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Mesotherapy and Biorevitalization in Young Skin Care

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Abstract

This article provides a systematic analysis and comparative evaluation of mesotherapy and biorevitalization as the main minimally invasive approaches to treating young skin (25-35 years). This research is relevant due to the steady growth of the aesthetic medicine industry, a shift in consumer interest toward preventive interventions ("prejuvenation"), and a 46% expansion of the biorevitalization segment in the Russian market by 2024. The aim of the study is to compare the effectiveness of these methods as monotherapy and as part of combination protocols in the prevention and correction of early manifestations of chrono- and photo-induced changes. The methodological framework includes a systematic literature review in Scopus/Web of Science databases, representing the most relevant research results. The obtained data confirm that biorevitalization is a basic procedure for restoring the dermis's water reserve, significantly increasing skin hydration levels by 43.7% ($p<0.05$). The effectiveness of mesotherapy is determined by its composition, which is based on polyrevitalizing complexes (in particular, NCTF 135HA), demonstrating a significant improvement in structural characteristics, increasing dermal density by 24%. A study of combined protocols (chemical peeling + mesotherapy) revealed a pronounced synergism, leading to a 79% increase in skin elasticity, which exceeds the results of monotherapy. Finally, a conclusion is made regarding the feasibility of differentiated tactics for young patients: biorevitalization as a tool for global rehydration, mesotherapy in combination with peels for targeted solutions to specific problems, including post-acne and dyschromia. The information presented in this article will be of interest to practicing dermatologists and cosmetologists focused on developing scientifically based protocols for the care of young patients.

Keywords: mesotherapy, biorevitalization, youthful skin, preventive cosmetology, combination protocols, fibroblasts, hyaluronic acid, chemical peels, skin quality, prejuvenation.

Introduction

Contemporary aesthetic medicine is undergoing a profound restructuring in which the emphasis is shifting from conventional invasive surgery toward minimally invasive and noninvasive interventions. The global market, valued at USD 89.64 billion in 2024, continues to expand steadily, with a projected compound annual growth rate of 11.73% over 2025–2033 [1]. This momentum is being driven by rapidly increasing demand for techniques capable of delivering natural-looking aesthetic outcomes, short recovery times, and a favorable safety profile [1]. The scale of this dominant segment is reflected in the 20.54 million nonsurgical procedures performed in 2024 [1]. The most pronounced growth has been observed in the biorevitalization segment, where the number of procedures increased by 46% to 3.8 million, whereas contouring procedures rose by only 7% [3]. At the same time, the patient population is becoming younger: whereas women older than 40 years previously constituted the core patient group, the center of demand has now shifted toward the 30–35-year age range [4].

Taken together, these observations—growing interest in skin-quality improvement and a decline in the average patient age—point to a transformation in consumer attitudes: away from a post factum strategy and toward a preventive, quality-centered model focused on maintaining skin health while slowing the aging process. The concept of prejuvenation reflects demand for procedures aimed less at correcting already established changes than at proactive management of cutaneous homeostasis [2, 5].

Within the present study, "young skin" is defined as the skin of patients aged 18–35 years. Physiologically, this period is characterized by high mitotic activity, adequate cellular hydration, with water content reaching 80–90%, and intensive collagen and elastin synthesis, all of which account for pronounced turgor and firmness [8]. At the same time, the biological prerequisites of future aging begin to emerge as early as the age of 25: fibroblast biosynthetic activity declines, cellular renewal slows, and damage induced by ultraviolet radiation and oxidative stress accumulates [10]. The earliest manifestations are often subclinical and may include reduced hydration, dullness, and slight loss of tone. Accordingly, interventions at this stage are directed not toward correcting marked structural deficits such as deep wrinkles or ptosis, but toward supporting cellular function and preserving dermal architecture.

Despite the broad routine use of mesotherapy and biorevitalization, the body of high-quality comparative studies capable of unequivocally ranking these techniques by efficacy in young patients remains limited; clinical application has outpaced the strength of the evidence base. Moreover, some studies have called into question the histologic efficacy of certain mesotherapy cocktails, failing to demonstrate statistically significant changes in collagen and elastin synthesis [12]. This underscores the need for a critical analysis of data on specific, clinically validated products and reveals a scientific gap in the systematization and comparison of approaches relevant to prejuvenation.

The aim of the study was to conduct a systematic review and comparative evaluation of the efficacy of mesotherapy and biorevitalization, both as monotherapies and as components of combined protocols, in the prevention and correction of early signs of aging in young skin.

The working hypothesis was that, for young skin, biorevitalization represents the procedure of first choice for optimizing the dermal hydration reserve, whereas multicomponent mesotherapy, particularly when combined with chemical peels, serves as a more targeted tool for addressing specific concerns such as post-acne changes and dyschromia while also providing a synergistic revitalizing effect.

The scientific novelty of the study lies in the systematization and comparison of the mechanisms of action and clinical outcomes of mesotherapy and biorevitalization in the growing cohort of young patients, as well as in the reasoned substantiation of the advantages of combined protocols on the basis of controlled-study data.

Materials and Methods

The present study was based on the methodology of a systematic review of the scientific literature combined with comparative analysis. To achieve the stated aim, several research strategies were employed. First, a systematic review was conducted through targeted literature retrieval, critical appraisal, and integrative synthesis of relevant publications, thereby establishing the theoretical framework of the study. Second, a comparative analysis was performed, including comparison of the mechanisms of action, compositions of injectable agents, procedural standards, clinical efficacy, and safety profiles of mesotherapy and biorevitalization. Third, published clinical studies were analyzed, with attention to both methodological design and quantitative outcomes, in order to verify intervention efficacy as objectively as possible. This was followed by a content analysis of industry reports aimed at identifying market trends and key statistical indicators. Finally, a clinical case study illustrating the long-term practical use of combined protocols was examined.

Sources were selected according to predefined inclusion criteria: the presence of quantitative efficacy indicators obtained by objective methods, such as corneometry, cutometry, ultrasonographic assessment, or morphometric analysis of biopsy specimens; the availability of detailed descriptions of injected formulations and therapeutic protocols; and a focus on rejuvenation, hydration improvement, correction of early signs of aging, and enhancement of skin quality.

Results and Discussion

The fundamental difference between mesotherapy and biorevitalization lies not so much in the injection technique itself as in their underlying concept and in the cellular and molecular logic of their action.

Mesotherapy is, by its nature, a multicomponent nutritive strategy. Its central premise is the targeted delivery into the dermal layer of amino acids, vitamins, minerals, peptides, and cofactors required to maintain and enhance fibroblast metabolic activity [10]. Its methodological rationale rests on the assumption that aging or stress-associated cells experience substrate deficiency, which in turn limits energy metabolism and biosynthesis. Accordingly, a mesotherapeutic formulation creates a favorable metabolic landscape by providing cells with direct access to critically important nutrients [10]. Numerous standardized formulations are available and are designed to address a broad range of dermatologic concerns, from acne to alopecia [6, 23].

Biorevitalization, by contrast, represents a stimulatory mono- or oligocomponent intervention. Its priority is not so much to supply the cell with nutrients as to restore the optimal physicochemical characteristics of the extracellular matrix (ECM) and to transmit a potent signaling stimulus to fibroblasts. The principal agent used is high-concentration non-crosslinked hyaluronic acid (HA) [24]. Once introduced into the dermis, HA, owing to its pronounced hygroscopicity, provides deep hydration and, through interaction with the CD44 receptor on fibroblasts, initiates signaling cascades that enhance the synthesis of endogenous collagen, elastin, and native HA [7, 18]. Contemporary formulations also incorporate polynucleotides, which potentiate cellular proliferation and reparative programs [24].

Comparison of these mechanisms suggests that the two approaches should not be viewed as competitors; rather, they are functionally complementary. Biorevitalization creates an optimal niche—a hydrated, metabolically active ECM—and, in effect, prepares the substrate for cellular activity. Mesotherapy then provides the cells with the substrates needed for targeted metabolic support.

Table 1. Comparative characteristics of mesotherapy and biorevitalization (compiled by the author based on [9, 11, 13]).

Parameter	Mesotherapy	Biorevitalization
Primary objective	Cellular nourishment, targeted correction of specific concerns (acne, pigmentation, dull complexion)	Deep hydration, optimization of the dermal milieu, global revitalization
Key components	Vitamins, amino acids, peptides, trace elements, low-molecular-weight HA	High-concentration non-crosslinked hyaluronic acid, polynucleotides
HA concentration	Low or absent	High
Depth of injection	Superficial and mid-dermis (1–4 mm), using nappage and point-by-point techniques	Intradermal administration with papule formation
Indications for young skin	Prevention of aging, dull complexion, acne and post-acne, localized pigmentation	Dehydration, reduced turgor, prevention of photoaging, first fine lines
Treatment course	6–10 sessions at 1–2-week intervals	3–5 sessions at 2–4-week intervals

Assessment of the efficacy of injectable techniques requires reliance on objective, instrumentally recorded parameters. Against this background, the body of evidence supporting biorevitalization and that available for individual mesotherapy products is fundamentally uneven.

The efficacy of biorevitalization is supported by data from controlled clinical trials. In a study evaluating a gel based on non-crosslinked hyaluronic acid [16], a pronounced increase in skin hydration was demonstrated. The primary endpoint was the change in the electrical capacitance of the stratum corneum, a quantitative marker of hydration assessed by corneometry. The mean capacitance value increased from 23.1 arbitrary units at baseline to 33.2 arbitrary units by the end of follow-up, corresponding to a 43.7% increase that was statistically significant ($p < 0.05$) [16]. Importantly, all study participants reported satisfaction with the treatment received, a finding consistent with the objective improvement and one that underscores the clinical relevance of the observed effects [16] (see Fig. 1).

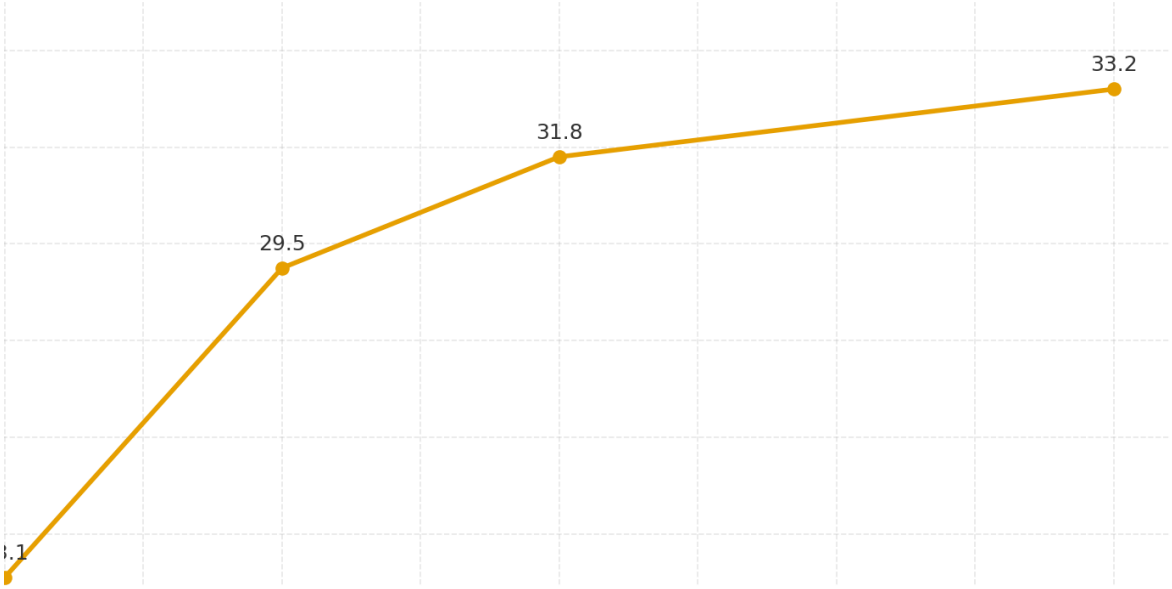

Fig. 1. Dynamics of skin hydration levels after a course of biorevitalization (compiled by the author based on [16, 17]).

The efficacy of mesotherapy is highly variable and depends decisively on the specific formulation of the injected product. The term mesotherapy itself functions as an umbrella designation for hundreds of heterogeneous formulations, a substantial proportion of which lack a convincing evidence base. Notably, a prospective study reported in sources [12, 18], which examined the effects of a multivitamin complex in the periorbital area, found no statistically significant clinical or histologic changes in collagen types I, III, and VII or in elastin. These findings make it inappropriate to extrapolate isolated results to the entire class of mesotherapeutic agents [12, 17].

At the same time, standardized polyrevitalizing complexes with well-characterized compositions have demonstrated high and reproducible efficacy. A representative example is NCTF 135HA, a hyaluronic acid–based formulation containing more than 50 biologically active components, including vitamins, amino acids, minerals, and other constituents. A multicenter study [22] using ultrasound imaging showed that a series of five NCTF 135HA procedures led to marked structural changes in the dermis, including an approximately 24% increase in dermal density, a 20% increase in dermal thickness, and a 58.5% reduction in pore size [22]. These findings confirm that a high-quality multicomponent formulation can not only improve the skin's appearance but also induce objectively measurable positive changes in its structure (see Fig. 2).

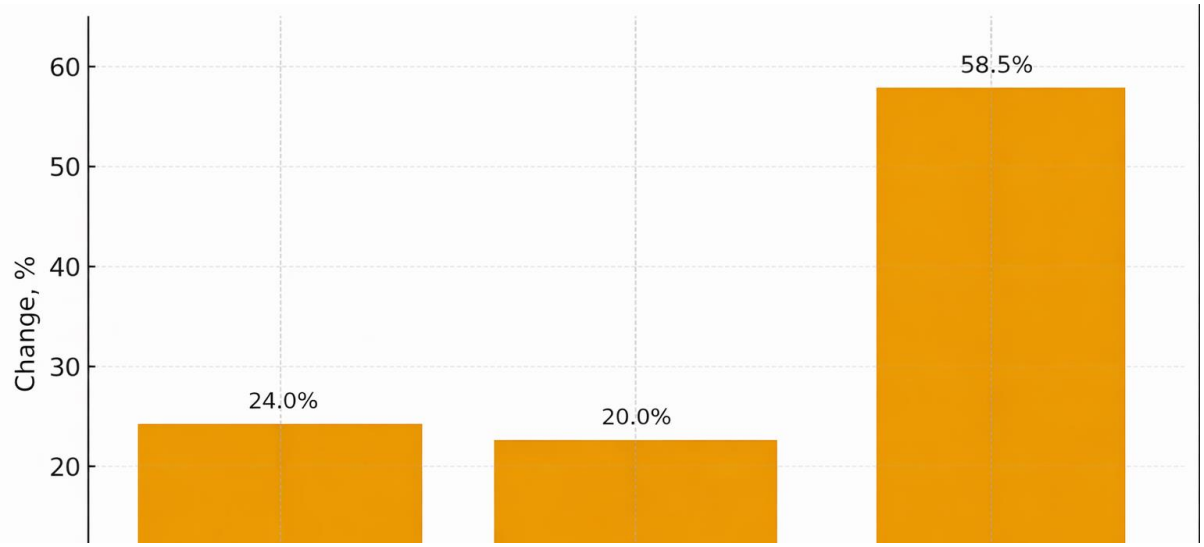

Fig. 2. Improvement of structural parameters of the skin after a course of mesotherapy with NCTF 135HA (compiled by the author based on [19-22]).

In young patients, especially those presenting with seborrhea, acne, and acne sequelae, the isolated use of a single technique is often insufficient. In such clinical settings, it is rational to employ combination regimens in which different interventions interact to produce a marked synergistic effect. The combination of chemical peels and mesotherapy is generally regarded as the most pathogenetically sound pairing.

The synergistic effect arises from the multidirectional yet mutually potentiating actions of the procedures. Chemical peeling based on azelaic, salicylic, or glycolic acid provides controlled exfoliation: it reduces hyperkeratosis, unblocks sebaceous gland ducts, and exerts an anti-inflammatory effect. In this way, superficial dermatocosmetic concerns are addressed while, at the same time, the permeability of the epidermal barrier is substantially increased for the subsequent delivery of active agents. Mesotherapy performed 3–7 days later ensures the targeted delivery of trophic and reparative substances into the preconditioned dermis, thereby accelerating recovery, promoting higher-quality regeneration, reducing the likelihood of post-inflammatory hyperpigmentation, and enhancing the overall rejuvenating outcome [14].

The effectiveness of the combined approach has been confirmed in clinical observations. In a comparative study [15] evaluating azelaic peel monotherapy against a protocol combining the same peel with microneedling mesotherapy using a 10% vitamin C solution, statistically and clinically significant advantages of the combination approach were demonstrated. Patients in the combination group showed superiority across all assessment metrics: the increase in skin hydration in the cheek area reached approximately 47%, compared with 36% under monotherapy, whereas the increase in forehead skin elasticity, measured by the integral R2 parameter, reached approximately 79%, compared with 51% in the monotherapy group [15]. Taken together, these findings indicate not mere additivity, but genuine synergism between peeling and mesotherapy. Table 2 presents the quantitative outcomes of combination therapy (peeling + mesotherapy) compared with monotherapy.

Table 2. Quantitative results of combination therapy (peeling + mesotherapy) in comparison with monotherapy (compiled by the author based on [15]).

Parameter (change relative to baseline)	Monotherapy (Peeling)	Combination therapy (Peeling + Mesotherapy)
Increase in hydration (cheek)	+36.0%	+46.4%
Increase in elasticity, R2 (forehead)	+51.2%	+79.0%
Increase in elasticity, R7 (forehead)	+43.7%	+49.8%
Reduction in pigmentation (forehead)	-21.4%	-25.5%

The clinical example presented here clearly demonstrates how these theoretical principles are translated into an actual treatment protocol. Patients older than 30 years with persistent inflammatory lesions and so-called problematic skin represent a complex yet quite characteristic category for whom a multicomponent, stepwise therapeutic strategy is required.

The management approach can be analyzed as follows.

Stage 1: Intensive therapy (first months). Initiation with combined cleansing procedures and chemical peels is clinically justified. These interventions address the primary objectives: suppression of active inflammation, normalization of sebum production, reduction of hyperkeratosis, and creation of a prepared cutaneous substrate for subsequent regenerative procedures.

Stage 2: Regeneration and recovery (up to 1 year). Once inflammatory activity has decreased, transition to mesotherapeutic formulations delivered in a combined technique becomes logical. This step embodies the principle of synergism: by reducing inflammation and increasing the permeability of the stratum corneum, peels prepare the tissues for the delivery of active substances; mesotherapy, in turn, supplies the dermis with the resources required for remodeling, correction of post-acne manifestations such as scarring and persistent erythema, and improvement of the integral parameters of skin quality.

Stage 3: Long-term management and prejuvenation (10+ years). At this stage, the key shift lies in the treatment focus: the skin is no longer being treated as diseased, but rather maintained in a youthful and aesthetically favorable condition. In other words, an intensive therapeutic protocol is transformed into a maintenance strategy centered on proactive control of cutaneous aging. Regular, preplanned mesotherapy or biorevitalization sessions at intervals of approximately 4–6 months make it possible to stabilize the achieved result, maintain water balance and cellular metabolic activity, and delay the manifestation of age-related changes.

Expected and short-term adverse events include pain at injection sites, erythema, edema, small hematomas, as well as papules in the case of biorevitalization [16]. These reactions usually resolve completely within 24–72 hours.

More substantial, though rare, risks are associated with infectious complications in cases of inadequate aseptic and antiseptic practice, as well as allergic reactions to the components of the injected products. In this regard, biorevitalizing agents based on highly purified non-animal-derived hyaluronic acid have an advantage because of their biocompatibility and extremely low allergenic potential. The likelihood of unpredictable reactions is higher with complex mesococktails containing numerous ingredients, especially when the composition or origin of the components is unclear [12].

Absolute contraindications include pregnancy and lactation, acute infections, oncologic diseases, coagulopathies, active inflammation in the intended injection area, and known hypersensitivity to the components of the preparation. Strict adherence to post-procedure recommendations remains critically important, above all rigorous photoprotection, since traumatized skin exhibits increased sensitivity to ultraviolet radiation.

Conclusion

The systematic analysis conducted in the present study makes it possible to formulate several principal statements that carry both theoretical and practical value for contemporary cosmetology focused on young patients.

The market for injectable interventions continues to expand steadily, a trend driven by the shift in consumer perspective toward prejuvenation, that is, proactive management of skin quality for the preventive control of age-related changes.

Biorevitalization using non-crosslinked hyaluronic acid represents a scientifically grounded and clinically validated approach to restoring and maintaining the dermal hydration reserve, which is a key prerequisite for the proper functioning of cellular structures.

The clinical efficacy of mesotherapy is heterogeneous and is critically determined by the composition of the injected cocktail. Standardized polyrevitalizing complexes with an evidence base, particularly NCTF 135HA, are capable of inducing significant positive shifts in dermal architecture, including increases in dermal density and thickness.

Combined protocols, above all the combination of chemical peels with mesotherapy, demonstrate marked synergism and substantially outperform monotherapy with respect to such parameters as skin elasticity and hydration. This makes them the preferred option for patients with concomitant dermatologic concerns, including post-acne changes and dyschromia.

The findings obtained fully verify the proposed hypothesis. For young skin, the optimal strategy is a differentiated and personalized one: biorevitalization serves as a universal baseline tool for the systemic improvement of skin quality through restoration of hydration, whereas mesotherapy, especially as part of combined protocols, functions as a more targeted and potent instrument for addressing specific aesthetic concerns and achieving a comprehensive revitalizing effect.

Promising directions for future work include direct comparative clinical trials of different mesotherapeutic formulations and biorevitalizing agents, as well as long-term prospective studies aimed at evaluating the preventive potential of early initiation of injectable procedures in slowing the processes of skin aging.

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