or an incisor is extracted.[9]

A study on the link between dry socket and the type of extraction procedure used has revealed that incidence of dry socket following non-surgical extraction was 1.7% (20 of 1188), while the incidence following surgical extraction was 12% (14 of 117). This difference was statistically significant.[10]

The aim of dry socket treatment is to keep the open socket clean and to protect the exposed bone. Usually, the socket is irrigated with mild warm antiseptic or saline, and then the open wound is filled with abundant dressing containing non-irritant antiseptic, in addition to frequent use of hot mouth rinses.[11]

The general objective of this study was to determine the prevalence of dry socket among patients attending Polyclinic, Kulliyyah of Dentistry, IIUM. The specific objectives were to determine the prevalence of dry socket in male and female patients; in different races; between different age groups based on causes of tooth extraction; between maxillary and mandibular teeth extraction, and between non-surgical (simple) and surgical extraction procedures.

Methodology

Study design: This is a retrospective, cross-sectional, descriptive and analytical study. Data were collected over a period of 39 months, from April 2009 to June 2012, from the log book of Oral and Maxillofacial Surgery of each medical student from Year 3 to Year 5, and also from the Amaryllis Dental Management System (ADMS) for every patient who had permanent teeth extraction at the Oral Surgery Clinic, Kulliyyah of Dentistry, IIUM.

During this study, 3,452 permanent teeth extractions were performed. There were 1,612

(49%) male patients and 1,701 (51%) female patients. Patients who had only deciduous teeth extracted were excluded from the study.

All information such as patients' socio-demographic data (age, gender and race), teeth extracted, indication for extraction, site of extracted teeth and procedure involved in teeth extraction were collected. Out of the 3,452 extractions, only 38 patients returned with dry socket phenomena.

I. For age variable, patients were divided into six age groups as follows:

(a) Less than 20 years old
(b) 21 – 30 years old
(c) 31 – 40 years old
(d) 41 – 50 years old
(e) 51 – 60 years old
(f) 61 years old and above

II. For race variable, only Malay and Chinese races were included.

III. Causes of extraction were classified into:

(a) Caries
(b) Periodontitis
(c) Prosthetic reason
(d) Orthodontic reason
(e) Impacted tooth
(f) Others (tumor, cyst, trauma)

IV. The extracted teeth were classified according to their anatomical location into upper teeth and lower teeth

V. Extraction techniques were classified into:

a. Simple or non-surgical extractions

b. Surgical extractions (removal of tooth/root by creation of flap, tooth or root sectioning and others).

All data were analyzed using SPSS version 16.0 statistical software. Descriptive statistics and bi-variant data analysis using chi-square tests were done as appropriate. *P* value of 0.05 was taken as indicative of statistical significance.

Results

There were 3,452 dental extractions from April 2009 to June 2012. The overall prevalence of dry socket was 1.13% (38 dry sockets in 3,452 extractions; Figure 1).

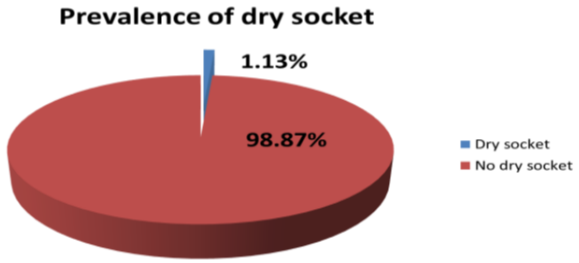

Figure 1. Prevalence of dry socket from the total of extraction

The prevalence of dry socket in male patients was 1.3% (21 dry sockets in 1,612 extractions), while in female patients, it was 1% (17 dry sockets in 1,701 extractions). The gender difference in prevalence was not statistically significant (P = 0.413; Figure 2).

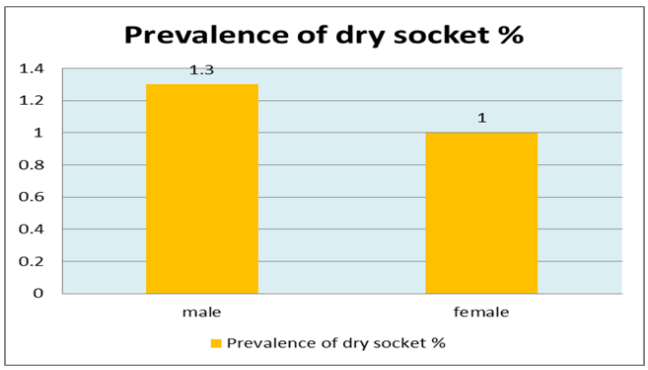

Figure 2. Prevalence of dry socket between genders.

Regarding race differences, there were 36 cases of dry socket in 3,028 extractions for Malay race, while for Chinese race, 2 patients developed dry socket out of 168 extractions. The overall prevalence for both races was the same i.e. 1.19%. Thus, there was no significant difference between the two races (p = 0.775; Figure 3).

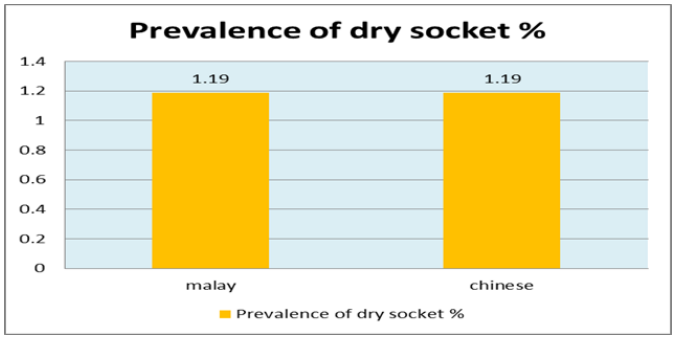

Figure 3. Prevalence of dry socket between Malay and China races.

Results based on age groups showed that the peak prevalence of dry socket (2.24%) was in the group aged below 20 years (3 dry sockets in 134 extractions), relative to prevalence values of 2.17% (13 dry sockets in 600 extractions) in patients aged 21 - 30 years; 1.65% (7 dry sockets in 425 extractions) in patients aged 31 - 40 years; 0.53% (4 dry sockets in 751 extractions) in patients aged 41 - 50 years; 0.99% (8 dry sockets in 812 extractions) in patients aged 51 - 60 years, and 0.22% (1 dry socket in 493 extractions) in patients older than 60 years. The differences in prevalence were not statistically significant (p = 0.012; Figure 4).

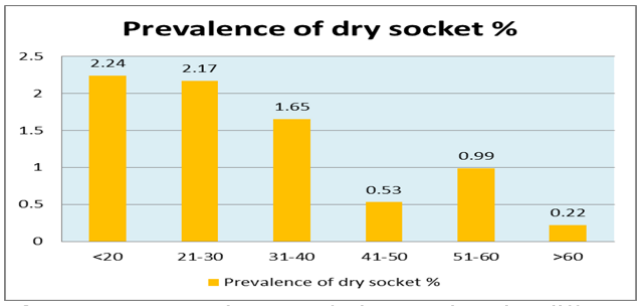

Figure 4. Prevalence of dry socket in different age groups.

Analysis based on the reason for extraction showed that the highest prevalence of dry socket (5.8%) was from impacted teeth extraction (8 dry sockets in 138 extractions), followed by 1.34% for caries (29 dry sockets in 2167 extractions), and 1.18% for orthodontic reasons (1 dry socket from 85 extractions). The differences in prevalence were statistically significant (p = 0.000; Figure 5).

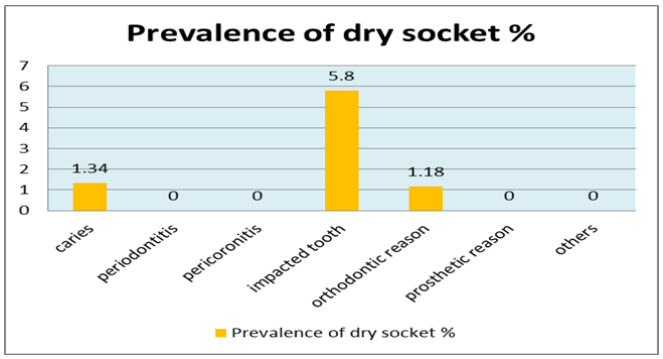

Figure 5. Prevalence of dry socket based on causes of tooth extraction.

When site of extraction was analysed, there were 18 (47.37%) cases of dry socket in the upper jaw and 20 (52.63%) cases in the lower jaw. The prevalence of dry socket was 0.98% following upper jaw extraction, and 1.26% following lower jaw extraction. The difference in prevalence due to extraction site was not statistically significant (p = 0.437; Figure 6).

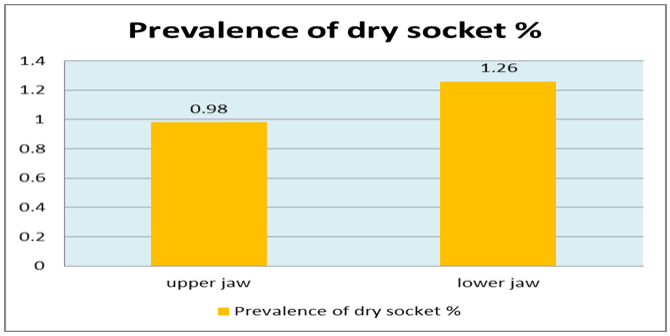

Figure 6. Prevalence of dry socket based on site of tooth extraction.

Results based on extraction techniques revealed that the prevalence of dry socket was 6.88% (13 dry sockets in 189 extractions) after surgical extraction, which was significantly higher than the prevalence of 0.77% after simple extraction (25 dry sockets in 3250 extractions; (p = 0 .000; Figure7).

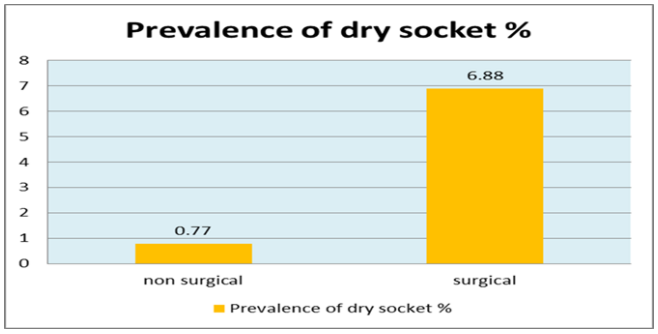

Figure 7. Prevalence of dry socket in non-surgical and surgical extraction procedures.

Discussion

Dry socket is an important and common clinical complication after extraction. The etiology and mechanism of dry socket are not exactly known, although several factors have been associated with them. In this study, the overall prevalence of dry socket was 1.13%, which is slightly lower than the overall prevalence of 2-4% reported in a previous study.[12] This difference could most probably be attributed to effective infection control, method of extraction, good oral hygiene, and adequate post-extraction

instructions to the patient.

The findings of this study showed that the prevalence of dry socket was highest in patients below 20 years of age. This is in agreement with the findings in previous studies which reported higher prevalence in early, 2nd and 3rd decades of life.[13] Dry socket prevalence was higher in extraction of impacted tooth due to the surgical procedure carried out to remove the impacted tooth, rather than the cause itself. Most of the patients aged below 20 extracted their impacted tooth with surgical technique. Surgical extractions are associated with higher prevalence of dry socket. In addition, the reduced frequency of periodontal disease at this age makes tooth extraction more difficult.[14] It is widely accepted that the prevalence of dry socket increases with increase in extraction difficulty and traumatic extraction.[8,12] This could be due to higher release of direct tissue activators secondary to bone marrow inflammation following the more difficult and traumatic extractions.[7]

The prevalence of dry socket was higher in the lower jaw when compared to the upper jaw. A similar result has been reported in other studies.[16] This is because the lower jaw has higher bone density and lower vascularity than the upper jaw.

The prevalence of dry socket was higher in male than in female patients. This result is inconsistent with the reports from previous studies.[17]

With regard to race there were no significant differences between the Malay and the Chinese population.

Conclusion

In conclusion, the overall incidence of dry socket obtained in this study is low when compared to earlier studies. The results also indicate that the technique used for extraction and extraction site play key roles in occurrence of dry socket. The prevalence of dry socket was higher in the second and third decades of life, with a peak in patients below the age of 20 years. The prevalence was also high in patients with impacted wisdom tooth or surgically extracted teeth. The lower jaw was more affected than the upper jaw. There was no significant association between development of dry socket and the patient's race or gender.

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