

The Use Of Manuka Honey

To Promote Wound Healing

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When wounds are not healing, or the healing is slow, this is usually because the wound is inflamed. Inflammation in a wound is also responsible for unsightly scars after a wound has eventually healed.

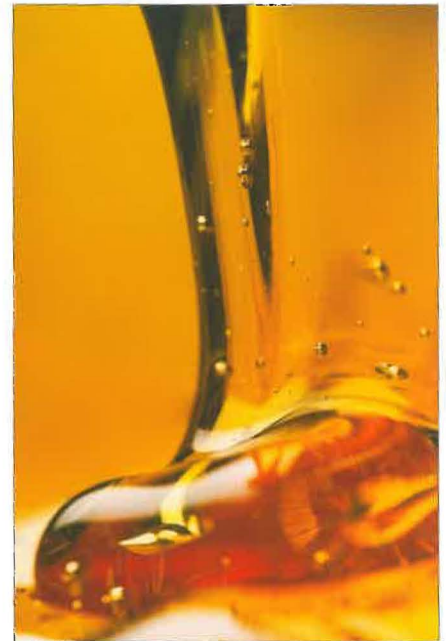
The use of honey as a wound dressing prevents these problems through its potent antibacterial and anti-inflammatory activity. Another action of honey, its rapid debridement of wounds, also aids healing by removing bacteria-harboured slough which gives rise to inflammation.

Whilst these various bioactivities of honey are at work on a wound, the physical attributes of honey are creating the ideal wound-healing environment. The osmotic action that comes from the high sugar content of honey draws out lymph from the underlying circulation. This means a honey dressing on a wound works like VAC therapy, without the need for a vacuum pump. As with VAC therapy, the flow of lymph removes bacterial toxins and destructive proteolytic enzymes, as well as providing nutrients for the growth of cells to repair the wound (honey has the advantage of itself providing additional nutrients, and of stimulating the release from leukocytes of growth factors which promote the growth of repair tissues.) The flow also provides the moist healing environment that is needed by wound repair tissues to be able to grow to their full potential, and prevents adherence of the dressing to the wound. Thus there is no pain during changing of dressings, and no damage from tearing away newly grown tissue as occurs when there is adherence.

Honey is not a generic medicine – it varies markedly in its composition. The Ancient Greek physicians were aware that certain types of honey were better for medical use than others, and this knowledge exists in present-day traditional medicine around the world. But many health-care professionals in modern Western medicine are not aware of this.

Manuka honey had a reputation in folklore as being the best to use as an antiseptic on cuts and grazes, and research into this found that it has a very unusual type of antibacterial activity. The antibacterial activity of all other types of honey is due to hydrogen peroxide, which is produced by an enzyme which bees add to the nectar when collecting it to make honey. In Manuka honey it is due to methylglyoxal (MGO) which is formed by a spontaneous reaction in ripened honey from a simple sugar molecule, dihydroxyacetone, that is present in substantial amounts in Manuka nectar alone. Other components of Manuka honey, yet to be identified, boost the potency of the MGO against bacterial cells and make the MGO non-toxic to body tissues.

Although honey with an antibacterial activity of even greater potency than that of Manuka honey in laboratory testing exists, if this was to be used on a wound, a large proportion of the hydrogen peroxide would be destroyed by the activity of the enzyme catalase (present in the cells of the body and in serum). It is for this reason that most of the many brands of honey products for wound care which are now on sale as registered medical products in many countries are made from Manuka honey.



Examples Of Treatment



Debriding before



Debriding after



Packing



Packing

Recent research has revealed that Manuka honey also has a higher anti-inflammatory activity than other types of honey. This is because MGO reacts with proteins in honey. This makes the bee protein in honey more potent as an anti-inflammatory agent, as it inhibits the triggering of the inflammatory response to bacteria and damaged tissue cells.

The potency of the anti-inflammatory activity and the antibacterial activity varies from batch to batch of Manuka honey. For this reason it is important to note the activity rating of what is purchased. Unfortunately there are many people selling Manuka honey where the activity that is rated is actually due to hydrogen peroxide, and is similar to the rating of any other type of honey. It is important to check that the rated activity which is specified is stated to be non-peroxide, or that the content of MGO is rated. In the published trials and case studies the non-peroxide activity rating of the Manuka honey used has been 12 or higher. The registered medical products have a similar rating of activity. There is some disagreement about the level of MGO in honey that corresponds with this level of antibacterial activity, but a level of MGO of 400 mg/kg would definitely have this level of antibacterial activity.

At present the potency of the anti-inflammatory activity is not rated on Manuka honey products on sale. Research shows that it is not correlated with the level of antibacterial activity. However, because MGO is involved in formation of the more active form of the anti-inflammatory protein, to get a good level of anti-inflammatory activity it is important to ensure that any Manuka honey purchased has MGO/non-peroxide antibacterial activity. Although infection or heavy colonisation with bacteria is the usual cause of inflammation, there can be an inflammatory response to dead cells in damaged tissues or to foreign bodies in the tissues, and inflammation can result from reperfusion injury. In reperfusion injury the inflammatory response is initiated by oxygen free radicals which are formed when blood flow is restored to tissues where blood flow had previously stopped for a while. The free radicals are formed from oxygen from the blood as a result of biochemical changes that occur in cells deprived of oxygen. This is seen in pressure sores and with varicose veins when blood flow is restored by elevation of the leg, or by calf muscle pump action in walking, after stagnation of blood flow through the lower leg when standing still or sitting. The anti-inflammatory action of honey explains why honey is so effective in healing varicose ulcers where compression cannot be used to prevent continual reperfusion injury.

Honey is also very effective for treating burns. Clinical trials have shown that honey prevents superficial burns from converting to full-thickness burns. Burns cause the release from damaged tissue of factors which are potent stimulators of the inflammatory response. Although not widely known, honey is excellent as first-aid treatment of burns. It is the sensitisation of nerve endings by inflammation that causes inflamed injuries to be painful, so application of honey to a fresh burn or scald takes away the pain. By preventing inflammation from developing, honey also minimises the damage to tissues that results from burns. When inflammation occurs, whether resulting from burns or other traumatic tissue damage, radiation, reperfusion injury, or infection, ulceration can be a consequence. This is because inflammation causes protein-digesting enzymes to be released and activated in the tissues, and erosion of the tissues by this digestion is the consequence. Tissue growth factors and the tissue matrix which is the scaffold on which new tissues are built are digested, so healing does not occur.

The presence of bacteria giving rise to inflammation and thus stopping wounds from healing may not be obvious. It is now

realised that many bacteria are in biofilms on the surface of the wound bed and are thus protected from the action of antibiotics. Another problem is that an increasing number of strains of bacteria are resistant to antibiotics. Manuka honey has been shown to be effective against bacteria in biofilms and on all the antibiotic-resistant strains usually encountered.

To maximise its wide range of beneficial effects on a wound, honey needs to be in contact with the wound bed at all times. At body temperature honey is very fluid and runs off wounds. Wound exudate flushes honey out of cellulose dressing pads and gauze. Soft (M type) alginate dressings will absorb honey and exudate, thus keeping honey on the wound. As a guide, 25 ml of honey is used for a 10 cm square dressing. On appropriate sites honey can be kept on a wound with adhesive polyurethane film, but if there is exudate this will burst the honey out. There are four different brands of Manuka honey wound dressings registered with Medsafe, all designed to keep honey on the wound. The frequency of dressing changes required depends on the amount of exudate there is and the capacity of the dressing to absorb it. The manufacturers of these dressings also sell Manuka honey packed in tubes to be used to fill any cavities or depressions in the wound bed before the dressings are applied.

The registered products are all sterilised by gamma-irradiation. Although there are a large number of reports published where the honey used on wounds was not sterilised, with no reports of infection resulting from this, it is always best practice to use the sterilised products. Also, it should be noted that the registered products are manufactured from honey produced for medical use and thus kept free from contamination with particles which would be foreign bodies in a wound bed.

Some of the honey wound dressings have a gel structure which helps prevent the painful sensation which some patients experience when honey is applied to an inflamed wound. The inflammation sensitises nerve endings which detect acidity. The gel slows the release of the acidity of honey into the wound. Another way of preventing pain is to apply a thin layer of hydrogel between the honey dressing and the wound bed.

With the use of Manuka honey, selected to have the right type and level of antibacterial activity, and with an appropriate dressing protocol that keeps honey present on the wound bed at all times, uncomplicated wounds will heal rapidly, painlessly, and without a visible scar. With complicated wounds, including ones failing to heal with any form of best-practice modern treatments, if Manuka honey is used appropriately it can be expected to have complete healing, with a cosmetically good outcome, within six to twelve weeks.

Further reading

Molan, P. C., (2011). The evidence and the rationale for the use of honey as a wound dressing. *Wound Practice and Research* 19(4)204-220. <http://researchcommons.waikato.ac.nz/handle/10289/6095>

Bio - Professor Peter Molan

Peter has been involved in research on natural antibacterial substances since 1973. In 1981 he was persuaded by a friend, who was a beekeeping enthusiast, to look at Manuka honey because of its reputation in New Zealand as an antiseptic.

Peter was honoured by the Queen (award of MBE) in 1995, and awarded the Science & Technology Silver Medal by the Royal Society of New Zealand in 2001, both awards in recognition of his work on honey.

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