# INCIDENCE OF DRY SOCKET IN LOWER JAW AT A TEACHING DENTAL HOSPITAL

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**ABSTRACT**

*The objective of the study was to determine the incidence of dry socket after extractions in lower jaw in Oral and Maxillofacial Surgery (OMS) Department during six year period at Dental Section, Nishtar Medical College, Multan, Pakistan. Hospital record ofall the patients who underwent forceps I elevator dental extractions during the selected period was examined for dry socket complication. The patients who were medically compromised and third molar extraction patients were excluded from the study. Among the total of 32811 simple dental extractions during the six year period, 1163 (3.5%) extraction cases suffered from dry socket with 696 (2.1%) in lower jaw and 467 (1.4%) in upperjaw; the difference between lower and upperjaw was statistically significant (p=.0001). The mean age of the dry socket patients was 33 years ranging from 17 - 49 years. Out of 1163 dry socket patients; 429 were male and 734 were female; showing a ratio of 1: 1.7 (p..0001). It can be concluded that incidence of dry socket was significantly higher (p=0001) in lower jaw as compared with upper jaw. Similarly; dry socket incidence was significantly higher in female as compared with males.*

## INTRODUCTION

Among common complications of tooth extraction, dry socket is a local painful rare postoperative complication within 72 hours that occur in about 3% of simple extractions cases'. An incidence of 25-30% has been reported after surgical removal of third molars4,5. The blood clot healing in the extraction socket is unexpectedly dislodged leaving a bare painful open area. The technical term for this condition is acute alveolar osteitis. Generally the pain involved with a dry socket is intense, throbbing and unceasing. This pain is often worse than the pain associated with the tooth prior to extraction. A foul odor may be associated with this condition. Pain medication often does serve the job of relieving the discomfort associated with this situation.

The issue of treatment of dry socket is still perplexed among dental surgeons. It is palliative, consisting of three stages: irrigation (as an antiseptic & debridement), placement of obtundant dressings (bactericidal / bacteriostatic) and administration of oral analgesics; no antibiotic is usually recommended because of no infections. Some authors do not advice curettage of the alveolus to force / or induce bleeding in necrotic socket due to risk of producing secondary infection [6].

The dry socket incidence was first described in literature by Crawford in 1896[7]. Although etiology of dry socket is still controversial[3 8], it is probably multifactorial with unknown pathogenesis1,[8]. It is inappropriate to define one factor as the cause of this painful condition. Several factors are involved in predispose an extraction case to develop dry socket; hypovascularity due to the density of boneo, local soft and hard tissue trauma[9-11], existing inflammation, vasoconstriction activity of local anesthesia[12], complicated tooth extraction[13.15] and mouth rinsing following extraction[16]. In addition, gender and age[17], and oral hygiene status contribute to dry socket[18,19]. Vasoconstrictor in local anesthesia is related to dry sockets due to causing ischemia and fibrinolytic activities[8,20,21].

Some studies show that dry socket occur more in mandibular teeth extraction than in maxillary teeth because of hard bone pattern and poor blood supply1'8. The frequency of dry socket has been reported to be more in molars (especially in first and third molars)

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followed by premolars, incisors and then other teeth[22]. A recent study has documented that mandibular teeth are affected three times more than maxillary teeth[23]. The reports about incidence of dry socket in Pakistani populations are rare. Therefore, the purpose of the present study was to determine incidence of dry socket in lowerjaw in a Teaching Dental Hospital in Pakistan.

## MATERIAL & METHODS

The records of 32,811 extraction patients during the six year study period were retrospectively studied. All the extractions were carried out in oral surgery department of the Dental Section, Nishtar Medical College, Multan, Pakistan. Among them; 15,046 were male and 17,765 were female; with mean age of 33 years ranging from 17- 49 years.

Local anesthetic xylocaine 2% (with adrenaline 1: 80,000) was used in all the patients. Patients with history of systemic disease were excluded from the study. Most of the cases were forceps /elevator extractions. Few cases like remaining roots, endo-treated & extensively decayed teeth were extracted with envelope flap reflection and sectioning of tooth with surgical bur without a planned surgery. The criterion of sterilization was the same for all the cases.

Dry socket was diagnosed when patients complained of a painful extraction socket, which commenced within 2-4 days of extraction. Clinical examination of the sockets usually also revealed empty or debris/disintegrated clot filled sockets with denuded bone.

Statistical Package for Social Sciences (SPSS Version #10) was used for data analysis. Chi-Square test was used to determine any significant difference in terms of jaw, gender, side of the mouth and tooth group.

## RESULTS

Among the total of 32811 simple dental extractions during the six year period, 1163 (3.5%) extraction cases suffered from dry socket with 696 (2.1%) in lower jaw [239 (1.6%) in males & 457 (2.6%) in females] and 467 (1.4%) in upper jaw [190 (1.3%) in males & 277 (1.6%) in females] .; the difference of dry socket incidence between lower and upper jaw was statistically significant (p=.0001) [Table 1 & Figure **I].** Out of 1163 dry socket patients; 429 were male and 734 were female; showing a ratio of 1:1.7. The gender difference in dry socket incidence was also statistically significant (p=.0001) [Table 2] .

TABLE 1: INCIDENCE OF DRY SOCKET IN UPPER AND LOWER JAW

| P=nder | Upper Jaw Dry Socket | | Lower Jaw Dry Socket | |
|---|---|---|---|---|
| | Yes | No | Yes | No |
| Male | 190 (1.3%) | 14856 (98.7%) | 239 (1.6%) | 14807 98.4%) |
| Female | 277 (1.6%) | 17488 98.4%) | 457 (2.6%) | 17308 (97.4%) |
| Total | 467 (1.4%) | 32344 (98.6%) | 696 (2.1%) | 32115 97.9%) |

P= 0.000

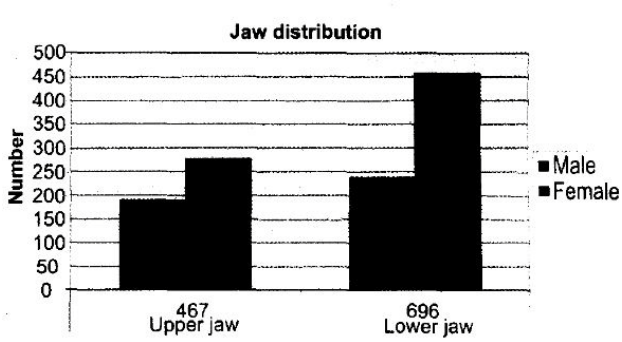


Fig. 1. Comparison of dry socket in upper and lowerjaw

TABLE 2: DRY SOCKET CASES BY GENDER

| Gender | Dry Socket Cases | No Dry Socket |
|---|---|---|
| Male | 429 (2.9%) | **14617** (97.1%) |
| Female | 734 (4.1%) | **17031** (95.9%) |
| Total | 1163 (3.5%) | 31648 (96.5%) |

P=.0001

TABLE 3: DRY SOCKET DISTRIBUTION IN TERMS OF MOUTH SIDE AND TOOTH GROUP

| Teeth | Side | Upper Jaw | Lower Jaw |
|---|---|---|---|
| Molars | Right | 123 (26.34%) | 217 (31.18%) |
| | Left | 98 (20.99) | 194 (27.87%) |
| Premolars | Right | 73(15.63%) | 112(16.09%) |
| | Left | 86 (18.42%) | 99 (14.22%) |
| Incisors | Right | 38 (8.14%) | 38 (5.46%) |
| | Left | 44 (9.42%) | 36 (5.17%) |

The incidence of dry socket was also determined in terms of tooth group i.e. molars, premolars etc and side of the mouth (Table 3). The dry socket incidence was highest in molars, followed by premolars and incisors.

The incidence of dry socket was higher on right side of the mouth as compared to left side in both upper and lower jaws. However; all these differences were not statistically significant. All the extractions with dry socket complication were carried out by undergraduate and postgraduate students. However; there was also no difference in terms of the operator (undergraduate and house surgeons).

## DISCUSSION

The present study showed 3.5% overall incidence of dry socket in a dental hospital. Several previous studies carried out in different parts of the world have reported similar level of dry socket incidence[22' 23]. The causality of dry socket is multifactorial. Studies have reported an association with between increased incidence of dry socket with local application of antifibrinolytic agents[16'24], Oral bacteria[25'26], Poor oral hygiene[27,28], trauma[9'10], surgical extractions[29'30], inexperience surgeon[11'30], tobacco use[31'32], Oral contraceptive use[33.35], increased age & female dominancy[17], incorrect technique[36] and third molar surgical extractions in patients 25 years of age or more[37]. Therefore; a variation in dry socket incidence is expected from study to study depending on all the factors narrated above.

- In the present study, incidence of dry socket was higher in lower jaw tooth extractions as compared with upper jaw tooth extractions. This was in agreement with other similar studies[22'23]. The higher incidence of dry socket in mandible has been attributed to high density of bone & insufficient blood supply. All the cases of dry sockets were from simple extractions performed by undergraduates and house surgeons. An association between incidence of dry socket and inexperience has been previously reported[11'23'30]. Many authors have hypothesized that the inexperienced surgeon is more likely to create greater trauma and require more time for surgery, increasing the chance of dry socket[9'11].

The present study showed higher incidence of dry socket in female patients as compared with male patent with a ratio of (1.7:1). The same result of female preponderance (1.4:1 & 1.08:1) was observed in similar previous studies[22' 23]. Oral contraceptives and female gender have been related to dry socket frequency. Estrogens and other drugs would activate the fibrinolytic system in an indirect way (increasing the factors II, VII, VIII, X and the plasminogen), contributing to the premature destruction of the clot and the development of dry socket. These changes in endogenous estrogens during the menstrual cycle also have influence, diminishing the fibrinolytic system in the days 23rd to 28th of the menstrual cycle. It is believed that dry socket may affect women in relationship of 5:1 in respect to the masculine sex, with a bigger frequency among those taking oral contraceptives'. A systematic review concluded that risk of dry socket is more in females who are using oral contraceptive compared to those not using these drugs.

The present was about dry socket incidence primarily after simple extractions; and molars showed higher dry socket incidence as compared with all other teeth. Studies have reported higher dry socket incidence after surgical extractions as compared to simple extractions; still others reported higher incidence of dry socket after removal of molars comparing with other teeth[26]. A recent study reported a frequency of dry socket from 20% to 30% after removal of third molars, al-most ten times more than other dental extractions[26]. The variability observed could be due to differences in experience of surgeons, angulation/or position of third molar, surgical procedure and duration of surgery [16'30'39.41.]

The present study showed a higher incidence of dry socket on the right side of the mouth than the left side. No previous study has reported such mouth side predilection for the incidence of dry socket. The results of future studies may confirm such a predilection towards right side of mouth. It could be related to habit of chewing on right side in most patients and/or bone nature on the more functional side.

Various methods of dry socket prevention have been suggested including thorough intraoperative and postoperative irrigation[16'19], placement of clot stabilizing factors/ antifibrinolytics[16] and use of antibiotics either topical or systemic[42'43]. Dry socket patients presented back mostly between 3 — 5 days postoperatively. They were treated conventionally with dressing of zinc oxide and eugenol mixed with gauze fibers and then packed in the socket as obtundant on the day of report, after saline irrigation". Dressing was removed after two days and followed by piece of *"sofra-tulae"* dressing packed in the socket every alternate day to avoid contamination and to encourage normal healing by body defense system. If pain persisted after first dressing then obduntant dressing was repeated. Nevertheless, prevention of this complication is highly recommended these days[45].

It can be concluded that incidence of dry socket was significantly higher in lower jaw as compared with upper jaw; and that the incidence was significantly higher in females as compared with males.

## REFERENCES


1 MacGregor AJ: Aetiology of dry socket: investigations. Br J Oral Surg 1968;6(1); 49-58

2 Krekmanov L, Hallander HO: Relationship between bacterial contamination and alveolitis circa dolorosa after surgical removal of mandibular third molars. Int J Oral Surg 1979;8: 430-434

3 Lilly GE, Osborn DB, Rael EM, Samuels HS, Jones JC. Alveolar osteitis associated with mandibular third molar extractions. J Am Dent Assoc 1974; 88:802-6

4 Blum IR. Contemporary views on dry socket (alveolar osteitis): a clinical Appraisal of standardization, aetiopathogenesis and management: a critical review. Int J Oral Maxillofac Surg 2002;31:309-17.

5 Houston JP, McCollum J, Pietz D, Schneck D. Alveolar osteitis: a review of its etiology, prevention, and treatment modalities. Gen Dent 2002;50:457-63

6 Kruger G: Textbook of Oral Surgery (ed 3). St Louis. MO, CV Mosby, 1968, p 128

7 Crawford JY: Dry socket. Dent Cosmos 1896.

8 Muhonen A, Venta I, Ylipaavalnienu P: Factors predisposing to post operative complications related to wisdom tooth surgery among university students. J Am Coll Health 1997;46:39

9 Catallani JE. Review of factors contributing to dry socket through enhanced fibrinolysis. J Oral Surg 1979;37:42-6

10 Ailing CC, Kerr DA. Trauma as a factor causing delayed repair of dental extraction sites. J Oral Surg 1957;15:3-10

11 Larsen PE. Alveolar osteitis after surgical removal of impacted mandibular third molars. Identification of the patient at risk. Oral Surg Oral Med Oral Pathol 1992;73(4):393-7

12 Meechan JG, Venchard GR, Rogers SN. Local anesthesia and dry socket. A clinical investigation of single extraction in male patients. Int j Oral Maxillofac Surg 1987;16 (3):279-84

13 Turner PS. A clinical study of dry socket. Int J Oral Surg 1982;11 (4): 226-31

14 Osborn TP, Frederickson G, Small IA, Torgerson TS. A prospective study of complications related to mandibular third molar surgery. J Oral Maxillofac Surg 1985;43:767-9

15 Heasman PA, Jacobs DJ. Clinical investigation into the incidence of dry socket. Br J Oral Surg 1984;22:115-122Lambert S, Reychler H. Dry Socket, Prevention and treatment Rev Stomatol Chir Maxillofac 1994;95:435

16 Birn H: Etiology and pathogenesis of fibrinolytic alveolitis (dry socket). Int J Oral Surg 1973;2:211-263

17 Cohen ME, Simecek JW. Effects of gender-related factors on incidence of localized alveolar osteitis. Oral Surg Oral Med Pathol Oral Radiol Endod 1995;79(4):416-22

18 Bonine FL: Effect of chlorohexidine rinse on the incidence of dry socket in impacted mandibular third molar extraction sites. Oral Surg Oral Med Oral Pathol Oral Radiol Endod 1995; 79:154

19 Shepherd J, Rinsing with chlorohexidine may reduce of dry socket after third molar surgery. Oral Surg Oral Med Oral Pathol Oral Radiol Endod 2005;6(2):36

20 Svajhler T, Knezevic G. Postextraction complications and the choice of anesthesia. Acta Stomatol Croat 1990;24(4):24151

21 Meechan JG, Venchard GR, Rogers SN et al. Local anesthesia and dry socket. A clinical investigation of single extraction in male patients. Int J Oral Maxillofac Surg 1987;16 (3): 279-84

22 Wagaiyu EG, Kaimenyi JT. Frequency of alveolitis Osteitis (dry socket) at Kenyatta National Hospital Dental. East Afr Med J 1989;66 (10):658-62

23 Oginni FO, Alagbe AO. A clinical evaluation of dry socket in a Nigerian teaching hospital. J Oral Maxillofac Surg 2003;61:871-876

24 Mannucci PM, Aberg M, Nilsson IM, et al: Mechanism of plasminogen activator and factor VIII increase after vasoconstrictive drugs. Br J Haematol 1985;30:81-93.

25 Timme AG, Buckner RY, Rebitski GF. New evidence implicating oral bacteria in etiology of dry socket. J Dent Res 1991;70:349

26 Torres-Lagares D, Serrera-Figallo MA, Romero-Ruiz MM et al, Update on dry socket: a review of the literature. Med Oral Patol Oral Cir Bucal. 2005;10(1):81-5; 77-81

27 Krogh HW: Incidence of dry socket. J Am Dent Assoc 1937; 24:1829

28 Tudsri S. Incidence of impacted wisdom teeth and complication in Thai community. J Dent Assoc Thai 1988;38 (4): 163-9

29 Nordenrum A, Grave S. Alveolitis sicca dolorosa after removal of impacted mandibular third molars. Int J Oral Surg. 1993; 12(4):226-31

30 Sisk AL, Hammer WB, Shelton DW, Joy ED. Complications following removal of impacted third molars: role of experience of surgeon. J Oral Maxillofac Surg 1986;44:855-9

31 Sweet JB, Butler DP. The relationship of smoking to localized osteitis. J Oral Surg 1979;37:732-5

32 James B, Sweet MS, Donald PB. The relationship of smoking to localized osteitis. J Oral Surg 1997;37:732-35

33 Catellani JE, Hervay S, Erickson SH, et al. Effect of oral contraceptives cycle on dry socket (localized alveolar osteitis). J Am Dent Assoc 1980;23:393

34 Catllani JE, Harvey S, Erickson SH, Cherkin D. Effect of oral contraceptive cycle on dry socket. J Am Dent Assoc 1980;101:777-80

35 Garcia AG, Grana PM, Sampedro FG, Diago MP, Rey JM. Does oral contraceptive use affect the incidence of complications after extraction of a mandibular third molar? Br Dent J 2003; 194( 8):453-5

36 Sweet JB, Butler DP, Drager JL. Effects of lavage techniques with third molar surgery. Oral Surg Oral Med Oral Pathol Oral Radiol Endod 1976;41:152-68

37 Haug RH, Perrott DH, Gonzalez ML, Talwar RH. The American Association of Oral & Maxillofacial Surgeons age-related third molar study. J Oral Maxillofacial Surg 2005;63:11061114

38 Sweet JB, Butler DP. Increased incidence of postoperative localized osteitis in mandibular surgery associated with pts using oral contraceptive. Am J Obstet Gynecol 1977;127: 518-9

39 de boer MP, Raghoebar GM, Stegenga B et al, Complications after mandibular third molar extraction. Quintessence Int. 1995;26(1):779-84

40 Khandker MH, Molla MR. Incidence of dry socket in surgical removal of impacted third molar. Bangladesh Med Res Coue Bull, 1994;0(2):60-7

41 Tsirlis AT, Iakovidis DP, Parissis NA. Dry socket: frequency of occurrence after intraligamentary anesthesia. Quintessence Int. 1992;23(8):575-7

42 Hall HD, Bildman BS, Hand CD. Prevention of dry socket with local application of tetracycline. J Oral Surg 1971;29:35-7

43 Curren JB, Kennett S, Young AR. An assessment of use of prophylactic antibiotics in third molar surgery. Int J Oral Surg 1974;3:1-3

44 Lambert S, Reychler H. Dry Socket, Prevention and treatment Rev Stomatol Chir Maxillofac 1994;95:435

45 Swanson AE, Prevention of dry socket: Am Overview. Oral Surg Oral Med Oral Pathol Oral Radiol Endod 1990;70:131-6.