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Traditional Remedies for Wound Healing: A Review

Shakila S. Shaikh*[1], Manisha D. Ukande[1], Dr. Krishna Murthy[1], Dr. Rajkumar V. Shete[1], Dr. R.S. Solunke[1]

[1] Rajgad Dnyapeeth's College of Pharmacy, Bhor-Pune, (M.S) India, Pin-412206

ABSTRACT

Wounds are a natural part of everyday life that can be successfully treated with the knowledge of Ayurveda. Ayurveda is the study of science that is based on herbal remedies. A wound must progress through vrana shodhana (wound purification) and vrana roopana (wound healing) and pass through the four stages of wound healing; dushta vrana (septic wound), shudh vrana (clean wound), roohyamana vrana (healing wound), and roodha vrana (healed wound). Through this, Ayurveda has revealed knowledge for treating conditions that can't be treating by the modern medicine. Ghee-based herbal formulations claimed to promote wound healing in traditional practices. This article aims to provide probable scientific explanations for using medicated ghrita (ghee) as wound healing formulation in Ayurvedic system of medicine and its clinical importance.

Keywords: Ayurveda, Wound, Ghrita, Wound healing.

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***Address for Correspondence:**

Miss. Shakila Shaikh, Rajgad Dnyapeeth's College of Pharmacy, Bhor Pune, (M.S) India, Pin-412206

INTRODUCTION

Wound management and wound healing, or vranaropaka, has consistently been an important tool for survival, and as such one could imagine that this ancient art form was an initial catalyst for our interest in the exploration of healing in general. Thus, wounds have been broadly studied and generally examined and in this way, numerous treatment procedures exists, both ancient and present day. Current biomedical research includes study of a multitude of cells, tissues and physiological events, which admittedly is only partially understood.[1] The Ghrita used as a base since it is most perhaps to concentrate or hold soluble active portions from the constituent used.[2]

Classification of Wound

Wounds are classified by certain strategies based on their etiology, area, kind of damage or indications, wound depth and tissue damage or clinical side effects of the injury. Wounds are likewise classified into two classes open and closed wound on the underlying cause for wound development and acute and chronic wounds based on the physiology of wound healing.

Open wounds

In this condition blood escapes outside of the body and bleeding clearly noticeable. It is additionally classified: Incised wound, Laceration or tear wound, Abrasions or superficial wound, Puncture wounds, Penetration wounds and discharge wounds.[3]

Closed wounds

In closed wounds blood escapes, the circulatory system of the body, however it remains inside the body and it incorporates contusion or bruises, hematomas or blood tumor and Crush injuries.[3]

Acute wounds

Acute wound is tissue damage that continues through a orderly and timely repetitive procedures that outcomes with the restoration of anatomic and functional integrity. Acute wounds are generally caused because of the cuts or surgical incisions and complete the wound healing process within the anticipated time.[4]

Chronic wounds

A chronic wound is wounds that have failed to progress through the normal stages of healing and thus enter a condition of pathologic inflammation. Chronic wounds additionally require prolonged period while to heal or repeat frequently.[5]

Wound Healing Process

The destruction or break in the integrity of body tissue or some portions of body is called Vrana (wound).[6] Wounds can be either acute or chronic. An acute wound would be any

instance of the discontinuity of skin from a surgical wound, bite, burn, cut, abrasion, laceration, crush, gunshot, or any other trauma to the body.[7] Chronic wounds, such as leg or foot ulcers, or pressure sores are generally connected with imbalanced endogenous systems hindered blood vessel supply or venous drainage of certain disorders for example, diabetes mellitus or AIDS and certain inclined individuals like the elderly, obese, smokers and those with poor nutrition, as well as those with immunosuppression (for example those utilizing chemotherapy or radiation treatment).[8] Present day moderrn science does not have an standardized model yet, which officially classifies the various phases of wound healing. Stages have been built up and endeavors to undergo standardizing increasingly definite models are being made. The most important part of the wound healing is classified in three phases, starting with epidermal migration (or the procedure of skin repairing), followed by re-epithelialization, and restoration of the skin barrier; Traditionally phases of wound healing classified into three stages, the inflammatory response, the proliferation phase and the remodeling phase.[8] The primary phases of wound healing include hemostasis, inflammation, followed by proliferation and migration of dermal and epidermal cells and the matrix synthesis. Eventually, remodeling and differentiation provide the rebuilding of tissue integrity, as is the objective of wound healing.[9]

Ayurvedic stages of Wound Healing

The Ayurvedic pharmacopoeia contains more than 200 herbs, mineral, animal and fat preparations that are utilized for healthy skin, which can possibly be utilized for wound healing. According to *Ayurveda*, herbal preparations are most potent when used together as formulae. Not any one single herb can usually address all intended areas of interest. Therefore, it is uncommon for one to use an herb in isolation. Through the use of compounded drugs, as is emphasized by *Ayurveda*, it is possible and likely that one can witness a more powerful effect with a broadened scope of activity with few to no side effects. [10]

Ayurvedic Formulations employed in the management of wound healing:

Ghrita is one of the herbal remedy that contain ghee as the base to dissolve or extract or hold the active therapeutic principles from the formulation. Ghritas are medicated ghee formulations which containing the fat-soluble components of the ingredients used in these preparations.

Table1: List of Wound healing Ghrita Preparations[12-23]

1.	***Tilvadi Ghrita***
2.	***Durva Ghrita***
3.	***Shatadhouta ghrita***
4.	***Sahasradhouta ghrita***
5.	***Jatyadi Ghrita***
6.	***Manjishthadi Ghrita***
7.	***Karpoor Ghrita***
8.	***Karanjadhya Ghrita***
9.	***Jati Kalpa Ghrita***
10.	***Manjishthasiddha Ghrita***
11.	***Tiktadya Ghrita***
12.	***Cordia macleodii ghrita***
13.	***Karanja Ghrita***
14.	***Daruharidra Ghrita***
15.	***Udumbara-Siddha Ghrita***

The principle of preparation is the protracted boiling of ghee with prescribed kashayas (decoctions) and kalkas (a fine paste of the drug/drugs) to dehydration or near dehydration thereby affecting the transference of the fat soluble principles to the ghrita, from the drug ingredients or kashayas or swarasas as the case may be according to the formulation.[11]

Therapeutic Potentials of various Ghrita Ayurvedic preparations in wound healing.

Tilvadi Ghrita:

Tilvadi Ghrita (TG) is ghee based herbal formulations claimed to promote wound healing in traditional practices. *Tilvadi Ghrita* is of such polyherbal formulations containing *Glycyrrhiza glabra* Linn. (25%),Sesamum *indicum* Linn. (25%), and *Ghee* (clarified butter: 50%) as its constituents. It belongs to the Panchgavya class of Ayurvedic formulations where ghee is used as a base as well as an active ingredient. TG prepared as per the procedure described in the ancient Ayurvedic literature. For the preparation of TG, The roots of *G.glabra* and seeds of *S.indicum* crushed to obtain fine powder. The powder obtained from *S.indicum* seeds suspended into water and stir continuously to obtain the fine dispersion. Separately clarified butter (ghee) heated in vessel till liquefaction. To liquefied ghee powdered roots of *G.glabra* and dispersion of *S.indicum* added and mixed with constant stirring and mild heating to evaporate the water until a liquid to semisolid consistency is achieved. The entire mixture allowed to cool to get the ghrita formulation.[13]

Durva Ghrita

Durva Ghrita is one of the ghee based formulation that comprises of *Cynodon dactylon* (10%) and Cow's ghee (2.5%) as its principal constituents. Durva Ghrita is a herbal formulation that has a place with the panchgavya class of Ayurvedic preparations. Panchgavya refers to the five significant products of bovine origin viz. milk, curd, ghee, urine and dung.[14]

Shatadhouta ghrita:

This *ghrita* found to be effective in first phase of burn wound healing. Exact mechanism of its activity may not be possible to suggest, but it can be speculated that *Shatadhouta ghrita* is different form of *ghrita* prepared by washing in water for hundred times. It is an oil water emulsion. The moister value of *Shatadhouta ghrita* was 49%. So changes in wound closure happened after the application of *Shatadhouta ghrita* can be considered as kind of moist wound healing. Over the centuries many publications have pointed out that a moist environment enhances epithelialization in the wound healing process. Controlled experimental and clinical data have in recent times supported the suggestion that a moist environment enhances wound healing in the form of an occlusive dressing compared with a dry environment. The moist environment may provide a medium for cell migration and supporting healing processes. [15]

***Sahasradhouta ghrita*:**

Sahasradhouta ghrita found to be effective in debriding effect in the form of eschar fall. One of main objective of topical application in any wound is debriding effect. In burn wound capillary permeability is greatly increased. Due to this, plasma rich in protein pours out continuously in large amount. These exudates collect in blisters or begin to form a dry brown crust known as eschar which protects the wound during initial days. Early separation of eschar will help better blood circulation in wound area, as it exerts pressure on the blood vessel. The quality of the eschar reflects in the regeneration of the new epithelium, this may lead to a better

quality of scar formation. The advantage of *Sahasradhouta ghrita* was though the moisture content was less compared to *Shatadhouta ghrita* (29%) it could adhere for more duration over the skin surface. This property could prolong the moisture atmosphere by that eschar which was formed was soft and easy to get separated. So, this *ghrita* can be considered a good base for topical application[15].

Jatyadi Ghrita

In these work author evaluated the wound healing potential of *Jatyadi Ghrita*. In which author selected albino wistar rats having age 6-8 week. Diabetes mellitus was induced by Streptozotocin 65 mg/kg body weight intravenously, wound created by using excision model. Wound diameter and score were recorded on days 1, 2, 3, 5, 7, 9, 12, 14 and 15. He was observed that there was no significant difference in diameter and percent change in wound healing as compared to any control. However, clinical score and histopathological changes in *Jatyadi Ghrita* group were improved from the second day of the study as compared to control.[16]

Manjishthadi Ghrita

Manjishthadi Ghrita was evaluated in Vrana Ropana patients. Author was prepared manjishthadi ghrita with the help of different drugs having vrana ropana effects and was evaluated clinically for its healing properties. *Manjishthadi Ghrita* was used topically in postoperative wounds. To evaluate wound healing activity of formulation he was selected 45 patients. The follow-up period was 1 month to observe the healing as well as vaikritapaham (reduced deformity) properties and any untoward effects of the drug. Arandomized control clinical trial was done. Out of 45 patients, 24 patients in group A were treated with "*Manjishthadi Ghrita*" (treated group), while 21 patients in group B (standard group) treated with povidine iodine ointment. Study concludes that better result was observed in the treated group in comparison to the standard group. No adverse effect was observed in any patient. *Manjishthadi ghrita* can be prescribed as a local healing agent for common wound.[17]

Karpoor Ghrita

Author studied on karpoor ghrita and povidine iodine in sadyo vrana formulation to evaluate effect of '*karpoor ghrita*' in minimizing infections after injury and wound healing potentials of formulations. He selected 60 patients. Patients were divided into two group karpoor *ghrita* dressing and control group 30 patients of povidone- iodine dressing. He found that Clinical parameters like Vedana, Var-na, Akruti, Gandha, were significantly reduced after treatment in Trial group than in control group. Number of Days required for ropan was less in Trial group than that in Control Group. After testing the effectiveness of Karpoor ghrita treatment against the standard Betadine Treatment, results showed that The Karpoor ghrita treatment has better results than the standard Betadine in Sadyovrana Patients[18].

Karanjadhya Ghrita:

Author worked on randomized controlled clinical study of *karanjadhya ghrita* in the management of Dushta Vrana (chronic wounds). *Karanjadhya Ghrita* was prepared using the standardization procedure the effects were studied on 40 patients with chronic wounds (wounds more than 3 weeks old) selected from Outpatient and inpatient department of department of Shalya Tantra, National Institute of Ayurveda, Jaipur. The patients were divided into two groups – Group A (*Karanjadhya Ghrita* dressing) and Group B (Hydrogen peroxide and EUSOL and dry Gauze bandage). He was found Chronic Wound the size was decreased 69.23% which was statistically highly significant. There was considerable improvement (> 80 %) in swelling and unhealthy margin. Pain, tenderness, discharge and unhealthy granulation tissue showed moderate effect (between 60 to 70 percent) in the chronic wounds.[19]

Jati Kalpa Ghrita:

Author evaluated the wound healing activity of Jati Kalpa Ghrita formulation in albino wistar rats. For these groups of herbs having healing property was combined and a ghee based herbal formulation called "*Jati kalpa ghrita*" was prepared. Formulation was evaluated for wound healing activity in excision wound model. He found significant wound healing activity was observed in *Jati Kalpa Ghrita* and RS treated groups in comparison to control group. Control group also have shown marked wound healing activity. The *Jati Kalpa Ghrita* treated group showed 100 percent wound contraction on 18th day and is better than that of RS treated group. *Jati Kalpa Ghrita* is having potent wound healing activity.[20]

Manjishthasiddha Ghrita

In this work author selected 60 patients and divided into two group experimental group-30 patients had local application of *Manjishthasiddha Ghrita* and Control group-30 patients had local application of Silver Sulfadiazine. Experimental Group-30 patients had local application of *Manjishthasiddha Ghrita* for 15 days daily. Control Group-30 patients had local application of Silver Sulfadiazine for 15 days daily. Author found change of color of burn wound into normal skin color and burning sensation were reduced better and significantly by local application of Experimental Group than Control Group.[21]

Tiktadya Ghrita

Author reported case a 45 years old man with non healing wounds over right heel of foot along with maggots since eight weeks. Author managed this case by Prakshalana of Panchvalkal Kwatha and Local application of *Tiktadya Ghrita*. With this treatment wounds got completely free from maggots and unhealthy condition of wound totally resolved without any complications and side effects.[22]

Shikari ghrita (Cordia macleodii ghrita)

In this study 20 patients with classical signs and symptoms of shuddha vrana (fresh wound) were selected. These patients randomly divided into two groups, one group was managed with *Cordia macleodii ghrita* and control group was treated with Povidone Iodine as local application, for duration of 21 days. The effect of drug on sign and symptoms was assessed at 7th, 14th and 21st days. Author concluded that *C.macleodii ghrita* showed highly significant effect on 21st day of observation while the standard drug i.e. Povidone Iodine show highly significant effect on all observational periods in all parameters. [23]

Medicated cow ghee/ ghrita

In a case study on a wound in a buffalo which did not respond to variable treatment that ranges from simple herbal preparation like turmeric to modern medicines (antibiotics) responded very well to the treatment by a formulation containing cow's ghee. Cow's ghee has been reported to exert significant wound healing activity. Its antifungal activity has also been shown to be independent of any antibiotic or antifungal agent, which may be included into the formulation. Ghee contains several saturated and unsaturated fatty acids which are capable of taking part in metabolic processes involved in any wound healing. It seems therefore worthwhile that the cow's ghee is explored further

as an effective clinical agent. A study of wound healing activity of preparation containing *Aegle marmelos* leaves and cow ghee showed enhanced and rapid healing. The effects produced by topical application of combination of *Aegle marmelos* leaves extract and cow ghee with reference to wound contraction, wound closure, decrease in surface area of wound and tissue regeneration at the wound site were studied. The wound healing activity was found to significant as the wound was healed completely in eight days.

In a study to evaluate the cow ghee containing formulation of *Aloe Vera* for wound healing potential, histological examinations revealed good keratinization, epithelization, fibrosis and collagenation indicative of good healing process. The results were comparable with Framycetin sulphate cream (1% w/w). Incision wound for tensile strength, excision wound contraction and histological observations of regenerated tissues were used to investigate the healing potential of the formulation.[24]

Health benefits of Ghrita

- Increases Digestion
- Enhances the absorption of nutrients.
- Enhances the healing properties of herbs.
- Heals the intestinal wall
- Reduces the risk of colon cancer
- Lubricates the body, externally and internally
- Promotes the elimination of toxins stored in the body
- Essential for rejuvenation therapy
- Nourishes the brain and nervous system
- Powerful anti-inflammatory properties.

Conclusion:

As *vranaropaka* is still today an important consideration for humans as it was since times of old, now within the context of modern academia and our growing obsession with being overly hygienic, I believe, this topic can be a significant platform for a global wakeup call of which *Ayurveda* has an advantage and can clear a pathway for the integration of ancient wisdom as is suggested in this material. This review includes the polyherbal Ghritas or Ghee based formulations that are widely employed in the management of wound healing.

This study concludes that ghrita formulations possess a tremendous pharmacological and therapeutic potential in wound healing. The reason behind the use of these cow derived products by the Indian civilization since a long time is justified from the research findings of various experimental studies on both human beings and animals.

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