A new laser Doppler flowmeter prototype for depth dependent monitoring of skin microcirculation

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Résumé en anglais	Laser Doppler flowmetry (LDF) is now commonly used in clinical research to monitor microvascular blood flow. However, the dependence of the LDF signal on the microvascular architecture is still unknown. That is why we propose a new laser Doppler flowmeter for depth dependent monitoring of skin microvascular perfusion. This new laser Doppler flowmeter combines for the first time, in a device, several wavelengths and different spaced detection optical fibres. The calibration of the new apparatus is herein presented together with in vivo validation. Two in vivo validation tests are performed. In the first test, signals collected in the ventral side of the forearm are analyzed; in the second test, signals collected in the ventral side of the forearm are compared with signals collected in the hand palm. There are good indicators that show that different wavelengths and fibre distances probe different skin perfusion layers. However, multiple scattering may affect the results, namely the ones obtained with the larger fibre distance. To clearly understand the wavelength effect in LDF measurements, other tests have to be performed.
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