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CASE REPORT: Experience in Treatment of Androgenetic Alopecia using Er:YAG Laser (SMOOTH™ Mode) Combined with Platelet-rich Plasma

Dmitry Vladimirovich Maksimov
Clinic of Aesthetic Medicine "Green Island", Nizhny Novgorod, Russia

ABSTRACT

Lasers are becoming important as an alternative or adjuvant treatment modality for the treatment of androgenetic alopecia. Another emerging modality for hair regrowth is autologous platelet-rich plasma. A combination therapy consisting of nonablative 2940-nm Er:YAG laser in SMOOTH™ mode and the subcutaneous injection of platelet-rich plasma seems to result in significant hair regrowth. We present a case of a grade-3 androgenetic alopecia patient with evident restoration of hair density after three sessions of the combined treatment, with preservation of the achieved result several months after therapy and no adverse effects.

Key words: Er:YAG laser, SMOOTH mode, platelet-rich plasma, combination therapy, hair restoration, androgenetic alopecia.

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I. INTRODUCTION

Androgenetic alopecia (AGA) is the most common form of hair loss in both men and women. The disease is a non-scarring form of alopecia and is due to the effect of active androgen dihydrotestosterone in combination with genetic susceptibility to androgenic influences on the hair follicles. The hallmark of the condition is progressive and gradual miniaturization of hair follicles [1], accompanied by changes in the duration of the hair cycle phases [2]. Although the prevalence of AGA is high, the treatment modalities are limited and mainly include minoxidil, 5- alpha-reductase inhibitors, and hair transplantation [3]. Hence, there is a need for adjuvants and newer modalities of treatment for AGA. Lasers have been used therapeutically in medicine for photobiomodulation in a variety of indications for more than 30 years, and have recently caught the attention of the scientific community for the treatment of AGA [4], owing to the fact that laser phototherapy has demonstrated proliferative effects in a variety of tissues and cell types, including hair follicles [5]. It has been reported that 2940-nm Er:YAG laser promotes hair growth in mice [6] via induction of hair cycle transition from the telogen to the anagen phase. The positive effect of Er:YAG laser monotherapy on hair regrowth in humans was published in a recent study [7]. Another emerging modality for AGA is platelet-rich plasma (PRP) [8], an autologous serum harvested from venous blood, which contains high concentrations of platelets and growth factors. PRP promote hair regrowth by stimulating stem cell differentiation of hair follicles [9]. Combining PRP injections with other hair restoration treatments may also enhance the overall efficacy.

II. CASE

Patient D., born in 1985, reported hair loss and a decrease in hair density in the frontoparietal area in the preceding year. He was diagnosed with grade-3 AGA on the Hamilton-Norwood scale, of a non-scarring nature, with diffuse-zonal hair thinning in the frontoparietal areas (Fig. 1).

Fig. 1: A global photograph of the patient at first visit

A combined therapy was used during the treatment. The patient's scalp was first treated with 2940-nm nonablative Er:YAG laser (SP Dynamis, Fotona, Slovenia) with a PS03 fractional handpiece in SMOOTH mode, using fixed parameters (7 mm spot size, 8.5 J/cm2 pulse fluence, 3.3 Hz frequency); the laser handpiece was moved in a cross-hatched pattern across the scalp in 8 passes. Immediately after the laser treatment, the previously harvested PRP (4 ml total volume) was injected subcutaneously on multiple points of the treatment area. The treatment consisted of three sessions with an interval of 1 month.

Global photographs were taken before treatment (Fig. 2a), before the third procedure (Fig. 2b) and after 5 months from the start of treatment (Fig. 2c). No cooling or anesthesia was used. There was no rehabilitation. The patient did not use Minoxidil as part of the treatment.

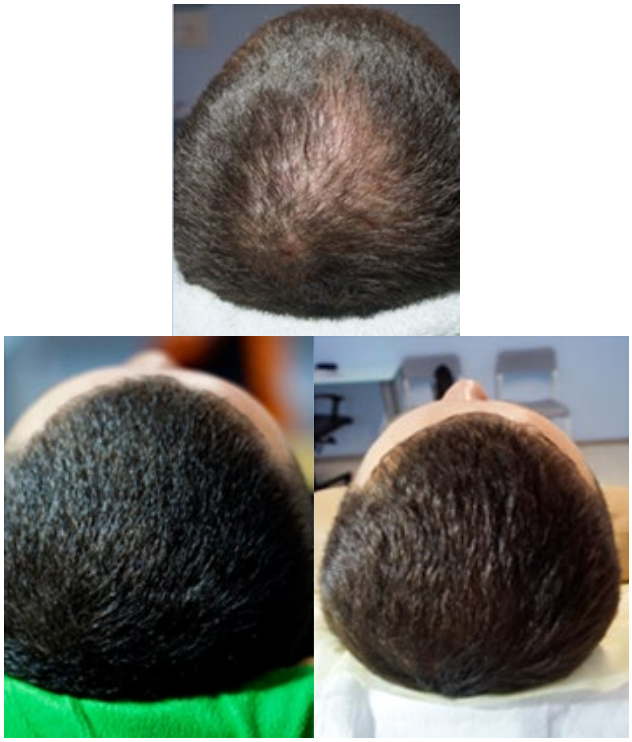

Fig. 2.: Global photograph of the patient taken before the treatment (a), before the third session of the treatment (b) and at 5 months after the completed treatment (c).

III. DISCUSSION

The treatment resulted in a visually evident restoration of hair density, with preservation of the achieved result lasting several months after therapy. The combined effects from the application of Er:YAG laser in SMOOTH mode with subcutaneous injection of platelet-rich plasma for treatment of androgenetic alopecia in the early stages led to a significant and stable effect on hair regrowth in a short period of time. The observed effect of treatment is presumably due to local processes of improved microcirculation, neoangiogenesis and improved nourishment of the hair follicles and surrounding tissues. Treatment compliance is high due to its painlessness, efficiency, and the absence of adverse effects in the post-treatment period. The effectiveness of combined treatment with 2940-nm Er:YAG laser and PRP was also recently demonstrated in another study [10]. This type of AGA treatment may represent an alternative for patients with low sensitivity and/or contraindications to minoxidil or autologous hair transplantation.

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