

Н. Осман, З. Хадизаде

**ОЦЕНКА КЛИНИЧЕСКОЙ ЭФФЕКТИВНОСТИ МЕСТНОГО
ПРИМЕНЕНИЯ ГЕЛЯ МЕТРОНИДАЗОЛА В ТЕРАПИИ И СОКРАЩЕНИИ
ДЛИТЕЛЬНОСТИ ПОСТЭКСТРАКЦИОННОГО АЛЬВЕОЛИТА**

Научный руководитель: ассист. М.Р. Масумзаде

*Челюстно-лицевой хирургии и пластической хирургии лица с курсом повышения
квалификации и переподготовки*

Беларусский государственный медицинский университет, г. Минск

N. Osman, Z. Hadizadeh

**ASSESSMENT OF THE CLINICAL EFFECTIVENESS OF TOPICALLY
APPLIED METRONIDAZOLE GEL IN THE MANAGEMENT AND DURATION
REDUCTION OF POST-EXTRACTION ALVEOLITIS**

Tutor: assistant M.R. Masoumzadeh

*Department of Maxillofacial Surgery and Facial Plastic Surgery with Advanced Training
and Restraining Course*

Belarusian State Medical University, Minsk

Резюме. Данное исследование оценивает клиническую эффективность геля метронидазола 1% при лечении постэкстракционного альвеолита. Десять пациентов были разделены на две группы: обычное лечение и лечение гелем метронидазола. Результаты показали значительное сокращение времени заживления. Исследование демонстрирует улучшенные терапевтические результаты при местном применении метронидазола 1%.

Ключевые слова: альвеолит, метронидазол гель, постэкстракционные осложнения, челюстно-лицевая хирургия, заживление ран.

Resume. This study evaluates the clinical effectiveness of metronidazole gel 1% in treating post-extraction alveolitis. Ten patients were divided into two groups: conventional treatment and metronidazole gel treatment. Results showed significant reduction in healing time. The study demonstrates enhanced therapeutic outcomes with topical metronidazole application 1%.

Keywords: alveolitis, post-extraction complications, metronidazole gel, oral surgery, wound healing.

Relevance. Alveolitis is one of the most common complications following dental extractions, more often involving mandibular molar teeth [1]. This condition is characterized by severe pain developing 2 to 3 days postoperatively with or without halitosis, presenting as a socket that may be partially or totally devoid of a blood clot [1,2]. The incidence of alveolar osteitis varies considerably based on the complexity of the extraction procedure, ranging from 0.5% to 5% for routine dental extractions, while for impacted mandibular third molars, rates can reach 25-30% [3,4]. This substantial variation underscores the clinical significance of this complication and its impact on patient quality of life.

The etiology of alveolar osteitis is multifactorial, including impaired blood clotting processes, anatomical considerations such as mandibular location, compromised immune status, poor oral hygiene, systemic diseases such as diabetes mellitus, and surgical trauma [5,6,7]. Clinical manifestations typically encompass severe localized pain that radiates to the ear, temple, and neck, characteristic halitosis, and purulent discharge within the

extraction socket [2,8]. Symptoms typically start on the second to fourth day after extraction and potentially last 10-40 days [8].

The development of improved treatment protocols utilizing topical antimicrobial agents addresses a critical clinical need in contemporary oral and maxillofacial surgery practice [9,10].

Aim: alveolar osteitis represents one of the most common complications following tooth extraction, with an incidence of approximately 3% for routine extractions and reaching over 30% for impacted mandibular third molars [3]. Despite various treatment approaches, the management of established alveolar osteitis remains challenging, with patients experiencing severe pain lasting 2-4 days and requiring multiple postoperative visits [1].

Previous studies examining topical metronidazole have shown mixed results, with higher concentrations (25%) demonstrating no significant difference compared to placebo. However, recent research suggests that combination therapy using lower concentrations of metronidazole with chlorhexidine may offer promising results in reducing both pain duration and healing time.

The effectiveness of 1% metronidazole gel specifically for the treatment of established alveolar osteitis remains poorly documented in the literature, creating a significant gap in evidence-based treatment protocols.

In this study, we evaluate the efficacy of intra-alveolar placement of metronidazole gel 1% on the incidence of alveolitis after surgical extraction of teeth in the Healthcare Institution «City Clinical Polyclinic № 8», Minsk.

Objectives:

1. To evaluate the clinical effectiveness of topically applied 1% metronidazole gel in reducing the duration of painful symptoms associated with post-extraction alveolitis compared to conventional treatment methods in patients treated at Healthcare Institution «City Clinical Polyclinic № 8», Minsk.

2. To compare the healing time and frequency of postoperative visits between patients treated with conventional therapy (chlorhexidine irrigation and Alvostase sponge) versus those receiving combination therapy with 1% metronidazole gel, chlorhexidine irrigation, and Alvostase sponge placement.

3. To assess the practical applicability and safety of intra-alveolar 1% metronidazole gel appl

4. Ication as an adjunctive treatment modality for post-extraction alveolitis management in clinical practice.

Materials and methods. In this research we divided 10 patients with a diagnosis of alveolitis randomly into two groups. The first group contained 5 people who were treated according to the conventional treatment plan in the following way: starting with injection of infiltration anesthesia (Articaine 4% with epinephrine 1:100,000), surgical cleaning of the socket with alveolar curettes, afterwards irrigation with chlorhexidine 2% using a 10 ml disposable syringe and repeating it several times to ensure there was no pus **“Fig. 1”**, and then placing an Alvostase sponge (hemostatic and antiseptic alveolar dressing) in the bottom of the socket **“Fig. 4”**.

The second group contained 5 people who were treated using Metronidazole gel 1% and chlorhexidine 2% in the following way: starting with injection of infiltration anesthesia

(Articaine 4% with epinephrine 1:100,000), surgical cleaning of the socket with alveolar curettes, after which irrigation with chlorhexidine 2% using a 10 ml disposable syringe was repeated several times **“Fig. 1”**. After ensuring the socket was completely clean, Metronidazole gel 1% was applied directly into the extraction socket using a sterile blunt-tipped syringe **“Fig. 3”** to ensure deep and accurate placement in the socket, then an Alvostase sponge was placed into the socket **“Fig. 4”**.



Fig. 1 – Irrigation with chlorhexidine 2% - 10 ml disposable syringe and repeat it several times



Fig. 2 – Preparing Metronidazole gel 1% with a sterile blunt-tipped syringe



Fig. 3 – Spreading metronidazole gel 1% directly into the extraction socket

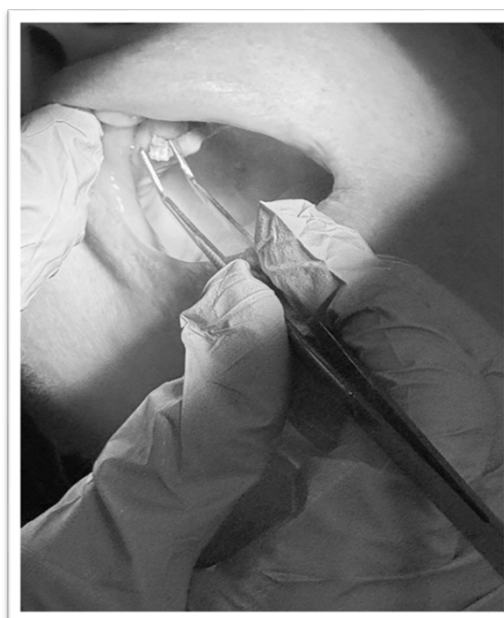


Fig. 4 – Inserting the Alveostase sponge into the socket

Results and their discussion. The analysis of the results after treatment for both groups showed differences in the duration of painful symptoms and healing process. In the group treated conventionally, severe pain lasted up to 48 hours and complete healing took up to 4 days. However, for the group treated with the metronidazole gel 1% treatment plan, severe pain resolved within 24 hours after treatment and complete healing occurred within 2 days. The use of metronidazole gel 1% significantly reduced the duration of post-extraction alveolitis

Conclusions:

1. The topical application of 1% metronidazole gel combined with conventional treatment significantly reduces the duration of painful symptoms in post-extraction alveolitis, with severe pain resolving within 24 hours compared to 48 hours in the conventional treatment group, and complete healing achieved within 2 days versus 4 days with standard therapy alone.

2. Patients treated with the combination therapy of 1% metronidazole gel and chlorhexidine irrigation required fewer postoperative visits compared to those receiving conventional treatment, demonstrating improved clinical efficiency and reduced healthcare resource utilization in the management of post-extraction alveolitis.

Literature

1. Blum IR. Contemporary views on dry socket (alveolar osteitis): a comprehensive update. *J Oral Maxillofac Surg.* 2002;60(1):13-23.
2. Alexander RE. Dental extraction wound management: a case against medicating postextraction sockets. *J Oral Maxillofac Surg.* 2000;58(5):538-551.
3. Daly BJ, Sharif MO, Jones K, Worthington HV, Beattie A. Local interventions for the management of alveolar osteitis (dry socket). *Cochrane Database Syst Rev.* 2022;9:CD006968.
4. Mamoun J. Dry socket etiology, diagnosis, and clinical treatment techniques. *J Korean Assoc Oral Maxillofac Surg.* 2018;44(2):52-58.
5. Kolokythas A, Olech E, Miloro M. Alveolar osteitis: a comprehensive review of concepts and controversies. *Int J Dent.* 2010;2010:249073.
6. Torres-Lagares D, Serrera-Figallo MA, Romero-Ruiz MM, Infante-Cossio P, Garcia-Calderon M, Gutierrez-Perez JL. Update on dry socket: a comprehensive review. *Med Oral Patol Oral Cir Bucal.* 2005;10(1):77-85.
7. Fazakis AG, Kuppuswamy A, Jones PF. An investigation into the effect of oral contraceptive use on dry socket incidence. *J Oral Maxillofac Surg.* 2004;62(2):161-164.
8. Vezeau PJ. Dental extraction wound management: medicating postextraction sockets. *J Oral Maxillofac Surg.* 2000;58(5):531-537.
9. Pouloupoulos A, Critchlow D, Stephen K. Antimicrobial approaches to alveolar osteitis. *Br Dent J.* 1994;177(11-12):413-419.
10. Cardoso CL, Rodrigues MT, Ferreira Junior O, Garlet GP, de Carvalho PS. Clinical concepts of dry socket. *J Oral Maxillofac Surg.* 2010;68(8):1922-1932.