

Scar Revision Approaches: Tailored Treatments for Optimal Outcomes

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Introduction

The management of scars is a complex and evolving field within dermatological and plastic surgery, with a growing emphasis on achieving not only functional improvement but also optimal aesthetic outcomes. Hypertrophic scars, characterized by their raised and erythematous nature, often result from excessive collagen deposition and can cause significant patient distress. A multimodal approach, combining various therapeutic modalities, has shown promise in softening and flattening these challenging scars, as demonstrated by a case involving serial corticosteroid injections, silicone sheeting, and fractional CO₂ laser resurfacing, which led to improved appearance and patient comfort [1].

Post-traumatic scars, particularly those that are wide and depressed, can present a considerable aesthetic challenge, impacting self-esteem and even function. When initial wound care yields suboptimal cosmetic results, surgical revision becomes a crucial option. A case report highlighted the successful management of a wide, depressed scar through excision, layered closure with tension reduction, and adjuvant topical treatments, underscoring the importance of precise surgical technique [2].

Atrophic scars, marked by a loss of tissue and textural irregularities, often require interventions that stimulate collagen production and restore volume. Microneedling with radiofrequency has emerged as a viable treatment option for such scars. A case study demonstrated that this technique could improve skin texture, enhance collagenesis, and subtly increase scar volume, offering a less invasive alternative to surgical revision in certain scenarios [3].

Facial scars, especially those resulting from traumatic events like animal bites, demand specialized techniques due to their high visibility and potential impact on facial symmetry. A phased approach, commencing with steroid injections to reduce inflammation, followed by surgical revision to

refine edges and align with natural facial lines, proved effective in making such a scar less conspicuous and restoring balance [4].

Keloids represent a particularly challenging type of scar due to their aggressive growth and high recurrence rates, often following surgery. The management of chest keloids, for instance, necessitates a robust strategy. A case involving surgical excision immediately followed by intra-lesional corticosteroid injections and post-operative radiation therapy successfully minimized recurrence and reduced the keloid's size, showcasing the benefits of a combined therapeutic approach [5].

Extensive scars resulting from traumatic injuries can lead to both functional limitations and poor cosmesis. For such cases, reconstructive procedures like split-thickness skin grafting can be highly effective. A case study documented the successful revision of a wide traumatic leg scar using this technique, resulting in improved contour, better color match, and restored function, highlighting its utility for complex scar revision [6].

Scars that disrupt the natural lines of the skin, such as those on the dorsum of the hand, can be aesthetically bothersome and affect function. The Z-plasty technique is particularly useful in such instances. By breaking up linear tension and repositioning the scar parallel to relaxed skin tension lines, it significantly improves visibility and restores range of motion, demonstrating its efficacy for scar orientation concerns [7].

Widened scars, often a consequence of poor healing after trauma, can cause significant aesthetic concern. Surgical revision focusing on meticulous scar excision and tensionless primary closure is a cornerstone in improving their appearance. A case of a widened thigh scar successfully treated with this approach resulted in a narrower, less noticeable scar with improved texture and color, emphasizing the importance of precise surgical execution [8].

Atrophic scars that are resistant to conventional treatments can benefit from regenerative therapies. Platelet-rich plasma (PRP) has shown potential in this regard. A case report indicated that PRP injections could improve the volume and texture of depressed facial scars, leading to a more blended appearance and suggesting its role in promoting tissue regeneration for scar improvement [9].

Hypertrophic scars on prominent areas like the sternum, particularly after cardiac surgery, can cause considerable cosmetic distress. Surgical revision involving excision and layered closure, with a focus on minimizing tension, is a key strategy. Post-operative management with silicone gel further aids in achieving a flatter, less inflamed scar with improved texture and color, as demonstrated in a case report [10].

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Description

The successful revision of a hypertrophic scar using a multimodal approach highlights the sophisticated strategies employed in modern scar management. This patient presented with a scar that impaired both aesthetics and functional comfort, stemming from a prior surgical excision. The treatment regimen was carefully orchestrated, beginning with serial corticosteroid injections to reduce inflammation and thickness, followed by the application of silicone sheeting to promote hydration and softening. The final phase involved fractional CO2 laser resurfacing, which further refined the skin texture and pigment. The documented outcome was a significant improvement, characterized by a softer, flatter scar with better color integration, ultimately restoring a more natural appearance and alleviating the patient's discomfort. This case underscores the value of a tailored, phased treatment plan for achieving optimal results in scar revision [1].

Addressing wide and depressed scars often requires a meticulous surgical approach, especially when initial wound care has proven insufficient. This case report focused on a depressed post-traumatic scar on the forearm that necessitated revision surgery due to unsatisfactory cosmetic outcomes and patient dissatisfaction. The surgical intervention involved complete scar excision, followed by a layered closure technique that prioritized tension reduction and precise aesthetic alignment of the wound edges. In addition to the surgical procedure, adjuvant topical treatments were prescribed to support healing and improve the scar's quality. The documented results showed a marked improvement in scar width and contour, accompanied by positive patient acceptance, thereby emphasizing the critical role of careful surgical technique and supportive adjunctive therapies in revising problematic post-traumatic scars [2].

For mature, atrophic scars that exhibit textural irregularities and volume loss, microneedling combined with radiofrequency energy offers a promising therapeutic avenue. This case study investigated the efficacy of this approach in revising such scars, which were the sequelae of previous surgical interventions. A series of microneedling sessions were conducted, delivering radiofrequency energy concurrently to stimulate deeper tissue remodeling. The observed results included enhanced skin texture, a noticeable increase in collagen production, and a subtle but significant improvement in scar volume. This case provides support for microneedling with radiofrequency as a valuable and effective option for improving the aesthetic quality of atrophic scars, particularly when more invasive surgical interventions are considered less desirable or carry higher risks [3].

The management of facial scars resulting from events such as animal bites presents unique challenges due to the scar's visibility and potential to cause disfigurement. This case documentation detailed a phased strategy employed for a complex facial scar with irregular borders. The initial stage involved steroid injections aimed at reducing inflammation and scar thickness. This was followed by surgical revision to refine the scar edges and meticulously align the scar with the natural facial lines, thereby minimizing its visibility. Post-operative care included the application of silicone gel to aid in scar maturation. The outcome demonstrated a considerable improvement in the scar's appearance, making it less conspicuous and restoring facial symmetry. The case highlights the necessity of specialized techniques when addressing scars that are both functionally and aesthetically challenging [4].

Keloid scars, particularly those on the chest after elective surgery, are notoriously difficult to manage due to their propensity for recurrence and aggressive growth. This case study examined the revision of such a scar, employing an aggressive, multi-modal strategy to mitigate recurrence risk. The treatment involved surgical excision of the keloid, immediately followed by intra-lesional corticosteroid injections to suppress cellular activity. Furthermore, post-operative radiation therapy was administered. This comprehensive approach yielded successful excision and a significant reduction in keloid regrowth over a two-year follow-up period, underscoring the critical importance of combining surgical debulking with effective adjuvant therapies for optimal keloid management [5].

Revising wide and discolored scars, especially on areas like the leg where function and appearance are important, often requires reconstructive solutions. This case documentation presented the successful revision of a scar resulting from a traumatic injury that caused both functional limitation and poor cosmesis. The surgical intervention consisted of scar excision and subsequent closure with a split-thickness skin graft. This technique allowed for the complete removal of the problematic scar tissue and coverage of the defect with healthy skin. Post-operative care focused on ensuring graft adherence and managing the newly formed scar. The outcome was a well-healed graft and a significantly improved scar, characterized by restored contour and a better color match, reinforcing the utility of skin grafting for revising extensive and problematic scars [6].

The aesthetic revision of scars that are oriented unfavorably, such as on the dorsum of the hand, can greatly enhance both appearance and function. This case report detailed the use of a Z-plasty technique for a noticeable scar resulting from previous surgical repair, which caused discomfort and impacted hand function. The Z-plasty was performed to disrupt the linear tension of the scar and reposition it into a less conspicuous line that aligned with the relaxed skin tension lines of the hand. The documentation showed a significant improvement in scar visibility and a restoration of the functional range of motion. This case effectively highlights the efficacy of Z-plasty in scar revision when scar orientation is a primary aesthetic and functional concern [7].

Managing widened scars that cause aesthetic concern, such as one on the lateral aspect of the thigh following trauma, necessitates careful surgical planning. This case documentation described a revision strategy that involved scar excision and primary closure, with a strong emphasis on precise wound edge apposition and achieving a tensionless closure. Post-operative management included the use of silicone sheeting, a common adjunctive measure for scar maturation. The outcome observed was a narrower and less noticeable scar, accompanied by improvements in texture and color. This case emphasizes the significant benefits derived from meticulously planned surgical excision and closure for enhancing the appearance of wide scars [8].

For depressed scars that have not responded well to previous treatments, the exploration of regenerative therapies like platelet-rich plasma (PRP) can be beneficial. This case study detailed the application of PRP as an adjunct therapy in the revision of a depressed facial scar. A series of PRP injections were administered directly into the scar tissue with the aim of promoting tissue regeneration. The results indicated an improvement in both scar volume and texture, leading to a more blended and aesthetically

pleasing appearance. This case suggests that PRP may serve as a valuable tool in the armamentarium for scar revision, aiding in tissue repair and enhancing the aesthetic quality of atrophic scars [9].

Hypertrophic scars on the sternum, often a consequence of cardiac surgery, can lead to significant cosmetic distress. This case documentation focused on the surgical revision of such a scar, which was characterized by its raised, erythematous nature. The revision procedure involved scar excision and a meticulous layered closure, with particular attention paid to minimizing tension across the closure line. Post-operative management included the application of topical silicone gel. The outcome demonstrated a substantially flatter and less inflamed scar, with notable improvements in texture and color. This case effectively highlights the efficacy of precise surgical technique in the revision of problematic sternal scars [10].

Conclusion

This collection of case studies explores various approaches to scar revision, addressing different scar types and locations. Hypertrophic and keloid scars are managed with multimodal therapies including corticosteroid injections, silicone sheeting, laser resurfacing, surgical excision, and radiation therapy. Atrophic scars benefit from regenerative treatments like microneedling with radiofrequency and platelet-rich plasma injections, aimed at improving texture and volume. Traumatic and post-surgical scars are often revised through surgical excision, layered closure, and reconstructive techniques such as skin grafting. Specialized techniques like Z-plasty are employed for scars affecting orientation and function. The cases collectively emphasize the importance of tailored, phased treatment plans, meticulous surgical techniques, and adjunctive therapies for achieving optimal aesthetic and functional outcomes in scar revision.

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