

Application of honey in the treatment of skin wounds

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S U M M A R Y

This paper reviews the current knowledge about the use of honey in the treatment of skin wounds. Most experience has been gained in human medicine, but first reports of its use in animals are available. Honey has, after application to wounds, an antibacterial effect against several bacteria and shows reduced oedema and discharge. Moreover, it helps in generating granulation and epithelial tissue and has an odour neutralizing effect. The need to use sterilized honey products free from pesticide and antibiotic residues is explained.

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INTRODUCTION

Dog and cat skin wounds are a common occurrence and are brought into vet practices every day. When treating them, both vet and owner often initially apply local medications. There is a preference for “something” to apply on a wound and a number of ointments and creams are marketed for this purpose. They generally are unnecessary and often even counterproductive, as virtually every medication will retard the wound healing process. Recently, however, two medications were reported as being proven to help the wound healing process by local application, i.e. 65% glycerol [12,16] and honey. The latter product is discussed in more detail below.

WOUND HEALING

Freshly incurred wounds are best cleansed with a physiological salt solution, and then sutured. Superficial wounds do not require antibiotics when treated properly and where extensive tissue damage is not evident. Only infected, deep wounds require antibiotic treatment [10].

This involves the systemic administration, for a minimum of 5 to 7 days, of a broad-spectrum antibiotic such as *cephalosporines*

and *amoxicillin with clavulanic acid*, against the most common skin bacteria. Important in this context is an adequate concentration of active antibiotics in the blood before the wound is operated on. This is best achieved by

intravenous administration of the antibiotic just before the induction of anaesthesia. There are no medical grounds for the local application of antibiotics. Anecdotes do exist however, of substances enhancing the wound healing process, such as honey, which has reportedly been used for centuries for its favourable effect on the wound healing process. This effect is explained by the fact that honey has a cleansing effect, absorbs oedema and odours, displays anti-microbial and infection inhibiting effects, and induces granulation, epithelialisation, tissue generation and bloodsupply in the wound area [4,8].

ANTIBACTERIAL EFFECT OF HONEY

Honey has an antibacterial effect against several bacteria such as *Pseudomonas*, staphylococci, streptococci and *E. coli*. Even some antibiotic-resistant bacteria, such as MRSA (Methicillin Resistant Staphylococcus Aureus) and VRE (Vancomycin Resistant Enterococci) are reportedly sensitive [2,3,9]. A

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Sutured wound on dog's paw, Day 0.



Application of sterile honey ointment.

concentration of 10% v/v is sufficient for full inhibition of wound bacteria [5]. The antibacterial effect is caused, among other things, by hyper-osmosis, low 3.6 pH, and the presence of a thermo unstable substance named *inhibine*, hydrogen peroxide and enzymes such as catalysts. Hydrogen peroxide is generated, along with glucose acid, from honey as a result of an reaction of the enzyme glucose oxidase (created by the bee) with the glucose. This reaction occurs after the honey has been diluted in the wound. The gradually released hydrogen peroxide has an adverse affect on bacteria but not on the normal cells, thus creating no cellulour damage. The assumption is that also other antibacterial substances also occur, originating from various flowers [17]. Studies show that bacteria display a different sensitivity to monofloral honey from differing species of plants [1,17].

OTHER EFFECTS OF HONEY

Animal experimental research has shown that honey reduces the number of neutrophils cells infiltrating the wound. Clinical studies showed moreover, reduced oedema and discharge. The hyperosmolarity of honey and stimulation of body enzymes induces autolysis of necrotic tissue in a wound, achieving remoral of debris.

Honey helps in the generation of granulation and epithelia tissues because hydrogen peroxide stimulates angiogenesis and the growth of fibroblasts. Also, low pH values and enhanced angiogenesis help release oxygen, stimulating tissue regeneration.

The odour neutralizing effect is achieved because bacteria in the wound are being inhibited, thus also reducing debris volumes. Also, once the honey has been applied, the bacteria will utilize the sugars it contains. This generates the odourless milk acid [5].

HUMAN AND ANIMAL CLINICAL RESEARCH

For skin burns, very good results were found comparing honey treatment to treatment with a silver-sulfadiazin [13] and polyurethane film [14]. The sterile antibacterial wound ointment with a honey basis (50% v/v)*, available in the Netherlands, was used in a multi-centre case-report study of 139 nursing homes and GP practice patients suffering from ulcers, decubital ulcers, abrasions and burns [15]. On several wounds, different wound treatment products were used (e.g. Betadine ointment*, Duoderm*, silver-sulfadiazin) and their effects compared in the same patient. Depending on the type of wound, a 14-47% faster healing process has been reported. However, no statistical analysis of the results was carried out. The specific wound ointment with a honey basis* also showed an anti-fungal effect against *Candida albicans*. Now, the manufacturer has the first dog and cat case-studies available.

NEED FOR AND USE OF STERILE HONEY

It is evidently an attractive option to use a natural product for the treatment of patients, however one important aspect must be emphasized before problems arise for man and animals. Only a very few studies state that sterile honey was used [14]. This fact is often not stated, or the honey is presumed to be sterile [13]. This however is a major misconception. Honey may contain *Bacillus* sp. and *Clostridium* traces and thus cause botulism [6,11]. The use of natural honey on necrotic wounds is therefore contraindicated in such cases counter indicated. Also, honey may contain pesticides as well as antibiotic residues such as tetracyclines used on bees.

The recommendation therefore is to use only honey for medical purposes that originates from specific pathogen free (SPF) non-medicated bees living in areas where no pesticides are in use. Also irradiated honey produces a sterile product, without any

* Mesitran*, Klinion* series, Medeco BV (www.medeco.nl).



Wound on paw after one week of daily treatment.

change in properties [7,11]. In the Netherlands, a sterile honey ointment for human use is available in tubes of 20 and 50 g *. The ointment may be used in combination with wound dressings and the product information sheet states that application once a day is sufficient.

Scientific research into the wound healing effect of honey in (domesticated) animals has not been performed and this will need to be done in the future to obtain independent proof that honey ointment is a useful addition to the existing treatments of (infected) wounds in veterinary practices (figures 1 and 2).

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