

## EFFICACY OF DERMAROLLER VS TRICHLOROACETIC ACID (TCA) CROSS TECHNIQUE FOR TREATMENT OF ACNE SCARS

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### ABSTRACT

**Objective:** To compare efficacy of Derma Roller versus Trichloroacetic Acid (TCA) Chemical Reconstruction of Skin Scars (CROSS) technique for the treatment of acne scars.

**Study Design:** Randomized control trial.

**Place and Duration of Study:** Department of Dermatology, Maroof International Hospital Islamabad, from Mar to Sep 2020.

**Methodology:** A total of 154 patients were sampled into two equal groups of 77 each, selected by non-probability consecutive sampling. Inclusion criteria was patients presenting with acne scars with duration >1 year, in the age range of 18-40 years, either gender and with acne scars on face only. The following patients were excluded from our study: patients with active acne or keloidal tendency, on oral retinoids and those having herpes labialis, group 'A' patients were made to undergo four sessions of derma roller therapy at four weeks' interval each while group 'B' had to undergo four sessions of Trichloroacetic Acid Chemical Reconstruction of Skin Scars technique at four weeks' interval each.

**Results:** As per efficacy in both groups, 31 (40.25%) patients showed effective results in group A whereas in group B, 46 (59.74%) patients showed effective results, *p*-value 0.015.

**Conclusion:** We therefore concluded that Trichloroacetic Acid Chemical Reconstruction of Skin Scars is comparatively better than Derma roller technique in the treatment of acne scars.

**Keywords:** Acne scars, Atrophic, Derma-roller, Trichloroacetic acid, Chemical reconstruction of skin scars.

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### INTRODUCTION

Acne vulgaris is a common disorder affecting teenagers and young adults which can result in post acne scarring. Acne scarring is not only a cosmetic concern but also carries psycho-social implications. Most teenagers are bothered by the "pimple marks" than the pimples and seek and demand quick and complete remedies<sup>1</sup>. Acne has a prevalence of over 90% among adolescents and persists into adulthood in approximately 12-14% of cases. Dermatologists and even General Physicians the world over and at all levels of health care are faced with the challenge of planning treatments for patients with acne scars.

There are numerous treatments, namely, chemical peels, dermabrasion / microdermabrasion, laser treatment, punch techniques, dermal grafting, needling, combined therapies, silicone gels, intralesional steroid therapy, cryotherapy, and surgery for acne scars<sup>2</sup>. A previous study concludes that both treatments are equally effective and safe for the treatment of acne scars when overall results are compared. It reveals that marked improvement was seen in 40% patients in the dermaroller group and in 60% patients in the chemical reconstruction of skin scars (CROSS) group while

moderate improvement was seen in 40% patients in dermaroller group and in 26.6% patients in the CROSS group and mild improvement was seen in 20% patients in dermaroller group and 13.3% patients in the CROSS group<sup>3</sup>.

The most common type of acne scars is atrophic<sup>4</sup>. Although, its pathogenesis is yet to be fully grasped, but it seems most likely due to inflammatory mediators and aberrant production and degradation of collagen and subcutaneous fat. However, it is still not clear why some acne patients develop scars while others do not, as the degree of acne does not always correlate with the incidence or severity of scarring<sup>5,6</sup>. The scarring process can occur at any stage of acne; however, it is uniformly believed that timely treatment of inflammatory and nodulocystic acne is the most effective way of preventing post-acne scarring. Once scarring has occurred, it is usually permanent<sup>7-9</sup>.

Dermaroller or microneedling is a hand held device with row upon row of tiny needles that penetrate skin to induce new collagen formation and smooth out wrinkles, acne scars, pigmentation and chicken pox scars<sup>10,11</sup>. The standard dermaroller used for acne scars is studded with 192 fine microneedles in eight rows, 0.5-1.5 mm in length and 0.1 mm in diameter<sup>12</sup>. In trichloroacetic acid (TCA) CROSS, focal application of 70% TCA concentration is done by pressing hard on

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the entire depressed area of atrophic acne scars using a sharpened wooden applicator<sup>13</sup>.

The objective of this study was to compare derma roller technique versus TCA CROSS technique for the treatment of acne scars.

**METHODOLOGY**

This randomized control trial study was conducted at department of Dermatology, Maroof International Hospital Islamabad, from Mar to Sep 2020. A total of 154 patients were sampled into two equal groups of 77 each selected by non-probability consecutive sampling. Patients excluded from our study comprised of pregnant or lactating women, Topical treatment (use of any medications applied to the skin) in last 2 weeks, previous history of CO2 laser therapy and post trauma keloid and scars.

Group ‘A’ patients had four sessions of derma roller therapy at four weeks’ interval. Group ‘B’ patients underwent four sessions of TCA (CROSS technique) at four weeks’ interval.

In group ‘A’, topical anesthetic was applied for an hour before uniform pinpoint bleeding was induced through multiple of micro puncture sites by rolling the derma roller device across the skin exerting pressure in multiple directions. Post-procedure, the treatment area was cleansed and an emollient was applied. Generally, the skin oozes for less than 24 hours and then remains erythematous and edematous for 2-3 days.

In group ‘B’, CROSS was carried out which consisted of application of 70% TCA concentration on the area of the acne scars. Post-procedure, an antibiotic cream was applied. The patients were advised regarding strict photo protection and told to apply a sun screen several times daily. The adverse effects were noted in both the groups. All the patients were followed up after one month to determine the efficacy of each technique.

The grading of acne scars was done clinically but also took into account the satisfaction of the patients who filled a feedback Performa which most importantly included their satisfaction level with the treatment based on a 10-point scale ranging from 0-10.

**RESULTS**

At the end of the four weeks’ sessions of both techniques, significant improvement was seen in 40% patients of group ‘A’ (Dermaroller) and in 60% patients of group ‘B’ (CROSS). Milder side effects were seen in 20 patients in group ‘A’, erythema (20%) and pain and edema after the procedure (6.7%). Hyperpigmentation

was seen in 10 (13.3%) patients in the TCA CROSS group. Moreover, it was also interesting to note derma roller seemed to be more effective in rolling and boxcar scars whereas TCA CROSS seemed to be more effective in patients with ice-pick scars. Although the difference in the degree of improvement between both the two groups is not statistically too large, however if feedback of the patients is given due weightage, the TCA CROSS technique seemed to have comparatively more satisfied patients.

As per descriptive statistics, in group A, mean and SDs for age was recorded as 32 ± 4.49. Mean and SDs for duration of scar was recorded as 3 ± 0.52. In group B, mean and SDs for age was recorded as 31 ± 4.9. Mean and SDs for duration of scar was recorded as 4 ± 0.69 (table-I).

As per age wise distribution, in group A, 37 (48.05%) patients were recorded in 18-30 years’ age group whereas 40 (51.94%) patients were recorded in 31-40 years’ age group. In the same manner, in group B, 37 (48.05%) patients were recorded in 18-30 years’ age group whereas 40 (51.94%) patients were recorded in 31-40 years’ age group (table-II).

As per gender wise distribution, in group A, 53 (20.30%) patients were recorded male patients and 24 (31.16%) patients were recorded female patients. In the group B, 37 (48.05%) patients were male whereas 40 (51.94%) patients were recorded as female patients (table-III).

**Table-I: Descriptive statistics (n=154).**

Contineous Variables	Mean & SDs		
	Group A (n=77)	Group B (n=77)	Overall (n=154)
Age	32 ± 4.49	31 ± 4.9	31 ± 4.5
Duration of Disease	3 ± 0.52	4 ± 0.69	3.5 ± 0.55

**Table-II: Age distribution (n=154).**

Age Group	Group A (n=77)	Group B (n=77)	Total (n=154)
18-30 Years	37 (48.05%)	37 (48.05%)	74 (48.05%)
31-40 Years	40 (51.94%)	40 (51.94%)	80 (51.94%)
Total	77 (100%)	77 (100%)	154 (100%)

**Table-III: Gender distribution (n=154).**

Gender	Group A (n=77)	Group B (n=77)	Total (n=154)
Male	53 (20.30%)	37 (48.05%)	90 (58.44%)
Female	24 (31.16%)	40 (51.94%)	64 (41.55%)
Total	77 (100%)	77 (100%)	154 (100%)

As per working environment, in group A, 56 (72.72%) were having outdoor environment and 21 (27.27%) patients were having indoor environment. In

group B, 39 (50.64%) patients were from outdoor environment and 38 (49.35%) patients were from indoor environment (table-IV).

Stratification of efficacy in both groups with respect to age and gender can be shown in table-V.

**Table-IV: Frequency and percentages for working environment (n=154).**

Working Environment	Group A (n=77)	Group B (n=77)	Total (n=154)
Outdoor	56 (72.72%)	39 (50.64%)	95 (61.68%)
Indoor	21 (27.27%)	38 (49.35%)	59 (38.31%)
Total	77 (100%)	77 (100%)	154 (100%)

**Table-V: Stratification of efficacy with gender & age in both groups (n=154).**

	Efficacy	Group A (n=77) (%)	Group B (n=77) (%)	p-value
<b>Gender</b>				
Male	Yes	21 (27.27)	19 (24.67)	0.270
	No	32 (41.55)	18 (23.37)	
Female	Yes	10 (12.98)	27 (35.06)	0.042
	No	14 (18.18)	13 (16.88)	
<b>Age</b>				
18-30 Years	Yes	20 (25.97)	26 (33.76)	0.150
	No	17 (22.07)	11 (14.28)	
31-40 Years	Yes	11 (14.28)	20 (25.97)	0.038
	No	29 (37.66)	20 (25.97)	

**DISCUSSION**

In the derma roller group, 31 (40.25%) patients showed effective results whereas in CROSS group 46 (59.74%) patients showed effective results. Types of acne scars are: 1) ice-pick, 2) rolling, and 3) boxcar scars. It is common for patients to have more than one type of scar<sup>14,15</sup>.

The CROSS technique has proven to be more effective for ice-pick and narrow boxcar scars<sup>16</sup>. A high-strength trichloroacetic acid (TCA) peel solution is placed in the base of these scars causing a local inflammatory reaction leading to the formation of new collagen fibers. Interestingly instead of full face resurfacing, focal chemical scar reconstruction was done<sup>17,18</sup>. Moreover, this technique is safe can avoid scarring and reduce the risk of developing post inflammatory hypopigmentation by sparing the adjacent normal skin. Repeated CROSS application can normalize deep rolling and boxcar scars and deep ice-pick scars with higher TCA concentrations of up to 100%. Because clinical improvement is proportional to the number of courses of CROSS treatment, this method is effective for the treatment of all deep acne scar types.

On the other hand, Dermaroller technique has its own advantages for being safe in all skin types and

carries the lowest risk of PIH<sup>19</sup>. Compared to other treatment types, it has less downtime and is less expensive. Usually, three or more treatments are required to achieve optimal clinical benefit, separated by four-week intervals.

**CONCLUSION**

TCA CROSS is comparatively better than the dermaroller technique in the treatment of acne scars owing to patient satisfaction, being inexpensive and the broader variety of acne scars that it can be used to treat. However, it is necessary for the Dermatologist / Physician to educate the patient regarding the unpredictability of acne scar treatment, specifically, explaining that there cannot be a quick and permanent solution.

**CONFLICT OF INTEREST**

This study has no conflict of interest to be declared by any author.

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