

# Treatment of mature port wine stains with the PhotoDerm VL

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Port wine stains (PWS) are congenital vascular naevi. Their presence is the cause of significant psychological morbidity due to their cosmetic appearance. The flashlamp-pumped dye laser (FPDL) is considered to be the treatment of choice for PWS. However, there is a recognized morbidity related to the use of the FPDL. The PhotoDerm VL is a broad spectrum, non-coherent, intense pulsed light source which has been shown to be an effective tool in the treatment of a number of vascular lesions including PWS.

Our strategy was to assess the effectiveness of the PhotoDerm VL in the treatment of mature PWS in three fair skinned subjects. Three patients with mature PWS were recruited. They were treated at 6-weekly intervals with the PhotoDerm VL machine using predeter-

mined parameters and assessed at each visit prior to treatment.

In all three patients there was at least a 50% improvement in the clinical appearance of the lesions as assessed by both operator and patient. No complications were reported. Further treatments in two patients, however, failed to produce any further clinical improvement.

We conclude that the PhotoDerm VL appears to be a promising treatment for PWS with no post-operative complications. However, a comparative study with the FPDL needs to be undertaken to determine the most effective therapy option for patients with this disfiguring cutaneous lesion.

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## Introduction

Port wine stains are congenital vascular malformations characterized by the presence of ectatic, superficial, dilated capillaries with a reported incidence of between 0.1% and 2%.<sup>1,2</sup> Acquired forms, although rare, have been documented in the literature as frequently occurring after direct or indirect trauma.<sup>3</sup> Typically, lesions are present over the face although virtually all body sites have been reported. Lesions initially start as erythematous macular lesions which progressively darken with age. Over the face they may undergo hypertrophy to give a cobblestone appearance. They may be associated with other vascular or lymphatic abnormalities which may

involve the meninges giving rise to the Sturge Weber syndrome.<sup>4</sup>

Port wine stains (PWS) may occasionally fade over the years, particularly those over the limbs.<sup>5</sup> However, their presence is a source of psychological morbidity.<sup>6,7</sup> The flashlamp-pumped dye laser (FPDL) with a wavelength of 585 nm is considered to be the treatment of choice for PWS by producing selective vascular damage to ectatic blood vessels. Although there have been a few reports of scarring post-treatment, both atrophic and hypertrophic, this is not frequently seen.<sup>8,9</sup> However, a major cause of morbidity post-treatment is the marked bruising, which in one study resulted in 43% of patients reporting a severe restriction in their lifestyle for up to 14 days post-treatment.<sup>10</sup> This, coupled to the multiple treatments required, sometimes lasting for over a year, has meant that for some patients the treatment is unacceptable.

## Original Research

Case (age/sex)	Location	Filter (nm)	Average energy (J/cm <sup>2</sup> )	Pulse width (ms)	Pulse duration (ms)	No. of treatments (50% clearance)
1 (25/F) (Figures 2 and 3)	Arm	515	25	2.4–2.6	10	3
2 (18/F) (Figures 4–6)	Face	515	29	2.6–2.8	10	2
3 (54/M)	Face	515	30	2.6–2.7	11	3

**Table 1**

A summary of parameters used and results obtained in our three patients with PWS.



**Figure 1**

The hand held PhotoDerm VL device.

The PhotoDerm VL (ESC Medical Systems, Ltd, Haifa, Israel) is a non-coherent light source that is said to treat vascular ectasia by selective photothermolysis. It emits a broad band of light with wavelengths between 515 nm and 1200 nm through a hand-held rectangular footprint (2.8 cm<sup>2</sup>). The wavelength of light may be controlled using a series of 'cut-off' filters which block wavelengths shorter than those designated by the filter – thereby allowing a degree of selectivity towards the target chromophore's peak



**Figure 2**

Mature port wine stain in case 1.

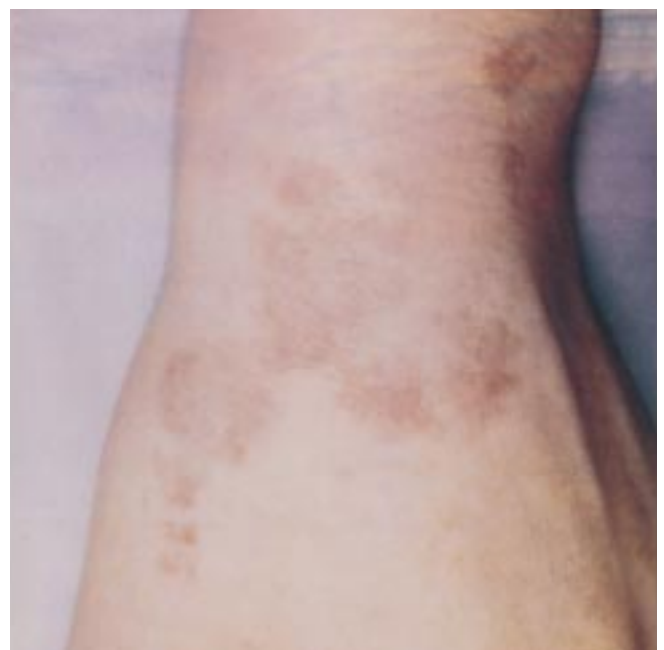
absorption. We report our experience of treating three patients with mature PWS using the PhotoDerm VL.

### Patients and methods

Three caucasian patients (two females, one male; mean age 40) with mature PWS were recruited to the study. In two cases (cases 2 and 3), lesions were located over the face and in one (case 1) the PWS was over the upper limb. All lesions were macular at presentation and had been present since birth. No patient had received any form of treatment to date.

The study had received ethics approval. Informed consent was obtained from all patients prior to commencing treatment.

A small area was tested initially to assess patient tolerability and clinical response using predetermined parameters suggested by the machine. In all cases a 'cut-off' filter of 515 nm was used because the target chromophore was oxyhaemoglobin with an absorption



**Figure 3**

A significant clinical improvement (>50% clearance after 3 treatments).



**Figure 4**  
Mature port wine stain in case 2.

peak at 577 nm. Protective glasses were worn by both operator and patient during the procedure. A cool gel was placed over the lesion to be treated and the device was then placed over this gel (not in direct contact with the skin) and fired (Figure 1). Care was taken to avoid overlapping treated areas. Immediately following treatment patients were given an ice pack to place over the treated area to limit any burning sensation encountered and to reduce erythema.

Patients were reviewed at 6-weekly intervals and the parameters adjusted according to clinical response.

## Results

A summary of results is shown in Table 1.

In all three cases minimal discomfort was experienced during treatment and was described by one patient as akin to hot fat spitting onto the skin. None of our patients requested any form of anaesthesia during the treatments or required pain relief after therapy. Besides mild, immediate post-treatment erythema there were no adverse events. All three patients described a degree of bruising to the treated skin 1–3 days post-treatment which lasted around 7 days, but none of the cases was inconvenienced by this in any way.

Our results show that after a median of three treatments all our cases were felt to show at least a 50% improvement in the clinical appearance of their lesions as determined by both patient and operator. In two cases (cases 1 and 2) a further treatment resulted in no appreciable further clinical improvement or adverse event.

## Discussion

We have described three patients with mature PWS who were treated with the intense pulsed light source,



**Figure 5**  
Purpura present over the treated area 2 days after treatment, this resolved within 36 hours.

PhotoDerm VL. All three cases showed a clinical improvement in the appearance of their lesions with very minimal side effects. In addition, the large spot size (2.8 cm<sup>2</sup>) meant that a larger area could be treated per shot thereby limiting patient discomfort. None of our cases complained about appreciable pain during the treatment or about any complications post-treatment other than mild purpura.

The PhotoDerm VL has been advocated as a therapeutic tool for a large number of lesions because of its non-coherent light with a broad spectrum and the ability for the operator to adjust the parameters. There have been few studies in the literature assessing this tool. Raulin et al<sup>11</sup> found it to be an excellent device for the management of essential telangiectasias; however, Green<sup>12</sup> found the PhotoDerm VL to have a low success rate with a high rate of adverse effects in the treatment of telangiectasias of the lower extremities. The use of the PhotoDerm VL in the



**Figure 6**  
Excellent clinical response after second treatment.

## Original Research

treatment of a PWS that failed to respond to the FPDJ has been reported, with complete resolution noted after four treatments and no complications.<sup>13</sup> Why resolution of the PWS with the PhotoDerm VL but not with the FPDJ occurred remains uncertain, but one possibility is that the larger spot size results in less scattering of light with deeper penetration thereby enabling the treatment of deeper ectatic vessels not readily amenable to the FPDJ. A more recent study has shown a similar excellent response of mature PWS to the PhotoDerm VL.<sup>14</sup> Katugampola et al<sup>15</sup> showed in their study looking at 5 years of experience with the FPDJ in the treatment of PWS that outcome was unpredictable and was not influenced by the colour of the lesion. They emphasized the need for an accurate and non-

invasive method to predict outcome in patients and reported that 38% of their patients had achieved an excellent lightening of their PWS (at least 75%) after a median of eight treatments.

In summary, the PhotoDerm VL appears to be an effective alternative to the FPDJ in the treatment of PWS, as highlighted by our three cases, with minimal pain during the procedure and no adverse events post-treatment. However, in view of the conflicting studies on its effectiveness on other vascular lesions we feel that a comparative study with the FPDJ using larger patient numbers would be of immense benefit to clinicians so that optimum patient treatment may be offered for this disfiguring condition.

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