31. Noninvasive topographical investigation of functional parameters in the human skin

Kessler, Manfred; Krug, Alfons; Hoeper, J.; AA(Univ. Erlangen-Nuernberg)
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Abstract:
A rapid micro-lightguide spectrometer (EMPHO II) coupled to an automatic three axis positioning system enables very precise and fast 2D-scans at the surface of human skin. The positioning accuracy amounts to 1 micrometer. This allows measurements with excellent spatial reproducibility. With this system examinations of local distribution of HbO2 and Hb have been performed in human skin. For this purpose at the back of the hand areas of 5 by 5 mm to 5 by 10 mm were scanned in defined steps of 100 micrometers. Functional images of local hemoglobin concentration and
hemoglobin oxygenation of microscopical structures have been resolved by use of 250 micrometer lightguide sensors. Two-dimensional-images of local oxygen supply parameters corresponding directly to morphological structures of human skin have been gained. The local pattern matches the distribution of the papillas of the corium. In the papillas the capillary loops supplying the lower part of the epidermis are situated. The measured parameters describe very exactly the local oxygen supply situation of the area under investigation.