



Impact of Mucous Adhesive Membrane in Reducing Edema and Pain Post-Surgical Removal of Lower Wisdom Teeth

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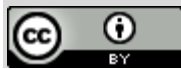
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Abstract

One of the most prevalent challenges that a specialized oral surgeon might encounter involves extracting impacted lower wisdom teeth, which can lead to post-operative complications like swelling and pain. Various techniques have been developed to mitigate these issues. In this research, we aimed to introduce a novel approach in oral surgery known as adhesive membrane oral aid. This study utilized a split-mouth design to assess the efficacy and impact of the adhesive membrane following the surgical removal of lower wisdom teeth in 10 patients. The split-mouth design enables both the control and study groups to be assigned within the same patient, reducing variability between different patients. The research involved a total of 10 patients who presented bilateral impaction of lower wisdom teeth and were recommended for surgical extraction. In the control group, the patient's ipsilateral side was sutured without the use of a membrane. After one month, the contralateral side of the same patient was sutured with a membrane using figure 8 sutures.

Introduction:

Pain is a negative subjective emotional experience caused by an unhealthy stimulation of the sensory nerve endings, which may be associated with tissue damage. Toothache pain may originate

from the dental pulp or periodontal ligament. Dental pain is intense, somatic, and has a central excitatory effect. (1) Somatic dental pain is profound and somatic, presenting various central

excitatory effects. Due to referred pain, muscles innervated by the trigeminal nerve may develop trigger points, autonomic effects, and spasm induction. It is described as a dreary, oppressive sensation that occasionally throbs, burns, is intense and is temporary. Dental pain can be mistaken for other types of pain because the patient frequently finds it difficult to identify the damaged tooth or site and may indicate that the pain is emanating from another tooth or location in one of the jaws or on the face and neck (2). When oral tissue is damaged, the inflammatory response is activated, resulting in the release of a number of inflammatory and pain mediators. Peripheral nociceptors are more sensitive to and stimulated by mediating substances such as prostaglandins and bradykinins, which normally have little natural action (1). The tooth that remains within the bone after its eruption period is referred to as an "impacted tooth" (3). The mandibular third molar holds the highest prevalence for impaction, reaching up to 70% within the population (4). Impaction of the mandibular third molar occurs due to limited space between the distal surface of the second mandibular molar and the anterior border of the ascending ramus of the mandible (5). The surgical removal of the impacted mandibular third molar is a routine procedure in oral and maxillofacial surgery; however, it often presents postoperative challenges such as dolor, dry socket, swelling, and trismus (6). The complexity of surgical tooth extraction can range from relatively straightforward to highly intricate, contingent upon factors such as the impacted tooth's depth, angle, root count, mouth opening capacity, and bone density (7). Numerous studies have explored the variables affecting postoperative complications, including surgical methodologies, procedure duration, and strategies for minimizing postoperative issues (8). "Various researchers have endeavored to identify effective approaches for preventing dry socket, employing methods like local and systemic antibiotics. Additionally, strategies like chlorhexidine rinse or gel, dressings, antifibrinolytic agents, low-level laser therapy, oxidized and regenerated cellulose, and dextran granules have been

utilized to mitigate the risk of alveolar osteitis (9) ". Pain serves as the body's defensive response to tissue damage caused by diverse stimuli, transmitting signals to the central nervous system (10). Dental pain typically arises from an acute inflammatory reaction, prompting patients to seek assistance from dental professionals. Conversely, surgical interventions in dental clinics might induce pain in patients who were previously asymptomatic during the postoperative phase (11). A critical dental procedure involves surgically extracting impacted teeth, followed by socket-healing processes (12). The treatment of wounds involves a combination of biochemical and cellular processes that restore the integrity and functionality of the injured tissue (13). Except for the anatomical state, which develops after tooth removal, the healing of an extraction socket wound is similar to the healing of other body wounds (14). Numerous The wound healing process involves several stages, including changes in blood vessels, inflammation, migration of the extracellular matrix, cell proliferation and differentiation, cell inhabiting and maturation, bone formation, modeling, remodeling, and ultimately the restoration of lost tissues (15). To ensure proper healing, it's essential for wound dressings to shield these wounds, preventing contamination by foreign materials and microbial infections, thus promoting the healing process. Enhancements in the management of extraction socket healing have been achieved through the development of non-resorbable membrane barriers. These barriers, whether used alone or in combination with particulate materials, contribute to improved healing outcomes (13). Aims of the study: This research aims to explore the clinical effects of mucous adhesive membranes on the wound healing process of surgically removed impacted teeth. Approval of the Study: "The study was registered by the Scientific Committee at the department of Oral and Maxillofacial Surgery/ College of Dentistry/Mosul University in first committee in 27-2-2023". "Prior to starting the study, its protocol was reviewed and the Research Ethics Committee at the College of

Dentistry / Mosul University (reference number UoM.Dent.26/23, in 2/3 / 2023) granted ethical approval".

Materials and Methods:

This research was designed to be a split-mouth study. It was conducted from 10 January to 15 May of 2023. Patients attending the Oral Surgery Clinic at the Department of Oral and Maxillofacial Surgery/ College of Dentistry/ Mosul University served as study participants. Prior to their participation, patients were informed of the research protocol and potential risks. Upon acceptance, each participant in the study signed a written consent form. Inclusion criteria for this study encompass patients aged between 18 and 35 years, who are generally in good health without any systemic illnesses, and whose wounds have healed through secondary intention. These criteria also pertain to patients without significant oral or systemic infections. Conversely, exclusion criteria involve individuals falling outside the specified age range, those dealing with systemic conditions necessitating daily medications, patients with severe oral or systemic infections, and individuals who declined participation or faced difficulties attending follow-up calls. Mucous adhesive membrane is a product designed and manufactured in South Korea and It consists of hydrophilic high-density polymers encased in water-insoluble mucoadhesive synthetic cellulose, along with vitamin E. This composition ensures safety, even in the case of ingestion. This non-eugenol protective dressing is created from biocompatible materials and is designed to safeguard intra-oral wounds. Its easy manipulation in a clinical setting is a key feature. The patches are mint-flavored to enhance the sensation of freshness in the mouth, and they gradually dissipate and get absorbed over time. "Pain (referred to as 'dolor') and swelling were accurately evaluated on the 1st, 3rd, and 7th days following the surgery by the surgeon. The assessment of postoperative pain was conducted using a visual analogue scale (VAS) that spans 10 centimeters, ranging from 0 (indicating no pain) to 10 (representing the most severe pain

imaginable). Additionally, three facial measurements were taken using a flexible measuring tape, providing baseline data for recording facial swelling. These measurements included the following: distance from Tragus to midline (pogonion), distance from Tragus to the corner of the mouth (canthus), and distance from Gonion to the lateral canthus ". A total of 10 patients were divided into: Control group, which surgically extracted of mandibular third molar on one side of patients and suture the flap only without membrane. Study group, which extracted the contralateral side of impacted mandibular third molar after one month of same patients and suture the flap with membrane by placement of membrane first and sutured over it by figure 8 suture technique and remove in the 7 days. All patients are operated by the same professional surgeon (which is the researcher)

Medication used Paracetamol tab. 1000 mg only (France). One tab. for 24 hours for three days .Statistical analysis: Data were analyzed using SPSS software Statistics for windows, version 16, Chicago: SPSS Inc. USA. As study data were normally distributed (pain VAS measures are always finite and subjective), median was used to present results of the study. Parametric statistical tests were used for comparisons between and within the two study groups. Paired T test was used for comparison of VAS and edema measures between control group and study group, as they were related groups. Differences considered statistically significant only if p-value was <0.05.

Results:

Ten patients were surgically removed impacted mandibular third molar who met the eligibility criteria. Postoperative complications had been evaluated in three postoperative periods 1 day, 3 day and 7 days. Measurements of swelling were taken at three periods (pre, day 1, day 3 and day7). The mean of measurements at each time for study and control groups as shown in table (1). The results revealed that studied samples had a similar extent of

swelling along different periods. The maximum values of swelling were reported at day 1 in both groups. There was a highly significant difference between the different periods in each group figure (1). The mean of measurements of pain at each time for study and control groups shown in Table (2). The results showed that the mean of pain scores was statistically significant difference between the groups at each period ($P < 0.05$) Figure (2).

Discussion:

One of the most frequent minor oral surgical operations carried out on a daily basis in centers for oral and maxillofacial surgery is the surgical extraction of mandibular third molar. The maximum extent of swelling in the current study was observed at day 1 with a highly significant difference compared to pre and day 7 in both groups. Difficult cases, which needed more bone removal and prolonged procedure, showed more swelling than slightly difficult cases and there was high correlation between swelling with surgical difficulty and operation time in control and study groups. However, non-significant difference was found in comparison to the parameter of swelling between the groups at each period of time. For study group, the mean of pain severity records started postoperatively at day of surgery scored 6.20, at the second day reduced to 4.88 and more reduced gradually to 3.36, 2.32, 1.36, and 0.48 and to end 0.0 at the 7th day. While in the control group, the mean of

pain records started postoperatively at day of surgery scored 7.04, at the second day reduced to 5.40 and more reduced gradually to 4.40, 3.40, 2.36, 1.20 and to end 0.6 at the 7th day. The result showed that pain gradually decreased in sequence significantly at each day in both groups. Regarding the comparison of pain between control and study groups, this study found a significant difference ($P < 0.05$) at each day. The correlation between pain and surgical difficulty was weak in both groups. While the correlation between pain and surgical operation time was high in both groups. By the end of the follow-up period, there were no instances of dry sockets or wound infections among the patients. No adverse effects related to the medications administered during the experiment were reported or observed.

Conclusion

"The immediate application of mucous adhesive membrane within fresh socket immediately following extraction of mandibular third molar impaction result in several benefits in comparison to the suture group which include reduce pain significantly especially at the first day postoperatively by protect the surgical site and blocking the external stimuli. Compared to the control group, the study group's degree of edema is better". However, the difference was not significant statistically.

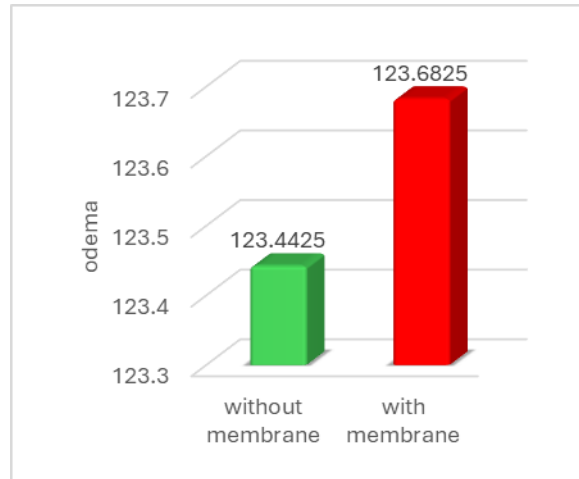


Figure (1): The profile difference of swelling between studies groups.

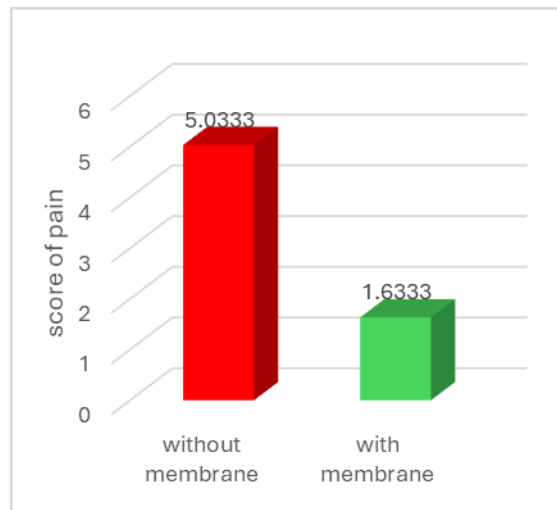


Figure (2): The profile difference of pain between studies group.

Table (1): show the measurement mean of edema at all days intervals in control and study groups.

Odema		without membrane	with membrane
pre	Mean	122.5200	122.9800
	N	10	10
	Std. Deviation	13.82275	13.78355
1 day	Mean	124.2800	124.2300
	N	10	10
	Std. Deviation	13.18288	13.54007
3day	Mean	124.1600	124.1800
	N	10	10
	Std. Deviation	13.19724	13.49056
7 day	Mean	122.8100	123.3400
	N	10	10
	Std. Deviation	13.62738	13.54697
Total	Mean	123.4425	123.6825
	N	40	40
	Std. Deviation	12.95677	13.06895

Table (2): show the measurement mean of pain at all days intervals in control and study groups.

Pain		without membrane	with membrane
1 day	Mean	7.0000 a	4.0000 a
	N	10	10
	Std. Deviation	1.33333	1.63299
3 day	Mean	6.2000 a	.9000 b
	N	10	10
	Std. Deviation	1.68655	1.44914
7 day	Mean	1.9000 b	.0000 b
	N	10	10
	Std. Deviation	2.07900	.00000
Total	Mean	5.0333	1.6333
	N	30	30
	Std. Deviation	2.82212	2.12511

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