A Groundbreaking 4-Step Combined Treatment for Asian Skin with Atrophic Acne Scars and Post-Inflammatory Erythema

Dr. Nadav Pam (M.D) Formatk Systems, Israel
Dr Tang-Tung Pham M.D, Dermatologist, Founder of Dr Simple clinic
Dr Van Thi Nhu Y M.D , Dermatologist, Co-Founder of Dr. Simple clinic

www.forma-tk.com

Case study: A Groundbreaking 4-Step Combined Treatment for Asian Skin with Atrophic Acne Scars and Post-Inflammatory Erythema

Dr. Nadav Pam M.D[1], Fromatk Clinical Director, certified CRA/ CTA /CRC by the Technion – Israel Institute of Technology 2022
Dr Tang-Tung Pham M.D[2], Dermatologist, Founder of Dr Simple clinic
Dr Van Thi Nhu Y M.D[3], Dermatologist, Co-Founder of Dr. Simple clinic
[1]FormaTK Systems Ltd Medical equipment manufacturer in Tirat Carmel - Yozma St 3, Tirat Carmel– Clinical Department.
[2] 2No 64/14, Cu Lao St, Ward 2, Phu Nhuan District, Ho Chi Minh City, Vietnam.

Overview of Acne Vulgaris Scars:
Acne vulgaris is fairly common in Asian populations, though its prevalence and severity can vary based on factors such as age, gender, genetics, and lifestyle. Studies indicate that acne is a common skin condition across Asia, with varying rates depending on the region and specific ethnic groups.

- In East Asia (e.g., China, Japan, Korea), acne affects about 40-50% of adolescents and young adults, with the highest prevalence typically observed in teenagers and those in their early 20s.
- Acne vulgaris is also common in South Asia (e.g., India and Pakistan), with some studies showing a prevalence rate of about 30-40% in adolescents. In these regions, acne may persist longer into adulthood than in other areas.
- In Southeast Asia (e.g., Thailand and Vietnam), acne vulgaris is reported in a significant percentage of the population, particularly among teens and young adults.
- The prevalence tends to be higher in teenagers and young adults, but it can affect individuals of all ages. Adult Acne Vulgaris, particularly in women, is also increasingly reported. Environmental factors, hormonal changes, diet, and genetics all play a role in the development of acne, and these factors can differ across regions and ethnicities.
- ·Acne scars are among the most persistent and distressing effects of acne vulgaris, significantly impacting a person's physical appearance, mental health, and social well-being. It is estimated that around 20-30% of individuals who experience acne vulgaris will develop some form of atrophic scars. However, the exact percentage can vary depending on the severity of acne and skin characteristics. Most people with atrophic acne scars tend to have a mix of scar types rather than just one type being predominant. The specific combination of scars can vary based on several factors, including the type and severity of acne, skin type, and the body's healing response. It's common for people to have a blend of icepick scars (deep and narrow), boxcar scars (broader and more defined), and rolling scars (with a wavy texture). The distribution of each type can depend on the location and severity of the original acne lesions. For example, rolling scars may be more prominent in areas with less dense collagen, while icepick scars may be more common in areas with more severe cystic acne.
- Post Inflammatory Erythema (PIE) is a temporary skin condition characterized by redness or pinkness due to inflammation or injury.

Post-Acne Scar treatments that stimulate Inflammatory Erythema (PIE):

Subcision is a minimally invasive procedure that can be performed to treat Acne Vulgaris scars in an outpatient setting with local anesthesia. PIE often occurs after subcision procedures due to the trauma caused to the skin during treatment. Subcision involves using a needle or small blade to break up the fibrous bands beneath the skin that cause scars or indentations. This process triggers a healing response, leading to inflammation and increased blood flow to the area, resulting in redness. Deeper, more severe acne scars may require more aggressive subcision, increasing the likelihood of trauma on the skin and, consequently, PIE.

Laser Treatments (e.g., Fractional CO_2, Er:YAG): Studies indicate that PIE occurs in about 10-20% of Asian patients undergoing acne scar treatments with fractional laser systems or similar energy-based devices. This is lower than the occurrence in Caucasians, which may be as high as 30-50%. However, PIE can still occur in some Asian individuals, especially those with sensitive skin or when the treatment is more aggressive.

Microneedling and RF Microneedling: Microneedling can cause mild erythema, with PIE affecting about 5-15% of Asian patients, particularly those with lighter skin types (Fitzpatrick II-III). RF microneedling, being less invasive, typically carries a lower risk of PIE, but it can still occur in individuals with sensitive skin or a history of inflammatory acne.

Chemical Peels (e.g., TCA, Glycolic Acid): Chemical peels, especially medium-depth ones, may induce PIE in about 10-20% of Asian patients. For higher-concentration TCA peels (over 80%), the likelihood of PIE increases due to the significant trauma caused to the skin, mainly if the skin is more sensitive.

Patients who undergo treatment for atrophic acne vulgaris often experience lingering Post-Inflammatory Erythema (PIE), and many seek additional treatments to address the redness and further improve their skin's appearance.

Aim:
This study evaluates the effectiveness and safety of an innovative four-step combined treatment specifically designed for Asian skin. It targets atrophic acne vulgaris scars and the post-inflammatory erythema resulting from the combination of subcision, TCA 80% cross, and CO_2 Fractional laser treatments for acne scars. The study will measure improvements in scar appearance, erythema reduction, overall patient satisfaction, and potential side effects of this novel treatment approach.

Methods:
This single-center, prospective observational case study was conducted by Dr. Tang-Tung Pham and Dr. Van Thi Nhu Y, a husband-and-wife dermatology team, at their clinic located at No. 64/14, Cu Lao St, Ward 2, Phu Nhuan District, Ho Chi Minh City, Vietnam.
Treatment Protocol:
Pre-Treatment: Topical anesthesia with Mi Caine Pro.
Step 1: Minimally invasive subcision using 21G and 23G fine needles.
Step 2: TCA 80% CROSS technique for ice pick scars, applied with a wooden toothpick.
Step 3: CO_2 Fractional Laser treatment with a scanning hand applicator to target acne scars.
Treatment Frequency: Depending on scar severity, 3-7 sessions were conducted at four-week intervals. Each session included all three treatment steps (subcision, TCA 80% CROSS, and CO_2 laser).
Step 4: To reduce post-inflammatory erythema (PIE), three treatment sessions were performed every two weeks using the Alpha System and 3D IPL S590 Applicator (manufactured by FormaTK Systems, Tirat Carmel, Israel).
Skin Type Assessment: Measured using a melanin meter.
Pre-Treatment Preparation: Parker Gel was applied before IPL treatment.
Safety Measures: Both the IPL practitioner and the patient wore protective IPL goggles.
IPL Treatment Parameters
S590nm Applicator Mode: Single 10% overlap.
IPL Tip: Contact cooled to 5°C.
Pass 1: Full face at 12-13J/cm² (for skin types III-IV).
Pass 2: Cheeks at 14-15J/cm² (for skin types III-IV).
Pass 3: Spot treatment with a stencil at 16-20J/cm², increasing by 2J/cm² in each subsequent IPL session.
Dr. Nadav Pam, clinical director at FormaTK Systems, reviewed and evaluated clinical photographic images taken before and after treatment.

Inclusion criteria:
Acne Vulgaris Scar with PIE on the face.
Fitzpatrick skin types I-VI can be included.

Exclusion criteria:
1. Drug-induced photosensitivity (e.g. Isotretinoin, Retin A)
2. Pregnancy and breastfeeding
3. Cancer
4. Epilepsy
5. Severe diseases
6. Auto-immune diseases
7. Frequent episodes of labial Herpes Simplex in case of face Treatment
8. Immunosuppressive pharmacologic therapy
9. Any other medical condition considered contraindicated to the treatment by the investigator.
10. Any other treatments for acne vulgaris, such as drugs, topical creams/lotions, or other phototherapy by medical device.
11. All participants agree to refrain from exposure to the sun or solarium (solar lamps) during the whole study period.

Results:
The study involved 10 patients (three males and seven females) aged 17-30 with Fitzpatrick skin types III-IV, all presenting with facial atrophic acne scars and post-inflammatory erythema (PIE). Each participant exhibited a combination of the three types of atrophic acne vulgaris scars: Ice Pick, Rolling, and Boxcar. PIE developed in all patients as a secondary effect of acne scar treatments, primarily due to subcision and CO_2 laser therapy, with a lesser extent attributed to the TCA 80% CROSS technique. Notably, significant improvement was observed in all patients after just two sessions of 3D IPL 590nm treatment with the Alpha System, conducted at two-week intervals. No adverse effects were reported throughout the study.

Patient 1: Female

Before

After 2 Treatments

Before

After 2 Treatments

Patient 2: Female

Before

After 2 Treatments

Patient 3: Male

Before

After 2 Treatments

Patient 4: Male

Before

After 2 Treatments

Patient 5: Female

Before

After 2 Treatments

Discussion:

This study evaluated the efficacy of a multimodal treatment approach for atrophic acne scars and post-inflammatory erythema (PIE) in a cohort of 10 patients with Fitzpatrick skin types III-IV. The treatment protocol combined minimally invasive subcision, TCA 80% CROSS, CO_2 fractional laser therapy, and IPL using the Alpha System with the 3D IPL S590 Applicator.

A key observation was that while subcision and CO_2 laser effectively improved the depth and texture of acne scars, they also contributed to the development of PIE, a typical post-treatment inflammatory response. Adding the Alpha System 3D IPL 590nm proved highly effective in addressing PIE, with patients reporting noticeable improvements after just two sessions. These findings align with previous research demonstrating the role of IPL in reducing vascular erythema and stimulating collagen remodeling.

The study's results indicate that this combination approach is effective and well-tolerated. No adverse effects were reported, suggesting the protocol is safe for Fitzpatrick skin types III-IV when proper cooling and energy settings are used. The contact cooling at 5°C likely contributed to minimizing thermal damage and discomfort, enhancing patient safety and satisfaction.

Despite the promising outcomes, the study is limited by its small sample size and single-center design. A more extensive, randomized, controlled study with long-term follow-up would be beneficial to validate these findings further and assess the durability of the treatment effects.

Conclusions:

This prospective observational case study demonstrates that a multimodal treatment protocol combining subcision, TCA 80% CROSS, CO_2 fractional laser, and 3D IPL 590nm effectively improves atrophic acne scars while addressing post-inflammatory erythema. The addition of IPL treatment resulted in significant PIE reduction after just two sessions, with no reported side effects. These findings highlight the potential of this protocol as a safe and effective approach for patients with Fitzpatrick skin types III-IV. Further research with a larger sample size is warranted to confirm these results and optimize treatment parameters.

Reference:

[1] Hu S, Chen MC, Lee MC, Yang LC, Keoprasom N. Fractional resurfacing for the treatment of atrophic facial acne scars in asian skin. Dermatol Surg. 2009 May;35(5):826-32. doi: 10.1111/j.1524-4725.2009.01139.x. Epub 2009 Apr 6. PMID: 19397671

[2] Hwang YJ, Lee YN, Lee YW, Choe YB, Ahn KJ. Treatment of acne scars and wrinkles in asian patients using carbon-dioxide fractional laser resurfacing: its effects on skin biophysical profiles. Ann Dermatol. 2013 Nov;25(4):445-53. doi: 10.5021/ad.2013.25.4.445. Epub 2013 Nov 30. PMID: 24371392; PMCID: PMC3870213.

[3] Oon HH, Wong SN, Aw DCW, Cheong WK, Goh CL, Tan HH. Acne Management Guidelines by the Dermatological Society of Singapore. J Clin Aesthet Dermatol. 2019 Jul;12(7):34-50. Epub 2019 Jul 1. PMID: 31531161; PMCID: PMC6715335.

[4] Salameh F, Shumaker PR, Goodman GJ, Spring LK, Seago M, Alam M, Al-Niaimi F, Cassuto D, Chan HH, Dierickx C, Donelan M, Gauglitz GG, Haedersdal M, Krakowski AC, Manuskiatti W, Norbury WB, Ogawa R, Ozog DM, Paasch U, Victor Ross E, Clementoni MT, Waibel J, Bayat A, Goo BL, Artzi O. Energy-based devices for the treatment of Acne Scars: 2022 International consensus recommendations. Lasers Surg Med. 2022 Jan;54(1):10-26. doi: 10.1002/lsm.23484. Epub 2021 Oct 31. PMID: 34719045.

[5] Li J, Duan F, Kuang J, Liu X, Pan J, Wei J, Zhao J. Fractional picosecond laser treatment of non-acne atrophic scars and scar erythema in Chinese patients. Skin Res Technol. 2024 Jul;30(7):e13856. doi: 10.1111/srt.13856. PMID: 39031924; PMCID: PMC11259539

formatk

Taking care of you