

Incidence and Risk Factors of Dry Socket Following Tooth Extraction in Syrian Private University Clinics

ABSTRACT

Background The alveolar osteitis, commonly known as “dry socket” (DS), is one of the common post-operative problems that result in severe pain inside and around the extraction site, usually caused by a partial or total disintegrated blood clot within the socket. The literature shows variation in its incidence and risk factors.

Aim The aim of this study was to determine and to establish the risk factors associated with dry socket after tooth extraction cases in the dental clinics of the Syrian Private University.

Materials and Methods 1921 permanent tooth extractions with non-surgical techniques were performed in 1185 patients. All patients were asked to come back to the clinic of the faculty in case of persistent or increasing pain during the first week of extraction. Every patient who returned back with a post-operative pain in the site of extraction was clinically examined by a calibrated operator for possible diagnosis of DS. Data regarding demographic information of patients, smoking habits, medical history, medications, tooth extracted, indication for extraction, amount and technique of local anesthesia, post-operative medications, and the duration of the extraction were collected over a period of 6 months. Statistical analysis using SPSS software program was performed for the collected data.

Results The overall incidence of dry socket was 7.3% (141 dry socket cases in 1921 extractions). Risk factors related to dry socket in our study were smoking, bad oral hygiene, long duration and traumatic extractions, failure to follow post-operative instructions. There was no statistically significant association between the development of dry socket and patient's age, sex, or extraction site.

Conclusion Smoking, extraction difficulty, failure to follow postoperative instructions, and poor oral hygiene might be behind the increased prevalence of dry socket. No clear association between the development of dry socket and patient's age, sex was found.

KEYWORDS dry socket, risk factors, smoking

INTRODUCTION

Alveolar osteitis is one of the famous extraction wound healing disorders¹, commonly known as “dry socket” (DS), which is one of the common post-operative problems that results in severe pain inside and around the extraction socket², usually caused by a partial or total disintegrated blood clot within the extraction site³.

The literature shows variation in the incidence of DS. Petri and Wilson (1992) reported a 0% incidence⁴, while Erickson et al. (1960) reported an incidence of 35%⁵. Dry socket occurs due to the disintegration of the blood clot by fibrinolysis⁶.

Bartoluzzi et al. observed the incidence of DS, and they reported that there were higher pain levels and pain persisting longer than 2 days⁷.

Smoking was clearly found to be associated with the development of postoperative complications. Mohammed H Abu Younes et al. reported that smoking, surgical trauma, and single extractions were considered predisposing factors in the occurrence of DS, and on the other hand factors like age, sex, medical history, extraction site, amount of anesthesia, and operator experience had no effect on the observation⁸.

Hasan Momeni et al. reported that the incidence of dry socket was 0.6% and females were more common involved than males (0.8% versus 0.04%), the ratio of mandible to maxilla was 2.5 to 1, and mandibular third molars

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were more often involved than other teeth⁹. Trauma, poor oral hygiene, and smoking had increased the incidence of dry socket.

Gender, level of difficulty, experience of the surgeon, patient medical condition, as well as smoking and use of oral contraceptive pills may affect post-operative complications in tooth extractions^{10,11}.

Many other factors contribute to the occurrence of dry socket like low experience level of operator¹², preoperative infection⁵, sex¹³, site of extraction¹⁴, use of oral contraceptives¹⁵, smoking¹⁶, and use of local anesthetics with vasoconstrictor¹⁷. The incidence of dry socket can be reduced with antibiotics¹⁸, antifibrinolytic agents¹⁹, mouthwashes²⁰, and steroids²¹.

The aim of this study was to determine the risk factors associated with DS after tooth extraction in the clinics of Department of Oral and Maxillofacial Surgery in Syrian Private University.

MATERIALS AND METHODS

This cross-sectional study followed the Declaration of Helsinki on medical protocol and ethics, and the approval of the Ethics Committee of the Syrian Private University was firstly obtained.

During the study performed in the Syrian Private University (SPU), Department of Oral and Maxillofacial Surgery, 1921 permanent tooth extractions with non-surgical techniques were performed in 1185 patients. All teeth were extracted under local anesthesia. Infiltration around the tooth was used in 1165 (60.64%) extractions, while regional block was used in 756 (39.36%) extractions.

All patients received oral post-operative instructions. In addition, medications such as painkillers and antibiotics were prescribed when necessary. All patients were asked to come back to the clinic of the faculty in case of persistent or increasing pain during the first week of extraction. Every patient who returned back with a post-operative pain on the site of extraction was clinically examined by a calibrated operator for possible diagnosis of DS. Data regarding demographic information of patients, smoking habits, medical history, medications, tooth extracted, indication for extraction, amount and technique of local anesthesia, which is divided into field blocking and regional block, post-operative medications, and the duration of the extraction were collected.

Data collected over a period of 6 months, starting from 1 August 2016 to 5 January 2017 using questionnaire. Pain and empty extraction socket with no blood clot were considered signs leading to diagnosis of DS. Patients were divided according to age as follows: group 1 with age range from 18 to 35 years old, group 2 from 36 to 55 years old, and group 3 over 56 years old. The study sample was sub-divided according to bad and good oral hygiene based on regular brushing of teeth.

RESULTS

During the study period, 1921 dental extractions were carried out in 1185 patients, there were 647 (54%) male patients and 538 (46%) females with age range from 16 to 81 years old. Thousand fifty teeth were extracted in 648 patients who were smokers (151 females, 497 males).

Some patients had bad oral hygiene and needed treatment before tooth extraction (604 patients 50.97%). Nine hundred and ninety-six of the extractions (51%) were traumatic, and the duration of the extraction was long (over 30 minutes).

Upper anterior and posterior teeth represented 362 (18.84%) and 541 (28.16%) of the total number of extraction, respectively, whereas lower anterior teeth and lower posterior teeth represented 262 (13.63%) and 756 (39.37%) of the total number of extractions, respectively.

Five hundred and seventy-one patients did not follow post-operative indications such as pressing on the gauze, rinsing, or smoking after extraction during the first hour. The overall incidence of DS was 7.3% (141 cases in 1921 extractions). Patients who developed DS cases were 89 males (63.12%) and 52 females (36.88%). The incidence of DS in female patients was 5.34% compared to 8.49% in male patients. This difference was not statistically significant ($P = 0.692$). The incidence of DS was 10.76% in smokers compared to 3.25% in non-smokers. This difference was statistically significant ($P = 0.001$). The incidence of DS was 16.55% in patients with bad oral health compared to 4.35% in patients with good oral health. This difference was statistically significant ($P = 0.001$) (Table 1).

The incidence of dry socket was 9.43% (94 dry socket in 996 extractions) following extractions in traumatic, and the duration of the extraction was long (over 30 minutes) compared to 4.71% (47 dry socket in 925 extractions) atraumatic extractions. This difference was statistically significant ($P = 0.001$). The incidence of dry socket was 19.61% (112 dry socket in 571 patients) following extractions in patients did not follow post-operative instructions compared to 4.71% (29 dry socket in 614 patients) followed post-operative indications. This difference was also statistically significant ($P = 0.001$) (Table 2).

The peak incidence of dry socket was in the 18–45 year age group and was 85 dry sockets in 645 extraction (13.2%) compared to 8.43% (33 dry sockets in 391

Table 1 Prevalence of dry socket in relation to smoking and oral hygiene.

	Smoker	Non smoker	Bad oral hygiene	Good oral hygiene
Male	72 (80.89%)	17 (19.11%)	67 (75.28%)	22 (24.72%)
Female	41 (78.84%)	11 (21.16%)	33 (63.46%)	19 (36.46%)
Total	113	28	100	41

Table 2 Prevalence of dry socket in relation to type of extraction and following instructions.

	Traumatic extraction	Atraumatic extraction	Followed instruction	Not followed instructions
Male	30 (33.71%)	59 (66.29%)	16 (17.98%)	73 (82.02%)
Female	17 (32.70%)	35 (67.30%)	13 (25%)	39 (75%)
Total	47	94	29	112

Table 3 Distribution of dry socket incidence in different age group.

Age range (in years)	18–25	26–35	36–45	46–55	Over 56	Total
Male	9	21	26	19	14	89
Female	5	8	16	14	9	52

extractions) in patients whose ages ranged from 46 to 55 years and 23 dry sockets in 885 extractions in patient who were older than 56 years. This difference was not statistically significant ($P = 0.214$) (Table 3).

DISCUSSION

Alveolar osteitis commonly known as “dry socket” is a common post-extraction complication, resulting in severe pain and discomfort. DS is diagnosed between second and fourth postoperative days when patients complain of a painful extraction socket and which on clinical examination usually reveals empty socket or disintegrated clot with exposed bone and fetid odor²². The average rate of DS for dental extractions is variable²³. Risk factors for DS mentioned in the literature include; traumatic surgery, remaining tooth fragment, smoking, oral contraceptives, advanced age, female gender, immunosuppression, and lack of dentist's experience which is associated with higher trauma during extraction. Bacterial infection is also a major risk as the frequency of DS increases in patients with poor oral hygiene and pre-existing local infection such as advanced periodontal disease.

The results of this study showed that the prevalence of DS at the clinics of SPU (7.3% in 1921 extraction) was generally similar to that reported in the literature^{8,24}.

The increase in extraction difficulty (i.e. long duration, traumatic extraction) leads to increase in the prevalence of DS. In the current study, traumatic and long duration extractions were associated with significantly higher incidence of DS (9.47%), which supports what is documented in the literature in which trauma is considered a major factor for the development of DS.

In our study, the difference in the prevalence of dry socket between males (63.12%) and females (36.88%) was not statistically significant. However, this was not compatible with other studies^{25,26}. This could be explained by the fact that eastern societies

differ from western ones in smoking habits between females and males. In western societies, females smoke in a higher percentage than in eastern societies. The present study showed that the percentage of female smokers was much less than males (3.4% and 58%, respectively).

The results of this study also showed the prevalence of dry socket to be higher with a peak incidence in the 18–45-year-old age group. This result agrees with many others reported previously^{16,25,26}. The possible explanation for this age dependence is still unknown, but the presence of well-developed alveolar bone and the relative frequency of periodontal diseases at this age both make tooth extraction more difficult and may provide a possible explanation.

It has been reported that patients who smoked on the same day of surgery had a higher incidence of DS than those who smoked on the second day postoperatively²⁷. The results of this study were not compatible with the findings of Johnson and Blanton²⁸ who showed no significant difference in the prevalence of DS between smokers and non-smokers. A dose-dependent relationship between smoking and the occurrence of DS was demonstrated in the present study which is similar to the findings of other studies²⁷.

We believe that failing to follow postoperative instructions was behind the increased prevalence of DS. Whether a systemic mechanism or a direct local effect on the extraction site (i.e., overheating and/or exaggerating suction) is responsible for this increase in the occurrence of dry socket is still unclear.

CONCLUSIONS

There was a statistically significant difference in the incidence of dry socket between smokers and non-smokers. The increase of extraction difficulty (long duration, traumatic extraction) leads to increase in the prevalence of dry socket. Failure to follow postoperative instructions might be behind the increased prevalence of dry socket. The frequency of DS increases in patients with poor oral hygiene. There was no statistically significant association between the development of dry socket and patient's age and sex.

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