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Publisher's version / Version de l'éditeur:

BIOS 2011: Diagnostics and Therapeutic Applications of Light in Cardiology [Proceedings], 2011-01-23

Improved phantoms of coronary arteries for optical coherence tomography

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250 mots :

We report significant improvements to a previously reported method to fabricate coronary artery phantoms for Optical Coherence Tomography (OCT). The method consists in the deposition of multiple layers on a rotating tubular structure. Each layer replicates the optical properties of the corresponding layer measured from a porcine coronary artery, and has elasticity similar to arteries for low deformations. The method also allows including various features in the phantoms to represent arteries affected by atherosclerosis. We have previously presented phantoms with inclusions that have the distinct optical signature of intima thickening, calcification and lipid pool in OCT images.

The improvements presented in the current paper include: more representative optical properties, phantoms with more realistic calcified and lipid plaques, and phantoms simulating more complex diseased structures.

First, we will present results of the characterization of a larger number of arteries, that lead to phantoms that are more representative of the average optical properties found in arteries. Second, we will present improvements to our method to fabricate phantoms that have hard calcifications and liquid lipid pools with shapes that are more similar to those found in clinical situations. Third, we will present phantoms of arteries affected by other conditions such as Thin Cap Fibro-Atheroma, restenosis after stenting, etc.

100 mots :

We report significant improvement to a previously reported method to fabricate coronary artery phantoms for Optical Coherence Tomography (OCT). The method consists in the deposition of multiple layers on a rotating tubular structure. The method allows including various features in the phantoms to represent arteries affected by atherosclerosis.

Our method now includes: more representative optical properties obtained from a larger number of measurements performed on arteries, phantoms with calcified and lipid plaques more similar to what is found in clinical situations, and phantoms simulating more complex diseased structures like the thin-cap-fibro-atheroma and restenosis after stenting.