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Effectiveness of irrigation with chlorhexidine after removal of mandibular third molars: a randomised controlled trial

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Abstract

To evaluate the effect of postoperative irrigation with chlorhexidine on inflammatory complications after the extraction of lower third molars under local anaesthesia, we recruited 100 patients to participate in a controlled, single-blind, randomised clinical trial. They were assigned to one of two groups: the intervention group (postoperative irrigation of the surgical site with chlorhexidine for seven days) or the control group (postoperative chlorhexidine mouth rinse for seven days). The primary outcome variables were pain, swelling, trismus, infection, and alveolar osteitis. The secondary outcome variables were wound dehiscence and food impaction. A total of 95 participants completed the study (47 in the irrigation group and 48 in the rinse group). In the irrigation group, alveolar osteitis and facial swelling had reduced significantly at seven days postoperatively (both $p < 0.01$). Pain scores had also reduced significantly at seven days ($p < 0.01$), but not at 48 hours, and patients had lower levels of food impaction ($p < 0.01$) and less severe symptoms ($p = 0.02$). Routine irrigation with chlorhexidine after the extraction of third molars helps to reduce pain and lowers the incidence of alveolar osteitis.

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Keywords: third molar(s); wisdom teeth; complications; chlorhexidine; irrigation; oral surgery; postoperative

Introduction

Pain, trismus, swelling, or anatomical variation after the removal of third molars can make the maintenance of oral hygiene difficult, and the accumulation of food debris around the surgical site increases the risk of infection and dry socket,¹ particularly when lower wisdom teeth have been removed because of the effects of gravity.²

Despite regular rinsing, impacted food continues to be a problem so some surgeons have advocated the use of a

syringe with a curved tip to irrigate the surgical site.³ Its effectiveness, however, has largely been anecdotal and we know of no published trials that have compared irrigation with rinsing after the removal of third molars.

We propose that use of a syringe will reduce the accumulation of debris and, in turn, reduce the incidence of postoperative inflammatory complications.

Material and methods

To test this hypothesis we designed a practical, single-blind, two-armed, randomised controlled trial. We recruited patients aged between 18 and 80 who were treated at three private dental clinics in South East Queensland, Australia, between

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IRRIGATION PROTOCOL

On the day after the surgery, start mouthwash irrigation twice a day (morning and night):

1. Squeeze all of the air out of the syringe
2. Draw up mouthwash to fill the syringe
3. Stand in front of a mirror
4. Using one hand, gently pull out your cheek on the assigned surgery side
5. Using your other hand, hold the syringe aiming the tip of the syringe behind the last molar tooth, where your wisdom tooth was.
6. Squeeze the syringe to flush mouthwash onto the stitches and the gums where the surgery has been done
7. Spit out mouthwash
8. Pull apart the syringe and rinse with clean water

RINSE PROTOCOL

On the day after the surgery, start mouthwash irrigation twice a day (morning and night):

1. Pour out 10 ml of mouthwash (one capful)
2. Rinse the mouthwash around your mouth for 30 seconds

Fig. 1. Protocol given to patients.

2014 and 2016. In all patients, the removal of one or two lower third molars under local anaesthesia involved the raising of a flap and removal of bone with or without sectioning of the tooth. The adjacent tooth (37 or 47) was present in all cases. Those who had previously had radiotherapy to the head and neck, those with diabetes mellitus or organ transplants, or who used bisphosphonates or steroids, were excluded; as were those who smoked or were pregnant or lactating, those with an allergy to chlorhexidine, or who had used a mouthwash preoperatively, and those who did not attend follow-up appointments.

Randomisation

Using a sealed envelope method, we randomly allocated the patients in a 1:1 ratio into the irrigation (intervention) or rinse (control) group ($n = 50$ in each). This was done postoperatively to minimise operator bias. Depending on the group, each patient was given a pack that contained the mouthwash and written instructions (Fig. 1). Those in the irrigation group were also given a syringe.

Table 1

Score for difficulty of extraction based on radiographic position.⁴

Anatomical position	Score
Angulation (inclination of longitudinal axis):	
Mesioangular	1
Horizontal/transverse	2
Impacted vertical	3
Distoangular	4
Depth of impaction (with respect to occlusal plane):	
Occlusal plane of impacted tooth at same level as occlusal plane of second molar	1
Occlusal plane of impacted tooth between occlusal plane and cervical line of second molar	2
Impacted tooth below cervical line of second molar	3
Available space (with respect to ascending mandibular ramus):	
Sufficient space between ramus and distal part of second molar to accommodate mesiodistal diameter of third molar	1
Space between second molar and ramus of mandible is less than mesiodistal diameter of third molar	2
All or most of third molar is in ramus of mandible	3

Extraction score: 3–4 = non-complex; 5–7 = moderate; 8–10 = difficult.

Surgical protocol

Before the teeth were removed, we recorded the patients' details, which included the presence of any preoperative infection, use of antibiotics before or after the procedure, and use of oral contraceptives. We also recorded mouth opening and facial dimensions. Each tooth to be extracted was given a difficulty score according to Freudlsperger et al (Table 1).⁴ Bilateral extractions were assigned a side from which to make the observations.

All patients had local anaesthesia with 2% lidocaine and 1:80 000 adrenaline (Lignospan[®], Septodont). Wounds were irrigated with 40 ml sterile 0.9% normal saline solution and the flaps closed primarily with 3/0 plain gut suture (PG305, Dynek). The patients were operated on in a dental chair under similar conditions using identical equipment and materials. Three surgeons (all with at least five years experience of dental alveolar surgery) did the operations, and they all used a three-sided mucoperiosteal flap. All patients were given a bottle of chlorhexidine mouthwash (Savacol[®] alcohol-free antiseptic mouth and throat rinse, Colgate-Palmolive) with verbal and written instructions on how to use it (Fig. 1). Those in the irrigation group were also given a plastic syringe (Monoject 412, Covidien).

Patients were prescribed oral analgesia with paracetamol/codeine 500/15 mg one or two tablets every four to six hours as needed, and ibuprofen 200 mg one or two tablets every four to six hours as needed, both with a maximum of eight tablets/day. They were told not to take any drugs other

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