

Evaluation of the efficacy of a TCA medium peeling procedure combined with skin biorevitalization in face rejuvenation: a case series

Abstract

Background: Aging is triggered by both intrinsic and external factors. Although chemical peels with trichloroacetic acid (TCA) are used to reduce wrinkles and hyperpigmentation, they cannot help to enhance the other factors that contribute to overall skin quality.

Objective: The aim of this case series was to compare the efficacy of 15% TCA peel alone versus a combination of NCTF®135HA injection and 15% TCA for face rejuvenation.

Methods: Six patients were treated on each side of their face with 15% TCA combined or not with NCTF®135HA. Each patient was subjected to one session of peeling on both sides of the face followed by three sessions of NCTF®135HA injections, on only one randomized side of the face, with an interval of two weeks between each treatment. Skin aging measures were assessed before and after treatments (D0 and D45).

Results: At D45, clinical scoring demonstrated a significant difference in reducing the lower face sagging score, increasing skin hydration, and improving skin homogeneity on the side treated with NCTF®135HA combined with peeling compared to the side treated with peeling alone. There is a tendency for improvement in Crow's feet only on the side treated with both peeling and NCTF®135HA, compared to the side treated with peeling alone. Both the evaluator and the patient reported a greater improvement on the side of the face treated with 15% TCA + NCTF®135HA on the Global Aesthetic Improvement Scale (GAIS).

Conclusions: The addition of NCTF®135HA to 15% TCA chemical peel application significantly enhanced the peeling effect on skin aging features, this improvement was perceived by both subjects and the physician.

Volume 8 Issue 2 - 2024

Riekie SMIT

Aesthetic Doctor, Sport Medicine, Pretoria, South Africa

Correspondence: Riekie SMIT MD, Aesthetic Doctor, Sport Medicine, Pretoria, South Africa, Email riekiesmi@icloud.com**Received:** May 30, 2024 | **Published:** June 14, 2024

Introduction

Aesthetic medicine is defined by medical procedures aiming at physical improvement at the patient's request. Its main indication regards the management of skin ageing, whether it is preventive, corrective or in addition to surgery, in order to preserve the youthfulness of the skin and reduce the signs of ageing.¹

The process of ageing is complex and multifactorial, affecting not only the skin but also the bone architecture and the subcutaneous tissues (fat, muscles, tendons).² It is defined as a process involving intrinsic and extrinsic mechanisms. Intrinsic ageing is highly related to chronological age and genetic factors aggravated by free radicals and hormonal influences. Extrinsic ageing is a distinct process caused by external factors such as UV exposure and the individual lifestyle (tobacco, pollution, nutrition).³⁻⁵

Unlike cosmetic surgery, which consists of invasive procedures performed by a surgeon, aesthetic medicine includes superficial, non-invasive procedures that are performed on an ambulatory mode and for which the results are obtained rapidly or even immediately, without social eviction. These non-invasive techniques are therefore increasingly attractive. A study published in 2018 showed that the primary motives, apart from skin ageing was health protection (53%), psychological well-being (69.3%), and improvement of comfort and confidence in social situations (56.6%).⁶

Various techniques at the forefront of innovation have proved their value: hyaluronic acid, threads, botulinum toxin injection, peeling,

laser. Furthermore, in recent years, we observed a shift toward an improved understanding and appreciation of the three-dimensional aspects of skin aging.^{1,7} In order to achieve the most natural and effective face rejuvenation, multiple improvements must be completed at once, which requires the usage of more than a single procedure or agent.⁷⁻⁹

However, it is critical to examine how multiple aesthetic interventions can be combined safely and effectively.¹⁰

In this study, we propose to evaluate the combining effect of a medium-depth peeling with a biorevitalizing procedure.

Peeling is a regenerative exfoliation technique aiming to rejuvenate the superficial surface of the skin by efficiently removing aged skin, replacing it with newer, smoother and more fine-looking skin, through a chemically abrasive procedure.^{11,12}

The medium-depth peel will act on the middle layers of the skin by penetrating as far as the papillary dermis by eliminating the epidermal layer and the upper part of the dermis.

The active ingredient of this peel is trichloroacetic acid (TCA), used in different concentrations generally between 15 and 30%. Here, we used a 15% concentration.

This type of peeling is indicated in the correction of spots and deep wrinkles. It also acts on fine lines, dilated pores and skin slackening.¹³

Anti-aging biorevitalization, or polyrevitalization, is a technique widely used in the aesthetic field because of its gentle and global

action, not only on the consequences of skin ageing but also on its causes. It consists in multiple injections into the superficial dermis using very fine needles. Very small quantities of hyaluronic acid and with a cocktail of nutrients essential to the cellular environment are introduced as close as possible to the cells of the dermis in order to stimulate the regeneration of the dermis.¹⁴

In this study, we chose to investigate the synergistic efficacy of a 15% TCA peeling procedure with NCTF®135HA, a polyrevitalizing complex consisting in vitamins, amino acids, minerals, coenzymes, nucleosides and antioxidants, combined with hyaluronic acid for its hydrating and plumping properties. This will help to restore an optimal environment for cells and to stimulate the biosynthetic ability of fibroblasts, stimulating an increase in collagen and elastin productions to help restructuring mature skin.¹⁴⁻¹⁶

The result expected from this combination is a long-lasting and enhanced action of the biorevitalizing and peeling procedures. Specifically, the peeling procedure will be carried out to eliminate dead skin cells and optimize penetration of the biorevitalizing cocktail into the skin.

Yet, studies examining the benefits of combining these two techniques on human skin are lacking and the efficacy and safety of such a therapeutic strategy are poorly documented. Thus, the aim of this study is to demonstrate the rationale of a combination approach, suggesting that two techniques act better than a single treatment to recover facial aging and to improve skin aspect and quality.

In this study, we propose to evaluate the synergistic effect of combining the NCTF®135HA biorevitalizing technique with a TCA peeling.

Material and methods

Patients

Six patients from 38 to 59 years old (median age 46), 4 women and 2 men have been evaluated in this case report. All of the patients were healthy, with no history of surgical or non-surgical procedures to improve skin quality and they accepted through a written consent to be treated unilaterally (split face manner) for 3 sessions after TCA peeling. 2 months after the end of evaluation period, the other side of the face has been treated as well in order to avoid any asymmetry.

Procedure

The study was conducted over a period of 6 weeks. To compare the efficacy of TCA peeling alone or in combination with NCTF®135HA on the same patient, both sides of the face were treated with 15% TCA peeling while only one side was injected with NCTF®135HA. Three injection sessions were conducted at D0, D15 and D30 by NCTF®135HA while the TCA peeling was performed only at D0 (Figure 1).

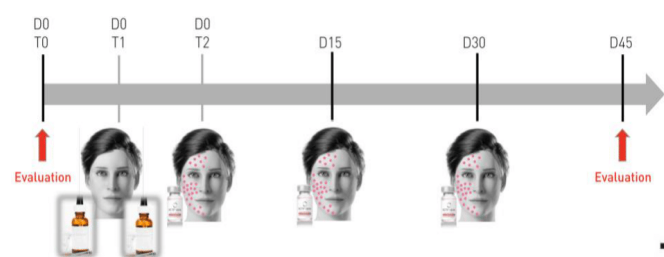


Figure 1 Injection schematic with 3 biorevitalizing treatment and one 15% TCA treatment.

Criteria for efficacy evaluation

The evaluator conducted a complete assessment of each patient. Various parameters were measured to determine treatment efficacy: intensity of crow’s feet wrinkle, nasolabial folds, ptosis of the lower part of the face, skin radiance, skin hydration, skin firmness, and skin homogeneity by clinical scoring scale.

Assessments included visual evaluation and clinical scoring. All procedures were photographically documented.

Patients were assessed at Day 0 (before treatments) and at Day 45. The crow’s feet wrinkles, nasolabial folds and ptosis of the lower part of the face were done according to Bazin scale.¹⁷

The other clinical scoring was performed on a 9-scale base scoring system (0 = none, 1-3 = light, 4-6 = moderate, 7-9 = important) for skin homogeneity, hydration, and firmness. In addition, clinical scoring of skin radiance was based on four scales scoring system as follows: 0=very dull skin, 1=dull skin, lacking radiance, 2=slightly radiant skin, 3= radiant skin, 4= very radiant skin.

Instrumental assessments were conducted using the VISIA skin analysis system (Canfield, US) based on the image analysis. Outcomes were assessed at D0 and D45. The satisfaction rate was evaluated by physician and the subjects based on the GAIS (Global Aesthetic Improvement Score) on a 7-point scale from “very much improved” to “very much worse”. The improvement scale with reference to the pre-injection aging grade was assessed independently by both subjects and physician at D45.

Statistical analysis

Although the number of subjects is limited, for all quantitative data, the mean and median were determined. The student t-test was utilized for comparative analysis.

Results

Clinical scoring of crow’s feet wrinkles, ptosis of the lower part of the face and firmness

At baseline (Day 0), the mean crow’s feet wrinkle score (Bazin crow’s feet scale) (Table 1) for both sides of the face were 2.6. This value decreased to 1.3 with a significant tendency on the side treated with TCA and NCTF combination (p value=0.06), but not on the side treated with TCA alone (NS) (Figure 2).

Table 1 Bazin Crow’s feet wrinkle scale

Bazin Crow’s Feet Wrinkle Scale	
Grade	Description
0	No wrinkle
1	Very shallow, still visible wrinkle
2	Shallow wrinkles
3	Slight wrinkles
4	Mild wrinkles
5	Deep wrinkles
6	Very deep wrinkles

In terms of facial contour sagging, the Bazin score was significantly lower on both sides of the face at day 45 (0.37 at Day 45 versus 2.37 at baseline for the side treated with combination; p<0001). The score for the other side treated solely with TCA decreased to 1.62 at day 45 compared to 2.37 at baseline (p=0.03)]. The evolution of the two sides of the face differed significantly (p=0.001) (Figure 3).

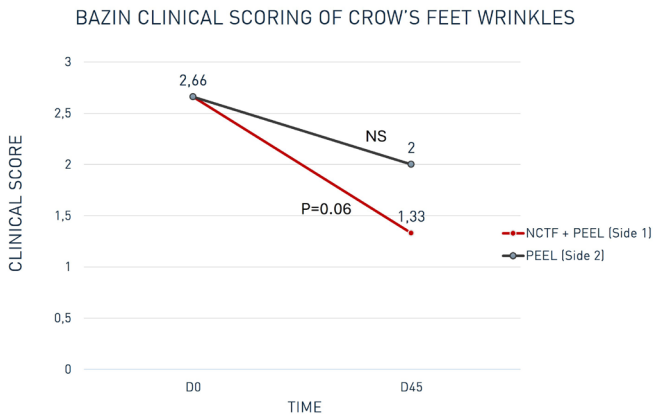


Figure 2 Evolution of mean crow's feet wrinkle score (Bazin scale) from D0 to D45 after 3 sessions of intradermal injections of NCTF®135HA combined with one session of 15% TCA versus one session of 15% TCA alone.

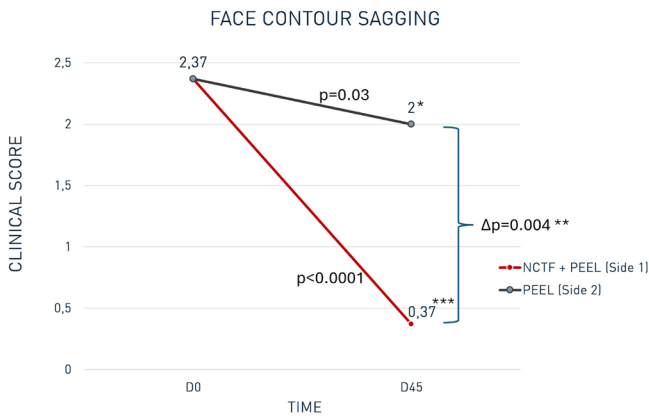


Figure 3 Evolution of mean face contour score based on Bazin scale from D0 to D45 after 3 sessions of intradermal injections of NCTF®135HA combined with one session of 15% TCA versus one session of 15% TCA alone.

Significant: * $p < 0.05$, *** $p < 0.001$.

A 9-scale clinical scoring system was utilized to assess skin firmness. The results showed a significant improvement in skin firmness on the side treated with TCA and NCTF (6 at day 45 against 4 at baseline, p value=0.03), but not on the side treated with TCA alone (4.8 at day 45 versus 4 at baseline, $p=0.3$).

Clinical scoring of skin quality

Overall, all patients showed a global improvement in their skin quality parameters after objective consideration.

Hydration: In comparison to 15% TCA alone (mean score of 4.7 at day 45, evolution NS, delta D45-D0 of 1.2 scores), the mean hydration score increased significantly only on the face-side treated with 15% TCA and NCTF®135HA from D0 to D45 (mean score of 5.8 at day 45, significant evolution with $p=0.0026$, delta D45-D0 of 2.3 points (Figure 4)).

Skin firmness: Differences between the skin's firmness before and after treatment with 15% TCA alone did not reach statistical significance. In comparison, the other side of the face that had been

treated with 15% TCA + NCTF®135HA showed a significant delta of 2 points between D45 and baseline (D0) ($p=0.003$) (Figure 5).

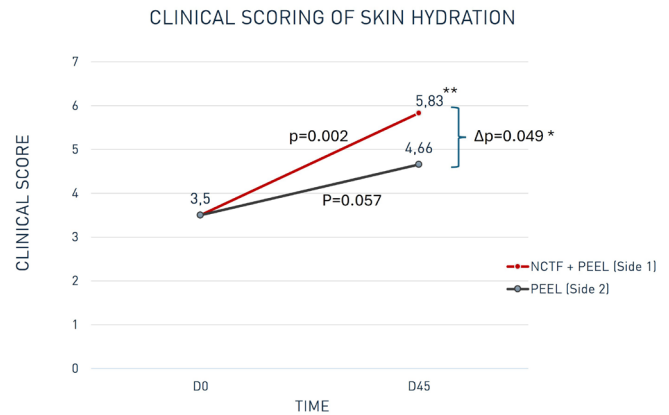


Figure 4 Evolution of mean skin hydration scores from D0 to D45 after 3 sessions of intradermal injections of NCTF®135HA combined with one session of 15% TCA versus one session of 15% TCA alone.

Significant: * $p < 0.05$, *** $p < 0.001$.

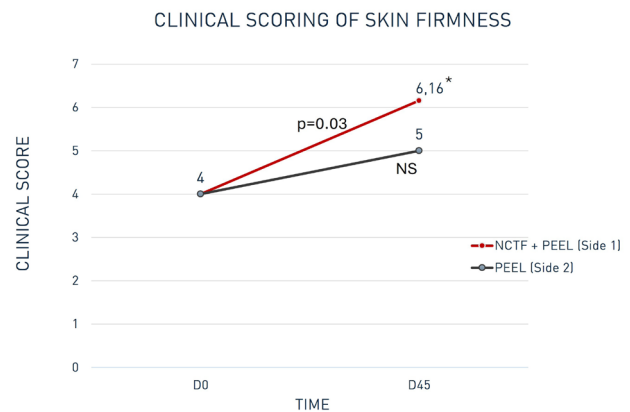


Figure 5 Evolution of mean skin hydration scores from D0 to D45 after 3 sessions of intradermal injections of NCTF®135HA combined with one session of 15% TCA versus one session of 15% TCA alone.

Significant: * $p < 0.05$, *** $p < 0.001$.

Skin Homogeneity was remarkably improved on both treatment sides (peeling with and without NCTF®135HA). However, this improvement was significantly much greater on the face-side treated with the combination of 15% TCA + NCTF®135HA versus peeling alone ($p=0.02$) (Figure 6).

Skin radiance: There was a notable improvement on both treatment sides, peeling with and without NCTF®135HA ($p=0.001$ and $p=0.01$ respectively). No significant difference was noted between the two sides (results not shown).

GAIS scoring

Treatment efficacy was assessed using the Global Aesthetic Improvement Scale (GAIS) by both participant and physician at D45 (Table 2).

Table 2 GAIS (Global Aesthetic Improvement Scale) Scoring

GAIS (Global Aesthetic Improvement Scale) Scoring	
Score	Grade
3	Very much improved
2	Much improved
1	Improved
0	No change
-1	Worse
-2	Much worse
-3	Very much worse

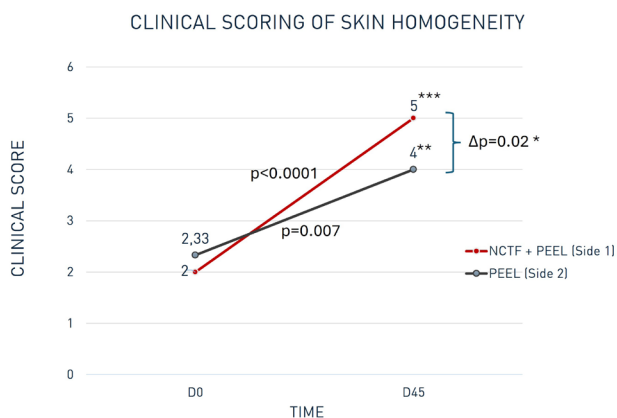


Figure 6 Evolution of mean Skin homogeneity score from D0 to D45 after 3 sessions of intradermal injections of NCTF@135HA combined with one session of 15% TCA versus one session of 15% TCA alone.

Significant: * $p < 0.05$, *** $p < 0.001$.

After objective examination, as shown in Figure 7, the physician reported mean scores on the GAIS of 2,5 (much improved, $p < 0.001$) on the side of the face treated with 15% TCA + NCTF@135HA compared to the side of the face treated with 15% TCA alone (mean score of 1.16 (improved), $p < 0.001$).

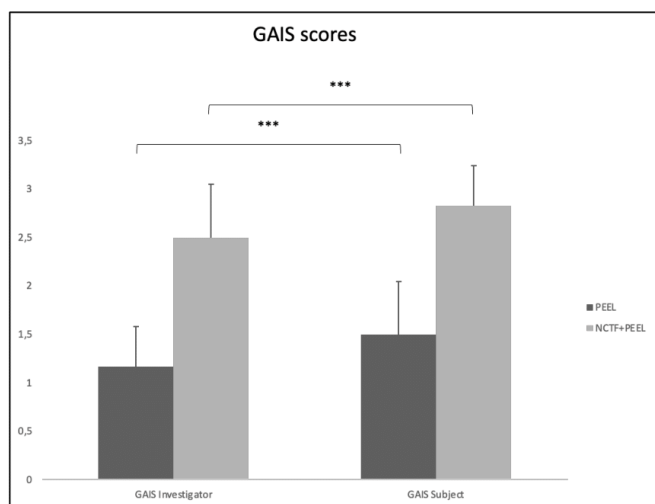


Figure 7 Physician and patient Global Aesthetic Improvement Scale (GAIS) ratings at D45 after 3 sessions of intradermal injections of NCTF@135HA combined with one session of 15% TCA versus one session of 15% TCA alone.

Significant: * $p < 0.05$, *** $p < 0.001$.

Similarly, patients reported significant improvement on both sides of their face. This improvement, however, achieved a score of 2.8

for the side of the face treated with the 15% TCA + NCTF@135HA combination, and only 1.5 for the side of the face treated with peeling alone (Figure 6).

Discussion

Skin rejuvenation research is continually evolving to identify innovative techniques that can deliver more effective results.

Chemical peels, which employ a variety of chemical agents, are one of the most commonly utilized cosmetic methods. It has been shown to improve the appearance of several skin conditions such as acne, melasma, photodamage, and skin rejuvenation. TCA is the mainstay for chemical peeling agents. It has been studied extensively and has the advantage of producing superficial, medium-depth, and deep peels.^{1,13,18-21}

As research into rejuvenation treatments progresses, the efficacy and safety of TCA peeling are increasingly being examined clinically in direct comparison with other therapies.

TCA in combination with other cosmetic procedures has also been studied, with the potential for synergistic treatment and greater flexibility in adapting therapies to specific patient demands and situations. It has been investigated in skin rejuvenation methods in combination with other techniques such as botulinum toxin injection or ablative carbon dioxide laser. It has also been mixed with other peeling agents like phenol, Jessner solution, or topical vitamin C.²²⁻²⁵

Although TCA treatment can improve photodamage, hyperpigmentation and fine wrinkles, a superficial peel cannot resolve all the parameters associated with aging, namely hydration and overall facial firmness.

In combination with NCTF@135HA treatment, a complete result can be achieved without having to resort to an excessively deep peel, thus limiting undesirable effects and ensuring greater patient acceptance.

According to our findings, both combination and control treatments showed a statistically significant improvement of aging parameters. However, the combined modality of 15% TCA + NCTF@135HA improved skin hydration and skin firmness while statistical significance was not achieved with the 15% TCA peel alone. Furthermore, the combination approach appeared to improve crow's feet wrinkles, skin homogeneity to a greater extent than the peeling alone.

These findings suggest that the combination therapy is more effective than TCA peel alone. This synergistic effect could be explained by the peeling procedure's ability to clear dead skin cells and optimize the penetration of the biorevitalizing cocktail into the skin.

Here, we report the outcomes for six patients. However, we hypothesize that a larger sample size would confirm the observed trends and the significant improvement associated with the addition of NCTF@135HA to a chemical peel.

Conclusion

This study demonstrates the effectiveness of combining TCA with NCTF@135HA treatment on skin quality features. Both combination and control treatments significantly improved aging parameters; however, the combined modality of 15% TCA + NCTF@135HA showed superior improvements in skin hydration, skin sagging and skin homogeneity compared to 15% TCA peel alone. The enhanced

effectiveness of the combination therapy likely stems from the peeling procedure's ability to clear dead skin cells, and the capacity of NCTF®135HA to provide all the ingredients the skin needs to improve its quality. Although our findings are based on a small sample size, we hypothesize that a larger cohort would further validate the significant benefits observed with the addition of NCTF®135HA to a chemical peel.

Acknowledgments

None.

Conflicts of interest

The author declares no conflict of interest.

References

1. Ganceviciene R, Liakou AI, Theodoridis A, et al. Skin anti-aging strategies. *Dermatoendocrinol.* 2012;4(3):308–319.
2. Swift A, Liew S, Weinkle S, et al. The facial aging process from the “Inside Out”. *Aesthet Surg J.* 2021;41(10):1107–1119.
3. Kaeberlein M. Longevity and aging. *FI000Prime Rep.* 2013;5:5.
4. Kenyon CJ. The genetics of ageing. *Nature.* 2010;464(7288):504–512.
5. Makrantonaki E, Zouboulis CC. Molecular mechanisms of skin aging: state of the art. *Ann N Y Acad Sci.* 2007;1119:40–50.
6. Maisel A, Waldman A, Furlan K, et al. Self-reported patient motivations for seeking cosmetic procedures. *JAMA Dermatol.* 2018;154(10):1167–1174.
7. Fabi S, Pavicic T, Braz A, et al. Combined aesthetic interventions for prevention of facial ageing, and restoration and beautification of face and body. *Clin Cosmet Investig Dermatol.* 2017;10:423–429.
8. Chuang J, Barnes C, Wong B. Overview of facial plastic surgery and current developments. *Surg J (N Y).* 2016;2(1):e17–e28.
9. Goldman A, Wollina U. Facial rejuvenation for middle-aged women: a combined approach with minimally invasive procedures. *Clin Interv Aging.* 2010;5:293–299.
10. Carruthers JDA, Glogau RG, Blitzer A, et al. Advances in facial rejuvenation: botulinum toxin type a, hyaluronic acid dermal fillers, and combination therapies--consensus recommendations. *Plast Reconstr Surg.* 2008;121(5 Suppl):5S–30S.
11. Samargandy S, Raggio BS. *Skin resurfacing chemical peels.* StatPearls. Treasure Island (FL) ineligible companies. Disclosure: Blake Raggio declares no relevant financial relationships with ineligible companies. 2023.
12. Soleymani T, Lanoue J, Rahman Z. A practical approach to chemical peels: a review of fundamentals and step-by-step algorithmic protocol for treatment. *J Clin Aesthet Dermatol.* 2018;11(8):21–28.
13. Lee JC, Daniels MA, Roth MZ. Mesotherapy, Microneedling, and Chemical Peels. *Clin Plast Surg.* 2016;43(3):583–595.
14. El-Domyati M, El-Ammawi TS, Moawad O, et al. Efficacy of mesotherapy in facial rejuvenation: a histological and immunohistochemical evaluation. *Int J Dermatol.* 2012;51(8):913–919.
15. Prikhnenko S. Polycomponent mesotherapy formulations for the treatment of skin aging and improvement of skin quality. *Clin Cosmet Investig Dermatol.* 2015;8:151–157.
16. Quan T, Wang F, Shao Y, et al. Enhancing structural support of the dermal microenvironment activates fibroblasts, endothelial cells, and keratinocytes in aged human skin in vivo. *J Invest Dermatol.* 2013;133(3):658–667.
17. Bazin R DE. *Atlas du vieillissement cutané:* Ed Med Com. 2007.
18. Atwa MA, Ahmed AH, Nada HA, et al. Combined chemical peels versus trichloroacetic acid (TCA) for treating melasma: a split face study. *J Dermatolog Treat.* 2022;33(2):959–964.
19. Kubiak M, Mucha P, Debowska R, et al. Evaluation of 70% glycolic peels versus 15% trichloroacetic peels for the treatment of photodamaged facial skin in aging women. *Dermatol Surg.* 2014;40(8):883–891.
20. Castillo DE, Keri JE. Chemical peels in the treatment of acne: patient selection and perspectives. *Clin Cosmet Investig Dermatol.* 2018;11:365–372.
21. Rendon MI, Berson DS, Cohen JL, et al. Evidence and considerations in the application of chemical peels in skin disorders and aesthetic resurfacing. *J Clin Aesthet Dermatol.* 2010;3(7):32–43.
22. Soliman MM, Ramadan SA, Bassiouny DA, et al. Combined trichloroacetic acid peel and topical ascorbic acid versus trichloroacetic acid peel alone in the treatment of melasma: a comparative study. *J Cosmet Dermatol.* 2007;6(2):89–94.
23. Puri N. Efficacy of modified Jessner's peel and 20% TCA versus 20% TCA peel alone for the treatment of acne scars. *J Cutan Aesthet Surg.* 2015;8(1):42–45.
24. Safoury OS, Zaki NM, El Nabrawy EA, et al. A study comparing chemical peeling using modified Jessner's solution and 15% trichloroacetic Acid versus 15% trichloroacetic acid in the treatment of melasma. *Indian J Dermatol.* 2009;54(1):41–45.
25. Landau M. Combination of chemical peelings with botulinum toxin injections and dermal fillers. *J Cosmet Dermatol.* 2006;5(2):121–126.