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Retinol versus Salicylic Acid Peels in Active Acne Vulgaris, Post-Acne Scarring and Hyper Pigmentation: A Comparative Study

Soukayna Kabbou*, Ouiame El Jouari, Imane Talhaoui, Fatine Soulami, Salim Gallouj

Department of Dermatology, University Hospital Center of Tangier, Tetouan Al Hoceima, Faculty of Medicine and Pharmacy Tangier Abdelmalek Essaadi University, Tangier, Morocco

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***Corresponding author:**
Soukayna Kabbou
Department of Dermatology
University Hospital Center Tangier, Tetouan Al Hoceima;
Faculty of Medicine and Pharmacy
Tangier Abdelmalek Essaadi University
Tangier, Morocco
Email: soukayna.kabbou@usmba.ac.ma

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Abstract

Acne vulgaris, a chronic inflammatory condition of the pilosebaceous unit, significantly impacts both skin health and psychological well-being. Clinicians commonly suggest superficial chemical peels as a safe and efficient treatment option. This research evaluated the effectiveness of salicylic acid (SA) and retinol peels in treating moderate acne, post-acne scars, and post-inflammatory hyperpigmentation (PIH) among 50 individuals of Fitzpatrick skin type II-IV over 12 weeks. Participants were randomly split into two groups: one received biweekly SA peels, while the other received retinol peels every four weeks. Efficacy was assessed using the Michaelsson Acne Score (MAS) and clinical photographs. Side effects were observed at each visit. At the end of therapy, the percentage reduction in MAS was notably greater in the SA group compared to the retinol group (54.3% vs. 37.3%, $p < 0.001$). Similarly, the reduction in average comedone counts was significantly higher in the SA group than in the retinol group (65.7% vs. 28.7%, $p < 0.001$). Both agents improved PIH, though retinol showed a slightly greater reduction (49.8% vs. 36.3%, $p = 0.001$). Neither treatment significantly improved atrophic acne scars. Retinol peels were associated with fewer side effects, though both treatments were well-tolerated. These results support previous research emphasizing SA's advantage compared to mandelic acid, trichloroacetic acid, and Jessner's solution for acne lesion treatment. In summary, SA peels are more effective for active acne, whereas both treatments enhance PIH. Retinol peels provide a more secure option with reduced side effects. It is suggested that additional studies with larger groups and longer follow-up periods be conducted to confirm these results.

Keywords: Salicylic acid, Retinol, Acne vulgaris, Post-inflammatory, Hyper pigmentation, Peel

Abbreviations: Salicylic Acid (SA); Post-Inflammatory Hyperpigmentation (PIH); Michaelsson Acne Score (MAS)

We are pleased to present the findings of our recent comparative study evaluating the efficacy of retinol and salicylic acid (SA) peels in the management of active acne vulgaris, post-acne scars, and hyperpigmentation. Acne vulgaris is a chronic inflammatory condition of the pilosebaceous unit, characterized by the development of papules, pustules, nodules, comedones, and scarring [1]. This condition not only affects the skin but also significantly impacts patients' psychological well-being, often leading to anxiety, depression, and reduced self-esteem [2]. Clinicians commonly suggest superficial chemical peels as a safe and efficient treatment option for acne vulgaris,

scarring, and post-inflammatory hyperpigmentation [3]. Alpha-hydroxy and beta-hydroxy acids are two of the most often utilized peeling agents for acne. Despite being widely used, there aren't many studies comparing the effectiveness of salicylic acid and retinol peels, two substances with different modes of action. Our research attempts to close this gap and offer insightful information about their relative efficacy [4].

Fifty individuals of Fitzpatrick skin type II-IV, with moderate acne, post-acne scars, and post-inflammatory hyperpigmentation (PIH) were included in our study. For a total of 12 weeks, participants were randomly split into two groups: one group had retinol peels every four weeks, while the other group received salicylic acid peels biweekly. Objective assessments were conducted using the Michaelsson acne score (MAS) and clinical photographs.

Our results demonstrated that both agents were effective, with a significant decrease ($p < 0.001$) in mean MAS in the SA group as well as in the retinol peel group (SA 54.3% vs. 37.3% with retinol peel, $p < 0.001$). Salicylic acid peels showed superior efficacy in reducing mean comedone counts (SA peel 65.7% vs. retinol peel 28.7%, $p < 0.001$). Both agents induced an improvement in PIH. However, atrophic acne scars were not considerably improved by either treatment.

Acne vulgaris is a common skin condition with numerous treatment options that target the multiple factors involved in its pathogenesis. These treatments can be categorized into topical, systemic, and procedural therapies. Chemical peeling is one of the most popular, secure, and simple procedural treatments. Alpha hydroxy acids (AHAs), beta hydroxy acids (BHAs), tretinoin peels, trichloroacetic acid (TCA) peels, and Jessner's solution are among the agents frequently used in chemical peels for acne vulgaris. Each of these agents works differently to exfoliate the skin, unclog pores, and promote skin renewal, making chemical peels an effective approach for managing acne [5,6]. Salicylic acid has both keratolytic and comedolytic properties, making it highly effective in exfoliating the skin and unclogging pores. SA peels are currently one of the most popular chemical peels for acne vulgaris. They are particularly beneficial for addressing both active acne and PIH, which are common concerns in patients with darker skin tones [7]. Retinol, a vitamin A derivative, is soluble in fat but insoluble in water. It has a long history of use in dermatology to treat psoriasis, acne, and aging skin. Only the natural retinoids used in peelings: retinol, ATRA, and retinoic acid [8]. Retinol peels offer many benefits, including addressing acne by unclogging pores, inhibiting tyrosinase to reduce pigmentation, and boosting collagen to improve elasticity and reduce fine lines [9].

In the present study, SA peels demonstrated a significant reduction in non-inflammatory lesions (comedones) as early as four weeks into therapy, while retinol peels showed a comparable reduction only after eight weeks. The superior effectiveness of 30% SA peels in treating non-inflammatory acne lesions was highlighted by the significantly higher overall percentage decrease in non-inflammatory lesions (65.7%) with SA peels compared to retinol peels (28.7%). These results confirm salicylic acid's efficacy in minimizing comedonal lesions and are consistent with a large body of research that has demonstrated its superiority in treating non-inflammatory acne. SA peels were found to be statistically significantly more effective than mandelic acid peels in treating non-inflammatory acne, according to a study by Jartarkar et al [10]. Furthermore, a study by Abdel Meguid et al showed that SA was more effective than trichloroacetic acid (TCA) at treating comedonal lesions [11]. Salicylic acid's strong comedolytic action and lipophilic characteristics are the main reasons for its effectiveness, which makes it essential for comedolysis because the first stage of comedone formation involves excessive keratinization in the mid-portion of the follicular canal. In our study, the SA peel group had a higher percentage decrease in mean papule and pustule counts (46.7%) than the retinol peel group (24.3%). These results are in line with Abdel Meguid et al.'s study [11], which showed that 30% SA peels, especially for patients with darker skin, are more successful than 25% trichloroacetic acid (TCA) peels at curing inflammatory lesions, due to its anti-inflammatory qualities, which include the suppression of arachidonic acid metabolism.

In our study, both groups showed a significant reduction in mean MAS after 12 weeks of therapy. The mean MAS score decreased by 54.3% for the SA group and by 37.3% for the retinol peel group. These results are in concordance with other studies that found that SA peels are more effective than mandelic acid [10], TCA [11], and Jessner's solution (JS) [12] in reducing inflammatory and non-inflammatory acne lesions. Both peeling agents reduced PIH, likely due to their distinct mechanisms. Retinol worked by inhibiting matrix metalloproteinase activation, reducing oxidative stress, decreasing melanosome transfer, and promoting extracellular matrix regeneration [13]. SA contributed through its whitening effect, exfoliation, and anti-inflammatory properties [14].

In terms of side effects, patients tolerated both peels well. However, retinol peels were reported to be less harmful and to cause fewer side effects, such as erythema and peeling, compared to SA peels. Side effects of salicylic acid included epidermal burning, dryness, and exfoliation, which were transient and resolved without intervention. According to our research, SA and retinol peels work well for reducing PIH and active acne. SA showed superior efficacy for active lesions, including both inflammatory and non-inflammatory kinds. However, it is important to note that both agents showed limited efficacy in treating atrophic scars. Therapies for acne scarring include surgical modalities, such as subcision, punch excision, and elevation, as well as injectable fillers, chemical peels, dermabrasion, microneedling, and energy-based devices. Further studies with larger sample sizes are needed to confirm these results.

We believe our study provides valuable insights into the comparative effectiveness of retinol and salicylic acid peels, offering clinicians evidence-based recommendations for customizing care to meet the needs of each patient. Further research with larger sample sizes and longer follow-up

periods are necessary to validate these findings and explore potential combination therapies.

Table 1: Summary of Results

Parameter	SA Peels	Retinol Peels	p-value
Reduction in MAS (%)	54.3%	37.3%	< 0.001
Reduction in comedones (%)	65.7%	28.7%	< 0.001
Improvement in PIH (%)	36.3%	49.8%	< 0.001

Table 2: Comparison with Previous Studies

Study	Agent Compared	Key Finding
Jartarkar et al. (2020)	Mandelic acid	SA more effective for noninflammatory acne lesions
Abdel Meguid et al. (2019)	TCA	SA more effective for comedonal lesions
Current Study	Retinol	SA superior for active acne; retinol better for PIH

Figure 1a Figure 1b

Figure 1: Photographs of patient in the SA group (a,b) before treatment (c,d) after treatment

Figure 1c Figure 1d

Figure 1: Photographs of patient in the SA group (a,b) before treatment (c,d) after treatment

Figure 2a Figure 2b

Figure 2: Photographs of patient in the retinol peel group (a,b) before treatment (c,d) after treatment

Figure 2c Figure 2d

Figure 2: Photographs of patient in the retinol peel group (a,b) before treatment (c,d) after treatment

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Patient Consent for Publication: Patient consent was taken

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