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## A study comparing the effectiveness of microneedling and subcisions in treating atrophic acne scars with and without 50% TCA: A cross-sectional analysis in rural area

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### Abstract

**Background:** Adolescents and young adults often experience acne vulgaris, a condition affecting the sebaceous unit. Lifelong scarring from acne can take the shape of atrophic, hypertrophic, or keloid scars. No medical intervention can reverse the atrophying scars caused by acne; these scars are categorized as ice-pick, rolling, or boxcar scars.

**Methods:** A study using a randomized controlled open-label prospective design aimed to compare the effectiveness of microneedling, subcision, and 50% TCA CROSS as a combo therapy with microneedling and subcision alone. The study was carried out in the Department of Dermatology, Sambhram Institute of Medical Sciences, located in Kolar, Karnataka, India. The investigation was conducted from January 2018 to December 2019.

**Results:** The findings can be compared to those of prior studies that utilized diverse methodologies. Out of the 60 patients included in our study, 75 percent of them, who had an average age of 23, fell between the age ranges of 21 to 30. The majority of patients in Group 1 are between the ages ranges of 21 to 25, accounting for 77% of patients aged 21 to 30. Conversely, 71% of individuals in group 2 fell between the age ranges of 21 to 30. In a study conducted by Raza Hassan *et al.*, the average age of the patients was 25.07 years, with the majority falling between the 26–30 year age brackets.

**Conclusion:** Based on this study, it can be inferred that acne vulgaris is a chronic inflammatory syndrome that affects the pilo sebaceous follicular unit. This is caused by the colonization of follicles by *Propionibacterium acnes*, increased production of sebum, and aberrant keratinization of the follicles.

**Keywords:** Atrophic acne scars, subcisions, microneedling, and patient satisfaction

### Introduction

Acne vulgaris is a condition affecting the pilosebaceous unit, commonly observed in teenagers and young adults. The consequences of acne can persist throughout a person's life, resulting in the production of atrophic, hypertrophic scars, or keloids. Atrophic acne scars occur due to tissue loss and are categorized as ice-pick, rolling, or boxcar scars<sup>[1, 2]</sup>. These scars cannot be effectively treated with medical interventions. The available surgical and procedural treatments for treating this condition include punch excision, punch elevation, elliptical excision, and subcision, and dermabrasion, percutaneous collagen induction by micro-needling, and chemical peels. More recent treatment methods encompass a range of ablative and non-ablative lasers as well as light intensities<sup>[1-3]</sup>.

Individualized treatment must be tailored to the specific needs and goals of the patient, as well as the assessment and expertise of the clinician. Subcision is a minimally invasive surgical treatment that was first described by Orentreich and Orentreich in 1995<sup>[3-5]</sup>. The procedure involves the subcutaneous insertion of a specially designed hypodermic needle into depressed scars, effectively disrupting the fibrotic threads that connect the scar to the underlying subcutaneous tissue. It is mostly utilized for the treatment of rolling scars. Percutaneous collagen induction using dermapen involves the creation of numerous tiny channels from the outer layer of the skin into the upper layer of the dermis, leading to skin remodeling. This induced damage triggers the typical wound healing process by releasing several growth factors. This process induces the movement and rapid growth of fibroblasts, leading to an augmentation in the creation of collagen<sup>[4-6]</sup>.

The process of chemical reconstruction of skin scars involves the targeted administration of a concentrated solution of trichloroacetic acid, with concentrations as high as 100%. This solution is applied with pressure to the entire depressed area of atrophic acne scars using a sharpened wooden applicator [5-7]. This procedure offers the benefit of effectively repairing acne scars by specifically targeting the thickness of the dermis and the generation of collagen. Applying CROSS treatment repeatedly can effectively normalize the appearance of deep rolling, boxcar scars, and icepick scars [6-8].

The objective of our study was to assess the effectiveness of a combined treatment approach involving subcision, dermapen, and 50% TCA CROSS for the treatment of atrophic acne scars. The reason for combining these three minimally invasive techniques was their cumulative effect on different types of acne scars through distinct mechanisms. Subcision is a procedure that separates scars from the adhesions beneath them [7-9]. It is considered the initial step in the treatment of acne scars. The process of micro-needling using dermapen stimulates the production of collagen. The 50% TCA CROSS treatment targets dermal thickening, stimulates collagen formation, and enhances skin texture. Therefore, by integrating these three minimally invasive techniques, one can effectively alleviate scars, stimulate collagen production, and rejuvenate the skin's surface [8-10].

**Materials and Methods**

Microneedling, subcision, and 50% TCA CROSS were compared to microneedling and subcision alone in a randomized controlled open-labeled prospective trial. The

goal was to find out whether treatment was more effective. The dermatology department at India's Sambhram Institute of Medical Sciences in Kolar, Karnataka, was the site of the research. The time period covered by this study is from January 2018 all the way through December 2019.

**Inclusion Criteria**

- Adults of any gender who are at least 50 years old;
- Individuals prepared to provide informed consent

**Exclusion Criteria**

- Individuals on corticosteroid medication;
- Those getting systemic or topical retinoids
- Those with chronic skin conditions that existed before
- Skin conditions that are currently active

**Results**

Both deep boxcar scars and deep pitted scars respond well to TCA CROSS. Because atrophic acne scars can manifest in different ways, there is no one new treatment that works for everyone.

**Table 1:** Gender distribution

Sr. No.	Gender	Group 1	Group 2
1.	Male	25	20
2.	Female	15	20

Table 1 represents the gender distribution in that male was 25, female 15 in the group and in the male 20 and female 20 in the group 2.

**Table 2:** Result of after treatment in Grade 2 Patients

Initial grade	Final grade		No. of patients		%		p value
	Group 1	Group 2	Group 1	Group 2	Group 1	Group 2	
3	0	0	0	1	0	0	0.812
1	3	3	5	6	100	100	
3	2	2	1	1	0	0	

Table 2 comprising the result of after treatment in grade 2 patients in that observed p value was the 0.812.

**Table 3:** Result of after treatment in Grade 3 Patients

Initial grade	Final grade		No. of patients		%		p value
	Group 1	Group 2	Group 1	Group 2	Group 1	Group 2	
2	2	0	0	0	0	0	0.789
2	2	3	8	6	38	28	
2	2	2	8	8	66	8	
2	3	4	0	0	0	0	

Table 3 comprising the result of after treatment in grade 3 patients and observed p value was the 0.789.

**Table 4:** Result of after treatment in Grade 4 Patients

Initial grade	Final grade		Patients		%		p value
	Group 1	Group 2	Group 1	Group 2	Group 1	Group 2	
3	0	0	0	0	0	1	0.625
3	3	3	0	0	0	1	
3	2	2	10	6	80	80	
3	4	4	1	3	27	26	
3	3	3	0	0	0	0	

Table 4 consisting with the Result of after treatment in Grade 4 Patients and observed value was the 0.625.

**Table 5:** End study patient satisfaction score

Patient satisfaction score	Group 1	Group 2
Good	15	17
Very Good	11	10
Excellent	7	7

Table 5 was comprising with of the end study patient satisfaction score and observed score was 15 (good), 11 (Very good), 7 (Excellent) for group 1 and 17 (good), 10 (Very good), 7 (Excellent) in group 2.

**Table 6:** Improvement in Scar Grade after Treatment in Grade 2

Scar grade	Before treatment	After treatment
Grade 1	1	14
Grade 2	11	18
Grade 3	15	1
Grade 4	11	1

## Discussion

The results of our study support the use of both methods in conjunction to treat atrophic acne scars of all types. Results can be contrasted with those of previous studies that employed a mix of approaches. Of the sixty patients included in our study, 75% were between the ages of 21 and 30, giving the mean age a respectable 23. The majority of patients in Group 1 are young adults (between the ages of 21 and 25), making about 77% of the total patients in this age group. Conversely, those in the 21–30 age bracket made up 71% of group 2's patient population. Raza Hassan *et al.* found that their patients tended to be young adults (26–30 years old, mean age 25.07). Microneedling, a 15% TCA peel, and subcision were all part of Shilpa Garg *et al.*'s experiment, which also included an average patient age of 25.6 years [11-13].

Shashank Bhargava's study, which included both microneedling and subcision, had a mean age of 24.2 years. All three of our study groups had males as the majority demographic. Men made up 63% of group 1 and women 37%. The second group consisted of 43% men and 57% females. Similarly, 55% of the people who took part in the study by Raza Hasan *et al.* were male. Shashank Bhargava and Shilpa Garg *et al.*, on the other hand, had nearly 60% female participation. Out of sixty participants, 38.7 percent had a significant reduction in scar grade [12-14]. Patients showed an improvement of at least two grades following treatment. There were 32.5 percent of patients in Group 2 who had an extremely positive response, and 45.0 percent in Group 1 who showed a substantial improvement. Shilpa Garg *et al.* found a remarkable 34.6% improvement rate in a combination experiment that included microneedling, subcision, and a 15% TCA peel. This is similar to their work. Positive responses were given by 52.6% of the people who took part in our study. These individuals had one notch greater scarring. In group 1, 51.5% of patients showed an acceptable reaction, while in group 2, 53.3% did. Similar findings were observed in the study by Shashank Bhargava *et al.*, which indicated that 71% of patients experienced satisfactory outcomes when subcision and microneedling were combined [13-15].

There was a grade-one improvement in scar quality for every patient in our research. After six sessions, all patients in the two groups had improved. The results were consistent with those of a research by Shashank Bhargava *et al.*, which

showed a 95.6% reduction in scarring, graded. Consequently, right from the start of our experiment, every single participant noticed a reduction in scarring. While 63% of grade 2 and 75% of grade 3 patients showed satisfactory response, 78% of grade 4 patients indicated exceptional response. According to research by Shilpa Garg *et al.*, in second grade, there was a perfect response rate of 100%, in third grade, it was 68.2%, and in fourth grade, it was 62.5%. After the statistical analysis was completed, the qualitative outcomes for the two research groups were compared [14-16].

Unlike the other study, we did not find any statistically significant improvement in scar grade in group 1 before or after therapy. The bulk of patients in group 1 didn't start to feel better until after two microneedling sessions and two subcision treatments using 50% TCA CROSS. Group 2 patients only showed improvement in 60% of cases after two microneedling and subcision treatments. Studies conducted by Shilpa Garg *et al.* indicated that the first signs of scar healing were observed following subcision and two sessions of dermaroller and peel. On the other hand, at the conclusion of the follow-up period, 10.5% of patients reported extremely good contentment, 35.5% reported extremely good pleasure, 43.7% reported extremely high satisfaction, and zero reported extremely poor happiness. The treatment caused post-inflammatory hyperpigmentation in two patients in group 2 and three individuals in group 1. Acne has worsened in six of group 1's patients and four of group 2's [15-17].

Following a period of three to four weeks, these patients' post-inflammatory hyperpigmentation diminished. Oral 1% clindamycin cream and doxycycline pills were administered to patients whose acne was worsening until lesion 89 healed. No new serious side effects or limitations on regular activities have appeared since therapy began. Temporary post-inflammatory hyperpigmentation and worsening acne were reported by three individuals in a study conducted by Shilpa Garg *et al.* [18-20]. Although our study's major objective was to determine whether there was a reduction in acne scars, several patients reported other benefits, including better skin texture in groups 1 and 2, less seborrhea in groups 7 and 5, and less acne in groups 9 and 7 [21-23].

Various research have utilized subcision, microneedling, TCA CROSS, and fractional CO<sub>2</sub>, either singly or in conjunction with other methods. It shown that combined treatments work wonders for atrophic acne scars. There is a lot of evidence that 100% TCA CROSS can help with atrophic acne scars, but there is also a lot of downtime and pigmentation when the inflammation goes down. We choose to utilize 50% TCA CROSS because of the minimal pigmentary implications associated with atrophic acne scars and the short downtime it provided. We tested the efficacy of 50% TCA CROSS alone on atrophic acne scars and in combination with subcision and microneedling, particularly with dermapen, as no single modality produces noticeable results [22-24].

## Conclusion

Scars caused by post-atrophic acne can have different shapes and sizes. You can cure atrophying acne scars with a variety of energy- and non-energy-based techniques. There is a growing demand for minimally invasive cosmetic procedures. For this study, we opted for less invasive methods, including as microneedling with a dermapen rather than a conventional dermaroller, and 50% TCA CROSS rather than 100% TCA CROSS, which results in less downtime and less post-inflammatory pigmentation. This package also contains subcision, the first step in treating atrophic acne scars before any further procedures are done. Results for atrophic acne scars of grades 3 and 4 were quite encouraging in our study's first and fourth groups, respectively. Concerns regarding the efficacy of 50% TCA CROSS for atrophic acne scars were raised when no statistically significant difference was found between the groups' improvements. However, in order to conduct a more comprehensive evaluation, further study with a larger sample size is required. Low treatment costs, great patient satisfaction, and little recovery time are all benefits of this procedure.

## Funding

None

## Conflict of interest

None

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