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**QUANTITATIVE ANALYSIS OF ERYTHEMA
RESPONSE TO LASER PORT WINE STAIN
THERAPY USING IMAGING MODALITY**

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Background and Objective: Methods to assess port wine stain (PWS) response to laser therapy are needed to improve therapeutic outcome. In this study, erythema distribution in PWS skin was analyzed with erythema index difference ($\Delta E.I.$) images to investigate systematically patient-dependent erythema response to laser therapy.

Study Design/Materials and Methods: Cross-polarized digital color images were acquired from 17 facial PWS subjects and associated $\Delta E.I.$ images computed. Qualitative and quantitative analysis of the erythema distribution was performed with $\Delta E.I.$ images as a function of degree of erythema defined with $\Delta E.I.$ values, in which $\Delta E.I.$ ranges of 40–6 and 5–0 represent the erythema ranges of PWS and normal skin, respectively.

Results: all subjects after laser therapy were noted to have a disappearance of higher degree of erythema distribution, resulting in a downgrading erythema distribution to the next lower level. Lower degree of erythema distribution resulted in reformation and complete disappearance of erythema. In PWS skin erythema range, higher and lower degree of erythema distribution was quantitatively reduced and increased in area size after laser therapy, respectively. In normal skin erythema range, erythema distribution increased in area size after laser therapy.

Conclusions: The imaging modality and image analysis method allowed systematic analysis of erythema distribution for investigation of patient-dependent erythema response to the laser PWS therapy. Laser PWS therapy was influenced by degree of erythema, presenting that erythema distribution can be utilized as an effective treatment responding factor to the laser PWS therapy.