# Fully Automated Gating of Optical Coherence Tomography Data

K Sihan, C Botha, F Post, S de Winter, E Regar, PJWC Serruys, R Hamers, N Bruining

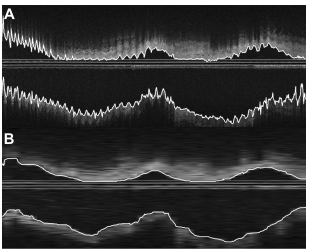
Erasmus MC, Rotterdam, the Netherlands

**Objectives and background:** images acquired of coronary vessels during a pullback of time-domain optical coherence tomography (OCT) are influenced by the dynamics of the heart. This study explores the feasibility of applying an in-house developed retrospective image-based gating method for OCT and the influence of catheter dislocation and luminal changes during the cardiac cycle on the outcome of quantitative OCT (QOCT).

**Methods:** The gating method was developed using Matlab (The Mathworks, Natick, MA, USA) and operates fully-automatic. OCT image data of 20 randomly selected patients, acquired with a commercially available system (Lightlab imaging, Westford, MA, USA), were pulled from our OCT database for development and validation.

**Results:** Twelve of the 20 datasets could be gated (an example is presented in the figure); the other 8 pullbacks could not be gated due to a lack of motion induced artefacts. Computations required approximately 30 minutes/dataset. Quantitative comparisons between the gated and the non-gated QOCT results showed significant differences for mean areas and volumes ($p < 0.001$) and mean relative differences of -11% (range -2 up to -20%) for lumen areas (gated) and -13% (range -5 up to -24%) for volumes.

**Conclusion:** Retrospective image-based time-domain OCT gating in the presence of motion induced artefacts is feasible. Significant changes in coronary lumen dimensions during the cardiac cycle were observed by OCT and in consequence, quantitative gated OCT analysis showed significant differences compared to non-gated QOCT analyses.




Panel A shows a non-gated data-set and panel B shows a gated data-set.