

HEART/THORAX FOR CARDIAC SPECT/PET AND MAMMOSCINTIGRAPHY

Applications of Anthropomorphic Phantoms*



Disassembled Phantom

- Receptor Quantification as a Function of Uptake Ratio(s)
- Partial Volume Effects
- Scatter and Attenuation - Correction Schemes
- Threshold for Changes in Uptake(s)
- Comparison of Different Acquisition Modes, e.g. 2D vs. 3D Pet(s)
- Design of Different Reconstruction Strategies
- Testing and Validation of Image Registration Techniques
- Design of Imaging Protocol for Patients

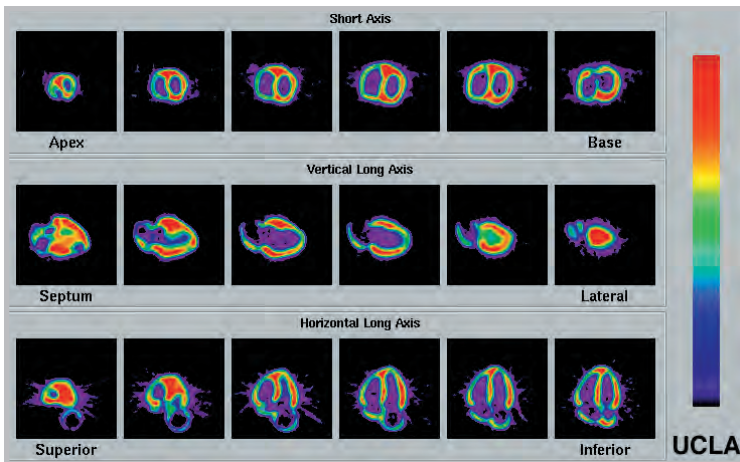
Myocardial perfusion SPECT is a widely-used, non-invasive method for the diagnosis and management of patients with coronary disease. However, non-uniform photon attenuation, Compton scatter, limited and depth-dependent spatial resolution, as well as image noise, limit the ability of SPECT to obtain images that reliably represent the true tracer distribution. The non-uniform attenuation of the thorax is the most significant factor limiting the diagnostic efficacy of myocardial SPECT.

The currently used attenuation, scatter and resolution correction methods are suboptimal, since they do not provide improvement in the 25% false-negative findings in a group of about 100 patients with luminal diameter stenoses of at least 50%(1). Furthermore, the ability to detect multivessel disease was 70% without and 47% with corrections. This finding implies that myocardial SPECT can seriously underestimate the extent

of disease in high-risk patients. On the other hand, the false-positive findings in the group with a low probability of coronary disease were reduced from 14% without corrections to 3% with corrections.

Obviously, further improvements in both hardware and software for myocardial SPECT are necessary before this important diagnostic technique can realize its full potential. These improvements must be carefully evaluated on realistic, anthropomorphic phantoms to improve results in clinical practice.

*Applicable to both Heart/Thorax(h) and Striatal(s) Phantoms unless otherwise indicated.



MODEL NUMBERS

Catalog Nos.	Description
RS-800T	Heart/Thorax Phantom (Includes all items listed below)
RS-801	Thoracic Cavity with bottom plate
RS-803	Perfusable Lungs (Pair)
RS-804	Heart (With two hollow defects in myocardial wall. Standard sizes or to customer specifications).
RS-805	Liver shell
RS-806	Chest overlay
RS-807	Removeable Breast with set of 5 tumors
RS-809	Set of 10 threaded nylon tumor support rods
RS-810	Set of 5 fillable markers
RS-811	Tumor only, with rods sizes – 3, 6, 9, 12 and 15m

PET images of the Heart Phantom filled with 0.5 mCi of F-18 FDG placed in the Thorax Phantom were acquired on a Siemens/CTI ECAT EXACT HR+ PET system in 3-D mode (septa out) at the University of California at Los Angeles (UCLA), by courtesy of Magnus Dahlbom, PhD. The emission scan contained 25M counts and were reconstructed using a Hanning filter, resulting in a final image resolution of approximately 5.5 mm FWHM. The data were corrected for scatter and attenuation prior to reconstruction.