the Journal of CONTEMPORARY DENTAL PRACTICE at www.thejcdp.com
Volume 7 Number 2 May 1, 2006

Comparison of Two Chlorhexidine Rinse Protocols on the Incidence of Alveolar Osteitis following the Surgical Removal of Impacted Third Molars

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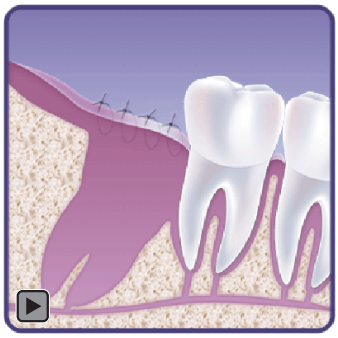

Abstract

Principles: Alveolar osteitis (dry socket) is the most common complication following the extraction of permanent teeth. This study was undertaken to compare the effect of two chlorhexidine rinse protocols on the incidence of alveolar osteitis in patients undergoing surgical removal of impacted mandibular third molar teeth.

Methods: A prospective randomized clinical trial was conducted among 99 subjects. Patients were randomly assigned into two groups. Subjects were instructed to rinse twice daily with 15 ml of chlorhexidine rinse 30 seconds for one week before and one week after surgery (group I) or one week after surgery (group II). Postoperatively, all patients were instructed to return in one week or sooner if bothersome pain increased or persisted. Data were collected regarding abnormal healing, presence of necrotic tissue, exposed bone, and absence of clot.

Results: The results indicated group I and group II were not statistically significant different in the reduction of alveolar osteitis.

Conclusions: To reduce alveolar osteitis after impacted third molar surgery, it was observed use of postoperative chlorhexidine rinse was adequate. The postoperative use of chlorhexidine is more feasible than both preoperative and postoperative use.

Keywords: Alveolar osteitis, chlorhexidine rinse, impacted mandibular third molar

Citation: Metin M, Tek M, Şener I. Comparison of Two Chlorhexidine Rinse Protocols on the Incidence of Alveolar Osteitis following the Surgical Removal of Impacted Third Molars. J Contemp Dent Pract 2006 May;(7)2:079-086.

Introduction

Alveolar osteitis (dry socket) is the most common complication after the extraction of permanent teeth.[1] Alveolar osteitis is an important postoperative problem for both the patient and surgeon.[2] The incidence rates of alveolar osteitis have been reported to range from 0.49% to 68.1%.[1] The patient experiences pain, loss of productivity, and the need for multiple return office visits. This is also costly to the surgeon.[2] The condition at the extraction site is characterized by the premature loss or necrosis of the blood clot, exposure of underlying bone, and moderate to severe postoperative pain two to five days after impacted third molar surgery.[1] The cause of alveolar osteitis has yet to be firmly established.[1] However, bacterial contamination is likely a major etiologic factor.[3] Patients with high preoperative counts of both aerobic and anaerobic organisms have been shown to develop alveolar osteitis in greater numbers than subjects with lower counts.[2] Several risk factors have been identified in association with alveolar osteitis.[2] These include increased difficulty of extraction, an inexperienced surgeon, tobacco or oral contraceptive use, the use of preoperative corticosteroids, the use of a local anaesthetic with a vasoconstrictor, and inadequate irrigation during and after extraction.[2]

Because of the proposed microbial origin, prevention of alveolar osteitis has focused on systemic and topical antimicrobial therapies.[2] Chlorhexidine, povidone iodine, 9-aminoacridine, metronidazole, tetracycline, and clindamycin in both systemic and localized regimens have been used as preventatives with varying degrees of success.[1]

In this clinical study the effects of two different protocols for use of 0.2% chlorhexidine mouth rinse (Klorhex, Drogsan, Ankara, TURKEY) on the incidence of alveolar osteitis after the extraction of impacted third molars were investigated.

Methods and Materials

This randomized, double blind, single-center clinical trial was conducted in the Department of Oral and Maxillofacial Surgery. The study included 99 healthy patients. Patient ages ranged from 17 to 46 years and mean age was 24.8 years. Ninety-nine mandibular third molars were extracted. All patients presenting for surgical

removal of impacted mandibular third molars were considered for inclusion in this study.

The details of the study were explained to the patients, and an informed consent form was obtained. Patients were randomly assigned into two groups. Patients' in group I rinsed with 15 ml for 30 seconds twice per day for both one week prior to and one week after surgery. Patients' in group II rinsed with 15 ml for 30 seconds twice per day for one week after surgery.

Before surgery, each patient completed a general medical history including smoking habits and the use of oral contraceptives. Patients with acute infection, pericoronitis, or those using antibiotics or requiring antibiotic before treatment were excluded.

Three oral and maxillofacial surgeons performed odontectomies. Each procedure was performed using local anesthesia and a standard surgical technique. Regional mandibular anesthesia was administered in the same way on each occasion using 2 cc of articaine with .006-mg/ml adrenaline (Ultracain DS, Hoechst, Frankfurt, Germany). Each third molar was exposed through the incision and reflection of an envelope flap. A sufficient amount of bone was removed with a round and fissure bur. After removal of the teeth, the surgical sites were rinsed with 10 ml of sterile saline solution, and the soft tissue was closed and sutured with 3-0 silk suture. No intraoperative or postoperative antibiotics were given.

After surgery, patients were instructed to return in one week or sooner if bothersome pain increased

or persisted. On the seventh day or on preceding days if pain was present, the extraction sites were evaluated for abnormal healing, presence of necrotic tissue, exposed bone, and absence of clot.

A positive diagnosis of alveolar osteitis was made on the basis of clinical and subjective findings. The clinical findings included evidence of one or more of the following: absence of clot, necrosis of blood clot, and exposed bone. Subjective findings included reports of persistent or increasing postoperative pain after the surgery with throbbing pain at the surgical site not relieved by mild analgesics. The same examiners made all diagnoses. The data were analysed using the Fisher's exact test.

Results

Nine cases of alveolar osteitis developed. Alveolar osteitis developed in three of 46 extraction sites within group I and six of 53 extraction sites in group II (Figure 1).

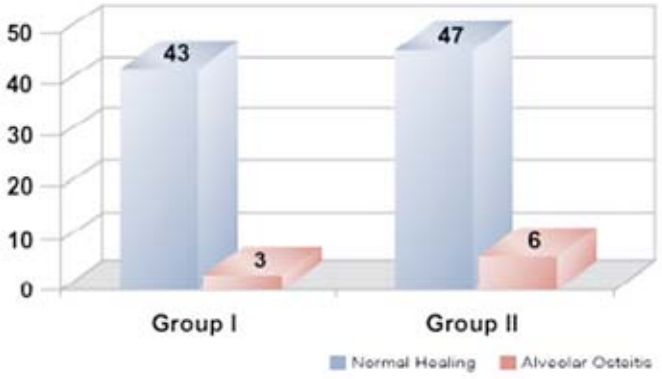

Figure 1. Incidence of alveolar osteitis in group I and group II patients.

Using the Fisher's exact test, the data were analyzed to compare the number of occurrences of alveolar osteitis for the two groups statistically (p=.498). The incidence of alveolar osteitis was 6.5% in group I versus 11.3% in group II; this represents a 42% reduction in alveolar osteitis in group I. The Fisher's exact test showed no significant difference between the two groups with regard to alveolar osteitis.

The effect of chlorhexidine use on the incidence of alveolar osteitis was also assessed separately for smokers and non-smokers. The incidence of alveolar osteitis in smokers was 17.9% and 3.4% in non-smokers.

In this study patients described 'numbness in the tongue' and 'disturbance of taste sensation' as a complication. Numbness in the tongue was in group I and group II 45.6% and 13.2%, respectively. However, disturbance of taste sensation was seen in 56.5 % of the patients in group I and in 11.3% of the patients in group II.

Discussion

Alveolar osteitis was first described by Crawford in 1896.[5] The incidence of alveolar osteitis following routine extraction of erupted teeth has been reported as 1% to 3%.[6,7] The reported incidence following the extraction of impacted mandibular third molars ranges from 1% to 65%.[8,9] This great variability is most likely due to differences in diagnostic criteria and uncontrolled variation within the population evaluated. In well controlled prospective studies with carefully defined diagnostic criteria, the incidence of alveolar osteitis falls in the range of 20 % to 31 %.[10-13] In our study the incidence of alveolar osteitis was 6.5% in group I and 11.3% in group II.

The pathogenesis of alveolar osteitis appears to result from the conversion of plasminogen to plasmin resulting in fibrinolysis of the blood clot within the extraction socket.[14] Multiple factors have been implicated in the etiology of alveolar osteitis including level of experience of the surgeon[15], surgical trauma[16], smoking[17,18], use of oral contraceptives[19,20], perioperative corticosteroids[21], regional blood supply[22],

and bacterial contamination.[13,23] Bacterial contamination is a major etiologic factor.[21] An increased incidence of alveolar osteitis occurs in the presence of pericoronitis, periapical infection, periodontitis, gingivitis, and in patients with poor oral hygiene.[7]

Ragno et al.[2] found a significant reduction in an incidence of alveolar osteitis can be achieved with use of 0.12% cholorhexidine solution as an immediate rinse and a seven day postoperative home rinse. Tjenberg[24] compared dental prophylaxis and pre-and postoperative oral rinses of chlorhexidine against a control group without benefit of cleaning or rinsing. Tjenberg found a reduction in alveolar osteitis from 17% in the control group to 3% in the test group.[24] Our study showed no statistical difference in the reduction of the incidence of alveolar osteitis between the two groups.

Conclusions

Although there was no statistically difference between group I and group II to prevent alveolar osteitis after impacted third molar surgery, complication numbness in the tongue and disturbance of taste sensation were statistically significant. To prevent alveolar osteitis after impacted third molar surgery, it was observed use of postoperative chlorhexidine rinse was adequate. The results of this study demonstrate the postoperative use of chlorhexidine alone is more feasible than both preoperative and postoperative use.

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