ACTA SCIENTIFIC DENTAL SCIENCES

Volume 9 Issue 4 April 2025

Case Report

Descriptive Evaluation of the Use of Collagen Hemostatic Membrane and Sponge in Alveoli: A Case Report

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DOI: 10.31080/ASDS.2025.09.2009

Received: March 12, 2025

Published: March 27, 2025

Abstract

Hemostasis is directly linked to the healing process after tooth extraction. Some biomaterials can be used inside the alveoli to aid and guide post-surgical healing, including collagen membranes and sponges. The objective of this split-mouth case report is to compare the use of the Hemospon® sponge with that of the Lumina Coat® membrane in two different surgical sites operated on the same patient, analyzing bleeding control, soft tissue healing and pain control after dental extractions. After tooth extractions, the alveolus of tooth 37 was filled with the membrane and that of tooth 27 with the Hemospon® collagen sponge and sutured. Once the procedure was completed, the two surgical sites were evaluated at the following times: immediately after, 30 minutes, 24 hours, 48 hours and 7 days in relation to bleeding, scar aspect, pain and use of analgesics. The Mühlemann classification was used to assess local bleeding, pain was checked using the visual analog scale (VAS) and the clinical aspect of soft tissue healing followed the criteria of Brancacio., et al., 2020. Suture removal was performed after 7 days, the time limit for evaluating comparative parameters. The results from the different time periods showed that there was no statistical difference in terms of pain, regardless of the material that filled the alveolus, but the area that received the membrane (tooth 37) showed lower morbidity and better healing aspects. It was concluded that the membrane accelerated the healing process when compared to the sponge.

Keywords: Exodontia; Local Hemostasis; Membrane; Sponge

Introduction

Effective hemostasis after tooth extraction is essential for proper healing and prevention of complications such as prolonged bleeding and infection [1]. Several hemostatic materials have been used in dentistry to control postoperative bleeding, including absorbable gelatin sponges (hemosponges) and collagen membranes [1].

Hemosponges have been widely used due to their biocompatibility, absorption capacity and promotion of blood clot formation, favoring the tissue repair process [2]. Studies indicate that the use of absorbable gelatin sponges contributes significantly to reducing postoperative bleeding time, improves patient comfort, helps protect the alveolus and acts as a matrix for clot formation, providing an environment conducive to bone and tissue repair [3].

When it comes to membranes, they are used in the regenerative process of surgical procedures to help control bleeding and tissue repair [4]. They are composed mostly of type I collagen and act as supports for platelet adhesion and activation, promoting the formation of a temporary matrix that facilitates the coagulation cascade, stimulates tissue regeneration and are used for cell exclusion and the control of minor bleeding, generating an extra mechanical hemostatic action [5,6]. These membranes can be impregnated with additional hemostatic agents, such as thrombin and fibrinogen, to enhance their effectiveness in controlling bleeding, especially in patients with coagulation disorders or undergoing highly complex surgeries [7,8].

This split-mouth case report aims to compare the use of Hemospon and Lumina Coat membrane in fresh post-extraction alveoli, evaluating the indices of pain, bleeding and scar characteristics in the periods immediately after, 30 minutes, 24 hours, 48 hours and 7 days.

Work proposal

This article aims to report a clinical case of split mouth using two materials with hemostatic function in different fresh alveoli after tooth extractions, evaluating the indices of pain, bleeding and scar characteristics in the periods immediately after, 30 minutes, 24 hours, 48 hours and 7 days.

Case Report

Patient AGH, 52 years old, melanodermic, normoreactive and normotensive, participated in the study according to the inclusion criteria, being submitted to a careful anamnesis, clinical diagnostic examination and radiographic examination (Figure 1) using panoramic radiography prior to the extractions. At this time, clinical data on oral health conditions close to the region of the extracted teeth was obtained using standardized intraoral photographs (Figure 2). The surgical procedure followed all biosafety protocols. After intraoral antisepsis of the oral cavity with 0.12% chlorhexidine and extraoral antisepsis with 2% chlorhexidine, local anesthesia was performed with mepivacaine with adrenaline 1:100.000. We then carried out the indicated extraction technique (exodontia via alveolar), which consists of syndesmotomy, coronal-root sectioning and luxation with forceps and extractors, followed by care of the alveolus after extraction. After extraction, the alveolus of tooth 37 was filled with collagen membrane (Critéria Lumina coat®, São Carlos, SP Brasi) and tooth 27 received the Hemospon®. collagen sponge. Subsequently, the edges of the flaps were reapproximated and sutured with 5-0 polypropylene threads in simple interrupted stitches. In the postoperative period, Amoxicillin 500 mg was prescribed, every 8 hours for 7 days, to prevent infections at the surgical site, Adrian 4 mg, every 12 hours, for 3 days to control inflammation and Dipyrone sodium 500 mg, every 6 hours, for 3 days to minimize postoperative painful symptoms. The sutures were removed after 7 days. The patient was clinically evaluated immediately after surgery (Figure 3), 30 minutes later, 24 hours later (Figure 4) and 48 hours later (Figure 5), as well as 7 days (Figure 6) after extraction to measure clinical aspects, hemostasis and pain control.

Consultations for postoperative evaluation were carried out by the same examiner and always at the same time. At the end of the surgical procedures, the regions of the two alveoli were evaluated in the clinic immediately after extraction and 30 minutes later to check the situation of local bleeding and then after 24 hours and 48 hours and 7 days regarding the healing of the soft tissues, the analog pain scale and bleeding.

Bleeding was analyzed using scores according to the Mühlemann Classification8 which range from 0-3, with 0 meaning: no bleeding within 30 seconds of probing, 1: bleeding within a few seconds of probing; 2: immediate bleeding in the probing; and 3: Bleeding along the gingival sulcus on slightest touch. (Mühlemann HR, 1971) [8]. Pain analysis was performed using the Visual Analog Scale (VAS), with 0 being no pain and 10 being the most severe pain, together with the graphic classification scale. Soft tissue healing was performed through the analysis of scores 0-3, according to Brancacio et al., 20209 in 0 = complete closure without fibrin, 1: complete closure with fibrin, 2: incomplete closure of the alveolus (dehiscence) and 3: incomplete closure with signs of necrosis. (Brancaccio et al., 2020) [9].

The Table (tab1) shows the results obtained in the analyses at different times of the research. Regarding the pain criterion, the region of tooth 37 obtained a score of 2 at 24 hours. At the other times evaluated, regardless of the surgical sites, the scores did not exceed 0 (zero). Regarding bleeding, tooth 37 that received the membrane, in the time immediately after extraction, presented a higher score [3], unlike tooth 27 that received the sponge, which presented a score of 2. However, in the other analysis times, the two areas had the same behavior, not demonstrating a change in relation to the results obtained between the two products used. However, when the healing aspect was checked, the tooth that received the membrane showed less morbidity and better tissue healing over time.

Teeth	Parameters	immediate	30 Min	24 h	48 h	7 days
27	pain	0	0	0	0	0
	bleeding	2	1	0	0	0
	healing	2	2	3	2	1
37	pain	0	0	2	0	0
	bleeding	3	1	0	0	0
	healing	2	2	2	1	0

Table 1: Analysis of pain, scar aspect, bleeding from surgical sites and use of analgesics immediately after, 30 minutes, 24h, 48h and 7 days.

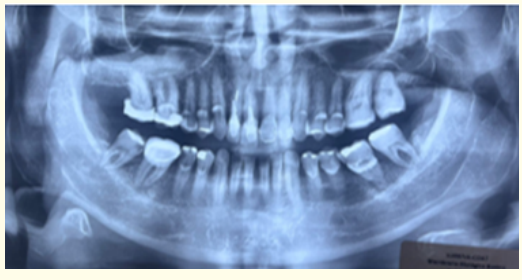

Figure 1: Initial radiographic aspect.

Figure 2: Initial intraoral aspect.

Figure 3: Clinical aspect immediately after the end of the procedure.

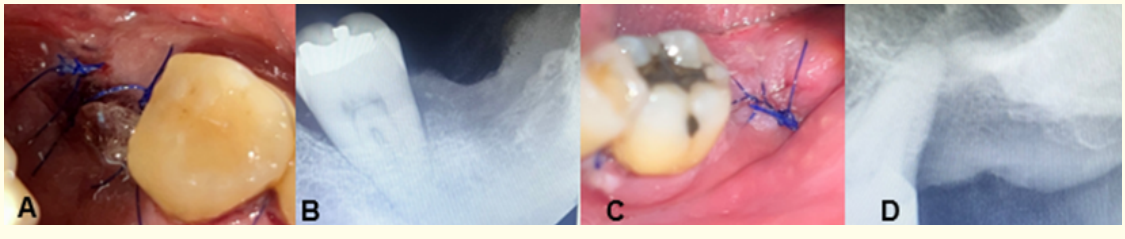

Figure 4: Clinical and radiographic aspect of elements 27 (A,B) and 37 (C,D) 24 hours after the procedure.

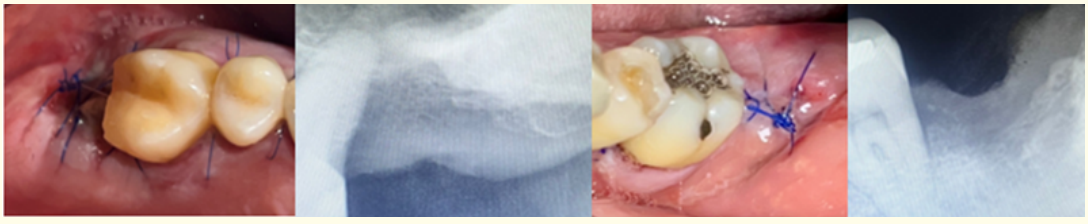

Figure 5: Clinical and radiographic aspect of elements 27 (A,B) and 37 (C,D) 48 hours after the procedure.

Figure 6: Clinical aspect of elements 27 (A) and 37 (B) 7 days after the procedure.

Discussion

The decision between using hemostatic sponges or membranes in surgical interventions is linked to the treatment objective. Hemostatic sponges, including absorbable gelatin and oxidized cellulose, are often used to manage bleeding and are especially useful in oral surgery [10]. These types of sponges work by promoting platelet aggregation and accelerating the coagulation process, offering efficient hemostasis in areas with high vascularization [11]. In contrast, membranes are commonly used in guided tissue regeneration, acting as barriers that block the movement of epithelial cells to the bone healing region [12].

Collagen membranes, in turn, have been widely used in both bone and periodontal regeneration due to their biocompatible characteristics and controlled resorption [13]. In addition, some membranes have bioactive characteristics, encouraging the differentiation of osteoblasts and accelerating the formation of new bone tissue [14]. In this clinical case of split mouth, it was observed that the site that received the membrane (alveolus of 37) obtained better healing performance, demonstrating a tendency of the membranes to help reduce morbidity.

A comparative analysis of hemostatic sponges and membranes indicated that sponges provide instant hemostatic control and membranes contribute to superior healing and long-term bone preservation [15]. These results agree with this research, since in the time immediately after the alveolus of tooth 27 that received Hemospon presented a score of 2: immediate bleeding in the probing, while 37 (membrane) received a score of 3: bleeding along the gingival sulcus on slightest touch. The results obtained also agree with regard to healing, where the scores demonstrate a long-term improvement in the morbidity of the alveolus of tooth 37 that received the membrane.

Therefore, the decision on which materials to use must consider the purpose of the procedure.

For immediate control of bleeding, hemostatic sponges stand out; however, if the focus is on tissue recovery, membranes show more effective results.

Conclusion

This report concluded that the membrane promoted an acceleration in the healing process when compared to the sponge, reducing the morbidity of post-extraction repair.

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