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# EFFICACY OF ABSORBABLE SURGICAL GELATIN SPONGE POST SURGICAL EXTRACTION OF IMPACTED MANDIBULAR TEETH: A PROSPECTIVE SPLIT MOUTH COMPARATIVE STUDY

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**Abstract**
Background: Post operative pain is common complication following surgical extraction of impacted mandibular teeth. Absorbable Surgical Gelatin sponge is a hemostatic Agent commonly used in controlling bleeding in oral surgery. The specific aim of this study is to understand the efficacy and efficiency of absorbable surgical gelatin sponge in reducing post operative complication after surgical extraction of impacted mandibular molars.
Materials and Methods: 30 patients who required bilateral Surgical extraction of impacted mandibular third molar were selected for the study through randomization one side was packed with absorbable gelatin sponge while the other was left empty prior to suturing. The patients were asked to fill a pamphlet handed to them post-surgery and score the three criteria from 0-2 for 7 days. The scoring was totaled and compared after 7 days.
Result: 30 patients with an average age 27years were selected, The experimental group showed significant reduction in pain $t = 0.09$, $0.05<p< 0.1$ and bleeding $t = 0.276$, $p >50$ postoperatively for 7 days though there was no difference in the swelling. Healing of both the control and experimental group did not differ significantly at the end of 7 days.
Conclusion: Using gelatin sponge in the extraction sockets of impacted third molars, when excessive bleeding is not present, reduces postoperative pain compared to non-packed control sites. This difference is statistically significant when gelatin sponge is used. Furthermore, the use of gelatin sponge does not significantly impede the healing process in clinical settings. There is a noticeable difference in pain reduction between the experimental and control groups.
Keywords: Third Molar extraction, oral surgery , Gelatin sponge, Impaction , Dry Socket

## INTRODUCTION:

Surgical Extraction of impacted third molar is a common procedure performed routinely in a dental clinic setup. Though A common procedure, postoperative pain of patients undergoing third molar extraction is one of the few complications that clinicians routinely face.

NSAIDS prescribed post Surgical Extractions greatly reduce post operative pain, but there is a void intraoperatively to reduce immediate post operative pain.[1]

Absorbable surgical Gelatin sponge is a commonly used hemostatic agent used in the Oral surgery to arrest bleeding, It is derived from neutral pharmaceutical grade Gelatin, has the ability to swell up to 45 times its size to arrest the bleeding by compressing the bleeding vessel.[2]

Few studies have shown that post operative pain is directly dependant on the rate of formation of clot. A research was conducted to examine the comparative impact of Absorbable surgical Gelatin sponge application within the extraction socket of surgically removed teeth, as opposed to keeping the socket empty prior to suturing. The primary objective was to evaluate the occurrence of typical postoperative complications, including pain, edoema, and bleeding.[3-5]

## MATERIALS AND METHODOLOGY

In total 30 patients, consisting of 10 Female and 20 Male Patients aged 18 to 40 with an average age of 27 years were Scheduled for surgical extraction of bilaterally impacted mandibular third molar following randomization protocol after Obtaining Ethical Clearance from the Institutional Human Ethical Committee (IHEC/SDC/OMFS-2201/23/167)

Patients Orthopantomogram was assessed and patients with similar impaction bilateral Mesio-angular impaction of third molar were selected.
Following Randomization, the material to be tested i.e., Absorbable Gelatin sponge was placed in the extraction socket of the patient and sutured with Interrupted 3-0 Silk Sutures while the control side was sutured with the same 3-0 Silk sutures leaving the socket empty.
The absorbable sponge was cut into identical Size of 15x15x15mm cubes.
To Avoid any clinician Bias the side of the study materials was switched with every patient so as to avoid any preference bias.

Absorbable Surgical Gelatin Sponge
The material in question is a gelatin-based substance that is capable of being absorbed by the body. Specifically, it is composed of collagen, a protein that has undergone formaldehyde treatment. The substance is distributed in a sponge-like structure, available in various dimensions, exhibiting both durability and porosity. The aforementioned characteristic allows the material to effectively absorb blood at a rate that is 45 times its own weight. The hemostatic action is attributed to the consistent porosity of the gelatin sponge, which facilitates platelet adhesion and subsequent degradation, resulting in the release of thrombokinase. Gelatin Sponge has a neutral pH, rendering it compatible for moistening with thrombin or antibiotic solutions without compromising its integrity.[3]
In All the 30 cases 3 simple interrupted 3-0 Silk sutures were placed to retain the Material of choice. For analgesia 1:80,000 2% Lignocaine Local anesthesia was administered as IANB Block along with Long buccal Nerve Block.

Patients were further grouped into 3 groups Group A, Group B and Group C based on the Intraoperative Trauma. Group A : Slight Trauma, Group B : moderate Trauma and Group C : Severe Trauma .
All Patients post operatively were prescribed oral NSAIDS Aceclofenac (100mg) + Paracetamol (325mg) to be taken twice a day for 5 days post

The patients were provided with a Pamphlet in which they were asked to record instances of bleeding, discomfort, and edoema following the surgical procedure. During each of the seven days following the surgical procedure, the patients were instructed to document the specified parameters at both 8a.m. and 8 p.m.

The postoperative patients were managed by investigators who were unaware of the specific placement of the test material. The statistical method employed for assessing the outcomes was the Student t-test for paired comparisons.

**RESULTS:**
The comparative assessment of the degree of surgical trauma indicated no observable differentiation between the sides treated with Absorbable surgical Gelatin sponge and those treated with the control substance.
Swelling
The examination of the cumulative swelling scores among the participants in the gelatin and Control group indicated a little disparity, as the gelatin group had slightly reduced levels of swelling in comparison to the Control Group (Table 3). The statistical analysis of paired comparisons done between the test side and control side within each patient did not yield any significant difference in edema between the two sides. Nevertheless, it is important to acknowledge that the t-value exhibited a preference for the Absorbable gelatin group.

Pain
The analysis of the mean pain scores for patients in the gelatin revealed a significant disparity in pain levels between the experimental and control sides favoring the Experimental Site (Table 3).

Bleeding
The calculation of the mean bleeding scores for the patients in both groups revealed a somewhat lower level of bleeding in the Absorbable surgical Gelatin sponge group in comparison to the Control Group (Table 3)

**Table 1 :** Parameters mentioned in the Pamphlet

| ***Scoring*** | ***Bleeding*** | ***Pain*** | ***Swelling*** |
|---|---|---|---|
| 0 | No Bleeding | No pain | No swelling |
| 1 | Oozing | Slight Pain | Slight intraoral or extraoral swelling |
| 2 | Severe Bleeding | Severe Pain | Severe intraoral or Extraoral Swelling |

Table 1 shows the Parameters mentioned in the Pamphlet

**Table 2:** The distribution of patients in groups categorized as surgical trauma and the average duration of operation time, measured in minutes. A: Minimal operating trauma; B: Moderate operative trauma; C: Severe operative trauma.

| | Test Side | | | Control Side | | |
|---|---|---|---|---|---|---|
| Degree Of trauma | Group A | Group B | Group C | Group A | Group B | Group C |
| Absorbable Surgical Gelatin Sponge No. of Patient | 20 | 10 | 0 | 18 | 12 | 0 |
| Average time for Surgery (min) | 15 | | | 15 | | |

Table 2 shows the distribution of patients in groups categorized as surgical trauma and the average duration of operation time, measured in minutes. A: Minimal operating trauma; B: Moderate operative trauma; C: Severe operative trauma.

**Table 3:** Average of Parameter Score For Absorbable Surgical Gel Sponge and Control Group

| | **ABSORBABLE GELATIN SPONGE** | |
|---|---|---|
| | **Test Side** | **Control Side** |
| Swelling | 4.8 | 6.0 |
| Pain | 2.9 | 7.2 |
| Bleeding | 1.5 | 3.5 |

**Table 4:** Paired comparisons between test side and control side in each patient

| | Absorbable Surgical Gelatin Sponge |
|---|---|
| Swelling | t = 0.17, p>50 |
| Pain | t = 0.09, 0.05<p< 0.1 |
| Bleeding | t = 0.276, p >50 |

Table 4 shows the Paired comparisons between test side and control side in each patient

## DISCUSSION

The findings of this prospective split-mouth study provide valuable insights into the potential benefits of using absorbable Gelatin surgical Sponges in the context of oral and maxillofacial surgery. Although the sample size in this study was relatively small, it's important to highlight the unique approach taken, where each patient effectively served as their own control, comparing the experimental side to the contralateral control side[6,7]

One notable outcome from the study was the significant reduction in postoperative pain experienced by patients in the experimental group over the course of 7 days. This reduction in pain is a crucial aspect of patient comfort and recovery, which is of great importance in the field of oral surgery.

It's also interesting to note that a majority of the patients preferred the experimental side, indicating their positive perception of the reduction in postoperative pain. Patient satisfaction is a vital component of any medical treatment, and these preferences may influence clinical decision-making[8-10]

However, it's worth mentioning that the study did not find a significant decrease in postoperative swelling when comparing the experimental group to the control group. While reduced pain is certainly a favorable outcome, the lack of a substantial decrease in swelling suggests that there may be other factors at play in the recovery process that need further investigation.

One particularly intriguing aspect highlighted in this discussion is the mechanism by which the gelatin sponge seems to operate. By physically compressing damaged blood vessels, promoting clot formation, and stabilizing these clots, it potentially hastens the healing process and encourages the differentiation of surrounding mesenchymal stem cells. This mechanism adds an interesting dimension to the potential benefits of absorbable gelatin sponges.[9-11]

Additionally, the reference to prior studies showing that periosteal placement of gelatin sponges can expedite bone formation and aid in healing is a promising finding. It suggests that this approach might have wider applications and merits further investigation with a larger sample size and a variety of impaction classifications[12]. Such studies would be crucial in determining whether absorbable surgical gelatin sponges should be routinely incorporated into clinical settings to reduce postoperative swelling, enhance patient recovery, and potentially improve long-term outcomes in oral and maxillofacial surgery[13]

In summary, while this study offers valuable initial insights, it underscores the need for more extensive research to draw definitive conclusions about the routine use of absorbable gelatin sponges in clinical settings. The potential benefits for patient comfort and healing make it a topic worthy of continued investigation and exploration[14,15]

## CONCLUSION

The utilization of gelatin sponge in extraction sockets of impacted third molars, in cases when excessive bleeding is absent, appears to result in a reduction of postoperative Pain as compared to the control sides that are not packed. The observed disparity has statistical significance in the context of gelatin sponge. The utilization of Gelatin Sponge materials does not appear to significantly hinder the healing process of sockets in clinical settings. There exists a notable disparity in the level of pain reduction seen between the experimental and control groups.

**CONFLICT OF INTEREST** : The authors guarantee there is no conflict of interest

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