

DaTscan™ (Ioflupane I 123 Injection) Imaging Quick Guide

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Before administering DaTscan, please read the Full Prescribing Information provide with this Guide or available online at [DaTscan Full Prescribing Information](#)

Indication for DaTscan (Ioflupane I 123 Injection):

- DaTscan is a radioactive diagnostic agent indicated as an adjunct to other diagnostic evaluations for striatal dopamine transporter visualization using single photon emission computed tomography (SPECT) brain imaging in adult patients with Suspected Parkinsonian syndromes (PS) or Suspected Dementia with Lewy bodies (DLB). (see [Full Prescribing Information](#))

Contraindications:

- DaTscan is contraindicated in patients with known serious hypersensitivity to Ioflupane I123

Scheduling considerations:

- Ask the patient if they:
 - are pregnant or breastfeeding
 - are sensitive to DaTscan, Potassium Iodide Oral solution, or Lugol's Solution
 - have severe renal impairment
 - are claustrophobic
 - are able to lay still for 30-40 mins
- Review patient's list of current medications

Patient preparation:

- No Diet Restrictions
- Encourage patient to hydrate prior to and following the administration of DaTscan

Striatal uptake of DaTscan (Ioflupane):

- Occurs at the presynaptic dopamine transporter (DaT)
- Drugs that bind to the presynaptic DaT with high affinity may interfere with uptake of DaTscan and impact the interpretation of the resulting images [1-2]

The data below is compiled from approved labeling and published literature and provided for your consideration when evaluating how to manage concomitant medications prior to administration of DaTscan [1-2].

For additional information, please email Medical.Affairs@ge.com or phone 800-654-0118 (option 2 then option 3).

Medications with the potential to interfere with uptake of DaTscan:

Medications that bind with high affinity to the dopamine transporter have the potential to interfere with uptake of DaTscan. The table below contains classes of medications for which evidence exists to support potential interference of uptake. There may be additional interfering medications not included in the table.

Medications/drugs that may interfere with DaT binding	Range of withholding times (5 half-lives) ^{*1-4}
Ephedrine, ketamine, isoflurane, codeine, phencyclidine	1 day
Cocaine, methylphenidate	1-2 days
Phentermine	1-5 days
Amphetamine, dexamphetamine, methamphetamine, methylphenidate, dexamethylphenidate	1-7 days
Fentanyl	2-5 days
Mazindol, modafinil, armodafinil	3 days
Haloperidol	5 days
Bupropion	5-8 days

*The decision to withhold medication prior to performing DaTscan should only be made by a physician familiar with the patient's clinical history and should take into account the relative risks and benefits to the patient of doing so. Withholding times provided are estimated ranges for drug classes based on published literature. To calculate precise withholding times, consult the FDA's Full Prescribing Information of the exact medication and formulation taken by the patient, and calculate 5 half-lives from the elimination half-life provided in the pharmacokinetic section.

The following classes of medication should not significantly interfere with DaTscan binding and do not need to be withdrawn:

- Cholinesterase inhibitors and neuroleptics (antipsychotics)
- Anti-parkinsonian drugs (e.g. L-dihydroxyphenylalanine (L-DOPA), dopamine agonists, monoamine oxidase-B inhibitors (MAO-B), N-methyl-D-aspartate (NMDA) receptor blockers, amantadine, and catechol-O-methyltransferase inhibitors (COMT) in standard dosages)
- Selective serotonin reuptake inhibitors (SSRI) may increase binding to DaT but should not interfere with visual interpretation

Day of procedure:

- Administer thyroid block at least one hour prior to DaTscan injection
- Potassium iodide oral solution, IOSAT tablets or Lugol's solution (equivalent to 100mg iodide)
- Administer DaTscan
- Recommended dose: 3 to 5 mCi
- Injection Technique: slow intravenous injection over at least 20 sec
- SPECT Imaging (begin between 3 and 6 hours post injection)
- Post-Processing

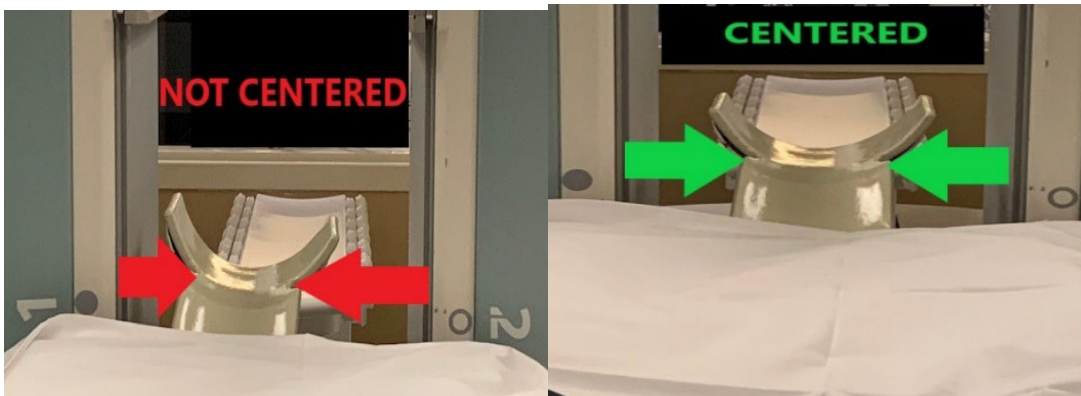
**** To maintain consistency between patients, post injection imaging time, acquisition parameters and processing parameters should be consistent**

Acquisition parameters:

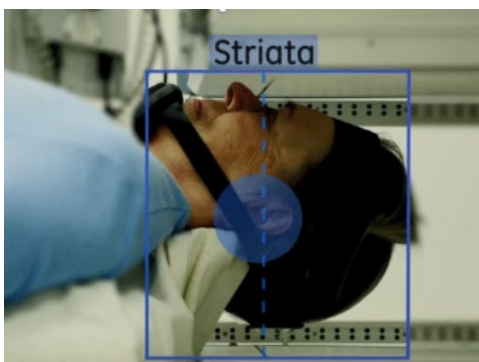
- High Resolution collimators
- 128 x 128 matrix
- Acquisition zoom factor to achieve pixel size of 3.5 to 4.5 mm (camera dependent)
- Photopeak of 159 KeV with $\pm 10\%$ energy windows
- Minimum of 60 views per detector/120 total views
- 180° rotation per detector/360° total rotation
- Minimum of 1.5m total counts, 30 seconds per view recommended
- Step and shoot mode with circular orbit

Patient positioning:

- Open DaTscan acquisition protocol, position detector heads at lateral position (90°-270°)
- Center off-the-table head holder in the imaging field of view



- Lay patient on the table and position their head in the head holder ensuring the entire striatum is within the field of view



- Secure head position by using straps or Coban/Coflex wrap
- Raise the table until the head is at the center on the field of view

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- Set the detector radius between 11-15 cm (confirm both detectors are at the same radius)
- Rotate the detectors slowly confirming that they remain close to, but not touching, the patient. Adjust the table height up or down, as necessary
- Adjust radius if necessary (maintain identical radius on both detectors)
- For consistency, start acquisition with detector 1 at 0° (recommended)

Image quality assessment:

1) Total counts \geq 1.5 million (recommended)

2) Motion:

- Patient motion can be identified in processed images by the caudates joining on the **transverse slices** referred as “kissing caudates”. If motion is observed, the patient should be rescanned

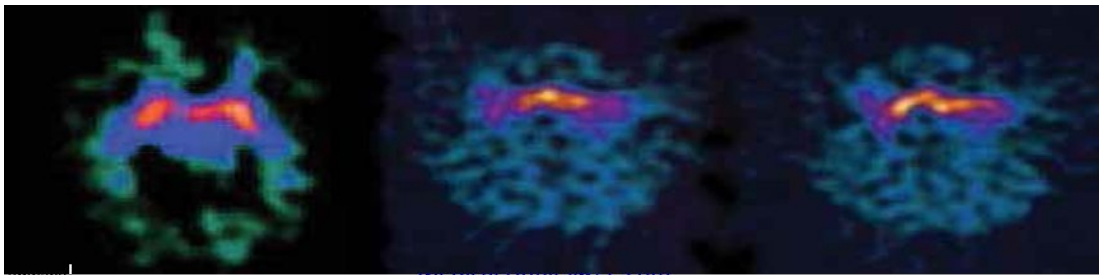


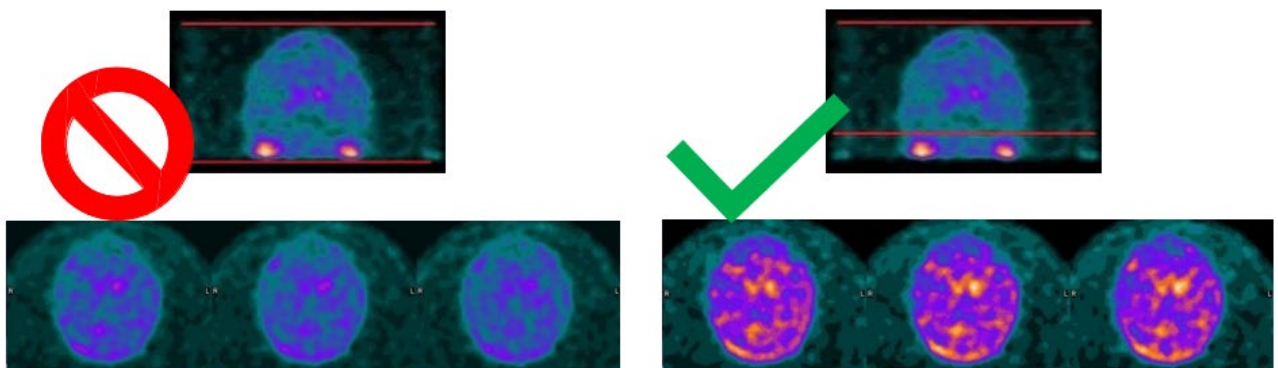
Image reconstruction and display:

1. Reconstruction type:

- Iterative reconstruction (OSEM) recommended or Filtered Back Projection (FBP)
- Filter: Butterworth or Gaussian (camera dependent)

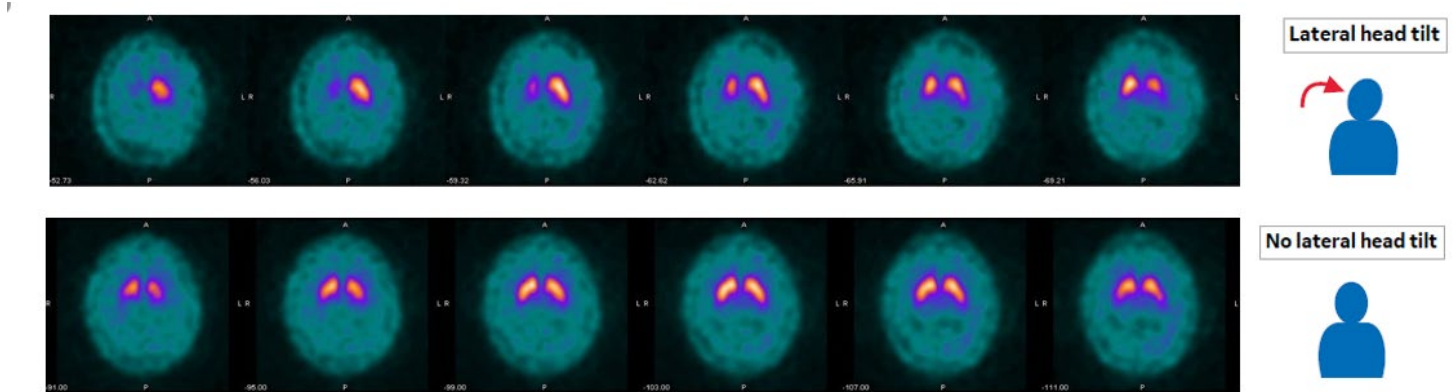
2. Image reconstruction volume:

- Exclude salivary glands from reconstruction volume as salivary gland uptake may impact normalization of the image

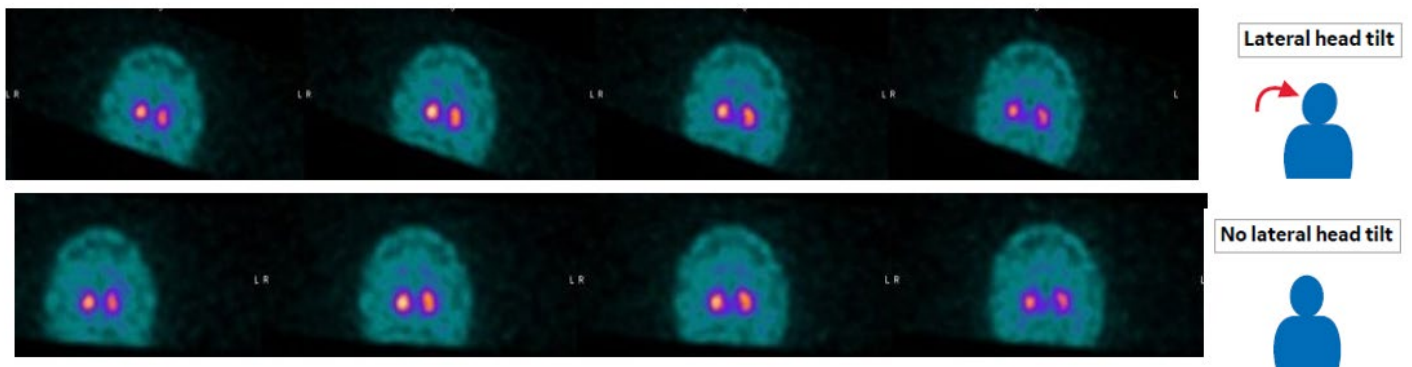


3. Assess and correct for lateral head tilt:

- If the patient's head is tilted during acquisition, this can result in an asymmetrical appearance on the reconstructed transverse slices. This head tilt may be corrected during processing



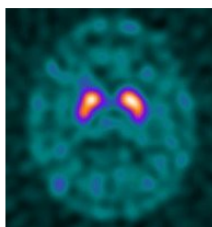
- Coronal slices may be useful to assess and correct head tilt:



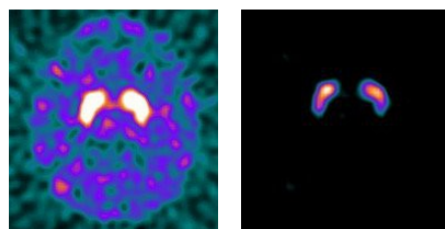
4. Display 12 to 16 transverse slices including striatal volume on a single page

5. Proper window leveling includes:

- No background subtraction
- Maximum intensity set to striatum



Auto window level



Window level manually adjusted:

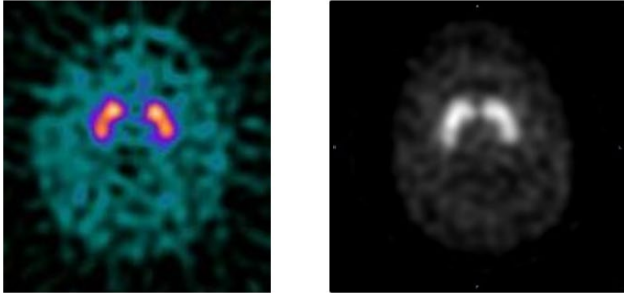
0-52%

33-100%

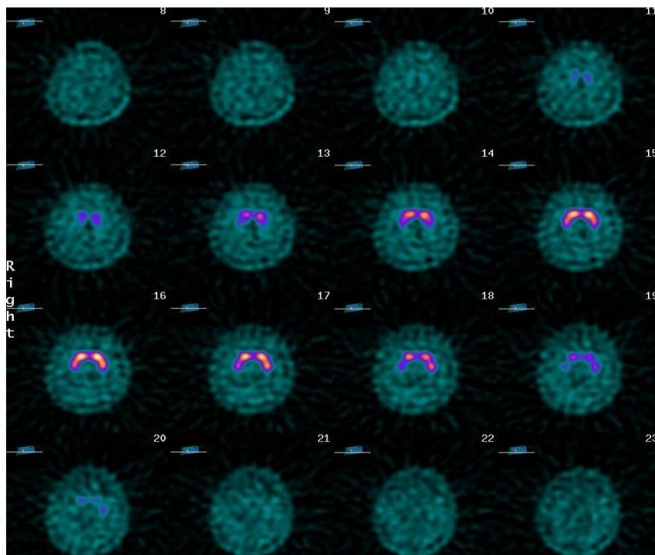


6. Recommended color scales:

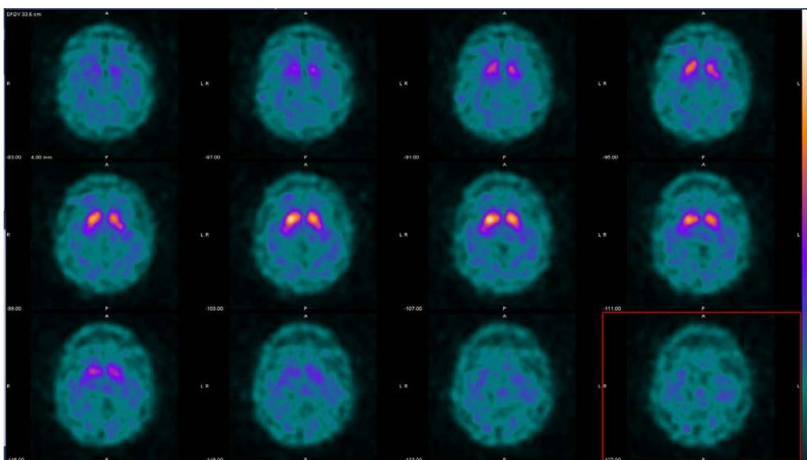
- GE cool or black and white/linear
- Cool or black and white color scales demonstrate appropriate sensitivity and specificity for DaTscan images



Examples of recommended image display:



- Transverse slices on a single page (~12 to 16 slices)



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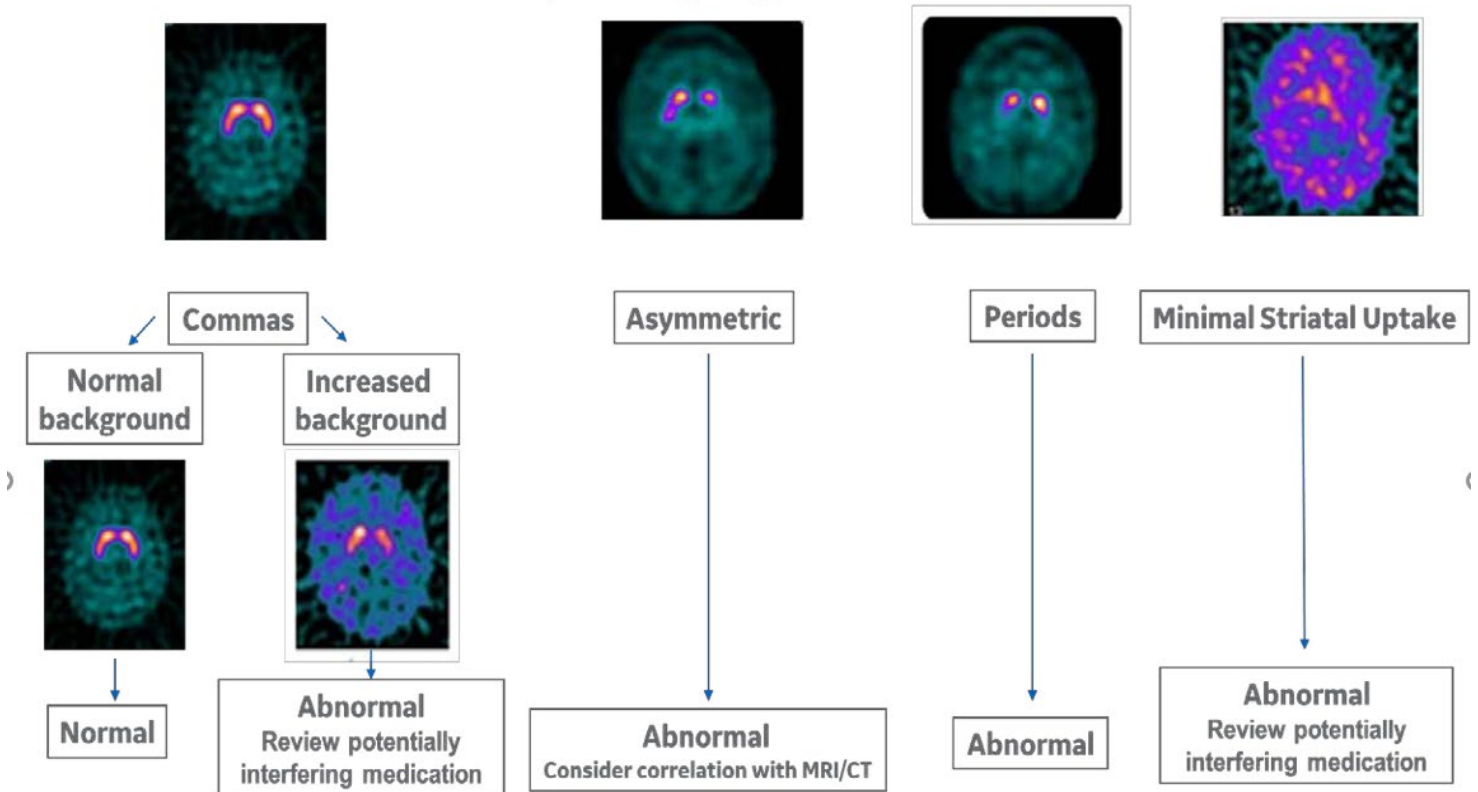
Image interpretation algorithm:

Assess: Morphology and striatal signal intensity

- **Morphology** – Is the striatal uptake symmetric and comma in shape? Yes or No
- **Signal** - Is background activity increased (striatal intensity reduced)? Yes or No
- **Result:** Normal or Abnormal Images

Images courtesy of Birmingham City Hospital, Birmingham, England.

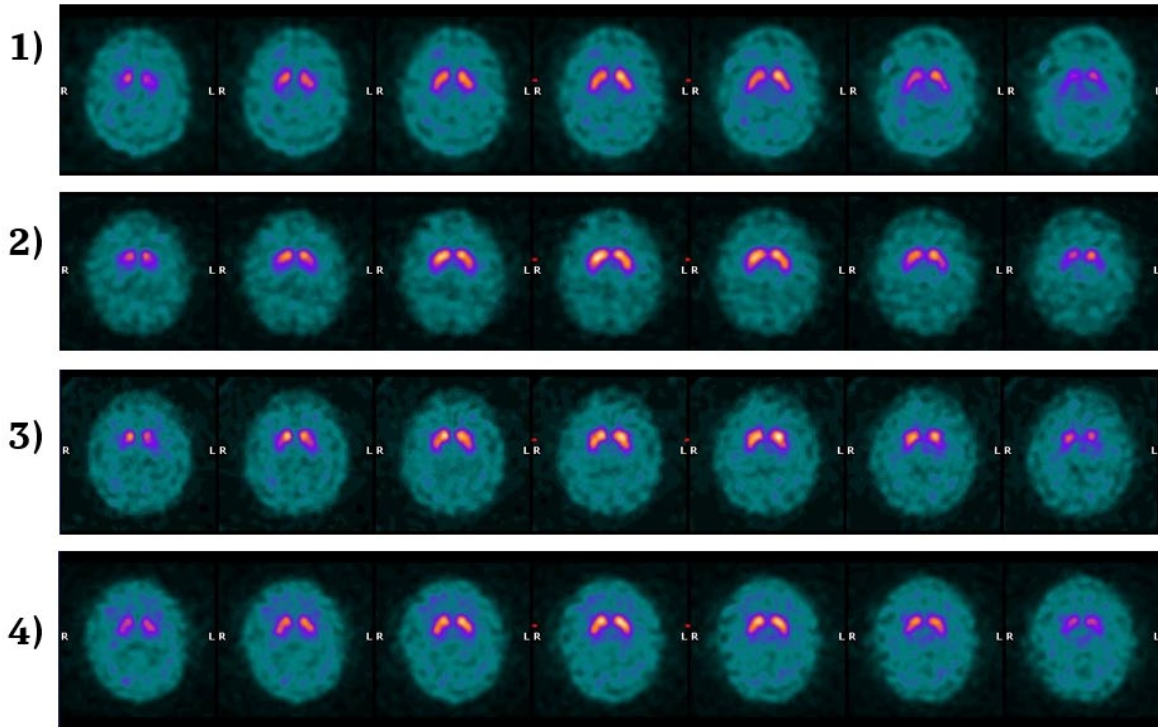
Reporting Algorithm



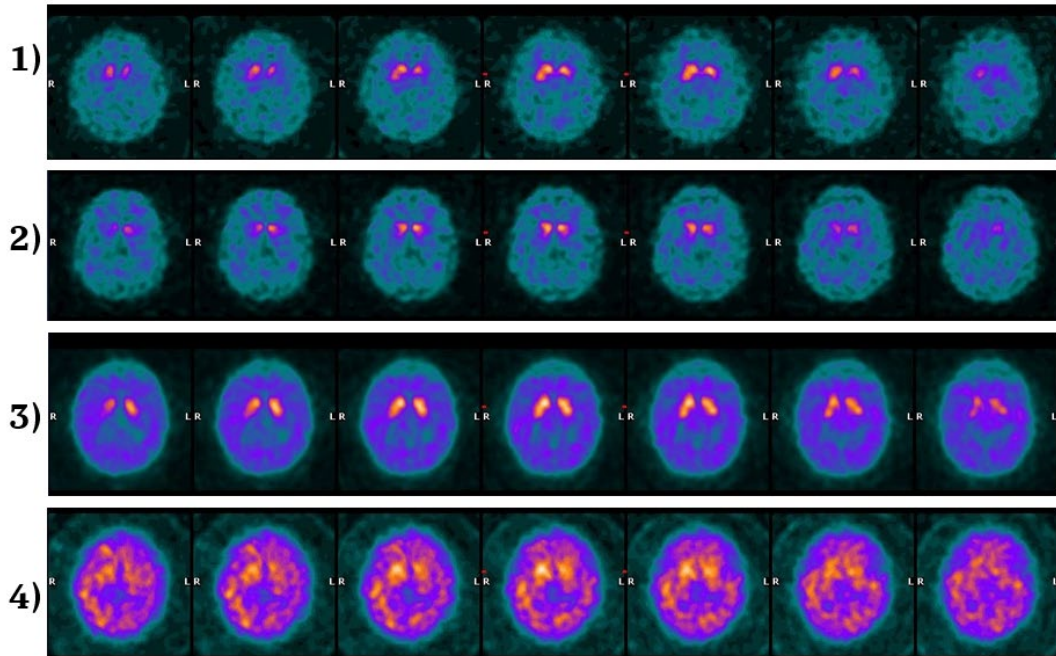
•**Normal images:** do not provide imaging evidence of a presynaptic dopaminergic deficit and are inconsistent with a parkinsonian syndrome or Dementia with Lewy bodies

•**Abnormal images:** provide imaging evidence of a presynaptic dopaminergic deficit and may be consistent with a parkinsonian syndrome or Dementia with Lewy bodies

Examples of normal images:



Examples of abnormal images:



Normal scan report example:

EXAMINATION: Dopamine transporter (DaT) SPECT imaging of the brain

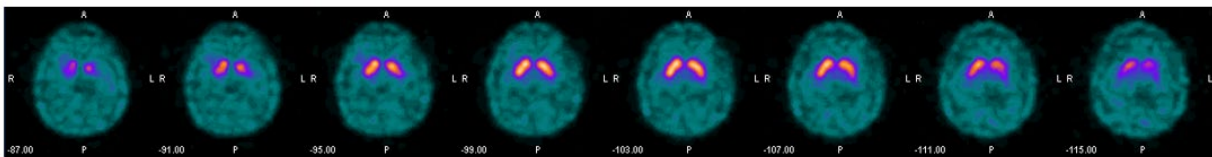
TECHNIQUE: Thyroid blocking agent equivalent to 100 mg iodide was orally administered one hour prior to the intravenous administration of 4.8 mCi of ¹²³I labeled DaTscan. Three hours later, a 30 minute SPECT scan of the brain was acquired. Data was reconstructed using iterative reconstruction and displayed in axial planes.

FINDINGS:

Bilateral, symmetric tracer uptake is noted in the striata. Nuclei uptake is distinct and above the background activity.

IMPRESSION:

Normal and symmetric uptake of DaTscan in the striatum without imaging evidence of a presynaptic dopaminergic deficit.



Abnormal scan report example:

EXAMINATION: Dopamine transporter (DaT) SPECT imaging of the brain

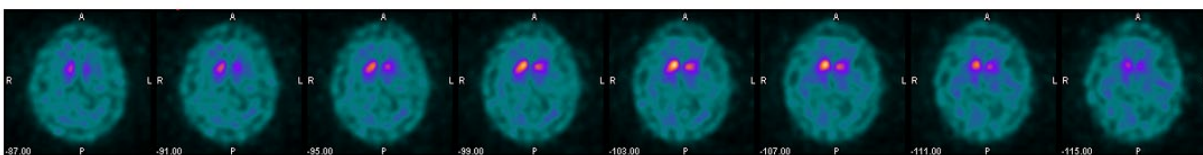
TECHNIQUE: Thyroid blocking agent equivalent to 100 mg iodide was orally administered one hour prior to the intravenous administration of 4.8 mCi of ¹²³I labeled DaTscan. Three hours later, a 30 minute SPECT scan of the brain was acquired. Data was reconstructed using iterative reconstruction and displayed in axial planes.

FINDINGS:

The images demonstrate reduced radiotracer uptake in the left and right striata, with more extensive involvement in the putamen, relative to caudate. Striatal reductions are more pronounced on the left caudate and putamen compared with the right.

IMPRESSION:

Abnormal DaTscan with imaging evidence of a presynaptic dopaminergic deficit.



Additional Resources:

1. Booij J, Kemp P. [Dopamine transporter imaging with \[\(123\)I\]FP-CIT SPECT: potential effects of drugs.](#) *Eur J Nucl Med Mol Imaging*, 2008;35(2):424-438.
2. Morbelli S, Esposito G, et al. [EANM practice guideline/SNMMI procedure standard for dopaminergic imaging in Parkinsonian syndromes 1.0.](#) *Eur J Nucl Med Mol Imaging*, 2020;47(8):1885-1912.
3. Djang D, et al. [SNM Practice Guideline for Dopamine Transporter Imaging with 123I-Ioflupane SPECT 1.0.](#) *N Nuc Med*, 2012;53(1):154-163.
4. Chahid Y, et al. [A systematic review of the potential effects of medications and drugs of abuse on dopamine transporter imaging using \[123I\]I-FP-CIT SPECT in routine practice.](#) *Eur J Nucl Med Mol Imaging*, 2023;Online ahead of print.
5. Thomas, Alan J et al. [Autopsy validation of 123I-FP-CIT dopaminergic neuroimaging for the diagnosis of DLB.](#) *Neurology* vol. 88,3 (2017): 276-283.
6. Thomas, Alan J et al. [Diagnostic accuracy of dopaminergic imaging in prodromal dementia with Lewy bodies.](#) *Psychological medicine* vol. 49,3 (2018): 396-402.
7. Walker, Zuzana et al. [Clinical usefulness of dopamine transporter SPECT imaging with 123I-FP-CIT in patients with possible dementia with Lewy bodies: randomised study.](#) *The British journal of psychiatry: the journal of mental science* vol. 206,2 (2015): 145-52.
8. Bega, Danny et al. [Clinical utility of DaTscan in patients with suspected Parkinsonian syndrome: a systematic review and meta-analysis.](#) *NPJ Parkinson's disease* vol. 7,1 43. 24 May. 2021.
9. Kägi G, Bhatia KP, Tolosa E. [The role of DAT-SPECT in movement disorders.](#) *J Neurol Neurosurg Psychiatry*, 2010;81(1):5-12.
10. Buchert R, Buhmann C, Apostolova I, et al. [Nuclear Imaging in the Diagnosis of Clinically Uncertain Parkinsonian Syndromes.](#) *Dtsch Arztebl Int*, 2019; 116(44):7474-754.
11. Nicastro N, Wegrzyk J, et al. [Classification of degenerative parkinsonism subtypes by support-vector-machine analysis and striatal 123 I-FP-CIT indices.](#) *J Neurol*, 2019; 266(7):1771-1781.
12. Nichols K, Chen B, et al. [Interpreting 123 I-ioflupane dopamine transporter scans using hybrid scores.](#) *Eur J Hybrid Imaging*, 2018;2(1):10.
13. McKeith I, Boeve B, et al. [Diagnosis and management of dementia with Lewy bodies.](#) *Neurology*, 2017; 89:1-13.
14. Santos C, et al. [Pitfalls and Artifacts of 123I-Ioflupane SPECT in Parkinsonian Syndromes: A Quality Improvement Teaching Tool.](#) *J Nucl Med Technologist*. 2021;46:114-119.

For clinical or scientific support, including applications training, please email Medical.Affairs@ge.com or phone 800-654-0118 (option 2 then option 3).