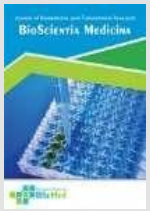
eISSN (Online): 2598-0580



Bioscientia Medicina: Journal of Biomedicine & Translational Research

Journal Homepage: www.bioscmed.com

Combination Procedure for Acne Scars Revision, Is It Needed?

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ARTICLE INFO

Keywords:
Acne scars
Dermal fillers
Microneedling radiofrequency
Polydeoxyribonucleotide
TCA CROSS

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All authors have reviewed and approved the final version of the manuscript.

https://doi.org/10.37275/bsm.v8i4.954

A B S T R A C T

Background: The treatment of acne scars is a problem for dermatologist. Varied morphology of acne scars makes the treatment more difficult. Combination technique has high efficacy than monotherapy. The challenge is how to select best combination procedure for scar revision. **Case presentation:** A 43-year-old male present with acne scars since 5 years ago. Dermatological findings revealed atrophic acne scars (ice pick, boxcar, rolling) types on forehead, nose and cheeks. Diagnosis established as moderate atrophic acne scars with global acne scarring system (GASS) is 21. Patient treated with blunt canula subcision, hyaluronic acid (HA) filler, microneedling radiofrequency, 90% trichloroacetic acid chemical reconstruction of skin scars (TCA CROSS) and application of salmon polydeoxyribonucleotide (PDRN). Patient also received topical 0.05% retinoic acid, 4% niacinamide, and sunscreen for daily. After 10 days, there is flattening and disappear of ice pick and boxcar, elevating of rolling scar, GASS score is 15. Blunt cannula subcision and HA filler is safe, effective for rolling scar through fibrous band breaking and prevent re-adhesion. Microneedling RF is effective for boxcar, otherwise 90% TCA CROSS preferrable for ice pick scars. This combination procedure leading cellular necrosis in epidermis, collagen in dermis, and stimulate regeneration. Application of Salmon PDRN may promote wound healing, hydrate the epidermis, and prevent dyschromia. **Conclusion:** Combination of subcision, dermal filler, microneedling radiofrequency, 90% TCA CROSS, and Salmon PDRN has high efficacy for scar revision through collagen remodelling and acceleration wound healing.

1. Introduction

Atrophic acne scars are categorized into ice pick, rolling, and boxcar. Several modalities have been used for atrophic acne scaring, including resurfacing, surgical, volume, and lifting procedures. Combination therapies are more effective than single treatments because patients typically have different types of scars.[1] Each procedure is best suited to a particular type of scar, and each has risks and benefits.[2] Subcision and microneedling are minimally invasive modalities that can be included in multimodality therapies.[3] Microneedle radiofrequency (MRF) delivers heat to the dermal structures without causing any epidermal damage.[4] Hyaluronic acid (HA) fillers are viscous materials that are injected into the depressed scar to elevate it to the normal level of surrounding skin.[5]

Chemical reconstruction of skin scars (CROSS) consists of the focal application of 90% trichloroacetic acid (TCA) concentrations which promotes dermal collagen remodelling, especially ice pick scars.[6,7] The application of polydeoxyribonucleotide (PDRN) from Salmon sperm fish for aesthetic procedures is relatively new. The mechanism of PDRN is to promote tissue regeneration and accelerate wound healing.[8] This case reported the combination of blunt cannula

subcision, HA dermal filler, microneedling RF, 90% TCA CROSS, and Salmon PDRN for acne scar revision in one session procedure.

2. Case Presentation

A 43-year-old male presents with acne scars that have felt rough and greasy on both cheeks since 5 years ago. These acne scars were felt to be a bit disturbing in appearance but did not make him embarrassed, insecure, and uncomfortable. The patient had a past history of acne for 15 years. The pimples were in the form of red bumps, multiple comedones, and pustules. The patient often squeezes and manipulates his acne.

Dermatological findings I revealed atrophic acne scars on the forehead, nose, and both cheeks (ice pick, boxcar, rolling types). Dermatological findings II revealed erythematous macules on the left lateral chin with irregular shapes and undefined borders. Dermatological findings III revealed brown macules on both cheeks. Goodman and Baron's quantitative global acne scar grading, the total score is 21, and qualitative revealed moderate acne scar. The Glogou aging scale showed early to moderate photoaging.

Based on physical examination, diagnosis is established as moderate atrophic acne scars (ice pick, boxcar, rolling scars type), port wine stain, epidermal melasma, and early to moderate photoaging. The patient has planned to be treated with combination scar revision procedures.

Figure 1. Atrophic scars ice pick (black arrow), box car (blue arrow), rolling (black circle). Port wine stain (black square). Melasma (red round).

Before the procedure, the patient has agreed by signing informed consent and approval for scientific publication. The patient underwent topical anesthesia with 20 grams of 10,56% lidocaine cream for 60 minutes. The first procedure is injection of 2% lidocaine 0,5 cc to the entry point of a needle, then puncture of the skin with an 18 G needle, and inserting 23 G blunt cannula into a rolling scar. Subcision was performed with back and forth of the cannula under the scars to break the fibrous strand. The second procedure is dermal filler. The rolling scar, which has subcision, is then filled with 0,2-0,4 cc HA on each area until it appears at elevation.

Figure 2. Lidocain infiltration, 18 G needle puncture to make entry point, 23 G blunt cannula subcision, HA dermal filler.

The third procedure is MRF. The atrophic area was treated with 49-needle MRF, 300 ms, 1,5 mm depth on cheeks, and 0,5 mm on the forehead for 25 minutes; the endpoint is pinpoint bleeding. After MRF, the skin was compressed with cold saline water for 10 minutes.

The fourth procedure is 90% TCA CROSS. After identification of the ice pick scars, each scar is carefully treated with 90 % TCA using a toothpick applicator. Observe frosting of the skin where the treated area initially turns white and later red in colour. The last procedure is application 1 ml solution named skin booster which has contain non cross link HA, salmon PDRN, ascorbic acid, and growth factor on all face areas. Apply topical antibiotics and the patient is prohibited from washing the face for 4 hours after the procedures.

Figure 3. Endpoint MRF is pinpoint bleeding, saline water compress for 10 minutes, application of 90% TCA CROSS with a toothpick, and topical application of skin booster solution.

The patient was educated on applying proper sunscreen and avoiding sun exposure. Each lesion then scabs after a few days, creating wounds and healing to generate new skin that feels soft and moist. Follow-up on the tenth day: the patient felt the skin was smoother, the pores were smaller, the acne scars felt more even, and the skin tone was brighter. There is no hyperpigmentation nor a reddish patch on the procedure area. The patient was advised to continue dermo-cosmeceutical therapy. The patient has planned for chemical peeling to treat the melasma and vascular laser to treat the port wine stain.

Figure 4. After 10 days, ice pick scars and boxcars are more lifting; rolling scars appear elevated on both cheeks.

3. Discussion

Atrophic scars are divided into 3 types, namely ice pick, rolling type, and boxcar type. Ice pick type is a small atrophic scar (diameter < 2 mm) with a depth ranging from the dermis to the subcutis, wide on the surface, and tapers to the base. The rolling type is usually shallow, 4-5 mm in diameter and undulating. Boxcar type is a well-defined scar with the same surface and base diameter.[9,13]

Dermatological findings revealed three types of atrophic scars were found which are dominated by ice pick and boxcar-type scars. Subcision and dermal

filler, microneedling RF, and TCA CROSS are preferable therapies for this patient. The patient was also treated with dermo-cosmeceuticals therapy and a combination procedure. The purpose of therapy is to reduce the deep of the scar and improve skin appearance.

The patient received topical 0,05% retinoic acid, 4% niacinamide, moisturizer, and sunscreen. Retinoic acid and niacinamide mechanisms normalize desquamation, inhibit melanogenesis, promote differentiation, and balance the dermal matrix remodelling. This topical medication simultaneously increases the efficacy of the scar revision procedure.[9-12]

The patient was treated with a combination of blunt cannula subcision and dermal filler, MRF, 90% TCA CROSS, and topical salmon PDRN. After 10 days, there is a significant improvement in the appearance of the acne scars. The global acne scarring system (GASS) score was reduced from 21 to 15 in 10 days.

The procedure was well tolerated by patients. There is no procedure-related erythema and oedema in 3 days and 10 days after the procedure. Pain and discomfort sensations during and after the procedure are well tolerated. Adverse effects, including infection, erythema, and post-inflammatory hyperpigmentation, were not noted. The downtime was minimal, and there was no post-procedure loss of work days.

Subcision is an important procedure to release tethering of the epidermis to the dermis that is present in many atrophic scars, especially rolling scars, and enhances neo-collagenesis. It has been successfully combined with microneedling RF and fractional CO_2 laser.[14-16] In this case, we performed subcision with a blunt cannula in 2 areas (right and left cheek). During the subcision, the patient did not feel any pain, and there was no bleeding in the puncture area. After full subcision, the empty space is filled with hyaluronic acid fillers immediately.

Gheisari et al. (2018) report that blunt cannula subcision has promising outcomes, including lesser or milder complications and single-session treatment instead of repeating perforations compared with other conventional surgery-based methods for acne scar remediation. Furthermore, the current study revealed that blunt cannula subcision is preferred to Nokor needle subcision, considering the point of view of dermatologists and patients.[18]

Hyaluronic acid (HA)--based fillers are effective at mitigating acne scars due to their filling effect. A low-viscosity stabilized HA dermal filler, injected in microdoses into the mid-to-superficial dermis, may provide a useful new approach to improving the appearance of depressed acne scars.[20] Dermal injection of HA revealed a significant reduction in the number of atrophic rolling scars as compared to saline without any significant side effects.[21]

Microneedle RF (MRF) uses microneedles that deliver electrical current to the dermal structures at the desired depth without causing any epidermal damage (non-ablative). The heat delivered via MRF has been associated with both short-term (tightening of collagen in the helical structure) and long-term (fibroblast activation, collagen production, and tissue regeneration) effects.[4,17]

After 10 days, a combination of subcision, dermal filler, and microneedling RF revealed significant improvement. This result was the same as research conducted by Fagihi et al. in Iran (2017), which showed MRF plus subcision is a more effective modality in acne scar revision versus MRF monotherapy in grades 3 and 4 of atrophic acne scars.[19]

The application of TCA to the skin leads to cellular necrosis in the epidermis and necrosis of collagen in the papilla and reticular dermis. Therapy with 70% TCA CROSS is effective for all types, especially boxcar after fourth therapies. Application 100% TCA CROSS is a cost-effective modality for ice pick scars in individuals with darker skin, but there is a hypopigmentation transient effect.[22,23]

A study by Narayan (2019) described that a combination of subcision, MRF, and TCA CROSS with 3-week intervals for each session is effective for moderate-severe acne scar revision. Subcision is very effective for rolling scars with fibrotic strands,

microneedling takes care of boxcars and superficial rolling scars, and TCA CROSS works better for ice-pick scars with deep components in the dermis. This study revealed that intense oedema post-procedure complication is seen in only one patient following subcision.[24]

Based on physical examination, there are brown spots on both cheeks and static wrinkles on the forehead as signs of moderate photoaging. Chronic sun exposure was identified as a contributing factor for the patient. We need further therapy for this condition, such as topical skin bleaching agents, chemical peels, mesotherapy, and picosecond 1064 nm Nd-YAG LASER. As likely for acne scars, combination therapy provides higher efficacy for melasma than monotherapy.[27] Application of retinoic acid as night cream has anti-wrinkle properties and collagen against degradation.[25] Retinoic acid can attenuate acne scars and reduce post-acne hyperpigmentation.[26,27]

The application of polydeoxyribonucleotide (PDRN) marine products (salmon sperm) is relatively new. The mechanism of PDRN in wound healing contributes to DNA formation by generating nucleotides and nucleosides; this reactivates normal cell proliferation and growth patterns, leading to faster tissue regeneration and wound healing.[8] Combination of topical solution applied after the procedure containing PDRN, hyaluronic acid, growth factors, and ascorbic acid may promote and accelerate wound healing, repair skin aging, and improve skin pigmentation.

4. Conclusion

A combination procedure with blunt cannula subcision, dermal filler, microneedling RF, 90% TCA CROSS, and application of salmon PDRN is effective for treating various atrophic acne scars.

5. References

1. Bhargava S, Cunha PR, Lee J, Kroumpouzos G. Acne scarring management: systematic review and evaluation of the evidence. Am J Clin Dermatol. 2018; 19: 459-77
2. Sánchez VM. Management of acne scars: fulfilling our duty of care for patients. Br J Dermatol. 2015; 172: 47-51.
3. Tam C, Khong J, Tam K, Vasilev R, Wu W, Hazany S. A comprehensive review of non-energy-based treatments for atrophic acne scarring. Clin Cosmet Investig Dermatol. 2022; 15: 455-69.
4. Simmons BJ, Griffith RD, Falto-Aizpurua LA, Nouri K. Use of radiofrequency in cosmetic dermatology: focus on non-ablative treatment of acne scars. Clin Cosmet Investig Dermatol. 2014; 7: 335-9.
5. Gheisari M, Iranmanesh B, Saghi B. Blunt cannula subcision is more efective than Nokor needle subcision for acne scars treatment. J Cosmet Dermatol. 2019; 18: 192–6.
6. Abrusci V, Benzecry V. Acne Scar: CROSS (chemical reconstruction of skin scar). In: Costa, A. editors. Minimally invasive aesthetic procedures. Springer, Cham 2020.
7. Garg S, Baveja S. Combination therapy in the management of atrophic acne scars. J Cutan Aesthet Surg. 2014; 7: 18-23.
8. Squadrito F, Bitto A, Irrera N, Pizzino G, Pallio G, Minutoli L, et al. Pharmacological activity and clinical use of PDRN Front Pharmacol. 2017; 8; 224
9. Connolly D, Vu HL, Mariwalla K, Saedi N. Acne scarring-pathogenesis, evaluation, and treatment options. J Clin Aesthet Dermatol 2017; 10: 12–23.
10. Leyden J, Stein-Gold L, Weiss J. Why topical retinoids are mainstay of therapy for acne. Dermatol Ther (Heidelb). 2017; 7(3): 293-304.
11. Weiss J, Stein Gold L, Leoni M, Rueda MJ, Liu H, Tanghetti E. Customized single-agent therapy management of severe inflammatory acne: a randomized, double-blind, parallel-group, controlled study of a new treatment-adapalene 0.3%-benzoyl Peroxide 2.5% Gel. J Drugs Dermatol. 2015; 14: 1427–35.

12. Rachmin I, Ostrowski SM, Weng QY, Fisher DE. Topical treatment strategies to manipulate human skin pigmentation. Adv Drug Deliv Rev. 2020; 153; 65-71.
13. Goh C, Cheng C, Agak G, Zaenglein AL, Graber EM, Thiboutot DM, et al. Acne vulgaris. In: Kang S, Amagai M, Bruckner AL, Enk AJ, Margolis DJ, McMichael AI, et al. editors. Fitzpatrick's Dermatology 9th ed. McGraw-Hill Education. 2019; 1319–412.
14. Anupama YG, Wahab AJ. Effectiveness of CO_2 laser with subcision in patients with acne scars. J Cosmet Laser Ther. 2016; 18: 367-71.
15. Nilforoushzadeh MA, Faghihi G, Jaffary F, Haftbaradaran E, Hoseini SM, Mazaheri N. Fractional carbon dioxide laser and its combination with subcision in improving atrophic acne scars. Adv Biomed Res. 2017; 6: 20.
16. Faghihi G, Poostiyan N, Asilian A, et al. Efficacy of fractionated microneedle radiofrequency with and without adding subcision for the treatment of atrophic facial acne scars: a randomized split-face clinical study. J Cosmet Dermatol. 2017; 16: 223-29.
17. Vejjabhinanta V, Wanitphakdeedecha R, Limtanyakul P, Manuskiatti W. The efficacy in treatment of facial atrophic acne scars in Asians with a fractional radiofrequency microneedle system. J Eur Acad Dermatol Venereol. 2014; 28(9): 1219-25.
18. Gheisari M, Iranmanesh B, Saghi B. Blunt cannula subcision is more effective than Nokor needle subcision for acne scars treatment. J Cosmet Dermatol. 2018; 00: 1–5.
19. Ahramiyanpour N, Rastaghi F, Parvar SY, Sisakht AK, Hosseini SA, Amani M. Subcision in acne scarring: a review of clinical trials. J Cosmet Dermatol. 2023; 22: 744-51.
20. Mehrabi J, Shehadeh W, Gallo ES, Artzi O, Horovitz T. Comparison of 2 hyaluronic acid-based fillers for the treatment of acne scars: structural lifting versus biostimulatory effect. Dermatol Surg. 2023; 49(6): 581-6.
21. Siperstein R, Nestor E, Meran S, Grunebaum L. A split-face, blind, randomized placebo-controlled clinical trial investigating the efficacy and safety of hyaluronic acid filler for the correction of atrophic facial scars. J Cosmet Dermatol. 2022; 21: 3768-78.
22. Puri N. Comparative study of dermaroller therapy versus trichloroacetic acid CROSS for the treatment of atrophic acne scars. Journal of Pakistan Association of Dermatologists. 2015; 25(2): 114-8.
23. Leheta T, El Tawdy A, Abdel Hay RA, Farid S. Percutaneous collagen induction versus full-concentration trichloroacetic acid in the treatment of atrophic acne scars. Dermatologic surgery. 2016; 37(2): 207-16.
24. Narayanan S, Nallu K, Venu S, Ganapathi AR. Combined treatment modalities in atrophic acne scars: a prospective study. Int J Res Dermatol, 2019; 5(2): 1-5.
25. Zasada M, Budzisz E. Retinoids: active molecules influencing skin structure formation in cosmetic and dermatological treatments. Postepy Dermatol Alergol. 2019; 36(4): 392-97.
26. Bikash C, Sarkar R. Topical management of acne scars: the uncharted terrain. J Cosmet Dermatol. 2023; 22: 1191-96.
27. Fatima S, Braunberger T, Mohammad TF. The role of sunscreen in melasma and postinflammatory hyperpigmentation. Indian J Dermatol. 2020; 65(1): 5–10.