

Review Article

Marham-i-Raal: a natural multifaceted formulation for enhanced wound healing

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ABSTRACT

A wound is a disruption in the skin's or mucous membrane's integrity caused by mechanical, chemical, or thermal injuries. The wound healing is complex and involves three overlapping stages: inflammation, proliferation, and tissue remodeling. The duration of healing of a wound can vary, and several factors may influence this process, potentially leading to delays or suboptimal healing outcomes. To address wounds and facilitate healing, various topical and systemic treatments, including antiseptics, antibiotics, antifungal, and analgesics, are utilized. In Unani System of Medicine wound is described as 'Tafarruq-i-Ittiṣāl' (loss of continuity) called 'Jarāḥat'. *Marham-i-Raal* is in use for centuries and has wonderful effects in *Qurūḥ-i-Muzmina* (chronic wounds), *Qurūḥ-i-Jarāḥiyya* (surgical wounds), *Shiqāq al-Maq'ad* (fissure in ano) and in other skin conditions like- *Nār Fārsī* (eczema), and *Qūbā* (dermatophytosis). It is valued for its effectiveness, affordability, and minimal side effects. This potent remedy is particularly beneficial for chronic ulcers, providing intensive and rapid therapeutic responses. This review explores the properties of *Marham-i-Raal* based on classical Unani literature and contemporary scientific research. An in-depth examination of research articles and significant scientific data from sources such as Google Scholar, PubMed, and ResearchGate was conducted. The findings indicated that *Marham-i-Raal* is a highly effective and safe wound healing preparation with potent desloughing, antimicrobial, antiviral, antiseptic, and antifungal properties.

Keywords: Chronic wounds, Ulcers, Wound infection, Wound remodeling, Marham-i-Raal

INTRODUCTION

Wound is any discontinuity in the skin's structure. It has been described as "normal anatomical structure and functional disturbance". Edwin Smith Papyrus first mentioned wounds in 1700 BC.¹ Depending upon the exposure to external environment wounds have been classified as the following: *open wounds*: when the skin layer is broken, exposing the underlying tissue known as open wounds, which included incised, lacerated, puncture, penetrating and crushed wounds.² *Closed wounds*, when there is no visible break in the skin but there is injury to the underlying tissue such as contusion and hematoma.² As

per the duration of healing, they have been classified as *acute wounds*: those that repair on their own and proceed according to systematic healing process, resulting in the restoration of both function and anatomical structure. *Chronic wounds*, those that cannot heal normally and cannot be properly organized manner.¹ Classification on the basis of depth of the wound - *superficial wounds*: these are indicated by an injury that affects only the uppermost layer of skin.² *Partially thickness wounds*: passing through the epidermis and into the dermis while the dermis is still at least partially intact that create new epidermis. *Full thickness wounds*: might reveal bone, muscle, tendon, or

fatty tissue as it totally penetrates the skin to the underlying structures.¹

In Unani system of Medicine, Wound is described as 'Tafarruq al-Ittiṣāl (loss of continuity) of skin or flesh called 'Jarāḥat'.³⁻⁸ If Jarāḥat is with peep/sadeed (suppuration) it is called Qarḥa (ulcer).^{3,4,6-8} In Unani medicine, wounds are classified based on clinical characteristics, including the presence or absence of sepsis, the type of inflammation, the occurrence of maggots, the presence of burns, and the overall severity.⁹ There are numerous reasons like waram (inflammation), Fasād-i-Mizāj (altered temperament), Qilla al-Dam (anemia), Dam Ghayr Ṭabī'ī (abnormal sanguine), mail (filth), Ufūnat (sepsis), used improper medicines, and the presence of bone fragments in the wound that delay to heal wounds.^{10,11}

Source of the study

This review is based on an extensive analysis of both classical Unani literature and contemporary scientific studies. Classical texts, such as *Tibb-i-Akbar*, *Qarabadeen Majeedi*, and *Khazain-ul-Advia*, were thoroughly examined to understand the traditional formulations and therapeutic principles of *Marham-i-Raal*. To integrate modern perspectives, electronic databases including PubMed, Google Scholar, and ResearchGate were searched for relevant scientific articles using keywords such as "chronic wounds", "chronic ulcers", "*Marham-i-Raal*", and "wound healing". Inclusion criteria focused on studies reporting antimicrobial, anti-inflammatory, and wound-healing properties of the formulation and its individual components. Additionally, recent clinical trials, quality control assessments, and experimental studies involving *Marham-i-Raal* were reviewed to evaluate its efficacy and safety. The synthesis of traditional and modern insights highlights the potential of this Herbo-Animal formulation in chronic wound management.

MECHANISM OF WOUND HEALING

The term "healing" refers to the replacement of damaged tissue with healthy tissue.¹² Wound healing is a complex physiological process comprising three overlapping phases: inflammation, proliferation, and remodeling.^{13,14} *Inflammation* begins with the damage to blood vessels and the activation of the homeostatic cascade.¹³ This cascade forms a physical barrier at the wound site through coagulation, leading to the deposition of fibrin and thrombin, which halts bleeding typically within a few hours.⁹ Inflammatory mediators, such as histamine, granulocytes, and platelets, are released, increasing capillary permeability. Prostaglandins and kinins attract white blood cells and fibroblasts to the site. During the initial 48 hours, polymorphonuclear (PMN) leukocytes dominate, clearing dead and necrotic tissue.¹⁵ *Proliferation* begins with the formation of granulation

tissue.¹⁶ Monocytes, which act as specialized scavengers, proliferate as PMN leukocytes decrease. By days 5 to 6, fibroblasts appear, producing protocollagen, which is then converted into collagen by protocollagen hydroxylase.¹⁵ Epithelialization starts from the wound margins, and wound contraction generally begins around days 10 to 12, with the cutaneous surface becoming keratinized. However, the timing can vary based on the patient's overall health and wound severity.¹³ *Remodeling* starts around 2-3 weeks after injury, as the collagen and extracellular matrix are refined. This phase involves the smoothing of collagen, with type I collagen fibrils becoming more cross-linked and stronger, leading to the formation of a scar known as cicatrization.¹⁶ Effective wound care is costly and complex. Proper management involves an initial assessment of the patient's condition and wound. Essential steps include cleaning the wound to remove microorganisms, dead tissue, and foreign bodies, often using a bacitracin solution. Debridement, the removal of non-viable tissue, is crucial for promoting healing.² Wound bed preparation and appropriate dressings are also important.¹

The wound healing can be accelerated by approximating the wound margins, applying desiccants, and consuming gelatin-rich foods. Key principles for wound treatment include: achieving hemostasis; encouraging healing through proper diet and medication; preventing infection and decay. Priority should be given to hemostasis.⁷ For chronic wounds, such as ulcers, maintaining dryness is essential. Astringents may suffice for clean ulcers, while caustics or cautery may be necessary for more severe cases. Medications that promote granulation tissue growth should be used along with suitable diet,⁷ and tissue debridement is often recommended.^{10,11}

Contemporary medical practices and Unani medicine often intersect in their approaches to wound management. *Marham-i-Raal*, a notable compound formulation of the Unani medicine has shown significant efficacy in treating persistent ulcers.¹⁷⁻²¹ This formulation supports wound healing by encouraging the development of new, healthy tissue while removing necrotic material. Additionally, it facilitates prolonged epithelialization, which helps in wound contraction and overall repair.¹⁸

MARHAM-I-RAAL AND ITS WOUND HEALING PROPERTIES

Marham-i-Raal aids at pathophysiological level. It has wonderful *Dāfi* '-i- 'Ufūnat (antiseptic), *Indimāl-i-Jarāḥat* (wound healing) and, *Inbāt-i-Laḥm* (formation of flesh) properties. It removes the devitalised tissue.^{22,23} It is useful in all types of wounds (acute and chronic).^{20,24-26} It is indicated for *Qurūḥ-i-Ātshak* (syphilitic ulcer), *Nawāṣīr* (fistula), *Qurūḥ-i-Anf* (nasal ulcer) and *Qarḥa 'Asīr al-Indimāl* (non-healing ulcer).^{22-24,26-28}

Table 1: Recent scientific study on *Marham-i-Raal*.

S. no.	Study	Publication	Objective	Design and participant	Key findings
1	Comparison with povidone iodine ¹⁹	Ahmad et al, 2023	Compare <i>Marham-i-Raal</i> with povidone iodine in non-healing ulcers	45 Participants, randomized into two groups: <i>Marham-i-Raal</i> and betadine	Granulation (%): <i>Marham-i-Raal</i> 99.74±1.34 versus betadine 74.30±36.31; Epithelialization (%): <i>Marham-i-Raal</i> 85.20±28.47 versus betadine 59.49±32.83; Surface area (cm ²): <i>Marham-i-Raal</i> 8.94±24.98 versus betadine 21.28±47.35; Depth(cm): <i>Marham-i-Raal</i> 0.037±0.11 versus betadine 0.30±0.45; Tenderness score (median): <i>Marham-i-Raal</i> 0 versus betadine 1 at 45 days; Significance: <i>Marham-i-Raal</i> showed superior efficacy (p<0.05)
2	Wound contraction in rats ²⁹	Mokhtar et al, 2014	Assess wound contraction and epithelialization in albino rats	Controlled study with <i>Marham-i-Raal</i> versus framycetin sulfate 1% cream	Wound contraction (%): <i>Marham-i-Raal</i> 98.93% versus control 90.3% (p<0.01); Epithelialization duration (days): <i>Marham-i-Raal</i> 16.00±0.36 versus control 21.33±0.21 (p<0.01)
3	Quality control and antimicrobial properties ³⁰	Ansari et al, 2023	Evaluate quality control, antimicrobial, and antioxidant properties of <i>Marham-i-Raal</i>	Laboratory-based antimicrobial and antioxidant testing	Antimicrobial activity: effective against Gram-positive bacteria and <i>Candida albicans</i> ; Antioxidant activity: notable at higher concentrations compared to DPPH and ABTS assays

DPPH: 2,2-diphenyl-1-picrylhydrazyl, ABTS: 2,2'-azino-bis (3-ethylbenzothiazoline-6-sulphonic acid)

Table 2: Ingredients involved in the preparation of *Marham-i-Raal* according to *Qarabadeen-e-Majeedi*.²⁰

S. no.	Ingredients	Quantity (grams)
1	Raal (<i>Vateria indica</i> linn)	50
2	Kafoor (<i>Cinnamomum camphora</i>)	50
3	Kath (<i>Acacia catechu</i>)	50
4	Mom (<i>Beeswax</i>)	50
5	Ghee (<i>Clarified butter</i>)	200

Table 3: Overview of *Marham-i-Raal* constituents: parts used, temperament, actions, uses, and phytoconstituent studies.

S. no.	Drug (botanical name)	Parts used	Temperament	Action and uses	Phytoconstituents
1	Raal (<i>Vateria indica</i> linn)	Gum-resin ^{31,32}	Hot and dry (third degree) ^{18,31,32}	Anti-inflammatory, detergent, wound healer, sedative, vision strength, desiccant; used in wounds, splenitis, syphilis, wet itch dermatophytosis, burn and fistula. ^{31,32}	Chalcone, alkaloids, terpenoids, glycosides; bergenin, phenol; resveratrol, viniferin and hopephenol, flavonoids and tannin. ^{18,29}
2	Kafoor (<i>Cinnamomum camphora</i>)	White crystalline substance ^{18,33}	Cold and dry (third degree) <i>Murakkab-ul Quwa</i> ³¹⁻³³	Anti-tubercular, exhilarant, heart and brain tonic, sedative, analgesic, haemostatic, hypnotic, anti-inflammatory, wound healer, expectorant, anti-cough, diaphoretic, anthelmintic, antidot, stimulant, rubefacient, antiseptic, carminative, anti-convulsant, local anaesthetic, anti-diarrheal; used in back pain,	Glycerides and flavonoids; tannin, saponin, alkaloids, Camphor, linalool, borneol, camphene, di pentene, terpineol, safrole and cineole, α and β-caryophyllene, germacrene D, bicyclogermacrene, nerolidol, spathulenol, and α-atlantone,

Continued.

S. no.	Drug (botanical name)	Parts used	Temperament	Action and uses	Phytoconstituents
				pleurisy, pneumonia, itching, toothache, epistaxis, tuberculosis, chronic cough, acute wounds, earache, convulsion, and scorpion poison. ³¹⁻³⁴	methyl isobutyl ketone, pinene (α and β), α -thujene, α -phellandrene, hexanal, 3-hexanal-1-ol, 1-hexanol and sabinene. ^{18,29,34}
3	Kath (<i>Acacia catechu</i>)	Dry extract ^{31,33,35}	Cold and dry (second degree) ³¹	Astringent, blood purifier, siccative, anthelmintic; used in stomatitis, uvuloptosis, bleeding gums, impurities of blood, syphilis, ulcers. ^{31,33,35}	Flavonoids; tannin, glycoside, kaempferol, quercetin, catechin, and terpene; camphor and phytol. ^{18,29}
4	Mom (<i>Beeswax/Cera alba</i>)	Wax	<i>Motadil</i> , hot and wet ³¹⁻³³	Anti-inflammatory, laxative, pain sedative, nerves aperient, antidote, diuretic, wounds healer, siccative, anti-pruritic, anti-scabies; used in dry cough, arthralgia, chest pain, piles, wounds, itching, and scabies. ^{31-33,35,36}	Esters of fatty acids, various long-chain alcohols; palmitoleate, and esters of long-chain (30-32 carbons) aliphatic alcohol, triacontanyl palmitate to cerolic acid and diesters, and exogenous substances. ^{18,29,36}
5	Ghee (<i>Clarified butter</i>)	Ghee	Hot and wet (first degree); hot and wet (third degree) ^{31,32,37}	Cleansing of morbid, matter/humour from brain, fattening/ anabolic, laxative, de-obstruent, anti-cough, exhilarant, brain tonic, antidote, bile sedative, carminative, aphrodisiac, antiseptic, anti-inflammatory, sedative, emollient, wound healer; used in dryness of skin, nostrils and throat, dry cough, jaundice, wounds, itching, piles, constipation, general debility, flatulence. ^{31,32,37,38}	Volatile acids and mixture of glycerides; butyric acid, caproic acid, caprylic acid, capric/decanoic, lauric/dodecanoic, myristic/tetradecanoic, palmitic/hexadecanoic, stearic/octadecanoic, linoleic/octadecadienoic acids. ^{29,38}

Method of preparation

First grind the *Raal* (*Vateria indica* linn) and *Kath* (*Acacia catechu*) finely and sieve it through the 100 NO. mesh. Then crush (*Kharal*) the *Kafoor* (*Cinnamomum camphora*) with some powder safely. Add the ghee (*clarified butter*) and mom (*Beeswax*) in a pan put it on fire and keep it. When the mom melts take it down from the fire and mix the medicated powdered in lukewarm mixture of ghee and mom. Mix it well and store in a jar.²⁰

Method of administration

Marham-i-Raal is a topical ointment used exclusively for external application. First, cleanse the wound with a neem leaf decoction, then apply the ointment.^{20,24-26}

DISCUSSION

In Unani Medicine, *Marham-i-Raal* has been widely used as an effective remedy for chronic ulcers and wounds due to its comprehensive therapeutic properties. The formulation incorporates ingredients with unique attributes that synergistically aid in wound healing and microbial infection management. *Vateria indica* serves as a natural cleansing agent, effectively removing pus and

wound exudates, while its anti-parasitic and rubefacient properties make it particularly beneficial for chronic wound care. The presence of monoterpenes, such as bergenin, contributes significantly to its antibacterial activity by inhibiting the growth of several bacterial strains. Camphor, known for its stimulant, antibacterial, and rubefacient qualities, improves local blood circulation through venous dilation, promoting tissue regeneration. Additionally, it provides analgesic and demulcent effects, with its linalool content proving particularly effective against *Staphylococcus aureus* and *Candida albicans*. *Acacia catechu* offers antipruritic benefits and is especially effective for syphilitic ulcers and burns. Its haemostatic properties help control bleeding when applied topically, while its strong astringent and anti-parasitic actions enhance wound healing. Furthermore, compounds such as kaempferol and quercetin within *Acacia catechu* exhibit potent antibacterial, anti-inflammatory, and anticancer effects. Beeswax enhances the penetration of active ingredients into tissues, amplifying the efficacy of the formulation, while ghee provides antifungal and anti-ulcer benefits. The presence of various saturated and unsaturated fatty acids in ghee supports essential metabolic processes involved in wound healing. Collectively, these ingredients contribute to the multifaceted action of *Marham-i-Raal*, offering antimicrobial protection, accelerating tissue regeneration,

and addressing long-standing wounds, ulcers, and skin conditions, thereby solidifying its role as an indispensable preparation in Unani medicine.

CONCLUSION

Marham-i-Raal is a highly effective formulation of wound-healing. Its efficacy can be attributed to the diverse properties of its ingredients, which include antimicrobial, antiseptic, antifungal, antiviral, antioxidant, anti-inflammatory, analgesic, anesthetic, antiparasitic, anti-ulcerogenic, vasodilator, de-sloughing, and wound-healing effects. Scientific studies have shown that these properties collectively enhance its ability to treat acute and chronic wounds. Given the promising results from ingredient studies, it is imperative to conduct extensive scientific research and clinical trials to further validate and expand on *Marham-i-Raal*'s effectiveness in treating chronic cutaneous wounds. Such studies will help in understanding its full potential and optimizing its use in modern wound management practices.

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