

# Use Of Apitherapy: A Sweet Approach To Bony Healing Of Extracted Tooth Socket

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## Abstract

**Objective:** To determine the effect of honey in enhancing the height of bony socket healing after tooth extraction.

**Methods:** This Quasi-experimental study includes 100 patients had were selected through convenience sampling and divided into two groups, i.e. 50 each. A tooth radiograph was taken both preoperatively and postoperatively followed by nonsurgical extraction of tooth. The experimental group was provided with honey and instructed to apply it 3 times daily for the next 10 days using an I/V syringe so that honey reached up to the depth of the socket during the initial healing phase. On the 90th postoperative day, patients were repeated with the periapical radiograph. The bony outline of the extracted tooth socket was traced on a tracing paper on the preoperative radiograph and the 90th postoperative day of the radiograph and compared for wound healing by overlapping and measuring the height through a ruler. Hence, the post-operative height of the socket was evaluated in both groups. Data were analyzed using SPSS version 17.0.

**Results:** The mean age was  $30.76 \pm 6.57$  and  $31.02 \pm 5.97$  years in the non-honey and honey group respectively. A total of 24 (48%) subjects were male in the honey group compared with the non-honey group 19 (38%). Females were 26 (52%) and 31 (62%) in the honey group and non-honey group. Statistically significant ( $p$ -value 0.001) was observed between the radiological Height of the socket on 90 days in honey and non-honey groups.

**Conclusion:** It has been determined that honey is significantly efficient honey in enhancing the height of bony socket healing after tooth extraction. To encourage adequate socket repair after tooth extraction, it may be given as a postoperative treatment.

**Keywords:** Alveolar Osteitis, Extraction, Honey and Healing, Postoperative Complication, Tooth Socket Healing, Wound.

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## 1. Introduction

Several variables can make tooth extraction more complicated, increase post-operative problems, and slow the healing process.<sup>1</sup> The healing of the extracted socket is closely related to the process of homeostasis and fibrin breakdown. The formation of a stabilized clot leads to appropriate healing of the bony socket. Healing of the socket starts with the initial clot formation which covers the exposed bone to form healthy granulation tissue in the bony cavity for which a suitable dressing material may be required in the initial phase of socket healing to prevent the wound from being infected by either bacteria or food debris or necrotic tissue, especially in elderly and immune-compromised patients. Currently honey proved to be as efficient as other commercially available antibiotics which meets all those requirements to speed up the healing process

without any complication.<sup>2</sup> Stable and mature clot formation leads to the accurate healing of extracted tooth socket which leads to organized and mature bone formation. Rarely, due to diminished blood supply the clot formation is impaired.<sup>3</sup> In most cases healing of extraction sockets following routine intra-alveolar dental extraction is uneventful. However, proper healing may be disturbed even in normal healthy patients for various reasons.<sup>4</sup> Factors that lead to impaired wound healing are intraoperative complications, the existence of local infection, bacterial infectivity of the socket, the skill of the surgeon, oral contraceptive use, smoking, alcohol drinking, use of a local anaesthetic agent with vasoconstrictor, diabetes mellitus, prior radiation therapy, and genetic predilection.<sup>5</sup> Various methods are used for the prevention and treatment of alveolar osteitis. This article focused on the need to use honey to accelerate the healing

process of post-extraction wounds to get maximum healing in a minimum period. Clinical and radiographic parameters have to be taken into account for assessing the healing of the socket is of prime importance to implement honey dressing for usual clinical applications.<sup>6</sup>

The need is to draw attention towards the regular use of honey in dental practice following the extraction of the tooth. Honey is cost cost-effective, easily available therapeutic dressing material of the socket which should be included in the list of medicaments.<sup>7</sup>

Honey stimulates the growth of granulation tissue and epithelial cells and eventually hastens the repair of damaged tissues.<sup>8</sup> Due to the soothing effects of honey, it is very effective in the treatment of post-radiation stomatitis.<sup>9</sup> The anti-inflammatory action of honey, shared with its momentous substance of antioxidants, may also decrease the erosion of periodontal tissues that occurs as collateral harm from the free radicals released in the inflammatory response to infection.<sup>10</sup>

After an depth search of data, very few studies are available locally to assess the bony healing of extracted sockets. Therefore, this study was conducted to assess post-extraction healing of the socket with the help of radiographic assessment of bony height by the application of honey in the socket wound.

## 2. Materials & Methods

This one-year study recruits 100 patients through purposive sampling, undergoing closed extraction of mandibular 1st or 2nd molar in each group. The sample size was calculated by Raosoft software with a confidence level of 95%, margin of error of 5%, response distribution of 50% and population size of 57. The study design was Quasi-Experimental. The inclusion criteria were patients undergoing closed extraction of mandibular first or second molar teeth only using forceps, aged between 35 to 40 years, patients from both genders and noninfected teeth which are indicated for extraction. The exclusion criteria were patients who are not compliant with research protocol, patients with debilitating diseases such as diabetes mellitus, severe nutritional deficiencies, endocrine disturbances, and restorable teeth Teeth which require surgical removal of teeth e.g. Broken Down Roots and

impactions, patients who allergic to honey, patients with radiotherapy and chemotherapy, patients taking antibiotics or taken antibiotics in previous one week., patients with poor Oral hygiene, Smokers, paan, gutka, tobacco chewers, patients on oral contraceptives and steroid therapy were also excluded. Subjects selected were 100 Patients indicated for non-surgical tooth extractions of Mandibular 1st or 2nd permanent Molars on either side. Verbal informed consent was obtained from each subject in the study. They were allocated in two groups controlled and experimental groups according to clinical intervention. The relevant biographic data, pre-operative clinical examination, and information recorded for each patient include the name, age, and gender of the patient and the reason for tooth extraction. The trained radiographer took the periapical radiograph with a standardized bisecting angle technique of radiography in all radiographic exposures preoperatively and postoperatively. A periapical radiograph was taken preoperatively and the patient was referred for extraction. Extractions were performed under local anaesthesia (2% xylocaine with epinephrine 1:80,000) with dental forceps using a standard protocol of cross-infection control. In 50 controlled group patients after extraction & irrigation with ten millilitres (ml) of saline, no honey was applied in the socket and they were labelled as a non-honey group, while in the other 50 experimental group patients after extraction & irrigation with ten ml of saline, and achievement of local hemostasis two ml of honey was applied in the socket. The patients in the experimental group were instructed to apply honey from the first postoperative day using an I/V syringe (without a needle) making sure that the honey should reach the depth of the socket to make contact with the socket for 24 hours during the initial healing phase. The patients were instructed not to eat at least for half an hour. The extraction wound was covered with one-inch folded sterile gauze in both groups and patients were exposed to a postoperative radiograph Along with the usual written and verbal post-operative instructions in both groups, those in experimental groups were advised to apply honey on the extraction wound three times daily for ten days. The Hamdard honey sachets were provided by the researcher as per the prescribed quantity postoperative antibiotics were prescribed. However anti-inflammatory Ibuprofen for 24 hours was given after extraction in both groups as needed. Patients were instructed for follow-up visits after seven days and/or immediately in case of persistent

bleeding and pus discharge. Patients were also instructed to strict maintenance of oral hygiene and post-operative instructions. Serial follow-up visits were then planned at one-month, two-month, and three-month intervals and clinical findings were reported in a proforma. The patients were instructed to report any complaints during this healing period. On the 90th postoperative day, the periapical radiograph was repeated under standardized conditions. The bony outline of the extracted tooth socket was traced on a tracing paper on the 7th day postoperative radiograph and the 90th postoperative day of the radiograph. The 7th-day postoperative radiograph was compared with the 90-day postoperative radiograph by overlapping the sheet and the height of the bony socket was reported in both groups. The post-operative maximum bony healing of the socket in terms of the height of bone was evaluated and compared with preoperative radiographs in both groups. The radiographs were evaluated by a trained radiographer under good light conditions and findings were recorded on the proforma.

All the relevant information and examination findings were recorded on a predesigned proforma by the researcher.

All the collected data was entered in SPSS version 19.00. Descriptive statistics were applied according to the type of variables. Categorical variables like gender, were presented as percentages.

Continuous variables like age, and radiographic height of socket (mm) after 90 days were reported as mean  $\pm$  S.D, and on main outcome variables of interest independent "t" test was applied to compare the mean difference between groups. P-value  $\leq$  0.05 was considered significant.

### 3. Results

Table 1 shows the average height of the socket taken preoperatively and postoperatively after extraction. A significant average difference (p-value  $\leq$  0.05) was observed between the radiological Height of the socket (mm) on 90 days in honey and non-honey groups as shown in Table 2.

### 4. Discussion

There are many reasons for tooth extraction.<sup>11</sup> Proper treatment planning and appropriate postoperative measures eventually lead to uneventful healing of the

socket.<sup>12, 13</sup> Clot formation preceded the tooth extraction and clot not only leads to hemostasis but also prevents debris, food, and irritants from entering into the bony cavity. It not only gives scaffold to the fibrin but also prevents bacterial contamination of the socket which may lead to bacteremia and eventually bacterial endocarditis in susceptible individuals.<sup>14</sup> Tooth extraction is followed by healing of alveolar bone which is a complex process. Socket healing is characterized by the formation and organization of blood clots.<sup>15</sup> Nearly one-month post-extraction woven bone formation started which is later followed by the formation of trabecular bone and finally compact bone in nearly four-month time.<sup>16</sup>

**Table-1** Mean comparison of Preoperative and Postoperative radiographic height of the socket

Radiographic height of socket (mm)		
Height of Socket	Honey Group Mean $\pm$ S/D )	Non-honey group Mean $\pm$ S/D
Mean Preoperative height of socket(mm)	11.92 $\pm$ 1.80	11.96 $\pm$ 1.33
Mean Difference of postoperative height of socket(mm)	0.36 $\pm$ 0.513	0.09 $\pm$ 0.26

The initial bone formation after tooth extraction occurs in areas adjacent to, but outside of the socket proper, a phenomenon termed extra-alveolar repair.<sup>17</sup> Bone formation within the socket begins at the periphery and proceeds inwards, gradually filling the socket with coarse immature bone. This new bone then matures and remodels until it is indistinguishable from the surrounding alveolar bone.<sup>18,19</sup>

It is currently recommended to close the vacant alveolus whenever possible to enhance postoperative patient comfort and decrease healing time.<sup>20</sup> Post-extraction alveolar sockets were treated with honey in 62 patients in a study by "Ikram and colleagues", honey-soaked 1/4-inch sterile gauze was applied as a dressing material. Healthy granulation tissue formation was noted from 3rd day in 69% of cases and in 31% of cases, granulation tissue appeared

on 4th day. The average pain rating on the first day showed significantly reduced pain levels which were 12.2mm less on the visual analog scale and were statistically significant. They concluded that due to antiseptic, antibiotic, and chemical debridement actions honey is a suitable dressing material for treatment of alveolar sockets post tooth extraction.<sup>21</sup>

We found that at 90 days average height of the socket was  $0.0900 \pm 0.035$  mm in the non-honey group compared to  $0.37 \pm 0.073$  mm in the honey treatment group ( $p=0.001$ ). However, a significant difference was found in the achievement of the maximum height of the socket, measured radiologically.

**Table-2** Comparison of Radiological Height of the socket (mm) at 90 days p-value

Groups	Distance	Mean ± SEM	Difference	P- value
Honey	Ninety days height of the socket	$0.37 \pm$ $0.073$	-0.279	0.001
Non- honey		$0.09 \pm$ $0.26$		

The major difference between this study with previous studies<sup>26</sup> is that they were only focused on soft tissue healing, not including bony healing of the socket, and assessments were not done for such an expanded period to achieve maximum bony healing of extracted tooth socket in terms of height.

The limitations of the study were the small sample size, lack of randomization, no intra-examiners reliability and single-centre study so the results cannot be generalized

It is recommended that there is a need to perform an accuracy assessment by multiple examiners for the interpretation of results and to determine the amount of variance within the measurements taken clinically and radiographically at different intervals of time. It is also recommended that the study should be done at multiple centres with larger sample sizes so that the results are more representative of the population.

It is recommended that additional research is still needed to recognize the mechanism of honey that encourages the immune reaction and motivates wound tissue development.

## 5. Conclusion

It has been determined that honey is significantly efficient honey in enhancing the height of bony socket healing after tooth extraction.

To encourage adequate socket repair after tooth extraction, it may be given as a postoperative treatment.

## CONFLICTS OF INTEREST- None

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## Contributions:

T.A, M.K, S.A - Conception of study

T.A - Experimentation/Study Conduction

M.K, S.A.A, A.A - Analysis/Interpretation/Discussion

T.A, M.K, S.A, M.H.B, S.A.A, A.A - Manuscript Writing

T.A, M.K, S.A, M.H.B, S.A.A, A.A - Critical Review

T.A, M.K, S.A, M.H.B, S.A.A, A.A - Facilitation and

Material analysis

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