



(RESEARCH ARTICLE)



Bio-mechanical property of skin in Psoriasis and Psorolin B

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Abstract

In the present paper we have investigated Psorolin B ointment for improving the bio-mechanical property of the skin. Psorolin B ointment is proprietary Siddha formulation composed of *Boswellia serrata*, *Wrightia tinctoria*, *Cynodon dactylon*, *Hydnocarpus laurifolia* and *red ochre*. The bio-mechanical property/elasticity of the skin is evaluated in volar forearm region by four different methods such as applying uniaxial force, centripetal force, vacuum suction and instant retraction by pinch-pull test. The findings clearly showed that Psorolin B ointment improved the skin elasticity and dexterity of the cutaneous tissue. In our previous study we have already established the elastase and collagenase inhibitory effect of Psorolin B and it also possess strong antioxidant effect. The findings are discussed in the article.

Keywords: Psoriasis; *Boswellia*; *Red ochre*; Skin elasticity; Elastase

1. Introduction

Pathological vagaries of Psoriasis and the underlying immunological irregularities and eruptions not only affect the barrier function of the skin but also its bio-mechanical properties, greatly.¹ When the largest organ in our body, the cutaneous tissue fails to provide the desired barrier protection, naturally such situation would trigger the immune reactions especially the one that is mediated by T lymphocytes and which in turn would elicit the release of several pro and active inflammatory mediators resulting in adverse reaction over psoriatic lesion.^{2,3}

The conventional line of topical treatment products often suppress the proliferation of keratinocytes or would exert immune suppression. None of such products would do anything positive to the organoleptic benefit to the skin. Therefore the bio-mechanical aspect of the cutaneous tissue remains Cinderella in the topical treatment arena of Psoriasis.

Psorolin B is a proprietary Siddha drug composed of several medicinal herbs known to offer wide variety of therapeutic benefit to Psoriasis. Besides the therapeutically effective herbal ingredients in the drug, the back-bone effect of the product, i.e., the base cream is so effective to improve the skin integrity and elasticity as well. Thereby Psorolin B instantaneously improves the bio-mechanical property of the cutaneous tissue which in turn results in calming the inflammatory elicitation eventually ends up in cutaneous tissue correction and normalization *in situ*.

In the present paper, we report the effect of Psorolin B in improving the elasticity of the skin which we have evaluated through four different methods. The medical significance of the above benefit in the treatment of Psoriasis is discussed. The backbone benefit of Psorolin B is although comes ancillary, but the benefit is very significant in the treatment of Psoriasis.

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2. Material and methods

2.1. Details of Psorolin B

Wrightia tinctoria, *Cynodon dactylon*, *Boswellia serrata*, *Hydnocarpus laurifolia*, *Red ochre*, Source of vitamin D (cheese), Vitamin e acetate, Wheatgerm oil

2.2. Use of uniaxial force to measure elasticity of skin

Eight healthy volunteers were chosen for the study. In the volar forearm in right arm, Psorolin B was applied twice daily for 15 days and the left volar forearm was left without treatment. Uniaxial force was applied over the skin using a soft rubber clip for 3 minutes and then the retraction time and extent of retraction in treated and untreated region was recorded.⁶

2.3. Use of centripetal force to measure elasticity of skin

In the treatment and control sites of the above volunteers where uniaxial force was not applied was chosen for the study. A flat bottom cork was applied over the skin, gently pressed for 3 minutes and then the cork was removed. The skin retraction time and extent of retraction in treated and untreated region was recorded.⁷

2.4. Use of vacuum suction to measure elasticity of skin

In the treatment and control sites of the above volunteers where no measurement was taken, a vacuum pressure was applied for 3 minutes and then the skin retraction time and extent of retraction in treated and untreated region was recorded.

2.5. Instant retraction by pinch-pull test

The instant retraction of the skin in treated and untreated sites in volunteers were tested by pinch-pull test. The skin was gently pinched and pulled upward using thumb and index finger and then released immediately. The extent of retraction and time taken were recorded.

2.6. Special Note

All the above measurements were taken only after 3 hrs of product usage in order to avoid slipperiness in the treatment site which may cause bias in the reading.

3. Results

Psorolin B application has significantly improved the bio-mechanical property of the skin especially the elasticity and dexterity of the cutaneous tissue.

All the four different methods employed in the experimentation have yielded a mutually agreeable result – Table 1 -4

Table 1 Use of uniaxial force to measure elasticity of skin

No. of volunteers	Group	Elasticity improvement	
		Retraction time (seconds)	Extent of retraction (central and radial)
8	Treatment	30	98
	Control	182	44

Table 2 Use of centripetal force to measure elasticity of skin

No. of volunteers	Group	Elasticity improvement	
		Retraction time (seconds)	Extent of retraction (central and radial)
8	Treatment	5	100
	Control	67	69

Table 3 Use of vacuum suction to measure elasticity of skin

No. of volunteers	Group	Elasticity improvement	
		Retraction time (seconds)	Extent of retraction (central)
8	Treatment	7	90
	Control	77	52

Table 4 Instant retraction by pinch-pull test

No. of volunteers	Group	Elasticity improvement	
		Retraction time (seconds)	Extent of retraction (radial)
8	Treatment	4	80
	Control	240	28

4. Discussion

Maintaining the bio-mechanical property of the skin is extremely important to ensure the normal functioning of the cutaneous tissue. The skin being the largest organ in the body that covers all internal systems from the external world, any damage to the skin will result in impaired barrier function and thermo-regulation.^{8,9} Psoriasis is a skin condition where keratinocytes loses the functional dexterity mostly due to T lymphocyte defect which results in very short stratum corneum turn over time.¹⁰ The rapidly proliferating skin cells show poor maturity and hence would offer poor to no benefit to the skin. But in most instances, the hyper proliferated skin cells may get deposited over the skin burdening the already impaired skin. Due to severe such defect, immune flare up occurs and which leads to inflammatory reaction exposing the system to further vulnerability.

The conventional line of topical therapy of Psoriasis largely focuses on either suppression of the cell proliferation or suppression of the immune reaction. Although the above line of treatment may reduce the clinical manifestation of the Psoriatic lesion, but the required level of improvement to the cutaneous tissue, such treatment may not offer. During Psoriasis, the collagen and elastin fibers stretches extensively overlaid by the deposition of immature skin cells which affect the elasticity or bio-mechanical property of the skin. Therefore emasculating the underlying pathophysiological causes of Psoriasis such as keratinocyte proliferation and violent immune reaction alone may not be sufficient to achieve complete relief. The elasticity of the skin also needs to be improved significantly so that both moisture and lipid balance or dermal homeostasis can be achieved simultaneously. We have already established elastase and collagenase inhibitory effect of Psorolin B besides strong antioxidant effect as established by Nitric oxide inhibition and anti-glycation assay. Psorolin B is formulated with well proven herbal medicines to execute several medical benefits to the Psoriatic skin. Alongside, we have also employed sophisticated formulation engineering to achieve instantaneous skin homeostasis through the backbone effect of the ointment base.

The cutis laxa like condition post Psoriasis treatment even at minimal degree if exist in the skin can sustain the 'self trigger eventually leading to secondary or tertiary flare up of the pathology and clinical condition. Therefore immediate correction of the viscoelastic or bio-mechanical characteristics of the skin is necessary. Correcting the biological sequel and mechanical sequel should run parallel to each other and must happen simultaneously and also from the same

treatment approach in the given time point as far as possible. This was the scientific principle that we employed while formulating Psorolin B where we chose herbal ingredients both for dealing the biological aspect of the disease as well as the mechanical aspect of the skin. Further we have also chose the formulation base carefully by using several super fine fats and fine actives such as vitamin E, vitamin D and wheat germ oil. The fine fats and essentials are rich in antioxidant principles to fight the reactive oxygen species playing a significant role in the etiopathology of psoriasis.

We have used elasticity as an index or preface of healthy skin, normal with good bio-mechanical property. We have measured the above parameter in glabrous skin post Psorolin use. All the four different methods yielded concordant result suggesting Psorolin B significantly improves both the clinical phase of Psoriasis as well as the underlying triggers besides improving the viscoelasticity of the skin.

5. Conclusion

Psoriasis is although an auto-immune led medical problem of the skin but definitely it causes severe damage to the skin with reference to its bio-physio- thermo regulatory function. The conventional line of treatment- steroidal preparations largely addresses the immune end of the spectrum and often neglects the organo-leptic needs. Psorolin B is a plant based steroid like acting ointment with proven effect on pro-inflammatory mediators. Psorolin B ointment base is made with ingredients that contain Vitamin D, vitamin E and Wheatgerm oil to offer best organoleptic benefits such as elasticity, cutaneous and sun-cutaneous hydro-lipo balance and increased cutaneous cell replenishment time.

Compliance with ethical standards

Disclosure of conflict of interest

We declare no conflict of interest.

Statement of informed consent

Informed consent was obtained from all volunteers as per statutory requirement.

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