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Open Access Case Report

Salmon-Derived Polynucleotides for Facial and Periorbital Rejuvenation: A Case Report

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Review began 10/12/2026
Review ended 11/18/2026
Published 11/24/2026

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DOI: 10.7759/cureus.120190

Abstract

Polynucleotide therapy is an emerging regenerative injectable treatment in aesthetic medicine, used to improve skin quality, hydration, elasticity, and early signs of facial aging. Unlike volumetric fillers, polynucleotides are intended to support dermal repair and tissue regeneration, making them relevant for patients seeking natural facial rejuvenation without alteration of facial features. A 36-year-old female with Fitzpatrick skin type III presented with gradually progressive facial aging concerns for more than two years. Her main complaints included fine lines, reduced skin quality, poor elasticity, mild periorbital pigmentation, and under-eye aging changes. She had no significant medical history and was not taking regular medications. She was a current smoker and had previously undergone aesthetic procedures, including botulinum toxin injections, dermal fillers, skin boosters, and laser treatments. No concomitant aesthetic treatment was performed during the active polynucleotide treatment protocol. The patient was treated with Plenhyage XL Strong, supplied as a 50 mg/2 mL syringe containing salmon DNA-derived polynucleotides. As polynucleotide therapy is dose-dependent, the injection volume and interval were selected according to the treated anatomical region. For the under-eye/periorbital area, 1 mL was administered every two weeks, and for full-face rejuvenation, 2 mL was administered monthly. In the present case, injections were delivered using micropapular and linear threading techniques in the intradermal-to-superficial-subdermal plane, with treatment focused on facial skin rejuvenation and periorbital improvement. One month after completion of treatment, clinical photographic comparison and physician assessment showed marked improvement in skin hydration, elasticity, texture, fine lines, pigmentation, and periorbital appearance. The treating physician's subjective estimate of overall improvement was approximately 80%, and patient satisfaction was rated 9/10. The improvement was maintained during three months of follow-up. Treatment was well tolerated, with only mild injection discomfort and transient papules that resolved spontaneously without intervention. No delayed adverse effects were observed. Salmon DNA-derived polynucleotide therapy may represent a well-tolerated regenerative option for facial skin rejuvenation, particularly in patients seeking improvement in skin quality, elasticity, hydration, fine lines, and periorbital aging changes without volumetric facial alteration. Larger prospective studies with objective skin-quality assessment tools and longer follow-up are required to confirm efficacy, durability, and safety.

Categories: Plastic Surgery, Therapeutics, Public Health
Keywords: aesthetic medicine, facial rejuvenation, fine lines, periorbital rejuvenation, polynucleotides, regenerative aesthetics, salmon dna, skin quality

Introduction

Facial aging is a progressive, multifactorial process involving intrinsic biological changes and cumulative environmental exposure [1,2]. Clinically, it is reflected in reduced dermal hydration, loss of elasticity, fine lines, pigmentary irregularities, and progressive changes in soft-tissue support, particularly in cosmetically sensitive areas such as the periorbital and midface regions [1,2]. Although conventional minimally invasive procedures, including botulinum toxin, dermal fillers, energy-based devices, and skin boosters, remain widely used, patient expectations are increasingly shifting toward treatments that improve skin quality without producing obvious volumetric alteration or an unnatural facial appearance [3,4].

Polynucleotides (PNs) are chains of nucleotides, the building blocks of DNA. The injectable used in this case contains PN derived from DNA extracted from salmon reproductive tissue, according to the manufacturer. Laboratory studies suggest one way PN may affect the skin. In one study, immune cells exposed to PN released signals that prompted fibroblasts, the cells that produce the skin's supporting tissue, to make more collagen [5]. This provides a possible explanation for changes in skin texture, although collagen production was not measured in this patient. Contemporary reviews suggest that PN injections may improve skin texture, elasticity, hydration, wrinkle depth, and overall facial appearance; however, the clinical evidence remains heterogeneous, with differences in product formulation, injection technique, treatment intervals, anatomical targets, and outcome assessment methods [4,6]. A recent systematic review identified only nine clinical studies, including 219 treated patients, and concluded that PN therapy appears promising and generally well tolerated, but that stronger clinical evidence is still needed to define optimal protocols and long-term efficacy [6].

The periorbital region is particularly challenging because the skin is thin, highly visible, and prone to fine lines, pigmentation, and early laxity. Treatments in this area require balancing visible rejuvenation with preservation of natural facial expression. An expert consensus has already described a similar injection volume and interval for the area around the eyes using a different PN formulation [7]. This case illustrates how treatment of the under-eye region every two weeks was combined with monthly full-face treatment in one patient. It documents changes visible in serial photographs, the patient's assessment, and adverse effects observed over three months of follow-up. This report follows the Case Report (CARE) guidelines, emphasizing patient presentation, intervention details, clinical response, tolerability, and the practical relevance of PN therapy as a regenerative option for natural facial rejuvenation [8].

Case Presentation

A 36-year-old female working as a human resources manager presented to the aesthetic clinic with concerns about progressive facial skin aging over the past two years. Her main complaints were fine lines, reduced skin freshness, under-eye concerns, and overall deterioration in facial skin quality. She reported that these changes had developed gradually and had become more noticeable over time. Her primary expectation was to achieve a natural-looking improvement in skin quality and facial rejuvenation without altering her facial features or creating an overfilled appearance.

The patient had Fitzpatrick skin type III, no significant medical illness, and no regular medication use. She reported smoking one pack of cigarettes daily for three years and no alcohol consumption. Her previous aesthetic procedures included botulinum toxin injections, dermal fillers, skin boosters, and laser treatments. Her most recent aesthetic treatment was approximately two years before presentation. She reported an unsatisfactory previous aesthetic treatment experience. No adjunctive aesthetic procedure was performed during the active polynucleotide treatment course. Her baseline characteristics and clinical findings are summarized in Table *1*.

Parameters	Findings
Age	36 years
Gender	Female
Occupation	Human resources manager
Fitzpatrick skin type	Type III
Relevant medical history	No significant medical history
Drug history	No regular medications
Smoking history	One pack daily for three years
Alcohol history	No alcohol consumption
Previous aesthetic procedures	Botulinum toxin injections, dermal fillers, skin boosters, and laser treatments
Duration of concern	More than 2 years
Main aesthetic concerns	Fine lines, under-eye rejuvenation, and facial skin rejuvenation
Patient expectation	Natural restoration of skin quality without alteration of facial features
Baseline skin hydration	Moderate
Baseline skin elasticity	Poor
Texture	Fine lines with mild textural irregularities
Pigmentation	Mild periorbital pigmentation
Other findings	Few residual post-acne scar spots

TABLE 1: Baseline patient profile and clinical findings of the patient.

At baseline, facial examination showed fine lines, mild textural irregularity, mild pigmentation around the eyes, and a few residual post-acne scars. Skin hydration was clinically described as moderate and elasticity as poor. These terms reflect qualitative clinical impressions. No validated grading scale or instrument-based measurement was used. The major treatment indications were facial skin rejuvenation, improved hydration

and elasticity, reduced fine lines, and correction of early periorbital aging changes. Because the patient had both periorbital and broader facial skin-quality concerns, treatment planning accounted for the dose-dependent nature of polynucleotide therapy, with lower-volume, shorter-interval treatment for the under-eye region and a higher-volume, longer-interval protocol for full-face rejuvenation. Baseline standardized clinical photographs were obtained before treatment and were used for comparative assessment during follow-up.

Treatment protocol

Polynucleotide therapy was performed using Plenhyage XL Strong, a salmon DNA-derived polynucleotide preparation supplied in a 50 mg/2 mL syringe (Table *2*). The treatment was planned as a regenerative skin-quality improvement protocol rather than a volumetric correction procedure. Since polynucleotide therapy is dose-dependent, the injected volume and treatment interval were selected according to the anatomical region and clinical indication.

Treatment variables	Details
Product used	Plenhyage XL Strong
Active component	Salmon DNA-derived polynucleotides
Product presentation	50 mg/2 mL syringe
Treatment principle	Region-specific injection volumes and treatment intervals
Under-eye/periorbital protocol	Six sessions, 1 mL per session, at two-week intervals
Full-face rejuvenation protocol	Three sessions, 2 mL per session, at monthly intervals
Injection technique	Combination of micropapular and linear threading techniques
Needle size	30G-32G
Injection depth	Intradermal to superficial subdermal plane
Main target areas	Under-eye/periorbital region and face, with emphasis on infraorbital, malar, and melomental regions
Adjunctive treatment during protocol	None
Immediate tolerability	Mild discomfort and transient papules
Management of immediate effects	No intervention required; spontaneous resolution

TABLE 2: Polynucleotide injection protocol given to patient.

The patient received six periorbital treatment sessions, with 1 mL administered per session at two-week intervals, and three full-face treatment sessions, with 2 mL administered per session at monthly intervals. Treatment addressed periorbital aging changes and broader facial skin-quality concerns, including reduced hydration, poor elasticity, fine lines, and textural irregularity. The treated areas included the infraorbital, malar, and melomental regions.

Injections were administered using a combination of micropapular and linear threading techniques with a 30G-32G needle. The product was placed in the intradermal-to-superficial subdermal plane, depending on the anatomical area and skin thickness. No adjunctive aesthetic treatment was performed during the active polynucleotide treatment period to allow clearer assessment of the clinical response.

The treatment rationale was based on the expected regenerative effects of polynucleotides, including improvement in hydration, dermal quality, elasticity, texture, fine lines, and periorbital appearance. The patient tolerated the procedure well. Mild injection discomfort and transient papules were noted immediately after treatment, but these resolved spontaneously without the need for medical intervention.

Clinical timeline

The patient reported that her facial fine lines and under-eye changes had developed gradually over more than two years. At the baseline visit, the treating physician assessed her concerns and obtained clinical photographs. The patient received six periorbital treatments at two-week intervals and three full-face treatments at monthly intervals (Table *3*). At the three-month follow-up, the physician compared the follow-up photographs with the baseline images and noted that the improvement in facial and periorbital

appearance had persisted. No delayed adverse effects were reported.

Time point	Clinical event
>2 years before presentation	Gradual onset of fine lines, reduced skin quality, and under-eye concerns
Baseline visit	Clinical assessment, treatment planning, and clinical photographs
Periorbital treatment	Six sessions of periorbital PN injections, 1 mL per session, at two-week intervals
Full-face rejuvenation treatment	Three sessions of full-face PN injections, 2 mL per session, at monthly intervals
Post-treatment assessment	Treating physician's assessment and comparison of clinical photographs
3-month follow-up	Improvement maintained; no delayed adverse effects observed

TABLE 3: Chronological timeline of the patient's clinical presentation, treatment sessions, outcome assessment, and follow-up.

PN: polynucleotide

Outcome and follow-up

The treating physician assessed the clinical response by examining the patient and comparing baseline and follow-up photographs. The patient separately rated her satisfaction with treatment. Follow-up photographs were obtained after completion of the planned periorbital and facial rejuvenation protocol. Comparative photographic assessment demonstrated visible improvement in overall skin quality, hydration, texture, and facial freshness. The periorbital region showed improved skin appearance and pigmentation, while the malar and lower facial regions showed smoother skin texture and improved overall appearance.

The treating physician estimated overall improvement at approximately 80%. This was a subjective global impression without a validated scoring scale. The patient rated her satisfaction as 9/10. The treating physician documented marked improvement in skin quality, elasticity, firmness, fine lines, pigmentation, and periorbital appearance. The patient also reported high satisfaction with the treatment outcome, rating it 9 out of 10. Importantly, the improvement was achieved without overfilling or altering facial appearance, consistent with the patient's initial expectation of a natural restoration. The patient was followed for three months after treatment. During this period, the observed improvement was maintained, and the patient remained clinically stable. No delayed adverse events were reported. The patient did not require any medical intervention for post-procedural effects (Figure *1*).



FIGURE 1: Facial photographs at baseline and three months after treatment.

The labels identify the infraorbital region (A), malar region (B), and melomental fold (C). Differences in lighting, hairstyle, and clothing limit direct visual comparison, particularly the assessment of pigmentation and facial contours.

Safety and tolerability

The treatment was well tolerated. The only immediate adverse effects were mild injection-related discomfort and transient papules at the injection sites. These findings were expected with intradermal micropapular injection and resolved spontaneously without any active treatment. No bruising, infection, nodules, persistent edema, allergic reaction, vascular event, or delayed inflammatory reaction were observed during the follow-up period. Overall, the procedure demonstrated a favorable tolerability profile in this patient (Table *4*).

Assessment domains	Baseline finding	Post-treatment/follow-up finding
Skin hydration	Moderate hydration	Marked improvement
Skin elasticity	Poor elasticity	Improved elasticity and firmness
Skin texture	Fine lines and mild textural irregularities	Smoother texture with reduced fine lines
Periorbital appearance	Mild pigmentation and under-eye aging changes	Improved periorbital appearance and reduced pigmentation visibility
Overall facial skin quality	Reduced skin freshness and quality	Substantial improvement in overall skin quality
Physician assessment	Facial skin rejuvenation is indicated	Marked clinical improvement
Estimated clinical improvement based on photographic and physician assessment	Not applicable	Approximately 80% improvement
Patient satisfaction	Not assessed before treatment	9/10 satisfaction score
Persistence of result	Not applicable	Maintained during the 3-month follow-up
Immediate adverse effects	Not applicable	Mild discomfort and transient papules
Delayed adverse effects	Not applicable	None observed
Management required	Not applicable	No intervention required

TABLE 4: Clinical outcome and safety assessment.

Discussion

This case report describes the use of salmon DNA-derived polynucleotide therapy for facial skin rejuvenation in a 36-year-old female with progressive fine lines, reduced skin elasticity, mild periorbital pigmentation, and overall deterioration in skin quality. The treatment was associated with visible improvement in hydration, elasticity, texture, periorbital appearance, and facial contour regularity, with an estimated 80% clinical improvement and a patient satisfaction score of 9/10. The response was maintained during the three-month follow-up period, and no clinically significant adverse events were observed.

The treatment protocol used different injection volumes and intervals for the periorbital region and the full face. These describe the treatment administered to this patient. A dose-response relationship was not evaluated. In this patient, the under-eye/periorbital protocol involved 1 mL every two weeks, whereas the full-face rejuvenation protocol involved 2 mL once monthly. This distinction is relevant because the periorbital region requires conservative volume placement due to thin skin and high anatomical sensitivity. In contrast, broader facial rejuvenation may require a higher treatment volume to address diffuse skin-quality concerns. An expert consensus on highly purified polynucleotides likewise recommends microdroplet or linear retrograde intradermal injection with a 30G-32G needle and lower-concentration formulations for delicate areas; for the periocular region, 1-2 mL per session at 14-21-day intervals has been proposed [8].

The findings are clinically relevant because the patient's primary goal was not volumetric augmentation but natural restoration of skin quality. This distinction is important in modern aesthetic practice, where many patients seek subtle regenerative improvement rather than visible structural alteration. Polynucleotides have been proposed as regenerative biostimulators that may improve dermal quality by promoting hydration, stimulating fibroblasts, remodeling the extracellular matrix, increasing collagen synthesis, and modulating inflammatory pathways [5,6]. Fibroblast activity, collagen synthesis, and tissue remodeling were not measured in this patient, so the mechanism underlying the observed changes remains uncertain [5]. In an early clinical series, four intradermal sessions at two-week intervals were associated with improvements in pore appearance, skin thickness, tone, wrinkles, and sagging, without serious adverse effects [9].

Recent literature supports the growing interest in polynucleotide-based injectables in aesthetic medicine. A 2025 experimental study found that polynucleotides influenced macrophage signaling and increased collagen synthesis in experimental models [5]. These findings provide a possible biological explanation for clinical observations, although the present case did not measure these mechanisms. Similarly, a systematic review of nine clinical studies involving 219 patients found that polynucleotide (PN) injections showed

promising outcomes in wrinkle reduction, skin texture improvement, and enhanced elasticity; however, the authors also emphasized that small sample sizes, heterogeneous techniques, and variable study quality limit the available evidence [6]. Therefore, while the present case demonstrates a favorable clinical response, the findings should be interpreted as supportive rather than definitive evidence. More robust comparative evidence comes from a randomized, double-blind, split-face trial of 27 participants; polynucleotide and non-cross-linked hyaluronic acid injections produced similar global aesthetic improvement, while the polynucleotide-treated side showed greater improvements in elasticity, hydration, roughness, and pore volume, with no serious adverse events [10]. A recent prospective study of 42 patients also found significant improvement in lower-eyelid and crow's-feet appraisal scores through six months, with peak improvement at three months and minimal adverse events [11].

The periorbital area remains one of the most challenging regions in facial aesthetic practice because of its thin skin, high visibility, vascularity, and tendency toward pigmentation, laxity, and fine rhytids. Traditional fillers can be useful in select patients but may pose risks such as edema, overcorrection, or contour irregularity when not carefully selected and injected. In contrast, PN therapy may be particularly attractive for patients whose primary concern is skin quality rather than volume loss. In this patient, improvement in the infraorbital and malar regions contributed to a fresher, more rested appearance without altering the patient's natural facial features.

The safety profile in this case was favorable. The only immediate treatment-related effects were mild injection discomfort and transient papules, both of which resolved spontaneously without intervention. No delayed inflammatory reaction, persistent edema, infection, nodularity, bruising requiring treatment, or vascular complication was observed. This is consistent with the generally favorable tolerability reported in recent reviews. However, larger studies with longer follow-up are still required to better define the incidence of uncommon adverse events [3,5]. The absence of serious adverse events in earlier clinical series, a randomized split-face trial, and a prospective periorbital cohort further supports this observation, although these studies remain limited by modest sample sizes and differing products and protocols [9-11].

This case has several limitations. First, it represents a single-patient observation and cannot establish generalizable efficacy. Second, outcome assessment was based on physician evaluation, comparative photographs, and patient satisfaction rather than validated skin-quality scales, three-dimensional imaging, cutometry, or objective hydration measurements. Because periorbital and full-face treatments were administered during the same treatment course, their individual contributions to the observed changes could not be determined. Third, the patient had a history of previous aesthetic procedures, which may have influenced baseline tissue quality and the observed response. However, no adjunctive aesthetic treatment was performed during the active PN treatment protocol. Previous aesthetic treatments, ongoing smoking, and any changes in skincare during follow-up may have influenced the observed appearance. Their contributions cannot be separated from the treatment effect in this single case. Fourth, follow-up was limited to three months; therefore, the long-term durability of the response and the optimal maintenance schedule cannot be determined from this case. Additionally, because polynucleotide treatment is dose-dependent and protocols may differ between anatomical regions, the findings of this case should not be interpreted as establishing a universal dosing schedule. Larger studies are required to compare different injection volumes, intervals, anatomical protocols, and maintenance regimens. This report documents the treatment course and subjective outcomes in one patient and highlights the need for standardized outcome assessment in future studies.

Patient perspective

The patient reported high satisfaction with the treatment outcome and appreciated the natural appearance of the improvement. She noted visible enhancement in overall skin quality and under-eye appearance without feeling that her facial features had been altered. Her satisfaction score after treatment was 9/10.

Conclusions

Following salmon DNA-derived polynucleotide injections, photographic comparison and the treating physician's global assessment suggested improvement in facial skin appearance in this patient. Mild injection discomfort and transient papules were documented. Interpretation is limited by subjective assessment, differences in photographic conditions, concurrent treatment of facial regions, and three months of follow-up. Objective changes in hydration and elasticity, a dose-response relationship, and long-term safety could not be established.

Additional Information

Author Contributions

All authors have reviewed the final version to be published and agreed to be accountable for all aspects of the work.

Concept and design: Hadeer Soultan

Acquisition, analysis, or interpretation of data: Hadeer Soultan

Drafting of the manuscript: Hadeer Soultan

Critical review of the manuscript for important intellectual content: Hadeer Soultan

Supervision: Hadeer Soultan

Disclosures

Human subjects: Informed consent for treatment and open access publication was obtained or waived by all participants in this study. **Conflicts of interest:** In compliance with the ICMJE uniform disclosure form, all authors declare the following: **Payment/services info:** All authors have declared that no financial support was received from any organization for the submitted work. **Financial relationships:** All authors have declared that they have no financial relationships at present or within the previous three years with any organizations that might have an interest in the submitted work. **Other relationships:** All authors have declared that there are no other relationships or activities that could appear to have influenced the submitted work.

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