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Confocal laser-scanning capillaroscopy: a novel approach to the analysis of skin capillaries in vivo.

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ABSTRACT

BACKGROUND: New techniques for diagnostics and therapy in dermatology are becoming increasingly non-invasive, among which confocal laser-scanning microscopy (CLSM) is the most prevalent. It allows visualization of cellular structures of the skin up to a depth of 300 microm in vivo. Until now, most studies have been conducted on pathologically altered skin, mostly oncologic lesions. We now present a detailed analysis of capillaries located in the upper dermal papillae.

METHODS: Multiple measurements were performed on the dorsal and ventral surface of the right forearm of 30 healthy volunteers (22-88 years) under standard conditions (room temperature, body position, time of day). Images were obtained with the VivaScope 1500 (Lucid) under standard settings and analyzed using the freeware ImageJ with a customwritten macro plugin. The following parameters of the capillaries in vivo were measured: area, perimeter, circularity and maximum diameter.

RESULTS: Statistical analysis showed that all four parameters were constant within a narrow range, regardless of the body site, sex and age. In this physiological study, we can clearly demonstrate that by confocal laser-scanning capillaroscopy (CLSC), it is possible to visualize and measure skin capillaries at the extremities in a reproducible manner.

CONCLUSION: This new approach offers a considerable advantage compared with nailfold capillaroscopy, which can only be performed at the proximal nail segment, and over histological analysis, which can be hampered by fixation artifacts resulting in altered size and shape of the vessels to be analyzed. CLSC could allow for precise analysis of in vivo skin vasculature in systemic and proliferative diseases of the skin.