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Acne and post-acne in the practice of a cosmetologist

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ABSTRACT

This paper examines the epidemiology, pathogenesis, and clinical and aesthetic consequences of acne and post-acne scars, as well as current options for their correction in the practice of a cosmetologist. The aim of the study is to systematize current data on the prevalence and risk factors of acne, clarify the role of hormonal, immune-inflammatory, and microbiome mechanisms, and substantiate an algorithmic approach to the treatment of post-acne scars and dyschromia. The methodological basis is the results of multicenter epidemiological projects, data from the Global Burden of Disease, clinical guidelines from specialized societies, and current reviews on chemical peels, laser and RF technologies, microneedling, subcision, and regenerative techniques (PRP/PRF, cellular technologies, fillers). The analysis demonstrates an increasing global burden of acne, a shift in incidence towards adult women, and the lack of a universal method for the treatment of post-acne scars. Personalized multi-step protocols combining fibrosis release, volume restoration, and skin surface remodeling demonstrate the highest clinical efficacy. Special attention is paid to scar prevention, reducing the risk of post-inflammatory hyperpigmentation in patients with high phototypes, and improving quality of life and psycho-emotional well-being. The need for interdisciplinary collaboration and monitoring of patients with acne and post-acne is emphasized.

Keywords: acne, post-acne, post-acne scars, cosmetology practice, combination therapy, chemical peels, laser and RF techniques, regenerative technologies.

Introduction

Acne (Acne vulgaris) is one of the most common chronic inflammatory dermatoses affecting the pilosebaceous unit and constitutes a major global medical and social problem [1]. According to current epidemiological estimates for 2024, approximately one in five people worldwide is affected by the disease, corresponding to a global prevalence of 20.5% [3]. Although the disorder has traditionally been associated with adolescence, persistent or recurrent disease in adulthood is being observed with increasing frequency, particularly in women, creating new therapeutic challenges for specialists in aesthetic medicine [5].

The consequences of acne extend well beyond cutaneous manifestations. The post-acne complex, including scarring and persistent dyschromia, markedly worsens psychoemotional well-being, social functioning, and quality of life. Patients frequently experience a sense of stigmatization, a tendency toward social isolation, increased fatigue, and sleep disturbances, underscoring the significance of the psychosocial burden associated with the disease [4].

The aim of this study is to systematize and analyze current data on the epidemiology, pathogenesis, and classification of acne, as well as the principal approaches to the correction of acne and post-acne sequelae in cosmetology

practice. To achieve this aim, the following **objectives** were established:

1. to analyze global epidemiological trends and their clinical implications;
2. to examine current pathophysiological mechanisms, including the specific features of acne in adult women;
3. to investigate the contemporary clinical classification of post-acne scars as a basis for treatment selection;
4. to review the efficacy and safety of the principal monotherapeutic and combined methods used in modern cosmetology.

The scientific novelty of the study lies in the comprehensive integration of epidemiological data, a detailed morphological classification of post-acne scars, and contemporary regenerative and microbiome-modulating technologies into a unified algorithm for the cosmetological management of patients with acne and post-acne sequelae.

The author's hypothesis is that personalized, multistage combined treatment protocols based on accurate phenotypic scar diagnosis and consideration of skin phototype provide higher clinical efficacy and safety than monotherapy and an "apparatus-centered" approach.

Materials and Methods

The study is based on an analytical review of publications on acne and post-acne presented in peer-reviewed dermatological and aesthetic journals over the period from 2018 to 2025. The search strategy was developed using the PubMed and Scopus databases, as well as materials from international professional societies and the Global Burden of Disease project, with the following keywords: acne vulgaris, adult female acne, post-acne scars, chemical peels, fractional laser, radiofrequency, microneedling, PRP, PRF.

At the selection stage, original clinical studies, meta-analyses, systematic reviews, and clinical guidelines containing quantitative assessments of the efficacy and safety of methods for the correction of acne and post-acne were included. Preference was given to studies with clearly described designs, standardized scar and quality-of-life assessment scales, and separate analyses of the adult female subgroup. Studies with small sample sizes lacking statistical processing, as well as publications not directly relevant to cosmetology practice, were excluded from the review.

Additional consideration was given to reviews addressing scar classification, treatment selection according to scar morphotype and skin phototype, and data on combined treatment protocols. This made it possible to correlate epidemiological trends with practical recommendations, identify the methods most substantiated from the standpoint of evidence-based medicine, and formulate an algorithmic approach to the management of patients with acne and post-acne in cosmetology practice.

Results and Discussion

An analytical reassessment of the 2021 Global Burden of Disease (GBD) dataset in combination with 2024 epidemiological summaries confirms a stable upward trend in the global burden of acne, one that has persisted since 1990 [6]. The age-standardized prevalence among adolescents and young adults aged 10–24 years increased from 8,563.4 per 100,000 population in 1990 to 9,790.5 per 100,000 in 2021; the corresponding average annual increase is estimated at 0.43% [9].

Peak rates traditionally occur in the 15–19-year age group [6]. At the same time, a key feature of contemporary patient populations is the growing proportion of adult cases, predominantly among women, referred to as Adult Female Acne (AFA): according to various sources, acne persists in 15–20% of women older than 25 years [5]. Overall, women demonstrate a higher global prevalence (23.6%) than men (17.5%) [3], and in 2021 the prevalence among young women was approximately one quarter higher than that among age-matched men [9]. This shift of acne from a predominantly adolescent dermatosis into a chronic, recurrence-prone condition in adulthood predetermines the need to revise therapeutic paradigms: approaches justified in juvenile populations are often suboptimal for adult skin, requiring a transition from short-term flare suppression to the development of comprehensive long-term maintenance strategies.

The epidemiology of acne is characterized by pronounced regional and population variability. According to the global Pierre Fabre review, the highest prevalence is reported in Latin America (23.9%) and East Asia (20.2%) [3]. At the same time, GBD analyses demonstrate the highest age-standardized values in Western Europe, whereas the most rapid increase in disease burden has been observed in North Africa and the Middle East [9]. A probable explanation for these discrepancies is methodological heterogeneity: in the first case, reliance on self-reports reflects a subjective assessment of the problem, whereas within the GBD framework the composite DALY indicator captures an objectivized burden of disease. The practical implication is straightforward: in regions with high rates of self-reporting, demand for cosmetology services may be elevated even when objective burden metrics are not at their maximum. In addition, patients

of Afro-Caribbean, Latin American, and Asian origin more frequently develop persistent acne sequelae, including scarring and post-inflammatory hyperpigmentation (PIH) [12].

In the pathogenesis of acne, the key mechanism remains a multilevel interaction of four processes within the pilosebaceous unit [1]. First, sebum production increases, with androgens acting as the leading trigger. Second, keratinization is disrupted: follicular hyperkeratosis develops, obstructing the sebaceous duct and generating the primary morphological substrate, the microcomedone. Third, microbial dysbiosis develops, dominated by the anaerobe Cutibacterium acnes (formerly Propionibacterium acnes). Finally, an inflammatory reaction is formed as a result of immune recognition of sebum components and C. acnes metabolites [1].

Contemporary interpretations of microbiological mechanisms have shifted away from the notion of simple C. acneshyperproliferation toward the concept of dysbiosis: clinically significant inflammation is associated with the predominance of certain more virulent phylotypes, whereas other strains may behave as commensals or even exert protective functions [11]. Other representatives of the cutaneous microbiota, including Staphylococcus epidermidis and Staphylococcus aureus, are also involved in the lesional ecosystem, adding complexity to the microbiological profile of acne [13]. This reconsideration of the role of C. acnes in qualitative rather than purely quantitative terms directly affects therapeutic strategy: indiscriminate suppression of the microbiota with antibiotics does not ensure sustained benefit and contributes to resistance, whereas microbiome-modulating approaches, such as the use of topical pro- and prebiotics, appear promising [13].

The immunoinflammatory phase is initiated by activation of innate immune receptors, above all Toll-like receptor 2 (TLR2) on macrophages and keratinocytes, as well as the NLRP3 inflammasome, triggering the expression of proinflammatory cytokines (IL-1, IL-8, IL-12, IL-17). Subsequent recruitment of neutrophils and CD4+ T cells (Th1 and Th17) maintains and amplifies local inflammation, thereby accounting for the clinical persistence of lesions [2].

Adult female acne (AFA), that is, acne persisting after the age of 25 years, is characterized by specific pathogenetic features [7]. Hormonal regulation plays a leading role: in a proportion of patients, hyperandrogenism, whether biochemical or clinical, is detected in approximately half of observations, or there is an increased sensitivity of sebocyte androgen receptors to physiological androgen concentrations [11]. Notably, up to 70% of cases of hyperandrogenism in women with acne are associated with polycystic ovary syndrome, underscoring the systemic nature of the disorder [11].

The development of AFA is a multifactorial process shaped by a set of external and behavioral determinants grouped under the term “exposome.” Substantial importance is attached to genetic predisposition (up to 80% of cases), chronic stress with its neuroendocrine effects on sebocytes, dietary features (high glycemic index), smoking, and the use of comedogenic cosmetics [7]. Such multicomponent complexity dictates the need to move beyond external procedures alone: effective management presupposes an interdisciplinary approach involving, where indicated, a gynecologist-endocrinologist and a dietitian, along with concurrent lifestyle modification. Within this paradigm, the role of the cosmetologist expands to that of a coordinator of a comprehensive treatment plan.

Scarring is the consequence of atypical healing arising after the regression of deep inflammatory lesions, such as nodules, cysts, and pronounced papules and pustules [8]. Prolonged or excessively intense inflammation induces degradation of the dermal collagen matrix through the action of matrix metalloproteinases (MMPs) [8]. Subsequent morphology is determined by the balance between collagen synthesis and degradation: when neocollagenesis is deficient, atrophic scars, or “loss-of-tissue” scars, are formed [19], whereas excessive synthesis and/or insufficient MMP activity lead to hypertrophic and keloid scars, or “gain-of-tissue” scars [19].

The term post-acne encompasses not only scar changes but also persistent dyschromias, including post-inflammatory erythema and post-inflammatory hyperpigmentation; nevertheless, scars remain the most difficult to correct and, in essence, the most permanent outcome of acne. Scar classification is based on morphological organization, which directly determines treatment selection [18].

Atrophic scars are the predominant form of scarring: according to several studies, they occur three times more often than hypertrophic scars and account for up to 90% of all post-acne scars [8]. They are characterized by tissue deficiency, with the lesion located below the level of intact skin. Within this group, three clinically significant subtypes are distinguished.

Ice-pick scars are narrow (<2 mm) yet deep V-shaped defects, often extending into the deep dermis and hypodermis; essentially epithelial tracts, they are considered the least amenable to correction and account for 60–70% of atrophic scars [8].

Rolling scars are broad (approximately 4–5 mm or more), shallow M-shaped depressions with indistinct borders, creating an undulating skin surface due to fibrous bands

tethering the dermis to underlying structures; their proportion is estimated at 20–30% [8]. Boxcar scars are round or oval crater-like depressions 1.5–4.0 mm in diameter with well-defined, almost vertical walls, resembling pitted scars; their depth may vary from superficial to marked, and collectively they constitute 15–25% of atrophic forms [8].

Hypertrophic scars are excessive collagen proliferations that project above the skin surface but do not extend beyond the borders of the original inflammatory lesion [18].

Keloid scars are regarded as a variant of hypertrophic scars but differ in invasive growth beyond the boundaries of the original injury; they are uncommon and occur more often in individuals genetically predisposed to keloid formation [18]. The combined proportion of hypertrophic and keloid forms in acne is estimated at approximately 10–20% of cases [21]. Normotrophic scars are located at the level of the surrounding skin and develop when repair proceeds in a balanced manner; aesthetically, they are the least significant [19].

The summary presented in Table 1 on the clinical forms of post-acne scars serves as a key diagnostic instrument for the practicing physician, since it makes it possible to relate morphological type to population prevalence and, consequently, to justify the optimal therapeutic strategy.

Table 1. Classification and prevalence of post-acne scars (compiled by the author based on [8, 18, 19, 21]).

Scar type	Subtype (for atrophic scars)	Clinical characteristics	Prevalence
Atrophic	Ice-pick	Narrow (<2 mm), deep, V-shaped depressions with sharp edges	60–70% of atrophic scars
Atrophic	Rolling	Broad (>4–5 mm), shallow, M-shaped depressions with indistinct borders	20–30% of atrophic scars
Atrophic	Boxcar	Oval or round depressions (1.5–4.0 mm) with well-defined, steep edges	15–25% of atrophic scars
Hypertrophic	—	Pink, dense lesions elevated above the skin level but confined to the original wound	Combined with keloids: 10–20% of all scars
Keloid	—	Dense, proliferative tumor-like lesions extending beyond the borders of the original wound	—
Normotrophic	—	Flat scars located at the same level as the surrounding skin; color may vary	—

Having reviewed the classification and prevalence of post-acne scars, it is appropriate to proceed to an examination of contemporary approaches to the correction of acne and post-acne in cosmetology practice.

Chemical peeling is a method of strictly dosed induction of chemical skin injury intended to initiate controlled exfoliation, accelerate regeneration, and remodel the dermal matrix [22]. The key principle is the stratification of procedures according to the depth of action, since this parameter determines both therapeutic objectives and the profile of possible adverse reactions.

Superficial peels are limited to the epidermal level and are used for mild acne, comedonal lesions, the smoothing of skin microrelief, and the reduction of follicular ostial occlusion. In practice, α-hydroxy acids (glycolic acid 30–50% and lactic acid 10–30%), β-hydroxy acids (above all salicylic acid up to 30%),

Jessner's solution, as well as low concentrations of trichloroacetic acid (TCA 10–35%) are employed. Medium-depth peels reach the papillary dermis and are indicated for more resistant forms of acne and for atrophic scars; TCA 30–50%, high-concentration glycolic acid (>70%), and their combinations are used. Deep peels penetrate to the reticular dermis, with phenol serving as the principal agent. They are employed for the correction of severe scars and deep wrinkles; however, because of the high risk of complications, including persistent hypopigmentation, scarring, and systemic toxicity, their role in post-acne therapy remains markedly limited [16, 17, 20].

Salicylic acid occupies a central place in acne management because it combines comedolytic and keratolytic activity with pronounced anti-inflammatory and seboregulating effects. The combination of salicylic and mandelic acids surpasses glycolic acid monotherapy in efficacy for acne.

Risks and contraindications correlate with treatment depth. Frequent reactions include erythema, edema, desquamation, pruritus, and burning; more significant complications include post-inflammatory hyperpigmentation, especially in patients with Fitzpatrick skin phototypes IV–VI, acne exacerbation, secondary infection (bacterial or herpetic), and scar formation. Absolute contraindications include active infectious processes in the treatment area, systemic retinoid use within the previous 6 months, and pregnancy and lactation.

A comparative description of chemical peels for the correction of acne and post-acne is presented in Table 2.

Table 2. Comparative characteristics of chemical peels for acne and post-acne correction (compiled by the author based on [16, 17, 20, 22]).

Peel type	Depth of penetration	Main agents and concentrations	Indications for acne/post-acne	Recovery period	Main risks
Superficial	Epidermis	AHAs (glycolic 30–50%), BHAs (salicylic 20–30%), Jessner's solution, TCA 10–25%	Mild acne, comedones, seborrhea, post-inflammatory pigmentation	1–3 days (mild peeling)	Erythema, temporary dryness, low risk of PIH
Medium-depth	Papillary dermis	TCA 30–50%, glycolic acid >70%	Refractory acne, atrophic scars (boxcar, rolling), pronounced PIH	7–14 days (marked peeling, crust formation)	Persistent erythema, edema, high risk of PIH, infection, scarring
Deep	Reticular dermis	Phenol, TCA >50%	Deep atrophic scars (used rarely)	2–3 months (prolonged erythema)	Persistent hypopigmentation, demarcation line, scarring, systemic toxicity

Device-based methods, above all laser technologies, are regarded as the most appropriate treatments for atrophic post-acne scars [21].

Ablative fractional systems (CO2, 10,600 nm; Er:YAG, 2,940 nm) create microthermal columns of ablation in the skin surrounded by a zone of coagulation. Such a controlled thermally induced injury initiates intensive dermal remodeling and neocollagenesis, which explains their maximal clinical effectiveness: even a single CO2 laser session can improve scar severity by 50–81% [21]. At the same time, this approach is associated with more pronounced adverse events, including pain, edema, erythema, and exudation, as well as a longer recovery period.

Non-ablative fractional lasers (glass 1,550 nm; fiber 1,540

nm) create dermal microcoagulation zones without disrupting epidermal integrity. Their efficacy is inferior to that of ablative systems, yet their safety and tolerability profiles are better: recovery is shorter and the risk of post-inflammatory hyperpigmentation is minimal, making them the preferred option for patients with darker skin phototypes.

Fractional radiofrequency (RF) therapy with microneedle energy delivery directs RF pulses directly into the dermis, causing thermal coagulation and inducing collagen synthesis. This technology is regarded as a safe and effective alternative to lasers, especially in dark or sensitive skin, because it causes minimal epidermal trauma and thereby reduces the likelihood of PIH.

Frequent and generally transient complications of hardware-based interventions include erythema, edema, and pain; PIH, especially in phototypes IV–VI, acneiform eruptions, and infectious events are also possible.

Against this background, injectable and minimally invasive procedures are of particular interest, among which the following may be distinguished:

1. Microneedling (dermaroller, dermapen). This consists of controlled multiple skin punctures to induce percutaneous neocollagenesis. In terms of clinical effect, the method is comparable to non-ablative fractional laser therapy, but it is better tolerated and associated with fewer adverse reactions; it is suitable for all skin phototypes [14]. Adverse events are rare and are generally limited to short-term erythema, edema, and a low risk of PIH.

2. Subcision. A minimally invasive surgical technique involving the release of fibrous bands tethering the base of the scar; it is the treatment of choice for rolling scars [8].

3. Mesotherapy and biorevitalization. These involve intradermal administration of compounds capable of modulating regenerative processes.

4. PRP (platelet-rich plasma) and PRF (platelet-rich fibrin). These autologous preparations provide delivery of growth factors that stimulate fibroblast proliferation, collagen and elastin synthesis, and accelerated healing. The most pronounced clinical response is observed in boxcar and rolling scars; an advantage of PRF is the formation of a fibrin matrix with a more prolonged release of growth factors (7–14 days) compared with PRP [10, 15].

5. Mesenchymal stem cell therapy (for example, adipose-derived cells) is viewed as a promising direction in the regenerative correction of scars.

6. Dermal fillers (based on hyaluronic acid, poly-L-lactic acid, or polymethyl methacrylate) are used for the immediate replacement of lost volume and leveling of the skin surface in atrophic defects.

The overall analysis indicates that there is no single universally most appropriate technology for the treatment of post-acne. The optimal strategy is determined by the predominant scar morphotype and skin phototype. Thus, in rolling scars, subcision is pathogenetically justified because it disrupts fibrous bands; for deep, narrow ice-pick scars, the best results are achieved with the CROSS technique using high concentrations of TCA or phenol; superficial boxcar defects respond best to resurfacing methods, including laser resurfacing and chemical peels [8]. In patients with darker skin phototypes, non-ablative lasers and RF microneedling are safer than ablative interventions. Accordingly, the key competence of the specialist lies not in mastery of a single method but in accurate phenotypic diagnosis of scars and the construction of a personalized treatment program.

A further issue concerns combined therapy strategies for the correction of atrophic scars. The clinical post-acne phenotype in a given patient usually represents a mixture of different atrophic morphotypes, each reflecting its own pathogenetic mechanisms, including volume loss, traction fibrous septa, and disorganization of the superficial skin relief. Treatment with a single modality aimed primarily at one pathogenic component rarely provides a complete correction. For this reason, combined regimens that unite several tools produce marked synergism and significantly better clinical outcomes [8].

The body of contemporary clinical data and meta-analytic reviews confirms the superiority of combined approaches:

– Laser + PRP. A 2024 network meta-analysis demonstrated the best reduction in scar severity on the ECCA scale when laser therapy was combined with PRP. PRP administration after laser exposure accelerates repair, reduces frequent reactions such as erythema and edema, and enhances laser-induced neocollagenesis.

– Subcision + microneedling + TCA peel. This combination has shown high effectiveness even in severe conditions: subcision eliminates traction by releasing the scar base, while microneedling together with superficial TCA peeling potentiates collagen formation and improves microrelief.

– CROSS + subcision + microneedling. Another productive triple protocol with a clear division of targets: high-concentration phenol or TCA CROSS acts specifically on ice-pick and boxcar scars, subcision addresses rolling defects, and microneedling provides global stimulation of dermal remodeling and surface smoothing.

– Laser + chemical peel. According to meta-analytic data, this combination most often yields maximal patient satisfaction, probably because it influences both skin texture and tone simultaneously.

Contemporary treatment strategy is constructed as a personalized algorithmic plan based on the dominant scar type [8] and usually includes three consecutive stages:

Stage 1 — elevation of the scar base and release of fibrosis: subcision for rolling scars; punch excision/elevation or the CROSS technique for deep ice-pick and boxcar scars.

Stage 2 — volume replacement: dermal fillers or lipofilling for correction of tissue deficiency.

Stage 3 — remodeling and surface leveling: fractional lasers, RF microneedling, chemical peels, or dermabrasion to improve texture and overall skin quality.

Table 3 below provides an overview of the efficacy and safety of the principal methods used for the correction of atrophic scars.

Table 3. Review of the effectiveness and safety of key methods for the correction of atrophic scars (compiled by the author based on [8, 10, 15]).

Technique	Main mechanism of action	Target scar type	Demonstrated efficacy	Satisfaction / Tolerability	Key risks and recovery
Chemical peel (medium-depth TCA)	Chemical ablation, collagen stimulation	Superficial boxcar, rolling	Improvement by 25–50%	Moderate	PIH, erythema, infection. Recovery 7–14 days
CROSS (TCA 70–100%)	Focal chemical reconstruction	Ice-pick, narrow boxcar	Improvement by 50–70%	High for target scars	Risk of scar widening, hypo-/hyperpigmentation
Subcision	Disruption of fibrous bands	Rolling	Improvement by 50–60%	High	Hematomas, edema, temporary induration
Microneedling	Percutaneous collagen induction	All types (especially superficial)	Improvement by 31–62%	High tolerability, low pain	Erythema, edema. Recovery 1–3 days
Fractional CO2 laser	Fractional ablation, powerful remodeling	All types (especially boxcar)	Improvement by 50–81%	High	Pain, edema, erythema, PIH. Recovery 7–14 days
Laser + PRP	Synergistic collagen stimulation, accelerated regeneration	All types	Highest efficacy on the ECCA scale	High	Reduced laser-related risks, accelerated recovery

Subcision + microneedling + peel	Combined action on fibrosis, collagen, and texture	Mixed scar types	Significant improvement (up to 2–3 grades)	High	Cumulative component-related risks, minimal downtime

The analysis performed demonstrates that acne has ceased to be an exclusively adolescent problem and is becoming a chronic multifactorial condition with a growing global burden and a marked shift toward adult women, which requires reconsideration of traditional therapeutic approaches. Understanding of pathogenesis has deepened from a simple model of sebaceous hypersecretion and C. acnes colonization to a complex interaction of hormonal, immunoinflammatory, microbiome-related, and behavioral factors integrated within the concept of the exposome, thereby substantiating the need for interdisciplinary management and targeted lifestyle modification alongside cosmetological interventions. A detailed morphological classification of post-acne scars has fundamental practical significance, since the type of scar and the skin phototype determine treatment selection. At the same time, no single technology is universal, and monotherapy rarely provides sufficient clinical correction, which confirms the advantages of multistage combined regimens with a clear sequence: release of fibrosis, volume replacement, and surface remodeling. Thus, contemporary cosmetology practice in the field of acne and post-acne should rely not on the choice of the "best device," but on precise phenotypic diagnosis, risk stratification, including PIH in darker phototypes, and the construction of personalized treatment algorithms in which the cosmetologist effectively acts as the coordinator of comprehensive, long-term, and ideally prevention-oriented therapy.

Conclusion

Acne and post-acne remain among the key challenges of modern aesthetic dermatology, as confirmed by accumulating epidemiological evidence and the marked decline in patients' quality-of-life indicators. Refinement of pathogenetic mechanisms, above all the role of cutaneous microbiome dysbiosis and the multifactorial nature of acne in mature women, dictates the need to reassess traditional treatment strategies and clinical management tactics.

The cumulative analysis of current studies indicates a paradigm shift in post-acne therapy: a departure from the notion of a single optimal procedure in favor of a personalized, algorithmically structured approach. Today, the outcome is determined by accurate identification of scar morphology and the construction of multistage combined protocols that act in a targeted and synergistic manner on different components of scarring, from lysis of fibrous septa to induction of neocollagenesis and correction of textural defects.

The integration of regenerative technologies, including PRP, PRF, and cell-based therapies, with classical device-based and chemical methods, as well as the introduction of strategies aimed at modulation of the cutaneous microbiome, opens opportunities for more pronounced and sustained clinical effects. Such an approach not only increases treatment effectiveness but also reduces the risk of complications while shortening the recovery period. Effective management of patients with acne and post-acne requires from the contemporary specialist not merely flawless procedural technique, but also deep expertise in pathophysiology, immunology, and pharmacology, along with readiness for interdisciplinary cooperation in order to achieve the optimal aesthetic and therapeutic outcome.

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