

# **Combination of 308-nm excimer light with topical for Daivobet ointment for vitiligo treatment**

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**[Abstract]** Objectives: To assess efficacy and safety of the 308-nm excimer light with topical Daivobet ointment for the treatment of vitiligo. Method: 70 patients with bilateral symmetrical lesions were randomly divided into two groups: group A: lesions received 308nm excimer light therapy two times weekly with the combination of Daivobet ointment twice daily; group B: lesion received 308nm excimer light therapy two times weekly only. The treatment was lasted 12 weeks and the efficacy was evaluated 3 days after the final treatment. Results: The efficiency rate of group A and group B is 84.8% and 65.2% respectively, the Significant efficiency rate of group A and group B is 50.0% and 25.8%. There is statistically difference between the two groups. Conclusion: The 308-nm excimer light is safe, effective and well-tolerated in treatment of stable vitiligo. Addition of topical Daivobet ointment for the lesion of trunk does significantly enhance its efficacy.

**Corresponding author:** Yang Huilan, female, Doctor of Medicine, professor treatment of stable vitiligo. Addition of topical Daivobet ointment for the lesion of trunk does significantly enhance its efficacy.

**【Key words】** excimer light; Vitiligo; Daivobet ointment

Vitiligo is a common disease due to multi-causal skin depigmentation, at a global morbidity of roughly 0.5%-2%<sup>[1]</sup> with an unknown pathogenesis. Clinically, it features reduction of skin melanocyte or deficiency of depigmentation. It relapses frequently making people look ugly and bringing a heavy psychological burden to patients. However, the various currently used therapies achieve an unideal effect, and therefore it is very important to find an effective therapy with stable effect. During April of 2011 to January of 2013, we have performed treatment on 70 cases of vitiligo

patient at stable stage with excimer light therapy with combination of Daivobet ointment, and come to the following result:

### **Data and Approach**

**Clinical data:** All the 70 patients are at stable stage and with bilateral symmetrical lesions received treatment at outpatient clinic or our hospital. Selection standard: clinically diagnosed as patients with vitiligo with no limitation of sex; agree to receive and abide by therapeutic schedule and sign consent for therapy; during the last 3 months, have not received corticosteroid hormone and UVB treatment. Exclusion criteria: (1) Segmental vitiligo; (2) skin lesion area is over 20% of body surface area; (3) Allergic with UV irradiation or contraindication in the past; (4) vitiligo at progressive stage; (5) patient with disease of liver and renal function. 70 patients are selected: 34 patients are male and 26 patients are female at average age of  $33.1 \pm 4.3$ , with an average course of disease for  $2.4 \pm 0.5$  years, 25 skin lesions at face and 32 lesions at body, an 13 lesions at palm.

## **2. Research Method**

**2.1 Light source:** GSD308nm excimer light therapeutic apparatus made by Shenzhen GSD Technology Co., Ltd. at wavelength of  $308 \text{ nm} \pm 2 \text{ nm}$ , frequency of 50/60Hz, facula area of  $18.9 \text{ cm}^2$  ( $6.1 \text{ cm} \times 3.1 \text{ cm}$ ) and laser type of Xecl excimer light.

**2.2 Minimal erythema dose measurement:** Before starting treatment, measure minimal erythema dose (MED) of each patient according to the operation mode provided by the apparatus, the selected part is abdomen. 24h later after irradiation, observe and make sure MED value of each patient.

**2.3 Therapeutic method:** Select two symmetrical or neighboring lesions from each patient, by using a self control research method randomly divide the two symmetrical or neighboring lesions into Group A and Group B. Group A: lesions received 308nm excimer light therapy two times weekly with the combination of Daivobet ointment twice daily for a course of treatment of 12 weeks. Group B: lesion received 308nm excimer light therapy two times weekly only for a course of treatment of 12 weeks. Initial dose of excimer light is determined based on MED with an interval of 72 hours between the twice treatments.

**2.4 Therapeutic effect evaluation:** According to the standard constituted by Pigment Disease Group of Specialty Committee of Dermatology: the therapeutic effects are divided into recovery, excellence, improvement and ineffectiveness. Recovery indicates all the vitiligo disappeared and normal skin color resumed. Excellence indicates vitiligo partially faded or reduced in size, and over 50% area of the skin lesion recovered to normal skin color; improvement indicates vitiligo partially faded or reduced in size; and ineffectiveness indicates no regeneration of area enlarged of the vitiligo. Effective rate = (Recovered patients + Excellent patients + Improved patients)/ total quantity of patients  $\times$  100%. Rate of excellence = (Recovered patients + Excellent patients) / total quantity of patients  $\times$  100%.

**2.5 Statistical analysis:** Data are processed with software in SPSS13.0 version. Check difference of therapeutic effective rate and efficiency of Group A and Group B by chi-square test,  $P < 0.05$  means statistical significance of difference.

### **3. Conclusion**

Therapeutic effect observation: After 12 week excimer light treatment, 2 patients stopped receiving the treatment due to relapse, 2 patients fell off during receiving treatment, and totally 66 patients received the whole course of treatment.

After 12 week excimer light treatment, Group A showed an effective rate of 84.8% and an efficiency of 50.0% including a facial effective rate and efficiency respectively of 91.7 and 58.3%, and a body effective rate and efficiency respectively of 90.3% and 54.8%, as well as a palm effective rate and efficiency respectively of 54.5% and 18.2%; Group B showed an effective rate of 65.2% and an efficiency of 25.8% including a facial effective rate and efficiency respectively of 75.7 and 35.3%, and a body effective rate and efficiency respectively of 67.7% and 25.8%, as well as a palm effective rate and efficiency respectively of 27.3% and 9.1%. The effective rate and efficiency of Group A and Group B quite differ from each other (Effective rate =  $\chi^2=6.828$ ,  $P=0.009$ ; Efficiency:  $\chi^2=8.242$ ,  $P=0.004$ ). Only the effective rate and efficiency of body lesion treated with combination treatment were remarkably higher than those only with treatment of excimer light (Effective rate =  $\chi^2=4.769$ ,  $P=0.029$ ; Efficiency:  $\chi^2=5.429$ ,  $P=0.020$ )

Table 1: Therapeutic effect comparison between Group A and Group B after 12 weeks of treatment with 308nm excimer light

Group	Location	Cases	Recovery	Excellence	Improvement	Ineffectiveness	Effective Rate	Efficiency
A	Face	24	6	8	8	2	91.7%	58.3%
	Body	31	8	9	11	3	90.3%	54.8%
	Palm	11	0	2	4	5	54.5%	18.2%
Total		66	14	19	23	10	84.8%	50.0%
<b>B</b>								
B	Face	24	3	5	10	6	75.0%	33.3%
	Body	31	3	5	13	10	67.7%	25.8%
	Palm	11	0	1	2	8	27.3%	9.1%
Total		66	6	11	26	23	65.2%	25.8%

## Discussion

At present, there are various therapies for treating vitiligo but with different therapeutic effect and they mainly include system or external use of glucocorticoid, immunosuppression agent, surgical operation and photochemotherapy. Traditional photochemotherapy mainly uses PUVA, UVB (290nm-320nm) or narrow-band UVB (311nm-313nm). Treating vitiligo with UVB is effective, but it features serious phototoxicity, long period of treatment, easily causing cataract and dermatome<sup>[3]</sup>. 308nm excimer light uses XeCl excimer light, which is an incoherent single frequency light source with a nearly 10 times of narrow-band in energy, and it may remarkably shorten the period of treatment but with less accumulation of UVB and featuring high safety<sup>[4]</sup>. Mechanism of 308nm excimer light curing vitiligo is not quite clear, and that may be similar with the mechanism of UVB mainly facilitating pigment recovery by immunosuppressant and immune regulation. In addition, the excimer light forces malpighian cell to release ET 1, and ET1 further affects migration, activation of

melanin cell and to generate melanin<sup>[5]</sup>. It is also reported that the excimer light can also stimulate non-pigmented cell around follicles pill to generate melanin. Leone et al. found during observation that after treatment with 308nm excimer for 3 moths, 89% patients showed over 50% color recovered; Shi Qiong and Li Qiang et al. used 308m, excimer light 1/day, and found after consecutive 20 times of irradiation that total effective rate of the treatment came to 95.83%, and an efficiency of 47.4; Cheng Aihua et al. reported that after treating for 30 times with 308nm excimer light as partner treatment for 2/week, the recovery rate came to 85.5%. All the experimental results is of certain comparison with the result observed for this time.

Daivobet ointment combines two incompatible ingredients including calcipotriol and betamethasone. Calcipotriol is an active metabolite 1, 25 (OH) 2D3 of vitamin D3, and it may increase output of melanin by stimulating activation and reproduction of melanin. The glucocorticoid restrains autoimmunity and controls disease development by its anti-inflammatory and immune regulatory function. However, long-term external use of strong glucocorticoid will cause atrophy, angiotelectasis to local skin and scars; combination of them two will have each of them play its own function benefiting s shortened course of disease, reduction of hormone dose, and thus will achieve a prevention of side effect and effect of curing vitiligo in a combined way. Li Qiang et al. used Daivobet and halometasone self control to treat symmetric lesion vitiligo. After 12 week treatment, the group of using Daivobet achieved an effect much better than the group of halometasone and with no side effect like atrophoderma and secondary infection found. For the result of this research, the effective rate and efficiency of combined treatment for body lesion is remarkably better than the treatment suing single excimer light, indicating that Daivobet can obviously improve therapeutic effect of body lesion. As for facial lesion, there is no remarkable difference between irritation with only 308nm excimer light and combination with Daivobet, indicating that irradiation with only 308nm excimer light for head and facial UVB sensitive part can achieve a better effect.

To sum up, 308nm excimer light is a safe, effective and convenient therapy with less side effects for vitiligo at stable stage, and combination with external use of Daivobet ointment will improve therapeutic effect for treating body lesions.

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