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## Review Article

### THE IMPACT OF VARIOUS INDIAN MEDICINAL PLANTS AS A WOUNDS HEALER

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#### ABSTRACT

Many requirements of human beings are fulfilled by the plants. They also prevent and cure various diseases of human beings including wounds and ulcers. Plants and their extracts have immense potential for the management and treatment of wounds. The management of wound has been a major problem since the early stages of medical science. In spite of brilliant progress of in surgery, wound management still remains a subject of speculation. The early manifestation of unsatisfactory wound healing gives rise to serious complications which can lead to prolonged healing and even death in surgical practice. These natural medicines for wound healing are cheap, affordable and purportedly safe as hyper sensitive reactions are rarely encountered with the use of these agents. These natural agents induce healing and regeneration of the lost tissue by multiple mechanisms. However, there is a need for scientific validation, standardization and safety evaluation of plants of the traditional medicine recommended for healing of the wounds.

**KEYWORDS:** *Nimba, Manjistha, Arka, Daruharidra, Vrana* (Wound/Ulcer).

#### INTRODUCTION

The disruption of the cellular and anatomic continuity of a tissue is called as wound. It may be produced by physical, chemical, thermal, microbial or immunological agents. In general, wound healing is a normal and continuous process which may be delayed due to deficiency of certain vitamins, trace elements and proteins.

In *Ayurveda*, the wound (*Vrana*) has been described as a main subject in *Sushruta Samhita* by *Sushruta*, the father of Indian surgery. He has described the wound from its different aspects right from the definition, causes etc. to the treatment of the scar tissues. *Vrana* (wound) is stated as<sup>1</sup>-“*Vrana gatravichurne*” i.e. destruction and discoloration of viable tissue due to various etiology. *Agnivesha* expanded the knowledge of wound and gave its detailed description including classification, sign, symptom, prognosis and thirty six *Upakrama* (essential procedures) for its management<sup>2</sup>.

#### Type of wounds

Ayurveda classifies the *Vrana* into two types-

(a) ***Dushta vrana***<sup>3</sup>: (i.e. chronic wound/Non-healing ulcers) are the contaminated wounds which require specific purification, called *Vrana shodhana*, without which healing cannot be initiated in the wounds.

(b) ***Shuddha vrana***<sup>4</sup>: The cause of such *Vrana* is generally a surgeon's knife & this type of *Vrana* does not require any specific treatment except its protection from various contaminations.

#### Mechanism of wound healing

The wound healing is a natural phenomenon which starts immediately after injury and continues in sequential manner till the formation of a healthy scar. This event is not uniformly present as a rule under different conditions of wound. Certain general factors such as age, nutritional deficiency, hormonal imbalance and various systemic diseases like anaemia, uraemia, jaundice, diabetes etc. and certain local factors like position of skin wound, blood supply, tension, infection, foreign body etc. either alone or in combination influences the normal sequence of wound healing<sup>5</sup>.

Upon injury to the skin, a set of complex biochemical events takes place in a closely orchestrated cascade to repair the damage. The classic model of wound healing is divided into four sequential, yet overlapping phases (1). Haemostasis (2). Inflammatory (3). Proliferative and (4). Remodeling<sup>6</sup>.

The phase of maturation and remodeling is not only complex but fragile and susceptible to interruption or failure leading to the formation of chronic non-healing wounds. Factors which may contribute to this include diabetes, venous or arterial disease, old age, and infection. Delayed wound healing in diabetes is due to microangiopathy, atherosclerosis, and proliferation of bacteria due to high blood sugar<sup>7</sup>.

Healing methods are same in different system of medicine whatever it may be allopath or *Ayurveda* i.e. to protect wound from microorganisms and to increase granulation tissue formation and epithelization.

### Wound healing plants

In *Ayurveda*, many plants having the wound healing properties are described. Out of which, some plants are described below that could prove beneficial in therapeutic practice.

#### ***Nimba (Azadirachta indica A. Juss.)***

In *Ayurveda*, it is indicated in many disorders especially in case of wound<sup>8,9,10</sup>. *Nimba* seed in form of oil is externally applied to wound and it performs good *Ropana* (healing) in *Vrana*<sup>11</sup>. The Bark of *Azadirachta indica* is being used by several Indian tribes as an antifungal, antiseptic, astringent in several skin diseases, boils and blisters, eczema etc. from centuries<sup>12</sup>. Modern scientific research has proved it to be anti-microbial, fungi static, fungicidal, anti-inflammatory, antioxidant, and free radical scavenger, useful in ulcers, infections and skin diseases<sup>13-17</sup>. Bark of *Azadirachta indica* contains polyphenols which are well known powerful antioxidants that scavenge free radicals, promote dermal fibrosis and improve wound healing and acts as an anti-inflammatory reagent<sup>18-20</sup>.

#### ***Manjistha (Rubia cordifolia Linn.)***

According to *Charaka*, *Manjistha churna* & its *Kwatha* are better for *Shodhana karma*<sup>21</sup>. The root of *Manjistha* is sweet, bitter, astringent, thermogenic, anti-inflammatory, anodyne, antiseptic, digestive, carminative, antidysentric and diuretic etc. and useful in leprosy, skin diseases, leucoderma, pruritus, wounds, ulcers etc<sup>22</sup>. It is considered to be traditionally useful as

an external application in inflammations, ulcers and skin diseases<sup>23,24</sup>. The methanolic extract of *R. cordifolia* has anticancer activity<sup>25</sup>. The triterpenes isolated from petroleum ether extracts of *R. cordifolia* possess anticonvulsant property<sup>26</sup>. The ethanolic extract of *R. cordifolia* has lipoxygenase inhibitory activity and its ethyl acetate fraction is most potent in this regard<sup>27</sup>.

#### ***Haridra (Curcuma longa Linn.)***

The paste of *Haridra* along with *Daruharidra*, *Yashtimadhu*, leaves of nimbi etc. purify the wounds<sup>28</sup> while Sushruta has clearly said that it is good for *Sadyovrana ropana*<sup>29</sup>. Its wound healing, anti-inflammatory and antimutagenic activities have been convincingly demonstrated<sup>30</sup>. The part used are rhizomes and it contains curcumin, turmeric oil or turmerol. Curcumin has potent anti-inflammatory and analgesic activities<sup>31</sup>.

#### ***Arka (Calotropis procera (Ait.) R. Br.)***

Its leaves are used to cover wound<sup>32</sup>. According to *Sahasrayoga*, oil cooked with latex of *Snuhi* and *Arka* along with bee wax heals chronic ulcers<sup>33</sup>. Its latex has been reported to possess wound healing activity<sup>34</sup> as well as antimicrobial activity<sup>35</sup>. As an antioxidant and anti-diabetic agent, its dry latex efficacy was comparable with the standard antidiabetic drug, glibenclamide<sup>36</sup> which indicates its usefulness in cases of delayed wound healing as seen in diabetes mellitus.

#### ***Daruharidra (Berberis aristata Dc.)***

The oil made from juice of *Durva* along with the paste of bark of *Daruharidra* is an efficacious remedy for wound healing<sup>37</sup>. In wounds, oil cooked with *Daruharidra*, *Vidanga* and *Kampillaka* is useful<sup>38</sup>. Its active principle is berberine which is shown to be active against variety of microorganisms like bacteria, viruses, fungi, protozoa, helminthes and chlamydia<sup>39</sup>. Antipruritic, antipyretic, antihypertensive and pigment inducing activity have been reported with berberine<sup>40</sup>.

### Other plants useful in wound

In *Ayurveda*, there are so many plants described for wound cleaning, wound healing, wound bursting, wound suppressing etc. These plants are used either singly or along with different other plants. Example are *Ingudi (Balanites roxburghii Planch.)*, oil of which is useful in chronic and dirty wounds<sup>41</sup>, *Kadali (Musa paradisiaca Linn.)*, the mature and clean leaves of which remove the hidden pus from wound and favouring wound healing<sup>42</sup>, *Kampillaka (Mallotus*

*philippinensis* Muel-Arg.), the oil made from juice of *Kampillaka* along with the paste of bark of *Daruharidra* is an efficacious remedy for wound healing<sup>43</sup>, *Lajjalu* (*Mimosa pudica* Linn.) which is mixed with *Chandan*, *Kamal* and other plants and used to heal the wound<sup>44</sup>, *Aguru* (*Aquilaria agallocha* Roxb.), the oil of which (along with the oil of other plants) is useful in chronic ulcers, worms and skin disorders<sup>45</sup>.

Above mentioned plants are just some examples of wound healers. *Ayurveda* describes many other plants which are useful in wound like *Tulasi* (*Ocimum sanctum* Linn.), *Kumari* (*Aloe vera* Tourn ex Linn.), *Vata* (*Ficus begalensis* Linn.), *Gular* (*Ficus glomerata* Roxb.), *Ashwattha* (*Ficus religiosa* Linn.), *Kadamba* (*Anthocephalis indicus* Miq.), *Plaksha* (*Ficus lacor* Buch-Ham.), *Vetasa* (*Salix caprea* Linn.), *Karvira* (*Nerium indicum* Mill.), *Kutaja* (*Holarrhena antidysenterica* (Linn.) Wall.), *Snuhi* (*Euphorbia nerrifolia* Linn.), *Chandana* (*Santalum album* Linn.), *Kamala* (*Nelumbo nucifera* Gartn.), *Dhataki* (*Woodfordia fruticosa* Kurz.), *Khadir* (*Acacia catechu* Linn.), *Priyangu* (*Callicarpa macrophylla* Vahl.), *Lodhra* (*Symplocos racemosa* Roxb.), *Yashtimadhu* (*Glycyrrhiza glabra* Linn.) etc.

## CONCLUSION

Wound healing is a normal physiological phenomenon starting just after injury but factors like nutritional deficiency, hormonal imbalance, systemic diseases and local factors such as infections, hematoma, and foreign body etc. delays normal healing resulting into non-healing ulcer. Plants and their extracts have immense potential for the management and treatment of the wounds. The wound healing through plants are cheap, affordable and safe as hyper sensitivity reactions are very rare. These natural agents induce healing and regeneration of the lost tissue by multiple mechanisms. However, there is a need for scientific validation, standardization and safety evaluation of these traditional medicinal plants before these could be recommended for healing of the wounds.

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