

SCAR REMODELING CONCEPTS AND TECHNIQUES OF AYURVEDA W.S.R. TO VAIKRITAPAHAM

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ABSTRACT

Ugly looking scars have been always a major concern for the mankind. Various techniques for its management are presently available. Many ultra modern techniques such as laser, gel, ointment etc are prescribed by dermatologists now days. Naturopathy, acupressure, acupuncture therapists are also using various methods to minimize scar. This study was conducted to understand the present trend in this field and to explore the new possibilities in *ayurveda* to handle this issue in a more healthy and natural way.

KEYWORDS Scar remodeling, wound healing, *Vaikritapaham*

INTRODUCTION

Scar is an ultimate result of a wound. Sometimes, it may be so ugly that a person needs medical or surgical consultation for this problem. In modern science, so many cosmetic techniques have been discovered for this purpose. But still there are many challenges in this field.

Ayurveda, is the science of health which deals human being and their problems in a natural way. This science is growing and exploring day by day to beat the challenges of the modern medical technology. Scar management is one of the biggest problems for skin specialists and plastic surgeons. *Ayurveda* professionals also have not much explored this vast knowledge about scar management through their specialty. This article is written to look over the new possibilities of scar management through *ayurveda*.

AIMS AND OBJECTIVES

1. Describe the phases of wound healing as per the *ayurveda* and modern medical science.
2. Understand the goals of scar management.
3. Understand how to apply *ayurveda* concepts and techniques to minimize scar marks.

METHODOLOGY

Review of relevant *ayurvedic* and modern literature available in books and on internet was done in order to achieve the objective of this study. Research papers of last ten years were taken into consideration for the modern aspect. Relevant part of *Charaka* and *Sushruta samhita* in this context was selected and correlated with scientific ideas.

SCAR FORMATION

Wound healing has mainly three overlapping phases: Inflammation, proliferation, and remodeling. Inflammation starts with disruption in capillaries and bringing of hemostatic cascade. By 4 to 5 days, the second stage of healing, proliferation takes place with the migration of fibroblasts into the wound matrix. The proliferative phase is characterized by epithelialization, formation of granulation tissue, neovascularization, wound contraction, and extracellular-matrix reorganization¹. The fibroblasts are maximally up-regulated in 2 to 4 weeks and replace the fibrin with a more robust matrix of collagen fibers. The initial elastic fiber network is no longer observed in the mature wound, and due to which the firmness and absence of elasticity of scars present in later condition. The third and final stage in wound healing is the **remodeling phase**, which generally begins after 3 weeks of tissue injury. In microscopic findings of this stage, decreases in fibroblast count, hardening of collagen fibers, and occlusion of blood vessels is found. Continuous collagen production and degradation has an effect of remodeling the mature wound matrix for approximately 6 months post injury. The remodeling phase is the most accountable for variations in scar qualities. A healing wound can become an unsightly scar during this period. As the wound closes and evolves into a scar, there are important processes: myofibroblast disappearance, the synthesis of extracellular matrix, and replacement with a collagenous matrix. However, deregulation of these apoptotic phenomena during wound healing is an important cause of excessive scar formation and development of pathological scarring².

SCAR MANAGEMENT

There are various modalities which can be considered as a measure to minimize the scar formation or even reduce or to vanish the scar.

- 1. Moist exposed burn ointment:** It contains six herbal extracts, including b-sitosterol as the active ingredient and sesame oil as an inactive ingredient³. It is believed to act by increasing tissue moisture, resulting in decreased vascular activity and, therefore, preventing vascular overgrowth and scar hypertrophy⁴.

2. **Silicone gel sheeting:** Topical silicone gel sheeting has been an effective treatment for scars and keloids. It is believed to increase occlusion and hydration of wounds and decrease capillary activity, hyperemia, and collagen deposition, with resultant improvement in scar appearance⁵.
3. **Massage therapy:** Massage therapy, regularly utilized for the treatment of burns and scars, is a simple regimen with minimal, if any, potential downside⁴.
4. **Contractubex gel:** Contractubexgel (Merz Pharma, Frankfurt, Germany) is a mixture of 10% onion extract, 50 U heparin per gram, and 1% allantoin⁶.
5. Topical vitamin E
6. Topical calcipotriol
7. Topical tretinoin
8. **Imiquimod. Topical:** 5% imiquimod has been utilized for the treatment of hypertrophic scars and keloids. It is believed to act via the induction of interferons, which leads to collagen breakdown⁷.
9. **Mederma.** Mederma (Merz Pharmaceuticals, Greensboro, NC, USA) is a mixture of avobenzone 3%, octocrylene 10%, oxybenzone 6%, water and allium cepa (onion) bulb extract. A split-scar study compared Mederma cream with petrolatum ointment in patients undergoing Mohs or excisional surgery. The results did not demonstrate any advantages of Mederma over petrolatum in improving scar appearance or symptoms⁸.
10. **Pulsed dye laser.** The 585 nm and 595 nm pulsed dye laser (PDL) selectively targets oxyhemoglobin, which may reduce the local microcirculation, which in turn impairs the proliferation of fibroblasts, resulting in a decrease in hypertrophic scar formation⁴.
11. **Non-ablative fractional Er:glass**
12. **Diode.** Capon et al. developed a novel 810 nm diode laser for use in the immediate postoperative period⁹.
13. Frequency doubled Nd:YAG
14. Er:YAG laser
15. Non-ablative fractional laser
16. Fractionated carbon dioxide
17. Radiofrequency
18. **Avotermin:** Avotermin is a human recombinant TGF- β 3 medication designed for scar reduction.
19. **Botulinum toxin type A**
20. **Antimitotic drugs.** Blocking any phase of mitosis results in cessation of cell proliferation and initiation of apoptosis. The current antimitotic medications, which are used for hypertrophic scars, include corticosteroids, 5-fluorouracil (5-FU), bleomycin, and mitomycin C.
21. **Fat injection**

22. **Mesenchymal Stem Cell Therapy**

23. Interferon

24. Transforming Growth Factor- β

25. **Pressure therapy:** Cutaneous wound compression has been used not only for prevention, but also for treatment of hypertrophic scars and keloids. Although pressure therapy reduces the subjective and objective signs and symptoms of hypertrophic scars and keloids, the scientific evidence supporting their use is weak, and their clinical efficacy is also controversial¹⁰.

26. Tension-Free Primary Closure

27. **Scar revision:**

- Beak-plasty
- “W-plasty” and geometric broken line closure
- V-Y and Y-V advancement flaps
- Dermal tube
- Dermabrasion

1. **AYURVEDIC CONCEPT OF WOUND HEALING:** The concept of wound healing is well explained by *Acharya Charak, Sushruta* and *vagbhata*. Scar has been termed as ***Vrana vastu***, and it is said to be remain as continued till whole life¹¹. Their classification system is counterpart of modern classification. Three stages of wound healing are mentioned.

2. ***Shuddha Vrana*** : An ulcer (*vrana*) which is of the same color with the back of the tongue, soft, glossy, smooth, painless, well shaped and marked by the absence of any kind of secretions whatsoever, is called a clean ulcer (*shuddha vrana*)¹². An ulcer (*vrana*) which is free from any *doshaj* vicar i.e. *vata, pitta and kapha*, having blackish brown margin, free from slough, normal contour, mild painful and having no discharges can be considered as *shuddh vrana*¹³.

3. ***Ruhyamaan vrana***: *Vrana*, which has grayish pigeon like colour, having no discharge and with good amount of granulation tissue, is known as *ruhyamaan vrana*¹⁴.

4. ***udh Vrana***: An ulcer whose margins are healed, free from any nodular swellings, no oedema, no pain, having normal skin colour and normal contour is called *samyag rudh vrana*¹⁵.

AYURVEDIC CONCEPT OF SCAR MANAGEMENT

The tissue repair and wound healing is a very important aspect of *shalya tantra*. The contents of *Sushruta samhita* are focused on *Vrana* and *vrana ropana* and many portions of *sumhita* are highlighting the essence of wound healing.

Sushruta has given sixty types of treatment modalities for wound care, known as *shashthi upkrama*. *Shashthi upkram* has been described in a very scientific manner and a sequence of therapies has been maintained for stepwise conditions of wound healing.

Vaikrita paham is a special type of care which is given in the last stage of wound healing for the purpose of scar remodeling. *Vaikritapaham* as described by *sushruta* is of five types.

Vaikritapaham



Krishna Karma: The blackening of a white cicatrix, which is the poor result of bad granulation, should be made by this method. *Bhallatak* seeds soaked in cow urine and then dried in sun light repeatedly for one week. Then put them in a pitcher filled with milk for one more week. Now obtain the oil from these seeds. The hoofs of *anup* and *gramya* animals should be burnt and pounded together into extremely fine powder. Now mix this powder with *bhallatak* oil and apply over white cicatrix¹⁶.

Pandu Karma: The natural and healthy colour (*pandu*) of the surrounding skin should be imparted to a cicatrix which has assumed a black colour owing to the defective or faulty healing in the following manner. The fruits of *rohini* should be immersed in goats' milk for seven nights and afterward finally pasted with the same milk, should be applied to the skin.

Powder of new earthen pot, *vetas* roots, *shal* roots, *kasis*, and *madhu yashti* pasted together with honey may be used.

The hollow rind of *kapitth* fruit, from which the pulp has been removed should be filled with the urine of goat together with *kasisa*, *rochana*, *tuttha*, *hartal*, *manahshila*, scrapings of raw bamboo skin, *prapunnad*, and *rasanjana* are buried a month beneath the roots of *arjuna* tree after which it should be taken out and applied to the black or hyper-pigmented cicatrix¹⁷.

Pratisarana (Rubbing): The shell of hen's egg, *katak*, *madhuk*, sea-oyster, crystals(pearl according to *Jejjata* and *Brahmdev*) taken in equal parts should be pounded and pasted with the urine of cow and made into boluses which should be rubbed over the cicatrix¹⁸.

Rom-sanjanana: (Hair producers) The burnt ashes of ivory and pure *rasanjana* pounded and pasted with goat milk should be applied to the spot where the appearance of hair is desire. An application of this paste would lead the appearance of hair even on the palm of the hand. Another alternative is the pulverized compound consisting of the burnt ashes of the bones, nails, hairs, skin, hoof, horns, of any quadruped, over the part of the body, previously anointed with the oil, which would lead to the appearance of hair in that area. And lastly the plaster composed of the sulphate of iron, and tender *karanja* leaves pasted with the expressed juice of *kappittha*, would be attended with the same result¹⁹.

Loma-paharan (Hair deplitors): The hairs of the ulcerated part of body found to interfere with the satisfactory healing up of the ulcer, should be shaved with a razor or clipped with the scissors, or rooted out with the help of the forceps. As an alternative, an application of the plaster consisting of the two parts of the pulverized (burnt ashes of) conch shell and one part of *Hartala* pasted with *shukta* over the desired part, would be attended with the same result. A compound made up of oil of *Bhallataka*, mixed with milky exudation of *Snuhi* should be used by intelligent physician as a depilatory measure. As an alternative, burnt ashes of the stem of plantain leaves and *dirghvrinta* (Shyonaka) mixed with the rock salt, *hartala* and seeds of *shami*, pasted with the cold water should be as a good depilatory. A plaster composed of ashes of the domestic lizard, plantain, *haritala* and the seeds of *Ingudi* burnt together and pasted with the oil and water and baked in the sun may also be used for eradicating of the hairs in the affected locality²⁰.

SCAR MANAGEMENT AS PER CHARAKA SAMHITA²¹

Twat Shuddhikara (Skin Purification): *Manahshila, Ela, Manjishtha, Laksha, Rajni dway.*

Twak Trishnkara (For hyperpigmentation of white cicatrix): *Ayorajah, kasis, Tifla kusuman.*

Twak Savarnikaran (For normal colour of skin): *Kaliyak, nata, amrasthi, hem(nagkeshar), kanta(manjishtha), rasottama(parad)* all mixed with cow urine.

Varnakara lepa *Dhyamak(fragrated grass), ashwatth, nichul moola(baint), laksha, gairik, hema, amritasanga, kasis.*

Rom-sanjanan: skin, hairs, hoofs, horn, bones ashes of quadrupeds.

SCAR MANAGEMENT AS PER ASHTANG HRIDAYA²²

Twak Shodhana: *Laksha, manahshila, manjishtha, Hartala, Nisha dway* all pasted with honey and ghee.

Twak Savarnikarana lepa: *Black Agaru, priyangu, amrasthi, nagkeshar, manjishtha, saindhav* all mixed with cow urine.

Rom-sanjanan: 1. *Vaaran dant mashi*

2. Nail, hairs, bones, skin, hoofs, horn, ashes of quadrupeds.

DISCUSSION

If we go in depth, we can find that the basic concept of scar remodeling or *Vaikritapaham* consists of three fundamental steps, i.e. to achieve colour, contour and hair follicles. All these three things are described by *sushruta* step by step in the description of *shashthi upkrama*. Colour of scar is normalized either by *Krishna karma* or *pandu karma*. To get normal colour is the first requirement of cosmetic treatment.

Generally, due to excessive collagen formation scar is indented inside the dermis and loose its normal contour. By massage or by micro-needling or by *pratisaran* the normal contour can be achieved by breaking micro-adhesions present in scar tissue.

Presence or absence of hair follicles can be achieved either by *romsanjanan* or *lomapaharan* respectively. Now days, hair transplantation and permanent hair removal is extremely costly treatments.

CONCLUSION

Scar remodeling is well explained in *ayurvedic* texts. Still, not much research work has been done in this field and it is also very less clinically implemented for patients. The need of *vaikritapaham* was also realized in ancient time and that is why these techniques were described in our *ayurveda granthas*. Vigorous scope of research is present in this field, which should be done on modern scientific parameters.

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