



Applications

Image quality evaluation

Image registration quality assurance

Quantification of striatal uptake

SUV calculation and validation



Modalities

SPECT/PET

IMAGE QUALITY EVALUATION & ASSURANCE WITH QUANTIFICATION OF STRIATAL UPTAKE

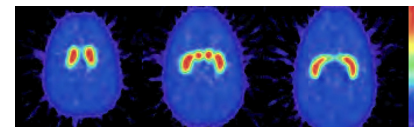
The Striatal Phantom optimizes quantitative imaging in patients, using PET or SPECT. This phantom is based upon a standard RSD head with a calvarial cut to insert or remove the brain shell easily. The nasal cavity and maxillary sinuses are filled with foam with a mass density of 0.23 g/cc.

The brain shell has five compartments which can be filled separately: left and right nucleus caudate, left and right putamen, and the remainder of the brain. This allows different nucleus caudate to putamen ratios as well as different striatal to background ratios to be obtained; this also permits differences between left and right striatal activity to be examined. The volume of the brain shell is about 1,260 ml. The volumes of the nucleus caudate and putamen are 5.4 ml and 6.0 ml respectively.

Fillable External Markers: A set of fillable capsules is provided to serve as external markers. Capsules can be filled with a radioactive solution and attached to the external surface of the phantom. The phantom can then be imaged, using SPECT or PET modalities to compare image-registration techniques.

Quantification of striatal uptake is not straightforward because it depends on a number of factors including type of radionuclide used (Tc-99m, I-123 or F-18), imaging factors (such as collimator type, amount of scatter and attenuation), and image processing parameters (such as scatter and attenuation-correction techniques, type of reconstruction filter, slice thickness, region-of-interest size and its location).

In normal subjects, the putamen and head of the nucleus caudate are small structures with typical dimensions of 7-15 mm in the axial plane (that is comparable to the system resolution). Since partial volume effects are more important for objects with dimensions less than twice the system resolution, the selection of imaging and reconstruction parameters is critically important in calculating the striatal-to-occipital ratio used to measure the relative striatal uptake in the brain.



Specifications

Packing Size	Packing Weight
36W x 36D x 36H cm	5 kg
14W x 14D x 14H in	12 lb.

Model Numbers

Model No.	Product Description
RS-900	Head without Brain Shell
RS-900T	Head with Transparent Brain Shell containing Striatum
RS-901T	Transparent Brain Shell with Striatum

Publication References: 1) Willowson K, Bailey D, Schembri G, Baldock C. CT-based quantitative SPECT for the radionuclide ²⁰¹Tl: experimental validation and a standardized uptake value for brain tumour patients. Cancer Imaging. 2012;12(1):31-40. DOI: <https://doi.org/10.1102/1470-7330.2012.0005>. 2) Koch W, Radau PE, Münzing W, Tatsch K. Cross-camera comparison of SPECT measurements of a 3-D anthropomorphic basal ganglia phantom. Eur J Nucl Med Mol Imaging. 2006 Apr;33(4):495-502. DOI: <https://doi.org/10.1007/s00259-005-0036-8>. Epub 2006 Jan 25. PMID: 16435116.