

NEW INSIGHTS IN HAIR AND SCALP PATHOLOGY AND NOVEL TREATMENT
OPTIONSJennifer Chu M.D.¹, Francis Bruyninckx M.D.² and Steven Goodman M.D.³¹Emeritus Associate Professor Physical Medicine & Rehabilitation, University of Pennsylvania, Philadelphia, USA.²Emeritus Clinical Professor, Physical Medicine & Rehabilitation, University of Leuven, Belgium.³Consultant.***Corresponding Author: Jennifer Chu, M.D.**

Emeritus Associate Professor Physical Medicine & Rehabilitation, University of Pennsylvania, Philadelphia, USA.

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SUMMARY

Scalp hair is a deeply engrained component of personal identity and culture. There exists a causal relationship between the health condition of the scalp and hair loss. Impaired scalp status leads to decreased hair quality. Nevertheless, its impacts on hair are reversible upon normalization of the scalp condition.^[1]

INTRODUCTION

Many methods have been used to keep the scalp healthy in order to facilitate healthy hair growth, such as topical micro needling and local injection of platelet-rich plasma for cases of androgenetic alopecia.^[2]

It has been shown that unhealthy scalp conditions can lead to reduced hair quality which is reversible upon normalization of the scalp constitution. A proposed theory involves the effect of scalp oxidative stress, as normal aging interferes with the typical keratinization of the pre-emergent hair cuticle (outermost layer of the hair shaft). This perturbed cuticle disturbs normal fiber anchoring on the scalp, and hairs emerge more brittle and fragile than those with normal cuticle leading to accelerated physical degradation, mirroring the effects of chronological aging of the hair fiber. The consequences of the rapid cuticle degradation result in hair that is more vulnerable to mechanical insults and compromised overall quality.^[3]

Recent insights and updates from the literature

New insights into the pathogenesis and mechanism of hair loss have been reported in over 20 published epidemiological studies. This covers a wide range of scalp pathologies and documented consequential effects on the hair.

A treatment study showed not only that impaired scalp condition led to diminished hair quality but also that the negative impacts are reversible upon normalization of the scalp status. Oxidative stress within the scalp tissues, as part of the etiology of these scalp conditions as well as normal aging, interferes harmfully with the normal keratinization of the pre-emergent hair cuticle. This

perturbed cuticle obstructs normal fiber anchoring in the scalp and hair fibers emerge more fragile than normal with accelerated physical degeneration, mirroring the effects of chronological aging of the hair fiber. More brittle fibers are more vulnerable to mechanical insults and a compromised overall quality. Oxidative stress is an unbalanced condition in which the body tissues are insufficiently able to counteract both exogenous and endogenous sources of reactive oxygen species. Oxidative stress is strongly associated with ageing, both local and systemic, as well as a wide range of local health conditions.

This review focuses on the oxidative stress data known for skin, scalp and hair. This oxidative stress may be the process by which an unhealthy scalp leads to scalp oxidative stress to normal hair elongation, retention and replacement.

Oxidative stress within the scalp leads to an unhealthy scalp which negatively influences the normal process of hair elongation, retention, and replacement.

The scientific evidence relating to hair growth and new insights into the pathogenesis and mechanism of hair loss was reviewed. The consequently emerging evidence advances the understanding of hair growth in both of these areas and provides a context for delineating current and novel therapies. These include finasteride, minoxidil, topical prostaglandins, natural supplements, micro needling, low-level laser light, platelet-rich plasma, fractional lasers, and cellular therapy.^[4]

Androgenetic alopecia (AGA) is an androgen-dependent hereditary condition characteristically resulting in hair

miniaturization. It is the most common type of alopecia in men and women. During recent years, multiple treatment modalities have been studied, but approval by the United States Food and Drug Administration topically is limited to minoxidil and finasteride.

Microneedling (MN) is a minimally invasive technique that induces new collagen formation, as well as local production of growth factors and neovascularization. Even though not many studies of MN in alopecia have been completed, it is seen as a promising favorable treatment modality.^[2]

Physiology and medical treatments for alopecia

Androgenetic alopecia (AGA) is the most common hair loss disorder in both men and women. The characteristic hair loss pattern in AGA negatively affects self-image and the outward perceptions of the balding person. The phenotypical changes are driven by dihydrotestosterone (DHT) and its precursor testosterone. DHT induces follicle miniaturization and hair cycle changes, resulting in hairs that can no longer extrude through the skin surface. AGA is inherited in a polygenetic pattern, however it is also susceptible to epigenetic and environmental factors. Currently, minoxidil, finasteride, and photo laser therapy are the only approved treatment modalities by the United States Food and Drug Administration.

No standardized protocol for MN in androgenetic alopecia hair loss has been proposed yet. Current evidence is insufficient to allow a direct comparison with other therapies, though it appears to show favorable effects on hair density, thickness, and quality of hair, especially when associated with other treatments or when it is used as part of a combined drug delivery system.

Personal observations

The main author and other associates have had experience using local magnesium sulfate lotion once a week to reduce oxidative stress on the scalp and hair and have experienced gratifying results. In order to be effective, the scalp has to be cleaned, rinsed, and dried first, and the subsequently applied magnesium lotion has to be left in place for at least 20 minutes before washing it out.



Figure of a single hair. Notice the affected structure of the cuticle in the damaged hair when compared to the normal status.

CONCLUSION

This article aims to summarize the available literature regarding the use of microneedling in isolation or associated with other therapies for the treatment of androgenetic alopecia.

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