

## Laser Therapy for Vitiligo

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### Introduction

Vitiligo is a common, acquired pigmentary disorder, characterized by variable-sized depigmented patches, of unknown etiology affecting 1-2% of world population without any racial, geographic or sexual predilection. The course of disease is chronic, and often progressive [1].

The current treatment options for vitiligo are not really satisfactory to the patient population and the dermatologists [2].

The current paper aims to give an overview of the effectiveness of laser treatments alone or in combination with topical treatment in the management of vitiligo lesions.

At the moment the laser therapy consists of UVB at 308 nm and a UVB 311 nm narrow-band microphototherapy that are indicated for segmental and non-segmental vitiligo. UVA treatments represent a second line treatment in vitiligo even though new devices have been introduced in the market. Lastly authors report the results of recent studies for the use of other lasers in vitiligo therapy.

### UVB Laser Therapy and Phototherapy

UVB laser therapy and narrow band (nb)-UVB phototherapy are suggested for vitiligo lesions that involve more than 15-20% of the body area. UVB-laser therapy represents a therapeutic option also for lesions of smaller involvement that are actively spreading on the body.

UVB-laser therapy at the wavelength of 308 and 311 nm represents a targeted therapy in the treatment of vitiligo. It represents a therapeutic option for the treatment of vitiligo resistant to treatment, in alternation or in combination with topical treatment.

The choice of narrow-band UVB-laser therapy or localized or whole-body narrow-band UVB phototherapy depends on the extension and involvement of vitiligo and the devices available.

As also reported in recent guidelines [2] they represent the first choice for localized vitiligo in particular for small lesions of recent onset and childhood vitiligo.

The combination with topical steroid or topical calcineurin inhibitors improves the clinical outcome [3,4].

As reported by Lotti et al., 0.05% betamethasone dipropionate cream plus 311 nm narrow-band UVB microfocused phototherapy give higher repigmentation rate than monotherapy with 311 nm narrow-band UVB [5].

The use of targeted laser therapy has the advantage to avoid the patient aging and the risk of skin cancer associated with total body irradiation.

Furthermore, also the side effects of the treatment, as erythema and burning, are localized to a confined area.

### UVA Laser Therapy and Phototherapy

In the last decade, light therapy lamps with halogen-metal band confined to the very high irradiance UVA1 (340-400 nm) has experienced a growing interest and use in dermatology.

The immunomodulating effects of UVA1 are mainly mediated by aerobic photo-oxidation. The intermediate formation of reactive oxygen species induces the apoptosis of T lymphocytes [6].

The treatment with high-intensity UVA phototherapy plus Psoralene (PUVA), acts through stimulation of inactive melanocytes in the outer root sheath of hair follicles to proliferate, mature, and migrate to repopulate the interfollicular epidermis.

UVA phototherapy (320–400 nm) can be combined with oral (PUVA) or topical (TUVa) administration of psoralens photosensitizers. Topical psoralen lotions can be administered to patients suffering from vitiligo affecting less than 10% of the body. This lotion is applied on the interested area of the skin 15 to 30 minutes before the exposure to UVA rays.

It can be used as an alternative to PUVA in patients with hepatic dysfunction or gastric disturbances [3,6].

A more interesting combination is represented by the treatment with UVA phototherapy in association with medium potency topical corticosteroid. This combination treatment has been reported to be about three times more effective than either treatment alone, suggesting synergy between melanocyte stimulation and immunosuppressive effects.

Nowadays, oral PUVA is currently used in adult patients with generalized vitiligo as a second-line therapy. In fact, compared with nb-UVB it has the disadvantage of lower efficacy and higher short- and long-term risks [2]. As with NB-UVB,

12–24 months of continuous therapy may be necessary to acquire maximal repigmentation.

Recently, a new instrument, laser Alba 355°, has been commercialized. This instrument is based on a 1064 wavelength neodymium-doped yttrium orthovanadate (Nd:YVO4) laser optically pumped using a 808 nm infrared beam able to achieve a third harmonic 355 nm wave delivery. It administers energy in the UVA1 emitting wavelengths mainly around 355 nm [7,8].

Two studies have recently demonstrated the efficacy of 355 nm UVA1 laser therapy in psoriasis, but also other immune-mediated skin disorders, as atopic eczema, hand eczema, localized scleroderma, mycosis fungoides and vitiligo may benefit from its use [6-8].

Localized UVA-1 laser therapy has the advantage to treat only the involved area: preliminary experience supports its use also in vitiligo.

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## Other Laser Treatments

Fractional CO<sub>2</sub> laser is a new method that can be proposed in the management of vitiligo in selected patients who do not have received any evident benefit from previous treatments [2].

Either alone or in combination with other treatments, fractional CO<sub>2</sub> laser treatment has been reported to induce benefits in repigmentation of vitiliginous lesions.

The association of NB-UVB with fractional CO<sub>2</sub> laser has been reported to be effective in refractory areas as reported in a small randomized left–right comparative trial [9].

In widespread vitiligo, where repigmentation therapies are ineffective, depigmentation can also be obtained by using a Q-switched ruby laser, alone or in combination with methoxyphenol [2].

## References

1. Taïeb A, Picardo M (2009) Clinical practice. Vitiligo. *N Engl J Med* 360: 160-169.
2. Taieb A, Alomar A, Böhm M, Dell'anna ML, De Pase A, et al. (2013) Guidelines for the management of vitiligo: the European Dermatology Forum consensus. *Br J Dermatol* 168: 5-19.
3. Lotti T, Tripo L, Grazzini M, Krysenka A, Buggiani G, et al. (2009) Focused UV-B narrowband microphototherapy (Biopsorin). A new treatment for plaque psoriasis. *Dermatol Ther* 22: 383-385.
4. Hercogová J, Buggiani G, Prignano F, Lotti T (2007) A rational approach to the treatment of vitiligo and other hypomelanoses. *Dermatol Clin* 25: 383-392, ix.
5. Lotti T, Buggiani G, Troiano M, Assad GB, Delescluse J, et al. (2008) Targeted and combination treatments for vitiligo. Comparative evaluation of different current modalities in 458 subjects. *Dermatol Ther* 21 Suppl 1: S20-26.
6. Gambichler T, Terras S, Kreuter A (2013) Treatment regimens, protocols, dosage, and indications for UVA1 phototherapy: facts and controversies. *Clin Dermatol* 31: 438-454.
7. Nisticò SP, Saraceno R, Chiricozzi A, Giunta A, Di Stefani A, et al. (2013) UVA-1 laser in the treatment of palmoplantar pustular psoriasis. *Photomed Laser Surg* 31: 434-438.
8. Zerbinati N, Portale S, Palmieri B, Rottigni V, Iannitti T (2012) A preliminary study to assess the efficacy of a new UVA1 laser for treatment of psoriasis. *Photomed Laser Surg* 30: 610-614.
9. Tsukamoto K, Osada A, Kitamura R, Ohkouchi M, Shimada S, et al. (2002) Approaches to repigmentation of vitiligo skin: new treatment with ultrasonic abrasion, seed-grafting and psoralen plus ultraviolet A therapy. *Pigment Cell Res* 15: 331-334.