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Effectiveness of Cutanplast Reabsorbable Gelatin Sponge in Implanted Third Molar Surgery

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Background and objectives: To assess the efficacy of the Cutanplast reabsorbable gelatin sponge for reducing the side effects of impacted third molar surgery.

Materials and methods: This non-randomized double-blind split-mouth study included 15 patients (30 sites) with two bilateral impacted third molars in one jaw. Following extraction, a random socket on one side was filled with a Cutanplast reabsorbable gelatin sponge with dimensions of10×50×70 mm. The sponge was inserted, however not actually used at the control site. Two independent surgeons visually examined the effect of gelatin sponge application on the occurrence of dehiscence, edema, and infection three and seven days postoperatively. Additionally, postoperative pain was quantified using a visual analog scale.

Results: At three days, there was no significant difference in the frequency of swelling between the two groups (P=0.9). At seven days, no edema was observed. By three days, no dehiscence occurred; however, at seven days, ten (66.7%) controls developed dehiscence, but no dehiscence was seen in the test group (P=0.001). The odds ratio computed for dehiscence due to the absence of gelatin was 0.67. The two groups did not differ significantly in terms of pain (P>0.05).

Conclusion: At seven days postoperatively, the use of Cutanplast resorbable gelatin prevented dehiscence, but had no effect on pain, edema, or infection.

Keywords: Impacted third molars, Dehiscence, Pain, Infection, Absorbable gelatin.

1. Introduction

Third molar extraction is a routine surgical procedure con by dental professionals and oral and maxillofacial surgeons (1, 2). Postoperative pain, swelling, dehiscence, and infection are all typical consequences after third molar extraction (3-5). Numerous studies have attempted to prevent or reduce the incidence of these complications through the use of pharmaceuticals such as antibiotics, nonsteroidal anti-inflammatory drugs, and corticosteroids (6, 7), as well as nonpharmacological methods such as cold compression therapy, triangular flaps, avoiding perioperative trauma, and irrigation of the surgical site (1, 2, 8). However, no agreement on a precise technique or substance for this purpose has been achieved. If left untreated, these problems can cause patients anxiety and concern and periodontal disorders like pericoronitis, root resorption, odontogenic cysts and tumors, and unexplained pain (9). Numerous resorbable membranes and absorbable gelatins have been advised to aid in the healing process and reduce the risk of problems associated with impacted third molar surgery (10, 11). Kim et al. investigated the bleeding, discomfort, and swelling effects of absorbable gelatin. They observed that absorbable gelatin was helpful at preventing and controlling bleeding following third molar surgery with an impacted third molar (12). Cutanplast resorbable gelatin sponge has been reported to be capable of controlling bleeding, stabilizing clots, and possessing bacteriostatic characteristics (10). However, to the best of our knowledge, there is no study comparing its effectiveness in preventing side effects following the third molar extraction surgery with placebo. The purpose of this study was to determine the efficacy of the Cutanplast resorbable gelatin sponge in the prevention of side effects following the extraction of impacted third molars.

2. Materials and methods

This double-blind non-randomized study was conducted on 15 patients (30 sites) with a split-mouth design. The patients were recruited from the Oral and Maxillofacial Surgery Department, Islamic Azad University, Tehran, Iran. Participants aged 17-40 years who had two bilateral impacted third molars in a single jaw (maxilla or mandible) and were referred for third molar extraction surgery were included. According to the Pederson difficulty index and trauma four-point rating scale (11), patients had similar extraction difficulty indices.

The exclusion criteria were as follows: semi-impacted third molars, age range other than the aforementioned range, not signing the consent form, not returning the questionnaire, systemic diseases, smoking, the inability of the surgeon to close the flap by suturing, absence of bony walls for application of the material and conditions necessitating the use of an unequal number of sutures at the two sides. A final sample size of 30 (15 in each group) was assessed based on a similar study (13). This study was approved by the Research Ethics Committee of the Islamic Azad University of Medical Sciences (Thesis code: 90-9350).

Patients underwent surgical removal of third molars by a single board-certified oral and maxillofacial surgeon. Local anesthesia was induced by inferior alveolar nerve block via injection of two cartridges of 1.8 ml 2% lidocaine with 1:100.000 epinephrine. A mucoperiosteal flap was elevated, and a vertical releasing incision was made to expose the bone. Bone was removed by a bur if required, and the tooth was extracted by an elevator. Whenever required, the tooth was sectioned and then removed to avoid traumatizing the cortical bone. After extraction of the tooth, the socket was precisely inspected and then rinsed with saline. The socket of one side was randomly selected to apply a Cutanplast re-absorbable gelatin sponge (Mascia Brunelli, Italy). The gelatin sponge had 10×50×70mm dimensions and was cut in the required amounts by sterile scissors until the cavity was filled.

In the control site, applying the sponge was imitated but was not actually used. Thus, the patient was blinded to the test and control sites. The flaps were returned and sutured by simple interrupted stitches with nonabsorbable silk sutures. An equal number of stitches was applied at the two sides. All the materials and instruments, including the anesthetic agent, sutures, analgesics, and gelatin sponges, were the same for all patients. The examiner was also blinded to the allocations.

The post-surgical assessment was done by two independent surgeons blinded to the study design. The impact of the gelatin sponge on dehiscence, pain, swelling, and infection was assessed. A third surgeon solved any disagreement between the two surgeons.

The occurrence of dehiscence was visually assessed at three and seven days postoperatively. To assess the level of pain, a visual analog scale (0-10) was used. A score of zero indicated no pain, 1-3 represented mild pain, 4-6 indicated moderate pain, 7-9 denoted severe pain, and 10 represented the most severe pain imaginable. Patients were instructed on how to use this scale. The presence of pain was assessed 30 minutes after the operation. After discharge, patients were given visual analog scale diagrams to record their level of pain at three and eight hours and one and two days postoperatively. If a patient was asleep at any of the assigned pain recording time points, he/she would remain in the pain assessment analysis until the last recording but would be excluded from the pain assessment analyses thereafter.

For pain control, 400 mg ibuprofen (Chemi Darou, Tehran, Iran) every 6 hours was administered for 24 hours postoperatively. A stronger analgesic was administered if patients had unbearable pain after 24 hours, and its time of use and dosage were recorded in the datasheets.

Fischer's exact and Mann-Whitney U tests were used for the analysis. A <0.05 P-value was deemed significant in all analyses.

3. Results

This study was conducted on 30 sites (15 patients). The characteristics of the participants are presented in Table 1.

No infection occurred in any patient when assessed at the aforementioned time points. The frequency of swelling is presented in Table 2. At three days, the swelling was noted in 12 (80%) control sides and 13 test sides (86.7%). Fisher's exact test showed that this difference was not statistically significant ($P=0.9$). At seven days, no swelling was seen in either group.

The frequency of dehiscence is shown in Table 3. Dehiscence did not occur in either group at three days postoperatively. However, at seven days, dehiscence occurred in 10 controls (66.7%), whereas no cases of dehiscence were observed in the test group. Fisher's exact test showed that this difference was statistically significant ($P<0.001$). The calculated AR for dehiscence due to not using gelatin was 66.7% (AR=66.7). Figure 1 shows the pain levels at different time points. Pain levels were not significantly different between the two groups ($P>0.05$). None of the patients required a stronger analgesic, and all of them accurately recorded their level of pain at all designated time points.

4. Discussion

Our findings showed that although the Cutanplast re-absorbable gelatin sponge prevented dehiscence at seven days, it had no effect on pain, swelling, or infection. Several studies have evaluated factors that can decrease the complications of impacted third molar surgery.

A previous study was performed on the efficacy of alloplastic bone graft and absorbable gelatin sponge to prevent periodontal defects distal to the mandibular second molars following impac-

Table 1. Characteristics of the participants.

Mean age (± SD)		23.8 ± 2
Gender	Male	60% (9)
	Female	40% (6)
Location	Maxilla	33.3% (10)
	Mandible	66.6% (20)

Table 2. Occurrence of swelling after surgery based on follow-up times and the use of gelatin.

Follow-up time	3 days post-surgery		7 days post-surgery	
Swelling / Use of Gelatin	No	Yes	No	Yes
Not used (n=15)	3 (20)	12 (80)	15 (100)	0
Used (n=15)	2 (13.3)	13 (86.7)	15 (100)	0
P-value	P < 0.9		-	

Table 3. Frequency of dehiscence after surgery based on follow-up times and the use of gelatin.

Follow-up time	3 days post-surgery		7 days post-surgery	
Dehiscence / Use of Gelatin	No	Yes	No	Yes
Not used (n=15)	15 (100)	0	5 (33.3)	10 (66.7)
Used (n=15)	15 (100)	0	15 (100)	0
P-value	-		P < 0.0005	

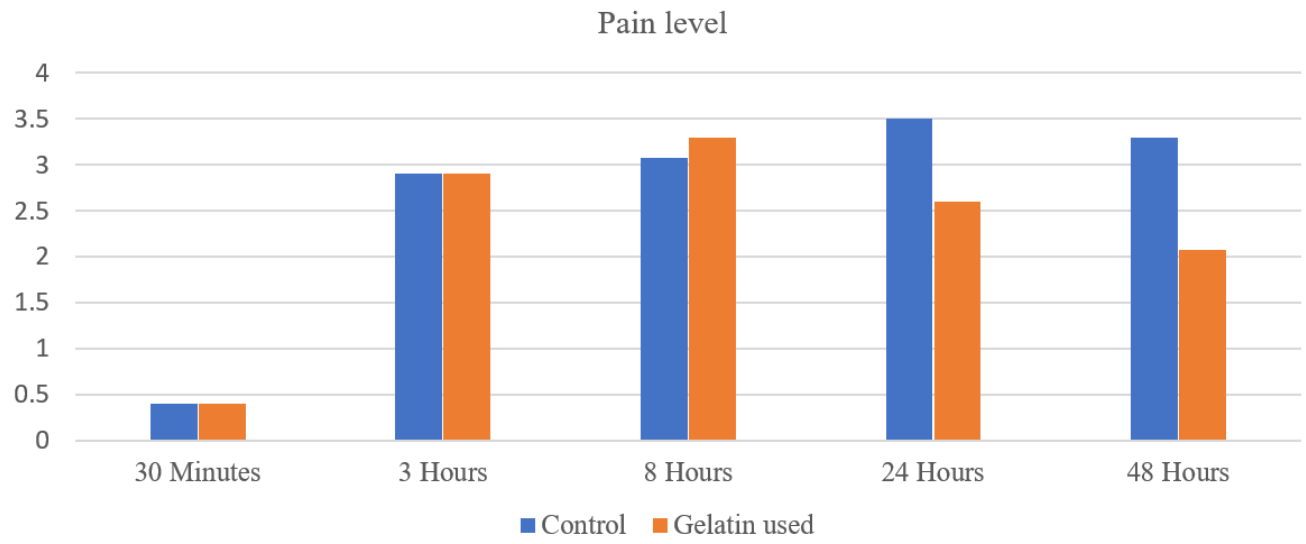

Figure 1. Pain level based on follow-up times and the use of gelatin

-ted third molar surgery. Its results showed an increased level of alveolar bone, improved alveolar bone probing depth, and better wound healing by the application of these agents (14). Cortell-Ballester et al. evaluated the effects of the application of resorbable collagen membrane after surgical extraction of impacted third molars. They showed that resorbable collagen membrane after extraction of horizontal or mesioangular impacted molars induced bone regeneration, improved attachment level, and enhanced bone fill in the distal of molars. Moreover, the probing depth at the distal of molars was decreased, and the healing was enhanced (15).

Cho et al. evaluated the complications following the use of absorbable collagen sponges in the extraction sockets of third molars. They showed a relatively lower rate of complications compared to previous studies, and they recommended using type I collagen sponges to prevent postoperative complications following third molar extraction (16). Another study showed that topical applying a gel containing chitosan, 0,2% chlorhexidine, allantoin, and despanthenol, improved wound healing after impacted lower third molar extraction. However, it did not lower the patients' discomfort (9). Another study showed that a single application of chlorhexidine gel was effective in reducing the frequency of alveolar osteitis following mandibular third molar surgery (17). These different results could arise from the difference in the study settings, participants, and the materials used. The optimal efficacy of Cutanplast re-absorbable gelatin sponge in oral and general surgeries is mainly due to bleeding control, clot stabilization, and bacteriostatic properties (10). In a study in 2010 by Dong-Seok et al., in South Korea, the positive efficacy of Cutanplast re-absorbable gelatin for bone regeneration in sinus lift surgery was shown (18). In another study in 2013, Cho et al. showed the positive efficacy of this material to prevent post-surgical bleeding and pain in endoscopic sinus surgery (19). This material could serve as a scaffold for the clot, further stabilize it and enhance healing.

In parallel with the previous studies, our finding showed that using Cutanplast re-absorbable gelatin could have significantly better results than a placebo. However, further studies with different settings are required.

5. Limitations

One of the primary limitations of this study is the small sample size, which may impact the generalizability of the findings.

6. Conclusion

Use of Cutanplast re-absorbable gelatin could be useful to prevent dehiscence at seven days after surgery, however, it had no significant effect on postoperative pain, swelling, or infection. However, further studies are recommended.m

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None.

Authors' contribution

Mehrdad Dehghanpour Barouj: Conceptualization, Methodology, Writing – Original draft
Mahtab Kheirkhahi: Data curation, Writing – Review & editing
Parsa Behnia: Validation, Supervision

Conflict of Interest

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