



Camouflage and Correction of Postoperative Scars by Dermopigmentation Methods: An Author's Technique

Oleksandra Chyrkova

LLC, Plymouth, USA.

Abstract

The paper analyzes the features of correcting postoperative scars against the backdrop of a dynamically expanding segment of aesthetic medicine. The scientific and practical relevance of the topic is due to the increase in the volume of surgical interventions and, consequently, the growing number of patients with cicatricial skin changes that substantially worsen psychoemotional status and quality-of-life indicators. The aim of the study is to substantiate and present the author's integrative dermopigmentation technique as an effective and minimally traumatic method for camouflaging postoperative scars. The methodological basis includes a systematic review of current scientific publications and clinical guidelines, as well as a descriptive analysis of a clinical observation. The obtained data demonstrate that traditional approaches — surgical revision and laser therapy — are characterized by substantial limitations, among which are the risk of recurrence and high cost. The proposed integrative strategy, combining medical principles, cosmetology approaches, and micropigmentation techniques, provides a pronounced aesthetic effect and a significant improvement in patient-oriented outcomes. It is concluded that this approach expands the therapeutic toolkit of specialists and facilitates the completion of rehabilitation after surgery, increasing patient satisfaction. The material presented in this paper will be of interest to plastic surgeons, dermatologists, cosmetologists, and professionals in the field of permanent makeup and medical micropigmentation.

Keywords: Dermopigmentation, Medical Micropigmentation, Scar Camouflage, Postoperative Scars, Plastic Surgery, Quality of Life, Psychosocial Impact, Aesthetic Medicine, Scar Correction, Integrative Technique.

INTRODUCTION

Modern aesthetic medicine is in a phase of rapid, essentially exponential expansion, driven by a combination of technological innovations and sustained sociocultural shifts. The market for aesthetic medical devices shows a stable upward trend; in the European region its volume in 2024 is estimated at 8,17 billion USD, with 55,87% of revenue generated by nonsurgical and minimally invasive interventions [1]. In parallel, a growing interest in surgical operations is observed. According to the American Society of Plastic Surgeons (ASPS) for 2024, the number of rhinoplasties, neck lifts (an increase of 2%), as well as body contouring procedures — including abdominoplasty and thigh lifts (an increase of 3%) — has increased [2]. A substantial driver is the correction of excess skin after significant weight loss, including in the context of GLP-1 receptor agonists [2].

Any full-thickness surgical intervention will logically result in the formation of scar tissue [3]. Consequently, the rise in operative activity directly increases the number of patients facing postoperative scars — a problem that extends far beyond simple aesthetic dissatisfaction. Accumulated data

convincingly demonstrate that the presence of visible scars substantially disrupts psychoemotional well-being and quality of life (QoL). For quantitative assessment in dermatology, the Dermatology Life Quality Index (DLQI) is widely used: it has been established that pathological scars, in particular keloid and atrophic, are associated with mean DLQI values of 6,06 and 7,26 respectively, which is interpreted as moderate and very strong impact on the patient's daily activity and social functioning [4]. It is of fundamental importance that the severity of psychological distress is often determined not so much by the objective clinical severity of the scar as by its subjective appraisal and its localization on exposed body areas [6].

Despite the wide range of available approaches to scar correction, each is characterized by substantial limitations, indicating a persistent research gap in this field. Surgical revision, especially for keloid scars, is associated with a high recurrence rate (over 50%) and a risk of worsening the aesthetic defect [7]. Laser technologies show encouraging potential; however, the reproducibility of results remains heterogeneous, since efficacy varies depending on the

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morphological type and the age of the scar and, as a rule, requires a series of costly procedures [8, 9]. The existing scientific evidence base and clinical guidelines often consider these interventions in a fragmented manner, failing to form a clear model for integrating complementary, noninvasive tools — in particular, dermopigmentation — into the standard patient management trajectory after surgery.

The aim of the present study is to develop and scientifically substantiate an integrative interdisciplinary method of dermopigmentation of postoperative scars, aimed at improving aesthetic outcomes and enhancing the psychological well-being of patients.

The scientific novelty of the work lies in the formalization and systematization of an integrative protocol that synergistically combines the principles of clinical medicine (pathophysiology of scarring), cosmetology (pre- and postprocedural care), and advanced micropigmentation (coloristics, layer-by-layer pigment deposition) as a standardized complementary stage of the patient pathway after surgical intervention.

The author's hypothesis is that the application of a structured integrative dermopigmentation method reduces the visual prominence of postoperative scars and, consequently, measurably improves quality of life, offering a safe and effective alternative to repeat invasive procedures for appropriate clinical situations.

MATERIALS AND METHODS

The study is based on a hybrid methodological framework that integrates two complementary approaches. The first element is a systematic review of the scientific literature intended to construct the theoretical and clinical foundation of the project. Within the review, data are aggregated on the epidemiology of postoperative scars, their psychosocial consequences, and a critical comparison of available correction strategies is performed.

The second element is a descriptive analysis of a clinical case that demonstrates the practical implementation, sequence of steps, and final outcomes of the authors' technique. This linkage translates conceptual positions into the realm of real clinical practice and allows a clear presentation of achievable effects.

The corpus of sources was formed according to criteria of relevance and quality. The search strategy was implemented in leading scientometric systems — Scopus, Web of Science,

and PubMed — with priority given to studies with a high level of evidence: systematic reviews, meta-analyses, and randomized controlled trials. The analytical field covered the pathophysiology of scarring, standard therapeutic approaches (surgical revision, laser technologies, injection-based interventions), psychosocial determinants and the impact of scars on quality of life, as well as the use of medical tattooing (dermopigmentation) in reconstructive and aesthetic practice. To maintain current context and reflect market trends, the academic corpus was supplemented by analytical reports from leading industry agencies.

RESULTS AND DISCUSSION

The dynamics of the aesthetic services market are determined by the combined influence of technological innovations and sociocultural shifts. Heightened attention to appearance, fueled by the ubiquitous mediation of everyday communication through social networks and video platforms under conditions of remote employment (the Zoom boom phenomenon), is shaping sustained demand for facial procedures, from fractional laser rejuvenation to radiofrequency microneedling [1]. In parallel, a new cohort of patients oriented toward body contour correction is emerging and rapidly consolidating. The widespread prescription of GLP-1 receptor agonists (including semaglutide) for body weight reduction exposes the problem of redundant, low-elasticity skin, which, in turn, translates into increased demand for brachioplasty and femoroplasty; in 2024 these interventions increased by 2% and 3%, respectively [2].

Consequently, the expansion of the aesthetic medicine sector is non-monolithic and manifests as a bifurcation of demand. On the one hand, preference for minimally invasive techniques is strengthening; on the other, there is a rise in interest in targeted surgical operations (facelifting, body lifting) driven by new demand drivers. This duality is shaping the scar management market into a configuration substantially more complex than would be inferred from aggregated indicators. Virtually every popular operation is inevitably accompanied by scarring, often in visually and functionally sensitive areas (for example, periauricular scars after a facelift or scars in the bikini area after abdominoplasty). Under these conditions, effective scar correction is not an optional add-on but a critically important component in achieving the patient's primary goal: improving appearance and reinforcing self-esteem. The key trends in aesthetic surgery and their direct relationship to scar tissue formation are summarized in Table 1.

Table 1. Key trends in aesthetic plastic surgery and their relationship with scar formation (compiled by the author based on [1, 2, 21]).

Procedure type	Growth/Popularity (2024)	Typical scar locations	Common scarring complications
Facelift/neck lift	Increase of 2%	Periauricular (around the auricle), occipital, infratemporal regions	Hypertrophy, hypo- and hyperpigmentation, scar widening

Abdominoplasty	Among the top 3 cosmetic procedures	Horizontal scar in the suprapubic area, periumbilical (around the navel)	Hypertrophic scars, keloids (depending on predisposition)
Mammoplasty (augmentation/reduction)	Persistently high popularity	Inframammary fold, periareolar area, vertical component (anchor incision)	Asymmetry, hypertrophy, atrophy, pigmentation changes
Arm/thigh lift	Increase of 2-3%	Medial arm surface from axilla to elbow; inguinal fold, medial thigh surface	Noticeable long scars prone to widening and hypertrophy

The psychological burden associated with the presence of scars is amenable to quantitative clinical assessment. The ten-item DLQI scale enables objective quantification of the impact of dermatological pathology on everyday functioning: scores of 0–10 correspond to no impact, whereas the range 11–20 reflects pronounced distress [5]. Application of this instrument reveals unfavorable patterns: in post-acne, the mean DLQI reaches 10,8, with 32,7% of patients indicating a very strong impact of scars on quality of life [14]; for burn scars, the mean score is 11,16, likewise indicating significant psychological distress [13].

Critically, scar-induced distress may persist irrespective of the technical perfection of the initial surgical result. For example, a patient who has undergone a technically impeccable rhytidectomy may perceive the outcome as unsatisfactory

due to a noticeable periauricular scar. This demonstrates a gap in the continuum of care: the surgical task (for example, correction of soft-tissue ptosis) has been accomplished, whereas the patient's target goal—improvement of self-perception and satisfaction with appearance—remains unrealized. The scar becomes an independent source of stress, anxiety, and depressive symptomatology, reflected in elevated scores on the relevant questionnaire subscales [5], thereby offsetting the potential psychological benefits of the operation. Consequently, scar management should be regarded not as an auxiliary option but as an essential element necessary for full value extraction and attainment of the final goals of the primary surgical intervention. The comparative profile of the impact of different scar types on quality of life is presented in Figure 1.

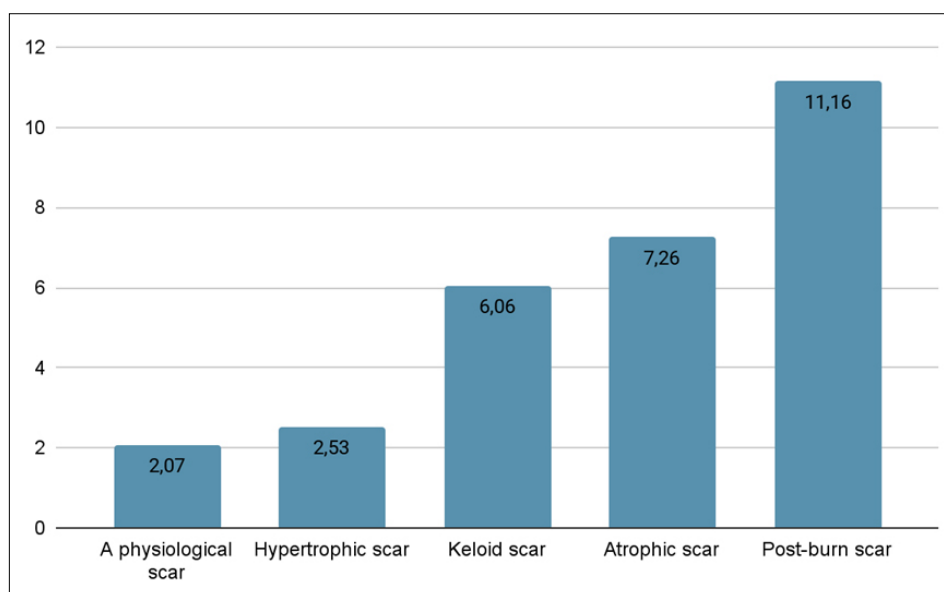


Fig. 1. Comparative analysis of the average scores of the Quality of Life Index in Dermatology (DLQI) depending on the type of scar (compiled by the author based on [4, 13]).

The existence of a wide range of therapeutic strategies for the treatment of scars does not imply their universality: none of the approaches demonstrates guaranteed effectiveness across all clinical scenarios, and each is accompanied by substantial limitations. A comparative characterization of the most commonly employed methods is presented in Table 2.

Table 2. Comparative effectiveness and limitations of standard scar treatment methods (compiled by the author based on [3, 8, 10, 11, 12]).

Method	Mechanism of action	Effectiveness/Success	Key limitations and risks
Surgical revision	Excision of scar tissue followed by suturing to form a more aesthetic scar.	Effective for correcting wide or atrophic scars.	Very high recurrence risk for keloids (45–100%). Risk of forming an even more noticeable scar. Requires a prolonged scar maturation period (up to 1 year) before revision.

Laser therapy (ablative/non-ablative)	Fractional photothermolysis, coagulation of vessels, stimulation of collagen remodeling.	CO2 laser improves atrophic scars by 50–80%. Pulsed dye laser (PDL) is effective for red, hypertrophic scars.	Requires a course of multiple sessions. High cost. Risk of post-inflammatory hyperpigmentation, especially in patients with dark skin phototypes. Effectiveness decreases for old, white scars.
Corticosteroid injections	Anti-inflammatory and antiproliferative action, suppression of collagen synthesis.	Considered first-line therapy for keloid and hypertrophic scars.	Pain on injection. Risk of skin atrophy, telangiectasias, hypopigmentation at the injection site. Multiple sessions required.
Silicone gels/patches	Creation of occlusion, hydration of the stratum corneum, modulation of growth factors.	Considered the standard for prevention and treatment of immature hypertrophic scars.	Requires prolonged (several months) and regular use. Low effectiveness for mature, atrophic, or keloid scars.

Analytical comparison indicates that when dealing with mature, clinically stable normotrophic or atrophic scars complicated by pigmentary disorders (hypo- or hyperpigmentation), the range of genuinely effective and at the same time safe interventions remains narrow. Escalation of invasiveness — including surgical revision or highly aggressive laser ablation — often proves suboptimal in terms of risk–benefit. In this clinical gray zone there is a demand for a low-trauma, reproducible, and safe technology for visual masking of the defect, a role fulfilled by medical dermopigmentation.

The proposed approach is implemented as a structured multistage protocol that shifts dermopigmentation from the category of a purely technical procedure to a full-scale clinical intervention. Its effectiveness rests on institutionalized empathy and the integration of interdisciplinary competencies, which makes it possible to address both the somatic and psychological aspects of the patient's condition simultaneously. The procedural algorithm is presented in Figure 2.

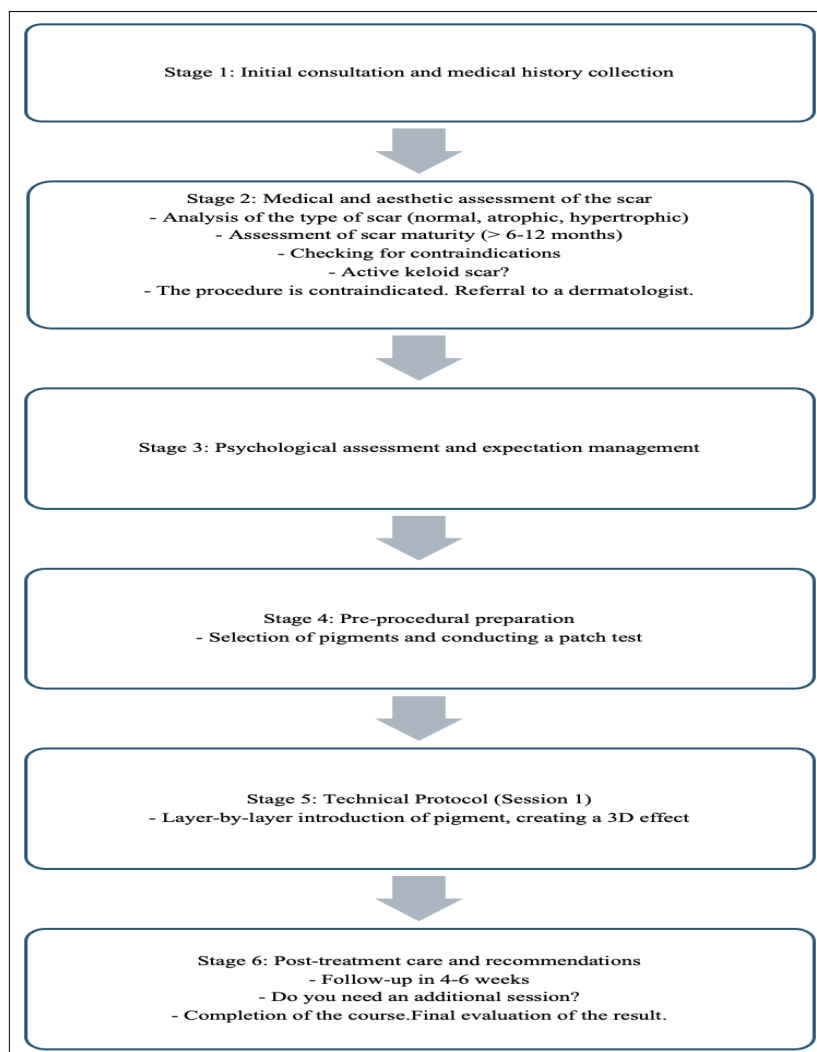


Fig.2. The algorithm of the integrative dermopigmentation technique of postoperative scars (compiled by the author on the basis of [12, 15, 18, 20]).

At the initial stage, clinical and cosmetological data are integrated. The scar is typified (normotrophic, atrophic, hypopigmented), and its maturity is recorded separately: intervention is permissible only in the presence of fully formed, stable scar remodeling, no earlier than 6–12 months after surgery [12]. The presence of active keloid formation is a strict contraindication, since any additional traumatization can induce progression of the process [18, 20]. In parallel, the properties of the perifocal skin are analyzed: textural features, phototype, and undertone.

Next, psychological assessment and expectation management are performed. This step specifically reduces the identified psychosocial burden. A structured interview is conducted to clarify motivation and the degree to which the defect affects QoL indicators. The central objective is the precise formation of expectations: the goal of the procedure is not to eliminate the scar anatomically, but to visually neutralize it to a level at which it ceases to be a source of psychological discomfort.

The following stage is preprocedural skin preparation; at this stage, several weeks before the intervention, the patient receives recommendations aimed at improving hydration and the overall quality of the skin in the intended treatment area. This enhances pigment uptake and ensures more uniform healing.

The stage related to the technical protocol implies a combination of scientific validity and artistic precision. Pigments are selected and mixed individually, according to the rules of color science, to achieve maximum match with the shade of the surrounding skin. Specialized devices for medical micropigmentation and atraumatic needles are used. The key to the technique is layer-by-layer, pinpoint deposition of pigment, forming the illusion of volume and the texture of intact cutaneous relief rather than a flat monochromatic coating.

At the stage of postprocedural care and subsequent sessions, the patient receives clear care instructions aimed at preventing infection and stabilizing the pigment [10, 11]. The course usually includes 3–4 sessions at intervals of 4–6 weeks. Such a stepwise tactic allows gradual increase of color density, achieving the most natural result with minimal tissue traumatization. To demonstrate the effectiveness of the method, a clinical example is considered: camouflage of periauricular scars after a facelift. The patient reported pronounced psychoemotional discomfort, a feeling of stiffness, and the need to conceal the ear area with a hairstyle. The scars were mature (more than one year), normotrophic, with noticeable hypopigmentation that made them contrast against healthy skin.

Upon completion of three sessions, a pronounced positive effect was noted. The verbal assessment of the patient (stopped being embarrassed to show her face) in clinical interpretation corresponds to a significant improvement in patient-oriented outcomes and an increase in quality of life.

A similar positive dynamic is observed in other complex clinical cases, such as the camouflage of scars in the highly mobile and visible perioral area (Fig. 3).



Fig. 3. Clinical case of postoperative scar camouflage on the upper lip using the integrative dermopigmentation technique.

Further, Figure 4 will be presented, demonstrating scar camouflage after plastic surgery.



Fig. 4. Camouflage of the scar after plastic surgery.

A single observation is consistent with the results of large systematic reviews: studies on medical tattooing for various conditions, including scars, demonstrate a consistently high level of satisfaction — from 78% to 93,6% [17]. This confirms that with proper patient selection and strict adherence to the

protocol, dermopigmentation is a highly effective approach. It is advisable to maintain a balanced and critically oriented stance regarding this technique. The key limitation is that dermopigmentation is not indicated for all variants of scar tissue: it is inapplicable in active, immature, hypertrophic, and especially keloid scars due to the likelihood of inducing a fibroproliferative response. Potential adverse outcomes include, albeit infrequent, allergic reactions to pigment components, infection when principles of asepsis and postprocedural care recommendations are violated, and gradual colorimetric drift of the pigment over time or under ultraviolet exposure [19].

Further development of the method is primarily contingent upon interdisciplinary consolidation. There is a pronounced need for closer collaboration among plastic surgeons, dermatologists, and specialists in medical micropigmentation. Scientific publications emphasize the necessity of formalized training and certification programs for medical tattooing assistants, as well as the standardization of collaborative workflows between surgical departments and practicing experts [16]. The study presented in this article moves in this direction by proposing a standardized and scientifically verified protocol that is potentially suitable for implementation in routine clinical practice.

CONCLUSION

The conducted analysis indicates that against the backdrop of sustained growth in interest in aesthetic surgery, the issue of safe and effective correction of postoperative scars assumes primary importance. Traditional invasive strategies — surgical revision and laser techniques — have well-known limitations and often prove inapplicable, especially when working with mature, stable scars accompanied by pigmentary disorders.

The proposed authorial integrative dermopigmentation technology, combining clinical reasoning, cosmetological logic, and contemporary micropigmentation techniques, constitutes a scientifically substantiated and clinically validated instrument for solving the stated problem. Achievement of the study objective is supported by the concordance of favorable clinical observation outcomes with the findings of systematic reviews documenting high levels of patient satisfaction with medical camouflage procedures (78–93,6%).

The practical significance of the work lies in articulating for clinical practice a structured, minimally traumatic, and low-risk protocol for managing one of the most common and psychologically significant patient complaints. Implementation of the method allows not only optimization of the aesthetic result of surgical intervention, but also the logical completion of the rehabilitation continuum, substantially improving quality of life and overall satisfaction with the treatment received. Thus, integrative dermopigmentation occupies a substantial position in

the contemporary armamentarium of reconstructive and aesthetic medicine.

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