

ASSESSMENT OF TRANSEPIDERMAL DELIVERY OF PLATELET-RICH PLASMA (PRP) ENHANCED NANOFAT TREATMENT IN ATROPHIC POST BURN SCARS

Nasser Ahmed Ghozlan, *Bassma Mohamed Elsabaa, Ehab Zaki Azzam, Ahmed Abdel Kader Elsaed Zidan, Esraa Mahmoud Elsayed Mustafa
Department of Plastic and Reconstructive Surgery, *Department of Pathology, Faculty of Medicine, Alexandria University

INTRODUCTION

Burn injuries are a major global public health concern, impacting millions annually. Despite advances in acute care boosting survival rates, burn scars lead to long-lasting physical and psychological effects. One of the consequences of burns is atrophic scars that result in functional limitations and cosmetic issues, affecting self-esteem. They happen due to disruption of healing process and inadequate collagen restoration, giving the scar the characteristic sunken appearance. Managing these scars is multifaceted, requiring aesthetic and functional considerations. Various treatment strategies have been researched however this study focuses on a novel approach utilizing Platelet-Rich Plasma (PRP) combined with microneedling and nanofat grafting to enhance the healing of atrophic post-burn scars. Each therapeutic modality targets different aspects of scar pathology, aiming for improved clinical outcomes by promoting collagen formation and skin regeneration while addressing the aesthetic concerns associated with scars. The treatment results are assessed by POSAS Scar scale and histologically.

AIM OF THE WORK

The aim of this study was to test the effect of triple combination therapy of PRP, Nanofat and microneedling as a tool for rejuvenation and improvement of post burn atrophic scars.

PATIENTS AND METHODS

This study involves 20 patients with post-burn atrophic scars from the Plastic Surgery Department at Alexandria University Hospitals. Inclusion criteria include scars older than one year, broad and atrophic scars, and patients aged 18 or older. Exclusions encompass keloids, hypertrophic scars, patients on anticoagulation, ulcerated scars, active dermatological conditions, and those with chronic debilitating illnesses or unrealistic expectations.

Patients underwent detailed history-taking, clinical examination, and scar assessment using the Patient and Observer Scar Assessment Scale (POSAS). Preoperative counseling, routine laboratory tests, and informed consent were obtained. A punch biopsy was performed for histological examination before and after the intervention. The surgical technique involved local anesthesia and tumescent infiltration, followed by liposuction of harvested fat. This fat was transformed into nanofat and combined with Platelet-Rich Plasma (PRP) for treatment and three sessions were done. Outcomes were assessed clinically and histologically after initial and follow-up sessions, followed by statistical analyses of results.

RESULTS

Table shows comparison in POSAS between Pre and Post treatment showing statistically significant improvement

% of improvement (between Pre and after 6 months)	PSAS (%)	OSAS (%)
Min. – Max.	20.0 – 83.33	14.29 –73.33
Mean ± SD.	48.60±16.09	45.72±17.56
Median (IQR)	50.00 (36.16–60)	43.84 (37.17–57.14)

Graph shows Improvement in variable histological factors in the post treatment biopsy

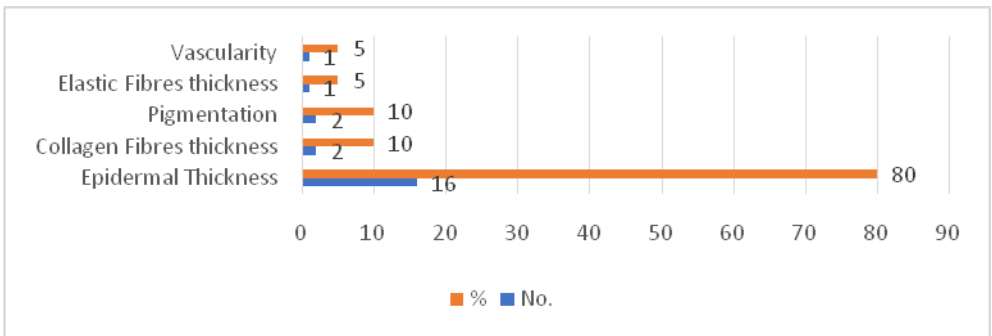


Fig 1: Bar Graph showing percentages of cases showing improvement in variable histopathological factors (n = 20)



Fig 2: Nineteen-year-old female patient with post scald burn atrophic dyspigmented scar to the chest showing improvement in texture and pigmentation. (before on left and after on right)

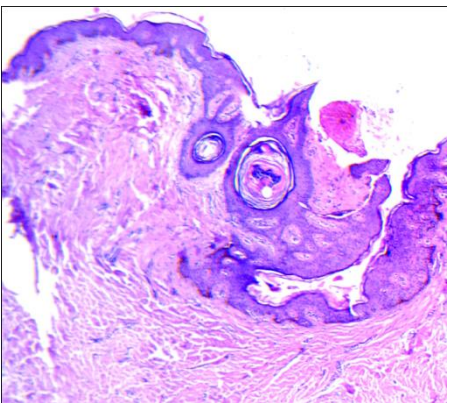


Fig 3: Section showing notably increased epidermal thickness with pseudohorn cyst formation (marked by red arrow) and increased dermal collagenization in the post treatment biopsy (H&E,x200)

CONCLUSIONS

In conclusion, the combination therapy of PRP, nanofat, and microneedling demonstrates remarkable efficacy in improving post burn atrophic scars, as evidenced by both POSAS scores and objective punch biopsy findings. These findings contribute to the evolving landscape of scar management, supporting the integration of regenerative and minimally invasive approaches.