

Clinical Evaluation of the Combination of Polyrevitalizing Solution and an HA-Based Filler in the Treatment of Rolling Acne Scars: A 6-Month Prospective Pilot Case Series

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Abstract

Background: Rolling acne scars are a frequent and distressing consequence of inflammatory acne, often leaving patients with long-term aesthetic and psychological burden. **Aims:** This preliminary pilot study aimed to evaluate the clinical efficacy of the combination of a polyrevitalizing solution and an HA-based filler in the treatment of rolling acne scars over a 6-month observational period. **Methods:** Six subjects with clinically confirmed rolling acne scars received localized injections of a HA-based filler combined with a polyrevitalizing solution, injected with a 25 G cannula by Fan technique, and proceeded with subcision. Standardized evaluations were performed at baseline and after 180 days (D180), including the 5-point Acne Scar Assessment Scale (ASAS), Subject Acne Scar Self-Assessment Scale, Acne Scar Improvement Score, and Global Aesthetic Improvement Scale (GAIS) from both investigator and subject perspectives. Standardized VISIA® images were taken to support clinical observations. **Results:** A significant reduction in the physician-rated ASAS score was observed at D180, showing a mean decrease of 53% ($p = 0.0079$). Subjects reported a significant increase in self-assessment scores ($p < 0.001$), reflecting improved skin texture and diminished scar appearance. The Acne Scar Improvement Score showed that half of the subjects experienced $> 50\%$ improvement in lesion visibility ($p < 0.001$). GAIS scores indicated that both injector and subjects reported significant global aesthetic improvement, with 100% of subjects satisfied or very satisfied with the treatment outcome. **Conclusion:** This pilot study suggests that the combined protocol of a polyrevitalizing solution and an HA-based filler is an effective minimally invasive treatment for rolling acne scars, offering notable improvement in skin quality and

subject satisfaction. Further investigations with larger cohorts and controlled designs are warranted.

Keywords

Hyaluronic Acid, Dermal Fillers, Facial Injections, Anti-Scar, Skin Healing

1. Introduction

Acne vulgaris is a highly prevalent dermatological condition, affecting up to 80% of individuals between the ages of 11 and 30, and approximately 5% of adults over 30 years of age [1]. It is about 25% more common in young women than in young men [2].

At the histological level, the pilosebaceous unit located in the epidermis, along with rete ridges, contains epithelial stem cells capable of regenerating and differentiating into basal keratinocytes. These cells play a critical role in the re-epithelialization process following skin injury [3]. In the context of acne, scarring often results from a combination of factors, including excessive sebum production, follicular hyperkeratinization, bacterial colonization, and chronic inflammation [4] [5]. A considerable number of patients, particularly those with moderate-to-severe inflammatory acne, go on to develop atrophic scars.

Acne scarring represents a frequent and heterogeneous sequela of inflammatory acne, resulting from altered wound healing processes and variable degrees of dermal matrix loss. Atrophic scars are the most prevalent subtype and are classically categorized into icepick, boxcar, and rolling scars, each reflecting distinct clinical and histopathological characteristics related to scar depth and collagen architecture [6] [7]. Hypertrophic and keloid scars, although less common, are characterized by excessive collagen deposition and show a predilection for specific anatomical sites and skin phototypes [8]. In most patients, multiple scar types coexist, which underlies the rationale for combined therapeutic strategies rather than single-modality treatments. Current treatment options include energy-based devices such as ablative and non-ablative fractional lasers to promote dermal remodeling [8] [9], subcision techniques aimed at releasing fibrotic tethering in rolling scars, chemical peels for superficial scar refinement, and injectable approaches including fillers and biostimulatory agents to restore dermal volume and improve skin quality.

Rolling scars are characterized by broad, shallow depressions with sloping edges, caused by dermal tethering and loss of subcutaneous tissue. One of the most prescribed treatments for severe acne is oral retinoids, such as isotretinoin, which reduce sebaceous gland activity, a key factor in acne pathogenesis. However, while isotretinoin effectively controls active acne, its role in supporting post-acne skin regeneration remains limited, and some reports have raised concerns about delayed wound healing in certain contexts [3].

To date, multiple treatment modalities have been investigated for rolling acne

scars, including ablative and non-ablative laser therapies, chemical peels, microneedling, subcision, and various dermal fillers. Each approach has demonstrated varying degrees of efficacy, balanced by differences in invasiveness, downtime, and adverse event profile. For instance, ablative fractional CO₂ lasers remain one of the most widely studied modalities [10]. However, the beneficial outcomes are often accompanied by significant recovery periods, risk of post-inflammatory hyperpigmentation [11]. Subcision, another popular option for rolling scars, provides mechanical release of dermal tethering. Nevertheless, subcision may result in bruising, hematomas, and variable outcomes, depending on operator skill and scar morphology. Using the subcision method alone carries a risk of scar fibrosis: after subcision, the released fibrotic tissue may stick back down again during healing [12].

Beyond device-based and surgical approaches, injectable biorevitalization techniques have emerged as validated strategies to improve superficial skin quality. The BioNutriLift injection protocol, combines structured hyaluronic acid delivery with polyrevitalizing microinjections to enhance dermal hydration, elasticity, and overall skin texture, addressing surface irregularities rather than deep fibrotic defects [13]. This approach has been clinically validated for skin quality improvement and may represent a complementary modality in multimodal acne scar management, particularly for the treatment of residual textural alterations and global skin quality.

The objective of this prospective clinical preliminary pilot study was to evaluate the performance of a combined protocol using the subcision method in combination with the injection of a hyaluronic acid based filler and a polyrevitalizing solution, for the treatment of rolling acne scars using a fan technique. The study focused on both objective assessments by investigators and subjective evaluations by subjects.

2. Materials and Methods

2.1. Study Product

NCTF®135 HA is a polyrevitalizing solution (PRS) composed of hyaluronic acid, amino acids, vitamins [13], coenzymes, nucleic acids, minerals, and antioxidants. It is designed to promote dermal hydration, stimulate fibroblast activity, and improve overall skin quality. ART FILLER Universal® is a specific combination of different crosslinked hyaluronic acid containing 0.3% by weight of lidocaine hydrochloride for its anesthetic properties.

2.2. Study Design and Setting

This is an Investigator Initiative Trial on six subjects presenting rolling-type acne scars of moderate to severe grade (score ≥ 2). All participants signed a written consent form and underwent a single full-face treatment session using a combination of ART FILLER® Universal (Fillmed Laboratories, France) and NCTF® 135HA (FILLMED Laboratories, France). A local anesthetic injection was performed to the entire zone prior to the procedure. All injections were performed under sterile conditions by the same physician.

Subcision was performed using an 18 G Nokor needle to release fibrotic scar bands. Injections were then carried out with a blunt-tip cannula, following the Bio-NutriLift™ technique. HA Filler was first injected into the mid to deep dermis for volume restoration, followed by Polyrevitalizing solution into the dermis and subdermis to break the under-scar fibrosis while promoting the bio-stimulation and improving skin healing and quality. Products were injected locally in acne-scar areas through the same entry points (**Figure 1**). Product depth and quantity adjusted according to individual topography. Follow-up assessments were conducted at Day 180 (6 months) post-treatment to evaluate safety, tolerability, and clinical outcomes.

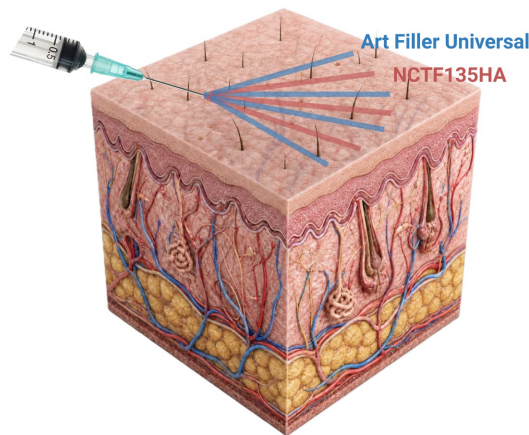


Figure 1. Representative scheme of injection sites within subject skin. Subcision was performed to release fibrotic scar bands. HA Filler was first injected into the mid to deep dermis for volume restoration, followed by NCTF into the dermis and subdermis to break the under-scar fibrosis.

2.3. Population and Inclusion Criteria

The 2 females and 4 males subjects were enrolled for this study, with a mean age of 29-year-old. Their individual characteristics were summarized in **Table 1**. Participants were screened for eligibility before enrollment in order to reduce confounding factors and improve reproducibility.

Inclusion criteria:

- Adults aged 18 years or older;
- Presence of clinically visible post-acne scars of the face considered appropriate for treatment with subcision;
- Stable acne scar burden at baseline, with scars present for at least 6 months before enrollment;
- No active inflammatory acne requiring systemic therapy at the time of inclusion, or only minimal/residual acne activity not expected to interfere with scar assessment;
- Willingness to avoid initiation of new scar-directed procedures, topical regimens, or systemic acne treatments during the study period;
- Ability to comply with the study visits, treatment sessions, and follow-up assessments.

Table 1. Baseline participant characteristics (age, sex, Fitzpatrick phototype, scar location distribution, baseline scar severity range, and concomitant skincare/medications).

Age at time of study conclusion	Sex	Fitzpatrick type	Scar location	Prior treatment
29	F	3	Mid-cheek	None
19	M	2	Temple, cheek, chin	None
25	M	3	Cheeks, chin, forehead	Oral retinoids a year before treatment
30	M	3	Cheeks, temple	None
34	F	2	Cheeks, chin	None
37	M	3	Cheeks	None

Exclusion criteria:

- Predominantly active inflammatory acne, acne conglobata, or other active facial dermatoses that could interfere with evaluation;
- Hypertrophic scars or keloid tendency;
- Facial infection, herpes simplex outbreak, or other local condition at the treatment site at baseline;
- Known hypersensitivity to any component of the injected product;
- Coagulation disorders, use of anticoagulants or antiplatelet medication that could increase procedural risk;
- Pregnancy or breastfeeding;
- History of autoimmune disease, uncontrolled systemic disease, or impaired wound healing, where relevant to procedural safety;
- Use of isotretinoin within the predefined washout period;
- Any prior scar treatment within the predefined washout period likely to affect baseline appearance or outcome assessment;
- Participation in another interventional clinical study during the study period.

2.4. Active Acne Status

Active acne status was documented at baseline. Participants with moderate-to-severe active inflammatory acne were excluded in order to avoid confounding from ongoing inflammation and concurrent treatment needs. Participants with absent, minimal, or clinically stable acne activity could be included, provided that acne severity was not expected to significantly influence scar outcome assessments.

2.5. Evaluation Parameters

The 5-point Acne Scar Assessment Scale (ASAS), rated by both physician and subjects, was evaluated at baseline and at D180 [14].

Acne Scar Improvement Score, adapted from the scale described by Dierickx *et al.* [15], was also used to evaluate categorized improvement based on percentage

change from baseline.

The Global Aesthetic Improvement Scale (GAIS) from both injector and subjects' perspective using a 5-point scale was determined and recorded.

Finally, a VISIA® photography was performed before the intervention and 180 days post-injections using a standardized high-resolution facial imaging.

Clinical evaluations were based on validated scales and included both investigator-reported and patient-reported outcomes. Physician-rated ASAS scoring was performed by an independent evaluator. Standardized VISIA® imaging was conducted under consistent lighting and positioning conditions.

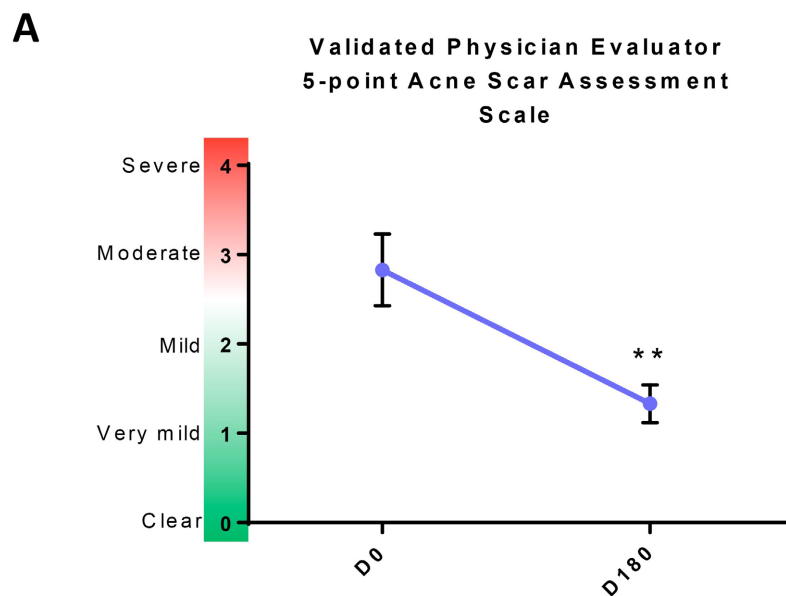
2.6. Statistical Methods

Descriptive statistics were used for baseline characteristics. Changes from baseline were analyzed using Wilcoxon signed-rank tests. A p -value < 0.05 was considered statistically significant. In addition to p -values, mean changes with 95% confidence intervals (CI) were calculated to better characterize the magnitude and precision of treatment effects. Given the small sample size ($n = 6$), these estimates should be interpreted as exploratory. No formal adjustment for multiple comparisons was applied.

3. Results

3.1. Acne Scar Assessment Scale

At Day 180 post-injection, acne scar severity was evaluated by an independent physician using the 5-point Acne Scar Assessment Scale (ASAS) as described by Munavalli *et al.* [14]. As shown in **Figure 2(A)**, treatment with injections led to a statistically significant reduction in acne scar severity. The mean ASAS score decreased from 2.83 to 1.33, corresponding to a mean change of -1.50 (95% CI: -2.38 to -0.62 ; $p = 0.008$).



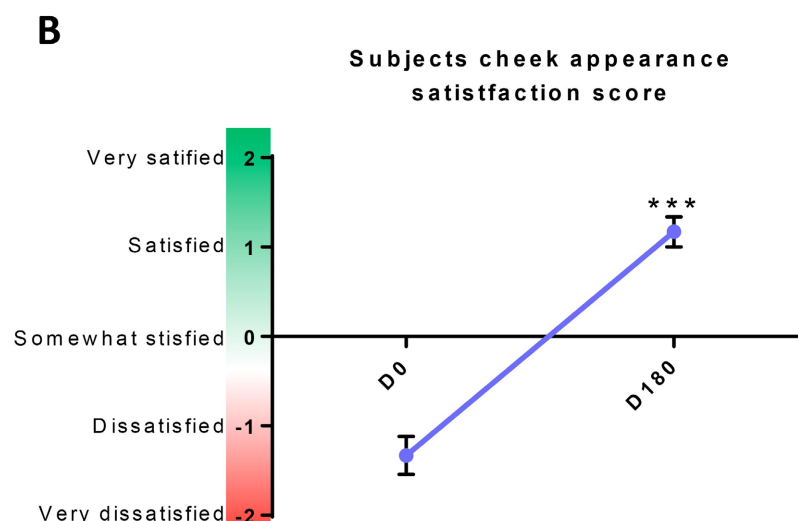


Figure 2. Mean Change in ASAS Score from Baseline to D180. (A) Physician evaluation in ASAS, Clear = no depression, Very mild = a single depression, Mild = few to several depressions detectable with direct lighting, Moderate = more than half of depressions are apparent, Severe = all lesions can be seen; (B) Subjects cheek appearance grading by the subject self-assessment (Baseline vs D180). ** $p < 0.01$; *** $p < 0.001$ D0 vs. D180.

3.2. Self-Assessment Scale

The clinical improvement was supported by subject-reported outcomes using a Self-Assessment Scale (**Figure 2(B)**), which showed a significant improvement in subject satisfaction, from a mean score of -1.33 (Dissatisfied) at baseline to $+1.17$ (Satisfied) at Day 180 corresponding to a mean change of $+2.50$ (95% CI: $+1.93$ to $+3.07$; $p < 0.001$).

3.3. Acne Scar Improvement Score

Treatment efficacy was further evaluated using an adapted Acne Scar Improvement Score derived from the method of Dierickx *et al.* [15]. The average improvement score increased significantly from 0 (No improvement) at baseline to 2.83 (Good improvement) at Day 180, mean change of $+2.83$ (95% CI: $+2.04$ to $+3.62$; $p < 0.001$) (**Figure 3(A)**). Among the six enrolled subjects, four demonstrated an improvement of at least three grades, while the remaining subjects showed a two-grade improvement.

To further demonstrate the treatment benefits, subject full faces were photographed before and 180 days after the injections (**Figure 3(B)**). Standardized photos showed visible reductions in scar depth, smoother contours, and more uniform skin texture. These visual outcomes correlated well with both subjective and objective measures.

3.4. Global Aesthetic Improvement Scale

Both physician and subject satisfaction levels were evaluated using the 6-point Global Aesthetic Improvement Scale (GAIS). As shown in **Figure 4**, the injector-

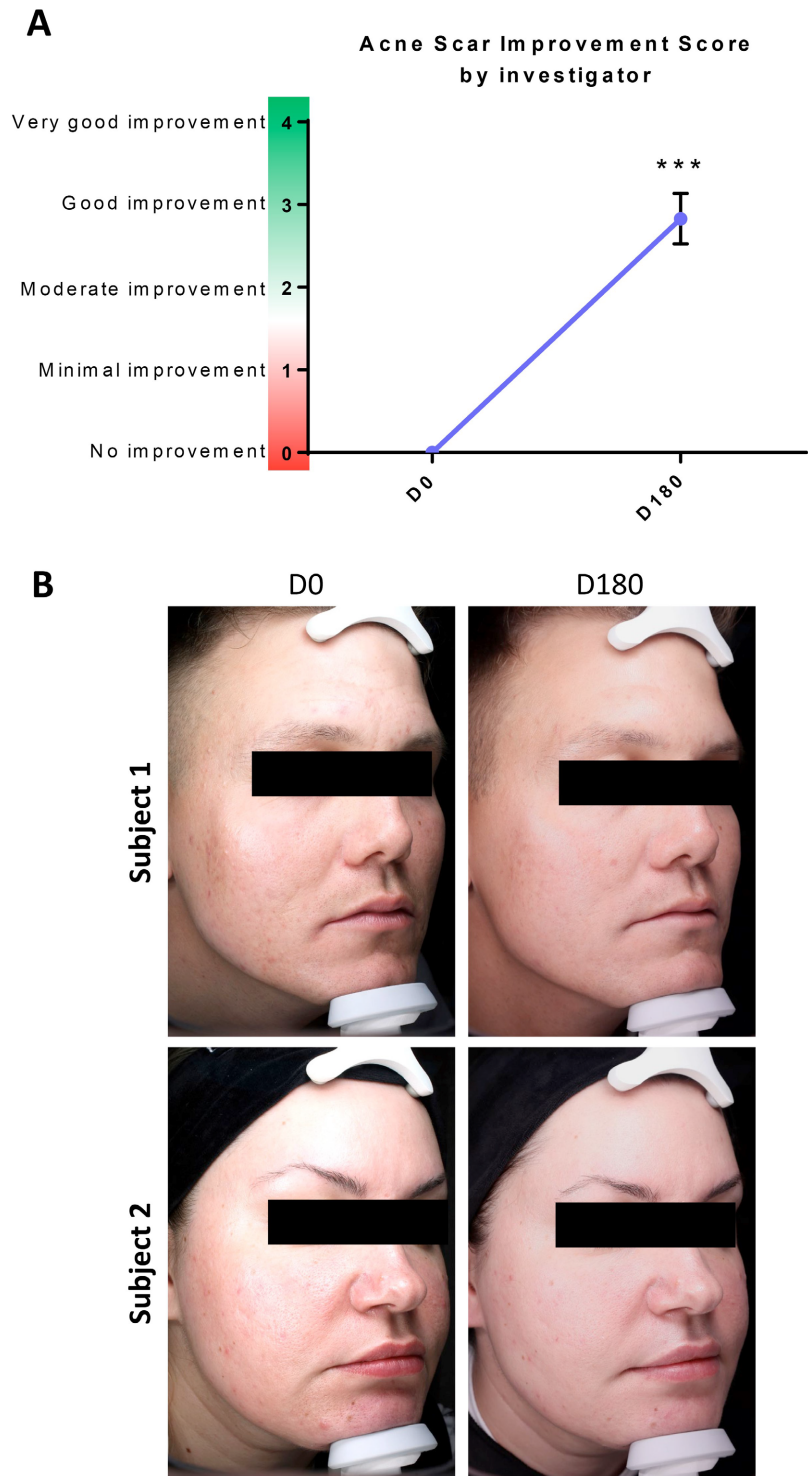


Figure 3. (A) Mean change in Acne Scar Improvement Score from Baseline to D180. Minimal = improvement < 25%, Moderate = improvement 25 - 49%, Good = improvement 50 - 74%, Very good = improvement > 75%; *** $p < 0.001$ D0 vs. D180; (B) VISIA Imaging comparison pre- and post-Treatment of two representative subjects.

assessed GAIS score demonstrated a significant improvement of 2 grades between

Day 0 and Day 180, mean change of -1.83 (95% CI: -2.26 to -1.40 ; $p < 0.001$). Specifically, five subjects were rated as having achieved “moderate improvement”, and one as “minimal improvement” (**Figure 4(A)**). Notably, self-assessments revealed an even more pronounced perception of benefit, with an average improvement of 3 grades at Day 180 mean change of $+3.17$ (95% CI: $+2.74$ to $+3.60$; $p < 0.001$) (**Figure 4(B)**). Four subjects rated their outcome as “good improvement”, and one reported a “very much improved” result. No subjects rated their results as unchanged or worse.

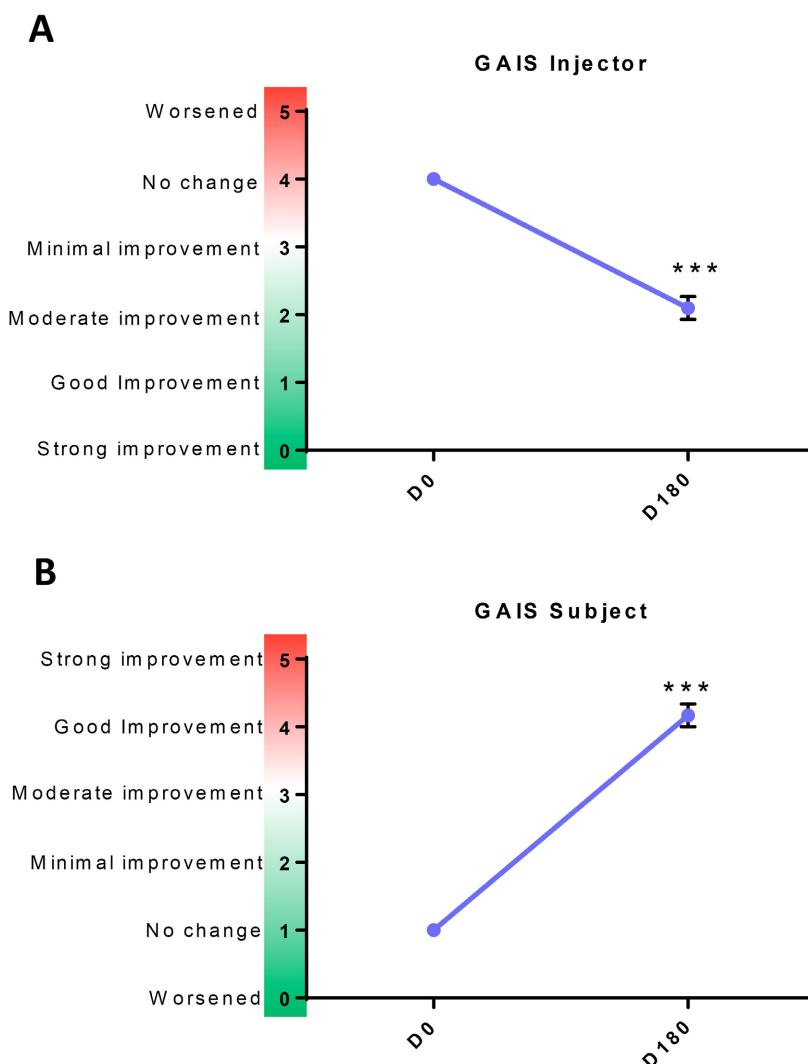


Figure 4. Mean change in Injector (A) and Patient (B) Global Aesthetic Improvement (GAIS) Ratings at D0 and D180 post-injections. *** $p < 0.001$ D0 vs. D180.

3.5. Safety and Adverse Reactions

Treatment tolerability was evaluated through systematic collection of solicited and unsolicited adverse events at each study visit. Solicited reactions included pain, erythema, edema, bruising, tenderness, pruritus, and palpable irregularities. Each event was characterized by severity, duration, and any management re-

quired. Unsolicited adverse events were also documented throughout follow-up.

Particular attention was given to nodules, vascular events, pigmentation changes, prolonged edema, infection, and any worsening of scar appearance. Overall tolerability was determined based on the incidence, severity, and resolution of these events.

4 out of 6 patients report transient edema and erythema at treatment site, lasting 2 - 4 days. 3 patients report bruising at treatment site, lasting 8 days to full resolution. No unsolicited adverse events were reported.

4. Discussion

An improved understanding of the pathophysiology of acne scarring has led to the development of several therapeutic options, including ablative and non-ablative laser resurfacing, subcision, microneedling, and dermal fillers [16]. Despite their efficacy, these interventions often come with limitations such as the higher phototypes, prolonged downtime, risk of post-inflammatory hyperpigmentation, and inconsistent results. Consequently, combining different methods has become a necessity in order to prolong the effect and achieve a synergistic action while minimizing side effects.

Hyaluronic acid (HA) fillers have been previously explored for atrophic acne scars due to their volumizing effect and biostimulatory properties [17]. They can be used alone or combined with subcision. Their use with subcision demonstrated more efficiency as it can prevent scar reattachment by maintaining tissue separation during healing, thereby enhancing clinical outcomes and minimizing the risk of fibrotic healing. In this case study, a polyrevitalizing solution was added to the procedure. It is composed of non-crosslinked HA combined with a cocktail of bioactive compounds, including amino acids, vitamins, coenzymes, nucleotides, and antioxidants. It provides better dermal microenvironment after tissue release during the “repair mode” after subcision. This product enhances extracellular matrix renewal by stimulating fibroblast stimulation and collagen synthesis leading to better healing post subcision. In addition, mean ASAS score decreased from 2.83 to 1.33 (–1.5 points) in this study at D180 suggesting that this combined protocol achieves more than transient plumping, but may also induce dermal remodeling. The subject-reported outcomes via the 3-grade improvement on the GAIS scale, further highlight the perceived benefit of this intervention. Previous study has consistently emphasized the psychosocial burden of acne scarring, including reduced self-esteem, anxiety, and depression [18]. The fact that none of the subjects rated their results as unchanged or worse is notable and supports the consistency of the treatment effect.

The Acne Scar Improvement Score adapted from Dierickx *et al.* [15], though originally designed for evaluating laser-based interventions, proved useful in our study for quantifying relative clinical benefit. An average score of 2.83, corresponding to “good improvement”, underscores the magnitude of response after a single session. While lasers and energy-based devices typically require 3 - 5 ses-

sions to achieve similar levels of improvement [19], our data support that even one injection session of the combined solution can yield substantial and sustained benefit.

The mechanism by which the polyrevitalizing solution exerts its effect remains speculative but may involve the restoration of skin depressions via HA and enhanced fibroblast activity due to the presence of vitamins, coenzymes, and amino acids. Further investigations are needed to better understand this histological process. Furthermore, a larger cohort would be necessary to confirm efficacy and reproducibility of our observations. Finally, the study population consisted of individuals with rolling scars; future studies could investigate the efficacy of this combined protocol on other types of atrophic scars, such as boxcar or icepick scars.

In conclusion, our preliminary findings suggest that combining polyrevitalizing solution and filler protocol to subcision method is a promising, well-tolerated, and effective injectable treatment for rolling acne scars. It offers substantial aesthetic improvement with minimal invasiveness, aligning with subject demand for procedures that are both effective and have low downtime. While these results are encouraging, larger controlled studies with long-term follow-up and histological correlation are needed to fully elucidate the therapeutic role of these injectables in acne scar management.

Conflicts of Interest

Independent investigator AB was responsible for patient recruitment, treatment administration, and clinical evaluations. FF, RK, PBK, and HI are affiliated with FILLMED Laboratories, the manufacturer of the products evaluated in this study. The study was supported by FILLMED Laboratories.

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