



Review Article

Irrigants used in the Surgical Removal of Impacted Third Molars – A Review

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Abstract

Impacted third molars are commonly removed surgically and a variety of postoperative complications such as pain, swelling, infection, dry socket and trismus may occur. In order to reduce the intensity of these symptoms and to improve the outcome of the procedure, several techniques have been employed. The use of irrigation solutions is one such technique. As with any material or procedure, irrigants have also evolved to overcome shortcomings of the earlier solutions. The important requirement of any irrigant is to prevent infection by destroying microbes and to prevent pain and post-operative swelling. This article is a review about the various irrigation solutions employed in surgical procedures pertaining to the third molars.

Keywords: Third Molar Surgery, Irrigants, Postoperative Sequelae, Swelling, Trismus Pain, Impacted Third Molars, Transalveolar Extraction.

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INTRODUCTION

The most commonly impacted teeth are the mandibular and maxillary third molars. They predominantly erupt into the oral cavity from 18 to 24 years of age [1]. They fail to erupt due to variation in the direction of growth and lack of space. In most cases, the third molars are indicated for removal if they are infected or cause pain due to the pressure exerted on the adjacent tooth. Impacted third molars can be surgically removed by guttering the bone around the tooth and sectioning the tooth if required [2]. These procedures are known to cause postoperative pain, infection, swelling and thereby trismus and reduced mouth opening [3]. Copious irrigation intra and peri-operatively has proven to aid in reducing such symptoms. Irrigation aids in reducing thermal injury to bone and teeth and removes debris and microbes from the working field [4]. The aim of this article is to review the various irrigants used in the surgical removal of impacted third molars and compare their respective advantages and disadvantages.

ROLE OF IRRIGATION

Irrigants have several advantages in the procedure of surgical removal of impacted teeth. Irrigation while guttering the bone and sectioning the tooth help to prevent heat necrosis to the bone and tooth. It clears the debris and improves visibility of the surgical site [5]. Several studies have compared the effect of irrigation on postoperative swelling and infection and have proven that irrigants reduce the inflammatory exudates and cellular breakdown products thereby decreasing the discomfort to the patient. Different irrigation solutions have varied composition and advantages making each of them unique.

Normal saline

The most commonly used irrigation solution is normal saline. It is known to be the best cleansing agent for humans. It has no antimicrobial properties but is a physiological isotonic fluid [6]. It is used in almost all surgical procedures and frequently during third molar surgeries. The main advantage of using it during the procedure is to reduce heat generation during guttering and tooth sectioning and to remove debris after removal of the tooth.

Ozone

Ozone has several applications in medicine and dentistry. It is available in three forms - gas, water and oil [7]. Due to its antibacterial property, it has been used as a disinfectant. It kills microorganisms by forming oxygen free radicals. It increases the permeability of the bacterial cell walls by blocking enzymes and leads to cell death. In addition to this, it is also anti-inflammatory properties and stimulates humoral immune system. Ozonated water is the form of ozone that is useful for irrigation in third molar surgeries. In vitro studies have shown that ozonated water works effectively against *Staphylococcus aureus*, *Enterococcus faecalis*, and *Pseudomonas aeruginosa* due to its antioxidant property [8]. Irrigation with ozonated water helps to reduce postoperative infections by removing microorganisms from the surgical site. Another advantage is that it causes less damage to native tissues when compared to chlorhexidine and hydrogen peroxide.

Povidone Iodine

Povidone iodine is an antiseptic agent that is essentially an iodophor that is formed by an iodine molecule binding to polyvinyl-pyrrolidone. The mechanism of action is due to release of iodine that has bactericidal activity. This iodine oxidises the microbes such as bacteria, viruses and fungi. 1% povidone-iodine effectively reduces oral microbial counts for up to 1 hour after completion of a surgical procedure without any complications postoperatively [9]. It is used extensively in the field of medicine and dentistry in the form of

solution, ointment and mouthwash in various concentrations. It is used as an anti-microbial agent after most dental procedures. A disadvantage of using povidone iodine is that it causes staining.

Bupivacaine

Bupivacaine hydrochloride, an anaesthetic agent is an aniline derivative that has one of the longest duration of action of up to 12 hours [10]. This property is utilized to reduce postoperative pain by inducing anaesthesia. The important drawbacks of bupivacaine are cardiac toxicity, nausea and vertigo, but seldom do these complications occur while using 0.5% of bupivacaine hydrochloride in irrigation of the extracted socket. Although it reduces postoperative pain, it is indicated for use only in patients who are not hypersensitive to anaesthetic agents and are free from cardiac issues.

Chlorhexidine

Chlorhexidine is an antibacterial agent effective against both gram positive and gram-negative bacteria. The most important advantage of chlorhexidine is its residual effect over 48 hours i.e., its substantivity [11]. It is also an antiseptic agent that helps to keep the working field clean. It remains unaltered even in extreme conditions like heat generated during surgical procedures. Studies have indicated that chlorhexidine helps to prevent dry socket when used during third molar surgeries. It also decreases the occurrence of trismus and postoperative pain.

CONCLUSION

Surgical removal of the third molars is the commonest surgical procedure performed in dentistry. The outcome following these procedures is affected by pain, swelling and infection. Irrigation helps to reduce such symptoms and discomfort to the patient. Several irrigation solutions are employed in surgical procedures to prevent postoperative complications. Each of them has their own mechanisms of action and advantages. The surgeon must be aware of these properties to be able to choose the right irrigant for the particular procedure.

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REFERENCES

1. Brauer HA. Unusual complications associated with third molar surgery: a systematic review. *Quintessence Int* 2009;40:565-72.
2. Garcia Garcia A, Gude Sampedro F, Gandarra Rey J, Gallas Torreira M. Trismus and pain after removal of impacted lower third molars. *J Oral Maxillofac Surg* 1997;55:1223-6.
3. Clauser B, Barone R, Briccoli L, Baleani A. Complications in surgical removal of mandibular third molar. *Minerva Stomatol* 2009;58:359-66.
4. Ghaeminia H, Hoppenreijts TJ, Xi T, et al. Postoperative socket irrigation with drinking tap water reduces the risk of inflammatory complications following surgical removal of third molars: a multicenter randomized trial. *Clin Oral Investig* 2017;21:71-83.

5. Managutti A, Managutti SA, Patel J, Puthanakar NY. Evaluation of Post-surgical Bacteremia with Use of Povidone-Iodine and Chlorhexidine During Mandibular Third Molar Surgery. *J Maxillofac Oral Surg.* 2017;16(4):485-490.
6. Lawrence JC. Wound irrigation. *J Wound Care* 1997 Jan;6(1):23-26.
7. Suh Y, Patel S, Re K, Gandhi J, Joshi G, Smith NL, Khan SA. Clinical utility of ozone therapy in dental and oral medicine. *Med Gas Res* 2019;9:163 - 7.
8. Nogales CG, Ferreira MB, Lage-Marques JL, Antoniazzi JH. Comparison of the antimicrobial activity of three different concentrations of aqueous ozone on *Pseudomonas aeruginosa*, *Staphylococcus aureus*, and *enterococcus faecalis* – in vitro study. *Rev Esp Ozonot.* 2014;1:9–15.
9. Chundamala J, Wright JG. The efficacy and risks of using povidone iodine irrigation to prevent surgical site infection: an evidence-based review. *Can J Surg* 2007: 50(6):473–481.
10. Khorshidi Khiavi R, Pourallahverdi M, Pourallahverdi A, Ghorani Khiavi S, Ghertasi Oskouei S, Mokhtari H. Pain control following impacted third molar surgery with bupivacaine irrigation of tooth socket: a prospective study. *J Dent Res Dent Clin Dent Prospects.* 2010;4(4):105-109.
11. Cho H, David MC, Lynham AJ, Hsu E. Effectiveness of irrigation with chlorhexidine after removal of mandibular third molars: a randomised controlled trial. *Br J Oral Maxillofac Surg* 2018 Jan;56(1):54-59.



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