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Variable Pulsed Light (VPL™) reduces treatment-induced pain in patients undergoing photodynamic therapy for actinic keratoses

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Background: Photodynamic therapy (PDT) is a well documented and established treatment alternative for epithelial skin cancer like basal cell carcinoma and actinic keratoses (AK). PDT induces selective tissue necrosis that occurs upon illumination with red light; this is based upon the induction of reactive oxygen species upon activation of synthesized porphyrins. Unfortunately, free nerve endings are co-stimulated during this process thus inducing pain which sometimes leads to treatment interruption. The purpose of this study was to investigate a modification of the illumination process using a variable pulse light source (VPL™, Energist Ultra, Energist, U.K.) with spectral characteristics matching the absorption spectrum of the photosensitizer.

Method: A randomized parallel-group trial was conducted. A total of 25 patients (8 f, 17 m, mean age 73 yrs) were included suffering from actinic keratoses (AK) on the skin and the scalp. Methyl aminolevulinate (MAL, Metvix, Galderma, France) was applied on the targeted area for 3 hrs. Subsequently one side received an illumination with a LED light source (37 J/cm², duration 12 min), and the contra lateral side received 80 J/cm² (double pulsed @ 40J/cm²) with VPL™, with a pulse train of 15 impulses each with duration of 5 ms utilising a 610-950nm filtered handpiece. Therapeutic outcome was evaluated using a lesion score after 2 weeks and 3 months; pain assessment was made after each treatment side with the use of a visual analogue scale (VAS).

Results: At beginning of the treatment patients showed an overall of 238 AK on face and scalp. After two weeks and three months, there was no significant difference between the therapeutic outcomes using the different illumination systems. However, pain assessment immediately after PDT revealed a significant lower pain level (4.3 vs. 6.4) for the VPL™ treated side.

Conclusions: The use of short pulsed light (variable pulsed light) is thus an efficient and useful alternative in the photodynamic treatment of AK where otherwise pain development can be a limiting factor for the performance of PDT.

