Use of three-dimensional digital image analysis for objective evaluation of the efficacy of port-wine stain treatment with large spot 532 nm laser

Abstract

**Introduction**: Capillary malformations are congenital skin lesions that affect approximately 1 to 300 newborns. They are related to segmental mosaicism, and they can occur in all body regions following the patterns of vascular embryogenesis. The most common type of capillary malformations is 'Port Wine Stain'.

**Aim**: To assess the efficacy of large spot 532 nm lasers for the treatment of 'Port Wine Stain' with the use of 3D image analysis.

**Material and methods**: Forty-three Caucasian patients aged 6 to 59 were included in this study. Patients had 3D photography performed before and after treatment with a 532 nm Nd:YAG laser with large spot and contact cooling. An objective analysis of percentage improvement based on a 3D digital assessment of combined colour and area improvement (global clearance effect [GCE]) were performed.

**Results**: The median maximal improvement achieved during the treatment (GCEmax) was 42.4%. Improvement of minimum 25% (GCE25) was achieved by 70.3% of patients, a minimum of 50% (GCE50) by 39.0%, a minimum of 75% (GCE75) by 6.3%.  
Moreover, the first two laser procedures had a median maximal improvement of 25.4% (GCE25.4), while the first five had 31.3% improvement (GCE31.3) and the first ten had 38.1% improvement (GCE38.1). Furthermore, the analysis found a correlation between time passed between procedures and efficacy of treatment.

**Conclusions**: Both objective and subjective analysis indicates that large spot 532 nm laser is highly effective in treatment of neck and trunk. The analysis indicates the first two laser procedures have higher efficacy. The established correlation between the time group and the efficacy of the treatment could be explained by the exacerbating of PWS over time.

**Keywords**: port-wine stain, KTP, pulse dye laser, 3D, laser.