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Microneedling Combined With Drugs and Stem Cells for Treating Androgenetic Alopecia

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INTRODUCTION

Microneedling (MN) is a minimally invasive procedure which permits the transdermal delivery of drugs, preferably 5% minoxidil or more recently clascoterone solution and exosomes rather than others (growth factors, PRP, dutasteride, Botox), confirming its effective and safe therapeutic value as innovative refinement for hair restoration, particularly in mild-moderate androgenetic alopecia (AGA) management.

Since the first description by Dhurat and collaborators, many clinical trials concerning MN for AGA have been reported, and their comparison has permitted us to understand nowadays the best protocol. It is preferable that the scalp is shaved, and topical anesthesia has to be ensured before sterilization of the bald areas. Dermaroller with a needle length of 1.5 mm has to be preferred for spreading the drug at a suitable depth of the dermis around the follicular unit. It can be moved in a vertical-horizontal-diagonal direction approximately 15 to 20 times until pinpoint bleeding. Hemostasis can be achieved with ice water-soaked sterile gauze, and an antibiotic cream has to be applied. A hair growth-promoting topical solution can be applied only 24 hours after the MN session has terminated, and generally, the best cosmetic results can be achieved by applying it twice daily. No serious side effects have been reported beyond transient erythema, pain, and cervical lymphadenopathy. Complications (infections, granulomas, scars) are very rare. Possible contraindications are bleeding disorders or using anticoagulants, active infections, or keloidal tendency. It is better to manage androgenetic alopecia (AGA) with sessions every 4 weeks rather than 1 to 2 weeks for 3 to 12 months, according to the long-term sustainability of the therapeutic response. Generally, about 80% of the patients show improvement above the 50% level through clinical iconography and trichoscopy, demonstrating their significant increase in hair density and shaft thickening, particularly on the vertex and frontal area.[1]

Even if stem cell-based therapies are not yet FDA approved, they have recently gained considerable attention, focusing on the reactivation of hair follicle stem cells (HFSC) and the growth of mature, well-developed hair follicles. Multi-potent SC are preferably extracted from autologous HF bulges of a few punch biopsies of the unaffected occipital scalp through medical devices for microdissection and can be cultured or not before implantation, as well as frozen in stored vial tubes for sequential sessions.[2] Their subcutaneous injections in the bald areas can induce the growth of new cosmetically acceptable hairs, improving their density and cumulative shaft diameter according to the frequency of these sessions for at least 6 months, especially in stable moderate AGA.[2,3]

Stem cell-based therapy is a safe and viable alternative treatment for AGA, and particularly its use combined with MN should be further investigated in the near future. Micrografts of HFSC (selected organoids in culture) can be naturally transplanted in the bald scalp through the microchannels produced by MN, together with transdermal drug delivery. Generally, only half of the HF organoids produce mature, properly oriented hairs,[4] but transdermal drugs delivery and biodegradable scaffoids or 3D bioprinting with a hydrogel matrix can improve respectively their quality and stability. More qualitative randomized controlled trials should better define the validation of a standardized protocol for this application of MN combined with HFSC transplant and topical new or old drugs.[5] Finally, its possible association with conventional therapies for a personalized treatment strategy must always be considered in severe AGA management.

DISCLOSURES

The author has no conflicts of interest to disclose.

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