

Accurate measurement of the pulse wave delay with imaging photoplethysmography

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Abstract

© 2016 Optical Society of America. Assessment of the cardiovascular parameters using noncontact video-based or imaging photoplethysmography (IPPG) is usually considered as inaccurate because of strong influence of motion artefacts. To optimize this technique we performed a simultaneous recording of electrocardiogram and video frames of the face for 36 healthy volunteers. We found that signal disturbances originate mainly from the stochastically enhanced dichroic notch caused by endogenous cardiovascular mechanisms, with smaller contribution of the motion artefacts. Our properly designed algorithm allowed us to increase accuracy of the pulse-transit-time measurement and visualize propagation of the pulse wave in the facial region. Thus, the accurate measurement of the pulse wave parameters with this technique suggests a sensitive approach to assess local regulation of microcirculation in various physiological and pathological states.

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Keywords

Biological sensing and sensors, Medical and biological imaging, Noise in imaging systems