

Incidence of Dry Socket in Relation to Psychological Stress: A Retrospective Study

Munir Y. Al-Kotany BDS, MSc. ⁽¹⁾

Key words

L.C.U = Life
change units.

Abstract

This study concerns with the incidence of dry sockets among a sample of patients attending different dental clinics after tooth extraction for three consecutive years in relation to their age, sex, tooth location and to patients perceived stress. Dry socket patients records were investigated for age, sex and tooth location. And a control group was chosen of exactly the same age and sex distribution as that of the patients but free from any symptoms. A questionnaire sheet with a list of possible life events for the last twelve months before the extractions were distributed among both, then the results was subjected to statistical analysis. Out of 956 patients, 58 (6%) developed dry sockets, (36%) of them were located on wisdom teeth with the lower ones comprising (25.86%). There were significant difference in mean perceived psychological stress between the patients (477.07 ± 7.38 L.C.U) and those in control group (240.44 ± 7.12 L.C.U.) regarding different ages and sexes. There were higher incidence of dry sockets in this study than most other studies around the world and female /male ratio was nearly equal. They occurred mostly on lower and posterior more than upper and anterior teeth wisdom teeth were most, highly affected, and there were a relationship between psychological stress and dry socket.

Introduction

Dry Socket was defined as a focal osteomyelitis in which blood clot has disintegrated or been lost with the production of foul odor and severe pain, but no suppuration ⁽¹⁾. Recently few studies about epidemiology of the dry socket such as in Kuala Lumpur, Malaysia ⁽²⁾ and Dar Es Salam, Tanzania ⁽³⁾ were published. Although dry socket is a common complication after tooth extraction its incidence is still small ranging from (1-5) percent ^(2,4-10). Its incidence is higher in female than male, as in a Swedish study the female/male ratio was 5/1 ⁽¹¹⁾ while MacGregor (1979) ⁽¹²⁾ found an incidence of 6.5% (female) to 4.2% (male). Dry socket incidence tend to

increase if related to wisdom teeth, separately ^(13,14), and it was (6.35%) in mandibular wisdom teeth in a three year study in America ⁽¹⁵⁾. In general dry socket incidence after extraction of lower wisdom teeth ranged from (0.5-39%) making them an average of 20% ⁽¹⁶⁾. Dry socket etiology is still unknown, it was though that it was due to excessive trauma during extraction particularly third molars, with the duration of extraction as an indicator of its difficulty ⁽¹⁷⁻²⁰⁾, but some other scientists found no relation ⁽²¹⁻²³⁾. But Archer ⁽⁶⁾ find dry sockets even after extraction of mobile teeth due to periodontitis. Still some authors believe that the bigger trauma can provoke thrombosis of under-lying vessels as well as a smaller resistance to infection by the alveolar bone ⁽²⁴⁾. Also dry socket

(1) Ass. Professor, Department of Community Dentistry, College of Dentistry, ALMustansiriyah University.

was related to vascularity for being more common in molars region than incisors and more in mandible than maxilla but Birn⁽²⁵⁾ showed that molar regions are better supplied with blood vessels than incisors region. Also it was thought that it increase in diseases that reduce the blood supply⁽²⁶⁾ such as diabetes Mellitus and old age^(22,23,27), and when the jaw bone is sclerotic as in Paget disease and in Albers-Schonberg disease^(26,28) and when the jaw is subjected to radiotherapy. Also dry socket was higher in smokers than non-smokers⁽²⁹⁾. Dry socket occur in extractions more with local anaesthesia than general anaesthesia due to the presence of vasoconstrictor^(8,30) while other scientists found no difference between the two^(31,32). Schow⁽³³⁾ have found increase in dry socket incidence in women taking contraceptive pills and Lilley⁽³⁴⁾ found these females are three times worse postoperatively than their female counterparts who do not use the pill after extraction of their third molars. The effect of pre existing infection (pericoronitis) as a cause of dry socket was evaluated and proved insignificant⁽¹⁸⁾. There is even a study that shown no significant difference between antibiotic treated and un treated groups with regard to trismus, pain, swelling and clot loss⁽³⁵⁾. In recent years there are several studies relating some oral disease to psychological stress for example, Burning mouth syndrome⁽³⁶⁻³⁸⁾, lichen plannus⁽³⁹⁻⁴¹⁾ and aphthous stomatitis⁽⁴¹⁻⁴³⁾. But only few studies were done on the area of healing of oral tissues and particularly dry socket. There were studies that found anxiety before third molar extraction caused delayed healing⁽⁴⁴⁾ due to increases in fibrinolytic activity⁽⁴⁵⁾. Also stress can cause reduction of osteoblastic activity⁽⁴⁶⁾ and delayed connective tissue and bone healing in artificially induced gingival wounds in stressed young male rats, but it does not affect mucosal epithelium⁽⁴⁷⁾. There is also increasing evidence that psychological stress affect blood coagulation and fibrinolysis⁽⁴⁸⁾, for example increased fibriolytic activity was related to emotional distress due to fear from an impending operation⁽⁴⁹⁾, after air raid

warning⁽⁵⁰⁾, with examinations⁽⁵¹⁾ and with announced blood tests^(52,53). Also intrapersonal conflicts may fasten blood clotting time^(54,55), which can be attributed by certain authors to recurrent thrombophlebitis in what is called "anger in style" now adays⁽⁵⁵⁾. Some scientists relate these findings to thrombosis of the alveolus underlying vessels particularly those after a bigger trauma as well as lowering the resistance of alveolar bone to infection⁽²⁴⁾. There are some scientists who believe that endogenous opiods released from pituitary gland (enkephaline, methionine (met)-enkephaline and B.endorphine)⁽⁵⁶⁾ may have a role in the initiation of dry socket⁽⁴⁾. Since these opiods have receptors on human granulocytes and monocytes and there is evidence that lymphocytes produce B-endorphin like substance that stimulate macrophage- chemotaxisinhibitor and increase lymphocyte proliferation and affect natural killer cells (N.K cells). At stress there is reduction of functional competence of the immune system particularly cell mediated immunity and depressed lymphocytes count^(56,57).

Materials and Methods

In this study the case sheets including questionnaire about personal stress, age, sex, extracted tooth, type and location in the mouth of 956 patients attending the out-patient of department of preventive dentistry and the evening consultatory dental clinic in the Institute of medical technology in Baghdad as well as patients attending three private clinics for three consecutive years duration, which were collected from October 2002 to October 2005. These case sheets were divided into two groups:

- 1-Group with dry socket.
- 2-Control group without dry socket and normal healing. This group was selected of exactly the same age and sex distribution as the dry socket group.

Patient who suffered of systemic disease were excluded from this study. The questionnaire sheet included a list of

possible life events according to Holmes and Rahe⁽⁵⁸⁾ with their social Re-adjustment rating scale that happened to the participants in the last 12 months before the extraction (Table 1). The results were subjected to statistical analysis. Chi square test was used.

Results

The results have shown that 58 patients (6%) developed dry sockets with 30 females (51.72%) and 28 males (48.28%) accordingly, (Table 2, 3, Fig 1). The psychological stress perceived by the patients group had a mean of $(477.07 \pm 7.38$ L.C.US) with $(467.9 \pm 7.615$ L.C.US in females and 477.2 ± 7.38 l.c.us in males). While those for the control group had a mean of $(240.44 \pm 7.012$ L.C.US) with $(240.8 \pm 6.28$ L.C.US in females and 240 ± 7.91 L.C.US in males), (Table 4, 5). After using chi-square test to compare patients perceived psychological stress with control group, it was found that $p > 0.5$, therefore is significant difference between the two groups, (Table 4). After using chi square test to compare the perceived psychological stress among males and females in both the patients and control groups it was found that $p > 0.5$ which means there is a significant difference between the two sexes in both groups, (Table 5).

Discussion

The incidence of dry socket in this study (6%) is higher than many other studies around the world, for it is higher than the incidence in the United States and Britain in the seventies^(6,7) and in Britain during the eighties⁽⁴⁾ and recently⁽¹⁰⁾. Also its incidence was higher than Malaysia⁽²⁾, but not higher than Tanzania⁽³⁾. The female to male ratio in the incidence of dry socket is usually higher in the females^(11,12) as it reached as high as 5:1 in Sweden⁽¹¹⁾ but in this study they were nearly equal (Table 2). The percentage of dry socket incidence following extraction of wisdom teeth was the highest in most studies⁽¹³⁻¹⁵⁾ but in this study it was even higher than all

those studies (36%) (Table 2). In this study dry sockets occurred in lower teeth more than uppers and in posterior teeth more than anteriors (Table 2, Fig. 1) a result that did not agree with Birns study⁽²⁵⁾ where it has shown that molar teeth are better endowed with blood vessels. Also this study has shown that dry socket increased with age (Table 3) and this agreed with results of other studies (21) and its peak occurred at ages (20-30) and (40-50) years but these results were higher than the above study and it is probably due to the higher number of unremoved third molars which remain till later age in this country compared to many industrialized countries which it is customary to remove the four wisdom teeth under general anaesthesia at early adolescent age. The results of pre extraction psychological stress perceived by the patients compared to the controls have shown a significant difference between the two with a mean of $(477.07 \pm 7.38$ L.C.US) in the patient groups and $(240.44 \pm 7.12$ L.C.US) in control group (i.e. the patients perceived nearly twice the stress as the controls) (Table 4). Also there were similar significant differences among females and males between the patients groups and the control groups with similar perceived stress (Table 5). The level of perceived stress among the patients group exceeded the level that cause many serious diseases like asthma, abortion, and approximate to the level of peptic ulcer⁽⁵⁹⁾. Also the mechanism by which the psychological stress is working is still obscure, should it be working through fibrinolytic activity?^(45,48-53) or fibroblasts⁽⁶⁰⁾ directly or as a result of its affect on its endogenous opioids^(4,56,57) or their effect on immunity^(56,57).

Conclusions

- 1- Incidence of dry socket in this study is higher than most studies around the world developing and industrialized.
- 2- The female/male ratio was nearly equal.
- 3- Dry socket occurred mostly on lower and posterior teeth.

4- Wisdom teeth sockets were the highest affected among all other teeth.

5-There were no relation between dry socket occurrence and trauma of extraction, type of anaesthesia used, vascularity of the area, pre existing.

infection, and systemic disease or drug usage

6-Psychological stress significantly affected the incidence of dry socket among different ages and both sexes.

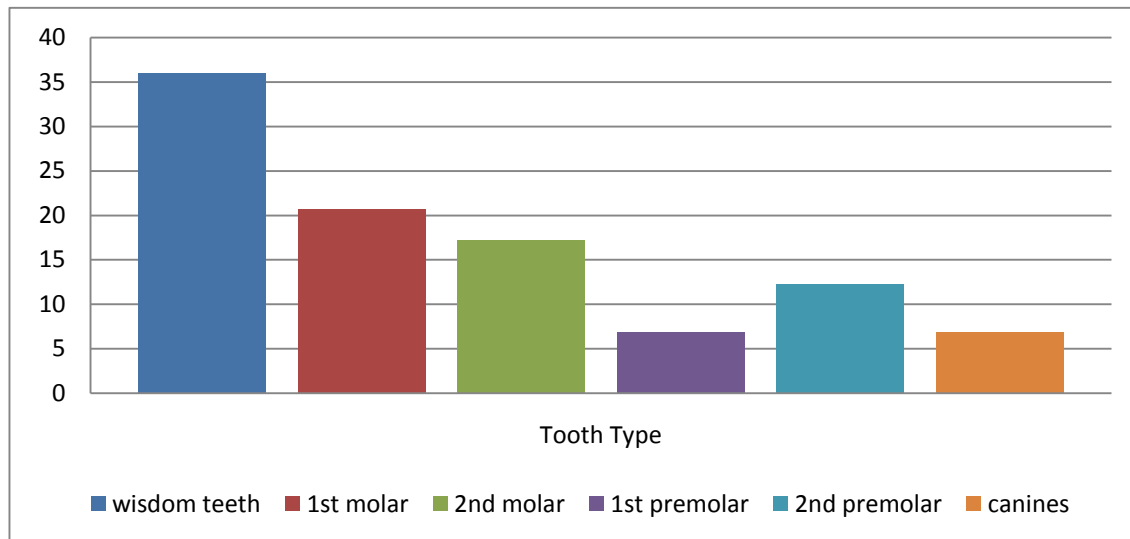


Fig.(1):- Distribution of dry sockets among different tooth types.

Table (1):- Social Re-adjustment Rating Scale (59).

| Life event | Mean value (L.C.U) |
|---|--------------------|
| Death of spouse | 100 |
| Divorce | 73 |
| Separation | 65 |
| Jail term | 63 |
| Death of close family member | 63 |
| Marriage | 50 |
| Fired at work | 47 |
| Retirement | 45 |
| Pregnancy | 40 |
| Sex difficulties | 39 |
| Change in number of arguments with spouse | 35 |
| Change in responsibilities at work | 29 |
| Change in work, residence ,outside activities | 20-18 |
| Change in home habits | 16-15 |
| Vacation, travel | 13 |
| Christmas, other religious ceremonies | 12 |

Table(2):- Distribution of dry sockets among sexes and tooth type.

| sex | Tooth type and location on the jaws | | | | | | | | | | | | | | | | | |
|--------|-------------------------------------|---|------|-----------|---|------|-----------|---|------|--------------|---|-----|--------------|---|------|---------|---|-----|
| | Wisdom teeth | | | 1ST Molar | | | 2nd molar | | | 1st premolar | | | 2nd Premolar | | | canines | | |
| | L | U | % | L | U | % | L | U | % | L | U | % | L | U | % | L | U | % |
| Male | 5 | 3 | 13.6 | 3 | 2 | 8.6 | 2 | 3 | 8.6 | 0 | 2 | 3.4 | 2 | 1 | 5.2 | 0 | 2 | 3.4 |
| Female | 10 | 3 | 22.4 | 5 | 2 | 12.1 | 4 | 1 | 8.6 | 2 | 0 | 3.4 | 3 | 1 | 7 | 0 | 2 | 3.4 |
| Total | 15 | 6 | 36.0 | 8 | 4 | 20.7 | 6 | 4 | 17.2 | 2 | 2 | 6.8 | 5 | 2 | 12.2 | 0 | 4 | 6.8 |

Table(3):- Distribution of dry socket among age groups.

| Age | No .of female with dry sockets | % | No .of male with dry sockets | % | Total no. of dry sockets | % |
|--------------|--------------------------------|-------|------------------------------|-------|--------------------------|-------|
| Under 20 yrs | 4 | 6.89 | 3 | 5.19 | 7 | 12.08 |
| 21-30 yrs | 6 | 10.36 | 7 | 12.06 | 13 | 22.42 |
| 31-40 yrs | 5 | 8.62 | 6 | 10.34 | 11 | 18.96 |
| 41-50 yrs | 9 | 15.51 | 7 | 12.07 | 16 | 27.58 |
| 51-60 yrs | 6 | 10.34 | 5 | 8.62 | 11 | 18.96 |
| Total | 30 | 51.72 | 28 | 48.28 | 58 | 100 |

Table (4):- Perceived stress means in L.C.US in patients sample and controls among different age groups.

| Age | Stress in patients (L.C.U) | Stress in controls (L.C.U) | Total (L.C.U) |
|--------------|----------------------------|----------------------------|---------------|
| Under 20 yrs | 481.42 | 238.28 | 719.7 |
| 21-30 yrs | 474 | 239.52 | 713.53 |
| 31-40 yrs | 474.91 | 244.26 | 719.18 |
| 41-50 yrs | 453.81 | 240.06 | 693.87 |
| 51-60 yrs | 474.18 | 239.45 | 713.63 |
| Total | 471.66 | 240.32 | 711.98 |

Table (5):- perceived stress means L.C.US in patients and controls in relation to sex among different age groups.

| Age | Perceived psychological stress(L.CU) among female patients and controls | | | Perceived psychological stress(L.CU) among male patients and controls | | |
|--------------|---|----------------|---------|---|---------------|--------|
| | Female patients | Female control | Total | Male patients | Male controls | Total |
| Under 20 yrs | 483.25 | 236 | 719.25 | 479 | 241.33 | 720.33 |
| 21-30 yrs | 405.85 | 237 | 642.88 | 474.42 | 241.57 | 715.99 |
| 31-40 yrs | 475 | 245.2 | 720.2 | 474.83 | 243.5 | 718.33 |
| 41-50 yrs | 480 | 241.44 | 721.44 | 482.52 | 238.28 | 720.8 |
| 51-60 yrs | 473.16 | 242.83 | 715.99 | 475.4 | 235.4 | 710.8 |
| Total | 463.16 | 240.494 | 703.946 | 477.234 | 240.016 | 717.25 |

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