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Influence of Chlorhexidine on Postoperative Recovery and Pain Management in oral Surgery

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Abstract : To analyze the impact of chlorhexidine on the prevention of infections and the promotion of alveolar healing following tooth extraction, revealing its effectiveness as a broad-spectrum antimicrobial agent. Chlorhexidine works by disrupting bacterial cell membranes and provides prolonged release of its antimicrobial properties, which reduces bacterial load and significantly decreases the incidence of infections while accelerating healing compared to other antimicrobial agents, such as hydrogen peroxide. At the *Centro Mexicano en Estomatología* (from Spanish: Mexican Center for Stomatology) Morelia branch campus, prior to the COVID-19 pandemic, the effect of chlorhexidine was evaluated in 14 patients who underwent third molar surgery. Patients were divided into two groups: one group received final irrigation with chlorhexidine gel, while the other did not. The results indicated that the group treated with chlorhexidine reported significantly lower pain perception, while the group without chlorhexidine showed higher pain perception. These findings suggest that chlorhexidine gel effectively reduces postoperative pain and improves patient experience in third molar surgery.

Keywords: Chlorhexidine, surgery, third molar, gel, postoperative

I. Introduction

Chlorhexidine, a bisbiguanide compound known for its broad-spectrum antimicrobial properties, has proven highly effective in dentistry, both in reducing bacterial load and preventing infections. This agent works by disrupting the cell membranes of microorganisms and releasing their internal components, which enhances its ability to combat bacteria. Additionally, it can adhere to mucosal and dental surfaces, offering prolonged release

of its antimicrobial properties. Owing to these characteristics, chlorhexidine is employed not only for daily oral hygiene but also in postoperative management, helping to prevent infections and improve healing [1,2].
The surgical removal of third molars is a common procedure in dental practice, especially where complex anatomy and limited accessibility can prolong the postoperative inflammatory process. One of the main risks associated with tooth extraction is the development of infections in the alveolar socket. Postoperative infections can lead to complications such as alveolitis, trismus, and reduced mouth opening, among others [3].

Several studies have shown that the use of chlorhexidine in the postoperative context can significantly improve clinical outcomes. For example, a study by Cho H et al. in 2018 found that the topical application of chlorhexidine to the alveolar area reduced the incidence of postoperative infections compared to the use of saline solutions, resulting in faster and more effective healing. Additionally, research conducted by Brookes ZLS et al. and Nisha S et al. has demonstrated that chlorhexidine effectively reduces bacterial load and prevents biofilm formation at the extraction site, crucial factors for the prevention of infectious complications [4-6].

Chlorhexidine has also been compared with other antimicrobial agents, such as hydrogen peroxide and saline rinses, standing out for its greater efficacy and duration of action. In a comparative study by Romero-Olid MN et al., chlorhexidine demonstrated significant superiority in reducing bacterial colonies at the extraction site and preventing secondary infections [7].

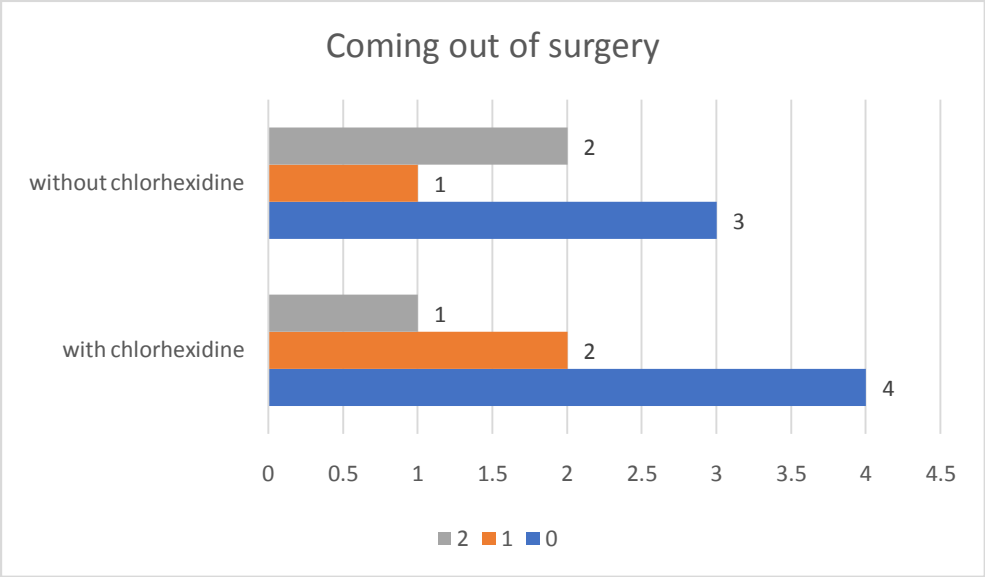
II. Materials and Methods

A prospective, cross-sectional, descriptive, risk-free study. The study was conducted in patients who underwent surgical consultations from 2019 to 2020, prior to the Covid-19 pandemic. At the *Centro Mexicano en Estomatología* (from Spanish: Mexican Center for Stomatology) Morelia branch campus. The study population included 14 third molar surgeries and was divided into two groups: The first group used chlorhexidine gel as the final irrigation for the dental alveolus, and the second group did not apply the gel. Pain perception was assessed using the visual analog scale.

III. Results

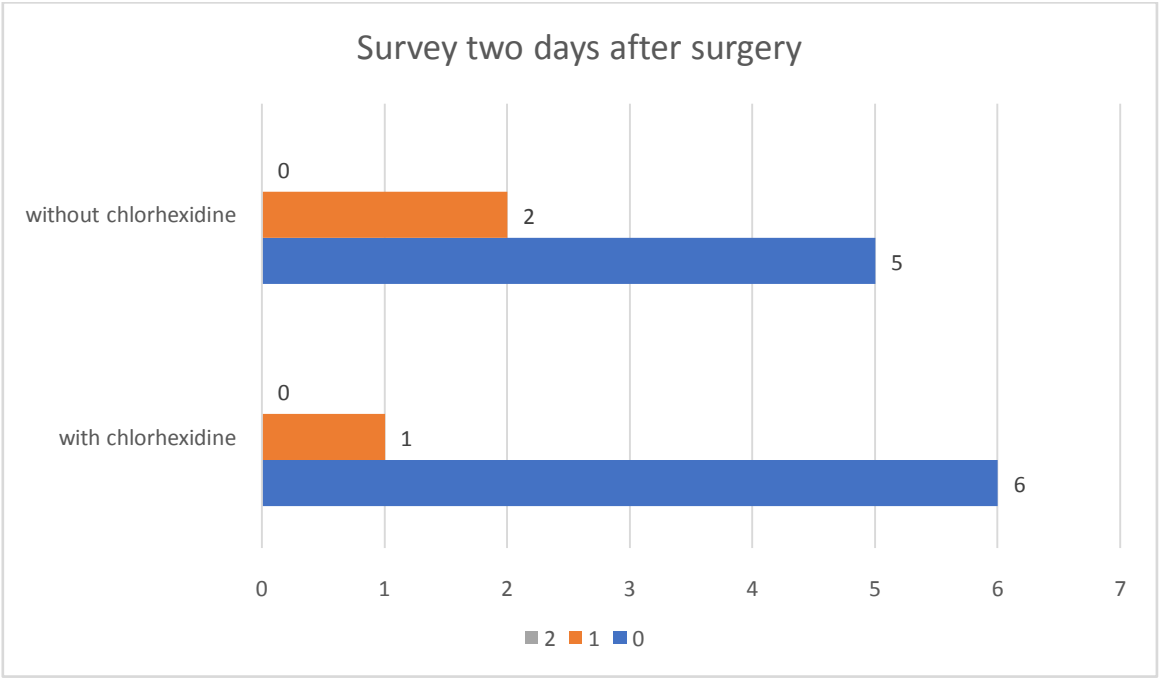
A total of 14 patients underwent third molar surgery, of which 7 received chlorhexidine gel as a final irrigation on the surgical site, while 7 did not, in order to establish a scale for postoperative pain perception. The study population consisted of 11 female participants (79%) and 3 male participants (21%). The most frequently treated tooth was the lower left third molar, with 8 (57%) surgeries performed, compared to 6 (43%) for the lower right third molars.

Using the visual scale for pain, it was established that the pain perception among patients who underwent surgery with chlorhexidine gel as the final irrigation was 0 in 4 surveyed patients, 1 in 2 patients, and 2 in 1 patient. Conversely, patients who underwent surgery and did not receive chlorhexidine gel reported a pain perception of 0 in 3 patients, 1 in 1 patient, and 2 in 3 patients. This situation indicates that pain perception after surgery in patients who were not treated with chlorhexidine gel was higher, with a ratio of 2:1. In contrast, the use of chlorhexidine resulted in no pain sensation in 4 patients, compared to 3 patients who underwent surgery without postoperative gel. See Graph 1.



Graph 1: It is demonstrated that pain perception after surgery was lower in patients who received chlorhexidine gel as a final irrigation.

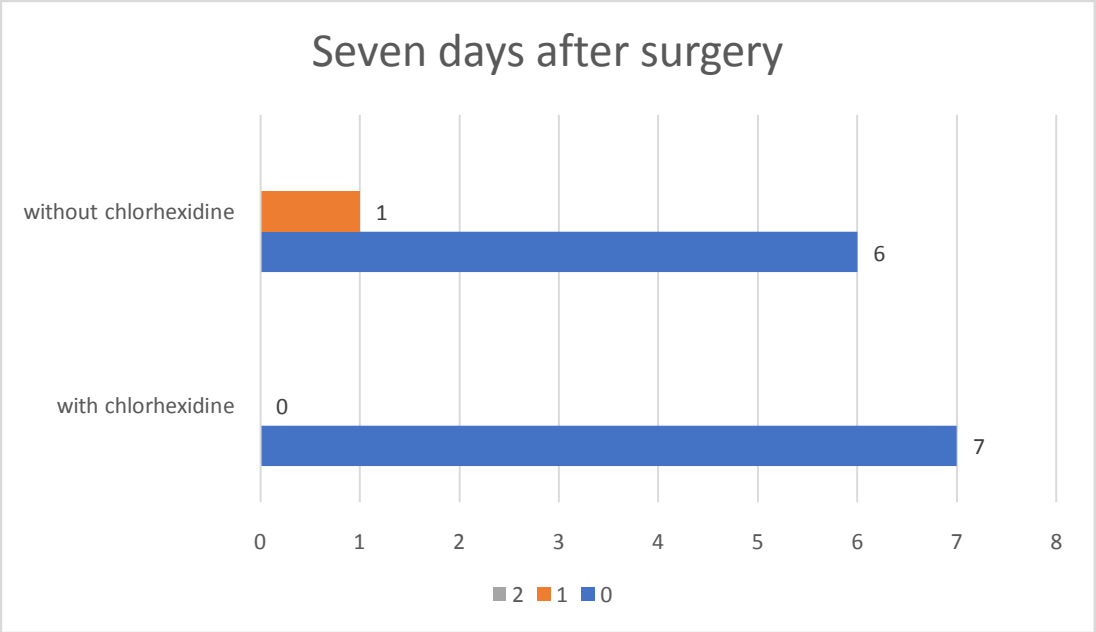
Using the visual scale for pain, it was determined that pain perception two days after surgery in patients who received chlorhexidine gel as a final irrigation was 0 in 6 surveyed patients, 1 in 1 patient, and 2 in 0 patients. Conversely, patients who underwent surgery and did not receive chlorhexidine gel reported pain perception of 0 in 5 patients, 1 in 2 patients, and 2 in 0 patients. This indicates that pain perception at two days post-surgery was very similar in both groups; however, more patients reported lower pain perception in the postoperative period when chlorhexidine gel was used. See Graph 2.



Graph 2: Pain perception two days after surgery was lower in patients who received chlorhexidine gel postoperatively compared to those who did not.

Using the visual scale for pain, it was determined that pain perception seven days after surgery in patients who received chlorhexidine gel as a final irrigation was 0 in 7 surveyed patients, 1 in 0 patients, and 2 in 0 patients.

Conversely, patients who underwent surgery and did not receive chlorhexidine gel reported pain perception of 0 in 6 patients, 1 in 1 patient, and 2 in 0 patients. This indicates that pain perception at seven days post-surgery was very similar in both groups; however, more patients reported lower pain perception in the postoperative period when chlorhexidine gel was used. See Graph 3.



Graph 3: It presents pain perception seven days after surgery, demonstrating that patients who received chlorhexidine during surgery reported no pain, unlike patients who did not undergo the procedure, where one patient reported minimal pain sensation.

IV. Discussion

The emergence of 0.2% chlorhexidine as a bioadhesive gel has opened up new lines of research. On one hand, the drug could be placed intra-alveolarly, allowing for a more direct action on the alveolus. On the other hand, the bioadhesive gel formulation enables the drug to have a more prolonged effect over time compared to chlorhexidine mouthwash, which is the pharmaceutical form used in other published clinical trials [8].

Several studies have demonstrated that chlorhexidine effectively reduces the incidence of postoperative infections. In a study by Bakker et al., it was observed that the application of chlorhexidine to the alveolar area during third molar surgery significantly reduced infections compared to the use of saline solutions. This finding is consistent with the meta-analysis conducted by Pineiro et al., which concluded that chlorhexidine is superior to saline solution in preventing postoperative infections. The ability of chlorhexidine to adhere to mucosal and dental surfaces and to release antimicrobial agents in a sustained manner contributes to its effectiveness in controlling residual bacterial flora and preventing infectious complications [9,10].

V. Conclusion

Third molar surgery is a surgical procedure that frequently generates postoperative pain. While pain is a normal response to this type of intervention, our goal as healthcare professionals is to minimize these symptoms to provide better care and enhance the patient experience.

Implementing a final irrigation protocol with chlorhexidine interalveolar gel to reduce pain perception during third molar surgery, showed a notable difference in pain perceptions between patients who received the treatment and those who did not. This difference in pain experiences validates the hypothesis satisfactorily.

The inflammatory response of patients was compared; in both cases, there was data indicating inflammation. However, overall, the incidence of inflammation was equal to or lower in patients who received chlorhexidine as the final irrigation.

Bibliography

[1] Yevenes LI, Reyes YJ, Campos PN, Saragoni FV. *Efecto inhibitorio en placa microbiana y propiedades antibacterianas de enjuagatorios de clorhexidina* (from Spanish: Inhibitory effect on microbial plaque and antibacterial properties of chlorhexidine mouth rinses). AV Periodon Implantol. 2003;15(1):19-24.
[2] Rodríguez B, Katherine J. *Revisión crítica: Beneficios del uso de clorhexidina al 0.2% en la higiene bucal para prevenir la neumonía asociada a ventilación mecánica en pacientes críticos* (from Spanish: Critical review: Benefits of using 0.2% chlorhexidine in oral hygiene to prevent ventilator-associated pneumonia in critically ill patients). Universidad Catolica. https://orcid.org/0000-0002-7707-1937
[3] Kammerer PW, Nawas BA. Surgical extraction of third molars. International Dental Publication. 2012;25(2):69-75.
[4] Cho H, David MC, Lynham AJ, Hsu E. Effectiveness of irrigation with chlorhexidine after removal of mandibular third molars: a randomized controlled trial. Br J Oral Maxillofac Surg. 2018;56(1):54-59. doi: 10.1016/j.bjoms.2017.11.010
[5] Brookes ZLS, Bescos R, Belfield LA, Ali K, Roberts A. Current uses of chlorhexidine for management of oral disease: a narrative review. J Dent. 2020;103:103497. doi: 10.1016/j.jdent.2020.103497
[6] Nisha S, Karmakar S, Das S, Jana D, Ali NM, Shashikumar P. Comparison of chlorhexidine and hydrogen peroxide as preprocedural mouth rinse during ultrasonic scaling: A triple-blinded randomized controlled clinical trial. J Pharm Bioallied Sci. 2022;14(1):s110-s114. doi: 10.4103/jpbs.jpbs_595_21
[7] Romero-Olid MN, Bucataru E, Ramos GP, González-Moles MA. Efficacy of chlorhexidine after oral surgery procedures on wound healing: Systematic review and meta-analysis. Antibiotics. 2023;12(10):1552. doi: 10.3390/antibiotics12101552
[8] Torres LD, Infante CP, Gutierrez-Perez JL, Romero-Ruiz MM, García CM, Serrera-Figallo MA. Intra-alveolar chlorhexidine gel for the prevention of dry socket in mandibular third molar surgery: A pilot study. Med Oral Patol Oral Cir Bucal. 2006;11:E179-84.
[9] Bakker AJ, et al. The effect of chlorhexidine on postoperative pain and inflammation after third molar surgery: a randomized controlled trial. Journal of Oral and Maxillofacial Surgery. 2009;67(5):968-974.
[10] Pineiro A, et al. Chlorhexidine versus saline for the prevention of postoperative infections: A meta-analysis. Clinical Oral Investigations. 2011;15(4):587-594.