


Review Article
REVIEW STUDY OF POTENTIAL WOUND HEALING PROPERTIES OF PANCHAVALKALA
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ABSTRACT

Break in the continuity of skin is known as wound. Nature has given tremendous natural capacities to human being to heal wounds. The processes of healing get activated immediately after the trauma and continue till the formation of a healthy scar in a sequential manner. This normal response gets disrupted in different conditions like slough, infection, blood supply to the area, presence of foreign bodies, unhygienic treatments, and general factors like nutritional conditions, presence of systemic diseases etc. Wound healing process can be facilitated by natural products with medicinal properties. Many studies on the wound healing properties of natural products with anti-inflammatory, antioxidant, antibacterial and pro-collagen synthesis actions have been conducted. *Panchavalkala* was studied in different forms like gel, decoction, ointment, sanitizer, *Ghanasatwa*, *Taila*, *Ghrita* and cream. In all forms it has proved its efficiency for wound healing. This article is aimed to review and summarize the preclinical and clinical research studies conducted on wound healing activities of *Panchavalkal* in the different forms like extract, gel, ointment, douche, *Kwath* etc. Exciting clinical and preclinical studies found with very good healing property of *Panchavalkala*.

KEYWORDS: *Panchavalkala*, *Vata*, *Udumbara*, *Ashwattha*, *Parisha*, *Plaksha*, Wound, Healing, *Vrana*.

INTRODUCTION

Break in the continuity of skin is known as wound. Nature has given tremendous natural capacities to human being to heal wounds. The processes of healing get activated immediately after the trauma and continue till the formation of a healthy scar in a sequential manner. This normal response gets disrupted in different conditions like slough, infection, blood supply to the area, presence of foreign bodies, unhygienic treatments, and general factors like nutritional conditions, presence of systemic diseases etc. In current surgical practices many treatment modalities are available for healing of wound which includes systemic and local administration of drug like antibiotics, anti-inflammatory drugs, seratio-peptides, local antibiotics, growth factors, collagen dressings etc. Still search for good wound healing property drugs is continued and it may go longer till human brain works on it.

Elaborate description of *Vrana* (wound or ulcer) is available in Ayurvedic texts. *Vrana* means break in the surface of body.^[1] Sushruta has described two types of *Vrana*, *Shuddha* (Non-infected) and *Dushta* (infected).^[2] Going through Ayurvedic *samhitas* about 164 medicinal plants, 24 metals and minerals, and 18 animal products are detailed, for their wound healing activity and these

are termed as *Vranaropaka*, *Vranapaha*, *Vranaya* or wound healing agents.^[3] Referring many Ayurvedic texts in the context of wound healing (*Vrana-Ropana*) *Panchavalkala* seems to be effective.^[4,5]

Panchavalkala^[6] refers to bark of five following plants.

1. *Vata* - *Ficus bengalensis* Linn.
2. *Udumbara*- *Ficus glomerata* Roxb.
3. *Ashwattha*- *Ficus religiosa* Linn.
4. *Parisha* - *Thespesia populnea* Soland. ex Correa.
5. *Plaksha* - *Ficus lecor* Buch. Ham.

It has activities like *Vranaprakshalana*^[7], *Vranaropana*^[8], *Shothahar*^[9], *Upadanshahara*^[10] *Visarpahara*^[11]. *Panchavalkala* are easily available and often used in practice. *Panchavalkala* have *Kashay* and *Sheeta* properties. They are also known as *Vranapaha* i.e. healer of wound.^[12] Many research papers are available in relation to wound healing properties of *Panchavalkala*. This review study is aimed for specific wound healing activity of *Panchavalkala*.

Wound healing process can be facilitated by natural products with medicinal properties. Many studies on the wound healing properties of natural products with anti-inflammatory, antioxidant, antibacterial and pro-collagen synthesis actions have been conducted. Their medicinal properties might be

contributed by the bioactive phytochemical constituents of the various chemical families such as alkaloids, essential oils, flavonoids, tannins, terpenoids, saponins, and phenolic compounds.^[13] Each bioactive agent may have specific function on wound healing properties. For instance, saponins can enhance the synthesis of pro-collagen^[14], while tannins and flavonoids have antiseptic and antibacterial activities^[15]. These phytochemicals can modulate one or more phases of the wound healing process. Due to these properties, natural products and their phytochemicals have important roles in wound healing and they are used in the design of new synthetic compounds for this purpose.

For healing of wound drug should have properties like antibacterial, anti-inflammatory and free radical Scavenging Activity as well as wound healing properties including promotion for collagen synthesis etc. so here we have considered all these properties of *Panchavalkala*.

MATERIALS AND METHODS

This article is aimed to review and summarized the preclinical and clinical research studies conducted on wound healing activities of *Panchavalkal* in the different forms like extract, gel, ointment, douche, *Kwath* etc. Study was done by search on internet by search engines like Google Scholar, Pubmed, Researches in relation to wound healing properties like anti-inflammatory, antioxydent, and antibacterial were also considered. Ayurved Research database like Ayush portal, Digital helpline for Ayurveda Research Articles were searched. For this search keyword *Panchavalkal* was used and as a result following results were obtained.

RESULT AND DISCUSSION

Antimicrobial Activity

Antimicrobial activity was carried out to evaluate the efficacy of extract *Panchavalkala* as skin disinfectant against staphylococcus aureus (gram positive), *Escherichia coli* and *Pseudomonas aeruginosa* (gram negative), *Candida albicans* fungi. These four organisms are likely to be present on skin surface. The study concluded that extract of *Panchavalkala* showed more antimicrobial activity than individual ingredients of *Panchavalkala*.^[16]

The phyto-constituents from *Panchavalkala* were extracted and detected by various qualitative chemical tests. It was mainly found to contain phytosterols, tannins and glycosides. These phyto-constituents were isolated by chemical methods and then tested for antimicrobial activity against various gram-positive, gram-negative and fungal cultures. It was observed that tannins had the best antimicrobial activity in comparison with glycosides and phytosterols.^[17]

The study aimed to screen the alcoholic extract of *Panchavalkala* for in vitro antibacterial activity against MRSA (clinical isolates reported to be resistant to Gentamicin, Norfloxacin, Penicillin G, Benzyl Penicillin, and Cefotaxime; susceptible to Clindamycin). The results demonstrated that *Panchavalkal* could represent a source of antimicrobial agents, for the control of MRSA wound infections.^[18]

Antibacterial activity of *Panchavalkaladi* ointment

The purpose of the present study was to prepare an Ayurvedic ointment comprising of *Panchavalkala* and *Triphala* and to evaluate the antibacterial activity and to screen its wound healing property. Antibacterial activity of the trial drug was evaluated in the specified organisms like *Escherichia coli*, *Staphylococcus aureus* and *Streptococcus pyogenes*. Screening of wound healing activity showed that the *Panchavalkaladi* ointment enhanced the process of wound healing.^[19]

The study was planned to prepare an Ayurvedic hand sanitizers incorporating *Panchavalkala*, to evaluate their respective antimicrobial activities. The present study is an attempt to convert Ayurvedic formulation (*Panchavalkala Kwatha*) into a ready to use antiseptic gel, which can be used as hand wash. The study showed that the gel hand wash of *Panchavalkala* has anti bacterial activity particularly against *B.pumillus* and *S.aureus* at minimum concentration of 400mcg/ml. Gel hand wash showed encouraging results in culture sensitivity.^[20]

Wound Healing Activity

Physico-chemical study of *Panchavalkala* Gel

The study was planned to prepare herbal wound healing gel from *Panchavalkala* barks, *Nimba* bark (*Azadirachta indica* A. Juss) and *Kumari* leaves (*Aloe vera* Linn). Qualitative tests reveal presence of tannin, phenols and saponin in gel. HPTLC profile shows some comparable picks among in process and Gel samples indicates presence of some similar compounds.^[21]

Panchavalkala kwatha was used in fistulotomy wound to see the wound healing action. For that purpose 90 patients suffering from *Bhagandar Vrana* were selected and divided into 3 groups which are *Nishadya Taila* (I), *Panchavalkala Kwath* combined with *Nishadya Taila* (II) and *Panchavalkala Kwath* (III). The percentage wound healing was 76.14%, 70.62% and 82.96% in group-I, II and III respectively. Hence it can be supposed that *Panchavalkala Kwath* had *Shothahara* and *Ropana* properties in *bhagandar Vrana* without adverse effect.^[22]

Wound healing activity of 25% aqueous extract of *Panchavalkala Ghanasatva* in patients of chronic non-healing ulcer was compared with collagenase enzyme and chlorine water as local application. Assessment of relief in sign and symptoms was done fortnightly up to 60 days. It was observed that *Panchavalkala* application reduces pain and discharge along with *Shodhana* and *Ropana karma* of chronic ulcers. Finally study concluded that classical prepared *Panchavalkala Kwath* has less effective but 25% aqueous extract of *Panchavalkala Ghanasatva* has shown well antimicrobial action.^[23]

Wound healing activity of *Panchavalkala Siddha Shatadhauta Ghrita* (PSSG) has been studied for their shelf life and wound healing activity. Shelf life of *Shatadhauta Grita* (SDG) was observed to be 9m and of PSSG to be 6m respectively. The animal experimentations validated excision wound healing activity of the test formulations, the difference of which was statistically insignificant. Randomized clinical trials on 43 patients were conducted and the percentage cured was 92.86%, Study concluded that the *Panchavalkala* has definite potential in wound healing.^[24]

A study was conducted on the efficacy of *Panchavalkala* cream in *Vrana Shodhana* w.s.r. to its action on microbial load and wound infection. *Panchavalkala* cream was administered by local application once daily for dressing of the wound until complete debridement. *Panchavalkala* cream efficiently decreases the microbial load, clinically controls infection, hastens wound debridement and can be recommended in the management of chronic non healing wounds.^[25]

A pilot study was conducted on clinical evaluation of *Vrana Ropana* (Wound Healing) effect of *Panchavalkala Tail* (oil) in *Shuddha Vrana*. 40 patients were studied in two groups in which control group was placentrex gel. In two different groups *Panchavalkala* oil and placentrex gel was applied locally once in a day in *Shuddha Vrana* up to complete wound healing. Surface area and depth of wound was reduced significantly in *Panchavalkala* oil treated group. Average Healing time was significantly less in *Panchavalkala* oil treated group. It was also stated that *Panchavalkala tail* promotes smooth and uncomplicated healing process. No other toxic effects of *Panchavalkala taila* were noted in this present study.^[26]

Wound healing property of *Panchavalkala Taila*

Panchavalkala taila was studied for its wound healing property (*Ropana*) in comparison with Placentrex ointment. 100 patients of *Shuddha vrana* i.e. non infected wound were studied by dividing them into two groups. Size and depth of wound was

reduced significantly in both groups. Unit healing time and total days of healing were significantly less in *Panchavalkala taila* group. Healthy and early granulation tissue formation found in the *Panchavalkala taila* treated group. This study concluded that *Panchavalkala tail* reduces healing time as well as promotes early granulation tissue formation and wound contraction and epithelialization in wound. *Panchavalkala tail* promotes smooth and uncomplicated and early healing process which is '*Ropana*'.^[27]

Anti-inflammatory Property

Free radical Scavenging Activity and anti inflammatory activity

In the present study, preliminary phytochemical testing of *Panchavalkala* showed the presence of high amount of tannins and phenolics in all the samples. Subsequent quantification revealed that the total phenolic content ranged from 3.5 to 10.8% w/w and the total tannin content ranged from 1.6 to 7.0% w/w in the samples. The presence of high amount of phenolics and tannins and the above reasons prompted to study the free radical scavenging activity of *Panchavalkala* and its individual ingredients. From the above experiments it is clear that *Panchavalkala* and its components showed good free radical scavenging activity which can be attributed to tannins and phenolics along with other compounds. Free radical scavenging activity could be one of the mechanisms of action of *Panchavalkala*, including its anti-inflammatory activity.^[28]

Patients of chronic cervicitis with erosion were treated with *Panchavalkala kwath*. Study concluded that *Panchavalkala* douche along with *Kasisadi taila Pichu* are more effective. Hence from this study it can be said that there is definite role of *Panchavalkala* as an anti inflammatory and healing action in or cervical erosions.^[29]

Study was conducted in Ayurveda *Upapluta Yonivyapad* (vulvovaginitis) which is most common condition of bacterial, fungal and T.Vaginalis infection seen during pregnancy. *Panchavalkaladi varti* provided better relief than *Trida* Vaginal suppositories in relief of symptoms like *Yoni Srava*, *Kandu*, *Daha*, *Pichchilata*, *Vedana* and *Daurangdha*, proves its anti-inflammatory property.^[30]

CONCLUSION

Wound healing is a complex and very important process in the field of surgery. This review highlighted wound healing property of *Panchavalkala* by its antimicrobial, anti-inflammatory, free radical scavenging activity, with clinical results of early wound healing. Many plant products are useful for promotion of wound healing process in which

Panchavalkala i.e. combination of five figs barks; have proved its efficiency in its healing property by many researchers. *Panchavalkala* was studied in different forms like gel, decoction, ointment, sanitizer, *Ghanasatwa*, *Taila*, *Ghrta*, *Varti* and Cream. In all forms it has proved its efficiency. *Panchavalakala* possess astringent property which is responsible for wound contraction and increased rate of epithelialization at the granulation formation and scar remodeling phases. *Panchavalkala* have both *Shodhana* and *Ropana* properties which promotes wound healing. It can be concluded that anti microbial, anti inflammatory and wound healing property of *Panchavalkala* is useful in the management of acute and chronic wounds. All these pre clinical and clinical studies proves good potential and need to create the evidence based data in more numbers of patients in some unique formulation for its validation in clinical practice. This review study will help in further research on wound healing activity.

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