

Clinical Assessment of Horizontal Mattress, Figure of Eight, and Simple Interrupted Suture to Wound Healing Socket After Third Mandibular Molar Odontectomy

Ahyar Riza¹, Gostry Aldica Dohude²

¹(Department of Oral and Maxillofacial Surgery/ Universitas Sumatera Utara, Indonesia)

²(Department of Oral and Maxillofacial Surgery/ Universitas Sumatera Utara, Indonesia)

Abstract:

Background: Patients who undergo odontectomy surgery will generally feel pain, trismus, and edema. Some of the cases will lead to complications such as dry socket, nerve injury, and delayed healing. In odontectomy procedure, suturing the socket is needed to maintain the flap, to cover the tissue underneath from irritating factors. Therefore, the right technique is needed to minimize the complications.

Materials and Methods: This research is a non-laboratory experimental study with post-test only design. Wound healing scores were obtained on the first and seventh day post odontectomy by observing inflammation signs clinically. The number of patients studied was 39 people consists of 13 people used horizontal mattress technique, 13 people used figure of eight technique, and 13 people used simple interrupted technique.

Results The results were statistically analyzed using Wilcoxon Test. It was found on the first day post odontectomy that there was a significant relationship ($p < 0.05$) between figure of eight with simple interrupted and horizontal mattress with simple interrupted suture technique on the first and seventh day post odontectomy. However, there was no significant relationship ($p > 0.05$) between figure of eight and horizontal mattress.

Conclusion: Figure of eight has a better wound healing than horizontal mattress and simple interrupted on the first and seventh day post odontectomy.

Key Word: Horizontal mattress; Figure of eight; Simple interrupted; Odontectomy; Wound healing.

Date of Submission: 13-01-2021

Date of Acceptance: 28-01-2021

I. Introduction

Impacted teeth is a condition when teeth are failed to erupt completely to oral cavity in some period of time. Mostly it occurs in both third mandibular and maxillary molar, followed by maxillary canine and mandibular premolar. Teeth can be impacted due to inadequate space for teeth to be erupted. Such cases like pericoronitis, caries, or pathologic lesion are unavoidable when teeth remain unerupted.¹⁻³

Third molar is the most common impacted teeth. According to Hashemipour, the incidence of impacted third molar in Southeast Iran is 44,3%. Elsey et al mentioned the percentage of impacted third molar in Europe is 73%. Pokharel reported around 46,2% third molar impacted in mandible, twice than in maxilla around 21,3%. The differences are caused by different genetic and race, which is the most important factor in impacted teeth.^{1,4,5}

Impacted teeth can only be treated with surgery. Impacted teeth can cause a problem to a patient. In this case, surgery is needed to treat impacted teeth. Surgical extraction tooth, also known as odontectomy, is a method that is used to extract teeth from its socket after making flap and removing necessary bone. This procedure is quite easy and can be done by general practioner as long as the procedures are being followed.^{3,6}

Patient who undergo odontectomy will commonly feel discomfort such as pain, swollen, or trismus. This is related to tissue inflammatory response post third molar odontectomy. But in some cases, complication like dry socket, nerve damage, and delayed wound healing can be occurred. Up until this day, dentists are trying to minimize the pain, swollen, and trismus in patients post odontectomy. Increasing patient's quality of life during healing time through emotionally and psychology is crucial since it is affecting the wound healing response.⁷⁻⁹

Based on patient's discomfort and complications that commonly happened, researches have been conducted to figure out ways to minimize complications and to speed up wound healing. Suture technique that has been performed in socket can affect wound healing. Suturing is needed in odontectomy procedure to maintain surgical flap, merging wound edges, covering tissues underneath from infection or irritant factors, and to prevent bleeding post operation.⁸⁻¹⁰

Until this day, it has not been claimed which suture technique that is best suited with wound healing. Acar previously reported horizontal mattress technique has better wound healing score than simple interrupted technique. Khamila reported figure of eight technique has a better wound healing score than simple interrupted technique.^{10,11}

Based on the previous study that suture technique is one of the factors affecting wound healing and this type of research is still minimal, therefore researchers are interested in comparing horizontal mattress, figure of eight, and simple interrupted suture technique to wound healing after third mandibular molar odontectomy surgery. The purpose of this study is to know the differences between wound healing that is sutured with horizontal mattress, figure of eight, and simple interrupted.

II. Material and Methods

This prospective comparative study was carried out on patients of Grandmed Hospital, Deli Serdang Regency, Lubuk Pakam, Sumatera Utara, Indonesia from June to October 2020. A total 39 subjects of aged 20-45 years were for in this study

Study Design: Non-laboratory experimental with a post-test only design.

Study Location: Grandmed Hospital, Deli Serdang Regency, Lubuk Pakam, Sumatera Utara, Indonesia.

Study Duration: June to October 2020

Sample size: 39 patients.

Sample size calculation: The sample size was estimated on simple random sampling in which samples that met the inclusion and exclusion criteria were taken randomly from a population. Based on the results of the calculation of the sample size formula, the average difference between two unpaired groups, the number of samples in this study was 39 people.

Subjects & selection method: The study population was drawn from odontectomy patients who presented to Grandmed Hospital with Pell and Gregory Class I classification with vertical or mesioangular position from June to October 2020. Patients were divided into three groups (each group had 13 patients) as follows:

Group A (N=13 patients) -Horizontal mattress suture technique;

Group B (N=13 patients) -Figure of eight suture technique; and

Group C (N=13 patients) -Simple interrupted suture technique.

Inclusion criteria:

1. Aged 20 to 45 years.
2. Pell and Gregory Class I classification with vertical or mesioangular positions.
3. Cooperatively agreed to be examined on the first day and control on the seventh day.
4. Good oral hygiene.

Exclusion criteria:

1. Patients with uncontrolled diabetes.
2. Patients with uncontrolled hypertension.
3. Patients with blood disorders.
4. Patients with active tuberculosis.
5. Patients with infectious diseases (hepatitis B and C, AIDS).
6. Patients with osteoporosis.
7. Pregnant women.

Procedure methodology

After written informed consent was obtained, an odontectomy was performed on the impacted teeth by one operator with the same procedure. After the odontectomy was completed, the first group was sutured with horizontal mattress suturing technique, the second group with figure of eight, and third group with simple interrupted.

The horizontal mattress suturing technique begins with an interrupted suture, where the needle goes through the edge of the wound and out of the tissue on the opposite side. Then, the needle is inserted back on the side next to the previous stitch, forming a horizontal thread line and knotted. The method for simple interrupted suture technique is that the needle goes 2-3 mm from the flap margin and comes out the same distance on the opposite side. The two ends of the thread are then tied in a knot and cut 0.8 cm above the knot. The way to make figure of eight is that the needle goes in the buccal side from the exit from the opposite side, the lingual side. Then, the needle is inserted back into the buccal distal and then comes out of the opposite side. Then the thread is knotted on the side of the first entering needle, on the thread at the buccal mesial.

Patient was instructed to maintain oral hygiene. On the first day after odontectomy, the sutured area was examined. The socket width was measured with caliper, edema was measured clinically by giving a score (0) if there was no edema, (1) if edema existed. Pain assessment was measured with Visual Analogue Scale (VAS) with a range of score from 0, the lowest pain, to 100, the highest pain. The patient was instructed to come back on the seventh day for control. Then performed a re-examination of the suture area with the same method as the assessment on the first day after odontectomy.

Statistical analysis

Data was analyzed using SPSS. Wilcoxon test, which is a nonparametric test, was used to compares two paired groups and to ascertain the significance of differences between mean values of two continuous variables.

III. Result

Table 1 shows mean distribution of socket width in three groups on first and seventh day post-odontectomy. First day post-odontectomy, 4,708±0,247 mm, 4,823±0,265 mm, 4,323±0,159, seventh day post-odontectomy 2,053±0,272 mm, 2,007±0,253 mm, 2,785±0,331 mm respectively of the three groups. The difference in the values was statistically significant in group I to III and group II and III (P<0.05), meanwhile in group I to II was not statistically significant (P>0.005).

Table 1: Shows mean distribution of socket width in three groups on first and seventh day post-odontectomy

	Horizontal mattress (mm)	Figure of eight (mm)	Simple interrupted (mm)	P value (I to II)	P value (I to III)	P value (II to III)
First day post-odontectomy	4,708±0,247	4,823±0,265	4,323±0,159	0,194	0,005	0,001
Seventh day post-odontectomy	2,053±0,272	2,007±0,253	2,785±0,331	0,597	0,002	0,002

Table 2 shows mean distribution of VAS in three groups on first and seventh day post-odontectomy. First day post-odontectomy, 2,153±1,214, 2,846±1,390, 42,539±28,11, seventh day post-odontectomy, 0, 0, 8,847±19,21 respectively of the three groups. The difference in the values was statistically significant in group I to III and group II and III (P<0.05), meanwhile in group I to II was not statistically significant (P>0.005).

Table 2: Shows mean distribution of VAS in three groups on first and seventh day post-odontectomy

	Horizontal mattress	Figure of eight	Simple interrupted	P value (I to II)	P value (I to III)	P value (II to III)
First day post-odontectomy	2,153±1,214	2,846±1,390	42,539±28,11	0,137	0,002	0,002
Seventh day post-odontectomy	0	0	8,847±19,21	1,000	0,041	0,041

Table no 3 shows mean distribution of edema in three groups on first and seventh day post-odontectomy. First day post-odontectomy, 0,384±0,507, 0,384±0,507, 0,846±0,375, seventh day post-odontectomy, 0, 0, 0,307±0,480 respectively of the three groups. The difference in the values was statistically significant in group I to III and group II and III (P<0.05), meanwhile in group I to II was not statistically significant (P>0.005).

Table 3: Shows mean distribution of edema in three groups on first and seventh day post-odontectomy

	Horizontal mattress	Figure of eight	Simple interrupted	P value (I to II)	P value (I to III)	P value (II to III)
First day post-odontectomy	0,384±0,507	0,384±0,507	0,846±0,375	1,000	0,034	0,034
Seventh day post-odontectomy	0	0	0,307±0,480	1,000	0,046	0,046

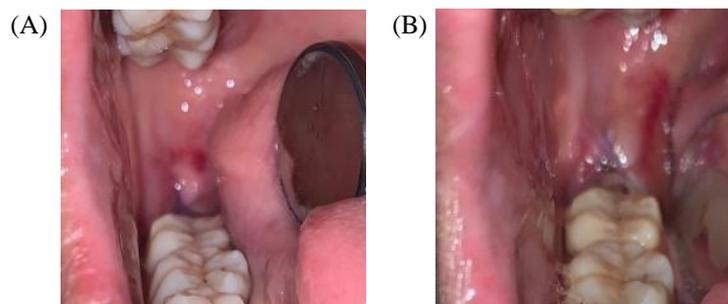


Figure 1: Horizontal mattress suture technique on the first day (A) and seventh day (B) post-odontectomy

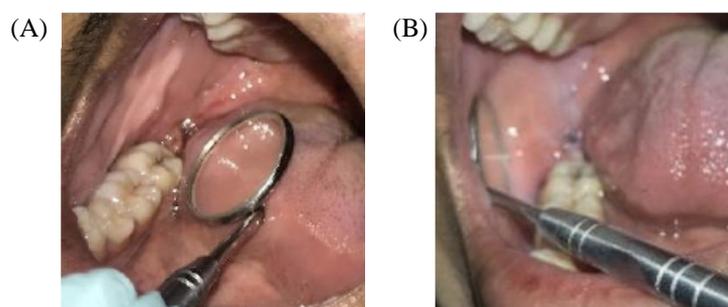


Figure 2: Figure of eight suture technique on the first day (A) and seventh day (B) post-odontectomy

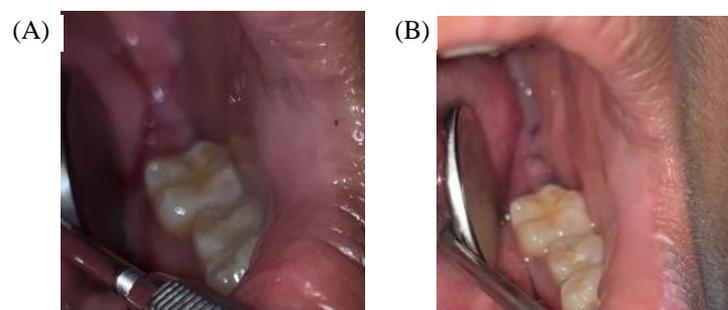


Figure 3: Simple interrupted suture technique on the first day (A) and seventh day (B) post-odontectomy

IV. Discussion

The purpose of this study is to know the differences between wound healing that is sutured with horizontal mattress, figure of eight, and simple interrupted. Only one operator was performing the suture technique and each sample has been treated the same way. These procedures are done to minimize additional factor that could affect wound healing.

In this research, sample that has been sutured with horizontal mattress technique shows a better wound healing than simple interrupted, either it is on first or seventh day. Horizontal mattress can spread tension equally to wound edges, when there is not all wound eversion could be reached by simple interrupted technique. Moreover, horizontal mattress technique can decrease tension between wound edges.^{12,13}

The statement of Acar et al is in accordance with the research that has been done where there is no significant difference ($p > 0.05$) between the mean score of wound healing between horizontal mattress suture technique and simple interrupted on the seventh day post-odontectomy. However, there is a significant difference in wound healing score ($p < 0.05$) between horizontal mattress suture technique and simple interrupted on the first day post-odontectomy. In fact, simple interrupted suture technique is the simplest and most frequently used technique and can be used in all surgical procedures in the mouth including the surgical extraction of impacted mandibular third molars. However, with irreparable flaws, the closure process is not interrupted and the wound closed is smaller.^{11,14}

The main function of suturing is to stabilize the flap during the healing phase without overexerting the soft tissue, resulting in better socket width closure. The resulting pull on the sutures used to close the socket wound after odontectomy will result fewer inflammatory cells in the inflammatory phase. The study conducted by Khamila et al showed that there are differences in wound healing between simple interrupted suturing technique and the figure of eight suturing techniques and better healing results in the figure of eight suturing

technique. This techniques that are diagonal in shape pass through the point which is the center of the load from the area to be sutured, causing a pull. This makes the wound close better.¹¹

Figure of eight is a suture technique used in areas where a suture technique is stable, safe, and closes quickly. The advantage of this suture technique is the fast performance and possibility of closure of the wound in two planes, and also the suture technique that joins the two surfaces. The biggest drawback of this suture technique is that there are enough pieces of thread trapped in the tissue that might interfere the healing process.¹⁵

Swelling after surgery is a result of tissue injury. Swelling is the accumulation of fluid residing in the interstitial space due to transudation of damaged vessels and lymphatic obstruction by fibrin. There are factors that determine the degree of swelling after surgery. The larger the damaged tissue, the greater the swelling is resulted. In addition, the less amount of connective tissue presents in the damaged area, the greater the swelling is produced.³

Wound dehiscence is when wound edges that has been sutured is reopened. If the incision is open even slightly, the wound is classified as wound dehiscence. In this research, more dehiscence is seen in simple interrupted group. This result is relevant to Acar et al, reported that horizontal mattress resulted bigger primary wound healing than simple interrupted technique. Dehiscence can be caused by force that has been given to wound is bigger than surgical suture. Failed wound edge closure is caused by ischemia in tissue that has been sutured tightly or getting too tight as the result of edema in the wound area. Poor suture technique can cause dehiscence. Other than that, if dilacerated edge is not cut, it would make tissue necrotic and cause dehiscence. Tissue failure cause dehiscence more than poor suture technique.^{10,16,17}

Post odontectomy pain is one of the local inflammation that happened with different intensity in every individual. Third molar extraction and tissue destruction and cell released several biochemical mediators that involved in the process of pain, such as histamine, bradykinin, and prostaglandin. Kumar et al mentioned medium to severe pain happened in the first 12 hours post odontectomy with the intensity at its peak in first 6 hours, gradually decreased in several days in normal wound healing.¹⁸

Suturing is done in masticatory mucous, whereas this mucous is consist by thick epithelial layer and lamina propria with some nerves without submucous due to it does not attached directly to bone. As a result, pain sensation can be felt much lower that pain in other mucous. When suturing is done in other mucous in labial, buccal, and tongue region, it will cause bigger pain because it has thinner epithelial layer, thick lamina propria, and submucous layer that consist of nerves and blood vessels.¹⁹

V. Conclusion

Figure of eight has a better wound healing than horizontal mattress and simple interrupted on the first and seventh day post odontectomy.

References

- [1]. Pokharel PK. Assessment of prevalence and pattern of impacted third molar among Kathmandu population: A retrospective analysis. *Int J Contemp Med Res* 2016; 2(6): 1658.
- [2]. Ness GM. Impacted teeth. In: Miloro M, Ghali GE, Larsen P, Waite P, eds. *Peterson's principles of oral and maxillofacial surgery*. China: People's Medical Publishing House, 2011: 97.
- [3]. Hupp JR. Principles of management of impacted teeth. In: Hupp JR, Ellis E, Tucker MR, eds. *Contemporary oral and maxillofacial surgery*. China: Elsevier, 2014: 143.
- [4]. Hashemipour MA, Arashlow MT, Hanzaei FF. Incidence of impacted mandibular and maxillary third molars: A radiographic study in a Southeast Iran population. *Med Oral Patol Oral Cir Bucal* 2013; 18(1): e143.
- [5]. Judzbalys G, Daugela P. Mandibular third molar impaction: Review of literature and a proposal of a classification. *J Oral Maxillofac Res* 2013; 4(2): 2.
- [6]. Fragiskos FD. Surgical tooth extraction. In: Fragiskos FD, ed. *Oral surgery*. New York: Springer, 2007: 95.
- [7]. Osunde OD, Adebola RA, Saheeb BD. A comparative study of the effect of suture-less and multiple suture techniques on inflammatory complications following third molar surgery. *J Oral Maxillofac Surg* 2012; 41: 1275.
- [8]. Gay C, Gomez L, Sanchez A, Herraes J. Effect of the suture technique on postoperative pain, swelling and trismus after removal of lower third molars: A randomized clinical trial. *Med Oral Patol Cir Bucal* 2015; 20(3): e373.
- [9]. Rodanant P, Wattanajitseree K, Shrestha B, Wongsirichat N. Pain and quality of life related to suture removal after 3 or 7 days at the extraction sites of impacted lower third molars. *J Dent Anesth Pain Med* 2016; 16(2): 132.
- [10]. Acar AH, Kazancioglu HO, Erdem NF, Asutay F. Is horizontal mattress suturing more effective than simple interrupted suturing on postoperative complications and primary wound healing after impacted third molar surgery. *J Craniofacial Surg* 2017; 1-4.
- [11]. Khamila GA, Asmara D, Kamadjaja DB. Perbandingan penyembuhan luka ekstraksi gigi antara tehnik penjahitan figure of eight dan simple interrupted. *J Oral Maxillofac Surg* 2016; 5(1): 5-8.
- [12]. Fragiskos FD. Principles of surgery. In: Fragiskos FD, ed. *Oral surgery*. New York: Springer, 2007: 38.
- [13]. Siervo S. Suturing techniques in oral surgery. 1st ed., Milan: Quintessenza Edizioni, 2008: 5, 27, 85.
- [14]. Acar AH, Kazancioglu HO, Erdem NF, Asutay F. Is horizontal mattress suturing more effective than simple interrupted suturing on postoperative complications and primary wound healing after impacted third molar surgery. *J Craniofacial Surg* 2017; 1-4.
- [15]. Macintyre NR. Tissue hypoxia: Implications for the respir clinician. *Respiratory Care* 2014; 59(10): 1590.

- [16]. Shetty V, Bertolami CN. Wound healing. In: Miloro M, Ghali GE, Larsen P, Waite P, eds. Peterson's principles of oral and maxillofacial surgery. China: People's Medical Publishing House, 2011: 9.
- [17]. Shope TR, Kabaker A. Perioperative evaluation and management of surgical patients. In: Lawrence PF, ed. Essentials of general surgery and surgical specialties. China: Wolters Kluwer, 2019: 53.
- [18]. Malek J, Sevcik P. Post-operative pain management. Praha: Mlada fronta, 2017: 9-10, 17.
- [19]. Rodanant P, Wattanajitseree K, Shrestha B, Wongsirichat N. Pain and quality of life related to suture removal after 3 or 7 days at the extraction sites of impacted lower third molars. J Dent Anesth Pain Med 2016; 16(2): 132.

Ahyar Riza, et. al. "Clinical Assessment of Horizontal Mattress, Figure of Eight, and Simple Interrupted Suture to Wound Healing Socket After Third Mandibular Molar Odontectomy." *IOSR Journal of Dental and Medical Sciences (IOSR-JDMS)*, 20(01), 2021, pp. 24-29.