

Efficacy of 1.0% chlorhexidine gel versus 0.12% chlorhexidine rinse in reducing the incidence of dry socket following extraction

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ABSTRACT

Aim: The aim of this study was to compare the effectiveness of 1.0% chlorhexidine (CHX) gel versus 0.12% CHX rinse in reducing the incidence of dry socket. **Materials and Methods:** This clinical study was a randomized, prospective, and clinical trial with parallel groups in a single center. The study involved the treatment of 60 patients of both genders between the age group of 18 and 65 years old, from September 2017 to January 2018. **Results:** A total of 60 patients underwent intervention with each group comprising 30 patients. This study shows that the application of bioadhesive 1.0% CHX gel to the post-operative wound after extraction reduces the incidence of the dry socket when compared with the application of CHX rinse. **Conclusion:** The present study concluded that the topical application of 1.0% CHX gel postoperatively shows a significant reduction in the incidence of dry socket.

KEY WORDS: Dry socket, Chlorhexidine gel, Rinse

INTRODUCTION

One of the most common post-operative complications following extraction of the tooth is a condition known as “alveolar osteitis” also known as dry socket. It was first described by Crawford in the year 1896. It is very painful arising between 1 and 3 days following the extraction. The incidence of dry socket ranges from 0.5% to 5% for all the extractions but could reach up to 38% for the extraction of impacted mandibular third molars. Blum (2002) described alveolar osteitis as the post-operative pain in and around the extraction site, which increases in severity between 1 and 3 days after the extraction, accompanied by a partial or total disintegration of a clot within the alveolar socket with or without halitosis.^[1,2]

Several other terms are used in referring to this condition, such as alveolar osteitis, localized osteitis, alveolitis sicca dolorosa, alveolgia, septic socket, necrotic socket, fibrinolytic alveolitis, and

fibrinolytic osteitis.^[3] Epidemiological studies have identified various risk factors: Difficulty of extraction, smoking, advanced age, female gender, use of oral contraceptives, and immunosuppression surgical trauma.

Chlorhexidine (CHX) is a biguanide antiseptic agent that has been proved effective in the prevention of dry socket in the form of a mouth rinse and bioadhesive gel. The method of administration of this gel has the main advantage of providing a greater bioavailability in the application area, and therefore, the medication has a more prolonged release. The objective of this study was to compare the effectiveness of these two forms of CHX (1.0% CHX gel and 0.12% rinse) in the prevention of post-operative dry socket, by means of topical application to the wound during 7 days after the intervention.

MATERIALS AND METHODS

This clinical study was a randomized and prospective clinical trial with parallel groups in a single center. It was carried out in the Department of Oral Surgery, Saveetha Dental College, from October 2017 to

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January 2018. The study involved the treatment of 60 patients of both the genders between the age of 18 and 65 years.

Inclusion Criteria

All the patients presenting to the oral surgery outpatient department for extraction were included in the study.

Exclusion Criteria

Patients with acute infection or those using antibiotic or requiring antibiotic prophylaxis before the treatment, patients with immunosuppression, pregnant or lactating mothers, patients allergic to CHX, patients in whom the administration of epinephrine is contraindicated and non-cooperative patients were excluded from the study.

Two forms of chlorhexidine were studied, 1.0% CHX gel and 0.12% CHX mouth rinse. The aim was to compare the decrease in post-operative dry socket incidence among the group of patients who received the application of CHX rinse and those who received 1.0% CHX bioadhesive gel, both in topical form, during the post-operative period after extraction. The patients underwent the procedure under local anesthesia. Once the tooth has been extracted, the alveolus was cleaned, and rough bony edges and prominences smoothed. The wound was closed with 3–0 braided black silk suture.

The patients were randomly classified into two groups by means of simple allocation: The gel group and the rinse group. Postoperatively, the patients were prescribed Zerodol P (1 tablet every 12 h). The patients in the gel group continued topical application of 1.0% CHX gel on the surgical wound twice a day (morning and night time) during the post-operative week, beginning on the same day as the intervention. The patients in the rinse group were informed to use 0.12% CHX mouthwash twice a day (morning and night time) during the post-operative week, beginning on the same day as the intervention.

The independent variable was the application of CHX gel or CHX rinse during the post-operative period. The main dependent variable was the appearance of post-operative dry socket according to Blum's standardized criteria.

The subjects were evaluated on the 3rd and 7th post-operative day. Diagnosis of dry socket was confirmed when patients presented with post-operative pain in and around the dental alveolus that had increased in severity between 1st and 3rd post-operative day and was accompanied by partial or total loss intra-alveolar blood clot. In addition, the risk factors associated with dry socket were analyzed: Smoking, oral contraceptives, and degree of difficulty of extraction.

RESULTS

A total of 60 patients were included in the study. Of these 60 patients, 27 were female and 33 were male. Nineteen male patients were smokers and two female patients were taking oral contraceptives. There were 30 patients in the gel group and 30 patients in the rinse group. The average age was 31 years old (ranging from 18 to 65 years). Details of both the group regarding age, gender, smoking habits, and the use of oral contraceptives are listed in Table 1.

In the gel group, 6.6% of dry socket incidence was found, while in the rinse group, there was 30% of incidence.

Chi-square statistic value is 5.455.

$P = 0.019517$.

The result is significant at $P < 0.05$.

None of the patients experienced any complications to the treatment, and there was sufficient tolerance in both groups.

Incidence of dry socket in the study population which includes smokers & non-smokers; those under oral contraceptives are elaborated in [Tables 2-4].

DISCUSSION

There are two main theories regarding the etiopathogenesis of dry socket: Bacterial theory and Birn's fibrinolytic theory. Considering these two theories, the prevalence of one theory over another is not accepted as there is no conclusive data to accept or reject either theories. The origin of the dry socket is believed to be the combination of both the theories.^[4]

There are many contributing risk factors which have been mentioned in the literature which acts together

Table 1: Frequency distribution of study participants

Participants	Gel group (n=30)	Rinse group (n=30)
Age, mean (year)	29	31
Age, range (year)	18–65	18–65
Gender		
Male	14	19
Female	16	11
Smoker		
Yes	8	11
No	22	19
Contraceptives		
Yes	1	1
No	29	29
Alveolar osteitis		
Yes	2 (6.6)	9 (30)
No	28 (93)	21 (70)

Table 2: Incidence of dry sockets among smokers and non-smokers

Participants	Gel group	Rinse group
Smokers		
Total extractions	8	11
Dry sockets	1	5
Non-smokers		
Total extraction	22	19
Dry sockets	1	3

Table 3: Incidence of dry socket among female patients who take oral contraceptives

Participants	Gel group	Rinse group
Oral contraceptives		
Total extractions	1	1
Dry sockets	0	1
No oral contraceptives		
Total extraction	15	10
Dry sockets	0	3

Table 4: Occurrence of dry socket in the study population

Participants	Group 1	Group 2
Alveolar osteitis present	2 (5.50) (2.23)	9 (5.50) (2.23)
Alveolar osteitis absent	28 (24.50) (0.50)	21 (24.50) (0.50)

to precipitate dry socket.^[5] Bacteria play a major role in clot breakdown. Furthermore, there is an increased incidence of dry socket seen in patients with the presence of periapical infection, periodontitis, and pericoronitis before extraction. Nitzan *et al.* (1983) have found that anaerobic bacteria such as *Treponema denticola* show plasmin-like fibrinolytic activity *in vitro*. Although bacteria play some minor role, there is no direct cause-effect relationship which is established between dry socket and bacteria.^[6]

The daily frequency of administration of CHX for the prevention of dry socket has been once in every 12 h. Greater controversy has been observed as regards the duration of treatment; however, both Berwick and Lessin^[7] and Bonine^[8] were not able to demonstrate the efficacy of the 0.12% CHX rinse in a single administration before dental extraction. Likewise, although some success was reported by Field *et al.*^[9] using irrigations with 0.2% CHX, and by Torres-Lagares *et al.*^[10] with the 0.2% gel, this dosing regimen seems insufficient to maximize efficacy in preventing dry socket.^[11] A single-dose administration of 0.2% bioadhesive CHX gel was also found to reduce the incidence of dry socket.^[12]

In the only study comparing two dosing forms of CHX for the prevention of dry socket, after applying treatment every 12 h, the 0.2% gel was seen to be

superior to the 0.12% rinse. However, further studies would be needed to compare the 0.2% gel with the rinse at the same concentration and with the 0.12% rinse under different administration regimens to determine which regimen and dosing form is most effective.^[13] While selecting the dosing form for CHX, the cost factor must also be taken into account. In this context, the gel dosing forms are clearly more expensive than the rinses.^[14]

Posteriorly, 0.2% CHX rinse was evaluated by Delilbasi *et al.*^[15] in a randomized, parallel-group and placebo-controlled study. A total of 62 patients were treated with CHX twice daily during 7 days after dental extraction, while 59 patients were treated with a saline solution using the same dosing regimen and for the same period of time. The authors found no differences in the appearance of a dry socket between the two groups of patients. On the other hand, Metin *et al.*^[16] conducted a randomized clinical trial involving 99 patients treated with a 0.2% CHX rinse. One group used the 0.12% CHX rinse twice a day during the week before and also the week following the extraction, while a second group only used the rinse in the week following the extraction. The patients were evaluated 7 days following extraction, and the results showed no differences in the incidence of dry socket between the two groups on the basis of the dosing regimen used.

Based on the results of the study, the 1.0% CHX gel, applied every 12 h for 7 days post-extraction, was found to be the best option for the prevention of dry socket.

CONCLUSION

To reduce alveolar osteitis after tooth extraction, it was observed that the use of post-operative CHX gel was adequate. The post-operative use of CHX is more feasible than both pre-operative and perioperative use. *P* value was found to be 0.019517, and the result is statistically significant.

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