



Reducing Scar and Post Inflammatory Acne by Using Daily Skincare Regimen

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Abstract:

Introduction: The physical sequelae of acne are highly burdensome for patients include erythema and scarring. Effective treatment in the earlier stage can potentially limit and prevent development of the sequelae, and using a proper daily routine skincare should have benefits or clinical efficacy.

Case report: A case of 5 patients who have post inflammatory acne lesions and acne scar using daily basic skincare regimen which have skin repairing action as moisturizer, anti-oxidants against the harmful free radicals, reducing pro-inflammatory mediators, improving collagen synthesis or inhibiting its degradation process had shown good result in reducing scars and redness within four weeks. All the patients have signed the informed consent.

Conclusion: One of treatment options of post inflammatory acne and acne scar is daily skincare that have proper ingredients to help repairing the condition of the sequelae of acne. Inflammatory lesions and scars could be reduced by daily skincare which has proper ingredients to reduce inflammation and improve skin barrier. The quality of life of the patients also improves as the skin improve.

Keywords: post inflammatory acne; acne scar; daily skincare; moisturizer

Introduction:

A primary goal in the treatment of the skin is the efficiency of the treatments and improvement for the skin problems. The most common skin problems is acne sequelae such as scarring, erythema, and hyperpigmentation.[1] One of the burden sequelae from acne is macular erythema induced by acne; termed as post-inflammatory erythema that erythema persist as acne lesion resolves. [2] Most commonly scarring from acne is atrophic scar but also can be hypertrophic scar or keloidal. [3,5] During the inflammatory stage, inadequate collagen deposition and dermal matrix loss in the form of collagen breakdown lead to a formation of an atrophic scar. [5]

The prevalence for acne-induced scarring estimates 43% - 90.8% which may correlate with severity of acne itself. [6,7] Fifty-five percents patients with mild acne had macular erythema of 40 patients in a cohort study. [8] Commonly the patients experience sequelae combination induced by acne. [9] Scars induced by acne affected patients seen as less happy, confident, healthy, attractive, and successful than people without scar problem and in some societies are negatively perceived. [10] Similarly, post-inflammatory erythema is often considered unacceptable cosmetically and can affect psychosocial burden and have a significant impact on patients themselves. [1,7,11-14] Patients can have significant psychosocial impacts and reduced quality of life in association with the sequelae. [15]

Chemical peeling, radiofrequency micro-needling, and laser often conducted to treat acne sequelae are a high cost procedural interventions. [2,14] Skin

maintenance to improve skin health and skin integrity be the major goal for the patients by receive daily routine skincare. [16] Over-the-counter (OTC) products effectiveness data are limited and it makes clinicians often have difficulty to recommend which products is the most appropriate for the patients, [15] but when it is selected properly, OTC products have the advantages of being effective and convenient. [17]

Case Report:

Five patients present with post inflammatory acne and acne scars on the face after having treatment for their acne problems. These problems occurred right after their acnes were controlled. Redness on their skin sometimes feel uncomfortable and make patients losing their confidence. There is no previous history of treatment for these conditions. There is no history of family members who have acne scars and post inflammatory acne. There is no history of atopy of all the patients. Physical examination results of the patient are within normal limits. All the patients have signed the informed consent.

Dermatologicus status obtained erythema macules and scars typed mostly ice picks and rolling on the both cheeks. We used Clinicians's Erythema Assesment (CEA) for clinicians and for patients we used Patients Self-Assessment (PSA), Dermatology Life Quality Index (DLQI) and Scale of Generalized Anxiety Disorder (GAD-2). All of the patients feel satisfied with the results using this skincare regimen.

Discussion:

Stratum corneum (SC) as the outermost skin layer is containing ceramides, cholesterol, and free fatty acids, it is in a multilamellar lipid matrix, constituted by corneocytes embedded. The function of skin barrier is determined primarily by stratum corneum integrity. Epidermal barrier impairment caused by exposure from multiple exogenous factors, the SC is continuously active in maintaining a state of physiology function by a self-repair mechanism. [18,19] Keratinocyte hyperproliferation is promoted by an inflammatory cascade triggers the release of tumor necrosis factor (TNF), interleukin (IL)-1 and IL-6 in initial. Epidermal becomes thicker and lead to counter the excessive trans-epidermal water loss (TEWL). [19] Skin injury can also affect the dermis in addition to the epidermal barrier. Cohesiveness of the epithelium can be compromised by disruption of epidermis and dermis. Wound healing consists of a dynamic and interactive process. It has four phases: 1. Hemostasis; 2. Inflammation; 3. Proliferation; and 4. Remodeling. Each other phase can partially overlap. [20,21]

Skin diseases linked with inflammation formed as occasional rashes are the most common problem in dermatology. [22] Macular erythema induced by acne or post inflammatory acne is a transitional lesion for atrophic scars. The development of atrophic scar as one of the acnes sequalae's pathogenesis is complex, ongoing inflammations appears to be a key underlying cause.[23] Increase in TEWL and decrease in SC capacitance and conductance have been reported as a malfunction SC that leads to scar form. [24]

Medical devices, medicines, and cosmetic products have different mechanisms to promote skin repair. Cosmetic products act in the epidermis which means the active substances in the skincare formulation action is in the inflammatory phase or in the regeneration phase. [25] The substances can act by reducing pro-inflammatory mediators, neutralizing free radical species, or by improving synthesis of collagen or inhibiting its degradation process in the regeneration phase. [25,26] Improvement of skin hydration can be impacted by products which act to improve the skin barrier damage by the moisturizer effect. The ingredients that boost skin structural lipids synthesis, restore the skin barrier directly, or bind and retain water to stratum corneum therefore reducing TEWL make this moisturizer effect. [25-27] Moisturizer can regulate epidermal cytokine and production of growth factor (GF), as a result, it is to be expected that moisturizer may improve scar form. [24]

Acne-induced erythema or post inflammatory acne is often contributing to psychosocial burden and unacceptable cosmetically. [1] Residual scarring from acne also can be linked to psychosocial effects. Acne scars can trigger and exacerbate negative body image and self-esteem to the patients. One of the important parameters in the dermatology field is recognizing acne scars impact to psychosocial well-being. Patients with acne scars experienced occurrence of anxiety, depressive symptoms, even suicidal tendencies. Personal relationship and social participation also impair the DLQI because of the acne scars. [28] We used CEA (table 1) for clinicians and for patients we used PSA (table 2) for the erythema and the DLQ (table 3) and GAD-2 (table 4) to assess both of skin problems (erythema and scars).

		Score
Mild	Mild erythema; define redness	2
Moderate	Moderate erythema; marked redness	3
Severe	Severe erythema; fiery redness	4

Table 1: Clinicians's Erythema Assesment (CEA)

		Score
Mild	Somewhat more redness than I prefer	2
Moderate	More redness than I prefer	3
Severe	Completely unacceptable redness	4

Table 2: Patients Self-Assessment (PSA)

The aim of this questionnaire is to measure how much your skin problem has affected your life OVER THE LAST WEEK. Please tic (√) one box for each question.			
1.	Over the last week, how itchy, sore, painful or stinging has your skin been?	Very much	
		A lot	
		A little	
		Not at all	
2.	Over the last week, how embarrassed or self-conscious have you been because of your skin?	Very much	
		A lot	
		A little	
		Not at all	
3.	Over the last week, how much has your Very	Very much	
		A lot	

	much <input type="checkbox"/> skin interfered with you going A lot <input type="checkbox"/> shopping or looking after your home or A little <input type="checkbox"/> garden?	A little	
		Not at all	
		Not relevant	
4.	Over the last week, how much has your skin influenced the clothes you wear?	Very much	
		A lot	
		A little	
		Not at all	
		Not relevant	
5.	Over the last week, how much has your skin affected any social or leisure activities?	Very much	
		A lot	
		A little	
		Not at all	
		Not relevant	
6.	Over the last week, how much has your skin made it difficult for you to do any sport?	Very much	
		A lot	
		A little	
		Not at all	
		Not relevant	
7.	Over the last week, has your skin prevented you from working or studying?	Yes	
		No	
		Not relevant	
	If "No", over the last week how much has your skin been a problem at work or studying?	A lot	
		A little	
		Not at all	
8.	Over the last week, how much has your skin created problems with your partner or any of your close friends or relatives?	Very much	
		A lot	
		A little	
		Not at all	
		Not relevant	
9.	Over the last week, how much has your skin caused any sexual difficulties?	Very much	
		A lot	
		A little	
		Not at all	
		Not relevant	
10.	Over the last week, how much of a problem has the treatment for your skin been, for example by making your home messy, or by taking up time?	Very much	
		A lot	
		A little	
		Not at all	
		Not relevant	

Table 3: Dermatology Life Quality Index (DLQI)

The scoring of each question is as follows:

Very much	Scored 3
A lot	Scored 2
A little	Scored 1
Not at all	Scored 0
Not relevant	Scored 0

Question unanswered	Scored 0
Question 7: "prevented work or studying"	Scored 3

The DLQI is calculated by summing the score of each question resulting in a maximum of 30 and a minimum of 0. The higher the score, the more quality of life is impaired.

Meaning of DLQI scores:

- 0 - 1 = no effect at all on patient's life
- 2 - 5 = small effect on patient's life
- 6 - 10 = moderate effect on patient's life
- 11 - 20 = very large effect on patient's life
- 21 - 30 = extremely large effect on patient's life

Over the last 2 weeks, how often have you been bothered by the following problems?	Not at all	Several days	More than half the days	Nearly every day
Feeling nervous, anxious or on edge	0	1	2	3
Not being able to stop or control worrying	0	1	2	3

Table 4: Generalized Anxiety Disorder Scale (GAD-2)

All the patients clinically had their erythema reduced based on CEA and PSA. It proves that a proper skincare regimen can lead to improvement of patients' skin problem in this matter are erythema and scars on their skin (table 5 and table 6).

	CEA		PSA	
	Before	After	Before	After
Patient 1	3	2	3	2
Patient 2	3	2	3	2
Patient 3	3	2	3	2
Patient 4	3	2	3	2
Patient 5	2	0	2	0

Table 5: Result of Clinicians's Erythema Assessment (CEA) and Patients Self-Assessment (PSA).









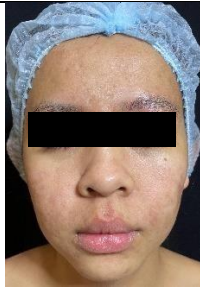






	Figure a	Figure b	Figure c
Patient 1			
Patient 2			
Patient 3			
Patient 4			
Patient 5			

Table 6: Before and after having skincare regimen.

Pictures taken before skincare regimen on day 1 (figure a). Patients were given skincare regimen including facial wash, daily cream and sunscreen for 4 (four) weeks. We repeated taken the pictures 2 weeks on day 14 during the treatment (figure b). Last pictures taken on the fourth week (day 28) of using skincare regimen (figures c). Patients started to feel more comfortable with their skin on the second week, and on the last week, erythema reduced and there was

improvement on scar appearances.

Most inflammatory skin diseases' treatment is dominated by corticosteroid but it is only for short term use because of the side effects. [22] If a cosmetic product is truly capable of repairing skin, it should help the healing process of a damage skin. Pharmaceuticals industries currently use a non-steroidal formula to

decrease skin inflammation. In this serial case we treated the patients for 4 (four) weeks with skincare regimen including facial wash, moisturizer and sunblock without any other treatment. They used facial wash and moisturizer twice a day and sunscreen every day. The moisturizer contains active ingredients such as azelaic acid (AZA), β -glucan, Calendula extract and bisabolol.

One of the ingredients known with the ability to regenerate skin is bisabolol. It is reducing the production of pro-inflammatory cytokine and improving skin inflammation. [22,29] As well as the β -glucans, it enhances GF production that are essential for skin, promotes collagen biosynthesis and maintains moisture and elasticity of the skin. Macrophages is activated and it removes cellular debris resulting from oxidative stress, hence speeding up the recovery tissue damage. [30] Another anti-inflammatory, anti-oxidant, a scavenger of harmful free radicals and can inhibit the reactive oxygen species (ROS) production is azelaic acid. Azelaic acid is a natural substance produced by the yeast *Malassezia spp.*. The effect of AZA has been confirmed in a study conducted by Draelos et al., compared to placebo in 961 patients is more effective 32% vs. 23.5%; $p < 0.001$. [31]

The plant raw material that has anti-inflammatory activity related to therapeutic indications of medicinal plants has been described in most studies. They also have the ability to regulate lipid synthesis in epidermis. One of them is *Calendula officinalis L* has anti-

inflammatory effects related to the content of flavonoids and derivatives of triterpene and there is a lipoxygenase inhibitor from isolated calendula flower that is isorhamnetin 3-glycosides. Faradiol and this flower extract at high concentration was comparable to indomethacin (synthetic drug for anti-inflammation). *Calendula officinalis L* inhibits cytokines formation to prevent the inflammatory reaction. [32] Topical formulations of *Calendula* are intended for wound healing and soothing inflamed and/ or damaged skin. [33]

It was reported in a recent researched that 26.2% of the people with acne had anxiety symptoms and the severity of this symptoms found to be associated to the impairment of quality of life. [34] Due to this report, the sequelae of acne such as erythema and scarring could possibly affect the psychosocial burden of the patients.

On the result on table 7, the quality of life of 4 patients were in very large effect state on their life, only 1 patient in moderate effect state before they start using the skincare regimen. On the 4th week, their quality of life improved to be in small effect state and moderate effect state in 1 patient and 4 patients, respectively. The result of GAD-2 showed there was improvement in their anxiety disorder based on the scale. Based on the result, there was improvement in patients' quality of life and the anxiety symptoms were reduced since their skin had an improvement.

	DLQI		GAD-2	
	Before	After	Before	After
Patient 1	8	3	2	1
Patient 2	16	10	3	2
Patient 3	13	10	1	0
Patient 4	11	6	1	0
Patient 5	15	7	3	1

Table 7: Result of Dermatology Life Quality Index (DLQI) and Generalized Anxiety Disorder Scale (GAD-2).

Conclusion:

The sequelae of acne such as scarring and erythema could have a significant impact on physiological and psychosocial effects for patient's quality of life. Proper clinical assessment has important role to treat these skin problems because the treatment options of both skin problems also challenging and costly. Clinicians should choose the right and proper treatment start from the initial inflammatory phase occurred. Effective treatment in the earlier stage can potentially limit and prevent development of the sequelae. One of treatment options of post inflammatory acne and acne scar is daily skincare that have moisturizing property to help repairing the condition of the sequelae of acne. By using a proper daily routine skincare should have benefits or clinical efficacy lead to reducing inflammatory lesions and scars, and eventually improving skin barrier.

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Declaration of competing interest:

I hereby declare that, to the best of my knowledge, there is no aspect of my current personal or professional state that significantly affect my views regarding the material subject I am presenting.

Ethics statement:

The content presented in this manuscript is solely for educational and informational purposes and does not require ethical approval as per institutional guidelines. All confidential or personal data is used solely for the purposes of this manuscript and has been approved and signed by the patients on informed consent. All sources have been given appropriate credit to respect intellectual property rights and academic integrity.

References:

1. Layton AM, Thiboutot D, Tan J. Reviewing the global burden of acne: how could we improve care to reduce the burden?. Br

- J Dermatol. 2021; 184(2): 219-25.
2. Bae-Harboe YS, Graber EM. Easy as PIE (postinflammatory erythema). *J Clin Aesthet Dermatol*. 2013;6(9):46-47.
 3. Kang S, Lozada VT, Bettoli V, *et al.*. New atrophic acne scar classification: reliability of assessments based on size, shape, and number. *J Drugs Dermatol*. 2016; 15(6): 693-702.
 4. Boen M, Jacob C. A review and update of treatment options using the acne scar classification system. *Dermatol Surg*. 2019; 45(3): 411-422.
 5. Bikash C, Sarkar R. Topical management of acne scars: the uncharted terrain. *J Cosmet Dermatol*. 2023; 22: 1191-6.
 6. Tan J, Kang S, Leyden J. Prevalence and risk factors of acne scarring among patients consulting dermatologists in the USA. *J Drugs Dermatol*. 2017; 16(2): 97-102.
 7. Hayashi N, Miyachi Y, Kawashima M. Prevalence of scars and “mini-scars”, and their impact on quality of life in Japanese patients with acne. *J Dermatol*. 2015; 42(7): 690-696.
 8. Wong SN. Presented at: the South-East Asia Study Alliance (SASA). In: Prevalence of scarring in mild to moderate acne vulgaris. 2012.
 9. Bae-Harboe YS, Graber EM. Easy as PIE (postinflammatory erythema). *J Clin Aesthet Dermatol*. 2013; 6(9): 46-47.
 10. Dreno B, Tan J, Kang S, *et al.*. How people with facial acne scars are perceived in society: an online survey. *Dermatol Ther*. 2016; 6(2): 207-218.
 11. Chuah SY, Goh CL. The impact of post-acne scars on the quality of life among young adults in Singapore. *J Cutan Aesthet Surg*. 2015; 8(3): 153-158.
 12. Akinboro AO, Ezejiofor OI, Olanrewaju FO, *et al.*. The impact of acne and facial post-inflammatory hyperpigmentation on quality of life and self-esteem of newly admitted Nigerian undergraduates. *Clin Cosmet Investig Dermatol*. 2018; 11: 245- 252.
 13. Darji K, Varade R, West D, Armbrecht ES, Guo MA. Psychosocial impact of postinflammatory hyperpigmentation in patients with acne vulgaris. *J Clin Aesthet Dermatol*. 2017; 10(5): 18-23.
 14. Min S, Park SY, Yoon JY, Kwon HH, Suh DH. Fractional microneedling radiofrequency treatment for acne-related post-inflammatory erythema. *Acta Derm Venereol*. 2016; 96(1): 87-91.
 15. Rodan K, Fields K, Falla TJ. Efficacy of a twice-daily, 3-step, over-the-counter skincare regimen for the treatment of acne vulgaris. *Clin, Cos and Invest Dermatol*. 2017; 10: 3-9.
 16. Lichterfeld A, Hauss A, Surber C, Peters T, Blume-Peytavi U, Kottner J. *J Wound Ost Cont Nurs*. 2015; 42(5): 501-24.
 17. Decker A, Graber EM. Over-the-counter acne treatments: a review. *J Clin Aesthet Dermatol*. 2012; 5(5): 32-40.
 18. Čuřiková-Kindlová B.A.; Vovesná A.; Nováčková A.; Zbytovská J. In Vitro Modeling of Skin Barrier Disruption and its recovery by ceramide-based formulations. *AAPS Pharm Sci Tech*. 2021; 23(1): 21.
 19. Maeno, K. Direct quantification of natural moisturizing factors in stratum corneum using direct analysis in real time mass spectrometry with inkjet-printing technique. *SciRep*. 2019; 9: 17789.
 20. Gushiken LFS, Beserra FP, Bastos JK, Jackson CJ, Pellizzon CH. Cutaneous wound healing: an update from physiopathology to current therapies. *Life*. 2021; 11: 665.
 21. Baron JM, Glatz M, Proksch E. Optimal support of wound healing: new insights. *Dermatology*. 2020; 236: 593–600.
 22. Layton A, Alexis A, Baldwin H, Beissert S, Bettoli V, Del Rosso J, *et al.*. Identifying gaps and providing recommendations to address shortcomings in the investigation of acne sequelae by the Personalising Acne: Consensus of Experts panel. *JAAD Int*. 2021; Vol. 5: 41-8.
 23. Wang H, Xu Z, Li Q, Wu J. Application of metal-based biomaterials in wound repair. *Eng Regen*. 2021; 2: 137–153.
 24. Makpol S, Jam FA, Khor SC, Ismail Z, Yusof YAM, Ngah WZ. Comparative effects of biodynes, tocotrienol-rich fraction, and tocopherol in enhancing collagen synthesis and inhibiting collagen degradation in stress-induced premature senescence model of human diploid fibroblasts. *Oxid Med Cell Longev*. 2013; 2013: 298574.
 25. Liu JK. Natural products in cosmetics. *Nat Prod Bioprospecting*. 2022; 12: 40.
 26. Rawlings AV, Bielfeldt S, Lombard J. A review of the effects of moisturizers on the appearance of scars and striae. *Int J of Cos Sci*. 2012; 34: 519-24.
 27. Maurya AK, Singh M, Dube V, Srivastava S, Luqman S, Bawankule DU. α -(-)- bisabolol reduces pro-inflammatory cytokine production and ameliorates skin inflammation. *Curr Phar Biotech*. 2014; 15: 173-81.
 28. Torres A, Rego L, Martins MS, Ferreira MS, Cruz MT, Sousa E, *et al.*. How to promote skin repair? In-depth look at pharmaceutical and cosmetic strategies. *Pharmaceuticals*. 2023; 16: 573.
 29. Rajarajaram A, Dakshanamoorthy A. Beta glucan: a biomimetic approach for reducing chronicity in delayed wound healing. *J Dermatol & Skin Sci*. 2020; 2(3): 16-21.
 30. Sauer N, Oślizło M, Brzostek M, Wolska J, Lubaszka K, Bodalska KK. The multiple uses of azelaic acid in dermatology: mechanism of action, preparations, and potential therapeutic applications. *Adv Dermatol Allergol*. 2023; XL(6): 716-24.
 31. Dawid-Pac R. Medicinal plant used in treatment of inflammatory skin diseases. *Postep Derm Alergol*. 2013; XXX(3): 170-7.
 32. Silva D, Ferreira MS, Sousa-Lobo JM, Cruz MT, Almeida IF. Anti-inflammatory activity of *Calendula officinalis* L. flower extract. *Cosmetics*. 2021; 8: 31.
 33. Zhou C, Vampati A, Tam C, Khong J, Vasilev R, Tam K. *et al.*. Beyond the surface: a deeper look at the psychosocial impacts of acne scarring. *Clin Cosmet and Invest Dermatol*. 2023; 16: 731-8.
 34. Acer E, Altinoz AE, Erdogan HK, Agaoglu E, Canakci NY, Saracoglu ZN. Anxiety sensitivity and quality of life in patients with acne. *Ann Dermatol*. 2019; Vol.31(4): 372-7.