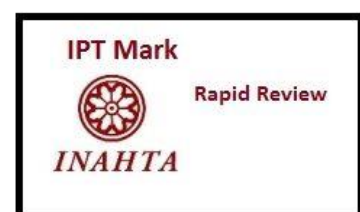




INFORMATION BRIEF (RAPID REVIEW)
**SUBCISION OF ACNE SCARS &
TRICHLOROACETIC ACID (TCA)
APPLICATION FOR ACNE SCARS**

Malaysian Health Technology Assessment Section (MaHTAS)
Medical Development Division
Ministry of Health Malaysia
018/2025



DISCLAIMER

This information brief is a brief report, prepared on an urgent basis, to assist health care decision-makers and health care professionals in making well-informed decisions related to the use of health technology in health care system, which draws on restricted review from analysis of best pertinent literature available at the time of development. This report has not been subjected to an external review process. While effort has been made to do so, this report may not fully reflect all scientific research available. Other relevant scientific findings may have been reported since the completion of this report. MaHTAS is not responsible for any errors, injury, loss or damage arising or relating to the use (or misuse) of any information, statement or content of this report or any of the source materials.

Please contact htamalaysia@moh.gov.my if further information is required.

Malaysian Health Technology Assessment Section (MaHTAS)
Medical Development Division
Ministry of Health Malaysia
Level 4, Block E1, Precinct 1
Government Office Complex
62590, Putrajaya
Tel: 603 8883 1229

Available online via the official Ministry of Health Malaysia website: <http://www.moh.gov.my>

SUGGESTED CITATION: Che Sarida CI, Roza S and Syaquirah Akmal. Subcision for Acne Scars and Trichloroacetic Acid (TCA) application for Acne Scars. Information Brief. Ministry of Health Malaysia: Malaysian Health Technology Assessment Section (MaHTAS); 2025. 15p. Report No: 018/2025

DISCLOSURE: The author of this report has no competing interest in this subject and the preparation of this report is entirely funded by the Ministry of Health Malaysia.

TITLE: SUBCISION FOR ACNE SCARS AND TRICHLOROACETIC ACID (TCA) APPLICATION FOR ACNE SCARS

PURPOSE

To provide brief information on the effectiveness and safety of subcision of acne scars and trichloroacetic acid (TCA) application for acne scars following request from the Director of Medical Practice Division, Ministry of Health, Malaysia.

BACKGROUND

Acne vulgaris is a common dermatological condition that primarily affects adolescents. Its pathophysiology involves hyperkeratinisation and androgen-driven overproduction of sebum within the pilosebaceous unit (psu), which fosters the proliferation of cutibacterium acnes (formerly known as propionibacterium acnes).¹

Acne scars result directly from a disrupted wound healing process triggered by cutaneous inflammation. Lesions such as comedones, papules, pustules, nodules, and cysts may cause scarring during resolution. As the severity of scarring is known to increase with prolonged inflammation it is imperative to initiate an early diagnosis and treatment of active acne. Acne scars result from either a loss (atrophic scars) or an excess (hypertrophic scars) of collagen during the healing process. Acne scars are classified as either atrophic or hypertrophic. Atrophic scars, comprising approximately 80 to 90% of cases, are further subdivided into ice pick (60 to 70%), boxcar (20 to 30%), and rolling scars (15 to 25%) (Table 1). It is common for patients to exhibit a combination of these atrophic scar types. Hypertrophic and keloidal acne scars, on the other hand, arise due to reduce collagenase activity and excessive collagen accumulation during wound healing.² Acne scars can lead to long-term negative effects on self-esteem and exacerbate common psychiatric disorders such as depression, anxiety, and body dysmorphia. Additionally, individuals who suffer from acne scarring may find greater difficulties in socialising and workplace functioning. Developing and optimising successful clinical strategies for acne scar management is thus also essential to ameliorate the distressing psychosocial effects associated with acne scarring.¹

Due to the distinct morphologies of atrophic acne scars, various treatment modalities have been developed, including chemical peels, dermal fillers, laser resurfacing, and microneedling. A more recent approach is subcutaneous incisionless surgery, commonly referred to as subcision. Subcision is a minimally invasive technique for treating depressed, tethered scars particularly rolling scars that has evolved from a needle-based procedure into a refined approach using blunt-tipped cannulas to reduce procedural trauma.¹ Early subcision procedures used tri-beveled hypodermic needles (18 to 25 gauge) or Nokor needles. The technique involved marking the scars, administering local infiltration anesthesia with 2% xylocaine, and inserting a sharp needle adjacent to the scar with the bevel oriented upward and parallel to the skin surface. The needle is advanced into the deep dermis and moved back and forth in a fan-like motion to sever fibrotic strands anchoring the scar to the

subcutaneous tissue. Multiple puncture sites may be required for individual scars, and haemostasis is achieved by applying pressure. Care is taken to avoid the preauricular, temporal, and mandibular regions to prevent injury to facial nerve branches and major vessels. Postoperative haematoma is the most common complication, typically managed with ice and NSAIDs. Blunt-tipped cannulas (18 to 25 gauge) are now the preferred instruments for large-area subcision, as their rounded tips displace rather than sever vascular and neural structures thus reducing procedural trauma. The therapeutic effect of subcision derives from three mechanisms: mechanical release of fibrous adhesions that elevate the dermis, controlled injury that stimulates connective tissue growth to fill the dermal pocket, and redistribution of subcutaneous tension through homogenisation of fat lobules, thereby reducing contour deformities associated with acne-related lipoatrophy.^{1,2,3}

Although subcision is highly effective for releasing fibrous tethers, it is frequently combined with adjunctive dermatological therapies to address other features of acne scarring, including surface texture, pigmentation, and volume loss. Subcision is frequently combined with adjunctive therapies to enhance scar correction. Dermal fillers, such as hyaluronic acid, collagen stimulators, or long-lasting polymethyl methacrylate (PMMA), restore volume and prevent re-adhesion of fibrotic bands. Microneedling, particularly radiofrequency-assisted techniques, improves surface texture, tightens skin, and promotes collagen remodeling. Fractional CO₂ and Er:YAG lasers complement subcision by refining superficial scars, pigmentation, and laxity, offering synergistic benefits for mixed scarring. Regenerative approaches, including platelet-rich plasma and polynucleotides, accelerate tissue repair, reduce inflammation, and stimulate collagen production.^{4,5}

Trichloroacetic acid (TCA) is a potent keratolytic agent used in varying concentrations for skin resurfacing and the management of atrophic acne scars. Its principal application for deep scarring is the focal technique known as TCA CROSS (Chemical Reconstruction of Skin Scars), which is considered the treatment of choice for ice-pick scars, effective for narrow boxcar scars with defined walls, and beneficial for improving the texture and depth of rolling scars when combined with subcision. Beyond acne scarring, TCA is also used in treating enlarged pores, fine lines, photoaging, and varicella scars.^{6,7,8}

Trichloroacetic acid (TCA) is a highly water-soluble agent prepared in weight-to-volume concentrations. At 10% to 30%, it is used for superficial peels to exfoliate the epidermis and improve mild texture irregularities, while medium-depth peels (35% to 50%) penetrate the papillary dermis to treat moderate scarring. High-strength formulations (70% to 100%) are applied focally in the CROSS (Chemical Reconstruction of Skin Scars) technique for deep atrophic scars. Some preparations incorporate saponins for more uniform penetration or blue dyes to guide precise application. Upon contact, TCA precipitates proteins and induces coagulative necrosis of epidermal and dermal cells, clinically visible as 'frosting' that reflects penetration depth. This controlled injury provokes inflammation and cytokine release, stimulating neocollagenesis and elastin production, which progressively thicken the dermis, restore volume, and elevate scar depressions to the level of surrounding skin. As TCA is self-neutralising and not systemically absorbed, high concentrations can be safely used for focal treatment. The CROSS technique involves focal application of 35% to 100% TCA with controlled pressure using a fine applicator to precisely target scar bases. This approach yields accurate results, promotes rapid healing, and is associated with minimal complications. Different applicators offer distinct advantages: syringe delivery allows rapid application but

may risk unintended diffusion in small scars, whereas toothpick or wooden applicators provide superior precision for deep, narrow ice-pick scars, ensuring consistent accuracy and reproducible outcomes despite being comparatively slower.^{8,9,10,11}

Table 1: Atrophic Acne Scars Subtypes¹

SCAR TYPES	MORPHOLOGY
Ice Pick	Diameter: <2mm Depth : Lower dermis/subcutis Visual : V-shaped, pitted appearance
Box car	Diameter: 1 to 4mm Depth : Upper dermis (shallow) or lower dermis (depth) Visual : Round or geometric appearance with vertical walls and flat base
Rolling	Diameter: ≥4mm Depth : Upper Dermis Visual : Slopy, undulating appearance caused by fibrotic tethering of dermis to subcutaneous layer

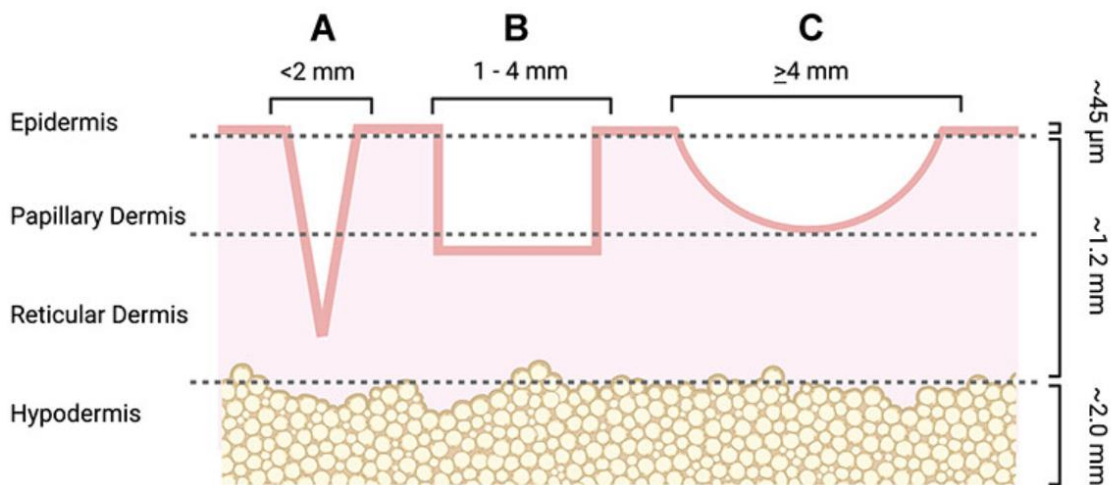


Figure 1: Atrophic scar subtypes¹

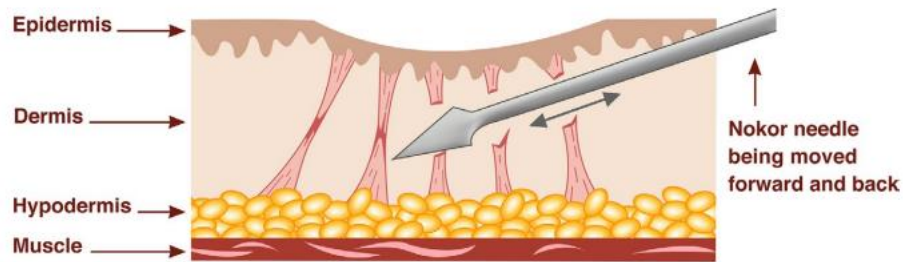


Figure 2:

Subcision procedure involves inserting Nokor Needle into the dermal subcutaneous junction to release fibrotic strands underlying scars that results in releasing the underlying fibrous attachments, and maintaining a single, parallel plane during the procedure helps minimise post-operative complications.¹²

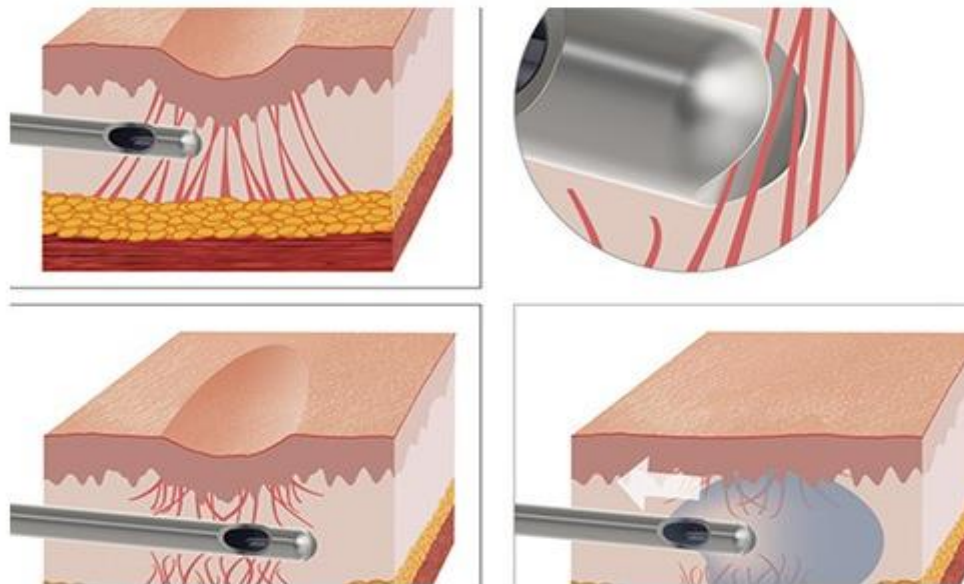


Figure 3:

Subcision procedure using cannula: A needle puncture allows cannula insertion beneath the dermis to release fibrous scar bands.¹³

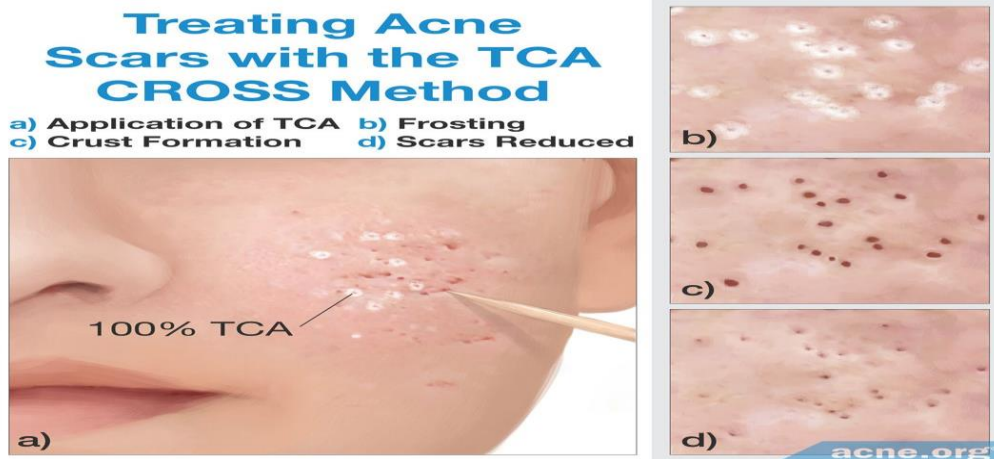


Figure 4:

TCA Cross (Trichloroacetic Acid Chemical Reconstruction of Skin Scars) is a targeted chemical peel that effectively treats deep acne scars, especially ice-pick scars.¹⁴

EVIDENCE SUMMARY

A total of 86 titles were retrieved from the scientific databases via OVID, PubMed and general search engines [Google Scholar], using the search term; *subcision, acne scars, trichloroacetic acid (TCA)*. The last search was conducted on 12th December 2025. The articles found to be relevant and included in this review were comprised of two systematic reviews, two RCTs, three cohort studies and two interventional studies (9 studies).

EFFICACY/ EFFECTIVENESS

SUBCISIONS OF ACNE SCARS

Ahramiyanpour N et al. (2022) conducted a systematic review of clinical trials to evaluate the efficacy and safety of various subcision techniques, both as standalone treatments and in combination with other modalities, for managing atrophic acne scars. This study involved 558 patients across 16 clinical trials. Four articles compared blunt cannula-based subcision (BCS) as a modified technique with needle based subcision as a conventional method. The study found that needle-based subcision (NNS) and blunt cannula-based subcision (BCS) yielded comparable scar improvement, though BCS was associated with fewer adverse effects and greater patient satisfaction due to its minimally invasive nature. Combining subcision with treatments such as hyaluronic acid (HA), plasma gel, microneedling, fractionated microneedle radiofrequency (RF), and cryoroller devices significantly enhanced outcomes, with HA achieving up to 94% improvement compared to 67.3% with subcision alone. Plasma gel outperformed platelet-rich plasma (PRP), though PRP results varied.¹⁵

Nilforoushzadeh MA et al. (2019) conducted a randomised controlled trial (2016 to 2018) to evaluate cannula subcision instead of needle subcision in the treatment of rolling acne scars

in Iran. The study was conducted in Jordan Clinic, Tehran University of Medical Sciences, Tehran, Iran between 2016 and 2018 involving 100 patients with rolling acne scars. Patients were randomised to receive either 18-gauge cannula or 27-gauge needle subcision, with two sessions four weeks apart. Outcomes measured including improvement, adverse effects, recovery time, and satisfaction were evaluated at two, three, and six months by blinded dermatologists and patient questionnaires. Study result demonstrated cannula subcision provide better outcomes with 83% of patients achieved good to very good improvement, 85% mean improvement, compared to 39.3% in the needle group. Satisfaction scores were significantly higher for cannula treatment ($p < 0.05$).¹⁶

Kim J et al. (2024) conducted a retrospective multicentre cohort study to evaluate the efficacy of KORA subcision therapy for atrophic scars in Korea. A total of 29 patients included in this study, carried out at four scar treatment network clinics (Rodam Korean Medicine clinic Gangnam branch, Hong-ik University branch, Cheonan branch and Suwon branch) between May 2016 and June 2020. KORA subcision therapy involves the use of a specialised needle to release fibrous tissue beneath the skin, thereby promoting collagen deposition and improving scar texture. Treatments were typically administered every two to three weeks over the course of six to ten sessions. Scar severity was assessed using the Qualitative Global Acne Scarring Grade System (QGASC) and the Stony Brook Scar Evaluation Scale (SBSES). Results demonstrated improvement, with the mean QGASC score decreasing from 3.14 ± 0.68 at baseline to 1.86 ± 0.90 at the final visit, while the mean SBSES score increased from 1.90 ± 0.84 to 3.14 ± 0.90 . Most patients showed improvement between second visit and eight visit, with the exception of four individuals whose scores remained unchanged. No adverse effects were reported.¹⁷

Tyagi A et al. (2025) conducted a prospective interventional study to evaluate the effectiveness and safety of combining subcision with microneedling for persistent atrophic acne scars in India. In view most patients have multiple scar types, the combined approach addresses both tissue release and volume restoration (subcision) and skin resurfacing and collagen stimulation (microneedling). A total of 160 patients aged 18 to 40 with atrophic acne scars involved in this study conducted at the National Institute of Medical Sciences and Research, Jaipur, India. All participants underwent four monthly sessions of combined subcision (using an 18 to 20 gauge needle to break fibrotic bands) and microneedling (dermaroller punctures to induce collagen and elastin). Scar improvement was assessed using the Goodman and Baron qualitative grading scale over a six-month follow-up. Results demonstrated significant improvement, particularly in severe grade 3 and 4 scars: none of the 96 patients with Grade 4 scarring remained in this category after treatment, and 95.6% of all participants improved by at least one grade. Rolling and boxcar scars responded well, while icepick scars showed minimal change. Patient satisfaction was high, with most reporting good to excellent improvement.¹⁸

Bhargava S et al. (2019) conducted a prospective study to evaluate the efficacy and safety of a combined approach using subcision and microneedling for the treatment of atrophic acne scars in patients with Fitzpatrick Skin Types III to V. The study involved 45 patients underwent four treatment sessions at monthly intervals, with scar severity assessed using the Goodman and Baron scale three months after the final session. Three months post treatment, the results demonstrated 95.6% of patients demonstrated overall improvement in acne scar severity, with no treatment failures reported. Prior to intervention, 64% of patients

presented with Grade 4 scars, which were completely eliminated following therapy. Specifically, 24.4% of patients improved by two grades, while 71.1% improved by one grade. Rolling and boxcar scars responded more favourably than ice-pick scars. Clinical outcomes were consistent with patient-reported satisfaction, with 17.8% perceiving excellent improvement (75 to 100%), 24.4% reporting very good improvement (50 to 74%), and the majority (55.5%) noting good improvement (25 to 49%) in their scar appearance. The procedure was well-tolerated, and side effects such as transient erythema, edema, and mild discomfort resolved within one to two days. These findings support the use of subcision combined with microneedling as a safe, cost-effective, and minimally invasive treatment option for atrophic acne scars in individuals with darker skin tones.¹⁹

TRICHLOROACETIC ACID (TCA) APPLICATION FOR ACNE SCARS

Chung et al. (2020) conducted a systematic review comprised of 19 studies published between 2002 and 2018, involving 394 patients, to evaluate the safety, effectiveness, and optimal use of the CROSS (Chemical Reconstruction of Skin Scars) technique. The review confirms that although CROSS was initially used for various atrophic acne scars, it is most effective for ice-pick scars. Its indications have broadened to include facial varicella scars, enlarged pores, and depressed surgical scars. A major technical insight is the shift in application method. Early use of wooden applicators or toothpicks posed safety risks due to excessive acid retention and spill-over onto surrounding skin. More recent studies recommend fine-gauge needles (30 to 33G) with insulin syringes, which allow controlled, precise delivery of acid directly into the scar base. Study result shown CROSS to be superior for ice-pick scars, outperforming fractional Er:Glass lasers and microneedling. It is less effective for rolling scars, where subcision or microneedling is preferred. For varicella scars, CROSS demonstrates high effectiveness, with 83% to 100% of patients achieving more than 25% improvement.²⁰

Sharma P et al. (2022) conducted a prospective, RCT study to evaluate the effectiveness and safety of microneedling versus TCA CROSS for treating moderate to severe atrophic acne scars in India. The study included 50 patients with Fitzpatrick skin types III to V, randomly assigned to two groups of 25. One group underwent three sessions of microneedling using a 1.5 mm device at four week intervals, while the other received three sessions of 100% TCA CROSS, applied focally to scar bases until frosting occurred. Both treatments led to scar improvement however, TCA CROSS showed significantly greater clinical reduction in scar severity, particularly after the second and third sessions, as confirmed by quantitative analysis and independent observers. In contrast, patients treated with microneedling reported higher satisfaction, likely due to its effect on overall facial rejuvenation and improvement in skin texture, as it treats the entire face rather than isolated scars. This study conclude that TCA CROSS is more effective for deep, severe scars, whereas microneedling offers advantages of shorter downtime, fewer pigmentary complications, and better overall patient satisfaction. They recommend a combined treatment approach, using microneedling for global improvement and reserving TCA CROSS for residual deep scars.²¹

Al-Hamamy et al. (2020) conducted a prospective cohort study to evaluate the safety and efficacy of combining a 25% trichloroacetic acid (TCA) peel with manual dermasanding for the treatment of mild to moderate atrophic acne scars. The study included 13 patients aged 16 to 27 years with Fitzpatrick skin types III and IV. All participants initially received a single

25% TCA peel, followed two weeks later by manual dermasanding in 11 patients. Dermasanding was performed monthly, with each patient undergoing one to three sessions depending on tolerance and clinical response. Study results demonstrated improvement in acne scars following both the TCA peel and subsequent dermasanding. The TCA peel alone reduced scar scores by 13.8%, while additional dermasanding sessions produced greater improvements. Patients who completed three sessions achieved the most pronounced benefit, with scar scores decreasing from 10.0 at baseline to 6.0 at the three-month follow-up. Continued improvement was observed beyond treatment, likely attributable to ongoing collagen remodeling. This study concluded that combining TCA peeling with manual dermasanding stimulates collagen types I and III, resulting in contraction and improvement of deep scars. This technique represents a cost-effective and accessible alternative to laser resurfacing, particularly in resource-limited settings.²²

Anum et al. (2020) conducted a prospective interventional study to evaluate alternating combination of microneedling and 35% trichloroacetic acid (TCA) focal peeling (CROSS technique) for post-acne atrophic scars at Jinnah Hospital, Lahore. The study included 90 patients aged 16 to 42 years, predominantly female, all with Fitzpatrick skin type IV, presenting with moderate (grade 3) or severe (grade 4) atrophic scars mainly boxcar and ice-pick types graded using the Goodman and Baron Qualitative Acne Scar Grading Scale. Participants underwent ten treatment sessions at two-week intervals, alternating between five microneedling sessions performed with a 1.5 mm dermapen in multiple directions and five focal applications of 35% TCA applied precisely to the scar base until speckled white frosting appeared. The combined protocol demonstrated high clinical efficacy, with 93.3% of patients showing at least a one-grade improvement. Notably, the proportion of patients with severe (Grade 4) scarring decreased from 45.6% at baseline to 3.3% at final evaluation conducted 15 days after the last session, with most patients improving to mild or moderate grades. Treatment response was uniform across age, gender, disease duration, and scar morphology, indicating consistent effectiveness across subgroups. Despite these promising results, the absence of a control group and the short follow-up period of 15 days post-treatment limited assessment of long-term collagen remodeling and durability of outcomes.¹¹

SAFETY

Trichloroacetic acid (TCA) is listed on the FDA 503B Bulks List, permitting its use in pharmaceutical compounding for topical chemical peels targeting acne and related scarring.²³ USFDA has issued formal warnings against the sale and unsupervised at-home use of unapproved, high-concentration chemical peel products (including 100% trichloroacetic acid), highlighting their significant risk of chemical burns and permanent scarring when applied without professional oversight.²⁴

Bhargava S et al. reported adverse effects were generally minimal for subcision procedure. No scarring was observed in the cannula group versus 18% in the needle group, with bruising, swelling, and post-inflammatory hyperpigmentation occurring less frequently, while infection rates remained similar.¹⁹ Tyagi et al. (2025) further reported only mild and transient side effects with minimal downtime, most commonly erythema, edema, and pain lasting two to three days, along with occasional bruising and post-inflammatory hyperpigmentation.

Recovery times were shorter, and the procedure was rated as easier for the physician to perform.¹⁸

Chung et al. reported that TCA CROSS is generally safe for Fitzpatrick skin types I to V, though the most common side effect is temporary post-inflammatory hyperpigmentation, with rates ranging from 6.7% to 68%, and scar widening (13% to 17%) linked to acid spill-over from wooden applicators; other risks include burning pain, longer downtime (> 8 days), and occasional hypopigmentation (8% to 10%), all of which can be minimised by using fine-gauge needles for precise application. Subcision, by contrast, is safer and more effective for rolling scars, typically performed under local anaesthesia with variable downtime, and associated with side effects such as erythema (25%), hyperpigmentation (15%), and mild hypopigmentation (10%). When combined, both techniques are well tolerated with only minor complications, making CROSS most suitable for deep, narrow ice-pick scars and Subcision preferable for rolling scars, while together they provide a complementary approach for mixed scar types.^{11,20,21,22}

COST/COST-EFFECTIVENESS (If any)

There was no retrievable evidence from the scientific databases on the cost/cost-effectiveness of subcision and trichloroacetic acid application in treatment Acne Scars.

In Singapore, subcision prices start from approximately \$163 (RM 550) to \$400 (RM 1,350) per session.²⁵ In South Korea, basic subcision session costs about 110 USD (RM446) to 220 USD (RM893) while treatments combined with options like PRP or fillers range from 220 USD (RM893) to 510 USD (RM 2069).²⁶ In USA, subcision costs ranging from 250 USD (RM 1014) to 500 USD (RM 2029) for moderate scarring and 500 USD (RM 2029) to 1,000 USD (RM 4057) or more for severe or full-face treatment. The average procedure cost is reported between 1,500 USD (RM 6085) and 2,700 USD (RM 10,954) per session.²⁷ In UK, the cost of subcision varies according to the number of scars and the size of the area treated, with prices ranging from £250 (RM 1365) to £300 (RM 1638) per individual scar or small area, and around £600 (RM 3277) for multiple scars or larger regions such as the full face.²⁸

In Malaysia, the cost of subcision varies based on the severity of the scarring, the expertise of the doctor, and the geographic location of the clinic ranging from RM 300 to RM 2,000 per session. Most patients require three to six sessions for a full treatment course, four to six weeks apart, to allow adequate collagen remodeling.²⁹ A professional TCA CROSS treatments cost ranging between RM 350 and RM 1,200 per session.³⁰ For TCA CROSS, one treatment in UK starts at £400 (RM 2185), depending on the number and severity of scars being treated.³¹ TCA CROSS treatment in Korea generally costs from 50 USD (RM 203) to 300 USD (RM 1217) per session.³² Cost for TCA CROSS in Singapore ranging from 233 USD (RM 945.28) to 465 USD (RM 1887) per session.³³

Estimated cost for subcision combined with TCA Cross in Malaysia ranging from RM350 to RM1000 per session.³⁰

CONCLUSION

Based on the review, evidence showed potential benefit of subcision and trichloroacetic acid (TCA) application procedure in treatment of acne scars. This procedure offer significant benefits in the management of atrophic acne scars, with effectiveness varying by scar type. Evidence demonstrated subcision to be effective for rolling and boxcar scars, showing comparable or superior outcomes with cannula-based techniques compared to needle subcision, while also improving safety and patient satisfaction. Evidences demonstrated enhanced results when subcision is combined with adjunctive modalities such as microneedling, fillers, or energy-based devices. TCA CROSS remains the preferred treatment for ice-pick scars, providing precise focal improvement beyond that achieved with resurfacing methods. Both procedures are generally safe, with only mild side effects.

REFERENCES

1. Vempati A, Zhou C, Tam C et al. Subcision for Atrophic Acne Scarring: A Comprehensive Review of Surgical Instruments and Combinatorial Treatments. *Clinical, Cosmetic and Investigational Dermatology*, 2023 16, 125–134. <https://doi.org/10.2147/CCID.S397888>
2. Gupta A, Kaur M, Patra S et al. Evidence-based Surgical Management of Post-acne Scarring in Skin of Color. *Journal of Cutaneous and Aesthetic Surgery* 13(2):p 124-141, Apr-Jun 2020. | DOI: 10.4103/JCAS.JCAS_154_19
3. Chandrashekar B, Nandini A et al. Acne scar subcision. *J Cutan Aesthet Surg*. 2010 May;3(2):125-6. doi: 10.4103/0974-2077.69029. PMID: 21031076; PMCID: PMC2956956.
4. Subcision with fillers or microneedling for better results. Available from: <https://www.mdcsnyc.com/post/combining-subcision-with-fillers-or-microneedling-for-better-results>
5. Combining Acne Scars treatment for maximum result. Available at: <https://metropolisdermatology.com/combining-acne-scar-treatments-for-maximum-results/>
6. Pour Mohammad A, Ghassemi M et al. Varicella-Zoster Scar Treatments: A Tertiary Review. *Med J Islam Repub Iran*. 2021 Oct 18;35:136. doi: 10.47176/mjiri.35.136. PMID: 35321363; PMCID: PMC8840850.
7. TCA cross. Available from: <https://dermnetnz.org/topics/tca-cross>
8. S Sitohang IB, Legiawati L, Suseno LS et al. Trichloroacetic Acid Peeling for Treating Photoaging: A Systematic Review. *Dermatol Res Pract*. 2021 Aug 30;2021:3085670. doi: 10.1155/2021/3085670. PMID: 34504524; PMCID: PMC8423570
9. Bhardwaj D, Khunger N et al. An Assessment of the Efficacy and Safety of CROSS Technique with 100% TCA in the Management of Ice Pick Acne Scars. *J Cutan Aesthet Surg*. 2010 May;3(2):93-6. doi: 10.4103/0974-2077.69020. PMID: 21031068; PMCID: PMC2956965.
10. Tca cross acne scars [Internet]. APAX Medical & Aesthetics Clinic. 2016 [cited 2025 Dec 23]. Available from: <https://apaxmedical.com/tca-cross-acne-scars/>
11. Anum S, Malik LM, Ilyas S et al. Outcome of microneedling combined with 35% focal trichloroacetic acid peeling in post acne atrophic scars. *J Pak Assoc Dermatol* [Internet]. 2020 Sep;30(2):242-8.
12. Dadkhahfar S, Robati RM, Gheisari M, Moravvej H. Subcision: indications, adverse reactions, and pearls. *Journal of cosmetic dermatology*. 2020 May;19(5):1029-38.
13. Subcision for acne scars in Birmingham and Solihull. Available at: <https://www.midlandskin.co.uk/treatments/subcision/>
14. Acne scar treatment London ON [Internet]. Pinkalhealth.com. Available from: <https://pinkalhealth.com/service/acne-scars>

15. Ahramiyanpour N, Rastaghi F, Parvar SY et al. Subcision in acne scarring: a review of clinical trials. *Journal of Cosmetic Dermatology*. 2023 Mar;22(3):744-51.
16. Nilforoushzadeh MA, Lotfi E, Heidari - kharaji M et al. Comparing cannula - based subcision with the common needle method: a clinical trial. *Skin Research and Technology*. 2020 Jan;26(1):39-44.
17. Kim J, Lee JH, Jeong D et al. Korean Medicine Subcision Therapies in Scar Treatment: A Retrospective, Multicenter Study at Network Clinics. *Clin Cosmet Investig Dermatol*. 2024;17:2381-2389.
18. Tyagi A, Randhawa N, Gupta K et al. Efficacy and Safety of Subcision and Microneedling in Treatment of Atrophic Acne Scar. *International Journal of Pharmacy Research & Technology (IJPRT)*. 2025 May 21;15(1):807-13.
19. Bhargava S, Kumar U, Varma K et al. Subcision and microneedling as an inexpensive and safe combination to treat atrophic acne scars in dark skin: a prospective study of 45 patients at a tertiary care center. *The Journal of clinical and aesthetic dermatology*. 2019 Aug 1;12(8):18.
20. Chung HJ, Al Janahi S, Cho SB, Chang YC. Chemical reconstruction of skin scars (CROSS) method for atrophic scars: a comprehensive review. *Journal of Cosmetic Dermatology*. 2021 Jan;20(1):18-27.
21. Sharma P, Sharma R et al. A Comparative Analysis of Microneedling and TCA CROSS For Management of Atrophic Acne Scars. *Sch J App Med Sci*. 2022 Mar;3:281-5.
22. Al - Hamamy HR, AL - Dhalimi MA, Abtan AF et al. Evaluation of treatment of acne scars with 25% trichloroacetic acid chemical peel followed by manual dermasanding. *Journal of Cosmetic Dermatology*. 2021 Jun;20(6):1750-5.
23. 503B Bulk Drug Substances Lists. Available at: <https://www.fda.gov/drugs/human-drug-compounding/503b-bulk-drug-substances-list>
24. Repare Skincare. Available at: <https://www.fda.gov/inspections-compliance-enforcement-and-criminal-investigations/warning-letters/repare-skincare-680247-07252024>
25. Ong R et al. Subcision for Acne Scars by Dr Ong: Available at: <https://www.medical-aesthetics.sg/subcision-acne-scars>
26. Cost of Acne Scar Removal in Korea: Price Guide & Best Clinics in Seoul. Korea Health Page. Available at: <https://koreahealthpages.com/blog/cost-of-acne-scar-removal-in-korea-price-guide-best-clinics-in-seoul.html>
27. Acne scars treatment cost. Available at: <https://skinrejuvenationdenver.com/blog/how-much-do-acne-scar-treatments-cost-a-real-talk-breakdown>
28. UK Dermatologist Prices: Available at: <https://ukdermatologist.co.uk/pages/p>
29. Acne scar removal price Malaysia 2025. Available at: <https://www.nextmedclinic.com.my/acne-scar-removal-price-malaysia-2025/>
30. Best treatment for scar on face price in Malaysia 2025.

Available at:<https://www.medicdeno.com/acne-expert-tips/best-treatment-for-scars-on-face-price-malaysia/>

31. TCA CROSS treatment for scars - Harley Street [Internet]. Self London. [cited 2025 Dec 23]. Available from: <https://selflondon.com/medical-dermatology/tca-cross/>
32. TCA CROS Technique in Korea. Koreacliniccost.com.
Available from: <https://www.koreacliniccost.com/tca-cross-technique-cost>
33. Khunger N et al. Standard guidelines of care for acne surgery. Indian Journal of Dermatology, Venereology and Leprology. 2008 Jan 1;74:28.

Prepared By

Dr. Che Sarida Che Ismail
Senior Principal Assistant Director
Health Technology Assessment Section (MaHTAS)
Medical Development Division
Ministry of Health Malaysia

Reviewed by

Dr. Roza Sarimin
Public Health Physician & Head Unit
Health Technology Assessment Section (MaHTAS)
Medical Development Division
Ministry of Health Malaysia

Dr. Syaquirah Akmal
Public Health Physician
Deputy Director
Health Technology Assessment Section (MaHTAS)
Medical Development Division
Ministry of Health Malaysia

8th January 2026