

Evaluation of Post Operative Infection Following Dental Extraction With or Without Antibiotics - A Clinical Study

Running title: Evaluation of post operative infection following dental extraction with or without antibiotics.

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Abstract: **Aim:** The aim of our study is to compare the effects of pre operative and post operative administration of amoxicillin and to analyze its beneficial and harmful effects. **Objective:** The study was conducted to evaluate the post operative instructions following a dental extraction with or without antibiotics. **Background:** Tooth extraction is a to remove hopeless teeth that are affected by decay, trauma, periodontal diseases even during orthodontic treatment or impacted tooth or removal of teeth for therapeutic reasons .Tooth extractions are usually done using local anaesthetic injection to reduce painful sensation .4].There are various complications that arise post extraction. Complications that are seen commonly are dry socket, erythema, pus discharge, excess bleeding. Another common problem that is seen in delayed wound healing. Post extraction antibiotics such as penicillin and amoxicillin are used most commonly. **Results:** The results showed that out of the 52 patients, only 2 patients reported with post operative bleeding and dry socket. There was no statistically significant difference (P value - 0.280) **Conclusion:** Within the limitations of the study we can conclude that, antibiotics are not required after simple extractions in patients who are not medically comprised nor do they have any role in preventing postoperative complications.

Keywords: Antibiotics, Bleeding, Complications, Dry Socket, Extraction

1. Introduction

A dental extraction also referred to as tooth extraction, exodontia, exodontics, is the removal of teeth from the dental alveolus in the alveolar bone. Tooth extraction is a to remove hopeless teeth that are affected by decay, trauma, periodontal diseases even during orthodontic treatment or impacted tooth or removal of teeth for therapeutic reasons .Tooth extractions are usually done using local anaesthetic injection to reduce painful sensation . Some teeth are more difficult to remove for several reasons, especially If a tooth is buried in the bone, a surgical or trans alveolar approach may be required, which involves cutting the gum away and removal of the bone which is holding the tooth in with a surgical drill. After the tooth is removed, stitches are used to replace the gum into the normal position. Extraction difficulty increases when the following conditions exist: dense supporting bone, difficult root morphology , teeth with large restorations or decay, adjacent teeth with large restorations, and brittle teeth associated with endodontic treatment[1].Oral cavity has one of the most diverse spectrums of bacterial flora in the body[2,3]. So after extraction when the oral cavity is left unchecked, it can contribute to local and systemic ill health [4].There are various complications that arise post extraction. Complications that are seen commonly are dry socket, erythema, pus discharge, excess bleeding. Another common problem that is seen in delayed wound healing. Post-operative bleeding is commonly due to venous bleed from nutrient blood vessels in the supporting bone but can also be due to an arterial source. Patients who are on medications such as anti-platelet drugs, anti-coagulants or systemic diseases such as haemophiliacs, liver

diseases etc may have prolonged bleeding. Post-operative soft-tissue swelling can be a normal part of the healing process, particularly during surgical extraction of third molars, the removal of bone and the elevation of periosteum can cause significant swelling in the post-operative period. Dry socket is also known as alveolar osteitis. It is delayed wound healing of the alveolar bone after dental extractions. It can be confused with normal post-operative pain. Dry socket is usually diagnosed from post operative 3 to 5 days when the pain suddenly intensifies instead of gradually decreasing. The pain is described as throbbing in nature and is difficult to control. There is also a distinctive foul odour from the wound that the patient may complain about. Examination of the extraction socket will reveal bare bone or minimal granulation tissue. The pain stems from the direct communication of the oral cavity with the socket base. The incidence of dry socket ranges from 1 percent to 3 percent[5,6]. The inferior alveolar nerve and artery are both contained within the inferior alveolar canal. Antibiotics are thought to increase postoperative comfort following exodontia by preventing wound infection and therefore pain. To reduce all these complications antibiotics are prescribed post extraction. There are evidences that antibiotics reduce the risk of infections. Post extraction Antibiotics such as penicillin and amoxicillin are used most commonly. Erythromycin is usually prescribed when patients have allergies to penicillin or amoxicillin. Use of antibiotics does not seem to have a direct effect on manifestation of fever, swelling or trismus seven days post-extraction. There are also concerns about development of antibiotic resistance which advises against the use of prophylactic antibiotics in practice [7]. A new class of

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antibiotics has not been discovered since the 1980s. Indiscriminate use of the current generation of antibiotics has led to the propagation of various resistant organisms [8]. It is therefore imperative that the use of antibiotics be strictly preserved for use only where specifically indicated. Dental prescriptions may account for as much as 7–9% of total antibacterial prescriptions in primary care in some settings [9]. This places a heavy burden of responsibility on dental surgeons to use antibiotics very selectively where indicated and not simply as a routine prophylaxis.

Prescription of antibiotics after simple tooth extraction has remained a controversial topic amongst dental academia. Antibiotics are thought to increase postoperative comfort following exodontia by preventing wound infection and therefore pain. Although bacteremia certainly occurs during simple exodontia [10], it also occurs during many other routine dental procedures in which there is no justification for antibiotic therapy. This is because the body's host response is more than sufficient to counter this level of bacteremia. The current trend is shifting to the notion that antibiotics are not justified following simple extraction[11].The value of antibiotic therapy in this part of the world has been questionable as the general consensus amongst dental surgeons is that antibiotics are essential to minimize postoperative complications. This trend is exacerbated by patients demand for and often self-prescription of antibiotics even in circumstances where antibiotic therapy is clearly not indicated. There are various studies which say that antibiotics are not necessary after an extraction . They also state that antibiotics should be given only to patients with systemic illness like diabetes mellitus, hypertension and bleeding disorders. Our study is to compare the effects of pre operative and post operative administration of amoxicillin and to analyze its beneficial and harmful effects.

2. Materials and Methods

Types of Randomization: Simple Randomization

Sample size: The sample size is 52

Inclusion criteria: Both male and female patients; Patients aged between 20 and 50 years ; Patients with a good systemic health ;Patients undergoing simple extractions ; Patients undergoing only single extraction at a time of maxillary or mandibular teeth .

Exclusion Criteria: Patients undergoing surgical extractions; Patients with deciduous teeth; Patients undergoing extraction of impacted third molars; Patients with systemic diseases such as diabetes mellitus, hypertension and bleeding disorders; Patients currently taking antibiotics or have had antibiotics 3 days prior to extraction.

Data Collection: All patients who fulfilled all those inclusion criteria were included in the study.

All extractions were performed in Undergraduate Clinics at Saveetha Dental College and Hospitals by Undergraduate students under the supervision of Oral surgeons following

the sterilization protocol: Regular surgical gloves and masks were worn during every single extraction. Local Anesthesia was given for every single extraction using a 2ML syringe. Inferior alveolar nerve block was used for mandibular molars and premolars and local infiltration was used for mandibular anteriors and all maxillary teeth. Extractions were performed with simple instrumentation using a mouth mirror, mucoperiosteal elevator and forceps. Instruments were sterilized before and after use. Bleeding was stopped using a cotton pressure pack. Patients were asked not to remove the cotton for atleast half an hour. Patients were given post operative instructions that has to be followed post extraction. All these patients who underwent extractions were divided into two major groups based on simple randomization.

Group 1: Patients receiving antibiotics

Group 2: Patients not receiving antibiotics

Group1

28 Patients belonged to this group. All these patients were prescribed Amoxicillin 500mg thrice daily aceclofenac 100mg twice daily for 3 days after extraction

Group 2

24 Patients belonged to this group. All these patients were prescribed only aceclofenac 100mg twice daily for 3 days and were not given any antibiotics post extraction.

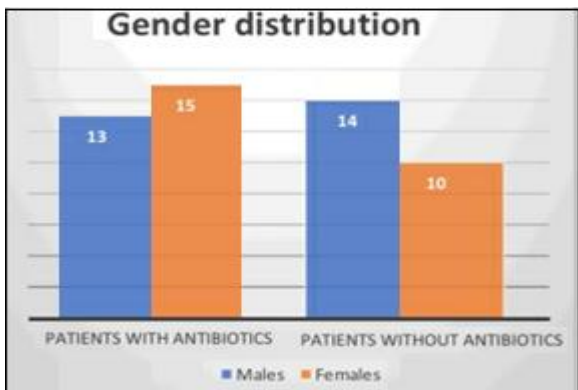
Data Analysis: Data was analyzed using Microsoft excel.

Patients were recalled after five days and checked for the following criteria:

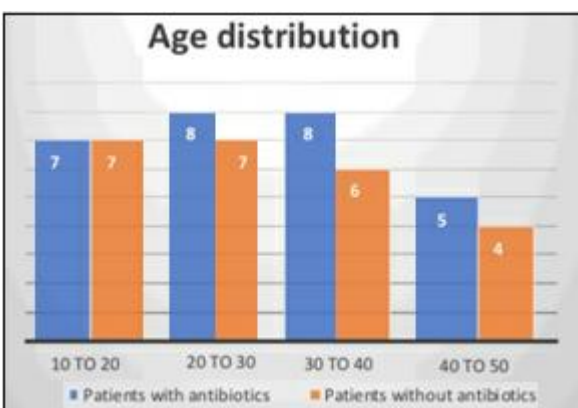
- Dry socket
- Delayed healing
- Excess bleeding
- Erythema
- Pus discharge

	Patients with antibodies (28)	Patients without antibodies (24)
Gender Distribution	Male-15 Female- 13	Male-14 Female-10
Age Distribution	10 to 20- 7	10 to 20-7
	20 to 30- 8	20 to 30-7
	30 to 40- 8	30 to 40-6
	40 to 50- 5	40 to 50-4
Type of Extraction	Maxillary Teeth-12	Maxillary Teeth-11
	Mandibular Teeth-16	Mandibular Teeth-13

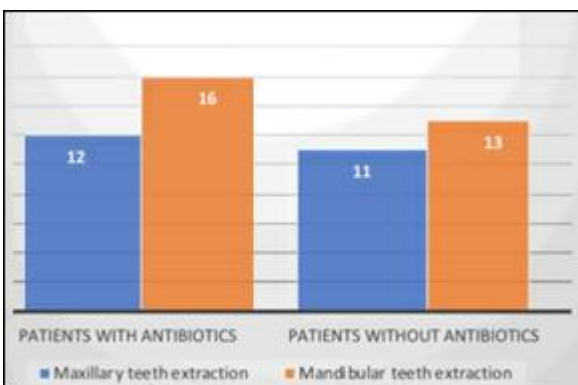
3. Results



Out of 28 patients in the group I, 53.5% of them were females while 46.4 % of them were males. In the other group of 24 patients who were not given antibiotics, 58.3% were males and 41.6% were females. Extraction was more commonly seen in the age group of 20 to 40 years.



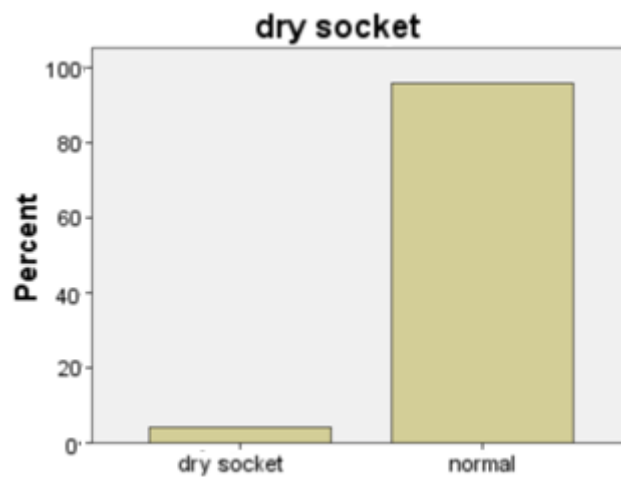
Out of the total sample, 16 teeth were mandibular teeth extraction while 12 were maxillary teeth Extraction in antibiotics group. In non antibiotics group, 13 were mandibular teeth and 11 were maxillary teeth extraction.



Type of Extraction

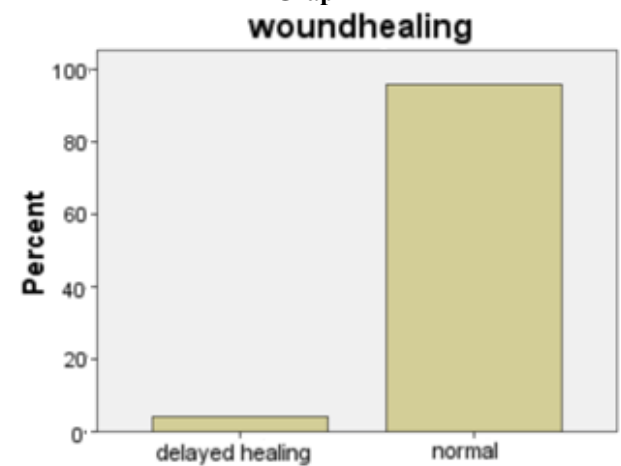
Incidence of post operative infections between two groups

	Incidents in patients given antibodies (28)	Incidents in patients not given antibodies (24)
Dry Socket	0	1
Excess Bleeding	0	1
Delayed Healing	0	1
Erythema	0	0
Pus discharge	0	0



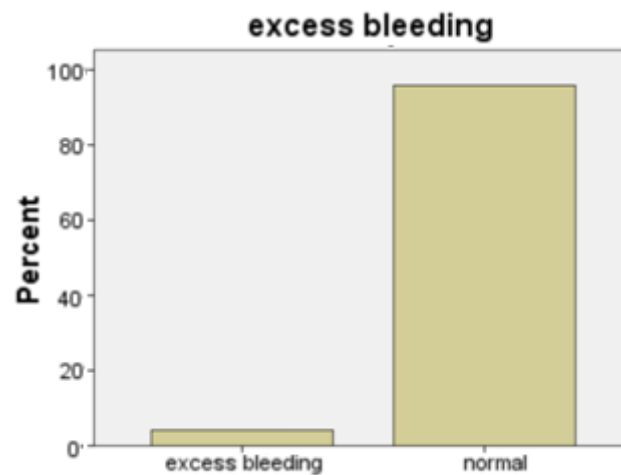
dry socket

Graph 1



woundhealing

Graph 2



excess bleeding

Graph 3

Hypothesis Test Summary

	Null Hypothesis	Test	Sig.	Decision
1	The distribution of DelHeal is the same across categories of Group.	Independent -Samples Mann-Whitney U Test	.280	Retain the null hypothesis.
2	The distribution of Excbleding is the same across categories of Group.	Independent -Samples Mann-Whitney U Test	.280	Retain the null hypothesis.
3	The distribution of DrySocket is the same across categories of Group.	Independent -Samples Mann-Whitney U Test	.280	Retain the null hypothesis.

Asymptotic significances are displayed. The significance level is .05.

4. Discussion

The results unequivocally point towards the use of antibiotics following extraction. This was proved by the fact that there was only very few cases of infection amongst the entire sample. These results are similar to the results in other studies such as those done by van Eeden and Bütow [12] and Agrawal et al. [13]. Conversely, these findings were in contrast to a study done by Arteagoitia et al [14]. In that study there was a significant rise in rate of post operative complications in individuals who were not prescribed antibiotics about 13%. But it should be mentioned that the study was done exclusively on impacted Molars so it has lesser influence on our study. This is not to say that there were no postoperative complications. There is incidence of dry sockets, excess bleeding and delayed healing even in our study. But it is very less when compared to other studies. This is not surprising as dry socket is a phenomenon which relates to lack of clot retention/formation within the socket and is not considered an infectious process. Dry socket was found only in one group (Non antibiotics group) and it was not found in patient given antibiotics.

It was in contrast to other studies done by Arteagoitia et al. [15] and López-Cedrún et al. [16] which noted no difference in prevalence of dry socket when postoperative antibiotics were given. However, it should be noted that in a study conducted by van Eeden and Bütow [17], there were no cases of dry socket in individuals who were given antibiotics, whereas 15.8% of those who were not given antibiotics presented with dry socket. In other studies the vast majority of dry socket cases were reported in females. Conversely, males showed a comparatively negligible incidence of dry socket. This aspect was not considered in our study.

Dry socket can be caused by traumatic extractions [18]. So that cannot be the reason for the incidence of dry socket in our study. Delayed healing was seen only in one patient. Usually delayed healing might be seen commonly in patients with systemic diseases like diabetes mellitus. But in this study patients with systemic diseases were not included. So there must be some other reason for delayed healing like not following the protocol. Such condition was not found in any other study. Even excess bleeding was found only in one patient. Patient might not have followed the post extraction protocol properly which would have lead to excess bleeding.

In the study done by Waqaf Younis et.al.patients belonging to antibiotics group reported more adverse effects when compared with their counterparts in the no antibiotic group. This is in contrast to our study where antibiotics group did not have any of the adverse effects which were not included in the study. There was also a study done Danda and Ravi at Saveetha

Dental College about Antibiotics prescription post orthognathic Surgery [19]. Another study was also done at Saveetha Dental College regarding the effectiveness of prophylactic antibiotics post extraction of impacted third molar [20].

On a community level the overuse of antibiotic has many consequences such as promoting the development of resistant organisms [21]. They may also be associated with unfavorable drug interactions as demonstrated by Hersh [22].

The vast majority of dental practitioners in this region routinely prescribe antibiotics as a preventive measure to avoid postoperative complications, namely, pain and infection. This can be used because the use of a stronger analgesic is a much better option after simple extractions to reduce pain in lieu of antibiotics.

5. Conclusion

Antibiotics are not required after simple extractions in patients who are not medically comprised nor do they have any role in preventing postoperative complications. Dental practitioners must show greater responsibility and selectivity when prescribing antibiotics.

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