

PROSPECTIVE STUDY OF THE DEVELOPMENT OF ALVEOLAR OSTEITIS AFTER 3RD MOLAR IMPACTED TEETH EXTRACTION IN RANDOMLY SELECTED PATIENTS

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ABSTRACT

Alveolar Osteitis is the most common post-surgical complication following extraction of impacted 3rd molar teeth. Various risk factors have been mentioned for this complication including gender, age, and amount of trauma during extraction, difficulty of surgery, inappropriate irrigation, infection, smoking, and oral contraceptive use. The aim of the current study was to evaluate the incidence of alveolar osteitis among patients who had undergone surgical removal of impacted third mandibular and maxillary molars in Oral and Maxillofacial Department of Khyber College of Dentistry, Peshawar, Pakistan and also to identify the background risk factors in terms of age of the patient and experience of the operating dentists.

A total of 1026 patients with a total of 1345 extractions formed the study group. Extractions to remove impacted third mandibular and maxillary molar teeth from 2006 to 2007 were included in this study. A questionnaire was designed in which the inclusion criteria age, gender, site of extraction, smoking and experience of the dentist while in exclusion criteria oral contraceptive use, menstrual cycle phase, systemic disorders, and use of antibiotics prior to surgery were included respectively.

The incidence of Alveolar Osteitis was 12.07% as a whole in both the genders, whereas 16.95 % alveolar osteitis developed in mandible and 7.34% in maxillary third molars extractions. However, incidence of Alveolar osteitis was significantly relevant to the patient's age, as well as the experience of the dentist in the extractions of impacted third molars.

Incidence of alveolar osteitis was higher where extractions were performed by the less experienced dentists due to the more traumas.

Key Words: Alveolar osteitis, Junior dentists, Impacted third molar, Risk factors.

INTRODUCTION

Alveolar Osteitis (AO) is a well-known complication after extraction or surgical removal of tooth. Commonly known as "dry socket" this condition remains a common postoperative problem that results in severe pain and repeated clinic/hospital visits. The exact pathogenesis of AO is not well understood. Many researchers have

studied alveolar osteitis, but most concepts are still subject to significant controversy. Dry socket, which is the generic term. Alveolar osteitis is more commonly used term.¹⁻³ In previous study reports many terms have been used for Dry socket such as, localized osteitis, alveolalgia, alveolitis sicca dolorosa, septic socket, necrotic socket, localized osteomyelitis, fibrinolytic alveolitis.⁴ Alveolar osteitis has been recently defined, as postoperative pain inside and around the extraction site, which increases in severity at any time between the first and third day after the extraction, accompanied by a partial or total disintegrated blood clot within the alveolar socket with or without halitosis.⁴ Generally dry socket is considered to occur 1-3 days after tooth extraction⁵, but 95-100% of AO have been reported within a week.⁶ Alveolar osteitis remains one of the most common postoperative complications after dental extractions and it is a good model to study bone infections in the oral cavity. The development of

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alveolar osteitis is a multifactorial event and an active role of microorganisms has been suggested, starting the chain of fibrinolysis.⁴ The incidence of dry socket has ranged from 1% to 4% of extractions, reaching 45% for mandibular third molars.⁷ It is one of the most studied complications in dentistry, and a great number of studies have searched for an effective and safe method for its prevention and treatment. The aim of the present study was to find out incidence of alveolar osteitis seen in patients of our department and its relation to the age of the patients and experience of the operators.

METHODOLOGY

One thousand three hundred forty-three maxillary and mandibular impacted third molar teeth, were removed at the Oral and Maxillofacial Department of Khyber College of Dentistry, Peshawar between 2006-2007, were prospectively collected and analyzed for the incidence of Alveolar osteitis (Dry Socket). Only the records of medically fit and healthy patients were considered for this study, patients taking medications for chronic diseases were excluded. All the patients were distributed randomly and were attended by forty seven junior dental surgeons and six senior dental surgeons respectively.

Several variables were collected from the records: Age, gender, degree and type of impaction, duration of the operation, surgical experience of the operator, smoking, the indication of teeth removal (prophylactic or therapeutic), and use of oral contraceptives.

Healthy individuals i.e. not suffering from any systemic disease were included while those using oral contraceptive or were in menstrual cycle phase, and or were suffering from any systemic disorders were excluded.

Removal of the third molar teeth and all patients signed a written consent form. The local anesthetic given to all patients was Xylocaine with adrenaline 1:80 000 and not more than five cartridges were given to a single patient.

Forceps or elevators were used in simple cases. In cases of impacted teeth, an envelope mucoperiosteal flap was raised and the bone overlying the tooth was removed using a slow speed round bur. In some cases a straight fissure bur was used to section the crown and the roots which helped the removal of tooth without any trauma. A sterile normal saline irrigation was used during the tooth sectioning and bone removal. After removal of teeth, wounds were irrigated and sharp areas were smoothened with bone file. A 3-0 Vicryl was used to close the wounds.

The following standardized postoperative regimen for all patients was prescribed; 400 mg of oral Metronidazole twice a day for 5 days, Ibuprofen 400 mg every 8 hours for 5 days. A written instruction sheet about possible complications and how to overcome them was handed over to the patients.

RESULTS

1026 patients were operated upon, 314 were females (30.60%) and 712 were males (69.40%). The overall incidence of alveolar osteitis was found 12.7% in both genders. The details of results can be seen in Tables 1-4.

DISCUSSION

Birn suggested that the etiology of AO is an increased local fibrinolysis leading to disintegration of the clot. The fibrinolysis is the result of plasminogen pathway activation, which can be accomplished via direct (physiologic) or indirect (non-physiologic) activator substances.⁸ Direct activators are released after trauma to the alveolar bone cells. Indirect activators are elaborated by bacteria. The fibrinolytic activity is local because initial absorption of plasminogen into the clot limits the activity of plasmin. In fact, it was found that active plasmin is inactivated in the general circulation by antiplasmins.⁹

It has been reported in the previous study reports that alveolar osteitis is more common following the

TABLE 1: DISTRIBUTION OF ALVEOLAR OSTEITIS ACCORDING TO THE SITE

S. No.		+ VE cases	-VE cases	Total	%age Positive cases
1	Mandible	175	857	1032	16.95 %
2	Maxilla	23	290	313	7.34 %

i.e

+ ve cases mean development of alveolar osteitis

-ve cases mean normal healing after 3rd molars extraction

TABLE 2: DISTRIBUTION OF ALVEOLAR OSTEITIS (DS) ACCORDING TO GENDER

Gender	Alveolitis		
	Alveolitis +ve	Alveolitis -ve	Percentage
Male	79	633	11.06%
Female	51	263	16.24%

extraction of mandibular third molars^{10,11} and frequency reported in different studies varied between 5 and 30%.^{10,11} Some authors believe that increased bone density, decreased vascularity, and a reduced capacity of producing granulation tissue are responsible for the site specificity. However, there is no evidence suggesting a link between AO and insufficient blood supply. The area specificity is probably due to the large percentage of surgically extracted mandibular molars

TABLE 3: DISTRIBUTION OF ALVEOLAR OSTEITIS ACCORDING TO PATIENT AGE

Age	Lower Jaw	Percentage	Upper Jaw	Percentage
16~20 years	78	07.55%	15	04.79%
21~25 years	154	14.93%	34	10.86%
26~30 years	201	19.48%	68	21.73%
31~35 years	253	24.52%	97	30.99%
36~40 years	130	12.52%	42	13.42%
41~45 years	113	10.95%	36	11.50%
> 45 years	103	09.98%	21	06.71%
Total	1032	100%	313	100%

TABLE 4: DISTRIBUTION OF ALVEOLAR OSTEITIS ACCORDING TO SURGEON'S EXPERIENCE

Surgeon		Total
Senior surgeon	Junior surgeon	
15	115	130
275	721	993

and may reflect the effect of surgical trauma rather than the anatomical site.¹² Present study results also coincide with the recently conducted study by Majid Eshghpour et al, the frequency of AO development following mandibular third molar surgery was 14.74%.¹¹ Similarly in the current study the frequency of AO, was in accordance with previous study reports, that alveolar osteitis developed twice in mandible compared to maxilla.

Many authors claim that female gender, regardless of oral contraceptive use, has been proposed as a risk factor for the development of AO.^{13,14,15}

Babatunde et al reported more females (63.2%) that presented with dry socket than male and most of the patients were in the fourth decade.^{16,17,18} In this particular study, development of dry socket was observed more in females than in males. But in Lagos¹⁸, the ratio gap between males and females was much higher, 1:4.4, and age was mostly in third decade. Similarly in this study more than 30% patients with dry socket were in third decades. In the present study we had all the single tooth extractions, as reported in Upadhyaya and Humagain study reports where Eighty-nine percent had extraction of single tooth.¹⁷ In this study ratio of alveolar osteitis was more in female than of male patients. According to the previous study reports, consumption of oral contraceptives in women increased the rate of AO significantly. The results showed that oral contraceptives could increase the DS risk double to triple.^{19,20,21} In present study also the Dry socket developed more frequently in female than male patients.

Menstrual cycle increased the incidence of dry socket significantly. This increase was observed during 8th to 21st day of a 28-day cycle. During this period, the level

of estrogen (estradiol) increased in blood circulation peri-ovulation and might contribute to the alveolar osteitis.²²

Catellani et al. found that incidence of AO in oral contraceptive users increased during the 1-22 days of tablet when they consumed; in contrast, it was significantly lower during the 23-28 days when they didn't consume.¹⁹

Little agreement is found as to whether age is associated with peak incidence of AO. In the recently conducted study, it has been reported that the frequency of AO is age dependent, with most studies marking the peak age of 20 to 40 years old.²⁴ Present study is in agreement with some other studies, and found a significant role for age, as reported by Baqain et al and Chuang SK et al respectively.^{25,26} The literature supports the general axiom that the older the patient, the greater the risk.²⁷ Blondeau et al²⁸ concluded that surgical removal of impacted mandibular third molars should be carried out well before age of 24 years, especially for female patients. AO has been commonly observed in patients 40 to 45 years old. In this study alveolar osteitis developed between 31 to 35 years on average. These results are almost similar to Ogunlewe et al²⁹ and Khorasani³⁰ who reported that the average age of people with dry socket was 36.61±13.59 years and without dry socket 42.86±15.49 years.

The relationship of AO with age in the present study can be attributed to more acute periodontal infections and pericoronitis in this age range.³¹ Generally, this complication can be seen more during third molar surgery and in fourth decade of life.

C. Upadhyaya and M. Humagain, et al had reported that operator technique and skills are essential factors in the occurrence of dry socket.¹⁷ Many other studies claim that operator's experience is a risk factor for the development of AO. Larsen et al³² concluded that operators inexperience could be related to a bigger trauma during the extraction, especially surgical extraction of mandibular third molars. This study (Afshin Haraji et al³³ and many others have confirmed that traumatic surgeries can increase the frequency of DS.²⁵ Trauma, difficulty, and duration of surgery seem to be the most important DS risk factors. Traumatic surgeries might increase the odds of AO up to 10 times.³⁴

Alexander²⁷ and Oginni et al³⁵ both reported a higher incidence of AO following extractions performed by the less experienced operators. Therefore the skill and experience of the operator should be taken into consideration. The results in the present study have been in concurrence with the above study reports, as shown in the table 4, where AO were developed in extractions performed by junior dentists.

CONCLUSION

This study showed that gender and age had a direct and profound impact on post-extraction alveolar osteitis and more importantly experience of the operator helps in reducing the frequency of dry socket.

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