

An Innovative Therapeutic Protocol for Vitiligo: Experience with the Use of Fraxel Herbium Laser, Topical Latanoprost and Successive Irradiation with UVA - 1 Laser

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Abstract

Despite the continuous introduction of innovative therapies for vitiligo, today none of them provide constant and excellent results in term of repigmentation. The authors report their experience in treating a localised form of vitiligo with a new protocol consisting in the use of a Fraxel Herbium laser, and in the following application of topical Latanoprost solution and, one day after, in lesional irradiation with UVA1 laser.

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Introduction

Vitiligo is an acquired, chronic, cutaneous disease, characterised by milky white macules and patches, due to the progressive loss of melanocytes from the epidermis and its appendages. Because the colour contrast between the pigmented skin and the cutaneous lesions, vitiligo is an important cause of psychological distress and reduction of the life quality index so that treating the disease is fundamental

[1][2]. Vitiligo treatment has two main goals: the first one is to halt the disease progression; the second one is to induce the lesions' repigmentation, achieving an acceptable cosmetic result. In the last years, several therapeutic options, both medical and surgical, have been proposed for vitiligo (Table 1) [1][3][5].

The aim of this multicenter study was to evaluate the efficacy and safety of an innovative combination treatment, based on the use of a Fraxel Herbium laser, the successive topical application of Latanoprost, and, finally, one day after, by the

irradiation with UVA - 1 laser.

Table 1: Main therapeutic options for vitiligo

MEDICAL THERAPIES	Topical and/or systemic corticosteroids Phototherapy: oral PUVA, topical PUVA, bath - PUVA, sol PUVA, nb - UVB, UVB - microphototherapy, UVA - 1 microphototherapy Excimer laser Topical calcineurin inhibitors Topical Vitamin D analogues Pseudocatalase Topical 5 - Fluoracil Topical prostaglandin E2 analogue Systemic antioxidants Low dose medicine Depigmentation therapy Camouflage
SURGICAL THERAPIES	Tissue grafting technique: suction blister grafting, split thickness grafting Miniature punch grafting Follicular unit grafting Smash grafting Cellular grafting techniques: non - cultured epidermal suspensions, melanocyte culture

Patients and Methods

We evaluated 30 subjects (19 female, 11 male), aged from 20 to 58 years (mean age: 34 years), who suffered from stable or active forms of localised vitiligo vulgaris for more than 18 months and less than five years (Table 2).

In the past six months, none of them had been treated for the cutaneous disease. After obtaining the informative consent, we decided to treat the patients with an innovative therapeutic protocol consisting of 3-phases sequential treatment of skin lesions.

Table 2: Distribution of the vitiliginous patches in our patients

Body part	Number of patients
Trunk	12
Face	9
Arms and legs	25

Initially, we treated the vitiliginous lesions with a single passage of Fraxel Erbium laser (Valseriana® Fraxel Erbium Laser), with a wavelength of 1540 nm and an energy level of 1800 mJ/P. Immediately after obtaining columnar areas of epidermal ablation, we applied Latanoprost 0.005% (Xalatan®) solution onto each skin lesion (1 drop every 2.5*2.5 cm² lesion).

The day after, we irradiated the skin lesions with a UVA1 laser (Laser Alba 355®, the wavelength of 355 nm) for 20 minutes. The treatment has been repeated every 21 days, for nine months (total session).

For all patients, digital photographs of the cutaneous lesions, with normal ambient light and Wood's lamp, have been obtained before the start and at each session, for all the treatment period. Response to the treatment was determined by assigning to each lesion a 0% score before therapy and a second percentage value at the end of the same lesion, to represent the level of repigmentation.

Results

At the end of the treatment, we evaluated the repigmentation rate achieved by every single patient treated with the innovative protocol.

Twenty-seven patients (90%) obtained a repigmentation rate higher than 75%, with a medium value of 88% (Figure 1). The other three patients (10%) achieved a marked improvement of the clinical findings with a repigmentation rate between 50-75%.



Figure 1: Progressive rapid repigmentation of Vitiligo patches after treatment with Laser Fraxel Erbium, local application of Latanoprost solution and UVA1 irradiation

We did not observe any difference in repigmentation for lesions with different localisation.

In any case, we did not observe side effects, apart for a transient inflammation (erythema and oedema) and itchy sensation in the treated area.

Discussion

In this study, we evaluated the treatment of 30 patient affected by a stable or active form of localised vitiligo with a new therapeutic protocol consisting of a 3 - phases sequential treatment of skin lesions.

At first, we used a Fraxel Erbium laser (Valseriana® Erbium laser) with a wavelength of 1540 nm and high energy level of 1800 mJ/P. We performed only one laser passage for each lesion to achieve micro-areas of epidermal ablation [6].

Immediately after the laser treatment, we applied Latanoprost 0.005% ocular solution (1

drop/2.5*2.5 cm² lesion).

Latanoprost solution is a prostaglandin F2 alpha (PGF2a) analogue, normally used in the treatment of glaucoma. Since the evidence of its periocular and iridal pigmentation side effects, Latanoprost has been evaluated for the treatment of cutaneous hypo-pigmentation, showing to be effective especially in combination with different therapies (e.g. phototherapy) [7][8].

The day after, we irradiated the skin lesions with a focused UVA1 laser with a wavelength of 355 nm and an energy level of 25 J/cm² (Laser Alba 355®) for 20 minutes.

As the classical UVA1 phototherapy devices, Laser Alba 355® acts both stimulating melanocytes and inhibiting the immune responses which lead to the formation of skin lesions. In detail, it has been shown that UVA - 1 can induce the apoptosis of T lymphocytes and to inhibit effector T- cells, through the direct inhibition of dendritic cells, and through the production of interleukin 10 (IL - 10) and the decrease of tumour necrosis factor-alpha (TNF - alpha) [9].

In contrast to the classical devices, Laser Alba 355® has the major advantages that, treating only skin lesions, it acts in a safer way reducing the side effects due to radiations and achieving better aesthetic results regarding less colour contrast between a vitiliginous and vitiliginous skin [9][10]. In our case, all patients treated with the innovative combination therapy achieved good results in term of repigmentation (repigmentation rate of 88%) without relevant side effects, apart from a transient inflammation and erythema.

In conclusion, the association of Fraxel Erbium laser, topical Latanoprost solution and focused UVA1 laser seems to provide good clinical results in term of repigmentation rate, without side effects.

All the patients were satisfied by the innovative protocol treatments, not only for the

achieved aesthetical results but also for its limited number of sessions.

References

1. Lotti T, Hautmann G, Hercogova J. Vitiligo: disease or symptom? From the confusion of the past to current doubts. In: Lotti T, Hercogova J, eds. Vitiligo. Problems and solutions. New York, NY, Basel: Marcel Dekker, Inc., 2004:1-14. PMID:15063608
2. Lotti T, Hanna D, Buggiani G, Urple M. The colour of the skin: psycho-anthropologic implications. *J Cosmet Dermatol.* 2005; 4(3):219-20. <https://doi.org/10.1111/j.1473-2165.2005.00316.x> PMID:17129270
3. Colucci R, Lotti T, Moretti S. Vitiligo: an update on current pharmacotherapy and future directions. *Expert Opin Pharmacother.* 2012; 13:1885-1899. <https://doi.org/10.1517/14656566.2012.712113> PMID:22835073
4. Wassef C, Lombardi A, Khokher S, Rao BK. Vitiligo surgical, laser, and alternative therapies: a review and case series. *J Drugs Dermatol.* 2013; 12(6):685-91. PMID:23839187
5. Lotti T, Hercogova J, Wollina U, Chokoeva AA, Zarrab Z, Gianfaldoni S, Rocca MG, Fioranelli M, Tchernev G. Vitiligo: successful combination treatment based on oral low dose cytokines and different topical treatments. *J Biol Regul Homeost Agents.* 2015; 29(Suppl 1):53-8. PMID:26016984
6. Yan R, Yuan J, Chen H, Li YH, Wu Y, Gao XH, Chen HD. Fractional Er: YAG laser is assisting topical betamethasone solution in combination with NB-UVB for resistant non-segmental vitiligo. *Lasers Med Sci.* 2017. <https://doi.org/10.1007/s10103-017-2282-y>
7. Anbar TS, El-Ammawi TS, Abdel-Rahman AT, Hanna MR. The effect of latanoprost on vitiligo: a preliminary comparative study. *Int J Dermatol.* 2015; 54(5):587-93. <https://doi.org/10.1111/ijd.12631> PMID:25545321
8. Korobko IV, Lomonosov KM. A pilot comparative study of topical latanoprost and tacrolimus in combination with narrow-band ultraviolet B phototherapy and microneedling for the treatment of nonsegmental vitiligo. *Dermatol Ther.* 2016; 29(6):437-441. <https://doi.org/10.1111/dth.12383> PMID:27329330
9. Lotti TM, Hercogova J, D'Erme AM et Al. UVA-1 in dermatology: clinical studies and observations. In UVA1 in dermatology. Evidence, data, hypotheses. Nuova Primos Publishing House Italy, 2013:74-160.
10. Babino G, Giunta A, Esposito M, Saraceno R, Pavlidis A, Del Duca E, Chimenti S, Nisticò SP. UVA1 Laser in the Treatment of Vitiligo. *Photomed Laser Surg.* 2016; 34(5):200-4. <https://doi.org/10.1089/pho.2015.4004> PMID:27070209