

Microneedling Combined with Topical Plant-Derived Exosome Therapy for Refractory Melasma in Fitzpatrick Skin Type V

A Case Report

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Case Report. JDD case reports require a structured abstract, up to 6 figures, up to 2 tables, and ≤ 1,500 words including abstract, title, legends, tables, disclosures, and references.



AFTER TREATMENT 1

AFTER TREATMENT 2

AFTER TREATMENT 3

FINAL FOLLOW-UP

Serial clinical photographs, reproduced at consistent scale and alignment. Photography was not standardized between sessions — see Note on the images, page 8.

Structured Abstract

Background: Melasma is a chronic, relapsing pigmented disorder that is often refractory to topical depigmenting agents, particularly in patients with darker phototypes. Microneedling has been studied as an adjunct to enhance topical drug delivery and to promote dermal remodeling. Exosome-based products are increasingly used in aesthetic dermatology, but clinical evidence remains limited.

Case: A 62-year-old Hispanic woman with Fitzpatrick skin type V and longstanding facial melasma, refractory to prior topical hydroquinone and topical tranexamic acid, underwent four treatments at 2-week intervals. Each session consisted of 0.7-mm microneedling with the Collagen P.I.N. device (Induction Therapies, Louisville, KY) followed by topical application of a commercially available plant-derived exosome formulation, TRUExosomes PRX8 Plant-Exo Stimulation Serum (Induction Therapies, Louisville, KY). Daily photoprotection continued throughout.

Outcome: Serial photographs obtained after each treatment session showed progressive improvement in hyperpigmentation, with no adverse events. Improvement is reported using physician global assessment and a retrospectively estimated mMASI score.

Conclusion: This case describes clinical improvement of refractory melasma after serial microneedling combined with topical plant-derived exosome therapy. Controlled studies with standardized photography, validated outcome measures, and longer follow-up are needed to determine whether this benefit is reproducible.

Introduction

Melasma is a common, chronic pigmentary disorder marked by acquired hypermelanosis on sun-exposed facial skin. Its pathogenesis is multifactorial; epidermal melanogenesis, dermal changes, vascular signaling, inflammation, oxidative stress, ultraviolet and visible light exposure, and hormonal influences all contribute. Relapse is common, which makes the condition difficult to treat definitively.^{1,2}

First-line management typically includes strict photoprotection and topical depigmenting agents such as hydroquinone. Tranexamic acid, cysteamine, azelaic acid, retinoids, chemical peels, and device-based procedures are often added as adjuncts in refractory disease.¹⁻⁴

Microneedling creates controlled microchannels that may enhance topical drug delivery while also inducing dermal remodeling and wound-healing signaling. It is generally favored in skin of color because it avoids bulk thermal injury, though postinflammatory hyperpigmentation remains a real risk.⁵⁻⁸

Extracellular vesicles, including exosomes, are nanoscale mediators of intercellular signaling. Dermatologic interest has focused on their potential anti-inflammatory, regenerative, and pigment-modulating effects, but clinical data remain early and product standardization is a major limitation.⁹⁻¹¹

A recent study reported melasma improvement with microneedling plus topical *Rosa damascena* stem-cell exosomes, but enrolled only Fitzpatrick I-III patients.¹² Evidence in Fitzpatrick V skin, where the risk-benefit calculus for procedural therapy differs, remains sparse.

Case Presentation and Methods

A 62-year-old Hispanic woman with Fitzpatrick skin type V presented with longstanding facial melasma. She had previously failed courses of topical hydroquinone and topical tranexamic acid, and had not used melasma-directed therapy for approximately 2 months before the treatment series. Written informed consent was obtained for treatment and for publication of de-identified clinical photographs.

The patient underwent four treatment sessions at 2-week intervals. At each visit, microneedling was performed to a depth of 0.7 mm using the Collagen P.I.N. microneedling device (Induction Therapies, Louisville, KY), followed immediately by topical application of TRUExosomes PRX8 Plant-Exo Stimulation Serum (Induction Therapies, Louisville, KY), a manufacturer-described plant-derived exosome product. The manufacturer reports NanoFCM characterization of membrane-positive particles in the 45-80 nm range¹³; these characterization data are manufacturer-reported and were not independently verified for this case report. The Collagen P.I.N. device is FDA cleared for the improvement of facial acne scars in adults with Fitzpatrick skin types I-III aged 22 years and older; its use in this patient was off-label.

Daily sunscreen use continued throughout the treatment course. Serial clinical photographs were obtained after the first, second, and third treatments, and at final follow-up 2 weeks after the fourth. No adverse events such as postinflammatory hyperpigmentation, scarring, infection, or prolonged erythema occurred.



First available clinical photograph, obtained after treatment 1



Clinical photograph after treatment 2, showing interval lightening of facial hyperpigmentation.



Clinical photograph after treatment 3, showing continued improvement.



Final follow-up photograph, obtained 2 weeks after treatment 4, showing approximately 50% physician-estimated improvement compared with the first available post-treatment photograph.

Outcome Assessment

The modified Melasma Area and Severity Index (mMASI) is a validated instrument that scores melasma severity based on area of involvement and darkness across the forehead, right malar, left malar, and chin. It removed the homogeneity component from the original MASI and has been reported as reliable, valid, and responsive to change.¹⁴⁻¹⁶ Overall clinician-estimated improvement was approximately 50% at final follow-up.

Table 1

Severity	Post-treatment 1 estimated mMASI	Final estimated mMASI	Approximate change
Moderate-to-severe	8	4	~50%

The estimated mMASI decreased from approximately 8 to 4 at final follow-up, consistent with an approximate 50% improvement.

Discussion

This case shows progressive clinical improvement of refractory melasma in a Fitzpatrick V patient treated with serial 0.7-mm microneedling followed by topical plant-derived exosome application. The patient had failed hydroquinone and tranexamic acid and completed a 2-month washout before the treatment series, which reduces, but does not eliminate confounding from prior topical therapy.

The rationale for combining these modalities is biologically plausible. Microneedling transiently disrupts the stratum corneum, increasing cutaneous penetration of topical agents, while also activating wound-healing and dermal remodeling pathways. Prior reports support the benefit of microneedling for recalcitrant melasma and as an adjunct to topical therapy.⁵⁻⁸

Exosome-based therapies are attractive because extracellular vesicles carry proteins, lipids, and nucleic acids that influence inflammation, angiogenesis, extracellular matrix remodeling, and cell signaling. Dermatologic exosome products are heterogeneous; however, regulatory standards are still evolving, and no exosome product should be assumed equivalent to another absent independent characterization.⁹⁻¹¹

This case differs from the recent microneedling-plus-exosome melasma study in two respects: Fitzpatrick type V skin and a plant-derived rather than *Rosa damascena* stem-cell formulation.^{5,12} Both differences are potentially clinically relevant as melasma is common in darker phototypes, and procedural therapies in this population must balance efficacy against the risk of postinflammatory hyperpigmentation.

Limitations include the single-patient design, short follow-up, and the inability to isolate the relative contribution of microneedling, sunscreen, and exosome application. Manufacturer-reported product characterization was used only to identify the product and should not be read as independent evidence of efficacy. Despite these limitations, the absence of adverse events and the visible improvement support further prospective study in skin of color.

Conclusion

Four sessions of 0.7-mm microneedling followed by topical plant-derived exosome application were associated with progressive improvement of refractory melasma in a 62-year-old Hispanic woman with Fitzpatrick type V skin, without adverse events. This case supports further controlled investigation using standardized baseline photography, mMASI scoring, validated patient-reported outcomes, and longer follow-up.

Figure Legends

Figure 1. First available clinical photograph, obtained after treatment 1

Figure 2. Clinical photograph after treatment 2, showing interval lightening of facial hyperpigmentation.

Figure 3. Clinical photograph after treatment 3, showing continued improvement.

Figure 4. Final follow-up photograph, obtained 2 weeks after treatment 4, showing approximately 50% physician-estimated improvement compared with the first available post-treatment photograph.

Disclosures, Funding, and Consent

Patient consent: Written informed consent for treatment and publication of de-identified clinical photographs was obtained and is retained by the treating physician.

Funding/material support: (A) TRUExosomes PRX8 product was provided by Induction Therapies; the company had no role in patient care, outcome assessment, manuscript drafting, or the submission decision

Conflicts of interest: Rafael E. Mojica, DO, FAAD [none]. Shino Aguilera [none]

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