Supplemental Table 1. Characteristics of DAT studies. Values are n or mean (SD/range) unless specified otherwise.

Study	Site	Groups	n (m/f)	Age (yrs)	Disease duration (yrs)	Motor UPDRS	Hoehn & Yahr	Injected dose (MBq)	Scan dur (min)	Tracer/ Scanner	Analysis method
Messa et al 1998(*31*)	MIL	PD	13 (8/5)	59 (13)	2.2 (1.4)	-	2.2 (0.2)	130	30	^{123}I-β-CIT Ceraspet	(str-occ)/occ
		PSP	5 (4/1)	66 (8)	3.8 (1.3)	-	3 (0)				
Kim et al 2000(*32*)	SEO	MSA-P	7 (4/3)	55 (9)	-	-	-	185-370	30	^{123}I-β-CIT Triad XLT	str/occ
		MSA-C	9 (5/4)	53 (7)	2.4 (1.5)	-	-				
Parkinson Study Group 2000(*33*)	MUL	PD	43 (30/13)	68 (8)	-	-	-	185	30	^{123}I-β-CIT 5 different scanners	(str-occ)/occ
		PSP	17 (10/7)	72 (6)	-	-	-				
Pirker et al 2000(*12*)	VIE	PD	48 (27/21)	68 (10)	8.6 (5.2)	35 (13)	3.5 (0.5)	89-197	40	^{123}I-β-CIT Siemens Multispect 3	(str-cer)/cer
		MSA	18 (7/11)	63 (11)	3.6 (2.2)	37 (10)	3.9 (0.5)				
		PSP	8 (6/2)	65 (6)	3.3 (2.1)	32 (11)	4.3 (0.5)				
		CBS	4 (1/3)	68 (9)	2.3 (1.0)	42 (9)	3.8 (0.5)				
Varrone et al 2001(*34*)	NEW	PD	157 (102/55)	61 (34-84)	4.0 (0.3-23)	18 (6-40)	1.7 (1-4)	217	-	^{123}I-β-CIT Picker PRISM 3000 XP	(str-occ)/occ
		MSA	26 (19/7)	66 (48-81)	4.0 (0.2-10)	31 (10-73)	2.8 (1-5)				
Kim et al 2002(*35*)	TOR	PD	12 (6/6)	62 (10)	3.5 (3.1)	18 (7)	1.9 (0.6)	-	-	^{123}I-β-CIT Picker PRISM 3000 XP	B_{max}/K_dV_2 (fcx as reference)
		MSA	7 (5/2)	62 (14)	3.4 (1.4)	50 (17)	4.0 (0)				
		PSP	6 (5/1)	63 (7)	3.6 (0.8)	27 (11)	3.3 (0.8)				
Berding et al 2003(*13*)	HAN	PD	14 (7/7)	57 (9)	13 (5)	-	3.9 (0.7)	-	120	^{123}I-β-CIT Siemens Multispect 3	(str-ref)/ref (ref = occ and cer)
		MSA	10 (2/8)	63 (7)	2.5 (1.7)	32 (12)	3.2 (1.1)				

Antonini et al 2003(*36*)	MIL	PD	70 (-)	62 (13)	5.0 (4.0)	-	-	110-140	-	^{123}I-FP-CIT Prism 3000	(str-occ)/occ
		MSA-P	10 (-)	60 (8)	4.0 (2.0)	-	-				
		PSP	10 (-)	64 (8)	4.0 (3.0)	-	-				
Lai et al 2004(*37*)	TAO	PD	10 (3/7)	60 (16)	1.9 (0.7)	22 (10)	1.8 (0.6)	925	-	^{99m}Tc-TRODAT-1 Siemens Multispect 3	(str-occ)/occ
		CBS	5 (4/1)	59 (16)	1.6 (0.9)	30 (7)	1.9 (1.2)				
Lu et al 2004 (*38*)	TAI	PD	36 (20/16)	63 (7)	4.8 (3.5)	30 (14)	2.3 (0.9)	925	-	^{99m}Tc-TRODAT-1 Siemens Multispect 3	(str-occ)/occ
		MSA-P	30 (12/18)	62 (8)	4.5 (3.3)	43 (15)	3.5 (1.3)				
		MSA-C	19 (9/10)	64 (7)	4.0 (2.5)	30 (13)	3.7 (1.2)				
Plotkin et al 2005(*14*)	BER	PD	25 (18/7)	60 (13)	4.0 (4.1)	-	1.8 (0.8)	200	-	^{123}I-FP-CIT Siemens Multispect 3	str/fcx
		MSA	13 (6/7)	64 (8)	4.0 (2.3)	-	-				
		PSP	8 (6/2)	67 (7)	3.0 (1.9)	-	-				
		CBS	9 (4/5)	63 (11)	3.0 (1.6)	-	-				
Scherfler et al 2005(*39*)	INN	PD	15 (10/5)	61 (7)	1.7 (0.8)	22 (7)	1.9 (0.9)	148-185	43	^{123}I-β-CIT ADAC Vertex-Plus	(str-occ)/occ
		MSA	15 (8/7)	62 (9)	2.0 (0.8)	39 (11)	2.6 (0.7)				
Swanson et al 2005(*40*)	PHI	PD	130 (87/43)	63 (10)	6.4 (5.4)	-	-	740	-	^{99m}Tc-TRODAT-1 Picker PRISM 3000 XP	(str-ref)/ref^{B}
		MSA-P	25 (17/8)	66 (9)	4.9 (3.6)	-	-				
Im et al 2006(*26*)	SEO	PD	20 (10/10)	62 (7)	2.8 (1.7)	-	2 (0)	251	30	^{123}I-IPT Triad XLT 24	(str-occ)/occ
		PSP	9 (6/3)	56 (11)	1.8 (0.8)	-	-				
Filippi et al 2006(*41*)	ROM	PD	21 (12/9)	64 (8)	2.7 (1.9)	-	-	185	-	^{123}I-FP-CIT Millenium VG	(str-occ)/occ
		PSP	15 (9/6)	64 (6)	2.7 (1.2)	-	-				
	INN	PD	17 (10/7)	62 (7)	2.0 (1.1)	22 (7)	-	148-185	-		

Seppi et al 2006(*42*)		MSA	15 (8/7)	62 (9)	2.0 (0.8)	39 (11)	-			^{123}I-β-CIT ADAC Vertex-plus	(str-occ)/occ
		PSP	14 (6/8)	67 (-)[A]	2.2 (0.7)	36 (7)	-				
Roselli et al 2010(*43*)	BAR	PD	15 (9/4)	78 (6)	3.5 (2.5)	25 (8)	2.5 (-)	111	22	^{123}I-FP-CIT GE Infinia	(str-occ)/occ
		PSP	10 (5/5)	66 (8)	1.5 (1.2)	25 (19)	1.8 (-)				
Lin et al 2010(*15*)	TAO	PD	10 (7/3)	61 (7)	4.6 (2.3)	25 (9)	2.1 (0.5)	925	40	^{99m}Tc-TRODAT-1 Siemens E.CAM	(str-occ)/occ
		PSP	6 (2/4)	64 (3)	5.2 (1.9)	47 (13)	3.7 (1.0)				
Goebel et al 2011(*44*)	INN	PD	15 (10/5)	61 (7)	1.7 (0.8)	22 (7)	-	148-185	43	^{123}I-β-CIT ADAC Vertex-plus	(str-occ)/occ
		MSA	15 (8/7)	62 (9)	2.0 (0.8)	39 (11)	-				
		PSP	15 (7/8)	66 (7)	2.0 (0.9)	35 (7)	-				
Cilia et al 2011(*45*)	MIL	PD	37 (18/19)	70 (5)	4.4 (2.9)	22 (8)	1.9 (0.7)	110-185	30-45	^{123}I-FP-CIT Prism 3000	(str-occ)/occ
		CBS	36 (16/20)	71 (7)	3.9 (1.6)	39 (13)	3.1 (0.8)				
Oh et al 2012(*25*)	SEO	PD	49 (21/28)	62 (11)	5.1 (6.0)	20 (13)	2.0 (1.0)	185	10	^{18}F-FP-CIT Biograph 40	(str-occ)/occ
		MSA	24 (8/16)	62 (11)	3.0 (1.7)	35 (17)	4.0 (1.2)				
		PSP	19 (9/10)	68 (8)	3.9 (2.1)	26 (13)	3.4 (1.3)				
Nocker et al 2012(*46*)	INN	PD	11 (7/4)	61(6)	2.4 (1.2)	19 (8)	1.9 (0.5)	148-185	43	^{123}I-β-CIT ADAC Vertex-plus	(str-occ)/occ
		MSA	8 (4/4)	60 (8)	2.4 (1.0)	40 (5)	3.0 (0)				
Jacobson Mo et al 2013(*47*)	UME	PD	29 (18/11)	74 (4)	1.5 (0.8)	27 (11)	2.0 (0.6)	185	60	^{123}I-FP-CIT GE Infinia	str/occ
		MSA	7 (-)	71 (14)	1.3 (0.9)	22 (11)	2.8 (1.0)				
		PSP	13 (-)	76 (9)	1.9 (1.5)	34 (15)	2.9 (1.0)				
Hammesfahr et al 2016(*48*)	DÜS	PD	18 (6/12)	65 (7)	1.9 (0.9)	18 (11)	-	184	-	^{123}I-FP-CIT Prism 2000	str/occ
		CBS	19 (6/13)	67 (8)	2.0 (0.9)	28 (15)	-				
Kim et al 2016(*49*)	DAE	MSA-P	13 (-)	-	-	-	-	185	10	^{18}F-FP-CIT Biograph 40	(str-occ)/occ
		MSA-C	21 (-)	-	-	-	-				
	AMS	PD	30 (16/14)	66 (8)	3.6 (3.0)	27 (12)	-	185	30	^{123}I-FP-CIT	

Joling et al 2017(*50*)		MSA-P	9 (2/7)	61 (10)	3.2 (2.6)	41 (23)	-			E.Cam, Siemens	(str-cer)/cer
		MSA-C	7 (3/4)	68 (11)	3.6 (1.4)	37 (8)	-				
		PSP	13 (7/6)	70 (6)	5.7 (4.7)	33 (12)	-				
Ohta et al 2017(*51*)	OKA	PD	21 (8/13)	70 (11)	6.3 (5.8)	37 (12)	-	-	-	^{123}I-FP-CIT	-
		PSP	13 (8/5)	70 (6)	4.5 (3.3)	37 (8)	-			-	
Saari et al 2017(*52*)	TUR	PD	11 (10/1)	69 (7)	1.5 (1.5)	-	-	185	-	^{123}I-FP-CIT	(str-occ)/occ
		MSA	5 (2/3)	53 (7)	1.3 (0.7)	-	-			^{123}I-β-CIT Picker, ADAC Vertex, GE Infinia	
Nicastro et al 2018(*53*)	GEN	MSA-P	28 (13/15)	70 (10)	2.6 (2.4)	36 (11)	3.0 (0.7)	185	-	^{123}I-FP-CIT	-
		MSA-C	6 (4/2)	62 (8)	1.6 (1.1)	20 (8)	2.8 (0.8)			GCA-9300A/UI Toshiba	

MIL = Milan, Italy; SEO = Seoul, Korea; MUL = Multisite; VIE = Vienna, Austria; NEW = New Haven, CT, USA; TOR = Toronto, Canada; HAN = Hannover, Germany; TAO = Taoyuan, Taiwan; TAI = Taipei, Taiwan; BER = Berlin, Germany; INN = Innsbruck, Austria; PHI = Philadelphia, PA, USA; ROM = Rome, Italy; BAR = Bari, Italy; UME = Umeå, Sweden; DÜS = Düsseldorf, Germany; DAE = Daegu, Korea; AMS = Amsterdam, The Netherlands; OKA = Okayama, Japan; TUR = Turku, Finland; GEN = Geneva, Switzerland

[A] Extremely large SD for the age of PSP patients, an apparent typographical error

[B] Reference region = supratentorial structures above the basal ganglia

Supplemental Table 2. Characteristics of AADC studies. All included studies performed with 6-^{18}F-fluoro-L-dopa as the tracer. Values are n or mean (SD/range) unless specified otherwise. None of the studies reported motor UPDRS values.

Study	Site	Groups	n (m/f)	Age (yrs)	Disease duration (yrs)	Hoehn & Yahr	Injected dose (MBq)	Scan duration (min)	Scanner	Analysis method
Brooks et al 1990a(*54*)	LON	PD	8 (7/1)	64 (6)	10.6 (8.7)	3.0 (0.8)	111-185	90	CTI 931/08/012	Ki^{occ}
		MSA	10 (6/4)	59 (9)	4.4 (3.2)	3.6 (1.0)				
Brooks et al 1990b(*55*)	LON	PD	16 (11/5)	56 (11)	9.2 (5.1)	2.7 (1-4)	74-185	90	CTI 981/08/012	Ki^{occ}
		MSA	18 (13/5)	56 (10)	4.1 (3)	3.2 (1-5)				
		PSP	10 (10/0)	68 (4)	3.5 (2.2)	3.3 (2-5)				
Burn et al 1994(*56*)	LON	PD	28 (-/-)	61 (38-77)	7.2 (0.5-20)	- (1-4)	111-185	94	CTI 931/08/012	Ki^{occ}
		MSA	25 (-/-)	58 (40-73)	4.4 (1-10)	- (2-5)				
		PSP	10 (-/-)	68 (62-75)	3.5 (0.5-8)	- (3-4)				
Otsuka et al 1995(*57*)	FUK	PD	4 (-/-)	-	-	-	110-240	127	Headtome III	ROI/cer
		PSP	3 (0/3)	56 (6)	1.7 (0.6)	-				
		CBS	2 (1/1)	65 (5)	4.0 (0)	-				
Otsuka et al 1997(*11*)	FUK	PD	15 (8/7)	49 (10)	7.0 (7.1)	1.9 (0.9)	110-240	127	Headtome III	ROI/occ
		MSA	9 (4/5)	52 (14)	6.4 (5.5)	2.4 (0.5)				
Antonini et al 1997(*58*)	VIL	PD	10 (7/3)	63 (5)	10 (5)	3.7 (0.6)	90-160	124	CTI 933/04-16	Ki^{occ}
		MSA	9 (5/4)	57 (7)	5 (2)	3.9 (0.9)				

LON = London, UK; FUK = Fukuoka, Japan; VIL = Villigen, Switzerland, Disdur = disease duration, ROI = region of interest, occ = occipital cortex, cer = cerebellum

Supplemental Table 3. MSA subgroups in included studies. Values are n.

Study	MSA total	Subgroups [A]			Comment
		MSA-P/SND	MSA-C/OPCA	SDS	
Brooks et al. 1990a	10	-	-	-	-
Brooks et al. 1990b	18	-	-	-	-
Burn et al 1994	25	-	-	-	-
Otsuka et al 1997	9	4	5	-	No separate mean values reported for subgroups
Antonini et al 1997	9	-	-	-	-
Kim et al. 2000	16	7	9	-	Separate mean values reported for MSA-P and MSA-C
Pirker et al. 2000	19	15	3	-	No separate mean values reported for subgroups
Varrone et al. 2001	26	14	-	12	Separate mean values reported for SND and SDS
Kim et al. 2002	7	7	-	-	-

Berding et al 2003	10	7	3	-	No separate mean values reported for subgroups
Antonini et al. 2003	10	10	-	-	-
Lu et al 2004	49	30	19	-	Separate mean values reported for MSA-P and MSA-C
Plotkin et al 2005	13	8	5	-	No separate mean values reported for subgroups
Swanson et al. 2005	25	25			
Scherfler et al 2005	15	15	-	-	-
Seppi et al 2006	15	15	-	-	-
Goebel et al 2011	15	15	-	-	-
Oh et al 2012	24	24	-	-	-
Nocker et al 2012	8	8	-	-	-
Jacobson Mo et al 2013	7	-	-	-	-
Kim et al. 2016	34	13	21	-	Separate mean values reported for MSA-P and MSA-C
Joling et al 2017	16	9	7	-	Separate mean values reported for MSA-P and MSA-C
Saari et al 2017	5	-	-	-	-
Nicastro et al 2018	34	28	6	-	Separate mean values reported for MSA-P and MSA-C

MSA = multiple system atrophy, MSA-P = parkinsonism varian multiple system atrophy, SND = striatonigral degeneration, MSA-C = cerebellar variant multiple system atrophy, OPCA = olivopontocerebellar atrophy, SDS = Shy-Drager syndrome

[A] Studies that did not report subgroups were included in the MSA-P group for the analysis (4 AADC studies and 2 DAT studies).

Supplemental Table 4. Quality of the included studies (Newcastle-Ottawa Scale).

Study	Case definition	Age-/sex-differences between groups	PET/SPECT imaging methodology & resolution	Disease duration	UPDRS/UMSARS/ HY-scale	Analysis method	Total Score

Brooks et al 1990a	*	*	-	*	*	*	5
Brooks et al 1990b	*	-	-	*	*	*	4
Burn et al 1994	*	-	-	*	-	*	3
Otsuka et al 1995	*	*	-	-	-	*	3
Otsuka et al 1997	*	*	-	*	*	*	5
Antonini et al 1997	*	*	-	*	*	*	5
Messa et al 1998	*	*	-	*	*	*	5
Kim et al 2000	*	*	-	-	-	*	3
PSG 2000	*	*	-	-	-	*	3
Pirker et al 2000	*	*	*	*	*	*	6
Varrone et al 2001	*	*	*	*	*	*	6
Kim et al 2002	*	*	*	*	*	-	5
Berding et al 2003	*	-	*	*	*	*	5
Antonini et al 2003	*	-	*	*	-	*	4
Lu et al 2004	*	*	*	*	*	*	6
Lai et al 2004	*	-	*	*	*	*	5
Plotkin et al 2005	*	*	*	*	-	-	4
Swanson et al 2005	*	*	*	*	-	-	4
Scherfler et al 2005	*	*	*	*	*	*	6
Im et al 2006	*	*	*	*	-	*	5
Filippi et al 2006	*	*	*	*	-	*	5
Seppi et al 2006	*	*	*	*	*	*	6
Roselli et al 2010	*	-	*	*	*	*	5
Lin et al 2010	*	*	*	*	*	*	6

Goebel et al 2011	*	*	*	*	*	*	6
Cilia et al 2011	*	*	*	*	*	*	6
Oh et al 2012	*	*	*	*	*	*	6
Nocker et al 2012	*	*	*	*	*	*	6
Jakobson et al 2013	*	-	*	*	*	*	5
Kim et al 2016	*	-	*	-	-	*	3
Hammesfahr et al 2016	*	*	*	*	*	*	6
Joling et al 2017	*	-	*	*	*	*	5
Ohta et al 2017	*	*	*	*	*	-	5
Saari et al 2017	*	-	*	*	-	*	4
Nicastro et al 2018	*	*	*	*	*	-	5

Supplemental Table 5. Clinical diagnostic criteria for PD, MSA, PSP and CBS in the included studies.

Study	Diagnostic criteria
Messa et al 1998	PD: Calne et al. Ann Neurol 1992;32:S125-S127, PSP: NINDS-SPSP International workshop criteria (Litvan et al. Neurology 1996;47:1-9)
Kim et al 2000	MSA-C: Criteria modified from Yamaguchi et al. J Neurol Sci 1994;125:56-61, MSA-P: Quinn, J Neurol Neurosurg Psychiatry 1989;special suppl:8-89
Parkinson Study Group 2000	PD: 1. At least two of the following: resting tremor, rigidity, bradykinesia, postural reflex impairment, and freezing phenomenon 2. Hoehn and Yahr stage of 1.0 to 3.028 3. Has a known positive response to antiparkinsonian medications 4. No other known or suspected cause of parkinsonism PSP: 1. At least two of the following: axial rigidity, bradykinesia, postural reflex impairment, speech impairment 2. Ophthalmoparesis including restriction of downgaze 3. No significant response to antiparkinsonian medication 4. Ability to ambulate without assistance 5. No other known or suspected cause of parkinsonism

Pirker et al 2000	MSA: Quinn, Movement Disorders 3 1994;262-281, PSP: NINDS-SPSP International workshop criteria (Litvan et al. Neurology 1996;47:1-9), CBD: Litvan et al. Neurology 1997;48:119-125
Varrone et al 2001	PD: Age older than 35 years, and at least two of the following: bradykinesia, resting tremor, rigidity, postural instability, or freezing phenomena (one of which is rest tremor or bradykinesia). MSA: A known negative, unsustained, or inadequate response to L-dopa, with at least two of the following: resting tremor, bradykinesia, postural reflex impairment, or freezing phenomenon; and with a concurrent presence of cerebellar dysfunction, symptomatic autonomic failure, or pyramidal signs.
Kim et al 2002	PD: Hughes et al J Neurol Neurosurg Psychiatry 1992;55:181-184, MSA: Quinn, Movement Disorders 3 1994;262-281, PSP: NINDS-SPSP International workshop criteria (Litvan et al. Neurology 1996;47:1-9)
Berding et al 2003	Not reported.
Antonini et al 2003	Not reported.
Lai et al 2004	CBD: Lang et al. In: Calne DB (editor). Neurogenerative Disease. Philadelphia: W.B. Saunders 1994;877-894
Lu et al 2004	PD: Calne et al. Ann Neurol 1992;32:S125-S127, MSA: Gilman et al. J Neurol Sci 1999;163:94-98
Plotkin et al 2005	PD: Hughes et al J Neurol Neurosurg Psychiatry 1992;55:181-184, MSA: Gilman et al. J Neurol Sci 1999;163:94-98, PSP: NINDS-SPSP International workshop criteria (Litvan et al. Neurology 1996;47:1-9)

Scherfler et al 2005	PD: Hughes et al. J Neurol Neurosurg Psychiatry 1992;55:181-184, MSA: Gilman et al. Clin Auton Res 1998;8:359-362
Swanson et al 2005	PD: Ward & Gibbs. In: Streifler et al (eds). Advances in neurology: anatomy, pathology and therapy. New York: Raven, 1990, MSA: Gilman et al. J Neurol Sci 1999;163:94-98
Im et al 2006	PD: CAPIT Committee, Mov Disord 1992;7:2-13, PSP: NINDS-SPSP International workshop criteria (Litvan et al. Neurology 1996;47:1-9)
Filippi et al 2006	PD: Hughes et al. J Neurol Neurosurg Psychiatry 1992;55:181-184, PSP: NINDS-SPSP International workshop criteria (Litvan et al. Neurology 1996;47:1-9)
Seppi et al 2006	PD: Hughes et al. J Neurol Neurosurg Psychiatry 1992;55:181-184, PSP: NINDS-SPSP International workshop criteria (Litvan et al. Neurology 1996;47:1-9), MSA: Gilman et al. Clin Auton Res 1998;8:359-362
Roselli et al 2010	PSP: NINDS-SPSP International workshop criteria (Litvan et al. Neurology 1996;47:1-9)
Lin et al 2010	PD: Hughes et al. J Neurol Neurosurg Psychiatry 1992;55:181-184, PSP: NINDS-SPSP International workshop criteria (Litvan et al. Neurology 1996;47:1-9)
Goebel et al 2011	PD: Hughes et al. J Neurol Neurosurg Psychiatry 1992;55:181-184, PSP: NINDS-SPSP International workshop criteria (Litvan et al. Neurology 1996;47:1-9), MSA: Gilman et al. Clin Auton Res 1998;8:359-362
Cilia et al 2011	CBS: Mahapatra et al. Lancet Neurol 2004;3:736-743
Oh et al 2012	

	PD: Hughes et al. J Neurol Neurosurg Psychiatry 1992;55:181-184, PSP: NINDS-SPSP International workshop criteria (Litvan et al. Neurology 1996;47:1-9), MSA: Gilman et al. Neurology 2008;71:670-676
Nocker et al 2012	PD: Hughes et al. J Neurol Neurosurg Psychiatry 1992;55:181-184, MSA: Gilman et al. Neurology 2008;71:670-676
Jacobson Mo et al 2013	MSA: Gilman et al. J Neurol Sci 1999;163:94-98, PSP: NINDS-SPSP International workshop criteria (Litvan et al. Neurology 1996;47:1-9), clinically uncertain parkinsonian syndromes (CUPS) at the time of imaging
Hammesfahr et al 2016	PD: Hughes et al. J Neurol Neurosurg Psychiatry 1992;55:181-184, CBS: Mathew et al J Neurol Neurosurg Psychiatry 2012;83:405-410 and Armstrong et al. Neurology 2013;80:496-503
Kim et al 2016	MSA: Gilman et al. Neurology 2008;71:670-676
Joling et al 2017	PD: Hughes et al. J Neurol Neurosurg Psychiatry 1992;55:181-184, PSP: NINDS-SPSP International workshop criteria (Litvan et al. Neurology 1996;47:1-9), MSA: Gilman et al. Neurology 2008;71:670-676
Ohta et al 2017	PSP: NINDS-SPSP International workshop criteria (Litvan et al. Neurology 1996;47:1-9)
Saari et al 2017	Neuropathological diagnoses
Nicastro et al 2018	MSA: Gilman et al. Neurology 2008;71:670-676
Brooks et al 1990a	Individual clinical details reported
Brooks et al 1990b	Individual clinical details reported

Burn et al 1994	PD: Hughes et al. J Neurol Neurosurg Psychiatry 1992;55:181-184
Otsuka et al 1995	Individual clinical details reported
Otsuka et al 1997	MSA-P: Fearnley & Lees, Brain 1990;113:1823-1842, individual clinical details reported
Antonini et al 1997	PD: Hughes et al. J Neurol Neurosurg Psychiatry 1992;55:181-184, individual clinical details reported.

Supplemental Table 6. Summary of DAT results (hemispheric values and ratios). *g* = Hedges' *g*, CI = 95% confidence interval for *g,* n = number of studies/number of patients, I^2 = heterogeneity index. AI = asymmetry index. There were no available studies that have compared MSA-C patients to PSP or CBS patients. Data were insufficient also for MSA-P vs. CBS comparison. Statistically significant comparisons are highlighted with bold text.

	PD vs MSA-P	**PD vs PSP**	**PD vs MSA-C**	**PD vs CBS**	**MSA-P vs PSP**	**MSA-P vs MSA-C**	**PSP vs CBS**
Caudate Contralateral	*g*=-0.61 CI=-2.35 to 1.13 n=3/268, I^2=74.9%	***g*=-1.05** **CI=-2.09 to -0.01** **n=6/181, I^2=78.5%**	Insufficient data n=1/55	*g*=-0.36 CI=-1.63 to 0.91 n=3/122, I^2=49.4%	Insufficient data n=1/13	Insufficient data n=1/49	Insufficient data n=1/17
Caudate Ipsilateral	*g*=-0.76 CI=-2.52 to 1.01 n=3/268, I^2=77.6%	***g*=-1.35** **CI=-2.45 to -0.25** **n=6/181, I^2=79.0%**	Insufficient data n=1/55	*g*=-0.24 CI=-0.85 to 0.37 n=3/122, I^2=0.0%	Insufficient data n=1/13	Insufficient data n=1/49	Insufficient data n=1/17
Putamen Anterior	*g*=-0.40 CI=-3.11 to 2.32 n=3/247, I^2=90.2%	***g*=-0.66** **CI=-1.25 to -0.07** **n=4/133, I^2=0.0%**	Insufficient data n=0	Insufficient data n=0	*g*=-0.05 CI=-8.74 to 8.65 n=2/56, I^2=79.8%	Insufficient data n=1/34	Insufficient data n=0
Putamen Posterior	*g*=-0.12 CI=-1.57 to 1.34 n=4/266, I^2=85.4%	*g*=-0.23 CI=-1.30 to 0.83 n=4/133, I^2=63.6%	Insufficient data n=0	Insufficient data n=0	*g*=0.19 CI=-11.29 to 11.66 n=2/56, I^2=87.4%	Insufficient data n=1/34	Insufficient data n=0
Putamen Contralateral	*g*=-0.10 CI=-4.71 to 4.50 n=2/249, I^2=80.0%	*g*=-0.63 CI=-2.04 to 0.77 n=4/145, I^2=82.3%	Insufficient data n=1/55	*g*=0.48 CI=-0.48 to 1.44 n=3/122, I^2=24.8%	Insufficient data n=0	Insufficient data n=1/49	Insufficient data n=1/17
Putamen Ipsilateral	*g*=-0.58 CI=-3.20 to 2.05	*g*=-1.40 CI=-3.63 to 0.82	Insufficient data n=1/55	*g*=0.57 CI=-0.53 to 1.67	Insufficient data n=0	Insufficient data n=1/49	Insufficient data n=1/17

	n=2/249, I^2=38.0%	n=4/145, I^2=89.9%		n=3/122, I^2=41.1%			
Putamen AI	*g*=0.02 CI=-0.89 to 0.93 n=4/264, I^2=74.9%	Insufficient data n=1/31	Insufficient data n=0	Insufficient data n=1/73	Insufficient data n=1/29	Insufficient data n=0	Insufficient data n=0
Putamen / Caudate ratio	*g*=0.36 CI=-4.70 to 5.42 n=2/263, I^2=75.0%	*g*=1.08 CI=-0.85 to 3.01 n=4/185, I^2=88.8%	Insufficient data n=0	*g*=1.08 CI=-0.88 to 3.03 n=3/101, I^2=62.0%	Insufficient data n=1/20	Insufficient data n=0	Insufficient data n=1/17

Supplemental Table 7. Summary of AADC results. *g* = Hedges' *g*, CI = 95% confidence interval for *g,* n = number of studies/number of patients. All other AADC comparisons had insufficient data.

	PD vs MSA-P	**PD vs PSP**	**MSA-P vs PSP**
Caudate	*g*=-0.54 CI=-1.23 to 0.14 n=5/148	*g*=-1.50 CI=-5.79 to 2.79 n=2/64	*g*=-0.91 CI=-2.77 to 0.96 n=2/63
Putamen	*g*=-0.01 CI=-0.62 to 0.60 n=5/148	*g*=-0.41 CI=-4.10 to 3.28 n=2/64	*g*=-0.07 CI=-1.83 to 1.69 n=2/63

Supplemental Table 8. Associations of moderators with Hedges' g (the difference between PD and MSA-P/PSP) in meta-regression analyses. The only significant association in meta-regressions was detected using HY stage as the moderator in PD vs. MSA-P caudate comparison (highlighted).

Comparison	Region	Moderator	β (95% CI)	n (studies)
PD vs MSA-P	Caudate	Disease duration	0.12 (0.0 to 0.24)	12
		HY stage	**0.74 (0.19 to 1.29)**	**7**
		Motor UPDRS	0.03 (-0.01 to 0.07)	9
	Putamen	Disease duration	-0.35 (-1.75 to 1.06)	10
		HY stage	0.90 (-1.95 to 3.76)	5
		Motor UPDRS	0.027 (-0.03 to 0.08)	8
PD vs PSP	Caudate	Disease duration	0.23 (-0.28 to 0.73)	10
		HY stage	0.96 (-4.0 to 5.9)	4
		Motor UPDRS	0.089 (-0.02 to 0.19)	6
	Putamen	Disease duration	0.060 (-0.84 to 0.96)	7
		HY stage	1.58 (-10.1 to 13.2)	2
		Motor UPDRS	0.059 (-0.03 to 0.14)	5