*Type of the Paper (Systemic review)*

# The effectiveness of micro-needling in the treatment of Atrophic post-acne scars: Systematic Review

**Samar N. S. Ahmed[1]*, Noha E.M. Abdel Gawad[1], Amel R. H. Abd El Aziz[1]**

[1]Department of Dermatology & Venerology, Faculty of Medicine, Fayoum University, Fayoum 63511, Egypt.

*Correspondence: Samar N. S. Ahmed, samar.naser.3dss@gmail.com, Tel: (002) 01062238302.

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**Abstract:**

**Introduction:** The majority of cases with moderate to severe acne acquire post-acne scars. A variety of therapeutic methods, including chemical peels, lasers, dermabrasion, autologous collagen, punch grafting, and surgical excision, can be employed to lessen scarring. Micro-needling is considered one of the promising techniques focused on breaking down dermis-damaged collagen & promoting the production of new collagen.

**Aim of the study:** To evaluate the clinical effectiveness of micro-needling in the treatment of post-acne scars

**Subjects and Methods:** Twelve female patients and six male patients, ages ranging from 15 to 30, had atrophic post-acne scars included in this review. Derma pen was applied to the face in five sessions every 2 weeks, with a follow-up two months following the final session. Goodman & Baron's score was evaluated before and after. Complications were evaluated in each patient after treatment.

**Results:** After being found and screened, one study met the requirements for inclusion in our review. The study's findings demonstrate that micro-needling was a very safe and successful therapy option for atrophic post-acne scars

**Conclusions:** Micro-needling is an excellent treatment for acne scars.

**Keywords:** micro-needling; post-acne scars; derma pen.

## 1. Introduction

Acne and acne scarring are the most significant cosmetic hazards, as around 95% of acne scars manifest on the face and profoundly affect one's quality of life [1].

There are numerous subtypes of acne scars, including keloidal, atrophic, and hypertrophic. Boxcar, icepick and rolling are the most prevalent types of atrophic scars [2].

The most widely recognized theory for atrophic acne scarring is that it is caused by inflammatory mediators & the enzymatic breakdown of collagen fibers and s/c fat through

the acne development process. However, the precise etiology of the condition is unknown. Individuals who touch their acne lesions run the danger of aggravating and deforming their condition even more [3]. A variety of treatment techniques, including chemical peels, dermabrasion, lasers, subcision, and micro-needling, can decrease the disfiguring impact of post-acne scars [4]. There are several current treatment methods available, involving ablative laser resurfacing and dermabrasion [5].

## 2. Subjects and Methods

***Inclusion criteria***

- Individuals who have scars from acne.
- Age: between 15 and 30 years old.
- Gender: male and female.

***Exclusion criteria***

- Individuals who, during the past month, have undergone topical or systemic acne treatment.
- People who suffer from other dermatological conditions.
- Individuals suffering from infections, autoimmune disorders, or any systemic sickness.
- Those who have already had laser therapy, IPL, or chemical peels.

### *2.1.Study design*

Individuals with scars from acne were included in both interventional and observational investigations. In three stages, we screened the items that were included. The first stage involved utilizing EndNote Software [7] to import the results from electronic databases into a Microsoft Excel [6] sheet. Two separate authors completed the second stage, which involved reviewing the papers' titles and abstracts before importing them into the Excel sheet. The full-text screening of step 2 contained citations was the third stage. Furthermore, we carefully looked through the included references.

### *2.2.Statistical Methods*

Review Manager software was used to conduct the meta-analysis of this research, which had continuous and dichotomous results. The mean difference (MD) and 95% confidence interval (CI)were used to analyze continuous data, & risk ratio (RR) and 95% CI were used to assess

dichotomous data. The mean standard deviation of each set of data was displayed from ten independent experiments. In statistical analysis, a p-value of below 0.05 is deemed significant.

## 3. Results

**Figure 1** shows the PRISMA Flow diagram of the literature search process.

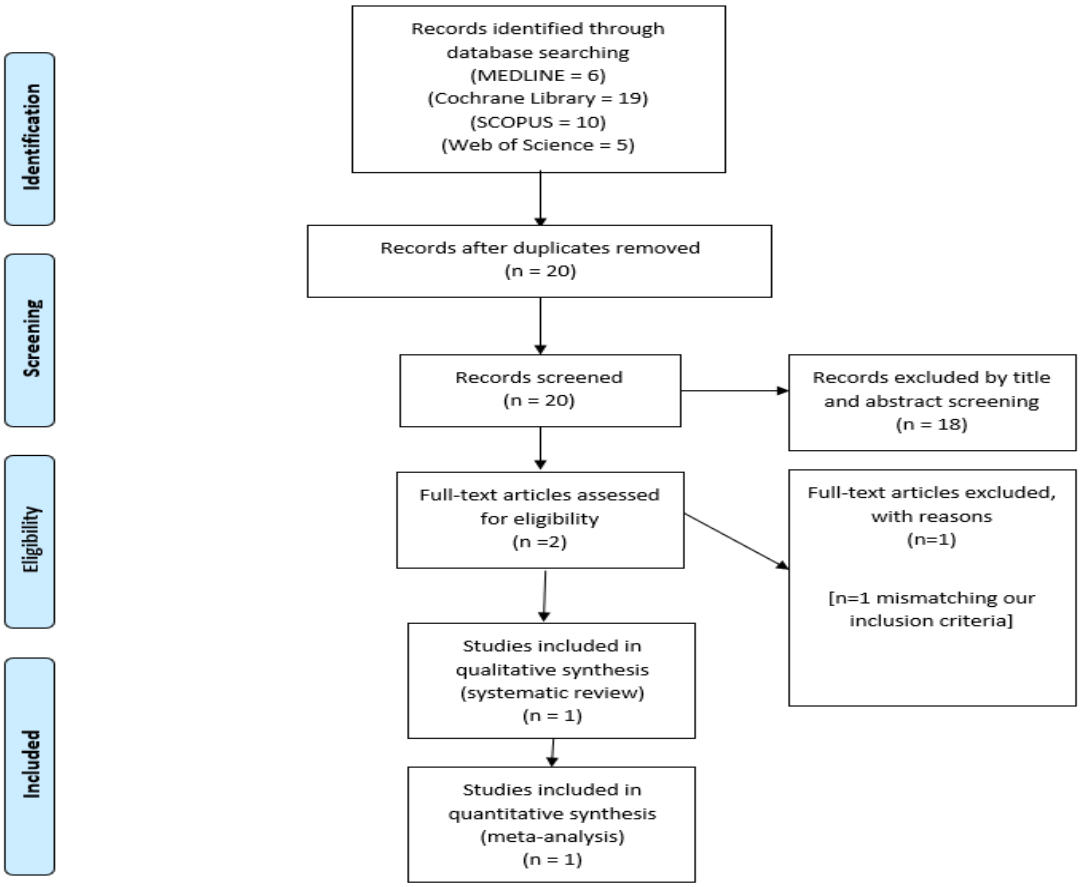


**Figure 1:** The PRISMA flow diagram.

A thorough analysis of four publications revealed that micro-needling was used to treat acne vulgaris. According to **Table 1** of this review, a significant statistical variance was found ($p < 0.005$) in the derma pen among S1 S2 and S3.

**Table 1:** Pair test of scores (Baseline, end of treatment, and two months later).

| Method | Pair test | | P-value |
|---|---|---|---|
| **Derma pen** | Pair 1 | S1 - S2 | 0.043* |
| | Pair 2 | S1 - S3 | 0.05 |
| | Pair 3 | S2 - S3 | 0.921 |

*significant.

Twelve patients under study were women, and six were men. Their ages varied from fifteen to thirty years old. Of the 18, 76% had a positive family history of acne scarring. The average length of the illness was 8.80 ±1.16 years, while the average time for scarring was 6.75 ±1.18 years **(Table 2).**

**Table 2:** Clinical characteristics of Acne patients.

| Variables | | Frequency |
|---|---|---|
| **Sex** | Male | 12 (67%) |
| | Female | 6 (33%) |
| **Duration of disease [Years]** | | 8.8 ±1.16 |
| **Duration of scar [Years]** | | 6.75 ±1.18 |
| **Family history** | Yes | 18 (72%) |
| | No | 7 (28%) |

Three cases (17%) have mild acne, five cases (28%) have moderate acne, and ten patients (55%) have severe acne. The improvement showed no increase in the acne scar score two months after the previous Derma pen session **(Figure 2).**

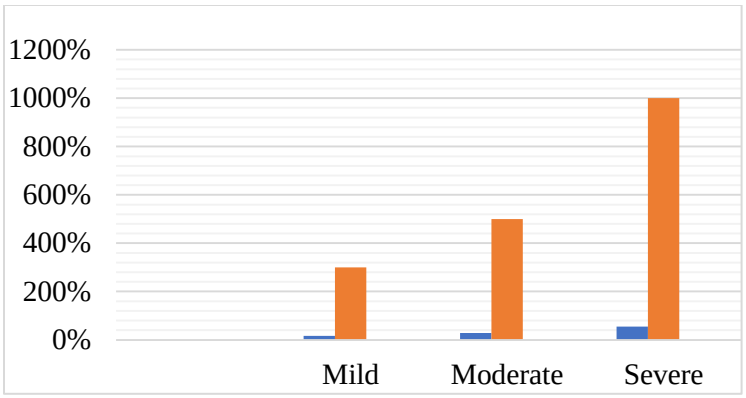


**Figure 2:** The acne scar score was two months after the previous Derma pen session.

All individuals, with Negative effects, reported having erythema on two sides of their faces. Just three patients (12%) had hyperpigmentation. Just five patients (20%) reported having pain **(Table 3 and Figure 3).**

**Table 3:** Adverse impacts on the two sides.

| | **No. of patients** | ***P-value*** |
|---|---|---|
| **Erythema** | 18 [100%] | 1 |
| **Hyperpigmentation** | 2[11%] | >0.001 |
| **Pain during session** | 4[22%] | >0.001 |

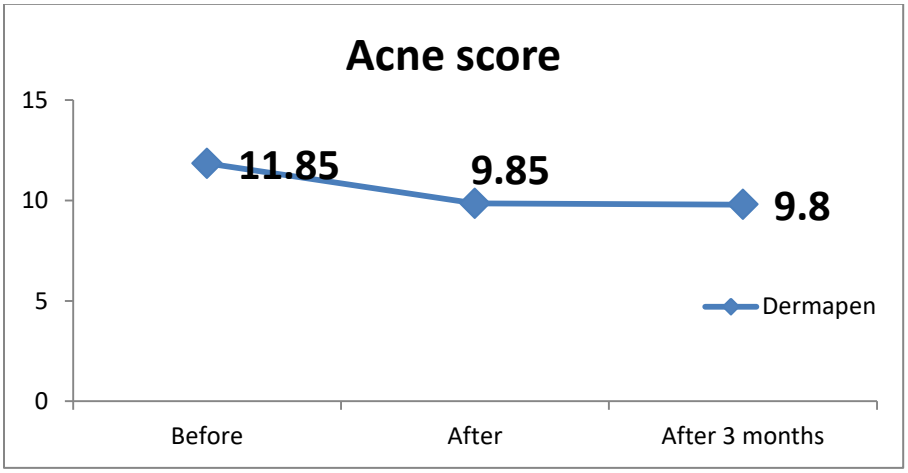


**Figure 3:** Acne score prior, post-treatment, and two months of therapy with derma pen.

## 4. Discussion

Acne is a chronic inflammatory disease of the pilosebaceous unit, inflammation can be detected by pathological and immunochemical analysis, acne formation is linked to predisposing environmental and genetic factors, and acne lesions appear in the form of blackheads, whiteheads, nodules and cysts [11].

One well-known method for treating atrophic post-acne scars is micro-needling. The creation of tiny epidermal channels followed by dermal injury forms the basis of the micro-needling mechanism [12]. Additionally, activation of fibroblast release, the production of elastic fibers, and platelet-derived growth factors lead to increased neo-collagenases and neovascularization, which improve the look of scars, particularly those of the atrophic type [13].

In clinical practice, the prevalence of acne vulgaris in adolescents is almost 86%. Acne vulgaris diagnosis varies depending on the patient's personal beliefs, social standing, and educational level [14].

In our study there was significant progress was made in micro-needling among S1 S2 and S3.

Regarding the side effects of the derma pen, the majority of patients experienced slight pain, while nearly all of them experienced erythema that cleared up in 48 hours or less.

Numerous skin conditions such as striae, ageing baldness, and scarring can be treated with micro-needling. Because of an increase in dermal extracellular matrix protein synthesis without epidermal ablation, it had a long-lasting effect on atrophic post-acne scar [15].

At both the completion of therapy and two months later, none of the patients included in the study reported a worsening in scar severity compared to the initial level. Similar to our findings, other research has examined micro-needling as a therapeutic approach for treating atrophic post-acne scars. Phuong et al. have reported on the safety and efficacy; however, our evidence indicates superior efficacy [16].

El-Domyati et al. examined the derma pen's function in atrophic post-acne scars using skin samples taken both before and after derma pen treatment. The authors observed a significant decline in total elastin [p below 0.05], but a significant rise in

newly generated collagen and collagen types I, III, and VII [17].

## 5. Conclusion

According to this research, micro-needling is a viable and successful therapeutic approach for treating scars from acne. This study has several limitations, such as the absence of long-term follow-up, which was not carried out because patients in our study did not comply, a relatively small number of patients were studied, and no histopathological correlation was found between the improvement in our patient's clinical condition.

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**Conflicts of Interest:** All authors declare they have no conflicts of interest.

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