



Laser speckle contrast imaging: Multifractal analysis of data recorded in healthy subjects

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Résumé en anglais	<p>Purpose: The monitoring of microvascular blood flow can now be performed with laser specklecontrastimaging (LSCI), a new noninvasive laser-based technique. LSCI images have good spatial and temporal resolutions. Nevertheless, from now, few processing of these data have been performed to have a better knowledge on their properties. We herein propose a multifractal analysis of LSCI data recorded in the forearm of healthy subjects, based on the method from Halsey et al., one of the popular methods using the box-counting technique. Methods: In laser specklecontrastimage time sequences, we studied time evolution of pixel values, as well as time evolution of pixel values averaged in regions of interest (ROI) of different sizes. The results are compared with the ones obtained with single-point laser Doppler flowmetry (LDF) signals recorded simultaneously to LSCI images. Results: Our work shows that, for the range of scales studied and with the method from Halsey et al., time evolution of pixel values present narrow multifractal spectra, reminding the ones of monofractal data. However, we observe that when LSCI pixel values are averaged in ROI large enough and followed with time, the multifractal spectra become larger and closer to the ones of LDF signals. Conclusions: Single pixels from laser specklecontrastimages may not possess the same multifractal properties as LDF signals. These findings could now be compared with the ones obtained with other ranges of scales and with data recorded from pathological subjects.</p>
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