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PHOTOTHERMAL TOMOGRAPHY FOR PORT WINE STAIN BLOOD VESSEL PROFILING: EVALUATION OF CLINICAL MEASUREMENTS**Bernard Choi,¹ Boris Majaron,^{1,2} Byungjo Jung,¹ Kristen M. Kelly,¹ Jun Zhang,¹ Zhongping Chen,¹ and J. Stuart Nelson¹**¹*Beckman Laser Institute, University of California, Irvine, CA*²*Jòef Stefan Institute, Ljubljana, Slovenia*

Background and Objective: Previous *in vivo* studies have demonstrated the ability of photothermal tomography (PTT) to image the cutaneous microvasculature. In this study, we report on an ongoing longitudinal study utilizing PTT for noninvasive imaging of PWS birthmarks in human subjects. A secondary goal is to compare PTT measurements with optical Doppler tomography (ODT) of PWS sites.

Study Design/Materials and Methods: PTT measurements were taken from select sites on PWS patients. Diagnostic light doses from a pulsed-dye laser at 585 and 600 nm were used on each site. An infrared focal plane array system, with a detection band set at 4.5–5 μm , was used to obtain high-speed infrared image sequences. A dual-wavelength-excitation-based inversion algorithm was applied to the acquired data to obtain 1-D and 3-D profiles of the PWS microvasculature.

Results: In the study to date, measurements have been acquired from six subjects. PTT results from each site revealed a complex network of superficial blood vessels. Currently, we are investigating the validity of several interpretations of the reconstructions. With one criterion, the effective initial depth of the PWS lesion was estimated to be on average $\sim 100 \mu\text{m}$, indicating superficial PWS lesions.

Preliminary Conclusion: PTT is apparently capable of imaging noninvasively the microvasculature of PWS birthmarks. Further systematic studies are required to evaluate fully the capabilities and limitations of PTT for use as a diagnostic tool in clinical management of PWS directed towards optimizing therapy on an individual patient basis.