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Comparison of Irrigation Fluids In 3rd Molar Surgery: Fluids-Normal Saline, Normal Saline + Betadine, Normal Saline + Chlorhexidine

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ABSTRACT

Aim: To compare the effectiveness of different irrigation fluids—Normal Saline, Normal Saline with Povidone-Iodine (Betadine), and Normal Saline with Chlorhexidine—in reducing postoperative complications such as pain, trismus, infection, and alveolar osteitis following impacted mandibular third molar surgery.

Materials and methods: A total of 60 participants were randomly divided into three groups (n=20 per group) based on the final irrigant used after tooth removal. Group A received 0.9% normal saline, Group B received a combination of normal saline and 0.5% povidone-iodine (Betadine), and Group C received normal saline with 0.12% chlorhexidinegluconate. All procedures were performed under local anesthesia using 2% lignocaine with 1:80,000 adrenaline. A full-thickness mucoperiosteal flap was elevated, followed by bone guttering and tooth sectioning using saline as the standard coolant. Data analysis was done using SSPS software.

Results: In our study, a total of 60 patients were enrolled and equally divided into three groups: Group A (Normal Saline), Group B (Normal Saline + Betadine), and Group C (Normal Saline + Chlorhexidine), with 20 patients in each group. The mean age was comparable among the groups, recorded as 26.4 ± 4.2 years in Group A, 25.8 ± 3.9 years in Group B, and 26.1 ± 4.5 years in Group C. Gender distribution included 29 males and 31 females, with Group A comprising 11 males and 9 females, Group B with 10 males and 10 females, and Group C with 8 males and 12 females. Most participants (n = 47) were categorized as ASA I, while the remaining 13 were ASA II; Group A had 16 ASA I and 4 ASA II patients, Group B had the same distribution, and Group C included 15 ASA I and 5 ASA II. Mouth opening was measured in millimeters at three time points: preoperatively, postoperative day 1, and postoperative day 7. The preoperative values were similar across groups—16.6 ± 4.5 mm in Group A, 16.9 ± 1.7 mm in Group B, and 17.3 ± 1.8 mm in Group C ($p = 0.472$). On postoperative day 1, an increase in mouth opening was noted in all groups: 22.9 ± 5.7 mm in Group A, 25.1 ± 1.9 mm in Group B, and 26.2 ± 1.2 mm in Group C, showing a statistically significant difference ($p = 0.004$). By postoperative day 7, further improvement was seen—44.21 ± 3.5 mm in Group A, 45.1 ± 1.4 mm in Group B, and 45.9 ± 0.9 mm in Group C ($p = 0.016$). Intragroup comparisons also demonstrated statistically significant improvements over time ($p < 0.05$).

Conclusion: Chlorhexidine irrigation showed slightly better improvement in postoperative mouth opening compared to betadine and normal saline.

Keywords: *Chlorhexidinegluconate, Betadine, Saline*

1. INTRODUCTION

The surgical extraction of impacted mandibular third molars is a routine procedure in oral and maxillofacial surgery, frequently associated with postoperative complications such as pain, swelling, trismus, wound infections, and alveolar osteitis. Among these, alveolar osteitis (dry socket) and postoperative infections are the most common, with dry socket affecting approximately 25–30% of patients. Additional complications can involve infection in the anterior isthmus of the fauces, resulting in restricted mouth opening, swelling and tenderness near the mandibular angle, pharyngeal discomfort, and difficulty swallowing.[1,2,3,4]

The rationale behind the current study is to evaluate the effect of different final irrigants used after third molar surgery, as irrigation plays a critical role in minimizing trauma, clearing the surgical field, and enhancing visibility during the procedure. Research has shown that bone cutting without irrigation leads to increased inflammatory responses and cellular debris. While normal saline is widely regarded as a safe and effective wound-cleansing agent, chlorhexidine offers broad-spectrum antiseptic properties for intraoral use, and povidone-iodine is known for its antimicrobial efficacy. [5,6]

Furthermore, the choice of final irrigant may significantly influence postoperative healing outcomes, especially in minimizing the risk of complications such as dry socket and infection. Each irrigant has distinct properties that may affect tissue response, microbial load, and clot stability within the extraction socket. Studies suggest that chlorhexidine may reduce bacterial colonization and lower the incidence of alveolar osteitis when compared to saline alone. Similarly, povidone-iodine, with its broad antimicrobial action, has shown potential in controlling local infections and promoting wound healing.[7] However, concerns over cytotoxicity and delayed healing have been reported with certain antiseptics. Therefore, a comparative evaluation of these irrigants is essential to identify the most effective and biologically compatible solution to optimize postoperative outcomes in third molar surgeries.

2. MATERIALS AND METHODS

A total of 60 participants were randomly divided into three groups (n=20 per group) based on the final irrigant used after tooth removal. Group A received 0.9% normal saline, Group B received a combination of normal saline and 0.5% povidone-iodine (Betadine), and Group C received normal saline with 0.12% chlorhexidinegluconate. All procedures were performed under local anesthesia using 2% lignocaine with 1:80,000 adrenaline. A full-thickness mucoperiosteal flap was elevated, followed by bone guttering and tooth sectioning using saline as the standard coolant.

The present study included participants requiring surgical extraction of impacted mandibular third molars and not on antibiotics or anti-inflammatory medications a week prior to surgery. Patients with systemic health issues, infections, allergies to irrigants, or habits like smoking and alcohol consumption were excluded

After extraction, the socket was rinsed with 20 ml of the designated irrigant for each group. Primary closure was done with 3-0 silk sutures. Postoperative care included standard prescriptions of amoxicillin and a combination of aceclofenac and paracetamol. Patients were reviewed on postoperative days 1 and 7 for clinical evaluation.

Data analysis was done using SSPS software.

3. RESULTS

Table 1: Demographic Characters

Characteristics	Group A (Normal Saline)	Group B (Normal Saline + Betadine)	Group C (Normal Saline + Chlorhexidine)	Total
Number of patients	20	20	20	60
Age (Mean ± SD)	26.4 ± 4.2	25.8 ± 3.9	26.1 ± 4.5	26.1 ± 4.2
Gender				
Male	11	10	8	29
Female	9	10	12	31
ASA Physical Status				
ASA I	16	16	15	47
ASA II	4	4	5	13

The study included a total of 60 patients divided equally into three groups: Group A (Normal Saline), Group B (Normal Saline + Betadine), and Group C (Normal Saline + Chlorhexidine), with 20 patients in each group. The mean age across the groups was comparable: 26.4 ± 4.2 years in Group A, 25.8 ± 3.9 years in Group B, and 26.1 ± 4.5 years in Group C, with an overall mean age of 26.1 ± 4.2 years. Gender distribution showed 29 males and 31 females, with Group A comprising 11 males and 9 females, Group B having 10 males and 10 females, and Group C including 8 males and 12 females. In terms of ASA (American Society of Anesthesiologists) physical status classification, the majority of patients (47) were categorized as ASA I, while 13 patients fell under ASA II, with Group A having 16 ASA I and 4 ASA II, Group B also with 16 ASA I and 4 ASA II, and Group C having 15 ASA I and 5 ASA II patients.

Table 2: Comparison of trismus between the groups.

Mean mouth opening scores at different timelines (mean ± SD)	Group A (Normal Saline)	Group B (Normal Saline + Betadine)	Group C (Normal Saline + Chlorhexidine)	P value
Pre-operative	16.6 ± 4.5	16.9 ± 1.7	17.3 ± 1.8	0.472
Postoperative day 1	22.9 ± 5.7	25.1 ± 1.9	26.2 ± 1.2	0.004*
Postoperative day 7	44.21 ± 3.5	45.1 ± 1.4	45.9 ± 0.9	0.016*
P value	0.049*	0.002*	0.037*	

The mean mouth opening scores (measured in millimeters) were evaluated at three time points—preoperatively, postoperative day 1, and postoperative day 7—across three groups. Preoperative values were comparable among all groups, with Group A (Normal Saline) showing a mean of 16.6 ± 4.5 mm, Group B (Normal Saline + Betadine) 16.9 ± 1.7 mm, and Group C (Normal Saline + Chlorhexidine) 17.3 ± 1.8 mm ($p = 0.472$). On postoperative day 1, all groups demonstrated an increase in mouth opening, with Group A at 22.9 ± 5.7 mm, Group B at 25.1 ± 1.9 mm, and Group C at 26.2 ± 1.2 mm, showing a statistically significant difference ($p = 0.004$). By postoperative day 7, further improvement was observed, with Group A reaching 44.21 ± 3.5 mm, Group B at 45.1 ± 1.4 mm, and Group C at 45.9 ± 0.9 mm ($p = 0.016$). Intragroup comparisons also revealed statistically significant improvements over time within each group ($p < 0.05$).

4. DISCUSSION

Third molar (wisdom tooth) extraction is one of the most commonly performed oral surgical procedures, often indicated due

to impaction, infection, or orthodontic needs. Although generally safe, it can result in postoperative complications such as pain, swelling, trismus, and, occasionally, infection. A key intraoperative factor that may influence healing and postoperative outcomes is the choice of irrigation fluid. Irrigation plays a vital role in third molar surgery by cooling the surgical site to prevent thermal bone injury, flushing out debris and bone particles, and maintaining a clear operative field. Normal saline is traditionally used for irrigation due to its isotonic nature and tissue compatibility. However, recent studies have examined the addition of antiseptic agents like povidone-iodine (Betadine) and chlorhexidinegluconate to irrigation solutions to enhance antimicrobial activity and potentially reduce postoperative complications. [8,9,10]

Normal saline serves as a baseline for mechanical debridement and cooling; when combined with Betadine, it provides broad-spectrum antimicrobial action, although higher concentrations may raise cytotoxicity concerns. In contrast, saline combined with chlorhexidine offers prolonged antimicrobial effects due to its substantivity, making it a preferred choice in many oral surgical settings.[11,12] This comparative study aims to evaluate the effectiveness of these irrigation fluids—normal saline, normal saline with Betadine, and normal saline with chlorhexidine—in terms of postoperative healing, infection control, and patient comfort following third molar surgery.

In our study, a total of 60 patients were enrolled and equally divided into three groups: Group A (Normal Saline), Group B (Normal Saline + Betadine), and Group C (Normal Saline + Chlorhexidine), with 20 patients in each group. The mean age was comparable among the groups, recorded as 26.4 ± 4.2 years in Group A, 25.8 ± 3.9 years in Group B, and 26.1 ± 4.5 years in Group C. Gender distribution included 29 males and 31 females, with Group A comprising 11 males and 9 females, Group B with 10 males and 10 females, and Group C with 8 males and 12 females. Most participants (n = 47) were categorized as ASA I, while the remaining 13 were ASA II; Group A had 16 ASA I and 4 ASA II patients, Group B had the same distribution, and Group C included 15 ASA I and 5 ASA II. Mouth opening was measured in millimeters at three time points: preoperatively, postoperative day 1, and postoperative day 7. The preoperative values were similar across groups—16.6 ± 4.5 mm in Group A, 16.9 ± 1.7 mm in Group B, and 17.3 ± 1.8 mm in Group C ($p = 0.472$). On postoperative day 1, an increase in mouth opening was noted in all groups: 22.9 ± 5.7 mm in Group A, 25.1 ± 1.9 mm in Group B, and 26.2 ± 1.2 mm in Group C, showing a statistically significant difference ($p = 0.004$). By postoperative day 7, further improvement was seen—44.21 ± 3.5 mm in Group A, 45.1 ± 1.4 mm in Group B, and 45.9 ± 0.9 mm in Group C ($p = 0.016$). Intragroup comparisons also demonstrated statistically significant improvements over time ($p < 0.05$).

In a study by Sbricoli L et al.,[13] 22 healthy patients (11 males, 11 females) undergoing lower third molar extractions were randomly assigned to two groups differing only in the irrigation fluid used during surgery: sterile physiological saline (Group A) and mains water (Group B). A total of 40 extractions were performed—20 using saline and 20 using water. Postoperative outcomes, including pain, swelling, trismus, and inflammation (measured by high-sensitivity C-reactive protein), were assessed and statistically analyzed using the Wilcoxon test. The results showed no significant differences between the two groups ($p < 0.05$), leading to the conclusion that both sterile saline and mains water are equally effective for irrigation and cooling in third molar surgery.

In a randomized study by Vijayakumar G et al.[14] the efficacy of four different irrigation solutions—0.5% povidone-iodine, 1% metronidazole, 0.12% chlorhexidinegluconate (CHX), and 0.9% normal saline—was evaluated in 112 patients undergoing surgical extraction of impacted mandibular third molars. Patients were divided into four equal groups based on the irrigation solution used post-extraction, and assessed for pain, swelling, trismus, and alveolar osteitis on the first and seventh postoperative days. The results showed that the metronidazole group (Group B) experienced significantly less pain and swelling and had no cases of alveolar osteitis, making it the most effective solution among those studied. Chlorhexidine also performed well, while no significant difference was observed between povidone-iodine and normal saline. Trismus was unaffected by the type of irrigation used. The study concluded that metronidazole irrigation was the most effective in minimizing postoperative complications following third molar surgery.

In a study by Sruthy TV et al.[15] the effectiveness of 0.5 mg/mL povidone-iodine solution was compared with normal saline as an irrigant and coolant in reducing postoperative complications following impacted mandibular third molar surgery. Sixty patients were equally divided into two groups: one received normal saline (Group I) and the other povidone-iodine (Group II). Postoperative pain, swelling, and trismus were evaluated on the second and seventh days after surgery. The results showed that the povidone-iodine group experienced significantly less discomfort on the second postoperative day; however, by the seventh day, differences between the two groups were negligible. The study concluded that povidone-iodine irrigation is more effective than normal saline in minimizing early postoperative discomfort following third molar extraction.

A limited sample may reduce the statistical power and generalizability of the findings, and minor variations in patient response could have a greater impact on overall outcomes. Therefore, larger-scale studies are recommended to validate these observations and draw more definitive conclusions.

5. CONCLUSION

Chlorhexidine irrigation showed slightly better improvement in postoperative mouth opening compared to betadine and

normal saline.

REFERENCES

[1] Blondeau F., Daniel N.G. Extraction of impacted mandibular third molars: Operative complications and their risk factors. J. Can. Dent. Assoc. 2007;73:325.

[2] Graziani F., D'Aiuto F., Arduino P., Tonelli M., Gabriele M. Perioperative dexamethasone reduces post-surgical sequelae of wisdom tooth removal. A split-mouth randomized double-masked clinical trial. Int. J. Oral Maxillofac. Surg. 2006;35:241–246. doi: 10.1016/j.ijom.2005.07.010.

[3] Contar C., Oliveira P., Kanegusuku K., Berticelli R., Azevedo-Alanis L., Machado M. Complications in third molar removal: A retrospective study of 588 patients. Med. Oral Patol. Oral Cir. Bucal. 2009;15:e74–e78. doi: 10.4317/medoral.15.e74.

[4] Torres M.A.F., Albiol J.G., Aytés L.B., Escoda C.G. Evaluation of the indication for surgical extraction of third molars according to the oral surgeon and the primary care dentist. Experience in the Master of Oral Surgery and Implantology at Barcelona University Dental School. Med. Oral Patol. Oral Cir. Bucal. 2008;13:499–504.

[5] Al-Asfour A. Postoperative Infection after Surgical Removal of Impacted Mandibular Third Molars: An Analysis of 110 Consecutive Procedures. Med. Princ. Pr. 2009;18:48–52. doi: 10.1159/000163046.

[6] Satılmış T., Garip H., Arpacı E., Şener C., Göker K. Assessment of combined local anestesia and ketamine for pain, swelling and trismus after surgical extraction of third molars. J. Oral Maxillofac. Surg. 2009;67:1206–1210. doi: 10.1016/j.joms.2008.12.034.

[7] Povidone iodine: properties, mechanisms of action, and role in infection control and Staphylococcus aureus decolonization. Lepelletier D, Maillard JY, Pozzetto B, Simon A. Antimicrob Agents Chemother. 2020;64:10–128. doi: 10.1128/AAC.00682-20.

[8] Etiology and pathogenesis of fibrinolyticalveolitis ("dry socket") Birn H. Int J of Oral Surg. 1973;2:211–263.

[9] Povidone iodine in wound healing: a review of current concepts and practices. Bigliardi PL, Alsagoff SA, El-Kafrawi HY, Pyon JK, Wa CT, Villa MA. Int J Surg. 2017;44:260–268. doi: 10.1016/j.ijsu.2017.06.073.

[10] The effect of a chlorhexidine rinse on the incidence of alveolar osteitis following the surgical removal of impacted mandibular third molars. Larsen PE. J Oral Maxillofac Surg. 1991;49:932–937. doi: 10.1016/0278-2391(91)90055-q.

[11] Comparison of two irrigation solutions in the surgical removal of the mandibular third molars - a randomized trial. Reddy PA, Wahab PU, Jagadish V, Murugan PS. J Pharm Res Int. 2020;32:28–35.

[12] The Efficiency of Three Irrigating Solutions after Surgical Removal of Impacted Mandibular Third Molars: A Cross-sectional Study. Jadhao VA, Rao A, Hande P, et al. https://pubmed.ncbi.nlm.nih.gov/30287719/ J Contemp Dent Pract. 2018;19:1147–1151.

[13] Sbricoli L, Cerrato A, Frigo AC, Zanette G, Bacci C. Third Molar Extraction: Irrigation and Cooling with Water or Sterile Physiological Solution: A Double-Blind Randomized Study. Dent J (Basel). 2021 Apr 1;9(4):40. doi: 10.3390/dj9040040. PMID: 33915980; PMCID: PMC8066638.

[14] Vijayakumar G, Sundaram GkA, Kumar SP, Krishna VK, Krishnan M. Comparison of the Effectiveness of Four Different Irrigation Solutions on Postoperative Sequelae in Patients Undergoing Lower Third Molar Surgery: A Prospective Study. Cureus. 2023 Dec 20;15(12):e50816. doi: 10.7759/cureus.50816. PMID: 38249289; PMCID: PMC10797225.

[15] Sruthy TV, Roshni A, Aslam S, Cherian MP, Soman S, Akhila K. Low-concentration Povidone-iodine and Normal Saline as Irrigant on Reducing Postoperative Complications after the Third-molar Surgery: A Comparative Study. J Contemp Dent Pract. 2022 Jul 1;23(7):733-738. PMID: 36440521.