



Case Report

W- plasty assisted with aprp and llrt in scar revision surgeries in post electric burns hypertrophic scar

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Abstract

Scar revision surgeries aim to improve the appearance and function of scars caused by trauma, burns, or surgery. W-plasty, a surgical technique involving zigzag incisions, redistributes tension, reducing scar visibility and improving flexibility. Platelet-Rich Plasma (PRP), derived from the patient's blood, promotes healing and collagen production, improving scar texture and minimizing hypertrophy. Low-Level Laser Therapy (LLRT) uses low-intensity light to stimulate collagen synthesis, reduce inflammation, and enhance scar pliability. These techniques, when used individually or in combination, have shown significant improvements in scar appearance, elasticity, and overall healing. Together, W-plasty, PRP, and LLRT offer a comprehensive approach to effective scar revision, enhancing both aesthetic and functional outcomes.

Keywords-W-plasty, LLLT, APRP, Scar revision

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1. Introduction

Scar revision surgery is an essential procedure aimed at improving the aesthetic and functional outcomes of scars resulting from trauma, burns, surgery, or other injuries. The healing process of scars can often lead to hypertrophic or keloid scarring, which can be unsightly and cause discomfort. Several advanced techniques have been developed to address these issues and optimize scar appearance and flexibility. Among these, W-plasty, Platelet-Rich Plasma (PRP), and Low-Level Laser Therapy (LLRT) have gained significant attention for their effectiveness in scar revision.

W-plasty is a surgical technique that involves creating zigzag incisions along the length of a scar. This technique redistributes the tension across the scar, improving its cosmetic appearance by breaking up the linearity of the scar, making it less noticeable. It is particularly useful in areas of high tension or where scar visibility is a concern, such as the face, neck, or joints. The W-plasty technique enhances flexibility and ensures a more natural contour of the skin.^{1,2}

PRP therapy, derived from the patient's own blood, is rich in growth factors that stimulate tissue healing and collagen production. When injected into scars, PRP has been shown to enhance cellular regeneration, reduce scar hypertrophy, and improve skin texture and color. This treatment has proven beneficial in managing both new and mature scars, improving overall aesthetic outcomes by promoting healthier and more flexible tissue.^{3-6,12-14}

LLLT, a non-invasive modality, uses low-intensity light to stimulate cellular repair and collagen synthesis. It has been found to reduce scar thickness, redness, and inflammation while improving scar pliability and elasticity. LLLT promotes better tissue oxygenation, which accelerates healing and minimizes the formation of hypertrophic scars. It is particularly effective in managing fresh scars or those that have not yet fully matured.⁷⁻¹¹

When combined, these treatments offer a comprehensive approach to scar management. W-plasty can be used to remove or reshape scar tissue, while PRP and LLLT provide complementary regenerative treatments that enhance healing

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and improve scar quality. This combination offers patients a multi-faceted solution that targets both the functional and cosmetic aspects of scar revision, leading to better patient satisfaction and outcomes.

2. Case Report

Our patient was an 8-year-old boy with a history of electric burns injury one year ago, involving 35% of total body surface area (BSA), now presenting with multiple scars over the body for scar management. He had no other comorbidities. On presentation, a healed burn scar with a Vancouver Scar Scale (VSS) score of 6/13 on the neck, 9/13 on the chest, 10/13 on the abdomen, and 9/13 on both upper and lower limbs was observed, with the scalp showing a healed area with an unstable scar. Pulsatile BJWAT score was 17, and TILI score was 1/5 and 0/3.

All preoperative workup and pre-anaesthesia clearance (PAC) were done. Assessment of the scar was performed, and he was taken up for left neck scar (**Figure 1**) revision with W-plasty (**Figure 2**) assisted with LLLT and PRP. (**Figure 3** and **Figure 4**)



Figure 1: Post electrical hypertrophic scar left mandibular region



Figure 2: W plasty in scar revision surgery



Figure 3: LLLT assisted scar revision



Figure 4: PRP therapy in scar revision surgeries

3. Discussion

Over the years, several studies have evaluated the effectiveness of W-plasty, PRP, and LLRT in scar revision surgeries, highlighting their ability to improve scar aesthetics, reduce hypertrophic scarring, and enhance functionality.

W-Plasty: This surgical technique involves creating zigzag incisions along a scar to redistribute tension and reduce its visibility. It is particularly effective in areas with high movement or tension, such as the neck, chest, and joints. Studies have shown that W-plasty reduces hypertrophic scarring and improves the cosmetic appearance of linear scars. It also plays a crucial role in increasing scar flexibility and facilitating better skin movement.^{1,2}

PRP: PRP has gained attention for its regenerative properties in scar management. By concentrating the patient's own platelets, PRP is rich in growth factors that promote collagen synthesis, accelerate healing, and improve scar texture. Studies have demonstrated that PRP significantly improves hypertrophic and keloid scars by reducing their size, volume, and rigidity. PRP's ability to accelerate wound healing makes it a valuable tool for post-surgical scars, offering a faster recovery time and better cosmetic results.^{3-6,12-13}

LLRT: LLRT has emerged as an effective non-invasive modality for improving scar quality. By using low-intensity light, LLRT stimulates cellular repair, collagen production, and tissue regeneration. Studies have shown that LLRT significantly reduces scar thickness, redness, and inflammation, especially in fresh scars. LLRT has been particularly beneficial in treating scars that have not yet fully matured, promoting a more aesthetically pleasing result.⁷⁻¹¹

Combining these three treatments has been shown to have synergistic effects. Research has highlighted the success of combining PRP with micro needling for improved scar texture and reduced hypertrophy. Studies have also explored the combination of PRP with silicone gel sheets and found that it led to improved scar pliability and reduced scar volume. Additionally, combining W-plasty with PRP and LLRT may enhance the final aesthetic outcome, as W-plasty can reshape scars while PRP and LLRT promote healing and improve scar appearance.¹²⁻¹⁴

4. Conclusion

The use of PRP, W-plasty, and LLRT in scar revision surgeries has shown significant promise in improving both the aesthetic and functional outcomes of scar treatment. W-plasty provides an effective surgical approach to redistribute tension across scar tissue, thereby reducing scar visibility, improving flexibility, and enhancing the overall cosmetic result. PRP has demonstrated its regenerative capabilities by stimulating collagen production, promoting tissue healing, and improving scar texture. LLRT, a non-invasive treatment, accelerates healing and helps prevent the formation of hypertrophic scars, enhancing scar elasticity and reducing redness and inflammation.

The combination of these three approaches offers a comprehensive treatment strategy for scar revision. When used together, they provide a synergistic effect that improves the appearance and functionality of scars, accelerates healing, and enhances patient satisfaction. These treatments offer a promising and effective solution for patients seeking optimal scar revision outcomes, addressing both aesthetic concerns and functional limitations.

4.1. Declaration of patient consent

The authors certify that they have obtained all appropriate patient consent forms. In the form the patient(s) has/have given his/her/their consent for his/ her/their images and other clinical information to be reported in the journal. The patients understand that their names and initials will not be published

and due efforts will be made to conceal their identity, but anonymity cannot be guaranteed.

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None.

6. Conflict of Interest

There are no conflicts of interest.

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