MOLAR EXTRACTION; EFFECT OF CHLORHEXIDINE GEL APPLICATION TO PREVENT DRY SOCKET AFTER MANDIBULAR 3RD MOLAR EXTRACTION

Shahzad Waheed Qureshi¹, Maha Siddiqui², Gulrez Amin³, Aliha Liaquat⁴, Sundas Chaudhary⁵

ABSTRACT… Introduction: Dry socket (DS) or Alveolar osteitis (AO) is a common post extraction complication in third molar removal. Various techniques have been used to reduce the risk of DS. Objectives: To evaluate the effect of Chlorhexidine (CHX) gel in preventing the development of DS. Study Design: Randomized double blind case-control study. Setting: Oral and Maxillofacial Surgery Department of University College of Dentistry (UCD), The University of Lahore, Pakistan. Period: July 2017 to December 2017. Methodology: Patients having impacted mandibular 3rd molars selected for surgical extraction. Randomly selected one group consisted of 30 patients received CHX gel and the other group again of 30 patients considered as the control. The outcome variable was formation of DS and the predictor variable was CHX gel application. Data were processed using chi-square test with the confidence interval of 95%. Results: 60 cases (39 females and 21 males) with average age of 22 years ± 5 years underwent 3rd molar extractions. Total 09 sockets (15%) developed DS. The frequency of DS in CHX gel (2 cases, 6.7%) was significantly lower than control (7 cases, 23.3%) (P-value < 0.05). Conclusion: CHX gel can reduce the risk of development of DS after mandibular 3rd molar surgical extraction.

Key words: Alveolar Osteitis, Chlorhexidine Gel, Dry Socket, Impacted Mandibular 3rd Molar.

INTRODUCTION

Dry socket (DS) is a poorly understood form of post-operative pain in the area of extracted tooth, which happens due to loss of a blood clot.⁴ Dry socket is featured with severe pain, initiating in initial three days of post-surgery associated with smell, bad taste, or respective side lymphadenopathy. However, DS is resolved within ten days with no intervention, but patient requires several follow up visits.¹³

Even if the etiology of AO is debated, it may be multifactorial.¹⁷ Some precipitating factors were recognized; hypovascularity due to the density of the bone, anesthetic agents (vasoconstriction), systemic conditions/disease, smoking, age, oral contraceptive (OCP) and traumatic extraction.¹⁹,²⁰,²¹

Mandibular impacted tooth extraction is a routine procedure carried out by dental surgeons. Dry socket (DS) is a common complication occurring after mandibular 3rd molar surgery.¹ Different studies reported incidence of dry socket in simple extractions as 1% to 4% while in surgical extractions as 5% to 30%.²

Different methods have been adopted to reduce the DS development, e.g. application of antifibrinolytics, clot stabilizing agents, steroids, systemic and local antibiotics, chlorhexidine (CHX) mouthwashes, and gels.⁴,⁵

Chlorhexidine is having antiseptic properties, and therefore effective against aerobic and anaerobic bacteria.⁶,⁷ CHX is available in different forms but the CHX mouthwash is the most commonly used form.⁸ While the bio adhesive CHX gel extends its availability to the tissues, when applied in 3rd molar surgery.⁹
The purpose of this research was to assess the effectiveness of CHX gel in preventing dry socket formation after 3rd molar surgery.

Rationale of this study is that the CHX gel application in sockets after 3rd molar surgery has significant effect in decreasing frequency of dry socket (DS) in comparison to control sockets.

MATERIALS AND METHODS

Study Design
Randomized double blind case-control study.

Setting
This research was conducted at the Oral and Maxillofacial Surgery Department of University College of Dentistry (UCD), The University of Lahore, Pakistan. The ethical committee of UCD approved the study protocol and a signed informed consent was taken from all patients.

Sample Technique
Technique was “simple random sampling (SRS)”. Patients who were routinely reporting to surgeon for 3rd molar surgery, first patient was included in CHX group and second reported patient was included in control group, then third patient in CHX group and fourth in control group and so on, according to inclusion/exclusion criteria randomly.

Sample Size
Sample of our study comprised of total 60 patients who presented in Oral and Maxillofacial surgery department with impacted third molars. 30 patients selected randomly for application of chlorhexidine gel and 30 patients as a control group.

Sample size calculated by the formula Daniel, 1999.22

Study Duration
The study was carried out from July 2017 to December 2017.

Inclusion Criteria
Eighteen to thirty five years old age group, having ASA physical status I or II, and impacted mandibular 3rd molars with moderate difficulty level of surgery.10

Exclusion Criteria
Following categories of patients were excluded from study as these conditions have known effect in developing dry sockets;
• Smokers
• Patients on oral contraceptives,
• Patients had received antibiotics during the last 2 weeks
• Allergic to CHX,
• Patients who has been injected more than 2 anesthesia cartridges during surgery.

Data related to age and gender were also analyzed, along with data about DS formation and CHX gel application.

Single surgeon performed all surgeries using same standard protocol for 3rd molar extraction. Amoxicillin (500 mg three times daily) and in case of pain acetaminophen (500 mg three times daily) were prescribed to almost all patients.

After surgery, CHX gel inserted into sockets of randomly selected half of total patients and remaining half acted as control. Every patient was called on follow-up after 7 days of surgery to assess the status of socket regarding proper healing or dry socket formation. Also they were advised to come anytime for check-up in case of persistent pain. Such patients were assessed clinically for signs of DS.

For treatment of DS Alvogyl was placed after irrigation of socket. Moreover, systemic analgesics were prescribed in some cases.

Recorded data were analyzed, and chi-square test performed using SPSS (ver. 23).

RESULTS
Initially 70 patients were included; but, ten patients were excluded as we had to inject more than two anesthetic cartridges during surgery to control pain. Finally 60 cases (39 females and 21 males) with mean age of 22 years ± 5 years underwent 3rd molar surgeries.
Out of 60 surgical extraction cases, 09 (15%) shown DS formation in 1st week of surgery. Only 2 (6.7%) cases developed DS in CHX group, while 7 (23.3%) cases developed DS in the control group who has not received CHX gel (Table-III).

Chi-square test analysis showed no significant association between frequency of DS with gender, slight association with age groups (Table-I and Table-II), and strong relation between the frequency of DS and application of CHX gel (Table-III).

<table>
<thead>
<tr>
<th>Variable</th>
<th>DS</th>
<th>n %</th>
<th>P-Value</th>
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<tbody>
<tr>
<td>Gender</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Male</td>
<td>Yes</td>
<td>3 (33%)</td>
<td>18 (35%)</td>
</tr>
<tr>
<td>Female</td>
<td>Yes</td>
<td>6 (67%)</td>
<td>33 (65%)</td>
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Table-I. Distribution of dry socket on the bases of gender.

<table>
<thead>
<tr>
<th>Variable</th>
<th>DS</th>
<th>n %</th>
<th>Mean Age (Years)</th>
<th>P-Value</th>
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<tbody>
<tr>
<td>Age (years)</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>18-22</td>
<td>Yes</td>
<td>4 (45%)</td>
<td>34 (47.9%)</td>
<td>0.05</td>
</tr>
<tr>
<td>23-26</td>
<td>Yes</td>
<td>2 (22%)</td>
<td>25 (35.2%)</td>
<td></td>
</tr>
<tr>
<td>&gt;26</td>
<td>Yes</td>
<td>3 (33%)</td>
<td>12 (16.9%)</td>
<td></td>
</tr>
<tr>
<td>Control</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Total</td>
<td>Yes</td>
<td>9 (15%)</td>
<td>51 (85%)</td>
<td>0.04</td>
</tr>
</tbody>
</table>

Table-II. Distribution of dry socket based on age groups.

<table>
<thead>
<tr>
<th>Variable</th>
<th>DS</th>
<th>n %</th>
<th>Total</th>
<th>P-Value</th>
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<tbody>
<tr>
<td>CHX gel*</td>
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<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Yes</td>
<td>2 (6.7%)</td>
<td>28 (93.3%)</td>
<td>30</td>
<td>0.04</td>
</tr>
<tr>
<td>Control</td>
<td>7 (23.3%)</td>
<td>23 (7.7%)</td>
<td>30</td>
<td></td>
</tr>
<tr>
<td>Total</td>
<td>9 (15%)</td>
<td>51 (85%)</td>
<td>60</td>
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Table-III. Frequency of dry Socket on the bases of chlorhexidine gel.

*The frequency of DS was less in sockets in which CHX gel applied, in comparison to control sockets (95% confidence interval; P-value = 0.04).

DISCUSSION

The purpose of this study was to see the correlation between application of CHX gel and formation of dry socket after mandibular 3rd molars impaction surgery.

Our hypothesis was confirmed by the results as the frequency of DS in CHX gel group was prominently reduced from that of the control group.

There was no marked difference between males and females regarding the frequency of DS. But there is less association of age groups to dry socket development in our study (p-value=0.05). The frequency of DS was significantly less in CHX gel group in comparison to the control group (p-value = <0.04).

Very less work has been done locally on this topic. However according to Khitab U, Khan A, Sh ah SM 53% males and 47% females developed DS while in our study 33% males and 67% females developed DS.

One of the common complications occurred after mandibular 3rd molar surgery is Dry Socket. Different studies reported DS frequency from 5% to 30%. The frequency of DS in our study (15%) was in line with the previous studies.

Based on the results of our study, the frequency of dry socket formation was markedly less in CHX gel group (6.7%). Supporting our study, Hita-Iglesias et al, Torres-Lagares et al, Babar et al, found obvious decrease in formation of DS after 0.2% chlorhexidine gel application.

Use of CHX mouthwash has been observed to reduce risk of DS formation. However, Hita-Iglesias et al reported the gel form of CHX is more effective than the mouth rinses. This might be due to more exposure time period and sustain release of CHX during the first post-extraction day. Also there is no mucosal irritation, tooth discoloration, taste change, which are side effects in rinsing with mouthwash.

Younus S, Ghumman NU, Latif K, Chishty MS compared efficacy of CHX gel and mouthwash in reducing dry socket formation after 3rd molar surgery. However, according to their study dry socket developed in only 6% cases in CHX group which is in line with the results of our study 6.7%.

According to Channar K, Dall A, Memon A, Lal R 8.7% cases developed DS who were prescribed antibiotic and CHX rinses after 3rd molar surgery.
Their results were almost in range to our results which are 6.7%.25

Haraji A, Rakhshan V, Khamverdi N, Alishahi HK and Silvana Requena-Calla, Italo Funes-Rumiche also proved significant reduction in development of DS when CHX gel placed, hence strengthen results of our study.26,27

Joseph Rubio-Palau, Jordi Garcia-Linares, Juan-Antonio Hueto-Madrid, Javier González-Lagunas, Guillermo Raspall-Martin, and Javier Mareque-Bueno conducted a study in 2014 to assess CHX gel role in preventing dry socket, published in 2015. They found 22% reduction in dry socket formation in CHX group in comparison to placebo group. This study also reinforces results of our study.28

The less occurrence of DS in CHX gel group in comparison to control group may be due to the antiseptic qualities of this drug. Clot dissolution and dislodgment occurs due to fibrinolytic activity of bacteria that leads to dry socket formation.13,14 CHX prevents fibrinolytic activity of bacteria by reducing their number. This results in decreased DS development as demonstrated in the present study too.

Amount of surgical trauma is a major risk factor in formation of DS as difficult surgeries require more amount of bone grinding and tooth sectioning. Experience of the operator affects the amount of trauma too.15,16 To prevent biasness in results due to above said factors, single surgeon did all surgeries in patients of impacted mandibular 3rd molars with almost same difficulty level, using same protocol.

Most of the studies says that DS formation has relation with age groups, indicating the peak age of 20 to 40 years old.17,18 However, in our study slight association between age groups and frequency of DS was found, as there are more number of patients in age group 18-22 years (p-value= 0.05).

Local anesthesia with epinephrine could hamper the bleeding and hence no clot formation leading to dry socket formation. This factor was addressed by eliminating patients who had been injected more than two anesthetic cartridges.

The small sample size was one of the limitations of our research. More research is needed in more complicated impaction cases with advanced variables to be compared for CHX gel effect in development of dry sockets.

CONCLUSION
Besides the limitations of this study, CHX gel was effective in minimizing the development of dry socket. Hence we can use CHX gel in patients whom we suspect of dry socket formation after extraction.

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REFERENCES
MOLAR EXTRACTION


Nothing is more dangerous than ignorance & intolerance armed with power.

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