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Efficacy of Suturing Techniques in Surgical Removal of Mandibular Third Molar: An Original Research

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ABSTRACT

Aim: Comparison of suturing technique outcomes: locking horizontal mattress v/s simple interrupted suturing technique.

Materials and Method: The study evaluated 60 patients across two groups: 30 in Group A with simple interrupted sutures and 30 in Group B with locking horizontal mattress suture. Parameters evaluated are time taken for suturing, postoperative pain, swelling, trismus, wound dehiscence, surgical site infection and dry socket immediately post operatively, and on 3rd, 5th, and 7th day.

Results: Suturing time and wound dehiscence was significantly reduced in Group B patients ($p < 0.001$), showing no statistical intergroup difference in postoperative pain, swelling, trismus, surgical site infection or dry socket incidence.

Conclusion: Locking horizontal mattress suturing is a faster technique with improved wound stability and comparable postoperative outcomes to simple interrupted suturing, making it a reliable alternative in third molar surgery.

Keywords: third molar surgery, impaction, pericoronitis, wisdom teeth, dry socket, nerve injury, coronectomy

INTRODUCTION

The most frequently performed oral surgical procedure is surgical removal of impacted mandibular third molar. [1] Although many impacted third molars remain asymptomatic, others are occasionally associated with pericoronitis, damage to adjacent second molars, caries, periodontal disease, and, cyst formation, thereby necessitating their removal. [2-4] Postoperative complications such as pain, swelling, and trismus due to operative trauma, are inflammatory responses which are mediated through prostaglandins, and associated muscular edema, as evidenced in previous literature. Effective management of these symptoms is essential to reduce postoperative morbidity and enhance patient recovery. [5-9]

As per the literature reviews, wound closure using sutures helps in tissue approximation, clot stabilization, and healing by primary intention thereby enhancing faster wound healing. Properties of an ideal suture material should include adequate tensile strength, should cause minimal tissue reactivity, and should be operator friendly in handling. [10] The most commonly used suture material in intraoral surgical procedure is non-absorbable black braided silk due to its ease of manipulation and knot security. [11]

The most widely used conventional suturing technique is simple interrupted sutures due to ease and control, whereas mattress sutures offer better tension distribution and wound stability. [12,13] The locking horizontal mattress suture, a modification of the traditional mattress technique, enhances tissue adaptation and reduces tension-related complications. [14]

This study aims to evaluate the comparison of suturing technique outcomes between simple interrupted and locking horizontal mattress to determine the most effective method for improving surgical outcomes.

MATERIALS AND METHOD

A prospective clinical study was conducted on sixty patients, divided into: Group A: Simple interrupted sutures (n = 30) and Group B: Locking horizontal mattress suture (n = 30).

Patients included in the study were above 18 years, classified into ASA class I, II and who agreed to sign informed consent. Standard surgical protocol needed for the surgical extraction of third molar was followed in every case. Closure was performed according to group allocation with 3-0 black silk suture. The intraoperative time recorded for suturing and immediate postoperative, 3rd, 5th, 7th day pain (Visual Analogue Scale), swelling (facial measurements using measuring tape in cm), trismus (interincisal opening using Vernier caliper in mm), wound dehiscence (using Vernier caliper in mm), surgical site infection and dry socket based on its presence or absence was recorded.

Data taken was entered in MS excel sheet. Continuous variables used the Mann–Whitney U test and categorical variables used the Chi-square test. This were analyzed using Jamovi (Version 2.7.15) and IBM SPSS Statistics (Version 20.0).

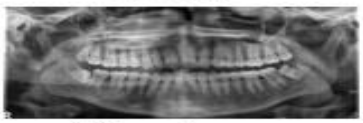
RESULTS

Statistical analysis confirmed that the two groups showed no meaningful difference in terms of age (p = 0.959), gender distribution (p = 0.796) and tooth distribution (p = 0.438). **Intraoperative Outcome was assessed based on time taken for suturing. Group B (p < 0.001)** 4.31 ± 1.11 min) with locking horizontal mattress suture showed **reduced operating time as compared to** Group A: 6.31 ± 1.55 min with simple interrupted suture.

Postoperative Outcomes

Postoperatively, pain decreased progressively from immediate postoperative to day 7th in both the groups, with no statistical significant difference at any interval (p > 0.05). Postoperative swelling, edema and reduced mouth opening showed significant increase on day 3rd and gradual decrease was noted by day 7th in both the groups. Wound dehiscence presented with a higher incidence in regards to Group A compared to Group B, with a statistical significant difference at later postoperative intervals (p < 0.05), indicating improved flap stability in the locking horizontal mattress group. Both the groups showed no comparable incidence of infection and occurrence of dry socket. Hence, no statistical significant difference was seen (p > 0.05).

GROUP A



Orthopantomogram

GROUP B

Orthopantomogram

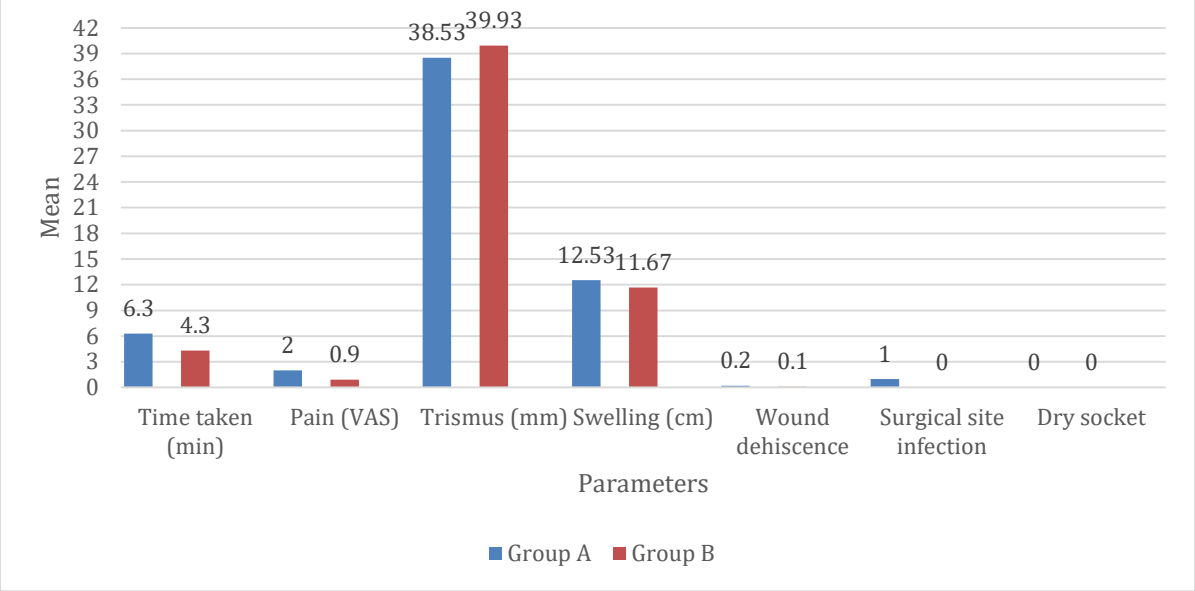
Simple interrupted suture

Locking horizontal mattress suture

Mouth opening

Mouth opening

Parameters	Group A (Mean ± SD)	Group B (Mean ± SD)	p value
Time taken for suturing	6.3133±1.554	4.3167±1.1198	< 0.001
Pain	2±1.3896	0.9±0.8847	<0.001
Trismus	38.43 ± 4.25	39.93 ± 4.17	0.144
Swelling	12.53±1.0346	11.6767±0.8024	<0.001
Wound dehiscence	0.2167±0.144	0.12±0.0407	0.001
Surgical site infection	1 (3.3)	0 (0)	0.313
Dry socket	0 (0)	0 (0)	N/A



DISCUSSION

Due to its high incidence of occurrence in age group of 18 to 25 years, surgical removal of impacted third molar has become the most commonly performed minor oral surgical procedure. The extent of surgical outcomes varies involving patient characteristics such as age and healing capacity, and surgical factors including extent of trauma, difficulty of impaction, flap design, duration of surgery, and suturing technique, that will influence recovery stage. The most common early postoperative symptoms are swelling, pain and trismus, which generally improve over time in most patients. [1-9] While postoperative complications such as infection or alveolar osteitis [26,27] can still develop, as documented in earlier clinical studies.

Burkhardt R et al. and Dunn DL et al. quoted that accurate approximation of wound margins improves healing by influencing flap adaptation with the help of suturing techniques. [10,20] Mahabaleshwara CH et al. and Esmaeelinejad M et al. suggested that simple interrupted sutures is widely used suturing technique due to their simplicity but this may concentrate tension at individual points. [21,14] In contrary, Acar AH et al. and Brandt MT et al. stated that horizontal mattress sutures allow tension to distribute more evenly over wider area and improve flap stabilization, the locking variant, in horizontal mattress further improves retention of suture but can adversely affect local blood supply if excessive tension is applied. [13,15,16,22]

Capuzzi P et al. reported that prolonged surgical duration increases tissue exposure and inflammatory response. [23] In this study, a highly significant reduction in closure time was observed in Group B (4.3167±1.1198 minutes) compared to Group A (6.3133±1.554), indicating greater efficiency of locking horizontal mattress sutures. This finding contrasts with the conventional assumption that simple interrupted sutures are faster, and may be explained by reduced need for multiple sutures and adjustments.

Both the groups showed similar pain scores in the early postoperative period with no statistical significant intergroup difference observed on immediate postoperative period and 3rd day, suggesting that early pain is primarily influenced by surgical trauma. However, significantly lower pain scores in Group B on 5th and 7th day indicate improved late-stage healing. One case of persistent pain in Group A was diagnosed as dry socket, consistent with findings by Blum IR et al. and Birn H et al. [26,27]

Maximum swelling was observed on the third postoperative day in both the groups. A statistical significant reduction in swelling was observed in Group B (11.6767±0.8024) compared to Group A (12.53±1.0346), supporting the observations of Danda AK et al. and Burkhardt R & Lang NP et al., who highlighted the importance of tension-free closure and reduced dead space in minimizing postoperative edema. [10,24,25]

No significant intergroup difference was observed in trismus, with progressive improvement by 7th day. Comparable findings have been described in the literature, [28,29] which suggest that trismus is primarily related to surgical trauma and muscle inflammation rather than suturing technique.

Wound dehiscence showed a statistical significant increase in Group A by 7th day (0.2167±0.144) compared to Group B (0.12±0.0407), indicating better flap stability with locking sutures, the supporting observations given by Ahyar R et al. and Dragović S et al., who emphasized the role of proper tissue approximation in preventing dehiscence. [30,31]

Surgical site infection rates were comparable between groups, supporting the findings of Acar AH et al. and Falci SG et al., who concluded that infection is primarily influenced by aseptic technique, tissue handling, and oral hygiene rather than suturing method alone. [13,32] Dry socket incidence was low, with one case in Group A ($p = 0.313$), consistent with reported rates of 1–5%. Suturing technique plays only an indirect role in its prevention by stabilizing the clot.

CONCLUSION

In conclusion, the present study demonstrates that locking horizontal mattress sutures provide superior outcomes in terms of reduced operative time, decreased postoperative swelling, improved late-stage pain, and lower wound dehiscence. However, no significant differences were observed in trismus, surgical site infection, or dry socket, indicating that these outcomes are influenced by multiple factors beyond suturing technique. Thus the study concludes that locking horizontal mattress suture is clinically effective and time-efficient alternative to simple interrupted suturing in impacted mandibular third molar surgery.

REFERENCES

[1] Archer WH. Oral and maxillofacial surgery. Philadelphia: WB Saunders; 1975. p. 142–144.
[2] Leonard MS. Removing third molars: a review for the general practitioner. J Am Dent Assoc. 1992; 123:77–86. doi:10.14219/jada.archive.1992.0041.
[3] Friedman JW. The prophylactic extraction of third molars: a public health hazard. Am J Public Health. 2007; 97(9):1554–1559. doi:10.2105/AJPH.2009.185652.
[4] Bui CH, Seldin EB, Dodson TB. Types, frequencies, and risk factors for complications after third molar extraction. J Oral Maxillofac Surg. 2003;61(12):1379–1389. doi:10.1016/S0278-2391(03)00716-9.
[5] Pogrel MA. What are the risks of operative intervention? J Oral Maxillofac Surg. 2012;70(9 Suppl 1):S33–S36. doi:10.1016/j.joms.2012.04.029.
[6] Deliverska EG, Petkova M. Complications after extraction of impacted third molars: literature review. J IMAB. 2016; 22(3):1202–1211. doi:10.5272/jimab.2016223.1202.
[7] Yuasa H, Sugiura M. Clinical postoperative findings after removal of impacted mandibular third molars: prediction of postoperative facial swelling and pain based on preoperative variables. Br J Oral Maxillofac Surg. 2004;42:209–214. doi:10.1016/j.bjoms.2004.02.005.
[8] 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. Int J Oral Maxillofac Surg. 2012;41(10):1275–1279. doi:10.1016/j.ijom.2012.04.009.
[9] Marciani RD. Third molar removal: an overview of indications and complications. Oral Maxillofac Surg Clin North Am. 2012;24(2):197–206. doi:10.1016/j.coms.2006.11.007.
[10] Burkhardt R, Lang NP. Influence of suturing on wound healing. Periodontol 2000. 2015;68:270–281. doi:10.1111/prd.12078.
[11] Faris A, Khalid L, Hashim M, Yaghi S, Magde T, Bouresly W, et al. Characteristics of suture materials used in oral surgery: systematic review. Int Dent J. 2022;72(3):278–287. doi:10.1016/j.identj.2022.02.005.

[12] Cetinkaya BO, Sumer M, Tutkun F, et al. Influence of different suturing techniques on periodontal health of the adjacent second molars after extraction of impacted mandibular third molars. Oral Surg Oral Med Oral Pathol Oral Radiol Endod. 2009;108:156–161. doi:10.1016/j.tripleo.2009.03.024
[13] 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 mandibular third molar surgery? J Craniofac Surg. 2017;28(7):e657. DOI: 10.1097/SCS.0000000000003813
[14] Esmaeelinejad M, Mansourian M, Aghdashi F. Influence of a novel suturing technique on periodontal health of mandibular second molar following impacted third molar surgery: a split-mouth randomized clinical trial. Maxillofac Plast Reconstr Surg. 2022;44:12. doi:10.1186/s40902-022-00342-w.
[15] Hanasono MM, Hotchkiss RN. Locking horizontal mattress suture. Dermatol Surg. 2005;31(5):572–573. doi:10.1111/j.1524-4725.2005.31163.
[16] Berge TI. Visual analogue scale assessment of postoperative swelling, pain, and trismus after third molar surgery. Community Dent Oral Epidemiol. 1986;14(4):241–244. doi:10.3109/00016358809004772.
[17] De Marco G, Lanza A, et al. Influence of flap design on postoperative outcomes after mandibular third molar surgery: a systematic review. J Appl Oral Sci. 2021;29:e20200932. doi:10.1590/1678-7757-2020-0932.
[18] Baqain ZH, Karaky AA, Sawair F, Khraisat A, Duaibis RB, Rajab LD. Frequency estimates and risk factors for postoperative morbidity after third molar removal. J Oral Maxillofac Surg. 2008; 66(11):2276–2283. doi:10.1016/j.joms.2008.06.047.
[19] Kolokythas A, Olech E, Miloro M. Alveolar osteitis: a comprehensive review. Oral Surg Oral Med Oral Pathol Oral Radiol Endod. 2010;109(3):e33–e44. doi:10.1155/2010/249073.
[20] Dunn DL, editor. Wound closure manual. Somerville (NJ): Ethicon Inc.; 2004.
[21] Mahabaleshwara CH, Francis M, Kumar DP, Amudhan CR, Pethkar R, Shravani B. Simple interrupted and continuous interlocking suturing techniques comparison in maxillofacial trauma: a randomized controlled trial. *RGUHS J Dent Sci.* 2021;13(3):198–201. doi:10.26715/rjds.13_3_8.
[22] Brandt MT, Jenkins WS. Suturing principles for the dentoalveolar surgeon. *Dent Clin North Am.* 2012;56(1):281–303. doi:10.1016/j.cden.2011.08.004.
[23] Capuzzi P, Montebugnoli L, Vaccaro MA. Extraction of impacted third molars: a longitudinal prospective study on factors that affect postoperative recovery. Oral Surg Oral Med Oral Pathol. 1994;77(4):341–343. doi:10.1016/0030-4220(94)90194-5.
[24] Pasqualini D, Cocero N, Castella A, Mela L, Bracco P. Primary and secondary closure of the surgical wound after removal of impacted mandibular third molars: a comparative study. Int J Oral Maxillofac Surg. 2005;34(1):52–57. doi:10.1016/j.ijom.2004.01.023.
[25] Danda AK, Tatiparthi MK, Narayanan V, et al. Influence of primary and secondary closure of surgical wound after impacted mandibular third molar removal on postoperative pain and swelling: a comparative split-mouth study. J Oral Maxillofac Surg. 2010;68:309–312. doi:10.1016/j.joms.2009.04.060.
[26] Blum IR. Contemporary views on dry socket (alveolar osteitis). Oral Surg Oral Med Oral Pathol Oral Radiol Endod. 2002;93(4):420–427. doi:10.1054/ijom.2002.0263.
[27] Birn H. Etiology and pathogenesis of fibrinolytic alveolitis (dry socket). Int J Oral Surg. 1973;2(5):211–263. doi:10.1016/S0300-9785(73)80045-6
[28] Heidari A, Ghorbani Afkhami M, Tavakoli S, et al. Effect of kinesio taping on pain, swelling and trismus after third molar surgery: a systematic review and meta-analysis. Head Face Med. 2026. doi:10.1186/s13005-026-00603-3
[29] Markiewicz MR, Brady MF, Ding EL, Dodson TB. Corticosteroids reduce postoperative morbidity after third molar surgery: a systematic review and meta-analysis. J Oral Maxillofac Surg. 2008; 66(9):1881–1894. doi:10.1016/j.joms.2008.04.022.
[30] Ahyar R, et al. Clinical assessment of horizontal mattress, figure-of-eight, and simple interrupted sutures on wound healing socket after third mandibular molar odontectomy. J Dent Med Sci. 2021. DOI: 10.9790/0853-2001152429
[31] Dragovic S, Vojvodic D, Knezevic P, et al. Comparison of four different suture materials in respect to oral wound healing, microbial colonization, tissue reaction and clinical features: a randomized clinical trial. J Craniomaxillofac Surg. 2019;47(9):1451–1458. DOI: 10.1007/s00784-019-03034-4
[32] Falci SG, Guimaraes MT, Avila ED, et al. Comparison of suture and sutureless techniques on postoperative complications after third molar surgery: a systematic review. Int J Oral Maxillofac Surg. 2024;53(7):104008. doi:10.1016/j.ijom.2024.104008.