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Bong H. Suh

*Philadelphia College of Osteopathic Medicine*

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### Recommended Citation

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# **Is honey effective in reducing pain for people who had tonsillectomy?**

Bong H. Suh, PA-S

A SELECTIVE EVIDENCE BASED MEDICINE REVIEW

In Partial Fulfillment of the Requirements for

The Degree of Master of Science

In

Health Sciences – Physician Assistant

Department of Physician Assistant Studies  
Philadelphia College of Osteopathic Medicine  
Philadelphia, Pennsylvania

December 16, 2020

## ABSTRACT

**OBJECTIVE:** The objective of this selective evidence based medicine (EBM) review is to determine whether or not “Is honey is effective in reducing pain for people who had tonsillectomy?”

**STUDY DESIGN:** Review two randomized control trials and one cohort study published in English between 2009 and 2019.

**DATA SOURCES:** Two randomized control trials and one cohort study were found using PubMed databases.

**OUTCOMES MEASURED:** The primary outcome measured was the pain intensity after tonsillectomy. The study by Mohebbi et al. and Hatami et al. used visual analog scale (VAS) and the study by Abdullah et al. used the facial pain scale for patients under 7 years old and VAS for patients above 7 years old.

**RESULTS:** One randomized control trial (RCT) comparing honey to cephalixin, one RCT comparing honey to sultamicillin, and one cohort study comparing honey to tramadol. In a RCT by Mohebbi et al., there was a significant reduction in pain between honey and cephalixin. In a RCT by Abdullah et al. illustrated that the p-value was 0.655 indicating the result was not significant. The cohort study by Hatami et al. showed that the p-value was greater than 0.05 indicating the result was not significant.

**CONCLUSIONS:** There were conflicting data in assessing the efficacy of honey in reducing pain for people who had tonsillectomy. In order to evaluate whether honey can significantly reduce pain, there needs to be more reliable studies that include larger sample size, or different types of honey.

**KEYWORDS:** honey, tonsillectomy

## INTRODUCTION

Tonsillectomy is a surgical procedure that involves removing both palatine tonsils completely including their capsule, by cutting the peritonsillar space between the tonsil capsule and the muscular wall.<sup>4</sup> A tonsillectomy is one of the most performed surgical procedures in the head and neck area and has been performed for over three millennia.<sup>5</sup> Indications for tonsillectomies include tonsil-related diseases and malignancies, dysphagia, halitosis and detritus.<sup>5</sup> It costs about \$2,890 for an uncomplicated outpatient tonsillectomy, reflecting a \$1.73 billion cost to the US health care system.<sup>6</sup> In the United States, more than 530,000 procedures performed annually in children younger than 15 years.<sup>4</sup>

It is uncertain whether a tonsillectomy is better than non-surgical treatment in each case when considering the risks.<sup>7</sup> However, tonsillectomies are usually done when recurring tonsillitis does not respond to medications. Tonsillectomy can cause complications such as pain, feeding intolerance, and delayed feeding onset.<sup>2</sup> Postoperative pain is considered the most complained complication.<sup>2</sup>

The usual methods for treating pain after tonsillectomy are acetaminophen, ibuprofen, narcotics such as tramadol, and antibiotics such as sultamicillin or cephalexin.

These medications can be effective but tend to cause unwanted side effects such as nausea, vomiting, constipation, dizziness, headache and drowsiness. Another pain medication used is tramadol, which is type of narcotic used to relieve moderate to severe pain but is not recommended in children younger than 12 years old or pregnant women, because it can have fatal side effects. For situations like these, honey can be a good alternate. The wound healing properties of honey involve stimulation of tissue growth, enhanced epithelialization, and less scar formation have been revealed by the previous literature.<sup>2</sup> However, it is unclear if these wound

healing properties can be effective specifically in pain after tonsillectomy. This paper evaluates the efficacy of honey in decreasing pain after tonsillectomy through two RCTs and one cohort study.

## **OBJECTIVE**

The objective of this selective EBM review is to determine whether or not “honey is effective in reducing pain for people who had tonsillectomy?”

## **METHODS**

The keywords used in searches were “honey” and “tonsillectomy” via PubMed. Articles used in this review were selected from published peer-reviewed journals in English. Articles were selected based on the relevance to the clinical question and that the outcomes of the studies mattered to patients, i.e. patient-oriented evidence that matters (POEM). The inclusion criteria include studies that were RCTs and clinical trials published in English between 2009 and 2019. The exclusion criteria were studies published before 2009, meta analyses, systemic reviews and articles that are not published in peer-review journals. The statistics used include p-values. All three studies selected for this review include people who had indication for tonsillectomy and therefore underwent the procedure. The intervention used was honey and the comparison groups used other treatments for such as antibiotics or narcotics. Two studies selected for this review were RCTs without blinding. The other study was a double blind cohort study. In all three studies, the pain scale was measured using visual analog scale or facial pain scale. The study conducted by Mohebbi et al. compared honey (5 mL) with cephalexin syrup 40mg/kg in patients age ranging from 5-15 years old who had a tonsillectomy. The study conducted by Abdullah et al., compared honey 2-3 mL with sultamicillin 25mg/kg 3 times a day for patients between 3-18 years old who had tonsillectomy. The study conducted by Hatami et al., compared honey with

tramadol in patients age ranging from 18-35 years old who needed tonsillectomy and underwent the procedure. The methodology is summarized in Table 1.

**Table 1.** Demographics and Characteristics of Included Studies

Study	Type	# Pts	Age	Inclusion criteria	Exclusion criteria	W / D	Interventions
Abdullah <sup>1</sup> (2015)	RCT	63	3-18	Diagnosed with chronic tonsillitis or recurrent acute tonsillitis with or without obstructive symptoms and patients without any other medical illnesses	Non-consented patients, patients with allergy to honey or other honey based products, and patients with allergy to penicillin based antibiotics	5	Honey pre-op, intra-op (2-3 mL into tonsillar fossa), post-op (4ml x3 /day for 7 days)
Hatami <sup>2</sup> (2018)	Cohort study	60	18-35	Patients with American Society of Anesthesia (ASA) I and II and underwent tonsillectomy	History of underlying disease, such as heart disease, severe respiratory diseases, severe obesity (body mass index > 35), severe obstructive sleep apnea, seizures, high intracranial pressure, monoamine oxidase inhibitor concurrent consumption, and allergy to honey	0	Honey dissolved in 40 mL warm water every 6 hrs after tonsillectomy. Then ate honey 3 times a day 7 days postop
Mohebbi <sup>3</sup> (2014)	RCT	80	5-15 yo	Tonsillectomy indication (surgeon decision), tonsillar hypertrophy, consent for entering this study	Allergy to honey and any underlying disease	0	5ml of honey every 6 hr after tonsillectomy

## **OUTCOMES MEASURED**

In this review, two RCTs and one cohort study measured outcomes of patient oriented evidence that matters (POEMs). The POEMs measured in this review are pain intensity or pain scores within a specific time period after tonsillectomy. Mohebbi et al. and Hatami et al. used the visual analog score (VAS). Abdullah et al. used facial pain scale for patients under 7 years old and VAS for patients above 7 years old, where 0 is no pain at all and 10 is the worst pain. All data was continuous. The study done by Hatami et al. did not provide numerical values for the VAS, so it was not possible to measure the size of the treatment effect.

## **RESULTS**

The two randomized control trials and one cohort study compared the efficacy of honey in reducing pain after tonsillectomy. All three studies used honey as a treatment to reduce pain and all patients presented in hospital setting underwent tonsillectomy. The data used in all three studies were continuous data and cannot be converted to dichotomous data. Thus, calculating the relative risk reduction (RRR), absolute risk reduction (ARR), and number needed to treat (NNR) was not possible. For safety purposes, people with honey allergy were excluded from all three experiments and no safety problems were reported during the studies.

The RCT study conducted by Mohebbi et al., recruited 80 participants with similar gender characteristics, ranging in age from 5-15 years, who needed and underwent tonsillectomy. They were divided into two groups of forty and assigned by simple randomization method using single sequence of random assignments. After tonsillectomy, the control group was given antibiotic (cephalexin syrup 40mg/kg every 6 h for 5 days) plus acetaminophen syrup (15mg/kg every 6 h as needed) while the study group was given antibiotic (cephalexin syrup 40mg/kg every 6h x 5d) plus acetaminophen syrup (15mg/kg/ every 6h as needed) plus one tea spoon (5

mL) of honey produced by Mahram Food Industries Group for every 6 h.<sup>3</sup> The patients were asked to continue the treatment for 10 days and they followed the instruction.

The study included many other outcomes, but for the purpose of this review, only the visual analog pain scores that measures pain intensity were considered. Pain intensity was assessed through the use of a questionnaire and the pain scores were assessed using the VAS. A repeated measures test was used to compare pain between the control group and the study group. The results showed that the p-value was less than 0.05 indicating the difference was considered statistically significant. The treatment effect was measured by the mean pain score difference and it came to be 0.7 indicating the treatment effect is small. Table 2 summarizes the results of the study by Mohebbi et al.

**Table 2.** Comparison of Average Pain Intensity During Postoperative Follow Up (on day 8)

	Estimated marginal means on day 8 (average pain intensity)
Pt who received honey	0.1
Control group without honey	0.8
p-value	<0.05 *

\* P values less than 0.05 was considered statistically significant.

In the study conducted by Abdullah et al., 68 patients between 3-18 years old who needed tonsillectomies were recruited and underwent the procedure, although only 63 patients completed the study. The 68 patients were randomly assigned to either a study group or a control group that received no intervention. The patients in the study group were given topical 2-3 mL of Tualang honey intraoperatively followed by eating honey at 4 mL doses 3 times daily for 7 days together with intravenous sultamicillin at 25mg/kg 3 times a day for 1-2 days followed by oral sultamicillin twice daily for 5 days.<sup>1</sup> On the other hand, the control group with antibiotic only received IV sultamicillin at 25mg/kg body weight for 2 days followed by oral sultamicillin twice



daily for 5 days.<sup>1</sup> The Tualang honey used in this study was produced by the Federal Agriculture Marketing Authority (FAMA).<sup>1</sup>

The outcomes measured were the VAS for the patients older than 7 years, and facial pain scale for patients younger than 7 years. The pain score was lower in the Tualang honey plus antibiotic group, but the difference was not significant. The treatment effect was 1 indicating the effect was small. As described in Table 3, the Greenhouse-Geisser p-value of 0.655 in pain between the study group and the control group indicate that the result is not significant.

**Table 3.** Pain Score Between Tualang Honey Plus Antibiotic Group and Antibiotic Only Group

	Pain score on day 7
Antibiotic only	2.8
Honey + antibiotics	1.8
P value	0.655

\* P values greater than 0.05 were not considered statistically significant.

For the double blinded cohort study by Hatami et al., 60 patients from 18-35 years old who needed tonsillectomy were recruited and underwent the procedure. They were divided into two groups to compare the efficacy of honey in reducing pain compared to tramadol. Three minutes before the procedure, Group B was given 2 mg/kg tramadol with volume of 4 mL while Group A was given normal saline with volume of 2 mL of medications that were injected using needle into tonsil bed and tonsil.<sup>2</sup> After tonsillectomy, in the recovery room, Group A was given antibiotic, oral acetaminophen (500 mg every 6 h), and honey (dissolved in 40 mL warm water for every 6 h in the recovery room, and instructed to eat honey 3 times a day until 7 days postoperative) while Group B received antibiotic plus acetaminophen (500 mg every 6 h) and tramadol (2 mg/kg with volume of 4 mL 3 min before surgery).<sup>2</sup>

Pain scores were measured using the VAS on day 7 and analyzed using a t-test.<sup>2</sup> Results showed the difference between the two groups was significant within 24 h postoperatively, but the P value on day 7 was greater than 0.05 which means at the end of the one week there was no

significant difference between the two groups. The treatment effect could not be measured since the mean pain scores were not provided by the authors.

**Table 4.** Pain Score on Day 7

	pain score on day 7	p value
Group A	N/A	> 0.05
Group B	N/A	

\* P values greater than 0.05 were not considered statistically significant

## DISCUSSION

Tonsillectomy is a widely performed surgical procedure, especially in children and young adults. As with any surgery, tonsillectomy carries some risks and complications. Pain after tonsillectomy is inevitable, making it difficult for patients to swallow liquid or food, which can cause additional problems such as dehydration, sluggish bowel function, and fatigue. Although common treatments such as antibiotics, acetaminophen, or ibuprofen can alleviate the pain, there are patients who cannot tolerate those medications due to the side effects.

Honey has been recognized as a successful treatment for reducing inflammation because of its natural anti-inflammatory and anti-bacterial effects.<sup>8</sup> Honey can be purchased at local stores without a prescription or insurance at a relatively low cost. In addition, considering the fact that many patients who undergo tonsillectomy are children, the taste of honey is more appealing compared to the medications that are commonly used for the pain after tonsillectomy. Although honey has its natural therapeutic properties, it can contain pollens and can cause allergic reactions such as hives, sneezing and runny nose; so people who are allergic to honey should not use it. Also, it is widely known that honey can cause botulism which is a life threatening condition if given to a baby under the age of one. Lastly, it may not be suitable for people who have high blood sugar because honey is natural sugar which is carbohydrates, and can affect blood sugar when taken excessively.

Limitations to these studies include relatively small sample sizes to be considered reliable studies and they do not represent the general population well. The studies did not address long term pain intensity changes as they were limited to separate single days. In the study by Abdullah et al., the age groups were children older than 7 years and children younger than 7 years, which left out children who are exactly 7 years old. Both Hatami et al. and Mohebbi et al. were limited in that they did not indicate if all participants completed the studies. It is also not clear if the control groups were told to avoid eating honey. Another limitation was that all three studies used honey in oral intake instead of using other methods such as topical applications which can help preserve the honey in tonsils. Also, only two types of honey were studied.

The study by Hatami et al. had numerous limitations. First, it did not mention the name of the antibiotics and medications that were given to the patients, so it was unclear if the same antibiotic was used. Second, the study did not mention the amount of honey given to the patients, nor did it mention if both groups were similar to each other, and no outliers were highlighted in any of the three studies. Lastly, this study does not indicate the specific pain scores provided by the patients making the study results less reliable. Also, none of the three studies mentioned about the tolerability and adverse events occurred during the experiment. The limited number of good quality studies on this topic limited the scope of this review.

## **CONCLUSIONS**

Considering the numerous limitations and flaws of these studies especially with the study done by Hatami et al., the evidence regarding the efficacy of honey for tonsillectomy pain is inconclusive and conflicting. Mohebbi et al. showed honey was effective in reducing pain after tonsillectomy while the other two studies show otherwise. To better assess the efficacy of honey, additional high quality studies are needed. For future studies, researchers could use different

doses of honey, because increasing or decreasing the dose may change its efficacy. More participants could be recruited in order to better represent the general population, because all three studies had relatively small sample sizes. Other modifications such as using different types of honey and at different intervals, could also help determine the optimal treatment plans. In conclusion, additional research is needed to evaluate the efficacy of honey in reducing pain after tonsillectomy.

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