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Intradermal Exosome Injection for Facial Skin Rejuvenation: A Case Report

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Abstract

Skin aging is associated with progressive loss of dermal collagen, reduced skin elasticity and the development of wrinkles and enlarged pores. Recently, exosomes derived from mesenchymal stem cells (MSCs) have emerged as regenerative modality in aesthetic dermatology due to their role in intercellular signaling, collagen synthesis and tissue regeneration [1,2]. The therapeutic potential of exosomes, which are nano-sized extracellular vesicles derived from various cell types, have distinctive capabilities, including facilitating intercellular communication, delivering bioactive molecules, and modulating immune responses, which make them promising candidates for skin regeneration/repair and treating dermatological disorders.

Noticeable improvements in skin texture, elasticity and pore appearance were observed after treatment. Intradermal exosomes injection is a safe and effective minimally invasive treatment for facial rejuvenation with downtime.

Keywords

Facial Skin Rejuvenation; Intradermal Exosome Injection; Mesenchymal stem cells.

Introduction

Skin, the largest organ in the human body consists of three layers: epidermis, dermis, and hypodermis. The outermost layer of the skin is the epidermis, a thin layer that is tightly packed with epithelial keratinised cells [1,2]. It is divided into 5 layers namely stratum corneum, stratum lucidum, stratum granulosum, stratum spinosum, and stratum basale. The primary achievement of skin barrier function is largely attributed to the stratum corneum. The stratum corneum is the outermost covering of the

epidermis, and consists of very tightly packed cells known as corneocytes. Stratum corneum acts as formidable physical, environmental, and microbial barriers protecting organisms from external invasion and homeostasis maintenance [3]. Tight junctions, which is a part of stratum granulosum are considered to be the second largest barrier of skin. Tight junctions are crucial components of the skin barrier, playing a vital role in maintaining skin integrity, preventing water loss, and protecting against the entry of pathogens, allergens, and toxins. They are composed of various proteins, form a network of strands that seal the space between adjacent cells, creating a barrier that regulates the movement of molecules and ions through the paracellular space (the space between cells). Exosomes, originating from endocytic membranes, facilitate the transfer of essential biomolecules in cell communication, making them widely utilised in aesthetic dermatology [2].

Aging, particularly skin aging, is a major concern for many individuals due to its effects on appearance, health, and overall quality of life. The aging process impacts the skin by causing wrinkles, fine lines, sagging, and changes in pigmentation. Skin aging is influenced by two primary processes: intrinsic and extrinsic aging. Intrinsic aging, driven by genetic factors, naturally occurs over time, while extrinsic aging is caused by environmental factors such as oxidative stress, sun exposure (UV radiation), pollution, and other external influences, that lead to decreased collagen production, dermal thinning, reduced elasticity and increased pigmentation which affects all skin layers, resulting in changes in texture, tone and elasticity [1].

Conventional treatments include laser resurfacing, chemical peels, platelet-rich plasma (PRP) and dermal fillers.

Exosomes are nano-sized extracellular vesicles (30-150nm) secreted by many cell types, particularly mesenchymal stem cells. They contain growth factors, cytokines, mRNA and microRNA that regulate cellular proliferation, collagen synthesis, angiogenesis and inflammation modulation [1,2].

In recent years, exosome-based therapy has gained increasing attention in regenerative medicine and aesthetic dermatology for its potential to stimulate collagen production, enhance fibroblast activity and improve skin quality [4].

This case report aims to evaluate the clinical efficacy and safety of intradermal exosomes injection for facial rejuvenation in a patient with visible signs of aging.

Case Presentation

A 52 years old female (Fitzpatrick skin type III) presented with complaints of dull skin tone, enlarged pores, hyperpigmentation of skin and decreased skin elasticity over the past several years. The patient had no significant medical history, autoimmune disease or active skin infection and had not undergone any aesthetic procedures. After discussing available treatment options, the patient opted for intradermal exosomes therapy as a minimally invasive skin rejuvenation treatment.

Clinical examination revealed mild skin laxity, enlarged pores bilateral cheeks, static fine lines around the eyes, moderate photodamage. Diagnosis: Early photoaging with textural skin changes.

Informed consent was obtained prior to the procedure. The face was cleaned using gentle cleanser and topical anaesthetic cream applied for approximately 30 minutes to improve patient's comfort.

A commercially prepared exosomes solution derived from mesenchymal stem cells was used.

Patients underwent intradermal microinjection using 30-gauge needle, injected approximately 1-2mm into superficial dermis. Total 3mls exosomes solution injected over whole face covers forehead, cheeks, nose and chin. Multiple microinjections were administered evenly across treatment areas.

Following the procedure, the patient was advised to avoid excessive sun exposure, apply broad spectrum sunscreen and maintain gentle skincare for several days.

Clinical assessment was conducted at 2 weeks and 4 weeks following treatment. At the 2 weeks follow up, patient demonstrated improved skin hydration, increased skin radiance and mild improvement in skin texture. At the 4 weeks follow up, further improvement were noted. Overall skin texture smoother and more even, improved skin elasticity, visible improvement in pore size and reduction in appearance of fine wrinkles.

Figure 1&2: Before Photo - Baseline and After Photo - 4 weeks later

The patient reported high satisfaction with the outcome. No complications such as infection, nodules, or prolonged erythema were observed.

Discussion

Exosomes have emerged as a promising tool in regenerative dermatology due to their role in cellular communication and tissue repair. They contain signaling molecules that can stimulate fibroblast proliferation, promote collagen synthesis and enhance extracellular matrix remodeling [1,5].

Intradermal administration allows direct delivery of exosomes to dermal layers, where fibroblasts and other target cells are located. This targeted approach may enhance treatment efficacy compared to topical application alone.

Compared with other regenerative therapies such as platelet-rich plasma (PRP), exosomes may provide a higher concentration of bioactive molecules and potentially stronger regenerative signaling.

In addition to natural aging, photo-aging has become a significant challenge faced by many individuals today. Chronic sun exposure leads to photoaging of human skin, characterized by clinical, histological, and biochemical changes that differ from those seen in skin that has aged naturally without sun exposure [2].

Exosomes have garnered significant attention in the field of anti-aging treatments due to their ability to influence cellular processes that contribute to aging. These extracellular vesicles, which carry proteins, lipids, RNA, and other bioactive molecules, can modulate various biological functions and potentially reverse or slow down aging-related changes in the skin and other tissues. They represent a cutting-edge approach in anti-aging treatments, leveraging their natural ability to modulate cellular processes and promote regeneration. By enhancing skin rejuvenation, reducing inflammation, and supporting tissue repair, exosome-based therapies offer promising potential for reversing or slowing down the visible and systemic effects of aging [1,2].

In this case, the therapy resulted in noticeable improvements in skin texture, pore size, and elasticity without significant adverse effects.

Conclusion

Intradermal exosome injection demonstrated significant improvement in skin texture, elasticity and radiance with minimal downtime and favorable safety profile. Exosome injection is a relatively safe and effective regenerative treatment for early photoaging skin.

As research continues to advance, exosomes therapies may become a cornerstone of anti-aging medicine, offering innovative solutions for maintaining youthfulness and health.

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