



# Methodology for Restoring Lip Shape after Tissue Loss: Practical Experience with Permanent Makeup

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## Abstract

*Post-traumatic lip defects, often caused by animal bites, create a pronounced aesthetic and psychoemotional burden, the significance of which is amplified against the backdrop of an expanding segment of reconstructive surgery. Based on this, the aim of the study is to systematize and substantiate a methodology for the use of permanent makeup (medical dermapigmentation) to restore the shape and color of the lips after traumatic tissue loss. Methodologically, the study relies on a systematic review of publications in the Scopus and PubMed databases, supplemented by a detailed analysis of a clinical case involving lip correction in a female patient after a dog bite. Within the study it was established that a staged approach to dermapigmentation provides effective camouflage of scar tissue, repositioning of symmetry, and reconstruction of the natural tone of the vermillion border. The presented clinical example demonstrates restoration of the lip contours in three sequential procedures with a marked improvement in appearance and a noticeable increase in the patient's psychological well-being. The proposed interdisciplinary model coordinating plastic surgeons, dermatologists, and dermapigmentation specialists helps optimize clinical outcomes and improve patients' quality of life. The information presented in this work is addressed to the professional community of plastic surgeons, dermatologists, cosmetologists, and permanent makeup practitioners oriented toward integrating this technique into medical practice.*

**Keywords:** Permanent Makeup, Medical Dermapigmentation, Lip Reconstruction, Post-Traumatic Defects, Scar Camouflage, Dog Bite, Tissue Loss, Quality of Life, Interdisciplinary Approach, Aesthetic Cosmetology.

## INTRODUCTION

Posttraumatic defects of the facial region, primarily injuries to the perioral segment, represent one of the most challenging problems in contemporary reconstructive surgery and aesthetic medicine. Their clinical significance is determined not only by the high level of traumatization but also by the pronounced psychoemotional burden on patients. According to statistics, bite wounds, predominantly from dogs, remain one of the leading causes of facial injuries, especially in the pediatric population [1]. Within the structure of such injuries, the largest share involves the lips, cheeks, and nose, which is directly related to their anatomical exposure and vulnerability [2, 3]. The consequences of this type of trauma are far from limited to somatic harm: persistent scar deformities, asymmetry, and pigmentation disorders develop, triggering a cascade of psychosocial complications ranging from pronounced self-consciousness and social anxiety to depressive disorders and a decline in overall quality of life [4, 5].

This clinical agenda unfolds against the backdrop of a rapidly growing global market for aesthetic and reconstructive surgery [8]. Reports from the American Academy of Facial Plastic and Reconstructive Surgery for 2024 document a steady increase in interest in all types of aesthetic interventions, including a 2% rise in reconstructive procedures [9]. The combination of the high prevalence of facial injuries and the increasing societal demand for aesthetic correction forms a therapeutic gap: primary reconstruction effectively restores function and anatomical integrity but often leaves residual aesthetic defects such as scars and dyschromias. It is precisely in this critical phase of rehabilitation that minimally invasive technologies are justified, such as medical dermapigmentation, which does not replace surgical treatment but serves as its final, integrative stage addressing residual aesthetic disorders.

Scientific sources thoroughly describe the spectrum of surgical reconstruction of the lips, from microvascular replantation to various flap techniques and other high-tech interventions. At the same time, a pronounced gap is evident: there is a lack of strict systematization and a

**Citation:** Oleksandra Chyrkova, "Methodology for Restoring Lip Shape after Tissue Loss: Practical Experience with Permanent Makeup", Universal Library of Medical and Health Sciences, 2025; 3(3): 95-101. DOI: <https://doi.org/10.70315/uloop.ulmhs.2025.0303013>.

convincing scientific foundation regarding nonsurgical approaches applied at the final stage of correction. Medical dermopigmentation (permanent makeup) is well known as a method for camouflaging scars and vitiligo [15]; however, its targeted use to recreate the complex anatomy of the lips after significant tissue loss remains insufficiently reflected in the academic literature.

**Based on this**, the aim of the study is to systematize and substantiate the method of applying permanent makeup (medical dermopigmentation) to restore the shape and color of the lips after traumatic tissue loss.

**The scientific novelty** of the work consists in incorporating the paramedical technique of dermopigmentation into the clinical algorithm for managing patients with posttraumatic lip defects and in substantiating its effectiveness according to a set of aesthetic, functional, and psychosocial indicators.

**The author's hypothesis** is formulated as follows: multistage medical dermopigmentation is a safe and effective method for restoring the contour and coloration of the lips on scar-altered tissues, ensures a substantial increase in satisfaction with appearance and improvement in patients' quality of life, and can serve as a valuable complement to traditional methods of plastic surgery.

### MATERIALS AND METHODS

The methodological architecture of the study is integral in nature and rests on two complementary modules: a systematic review of the scientific literature and a detailed analysis of a clinical case. This combination simultaneously ensures a critical synthesis of accumulated knowledge and a demonstrative verification of the applicability of the chosen method to a specific clinical material.

The systematic search of sources was conducted in the peer-reviewed scientometric databases Scopus, PubMed, and ResearchGate. The temporal boundaries of selection encompassed recent years in order to maximize the relevance of the empirical base. Search strategies were constructed in English using the following keywords and their combinations: medical micropigmentation, dermopigmentation, scar camouflage, lip reconstruction, facial trauma, dog bite lip, quality of life facial disfigurement. Inclusion criteria provided for thematic relevance, the presence of empirical data (clinical observations, cohort studies, reviews), and publication in peer-reviewed journals.

To demonstrate and verify the method, a case study format was used. Source data were obtained from the presented clinical practice describing the stepwise restoration of the contour and pigmentation of the lip in a female patient after an injury due to a dog bite. The analytical protocol included reconstruction of the medical history, assessment of the baseline status, a description of the interventions performed (3 sessions), and subsequent analysis of the final aesthetic outcome and its psychological significance for the patient.

### RESULTS AND DISCUSSION

Reconstruction of the lips after traumatic tissue loss is a multicomponent clinical-surgical challenge that must simultaneously restore anatomical continuity, full function, and a convincing aesthetic outcome. Contemporary practice relies on two complementary directions—operative and nonoperative (camouflaging) approaches—the selection and sequence of which are dictated by the extent of the defect and the target rehabilitation criteria.

In pronounced injuries, surgical interventions constitute the therapeutic framework. These include direct closure, various options of local flap reconstruction (in particular, the Abbé flap, the Estlander flap), and, in the most challenging scenarios, microsurgical replantation of the amputated lip segment [11]. Their primary objective is restoration of the muscular apparatus (the orbicularis oris), an adequate volume of soft tissues, and stable perfusion. Even with a high likelihood of functional success (articulation, feeding) and prevention of gross deformities, scarring remains the inevitable cost of surgery. After technically flawless reconstruction, subtle yet clinically meaningful residual phenomena may persist: contour asymmetry, blurring of the vermillion border, and dyschromia of the scar zone. Such microdefectiveness often determines the subjective appraisal of the outcome and affects the patient's psychoemotional well-being.

Against this background, medical dermopigmentation is not a replacement for surgery but rather its logically substantiated, often necessary final link. The method is employed as an adjuvant stage after completion of scar remodeling—usually 6–12 months after injury or surgical intervention—and is aimed at targeted aesthetic correction [15]. Key effects include camouflage of scars using pigment matched to the surrounding skin tone; restoration of contour sharpness and symmetry; reproduction of the natural shade of the vermillion. Thus, dermopigmentation refines the outcome of surgical reconstruction toward the most natural visual appearance, minimizing visible markers of prior trauma.

Work with post-traumatic scar tissue in the lip region, an area that is both highly mobile and extremely sensitive, requires from the practitioner not only impeccable command of dermopigmentation techniques but also a deep understanding of tissue histoarchitecture, the principles of colorimetry, and the behavioral characteristics of pigments in a modified dermal matrix. A scar is fundamentally different from intact skin: it is characterized by a denser and disordered arrangement of collagen fibers, the absence of appendages (hair follicles and sebaceous glands), and altered, often reduced vascularization [17]. These factors directly determine the features of pigment implantation and retention: it may distribute in a mosaic pattern, require a greater number of passes, and demonstrate a shade shift during repair.

The success of the intervention is determined by strict adherence to a protocol that includes several key aspects:

- Pigment selection and coloristics: For scar camouflage, stable hypoallergenic compositions of inorganic (mineral) origin are preferred, providing high coverage and predictable color dynamics, which reduces the risk of late chromatic distortions [23]. Mastery of color theory remains essential. A scar often exhibits a cool cyanotic or, conversely, a pronounced erythematous nuance, which must be preliminarily neutralized with complementary correctors located on the opposite side of the color wheel before introducing the main tone [28].

- Needle configuration and implantation depth: Instrument parameters are correlated with the target task. To construct a crisp outline, the use of single needles or dense bundles (for example, 3-Round Liner) is rational. For uniform filling and soft shading, flat-type (Flat) or Magnum configurations are used [25]. Control of depth remains critically important: the pigment should be deposited in the upper layers of the dermis. Too superficial implantation leads to accelerated washout, whereas excessively deep placement leads to

migration (blurring of borders) and a shift of the shade into the cool gray zone [15].

- Multistage procedure: Unlike work on intact skin, camouflage of scar tissue is almost always implemented as a series of interventions. Clinical experience and literature data indicate the need for 2–4 sessions at intervals of 4–8 weeks [19]. Stepwise, layer-by-layer saturation of the dense scar substrate allows control of regenerative processes, timely correction of shape and tone, and, consequently, the achievement of the most natural and durable result.

To demonstrate the effectiveness of the technique, present a clinical case (Fig.1). A medical dermopigmentation plan was developed, aimed at consistently solving aesthetic problems. It is important to note that the initial procedure, despite minimal pigment retention, played a key role in softening and preparing dense scar tissue, which made subsequent pigment implantation much more successful and predictable. This highlights the important practical importance: often the first session serves primarily as a preparatory stage, improving tissue susceptibility to achieve optimal results during subsequent interventions.



**Fig.1.** A clinical case of scar masking using the method of integrative dermopigmentation.

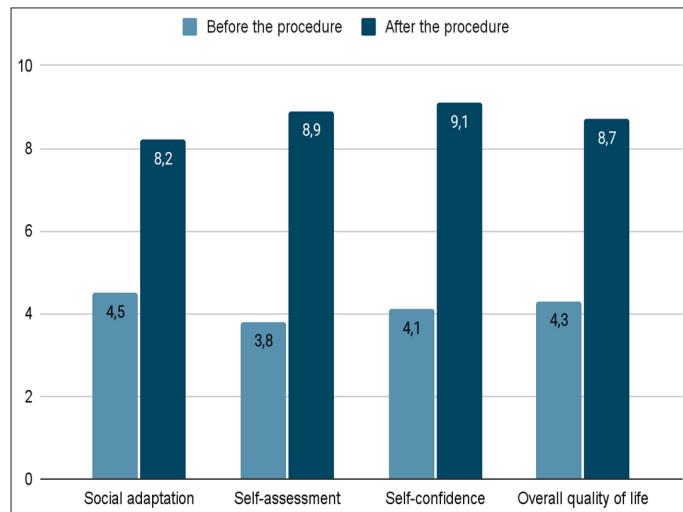
The intervention protocol and the dynamics of the results are summarized in Table 1.

**Table 1.** Protocol of procedures and outcome assessment (compiled by the author based on [22, 24, 29]).

Stage (Procedure)	Objective	Technique used	Pigment selection (shades)	Healing dynamics	Intermediate result
1	Softening of scar tissue, initial contouring, and assessment of tissue receptivity.	Light contour delineation, pointwise implantation into the scar	Skin-toned and light pink shades to neutralize the scar color	Standard healing, mild flaking on days 3-5. Minimal pigment retention observed, but noticeable softening of scar tissue.	The contour is outlined, the scar margin is smoothed, the scar has become less noticeable. Crucially, the scar tissue showed significant softening, which facilitated subsequent pigment implantation despite limited initial color uptake.
2	Color filling, correction of asymmetry	Watercolor shading technique, layer-by-layer pigment deposition	Primary pink-berry shade matched to the natural lip color	Healing without complications, complete restoration of the epidermis	Color restored to 70%, contour asymmetry markedly reduced, lip shape approximated to symmetrical
3	Final correction, color saturation, creation of volume	Combined technique: color densification, addition of light highlights	Deepening of the primary color, use of a lighter shade for a 3D effect	Complete healing within 7 days	Final aesthetic outcome achieved: complete visual symmetry, natural and uniform color, the scar is fully camouflaged

Upon completion of three sequential interventions, it was possible to fully reconstruct the contour of the vermillion border, reliably camouflage the cicatricial deformity, and reproduce a physiologic tissue hue. The clinical assessment of the appearance of the lips was rated as very high. A principal outcome was the complete mitigation of the previously pronounced psychological discomfort attributable to the defect, concomitant with the restoration of subjective self-confidence.

The result achieved in the present clinical observation (the client became psychologically comfortable) converges with the findings of numerous studies demonstrating a direct influence of aesthetic correction of facial defects on the psychoemotional state of patients. According to systematic reviews, medical camouflage procedures provide a substantial improvement in quality-of-life (QoL) metrics, which is objectively confirmed by a statistically significant reduction in total scores on validated questionnaires, particularly on the Dermatology Life Quality Index (DLQI) [7]. Studies also indicate that the mean level of satisfaction with the outcomes of medical tattooing across various nosological conditions (scars, vitiligo, alopecia) consistently exceeds 90% [18]. This confirms that the value of the intervention lies not only in visual enhancement but also in a pronounced therapeutic effect that restores to the patient a sense of wholeness and confidence. The dynamics of key quality-of-life indicators are clearly presented in Figure 2, constructed on the basis of aggregated data from scientific sources.



**Fig. 2.** Improvement of the quality of life of patients after dermopigmentation (compiled by the author based on [7]).

The effectiveness and safety profile of such interventions increase substantially with the implementation of an interdisciplinary management model. Accumulated clinical experience indicates that a durable partnership among specialists in related disciplines—plastic surgery, dermatology, and medical cosmetology—is a decisive prerequisite for achieving optimal composite outcomes. Within this model, primary reconstruction is performed by a plastic surgeon who, after completion of healing, assesses the degree of scar maturity and, if necessary, refers the

patient for final aesthetic correction. The dermatologist preliminarily evaluates the condition of the skin, rules out contraindications (including active dermatoses and a tendency toward keloid formation), and provides counseling regarding procedural risks and subsequent care. A certified dermopigmentation specialist executes the technical stage, guided by the recommendations of the surgeon and dermatologist, and ensures postprocedural follow-up. Institutionalizing this interaction—through joint protocols and patient routing—makes it possible to move medical dermopigmentation from the gray zone of cosmetology to the status of a recognized paramedical practice, which, in turn, actualizes the standardization of training, formal certification, and the potential integration of the procedure into rehabilitation programs as the final phase of treatment.

Despite high effectiveness and a satisfactory safety profile, medical dermopigmentation, like any invasive intervention, carries risks and requires strict consideration of contraindications. Proper clinical assessment of these factors is a necessary condition for safe procedure performance.

It is advisable to consider potential adverse outcomes along the following lines.

1. Infectious complications: breach of aseptic and antiseptic principles can lead to bacterial (including *Staphylococcus aureus*), viral (reactivation of herpes simplex virus, which is particularly critical for the perioral area), and fungal processes [15].
2. Allergic and inflammatory reactions: most often associated with the composition of pigments. Although modern mineral formulations are positioned as hypoallergenic, sensitivity may arise to preservatives, stabilizers, or metallic impurities; a reaction to nickel originating from needles is also possible [26]. Clinically, this manifests as contact dermatitis, granuloma formation, or photosensitization.
3. Aesthetic complications: include patient dissatisfaction with shape or color, gradual hue shift over time (for example, drift toward gray or reddish tones), as well as migration or blurring of pigment when implanted at excessive depth. It is important to emphasize the risk of paradoxical darkening during attempted laser elimination, especially when titanium dioxide is present in the pigment [27].

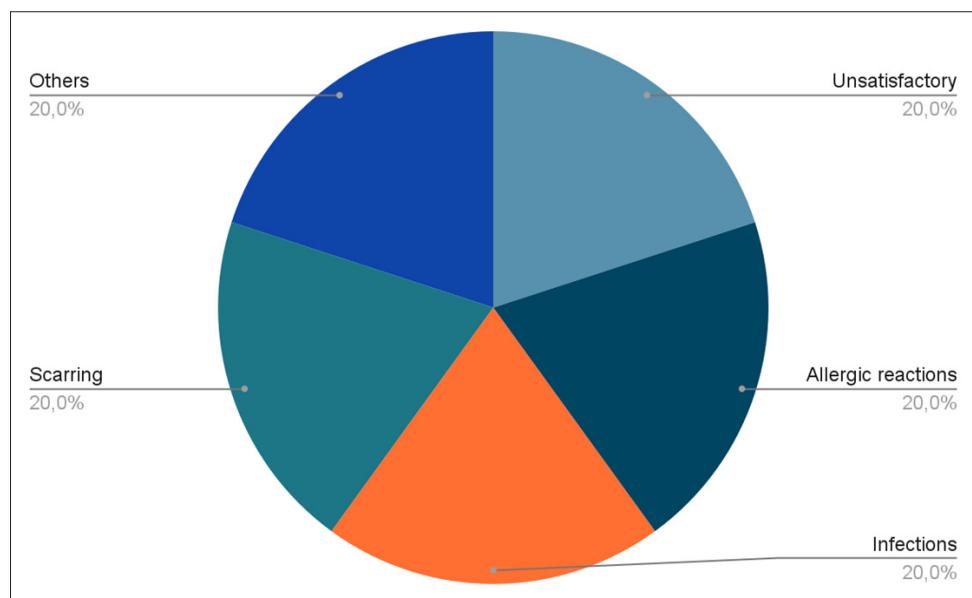
Complications characteristic of scar tissue: scars are prone to atypical healing; needle-induced trauma may trigger a hypertrophic or keloid response via the Koebner phenomenon, particularly in individuals with corresponding predisposition [20]. Heterogeneous distribution and unstable pigment retention are also possible.

4. The aggregate assessment of the listed risks serves as the basis for developing the list of contraindications, differentiated into absolute and relative (see Table 2).

**Table 2.** Classification of risks and contraindications in dermopigmentation of scar tissue (compiled by the author based on [6, 10, 15, 26]).

Category	Description	Minimization strategy
Absolute contraindications	Tendency to form keloid scars, active dermatoses in the treatment area (psoriasis, eczema), coagulation disorders (hemophilia), pregnancy/lactation, use of systemic retinoids (Roaccutane) in the last 6-12 months, decompensated diabetes mellitus.	Thorough medical history taking, mandatory consultation with a dermatologist.
Relative contraindications	Autoimmune diseases in remission, use of anticoagulants, history of hypertrophic scars, presence of herpes simplex virus (prophylaxis required).	Obtain medical clearance from the treating physician, adjust therapy as agreed, perform a test procedure on an inconspicuous area, prophylactic administration of antiviral drugs.
Main risks	Infections, allergic reactions, unsatisfactory aesthetic outcome, pigment color change.	Strict adherence to aseptic protocols, use of certified single-use materials and pigments, performing an allergy test (patch test), detailed discussion of expectations and signing of informed consent.

Pooled data from systematic reviews indicate that aesthetic problems predominate within the structure of adverse outcomes, primarily driven by dissatisfaction with the achieved result, whereas clinically significant medical events — including infectious complications and induced scarring — are recorded substantially less frequently when the protocol is strictly followed (Figure 3).

**Fig. 3.** Relative incidence of complications in medical dermopigmentation (compiled by the author based on [16, 21]).

In summary, it can be noted that the integration of medical, cosmetological, and permanent makeup techniques, as demonstrated in the study, not only enables the camouflage of skin defects but also exerts a pronounced positive effect on the psychoemotional state of patients, restoring their confidence and social functioning.

## CONCLUSION

The conducted study made it possible to systematize and theoretically verify the method of medical dermopigmentation used to restore lip contours and tone after traumatic loss of tissues. Based on a critical analysis of contemporary scientific literature and a detailed examination of a clinical case, a set of key propositions has been formulated.

First, the pronounced clinical and social significance of the problem has been confirmed, as has the presence of a

therapeutic gap between the outcomes of primary surgical reconstruction and the patient's final aesthetic expectations. Medical dermopigmentation fills this niche, serving as a safe, minimally invasive tool for final correction of scar deformities, asymmetry, and pigmentation disorders of the lips.

Second, the study objective has been achieved: a multistage intervention protocol has been developed and empirically validated, grounded in the histological characteristics of scar tissue and requiring advanced expertise in color science and pigment implantation techniques. The presented clinical case convincingly demonstrates that this algorithm ensures restoration of the natural appearance of the lips and is associated with improvements in psychological well-being and quality of life.

Third, the necessity of interdisciplinary cooperation has been substantiated, and a workable model has been proposed. Coordinated participation of plastic surgeons, dermatologists, and certified dermopigmentation specialists is a key prerequisite for comprehensive, safe, and effective management of patients with post-traumatic defects. Institutionalization of such collaboration appears to be a promising means of raising standards of care in this field.

The practical significance of the work lies in providing specialists in aesthetic medicine and permanent makeup with a scientifically validated algorithm of actions, as well as in systematizing information on potential risks and contraindications. For plastic surgeons and dermatologists, the results create opportunities to expand rehabilitation programs by incorporating adjuvant camouflaging techniques.

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