



Role of Manuka Honey on the Postoperative Sequelae of Mandibular Third Molar Disimpaction -A Prospective Analysis

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Abstract

Introduction: This work is aimed at the function of honey in the soft tissue management of the post-extraction socket. The aim of study to evaluate the application of honey in postoperative soft tissue curing of the extraction socket. **Materials and methods:** The present study incorporated 50 acquainted and approved vigorous patients. Two test groups were made, respectively, the test group (Group A) acknowledged Manuka honey as an intra-alveolar medicament in the extraction socket preceding the suturing. In contrast, the control group (Group B) had the principal securing, devoid of any medicament in the extraction socket. Postoperative pain was measured by VAS; edema by measurements of pre-op specified landmarks and the mouth opening was noted and evaluated with preoperative measurement on first, third, and seventh postoperative days. **Results:** The first and second postsurgical days of VAS scores of the control group were extensively elevated as measured up to the Manuka group ($P < 0.05$; Table 1). There was no momentous group difference in VAS scores at the third, fourth, fifth, sixth, and seventh postsurgical days ($P=0.05$). **Conclusion:** It has been demonstrated in this study that postsurgical extraction of impacted lower third molars intra socket application of Manuka honey is a productive process for reducing sharp postsurgical pain.

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INTRODUCTION

Postsurgical sequels (PSS) are a series of impediments that occur after invasive dental surgical procedures such as periodontal regenerative surgeries, maxillary sinus development, and removal of impacted 3rd molars.^[1] Pain, extraoral bruising, trismus, edema, and a few other symptoms are among them.^[1,2]

PSS prevention and administration has been a common practice for decades, with good results and patient satisfaction.^[3,4] Nonsteroidal anti-inflammatory drugs (NSAIDs) and corticosteroids (CS) are commonly used. Even a particular category of patients with chronic underline medical conditions such as hypertension, kidney disease, and diabetes with impulsivity of effect depending on factors such as the surgical procedure's sensitivity, the patient's age, and surgical performance may not be entitled due to potential adverse events and toxins. As a result, other alternative Medical and homeopathic remedies are being extended.^[5,6]

Since ancient times, honey has been one of the oldest and most commonly used folk medicine substitutes. A folk medicine element has recently replaced it with strong anti-inflammatory properties. It is consumed in a medical world that has vexed the interest of researchers in various medical fields.^[7,8] There are enough studies to support the use of honey in the treatment of wounds and burns.^[7,8,9,10]

Honey therapy has been classified by researchers as having antibacterial, antiviral, anti-inflammatory, and antioxidant properties. Honey is thought to aid in the healing of wounds and burnt skin. The honey dressing is

highly successful and has been shown to relieve extreme pain in patients with chronic wounds and dressing in acute postoperative pain and analgesic treatment.^[11,12,13]

Honey aids in the moistening of the wound. Furthermore, it causes white blood cells to release cytokines, including interleukin-1, interleukin-6, and tumor necrosis factor. Honey also aids in the speeding up of the healing process and the reduction of scarring. Due to its hygroscopic property, which keeps it stable, it also dehydrates bacteria; this is the ability of the material used in dry socket management.^[14]

Potassium helps bacteria recover moisture; honey's aluminum sulfate and sucrose also hasten the natural therapeutic process.^[15] Pain was decreased after surgical removal of the third molars in a 1985 study by "Elbagoury et al." In the postoperative requirement, honey is used as a dressing material. The treated group's postoperative swellings were found to be smaller than the control group's.^[16] This study focused on the function of honey in soft tissue healing of post-extraction sockets due to easy access to our local data, this analysis aimed to see how honey affected soft tissue care after extraction socket extraction.

MATERIAL AND METHODS

The prospective, randomized study done between a period of December 2018 to December 2020 in the Department of Dentistry, Shri Guru Ram Rai Institute of Medical and Health Sciences, and associated Shri Mahant Indiresh Hospital Dehradun, following the institute's ethics committee clearance included 50 informed and consented healthy patients irrespective of sect, creed, and gender requiring prophylactic Mandibular third molar

surgery under Local anesthesia with Adrenaline 1:200000 (n=100).

The subjects with Pederson difficulty index between 5-7, which indicates moderately difficult cases after OPG radiographic and clinical analysis, were selected. They were subjected to preoperative measurements of mouth opening, i.e., the interincisal distance was made. The three facial measurements, namely from lateral canthus to angle of the mandible(S1), tragus to menton(S2), and corner of the mouth to the angle of the mandible(S3), were made for assessing the postoperative edema.

The test group (Group A) received Manuka honey as an intra-alveolar medicament in the extraction socket before suturing. In contrast, the control group (Group B) had the primary closure without any medicament in the extraction socket. Postoperative pain measured by VAS; edema by measurements of pre-op specified landmarks and the mouth opening was compared with preoperative measurements on first, third, and seventh postoperative days.

In case patients continue to have pain, swelling, or trismus, the follow-up was extended for the patients complaining of pain, swelling, or trismus until the restoration to pre-surgical measurements. The total number of analgesic tablets consumed by both groups' subjects during the postoperative follow-up period was also noted and compared.

RESULTS

A total of 50 patients were assessed who met the search criteria. The participants were split into two classes. The Manuka Honey group had 25 participants, while the control group had another 25. Figure 1 depicts the postoperative amount of mouth opening measured with Vernier calipers and facial scarring and the angle of the mandible used to examine study participants for facial edema. Figure 2 depicts the active Manuka Honey with an activity level of 25+ that was used in this analysis. Figures 3 and 4 show the exposed teeth and photographs after surgical removal of the mandibular left 3rd molar, respectively. Figure 5 depicts the radiographic assessment and accumulation on clinical inspection.

Table 1 shows the distribution of variables among the classes. There was no significant community difference in surgical removal time ($P = 0.828$). Compared to the Manuka group, the control group's VAS scores at the first and second postsurgical days were significantly higher ($P < 0.05$; Table 1). On the third, fourth, fifth, sixth, and seventh postsurgical days ($P = 0.05$; Table 1) of the soft tissue procedure, there were no major variations in VAS ratings. The Manuka group had significantly higher index scores on the seventh day than the control group ($P = 0.0001$; Table 1).

The total analgesic intake was significantly higher ($P = 0.0001$; Table 1) in the control group. The control group's peak of pain was on the first day, and for the Manuka group on the third postsurgical day.

Table 1: Distribution of variables and comparative tests results; patient age, surgery time, visual analogue scale(VAS), soft tissue healing index, analgesic dose

	Manuka group	Control group	Test value	P
	Mean±SD	Mean±SD		
Age(years)	23.21±5.125	23.21±5.125	0.000	1.000 ^a
Surgery time(min)	30.61±9.157	27.61±8.461	1.455	0.828 ^a
VAS – first day	3.38±0.957	4.21±1.143	-2.768	0.007 ^b
VAS – the second day	1.88±0.995	3.42±1.038	-2.078	0.039 ^b
VAS – the third day	3.41±1.105	3.61±0.870	-0.689	0.493 ^b
VAS – the fourth day	3.34±0.953	3.71±1.108	-1.320	0.188 ^b
VAS – the fifth day	1.79±1.033	3.28±1.208	-1.596	0.112 ^b
VAS – sixth day	1.48±0.794	1.88±1.115	-1.686	0.093 ^b
VAS – seventh day	1.43±0.792	1.85±1.219	-1.085	0.279 ^b
Soft tissue healing – seventh day	5.41±0.568	4.58±0.636	-5.277	0.000 ^b
Total analgesic dose	11.55±5.493	16.31±5.984	-4.776	0.000 ^a



Figure 1: (a) Preoperative measurement of maximum mouth opening with Vernier caliper



Figure 1: (b) Facial landmarks and distances to an angle of the mandible used to evaluate study subjects for facial edema.



Figure 2: Active Manuka honey (activity level 25+) used in this study



Figure 3: exposure of the impacted tooth



Figure 4: After Surgical extraction of mandibular left 3rd molar



Figure 4: radiographic assessment in addition to clinical examination.

DISCUSSION

Manuka honey has a number of characteristics that contribute to its medicinal properties, including a low pH, high osmosis, high adhesive, and the presence of methylglyoxal, bees defensin-1, and phenolic compounds. Angiogenesis is aided by these reimbursements' antioxidant, antimicrobial, bacteriostatic, antibacterial, anti-inflammatory, and overall wound healing properties.^[17] Honey induces pro-inflammatory cytokines, which promote fibroblast and epithelial cell proliferation.^[18]

Manuka Honey is monofloral dark honey extracted from the Manuka tree, *Leptospermum scoparium*, which grows as a small tree in New Zealand and Eastern Australia and belongs to the Myrtaceae family.^[19] Manuka honey has been established as the gold standard for evaluating biological

ideas and chemical capture of honey in studies published in the literature.^[20] Al-Khanate NM and Al-Moudallal Y conducted a split-mouth control report on patients with bilateral lower third molar effects in 2019. They made two seizures while doing a molar surgical infusion. On the one side, manuka honey was put in a post-extract socket.

They performed surgical removal without treatment on the other hand after two weeks. On the first and second postoperative days, the honey side had slightly lower pain ratings than the second side, indicating that the honey side received better soft tissue care.

Furthermore, the mean and process time for the management community increased due to the additional time taken to apply the honey and slightly more time to see after the honey application, as seen in the results. Until now, the treatment community had a lower VAS in the first and second postoperative days, and it was still dependent on pain relievers.^[21]

Inflammation and pain are closely linked. In this study, signs of inflammation were significantly lower in the Manuka group than in the control group, as calculated by the soft tissue healing index ($P = 0.0001$). However, this research supports the findings of Boroum and et al.^[13] who found that honey has analgesic properties after tonsillectomy. Malhotra et al.^[22] attribute the findings of the current study to the premature postsurgical settlement of honey submission on eyelid wounds; VAS scores of the Manuka side were substantially lower only in the first and second postoperative days.



Rather than taking painkillers daily, patients were instructed to take the same painkiller as and when needed, up to a limit of three tablets per day. As a result, the definite need to take analgesics is extracted here, which is simplified in the management community. This is done to balance the other pointer, which is the subjects' VAS-based assessment of pain concentration. There's no doubt that the analgesics helped with some pain, but the participants were taught to record their VAS value at the highest point of pain every day after surgery. The combination of instructing patients to take painkillers as needed (rather than daily) and recording the pain value at the end of the day supports the validity of both measures used in the study.

At the end of the study, manuka honey reduced the incidence of pain and edema and enhanced the healing process following surgical extraction compared to case and control groups and had good effect on trismus. On Day 2, patients in manuka group had better pain control and milder PSS in terms of intraoral bleeding, extraoral bruising, and

trismus compared to control group. In addition, extraoral edema was significantly less reported in the manuka group compared to control. During the follow-up visit on Day 7, most of PSS have resolved completely for both groups as anticipated for similar cases in general.

CONCLUSION

This study fervently proposes that Manuka honey on intra-alveolar application efficiently diminishes the occurrence of postoperative sequelae of impacted mandibular third molar surgery. Based on our data, Manuka honey showed significant potential to decrease the degree of edema in addition to pain experience following surgical extraction of impacted mandibular 3rd molars. Manuka honey showed potential to manage PSS includes pain, bleeding, trismus, bruising, and most importantly extraoral edema. However, Manuka honey is a capable natural substance that requires more trials to recognize the most capable procedure.

REFERENCES

1. Glara-Suárez P, Soto-Peñaloza D, Peñarrocha-Oltra D, Peñarrocha-Diago M. Patient morbidity after impacted third molar extraction with different flap designs. A systematic review and meta-analysis. *Med Oral Patol Oral Cir Bucal*. 2020;25(2):e233-e239. doi:10.4317/medoral.23320
2. Yamada SI, Hasegawa T, Soutome S, Yoshimura H, Miyakoshi M, Ueda N, Okamoto K, Hishida S, Rokutanda S, Nakahara H, Fujita S, Akashi M, Kitagawa Y, Kirita T, Shibuya Y, Umeda M, Kurita H. Prevalence of and risk factors for postoperative hemorrhage after lower third molar extraction on warfarin therapy: a multicenter retrospective study in Japan. *Odontology*. 2020;108(3):462-469. doi:10.1007/s10266-019-00474-y.
3. Shoohanizad E, Parvin M. Comparison of the Effects of Dexamethasone Administration on Postoperative Sequelae Before and After "Third Molar" Extraction Surgeries. *Endocr Metab Immune Disord Drug Targets*. 2020;20(3):356-364. doi:10.2174/1871530319666190722120405.
4. Brignardello-Petersen R. Similar pain, swelling, and trismus after third-molar surgical extraction when receiving a phytotherapeutic drug, ibuprofen, or a placebo. *J Am Dent Assoc*. 2019;150(5):e50. doi:10.1016/j.adaj.2018.12.020.
5. Knackstedt R, Gatherwright J. Perioperative Homeopathic Arnica and Bromelain: Current Results



- and Future Directions. *Ann Plast Surg.* 2020;84(3):e10-e15. doi: 10.1097/SAP.0000000000002043.
6. Kriplani P, Guarve K, Baghael US. *Arnica montana L. - a plant of healing: review.* *J Pharm Pharmacol.* 2017;69(8):925-945. doi: 10.1111/jphp.12724.
7. Molan PC, Betts JA. Clinical usage of honey as a wound dressing: an update. *J Wound Care.* 2004;13(9):353-6. doi: 10.12968/jowc.2004.13.9.26708.
8. Khan FR, UIAbadin Z, Rauf N. Honey: nutritional and medicinal value. *Int J Clin Pract.* 2007;61(10):1705-7. doi: 10.1111/j.1742-1241.2007.01417.x.
9. Moore OA, Smith LA, Campbell F, Seers K, McQuay HJ, Moore RA. Systematic review of the use of honey as a wound dressing. *BMC Complement Altern Med.* 2001;1:2. doi: 10.1186/1472-6882-1-2.
10. Wijesinghe M, Weatherall M, Perrin K, Beasley R. Honey in the treatment of burns: a systematic review and meta-analysis of its efficacy. *N Z Med J.* 2009;122(1295):47-60.
11. Gulati S, Qureshi A, Srivastava A, Kataria K, Kumar P, Ji AB. A Prospective Randomized Study to Compare the Effectiveness of Honey Dressing vs. Povidone Iodine Dressing in Chronic Wound Healing. *Indian J Surg.* 2014;76(3):193-8. doi: 10.1007/s12262-012-0682-6.
12. Hwang SH, Song JN, Jeong YM, Lee YJ, Kang JM. The efficacy of honey for ameliorating pain after tonsillectomy: a meta-analysis. *Eur Arch Otorhinolaryngol.* 2016;273(4):811-8. doi: 10.1007/s00405-014-3433-4.
13. Boroumand P, Zamani MM, Saeedi M, Rouhbakhshfar O, Hosseini Motlagh SR, Aarabi Moghaddam F. Post tonsillectomy pain: can honey reduce the analgesic requirements? *Anesth Pain Med.* 2013;3(1):198-202. doi: 10.5812/aapm.9246.
14. Pillay AG, Zainol J, Fei YM. Experimental evaluation of repair process of burn wounds treated with 15 UMF manuka honey. *J Med Sci.* 2003;3(5):358-366. DOI: 10.3923/jms.2003.358.366.
15. Dutta S, De SP, Bhattacharya SK. In vitro antimicrobial activity of potash alum. *Indian J Med Res.* 1996;104:157-9.
16. Elbagoury EF, Fayed NA. Application of "natural honey" after surgical removal of impacted lower third molar. *Egypt Dent J.* 1985;31(3):203-11.
17. Yaghoobi R, Kazerouni A, Kazerouni O. Evidence for Clinical Use of Honey in Wound Healing as an Anti-bacterial, Anti-inflammatory Anti-oxidant and Anti-viral Agent: A Review. *Jundishapur J Nat Pharm Prod.* 2013;8(3):100-104. doi:10.17795/jjnpp-9487
18. Visavadia BG, Honeysett J, Danford MH. Manuka honey dressing: An effective treatment for chronic wound infections. *Br J Oral Maxillofac Surg.* 2008;46(1):55-6. doi: 10.1016/j.bjoms.2006.09.013.
19. Kato Y, Umeda N, Maeda A, Matsumoto D, Kitamoto N, Kikuzaki H. Identification of a novel glycoside, leptosin, as a chemical marker of manuka honey. *J Agric Food Chem.* 2012;60(13):3418-23. doi: 10.1021/jf300068w.
20. Alvarez-Suarez JM, Gasparrini M, Forbes-Hernández TY, Mazzoni L, Giampieri F. The Composition and Biological Activity of Honey: A Focus on Manuka Honey. *Foods.* 2014;3(3):420-432. doi: 10.3390/foods3030420.
21. Al-Khanati NM, Al-Moudallal Y. Effect of Intra-socket Application of Manuka Honey on Postsurgical Pain of Impacted Mandibular Third Molars Surgery: Split-Mouth Randomized Controlled Trial. *J Maxillofac Oral Surg.* 2019;18(1):147-152. doi: 10.1007/s12663-018-1142-z.
22. Malhotra R, Ziahosseini K, Poitelea C, Litwin A, Sagili S. Effect of Manuka Honey on Eyelid Wound Healing: A Randomized Controlled Trial. *Ophthalmic Plast Reconstr Surg.* 2017;33(4):268-272. doi: 10.1097/IOP.0000000000000743.

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