

Comparative study of the effect of warm saline mouth rinse on complications after dental extractions

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Abstract. The aim of the present study was to determine the effect of saline mouth rinse on postoperative complications following routine dental extractions. Patients aged ≥ 16 years, who were referred to the oral surgery clinic with an indication for non-surgical extraction of pathologic teeth, were prospectively and uniformly randomized into three groups. Group A ($n = 40$) were instructed to gargle six times daily with warm saline and group B ($n = 40$) twice daily; group C ($n = 40$) were not instructed to gargle with warm saline and served as controls. Information on demographic characteristics, indications for extraction, and the development of complications, such as alveolar osteitis, acute inflamed socket, and acute infected socket, was obtained and analyzed. There were no significant differences between patients who gargled six times daily with warm saline and those who gargled twice daily with reference to either alveolar osteitis or acute inflamed socket ($P > 0.05$). However saline mouth rinses at either frequency were beneficial in the prevention of alveolar osteitis in comparison with those who did not rinse. A twice-daily saline mouth rinse regimen is more convenient, and patient compliance may be better than with a six times daily rinse regimen.

Key words: warm saline rinse; complications; dental extractions.

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The use of warm saline rinse is commonly included in the instructions given to the patient by the dentist post-extraction, and this is also the case in Nigeria. Patients are usually instructed to gargle six to eight times daily for about a week. The warm saline rinse is prepared by dissolving one level teaspoon of salt in a glass of warm water (300–350 ml), thus producing a hypertonic solution that is believed to be bacteriostatic.¹ The

warm saline rinse is also thought to promote uncomplicated healing via vasodilatation, thereby bringing phagocytes to the extraction site.

However, an objective assessment of the efficacy of this agent is lacking, as revealed by a literature search. In fact, several electronic searches were done using the search terms ‘warm saline mouth rinse’, ‘warm saline gargle’, and ‘post-extraction instructions’ in PubMed,

Medline, Cochrane Library, and HINARI. A manual search of textbooks including lecture notes was also performed. The search yielded very little or no information on warm saline mouth wash and oral surgical procedures. In addition, the few publications that did mention the use of warm saline rinsing after dental extractions did not state the optimum number of gargles/day or the optimum duration of treatment for maximum benefit.^{2–5}

The use of warm saline rinse, even with all its acclaimed benefits, is not evidence-based. Anecdotal evidence has revealed that patients who have defaulted in terms of outright disregard for the instruction, in the number of gargles/day, or in the duration of use, have not suffered any complication, such as delayed healing, severe pain, or alveolar osteitis. Anecdotal evidence has also revealed that this practice is not promoted by dentists in some parts of the world. In addition, strict adherence to the instruction to use warm saline rinse may not be feasible for some, as patients are expected to gargle before and after every meal; no consideration is given to the patient's social activities or the patient's occupation.

The aim of this study was to determine the beneficial effect of different warm saline rinse regimens on the development of alveolar osteitis, acute inflamed socket, and acute infected socket following routine dental extraction.

Materials and methods

This was a randomized prospective single-blind study conducted in a dental and maxillofacial surgery department. Patients referred to the department with an indication for the non-surgical extraction of their pathologic teeth were selected and consecutively randomized into three treatment groups. The study protocol was approved by the institutional ethics committee. Details of the study, including the possible complications, were adequately explained to the selected patients who gave written informed consent for study participation.

Our inclusion criteria were: healthy patients, aged 16 years and above, who presented consecutively to the dental and maxillofacial surgery department with a clear indication for dental extraction within the study period. Patients with a history of an underlying systemic abnormality, such as uncontrolled diabetes mellitus, sickle cell disease, renal disease, or another immunosuppressive condition, as well as smokers and women on oral contraceptives, were excluded. Also excluded were patients on steroid medications, immunosuppressive therapy, those with previous radiotherapy to the head and neck region, and patients with a dentoalveolar abscess or facial cellulitis. Patients who had undergone a previous dental extraction and so may have been familiar with the warm saline rinse instructions were also excluded.

Randomization

The patients were selected consecutively as they presented and were randomized to one of three groups, A, B, and C. Patients in group A were instructed to gargle with warm saline six times daily and group B to gargle twice daily; group C were not instructed to use warm saline rinse and served as controls.

Surgical protocol

Dental extractions were performed by general dental practice and dental surgery residents in their second year of training. It was assumed that these groups of residents would have the same level of surgical experience. All extractions were carried out within the duration of 15 min, and patients whose procedures lasted over 20 min were excluded. All patients received the same oral antibiotics (amoxicillin 500 mg 8-hourly and metronidazole 200 mg 8-hourly for 5 days) and analgesics, and similar postoperative instructions, except that the warm saline rinses varied depending on the treatment group, as outlined above. The control group did not receive any instruction on the use of warm saline rinse. The warm saline groups were instructed to commence rinsing 24 h from the time of completion of the procedure. Patients were advised to adhere strictly to the instructions and to return to the clinic 72 h post-extraction for evaluation. Patients were also advised to report to the clinic on any other day in the case of other untoward events or perceived discomfort related to the surgical procedure.

Post-extraction evaluation

The patients were evaluated 72 h post-operatively for the presence of alveolar osteitis, acute inflamed socket, and acute infected socket, by an independent observer who was blinded to the treatment group. Using the assessment parameters reported by Chuang et al.⁶ for postsurgical complications following tooth extraction, acute inflamed socket was diagnosed as a painful socket, red and swollen, without pus or systemic fever, presenting within 48–72 h after surgery; acute infected socket was diagnosed when there was redness, swelling, and discharging pus or systemic fever presenting within the same duration as above. Alveolar osteitis was diagnosed on the basis of persistent throbbing pain and exposure of bare alveolar bone, usually presenting within 48–72 h post dental extraction.

Statistical analysis

The data collected were analyzed using SPSS version 13 (SPSS Inc., Chicago, IL, USA). Analysis included mean, standard deviation, frequency distribution, and cross-tabulation. Comparative statistics was done using the Chi-square test, non-parametric Kruskal–Wallis test, or Mann–Whitney *U*-test, as appropriate. A *P*-value of less than 0.05 was considered significant.

Results

A total number of 120 patients equally distributed among the study groups participated in the study. Fifty-two were males (43.3%) and 68 were females (56.7%), and they ranged in age from 17 to 45 years (mean 29.13 ± 5.23 years). Caries-related sequelae ($n = 99$; 82.5%) were the most common indications for extraction. Other indications were chronic periodontitis ($n = 5$; 4.2%), failed restoration ($n = 3$; 2.5%), fractured tooth ($n = 8$; 6.7%), and prosthetic ($n = 3$; 2.5%) and orthodontic reasons ($n = 2$; 1.7%) (Table 1). The demographic and baseline parameters, such as indication for extraction, were comparable among the study groups ($P > 0.05$) (Table 1).

The overall prevalence of alveolar osteitis was 10.0% and that of acute inflamed socket was 25.0%. No case of acute infected socket was observed across the different study groups. There were no significant differences between the maxilla and mandible ($\chi^2 = 0.19$, $df = 1$, $P = 0.49$), or between the anterior and posterior teeth ($\chi^2 = 0.21$, $df = 1$, $P = 0.54$) with respect to the occurrence of alveolar osteitis. There was a statistically significant difference among the study groups with respect to the development of alveolar osteitis ($\chi^2 = 15.43$, $df = 2$, $P = 0.001$), but not for acute inflamed socket ($\chi^2 = 3.44$; $df = 2$; $P = 0.179$) (Table 2). The development of alveolar osteitis among the three study groups is represented graphically in Fig. 1. While the development of alveolar osteitis was remarkable in the control group, less alveolar osteitis was recorded in the warm saline groups ($P < 0.001$) (Table 3). This shows some beneficial effect of warm saline mouth gargle in preventing the development of alveolar osteitis. In contrast, warm saline rinse did not play any significant role in preventing the development of acute inflamed socket (Table 3).

There were no significant differences between patients who gargled six times daily with warm saline and those who

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