

Effectiveness of Honey and Aloe Vera on Post Extraction Healing

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Abstract:

Objective: To conduct a cross-sectional, interventional, randomized controlled trial in order to evaluate the effectiveness of honey and aloe vera on healing of post extraction wounds.

Study Design: Sample size obtained was 30 atraumatic extraction sockets, which were split into three groups.

Group 1- Conventional regime.

Group 2- Honey soaked foams were placed on the socket along with conventional regime.

Group 3 - Aloe vera soaked foams were placed on the socket along with conventional regime. All the three groups were followed up on the 3rd and the 7th day according to Landry, Turnbull and Howley healing index.

Result: Control group on the 3rd and the 7th day showed 38% and 54% respectively and in the honey group it was obtained 42% and 68% on the 3rd and 7th day and the aloe vera group showed a better result having a healing potential of 46% on the 3rd day and 70% on the 7th day.

Conclusion: At the end of the study, the aloe vera group showed better healing potential at the end of 7 days than the other two groups.

Keywords: Honey, Aloe vera, wound healing.

I. Introduction

Natural products have been used for several years in folk medicine. Over the last decade herbal medications in both prophylaxis and treatment of various diseases turned to be a popular form of therapy throughout the world. Many side effects associated with conventional drug regime have been averted by using herbal medicines and thus they are safer to use.¹

Herbal medicines are drugs of plant origin and are referred to as alternative medicine. Many herbal medicines have been proven to be beneficial in treatment of various medical conditions. However, the effect of herbal products on oral tissues, their mechanism of action and side effects are lacking sufficient evidence.¹

Recent interest and advances in the field of alternative medicine has promoted the use of various herbal and natural products for multiple uses in the field of dentistry. The use of natural products in the prevention and treatment of oral conditions could be of benefit to low socioeconomic level in urban and rural communities.

Among the various currently available herbal agents, the most popular and currently receiving a lot of scientific attention is “Honey” & “Aloe vera”

Honey is defined as a sweet liquid substance produced by bees from the nectar gathered from flowers and stores by them for food.² Honey having an effective antibacterial potential to combat oral pathogens and many other better properties holds promise for the treatment of many diseases of oral cavity. In 50 AD, Dioscorides described honey as being "good for all rotten and hollow ulcers."³ More recently, honey has been reported to have an inhibitory effect to around 60 species of bacteria including aerobes and anaerobes, gram-positives and gram-negative microorganisms.⁴

On the other hand, Aloe vera, The name Aloe vera derives from the Arabic word “Alloeh” meaning “shining bitter substance,” while “vera” in Latin means “true.” The parenchymal tissue making up the inner portion of the aloe leaves produces the **Aloe vera gel** (or mucilage), a clear, thin, tasteless, jelly-like material. This tissue is recovered from the leaf by separating the gel from the inner cellular debris.⁵

Aloe vera is a potent anti inflammatory agent it inhibits the cyclooxygenase pathway and reduces prostaglandin E2 production from arachidonic acid. Aloe vera has been shown to enhance defence mechanisms, and it has a variety of components to help combat periodontal disease and other oral conditions.⁶

As people are realizing that modern medicine is not the sole remedy for infections today, we are looking back to the past for the alternative approaches with least possible side effects. So the objective of this study was to conduct a cross-sectional, interventional, randomized controlled trial in order to evaluate the effectiveness of honey and aloe vera on healing of post extraction wounds.

II. Materials & Methods

The study design was approved by the Ethical committee, SRM Dental College, Ramapuram, Chennai. Informed consent was obtained from each subjects/parents.

A group of 30 freshly extracted sockets were identified randomly and included in the study.

Inclusion criterions were participants who underwent atraumatic extractions in the Department of Pedodontics for the treatment of grossly decayed teeth. The patients were inclusive of Dichotomous classification in the age range of 4– 12 years without any major systemic diseases. Participants had the right to withdraw from the study at any time at their own discretion. After selection of the patients the extraction sockets were divided into three groups randomly.

Group (1):(10 Nos)patients were prescribed only analgesics and followed for 7 consecutive days.

Group (2): 10 post extraction sockets were treated with honeyapplication (100 % pure natural honey) soaked in small foamsthree times a day for 7 consecutive days along with conventional analgesics and antibiotic regime.

Group (3):10 post extraction sockets were treated with aloe-vera application (100 % pure natural aloe-vera) soaked in small foams three times a day for 7 consecutive days along with conventional analgesics and antibiotic regime.

All the three groups of the patients were called for follow-up re-examination after treatment on the third day and the following 7th day to check the response of natural honey and aloe vera on the extraction site. Parents or children who were not willing to participate in the study and if they were not willing to participate during the follow up were excluded from the study group.



Fig 1: Jar of Honey and Aloe vera and a packet of foams given to the patient/parent.

Healing potential was assessed using the standardised index byLandry, Turnbull and Howley

Scores

Healing Index 1: Very Poor

Has 2 or more of the following:

- Tissue color: \geq 50% of gingiva red
- Response to palpation: bleeding
- granulation tissue: present
- incision margin: not epithelialized, with loss of epithelium beyond incision margin
- suppuration present

Healing Index 2: Poor

- tissue color: \geq 50% of gingiva red
- response to palpation: bleeding
- granulation tissue: present
- incision margin: not epithelialized, with connective tissue exposed

Healing Index 3: Good

- tissue color: \geq 25% and $<$ 50% of gingiva red
- response to palpation: no bleeding

- granulation tissue: none
- incision margin: no connective tissue exposed

Healing Index 4: Very Good

- tissue color: < 25% of gingiva red
- response to palpation: no bleeding
- granulation tissue: none
- incision margin: no connective tissue exposed

Healing Index 5: Excellent

- tissue color: all tissues pink
- response to palpation: no bleeding
- granulation tissue: none
- incision margin: no connective tissue exposed⁷

III. Results

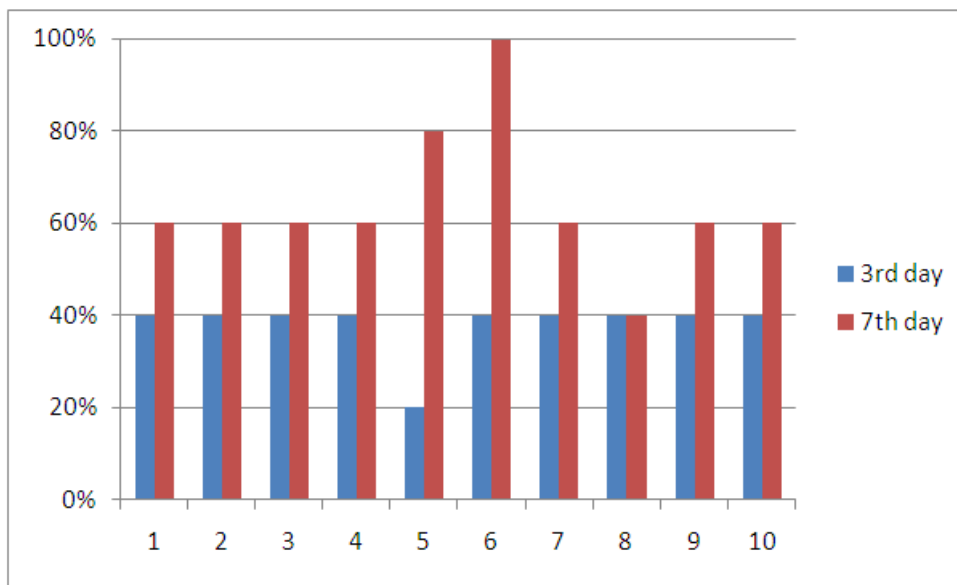


Fig 2- Control group

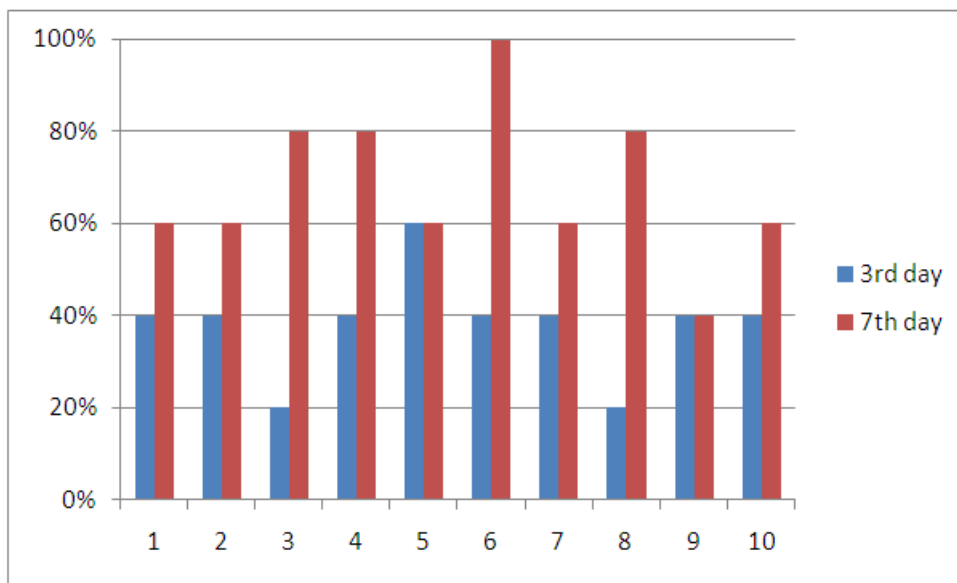


Fig 3: Honey group

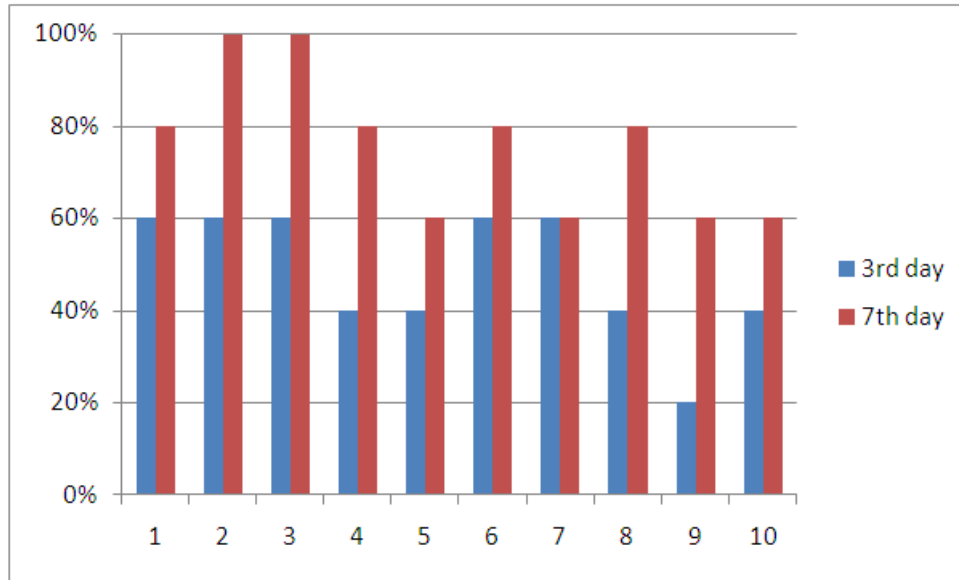


Fig 4: Aloe vera group

Inference:

Group:	On the 3rd day	On the 7th day
Control	38%	54%
Honey	42%	68%
Aloe vera	46%	70%

IV. Discussion

As by the study results obtained, the aloe vera group showed 46% potential of healing on the 3rd day and 70% healing on the 7th day. This healing potential in the aloe vera group can be attributed to many reasons, of which the three main factors are:

1. Inhibition of pain & inflammation
2. Stimulation of fibroblasts to functionally produce collagen & proteoglycans
3. Increased wound tensile strength⁸

During the healing process, (Figure 5) Aloe vera’s stimulation of the fibroblast produces and adds new collagen to tissue. However, we should note that macrophages can also secrete substances that can similarly stimulate fibroblasts. Whether the effect is direct (from Aloe) or indirect (from macrophages), new collagen forms between the margins of wounds when Aloe is present. These collagen bonds are responsible for increased tensile strength. Therefore, if the tensile strength increases, it is assumed the collagen productions is increased by Aloe.⁹

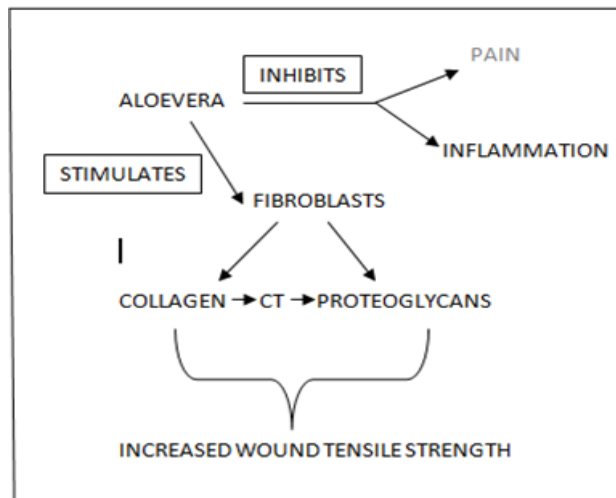


Figure 5

When the soft tissue is injured, fibroblasts migrate into the wound Figure 5 area to proliferate and produce collagen as well as proteoglycans. Proteoglycans form the ground substance in which collagen fibers embed. This represents a remodeling of connective tissue. Cells in the wound area communicate with each other by growth factors. Growth factors in Aloe are attracted to the wound area and bind to the fibroblast IGF receptor to produce collagen and proteoglycans which increase the tensile strength. (Figure. 5)

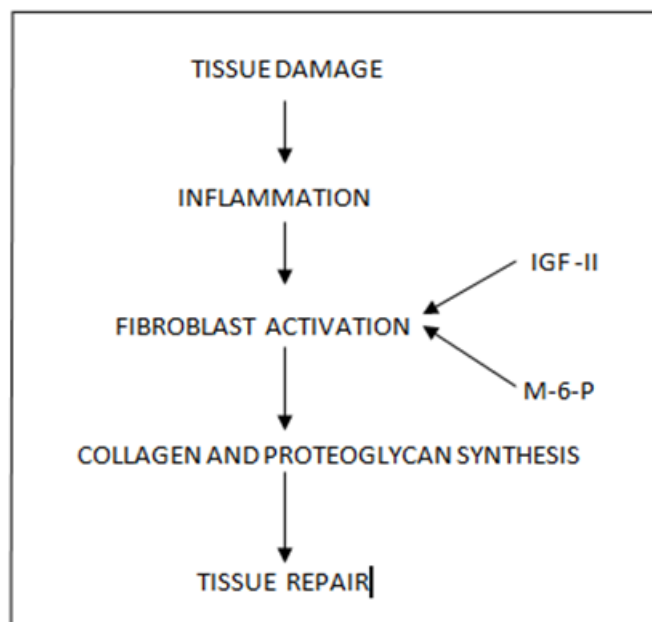


Figure 6

Aloe vera is also used to inhibit acute inflammation. But, unlike steroids, it stimulates fibroblast growth to improve wound healing and block the spread of infection. This is the miracle of Aloe. (Fig 6)

Acemannan is the name given to the large molecular-weight sugars called mucopolysaccharides that are found in Aloe Vera. They assert that this is the “active” ingredient interacts with the body’s immune system, enhancing rather than overriding this system. It stimulates the macrophages, one of the principal immune response steering mechanisms of the body.⁸

Post-treatment dental discomfort and pain are among the most unpleasant forms of misery we humans inflict upon ourselves. In providing relief from this, the blessed Aloe Vera plant displays yet another example of Heavenly mercy. The aloe vera plant having a long history of therapeutic ability it has gained some popularity as an active ingredient in tooth gel. The ability of aloe vera tooth gel to successfully perform its function has been a point of contention for many dental professionals.

Aloe vera contains amino acids such as phenylalanine and tryptophane that have anti-inflammatory activity. The salicylic acid in Aloe prevents the biosynthesis of prostaglandins from arachidonic acid. This explains, in part, how Aloe reduces vasodilation and decreases the vascular effects of histamine, serotonin and other mediators of inflammation. Since prostaglandins play an integral role in regulating both inflammation and immune reactions, Aloe vera can affect both of these systems by blocking prostaglandin synthesis. The analgesic effect of Aloe vera is synergistic with aspirin. Since Aloe vera has both stimulatory and inhibitory components.^{10,11,12}

Aloe can modulate both immune and inflammatory reactions. It can act as a stimulator of wound healing and antibody production. Aloe can block prostaglandin and modulate the production of lymphocytes and macrophage derived mediators (lymphokines) including interleukins and interferons.¹³

Besides Aloe’s effects on inflammatory and immune reactions, it also acts as a scavenger of free oxygen radicals produced by PMN’s. The vitamin C in Aloe that inhibits inflammation picks up oxygen radicals to block the inflammatory process. Vitamin E, a known antioxidant, is also a component of Aloe vera. These biological effects of the orchestra work in collaboration with the conductor (polysaccharide) to produce these valuable therapeutic effects.¹⁴

Yagi et al reported that aloe vera gel contains a glycoprotein with cell proliferating-promoting activity, while Davis et al noted that aloe vera gel improved wound healing by increasing blood supply, which increased oxygenation as a result. In 1991, Thompson reported that topical application of the aloe vera-derived allantoin gel stimulated fibroblast activity and collagen proliferation.¹⁵

Angiogenesis is the growth of new blood capillaries and is a part of tissue regeneration. A 1993 study showed that topical application of aloe vera gel re-established vascularity of burn tissue for a guinea pig, although no specific constituents were identified.¹⁶

Indeed, medicinal importance of honey has been documented in the world's oldest medical literatures, and since the ancient times, it has been known to possess antimicrobial property as well as wound-healing activity.¹⁷ The results of honey however showed significantly less healing potential than the aloe vera group. 42% 3rd day and 68% on the 7th day Honey's healing property is attributed to the fact that it offers antibacterial activity, maintains a moist wound condition, and its high viscosity helps to provide a protective barrier to prevent infection.¹⁸ Its immunomodulatory property is relevant to wound repair.¹⁹

Application of honey (or concentrated sugar preparations) to wounds might help prevent infection and possibly speed healing.^{20,21,22} Honey is thought to work primarily through its high sugar content, which directly kills microorganisms. However, trace substances contained in it might also be at work. Not all studies show clear benefit, however.²³ One trial found that antibacterial honey (Medihoney) did not significantly improve wound healing in 105 patients suffering from mostly leg ulcers.²⁴ Conversely, topical honey improved healing time compared to saline gauze and silver sulfadiazine in 2 trials of 140 patients with skin ulcers or burns.²⁵

V. Conclusion

It may be concluded that aloe vera is a safe and natural and user friendly alternative adjunct that might be feasible to promote wound healing. Within the limits of the study, we could show better results if we increase the sample size and also increase the number of comparative natural products we could get better results on different aspects.

References

- [1]. Omar OM (2013) *Alternative Medicine: Implications on Dentistry*. *AlternInteg Med* Volume 1 • Issue 1 • 1000e103
- [2]. *Stedman's Medical Dictionary* 26th ed. Williams and Wilkins, Baltimore, USA
- [3]. Gunther RT. *The Greek Herbal of Dioscorides*. New York: Hafner, 1934 (reprinted 1959).
- [4]. Molan PC. The antibacterial activity of honey. 1. The nature of the antibacterial activity. *Bee World* 1992; 73(1): 5-28.
- [5]. Aloe Vera: A Short Review. *Indian J Dermatol*. 2008; 53(4): 163–166. PMID: PMC2763764.
- [6]. Michael. G. Newman, Henry. h. Takei, Fermin. a. Carranza. *clinical periodontology*; 1997. p.347.
- [7]. Landry RG, Turnbull RS, Howley T. Effectiveness of benzydameyneHCl in the treatment of periodontal post-surgical patients. *Research in Clinic Forums*. 1988; 10: 105-118.
- [8]. Masse JF, Landry RG, et al. Effectiveness of soft laser treatment in periodontal surgery. *International Dental Journal*. 1993; 43: 121-127.
- [9]. Danhof I 1987. *Aloe Through the Ages*, Volume 1. Omnimedicus Press.
- [10]. Gowda D; Neelisiddaiah B; Anjaneyalo Y 1979. Structural studies of Polysaccharides from Aloe vera *Carbohydrate Research*. 72:201.
- [11]. Morgan, D; Edman JC; Strand-ring DN; Fried VA; Smith MC; Roth RA; Rutter WJ 1987. Insulin-Like Growth Factor 11 Receptor as a Multifunctional Binding Protein. *Nature* 329:301.
- [12]. Willenborg DO; Parish CR; Cowden WB 1989. Phospho-sugars are Potent Inhibitors of the Central Nervous System: Inflammation *FASEB* 3: 1968.
- [13]. Yagi A, Kabash A, Okamura N, Haraguchi H, Moustafa SM, Khalifa TI. Antioxidant, free radical scavenging and anti-inflammatory effects of aloe derivatives in aloe vera. *Planta Med* 2002;68:957-960.
- [14]. Hu Y, Xu J, Hu Q. Evaluation of antioxidant potential of aloe vera (*Aloe barbadensis* Miller) extracts. *J Agric Food Chem* 2003;51:7788-7791.
- [15]. Thompson JE. Topical use of aloe vera derived allantoin gel in otolaryngology. *Ear Nose Throat J* 1991;70:56.
- [16]. Heggars JP, Pelley RP, Robson MC. Beneficial effects of aloe in wound healing. *Phytotherapy Research* 1993;7:S48-S52.
- [17]. Van den Berg AJ, Van den Worm E, Van Ufford HC, Halkes SB, Hoekstra MJ, Beukelman CJ. An in vitro examination of the antioxidant and anti-inflammatory properties of buckwheat honey. *J Wound Care*. 2008;17:172–178. [PubMed]
- [18]. Molan PC. The evidence supporting the use of honey as a wound dressing. *Int J Low Extrem Wounds*. 2006;5:40–54. [PubMed]
- [19]. Simon A, Traynor K, Santos K, Blaser G, Bode U, Molan P. Medical honey for wound care - still the 'Latest Resort' *Evid Based Complement Alternat Med*. 2008 doi: 10.1093/ecam/nem175.
- [20]. Okeniyi JA, Olubanjo OO, Ogunlesi TA et al. Comparison of Healing of Incised Abscess Wounds with Honey and EUSOL Dressing. *J Altern Complement Med*. 2005;11:511-513.
- [21]. Ingle R, Levin J, Polinder K. Wound healing with honey - a randomised controlled trial. *S Afr Med J*. 2006;96:831-835.
- [22]. Singh AK, Sharma A, Warren J, et al. Picroliv accelerates epithelialization and angiogenesis in rat wounds. *Planta Med*. 2007;73:251-256. Epub 2007 Feb 22.
- [23]. Barna M, Kucera A, Hladicova M, et al. Wound healing effects of a *Symphytum* herb extract cream (*Symphytum x uplandicum* NYMAN): Results of a randomized, controlled double-blind study. *Wien Med Wochenschr*. 2007;157:569-574.
- [24]. Jull AB, Rodgers A, Walker N. Honey as a topical treatment for wounds. *Cochrane Database Syst Rev*. 2008;CD005083.