

**Referencer til artiklen Sansemotorisk træning kan udsætte funktionsnedsættelse skrevet af Fay Horak et al. publiceret i Fysioterapeuten nr. 20 2009.**

1. Keus SH, Bloem BR, Hendriks EJ, et al. Evidence-based analysis of physical therapy in Parkinson's disease with recommendations for practice and research. *Mov Disord.* 2007;22:451–460.
2. Morris ME. Movement disorders in people with Parkinson disease: a model for physical therapy. *Phys Ther.* 2000;80:578–597.
3. Wood BH, Bilclough JA, Bowron A, Walker RW. Incidence and prediction of falls in Parkinson's disease: a prospective multidisciplinary study. *J Neurol Neurosurg Psychiatry.* 2002;72:721–725.
4. Patla AE, Shumway-Cook A. Dimensions of mobility: defining the complexity and difficulty associated with community mobility. *J Aging Phys Act.* 1998;7:7–19.
5. Shumway-Cook A, Woollacott M. *Motor Control: Theory and Practical Applications.* Baltimore, MD: Williams & Wilkins; 1995.
6. Horak FB, Macpherson MJ. Postural orientation and equilibrium. In: Rowell LB, Shepherd JR, eds. *Handbook of Physiology, Section 12: Exercise: Regulation and Integration of Multiple Systems.* New York, NY: Oxford University Press; 1996: 255–292.
7. Bloem BR, van Vugt JP, Beckley DJ. Postural instability and falls in Parkinson's disease. *Adv Neurol.* 2001;87:209–223.
8. van Praag H, Kempermann G, Gage FH. Running increases cell proliferation and neurogenesis in the adult mouse dentate gyrus. *Nat Neurosci.* 1999;2:266–270.
9. Heyes MP, Garnett ES, Coates G. Nigrostriatal dopaminergic activity is increased during exhaustive exercise stress in rats. *Life Sci.* 1988;42:1537–1542.
10. Meeusen R, De Meirleir K. Microdialysis as a method to measure central catecholamines during exercise. *Med Sci Sports Exerc.* 1994;26:S23.
11. Tillerson JL, Cohen AD, Caudle WM, et al. Forced nonuse in unilateral parkinsonian rats exacerbates injury. *Neuroscience.* 2002;22:6790–6799.
12. Fisher BE, Petzinger GM, Nixon K, et al. Exercise-induced behavioral recovery and neuroplasticity in the 1-methyl-4-phenyl- 1,2,3,6-tetrahydropyridine-lesioned mouse basal ganglia. *J Neurosci Res.* 2004; 77:378–390.
13. Tillerson JL, Caudle WM, Reveron ME, Miller GW. Exercise induced behavioral recovery and attenuates neurochemical deficits in rodent models of Parkinson's disease. *Neuroscience.* 2003;119:899–911.

- 14.** Herman T, Giladi N, Gruendlinger L, Hausdorff JM. Six weeks of intensive treadmill training improves gait and quality of life in patients with Parkinson's disease: a pilot study. *Arch Phys Med Rehabil.* 2007; 88:1154–1158.
- 15.** van Eijkeren FJ, Reijmers RS, Kleinveld MJ, et al. Nordic walking improves mobility in Parkinson's disease. *Mov Disord.* 2008; 23:2239–2243.
- 16.** Muhlack S, Welnic J, Woitalla D, Muller T. Exercise improves efficacy of levodopa in patients with Parkinson's disease. *Mov Disord.* 2007;22:427–430.
- 17.** Cianci H. *Parkinson's Disease: Fitness Counts.* 3rd ed. Miami, FL: National Parkinson Foundation; 2006.
- 18.** Argue J. *Parkinson's Disease and the Art of Moving.* Oakland, CA: New Harbinger Publications; 2000.
- 19.** Zid D. *Delay the Disease: Exercise and Parkinson's Disease.* Columbus, OH: Columbus Health Works Production; 2007.
- 20.** Palmer SS, Mortimer JA, Webster DD, et al. Exercise therapy for Parkinson's disease. *Arch Phys Med Rehabil.* 1986;67: 741–745.
- 21.** Comella CL, Stebbins GT, Brown-Toms N, Goetz CG. Physical therapy and Parkinson's disease: a controlled clinical trial. *Neurology.* 1994;44(3 pt 1):376 –378.
- 22.** Schenkman M, Cutson TM, Kuchibhatla M, et al. Exercise to improve spinal flexibility and function for people with Parkinson's disease: a randomized controlled trial. *J Am Geriatr Soc.* 1998;46:1207–1216.
- 23.** Hirsch MA, Toole T, Maitland CG, Rider RA. The effects of balance training and high-intensity resistance training on persons with idiopathic Parkinson's disease. *Arch Phys Med Rehabil.* 2003;84: 1109–1117.
- 24.** Ellis T, de Goede CJ, Feldman RG, et al. Efficacy of physical therapy program in patients with Parkinson's disease: a randomized controlled trial. *Arch Phys Med Rehabil.* 2005;86:626–632.
- 25.** Protas EJ, Mitchell K, Williams A, et al. Gait and step training to reduce falls in Parkinson's disease. *NeuroRehabilitation.* 2005; 20:183–190.
- 26.** Burini D, Farabollini B, Iacucci S, et al. A randomised controlled cross-over trial of aerobic training versus Qigong in advanced Parkinson's disease. *Eura Medicophys.* 2006;42:231–238.

27. Dibble LE, Hale TF, Marcus RL, et al. Highintensity resistance training amplifies muscle hypertrophy and functional gains in persons with Parkinson's disease. *Mov Disord.* 2006;21:1444–1452.
28. Schmitz-Hubsch T, Pyfer D, Kielwein K, et al. Qigong exercise for the symptoms of Parkinson's disease: a randomized, controlled pilot study. *Mov Disord.* 2006; 21:543–548.
29. Ashburn A, Fazakarley L, Ballinger C, et al. A randomised controlled trial of a home based exercise programme to reduce the risk of falling among people with Parkinson's disease. *J Neurol Neurosurg Psychiatry.* 2007;78:678–684.
30. Schmidt RA. *Motor Control and Learning: A Behavioral Emphasis.* Champaign, IL: Human Kinetics Inc; 1982.
31. Chu CJ, Jones TA. Experience-dependent structural plasticity in cortex heterotopic to focal sensorimotor cortical damage. *Exp Neurol.* 2000;166:403–414.
32. Isaacs KR, Anderson BJ, Alcantara AA, et al. Exercise and the brain: angiogenesis in the adult rat cerebellum after vigorous physical activity and motor skill learning. *J Cereb Blood Flow Metab.* 1992;12:110–119.
33. Colcombe S, Kramer AF. Fitness effects on the cognitive function of older adults: a meta-analytic study. *Psychol Sci.* 2003; 14:125–130.
34. Black JE, Isaacs KR, Anderson BJ, et al. Learning causes synaptogenesis, whereas motor activity causes angiogenesis, in cerebellar cortex of adult rats. *Proc Natl Acad Sci USA.* 1990;87:5568–5572.
35. Anderson BJ, Alcantara AA, Greenough WT. Motor-skill learning: changes in synaptic organization of the rat cerebellar cortex. *Neurobiol Learn Mem.* 1996;66: 221–229.
36. Sullivan KJ, Brown DA, Klassen T, et al. Effects of task-specific locomotor and strength training in adults who were ambulatory after stroke: results of the STEPS randomized clinical trial. *Phys Ther.* 2007; 87:1580–1602; discussion 1603–1587.
37. Wolf SL, Winstein CJ, Miller JP, et al. Retention of upper limb function in stroke survivors who have received constraintinduced movement therapy: the EXCITE randomised trial. *Lancet Neurol.* 2008; 7:33– 40.
38. Morris M, Iansek R, Matyas TA, Summers JJ. Stride length regulation in Parkinson's disease normalization strategies and underlying mechanisms. *Brain.* 1996;119: 551–568.
39. Viliani T, Pasquetti P, Magnolfi S, et al. Effects of physical training on straighteningup processes in patients with Parkinson's disease. *Disabil Rehabil.* 1999;21:68 –73.

40. Mak MK, Hui-Chan CW. Cued task-specific training is better than exercise in improving sit-to-stand in patients with Parkinson's disease: a randomized controlled trial. *Mov Disord*. 2008;23:501–509.
41. Jobges M, Heuschkel G, Pretzel C, et al. Repetitive training of compensatory steps: a therapeutic approach for postural instability in Parkinson's disease. *J Neurol Neurosurg Psychiatry*. 2004;75:1682–1687.
42. Farley BG, Koshland GF. Training BIG to move faster: the application of the speedamplitude relation as a rehabilitation strategy for people with Parkinson's disease. *Exp Brain Res*. 2005;167:462–467.
43. Melnick M. *Neurologic Rehabilitation*. 3rd ed. St Louis, MO: Mosby; 1995.
44. Wierzbicka MM, Wiegner AW, Logigian EL, Young RR. Abnormal most-rapid isometric contractions in patients with Parkinson's disease. *J Neurol Neurosurg Psychiatry*. 1991;54:210–216.
45. Stelmach GE, Teasdale N, Phillips J, Worringham CJ. Force production characteristics in Parkinson's disease. *Exp Brain Res*. 1989;76:165–172.
46. Corcos DM, Chen CM, Quinn NP, et al. Strength in Parkinson's disease: relationship to rate of force generation and clinical status. *Ann Neurol*. 1996;39:79–88.
47. Inkster LM, Eng JJ, MacIntyre DL, Stoessl AJ. Leg muscle strength is reduced in Parkinson's disease and relates to the ability to rise from a chair *Mov Disord*. 2003; 18:157–162.
48. Carpinella I, Crenna P, Calabrese E, et al. Locomotor function in the early stage of Parkinson's disease. *IEEE Trans Neural Syst Rehabil Eng*. 2007;15:543–551.
49. Rochester L, Hetherington V, Jones D, et al. Attending to the task: interference effects of functional tasks on walking in Parkinson's disease and the roles of cognition, depression, fatigue, and balance. *Arch Phys Med Rehabil*. 2004;85:1578–1585.
50. Maschke M, Gomez CM, Tuite PJ, Konczak J. Dysfunction of the basal ganglia, but not the cerebellum, impairs kinaesthesia. *Brain*. 2003;126(pt 10):2312–2322.
51. Chong RK, Horak FB, Woollacott MH. Parkinson's disease impairs the ability to change set quickly. *J Neurol Sci*. 2000; 175:57–70.
52. Yehene E, Meiran N, Soroker N. Basal ganglia play a unique role in task switching within the frontal-subcortical circuits: evidence from patients with focal lesions. *J Cogn Neurosci*. 2008; 20:1079–1093.
53. Taniwaki T, Okayama A, Yoshiura T, et al. Reappraisal of the motor role of basal ganglia: a functional magnetic resonance image study. *J Neurosci*. 2003;23:3432–3438.

54. Brown P, Marsden CD. What do the basal ganglia do? *Lancet*. 1998;351(9118): 1801–1804.
55. Wright WG, Gurfinkel VS, Nutt JG, et al. Axial hypertonicity in Parkinson's disease: direct measurements of trunk and hip torque. *Exp Neurol*. 2007;208:38–46.
56. Burleigh A, Horak FB, Nutt JG, Frank JS. Levodopa reduces muscle tone and lower extremity tremor in Parkinson's disease. *Can J Neurol Sci*. 1995;22:280–285.
57. Mak MK, Wong EC, Hui-Chan CW. Quantitative measurement of trunk rigidity in parkinsonian patients. *J Neurol*. 2007;254: 202–209.
58. Jacobs JV, Dimitrova DM, Nutt JG, Horak FB. Can stooped posture explain multidirectional postural instability in patients with Parkinson's disease? *Exp Brain Res*. 2005;166:78–88.
59. Schenkman ML, Morey M, Kuchibhatla M. Spinal flexibility and balance control among community-dwelling adults with and without Parkinson's disease. *J Gerontol A Bio Sci Med Sci*. 2000;55:M441–M445.
60. Schenkman ML, Clark K, Xie T, et al. Spinal movement and performance of a standing reach task in participants with and without Parkinson disease. *Phys Ther*. 2001;81:1400–1411.
61. Dimitrova D, Horak FB, Nutt JG. Postural muscle responses to multidirectional translations in patients with Parkinson's disease. *J Neurophysiol*. 2004;91:489–501.
62. Vaugoyeau M, Viallet F, Aurenty R, et al. Axial rotation in Parkinson's disease. *J Neurol Neurosurg Psychiatry*. 2006;77:815–821.
63. Schenkman ML, Cutson TM, Kuchibhatla M, et al. Exercise to improve spinal flexibility and function for people with Parkinson's disease: a randomized, controlled trial. *J Am Geriatr Soc*. 1998;46:1207–1216.
64. Horak FB, Dimitrova D, Nutt JG. Direction-specific postural instability in subjects with Parkinson's disease. *Exp Neurol*. 2005;193:504–521.
65. Frank JS, Horak FB, Nutt JG. Centrally initiated postural adjustments in parkinsonian patients on and off levodopa. *J Neurophysiol*. 2000;84:2440–2448.
66. Burleigh-Jacobs A, Horak FB, Nutt JG, Obeso JA. Step initiation in Parkinson's disease: influence of levodopa and external sensory triggers. *Mov Disord*. 1997; 12:206–215.
67. King LA, Horak FB. Lateral stepping for postural correction in Parkinson's disease. *Arch Phys Med Rehabil*. 2008;89: 492–499.
68. Mancini M, Rocchi L, Horak FB, Chiari L. Effects of Parkinson's disease and levodopa

on functional limits of stability. *Clin Biomech (Bristol, Avon)*. 2008;23:450–458.

**69.** Rocchi L, Chiari L, Mancini M, et al. Step initiation in Parkinson's disease: influence of initial stance conditions. *Neurosci Lett*. 2006;406:128–132.

**70.** Mak MK, Patla A, Hui-Chan C. Sudden turn during walking is impaired in people with Parkinson's disease. *Exp Brain Res*. 2008; 190:43–51.

**71.** Pfann KD, Buchman AS, Comella CL, Corcos DM. Control of movement distance in Parkinson's disease. *Mov Disord*. 2001;16: 1048–1065.

**72.** Farley BG, Sherman S, Koshland GF. Shoulder muscle activity in Parkinson's disease during multijoint arm movements across a range of speeds. *Exp Brain Res*. 2004; 154:160–175.

**73.** Glendinning DS, Enoka RM. Motor unit behavior in Parkinson's disease. *Phys Ther*. 1994;74:61–70.

**74.** Salenius S, Avikainen S, Kaakkola S, et al. Defective cortical drive to muscles in Parkinson's disease and its improvements with levodopa. *Brain*. 2002;125:491–500.

**75.** Yanagawa S, Shindo M, Yanagisawa N. *Muscular Weakness in Parkinson's Disease*. Vol. 53. New York, NY: Raven Press; 1990.

**76.** Giladi N, Kao R, Fahn S. Freezing phenomenon in patients with parkinsonian syndromes. *Mov Disord*. 1997;12:302–305.

**77.** Bloem BR, Hausdorff JM, Visser JE, Giladi N. Falls and freezing of gait in Parkinson's disease: a review of two interconnected, episodic phenomena. *Mov Disord*. 2004; 19:871–884.

**78.** Giladi N, McDermott MP, Fahn S, et al. Freezing of gait in PD: prospective assessment in the DATATOP cohort. *Neurology*. 2001;56:1712–1721.

**79.** Giladi N, Hausdorff JM. The role of mental function in the pathogenesis of freezing of gait in Parkinson's disease. *J Neurol Sci*. 2006;248:173–176.

**80.** Jacobs JV, Horak FB. External postural perturbations induce multiple anticipatory postural adjustments when subjects cannot pre-select their stepping foot. *Exp Brain Res*. 2007;179:29–42.

**81.** Chong RKY, Jones CL, Horak FB. Postural set for balance control is normal in Alzheimer's but not in Parkinson's Disease. *J Gerontol A Biol Sci med Sci*. 1999;54: M129–M135.

**82.** Tunik E, Feldman AG, Poizner H. Dopamine replacement therapy does not restore the ability of Parkinsonian patients to make rapid adjustments in motor strategies according to changing sensorimotor contexts. *Parkinsonism Relat Disord*.

2007;13:425–433.

- 83.** Horak FB, Nutt JG, Nashner LM. Postural inflexibility in parkinsonian subjects. *J Neurol Sci.* 1992;111:46–58.
- 84.** Steiger MJ, Thompson PD, Marsden CD. Disordered axial movement in Parkinson's disease. *J Neurol Neurosurg Psychiatry.* 1996;61:645–648.
- 85.** Brown RG, Marsden CD. Dual-task performance and processing resources in normal subjects and patients with Parkinson's disease. *Brain.* 1991;114(pt 1A):215–231.
- 86.** Bloem BR, Grimbergen YA, van Dijk JG, Munneke M. The “posture second” strategy: a review of wrong priorities in Parkinson's disease. *J Neurol Sci.* 2006;248:196–204.
- 87.** DeLong MR. The neurophysiologic basis of abnormal movement in basal ganglia disorders. *Neurobehav Toxicol Teratol.* 1983;5:811–816.
- 88.** Lidsky T, Manetto C, Schneider J. A consideration of sensory factors involved in motor functions of the basal ganglia. *Brain Res.* 1985;356:133–146.
- 89.** Snider SR, Isgreen WP, Cote LJ. Primary sensory systems in Parkinsonism. *Neurology.* 1976;26:423–429.
- 90.** Diamond SG, Schneider JS, Markham CH. Oral sensorimotor defects in patients with Parkinson's disease. *Adv Neurol.* 1986;45: 335–338.
- 91.** Jobst EE, Melnick ME, Byl NN, et al. Sensory perception in Parkinson's disease. *Arch Neurol.* 1997;54:450–454.
- 92.** Zia S, Cody FWJ, O'Boyle DJ. Disturbance of human joint position sense in Parkinson's disease. *J Physiol.* 1997;504:117–118.
- 93.** Zia S, Cody FWJ, O'Boyle DJ. Impairment of discrimination of bilateral differences in the loci of tactile stimuli in Parkinson's disease. *J Physiol.* 1998;509:180–181.
- 94.** Klockgether T, Borutta M, Rapp H, et al. A defect of kinesthesia in Parkinson's disease. *Mov Disord.* 1995;10:460–465.
- 95.** O'Sullivan SB, Schmitz TJ. *Physical Rehabilitation: Assessment and Treatment.* Philadelphia: FA Davis Company; 1994.
- 96.** Lundin-Olsson L, Nyberg L, Gustafson Y. “Stops walking when talking” as a predictor of falls in elderly people. *Lancet.* 1997;349(9052):617.
- 97.** Marchese R, Bove M, Abbruzzese G. Effect of cognitive and motor tasks on postural stability in Parkinson's disease: a posturographic study. *Mov Disord.* 2003;18:652–658.