

## Subcision Combined With Microneedling in the Management of Atrophic Acne Scars

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### Abstract:

**BACKGROUND-** Atrophic acne scars are difficult to treat. The treatment of acne scars is challenging due to variety in morphology of acne scars and the limitations of the available treatment modalities in their ability to improve scars. The demand for less invasive but highly effective treatment for scars is growing.

**AIM** –To assess the efficacy of combination therapy using subcision and microneedling for the management of atrophic acne scars.

**MATERIAL AND METHOD**–Thirty patients with atrophic acne scars were graded using Goodman and Baron qualitative grading. After subcision and microneedling was performed in the same sitting. This procedure was repeated after every 4 weeks for 6 sessions. Grading of acne scars, photographs were taken pretreatment and 1 month after last procedure.

**RESULTS**-Out of 12 patients with grade 4, 9 (75%) patients improved to grade 2 and 3 (25%) patients improved to grade 1. Out of 10 patients with grade 3, 6 (60%) patients improved to grade 2 and 4 (40%) patients were left with no scar. All 7 (100%) patients with grade 2 scars were left with no scars. There was high level of patient satisfaction.

**CONCLUSION** – This combination has shown good response in treating atrophic acne scar.

**Keywords** - subcision, dermaroller for acne scars.

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### I. Introduction

Acne is prevalent in over 90% adolescents and it persists into adulthood in approximately 12-14% of case with psychological and social implications.<sup>1,2,3</sup> In some patients with acne, scars occur consequent to abnormal wound healing following sebaceous follicular inflammation in acne.<sup>3</sup> Post acne facial scarring is a psychologically devastating condition and the affected patient invariably suffers from many psychological ill-effects because of this condition.<sup>4</sup> Acne ruins beauty and, in some, it scars for life.

Scar is an end result of local response of the skin to any inflammatory, traumatic and surgical injury.<sup>5,6</sup> Pathogenesis of acne scarring mainly involves inflammation, granulation, tissue formation and matrix remodeling.<sup>7</sup>

There are two general types of acne scars- atrophic and hypertrophic. Scars with loss or damage of tissue are atrophic scars and can be classified into icepick, rolling and boxcar scars (fig 1).<sup>5</sup> Icepick scars are narrow, deep scars that are widest at the surface of the skin and taper to a point in the dermis. Rolling scars are shallow, wide scars that have an undulating appearance. Boxcar scars are wide sharply demarcated scars. Unlike ice pick scars, the width of boxcar scars is similar at the surface and base. Hypertrophic scars and keloids are examples of scars that results from increased tissue formation. Hypertrophic scars are pink, raised and remain within borders of original site of injury. Keloids are reddish purple papules or nodules that proliferate beyond the borders of original wound.

There is no standard treatment option for the treatment of acne scars. Medical management of atrophic scars can be done by using topical retinoids. Surgical management of atrophic acne scars can be done along with punch excision, elliptical excision, punch elevation, skin grafting and subcision depending on the type of scars. Procedural management includes dermabrasion, chemical peels, percutaneous collagen induction by microneedling and dermabrasion. Various ablative and non ablative lasers and light energies are also available for treatment of atrophic acne scars.<sup>8</sup> Out of the multiple treatment options, treatment has to be tailored to patients

need, tolerance and goals along with the physicians assessment skill, expectations and resources available. One such device is dermaroller.

In 1995, Orentreich and Orentreich described subcision as a method of subcuticle undermining of scar using a tri-beveled hypodermic needle. This results in lifting the scar by releasing the papillary dermis from the binding connections of the deeper tissues and by the formation of connective tissue that results from the course of normal wound healing.<sup>9</sup> It is mainly used for the treatment of rolling type of atrophic scars.<sup>5</sup>

The mechanism hypothesised for action of percutaneous collagen induction using dermaroller is that it creates thousands of microclefs through the epidermis into the papillary dermis. These wounds create a confluent zone of superficial injury which initiates the normal process of wound healing<sup>10</sup> with release of several growth factor. This stimulates the migration and proliferation of fibroblasts resulting in collagen depositions<sup>11</sup> which continues for months after the injury.<sup>12</sup>

## II. Aim Of Study:

The aim of this study was assessment of combination therapy using subcision and dermaroller for the management of atrophic acne scars. The rationale for combining these minimally invasive procedure was their additive action on acne scars. Subcision releases the scars from the underlying adhesions which should be the first step for any treatment for acne scars. Microneedling with dermaroller cause collagen induction.



**Fig 1:** Types of acne scars.

## III. Materials And Method:

Thirty patients with atrophic acne scars were enrolled in the study who presented in skin OPD from October 2018 - March 2019. Exclusion criteria were patients with active acne, active herpes labialis, patients on systemic retinoids. Evidence or history of keloid scars, history of any facial surgery or procedures for scars and patients with unrealistic expectations. All the patients were counseled for surgical intervention and written informed consent was taken. The atrophic acne scars were graded by a single non-treating physician using Goodman and Baron Qualitative scar grading system. Percentage calculation was done by Microsoft Excel Office.

Eutectic mixture of lignocaine 7% and prilocaine 7% cream was applied under occlusion for 45 minutes to the affected areas which was removed using gauze. At the start of treatment, subcision was performed only once using a 24G needle on the rolling type of scars. Treatment was further performed by rolling the dermaroller in vertical, horizontal and diagonal directions in the affected area until appearance of uniform fine pin point bleeding. Then the area was wiped with saline soaked gauze and sunscreen and calamine lotion was applied on the face. Patient was instructed to apply sunscreen in the morning and fusidic acid twice daily for 5 days after which sunscreen was continued in the morning. This procedure was repeated after every 4 weeks for 6 months. Patients were evaluated for results 1 month after the last procedure was performed. Post treatment scars were graded again by same physician using Goodman and Baron Qualitative scar grading system. Patient graded their response to treatment as poor, good, very good or excellent with 0-24%, 25-49%, 50-74% and 75-100% improvement, respectively, in their acne scars. Patients were followed up to 6 months after treatment at 2 monthly interval to observe the sustenance of improvement in scars. Digital color photographs were taken before treatment, during each visit of treatment, at 1 month after the last procedure. Grading system, proposed by Goodman and Baron (shown in table 1) encompasses all types of post acne scars and uses a simple clinical examination as the tool to grade the scars on objective lines.<sup>13</sup>

**Table 1.** Goodman and Baron Qualitative scar grading system

Grade	Level of disease	Clinical features
1	Macular	These scars can be erythematous, hyper- or hypopigmented flat marks. They do not represent a problem of contour like other scar grades but of colour
2	Mild	Mild atrophy or hypertrophic scars that may not be obvious at social distances of 50cm or greater and may be covered adequately by makeup or the normal shadow of shaved beard hair in men or normal body hair if extrafacial
3	Moderate	Moderate atrophic or hypertrophic scarring that is obvious at social distances of 50cm or greater and is not covered easily by makeup or the normal shadow of shaved beard hair in men or body hair if extrafacial, but is still able to be flattened by manual stretching of the skin (if atrophic)
4	Severe	Severe atrophic or hypertrophic scarring that is evident at social distances greater than 50cm and is not covered easily by makeup or the normal shadow of shaved beard hair in men or body hair if extrafacial and is not able to be flattened by manual stretching of the skin

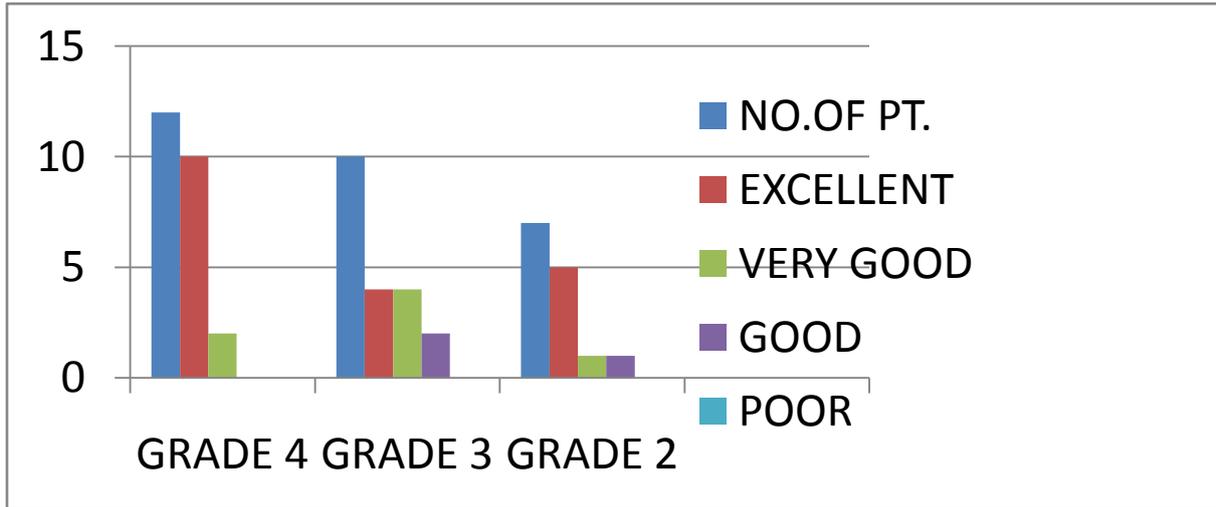
**IV. Results:**

Out of 30 patients, 29 patients completed the treatment. Out of 29 patients 2 patients were treated with cap doxycycline during the treatment protocol due to active acne eruptions. Out of 29 patients there were 18 females and 11 males with age group between 18-39 years with mean age  $25.6 \pm 5.2$  years.

Out of 29 patients who completed the treatment, 12 patients had grade 4, 10 patients had grade 3, 7 patients had grade 2 scars before treatment. In patients with Grade 4, 9 patients (75%) showed improvement by 2 grades which means their scars improved from grade 4 to grade 2 of Goodman and Baron scale (fig 2 a-b). 3 patients (25%) with grade 4 scars showed improvement by grade 1 with scars being obvious at social distances of 50 cm or greater. In 10 patients of grade 3 scars, 6 patients (60%) showed improvement by 2 grades (fig 3 a-b), they were left with hyperpigmented flat marks, whereas 4 patients (40%) showed improvement by 3 grades which means they were left with no scars (fig 4 a-b). 7 (100%) patients with grade 2 scars before, showed improvement by 2 grades and were left with no scars (fig 5 a-b). Hence all 29 patients (100%) had showed improvement in their scars by some grade with no failure rate. Table 2 shows objective assessment of response to treatment based upon grades at the end of treatment. Out of 12 (41.3%) patients with grade 4 scars, 10 patients (83.3%) graded their response to treatment from excellent improvement with 75% improvement in their acne scars after treatment and 2 patients had very good improvement in their scars with 50-74%. In patients with grade 3 scars, 4 patients (40%) graded as excellent response, 4 patients (40%) with very good response and 2 patients (20%) with good response. Out of 7 (24.3%) patients with grade 2 scars graded their response after treatment 5 patients (71.4%) with excellent response, 1 patient (14.3%) with very good and 1 patient (14.3%) with good improvement.

Pre treatment grade	No. of patients	Excellent >75%	Very good 50-74%	Good 25-49%	Poor 0-24%
GRADE 4	12 (41.3%)	10 (83.3%)	2 (16.7%)	0	0
GRADE 3	10 (34.4%)	4 (40%)	4 (40%)	2 (20%)	0
GRADE 2	07 (24.3%)	5 (71.4%)	1 (14.3%)	1 (14.3%)	0

**Table 2.** Objective assessment of scars after treatment on the basis of grades.



**Table 3:** line diagram showing objective assessment after treatment on the basis of grades.

There was improvement in rolling, boxcar and linear tunnel scars with little or no improvement in ice pick scars. All patients tolerated the procedure well. Side effects were mild and transient. Post treatment erythema persisted for 1-4 days. Only 3 patients showed post inflammatory hyperpigmentation, which were treated with sunscreen and depigmenting agents.



**Fig 2. a)** Grade 4 acne scars;



**b)**Improvement in acne scar from Grade 4 to 3 after treatment



**Fig3.**a) Grade 3 acne scars;

b) improvement in acne scars from 3 to 1



**Fig 4** a)Grade 3 acne scars



b)Post treatment improvement



**Fig 5:** a) Grade 2 acne scars; b) Post-treatment after 6 sessions

## V. Discussion

This study has shown good results in patients with severe grade 4 and 3 acne scars with 9 (75%) patients moving from grade 4 to grade 2 and 4 (40%) patients from grade 3 to no scars at the end of treatment. In 10 patients of grade 3 scars, 6 (60%) patients showed improvement by 2 grades, whereas 4 (40%) patients showed improvement by 3 grades that is they were left with no scars at all. 7 (100%) patients with grade 2 scars before, showed improvement by 2 grades and were left with no scars. Hence all 29 (100%) patients had improvement in their scars by some grade with no failure rate. In patients with grade 4, 10 patients graded their response to treatment to very good with 50-74% improvement in their acne scars after treatment and 2 patients had good improvement in their scars with 25-29%. In patients with grade 3 scars, 4 patients graded as excellent response, 4 with very good response and 2 with good response. All 7 patients with grade 2 scars graded their response after treatment. The procedure was well tolerated by all the patients. Post procedure there was no loss of work days and side effects were mild and transient.

Although ablative laser resurfacing is generally considered to be most effective option for scar resurfacing, it is associated with significant damage to the epidermis and basal membrane with associated inflammation which causes erythema, scarring and pigmentation problems.<sup>14,15,16</sup> In comparison, percutaneous collagen induction does not induce post-operative dyspigmentation as the epidermis and basal membrane are left intact.<sup>17</sup>

## VI. Conclusion:

As the demand for less invasive and highly effective cosmetic procedures is growing, this combination of treatment for acne scars has shown good results not only in grade 2 but also in grade 3 and grade 4. There is high level of patient satisfaction, minimal downtime and treatment is also cost effective.

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