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## **Syncope : an integrative physiological approach**

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## **Curriculum vitae**

Roland Derk Thijs was born in Amsterdam on September 15, 1974. In 1992 he obtained his “gymnasium” diploma at the “Eerste Christelijk Lyceum” in Haarlem. Afterwards, he studied Medicine at Utrecht University, where passed his “propedeuse” level examination cum laude in 1993. During his studies he tutored courses in embryology, microscopic anatomy, neuroanatomy and medical ethics. As a student he became involved in a research project into the distribution of weakness of central and peripheral origin at the Department of Neurology (prof JHJ Wokke). In addition, he participated in a research project at the Welsh Epilepsy Unit (dr MP Kerr) supported by an EU funded SOCRATES grant. As part of his clinical internships he worked at the department of Gynaecology & Obstetrics of the United Bulawayo Hospitals in Zimbabwe (dr DAA Verkuyl). In 1999 he obtained his Medical Degree. In 2000 he commenced his residency in Neurology at Leiden University Medical Centre (Prof RAC Roos) and in 2002 he started this PhD research project (Prof JG van Dijk). Parts of research in this thesis were awarded by the American Autonomic Society (AAS) and the European Federation of Neurological Societies (EFNS). He received his certificate in Neurology in April 2008. Hereafter, he started as a neurologist at the Dutch Epilepsy Clinics Foundation (SEIN, Stichting Epilepsie Instellingen Nederland), Heemstede, the Netherlands.



## List of publications

1. Thijs RD, Wieling W, van Dijk JG. Status vasovagalis. Lancet (*in press*)
2. Thijs RD, van Dijk JG. How do feelings cause faints? (editorial) Clin Neurophysiol (*in press*)
3. Thijs RD, van den Aardweg JG, Reijntjes RHAM, van Dijk JG, van Lieshout JJ. Contrasting effects of isocapnic and hypocapnic hyperventilation on orthostatic circulatory control. Journal of Applied Physiology (*in press*)
4. Thijs RD, Willem A. Wagenaar WA, Middelkoop HAM, Wieling W, van Dijk JG. Transient loss of consciousness through the eyes of a witness.. Neurology (*in press*)
5. van Dijk JG, Thijs RD, Wieling W. Prognosis of transient neurological attacks (letter). JAMA 2008 299(15):1771-2.
6. Thijs RD, Wieling W, van den Aardweg JG, van Dijk JG. Respiratory countermeasures in autonomic failure. Neurology 2007; 69(6):582-5.
7. Thijs RD, van Dijk JG, Stephenson JBP, Wieling W. Mind-stretching faints (editorial). Epileptic Disorders 2007; 9(4):418-23.
8. Thijs RD, Buijnzeels M, Kamper AM, van Dijk AD, van Dijk JG. Assessment of orthostatic fluid shifts with strain gauge plethysmography. Clin Sci 2007 113(9):369-74.
9. Thijs RD, van Dijk JG. Hyperventilation in autonomic failure (letter). Int J Clin Pract 2007; 61(4):695.
10. Thijs RD, Kruit MC, van Buchem MA, Ferrari MD, Launer LJ, van Dijk JG. Syncope in migraine: the population-based CAMERA study. Neurology 2006;66(7):1034-7.
11. Thijs RD, van Dijk JG. Stress induced hypotension in pure autonomic failure. J Neurol Neurosurg Psychiatry. 2006; 77(4):552-3.
12. Thijs RD, Hazekamp MG, Rijlaarsdam ME, Willems SM, Schutte PJ, Laan LA. An unexpected cause of a recurrent cerebral hemorrhage. Neuropediatrics. 2005;36(5): 324-7.
13. Thijs RD, Benditt DG, Mathias CJ, Schondorf R, Sutton R, Wieling W, van Dijk JG. Unconscious confusion. A literature search for definitions of syncope and related disorders. Clin Auton Res 2005;15(1):35-9.
14. Thijs RD, Granneman E, Wieling W, van Dijk JG. Gebruikte termen voor ‘voorbijgaande bewusteloosheid’ op de Eerste Hulp; een inventarisatie. Ned Tijdschr Geneesk 2005;149(29):1625-30.

15. Thijs RD, Wieling W, Kaufmann H, van Dijk G. Defining and classifying syncope. Clin Auton Res 2004;14 (Suppl 1):4-8.
16. Thijs RD, Reijntjes RHAM, van Dijk JG. Water drinking as a potential treatment for idiopathic exercise-related syncope: a case report. Clin Auton Res 2003; 13(2):103-5.
17. Thijs RD, Wijman CA, van Dijk GW, van Gijn J. A case of bilateral medial medullary infarction demonstrated by magnetic resonance imaging with diffusion-weighted imaging. J Neurol 2001;248(4):339-340.
18. Thijs RD, Notermans NC, Wokke JH, van der Graaf Y, van Gijn J. Distribution of muscle weakness of central and peripheral origin. J Neurol Neurosurg Psychiatry 1998;65(5):794-796.
19. Thijs RD, Kerr MP. The outcome of prescribing novel anticonvulsants in an outpatient setting: factors affecting response to medication. Seizure 1998;7(5):379-383.
20. Thijs RD. The need for education on a moral debate. Issues in Medical Ethics 1997; 5: 80-82.

### **Book Chapters**

1. Thijs RD, van Dijk JG. De wegraking: een diagnostisch dilemma voor de neuroloog. In: Het medisch jaar 2007. Keeman JN, de Leeuw PW, Mazel JA en Zitman FG (redactie). Houten: Bohn Stafleu van Loghum, 2007: 29-39.
2. van Dijk JG, Thijs RD. Cerebral perfusion in syncope. In: Syncope and transient loss of consciousness. Benditt DG, Brignole M, Raviele A en Wieling W. Oxford: Blackwell Publishing 2007: 20-23.
3. Thijs RD. Een spiegel in het brein. In: Tante krijgt een zenuwtoeval en andere essays over neurologie en literatuur. Haan J, Meulenbergh F en Maassen H (redactie). Overveen: Belvédère, 2006: 224-228.

## References

- 1 La Chanson de Roland. English translation of Charles Scott Moncrief (London, 1919). Verses CLXIV to CLXV. <http://www.orbilat.com/Languages/French/Texts/> .
- 2 Adams SL, Martin GJ. Syncope. Evaluation and general considerations. In: Schwartz GR, ed. *Principles and practice of emergency medicine*. Baltimore: Williams&Wilkins, 1998: 1071-4.
- 3 Alboni P, Brignole M, Menozzi C, *et al.* Clinical spectrum of neurally mediated reflex syncope. *Europace* 2004; **6**:55-62.
- 4 Alboni P, Brignole M, Menozzi C, *et al.* Diagnostic value of history in patients with syncope with or without heart disease. *J Am Coll Cardiol* 2001; **37**:1921-8.
- 5 Anonymous. E.P. Sharpey-Schafer. *Br Med J* 1963; **2**:1135-6.
- 6 Anthonisen NR, Bartlett D, Jr., Tenney SM. Postural effect on ventilatory control. *J Appl Physiol* 1965; **20**:191-6.
- 7 Asmussen E, Christensen EH, Nielsen M. The regulation of circulation in different postures. *Surgery* 1940; **8**:604-16.
- 8 Atheniensis S. Commentary on Hippocrates' Aphorisms. Berlin: Akademie-Verlag, 1992.
- 9 Badra LJ, Cooke WH, Hoag JB, *et al.* Respiratory modulation of human autonomic rhythms. *Am J Physiol Heart Circ Physiol* 2001; **280**:H2674-H2688.
- 10 Bannister R, Ardill L, Fentem P. Defective autonomic control of blood vessels in idiopathic orthostatic hypotension. *Brain* 1967; **90**:725-46.
- 11 Bannister R, Mathias CJ. Clinical features and evaluation of the primary chronic autonomic failure syndromes. In: Mathias CJ, Bannister R, eds. *Autonomic failure. A textbook of clinical disorders of the autonomic nervous system*. Oxford: Oxford University Press, 1999: 307-16.
- 12 Barcroft H, Edholm OG, McMichael J, *et al.* Posthaemorrhagic fainting: study by cardiac output and forearm flow. *Lancet* 1944; **246**:489-91.
- 13 Beckman HB, Frankel RM. The effect of physician behavior on the collection of data. *Ann Intern Med* 1984; **101**:692-6.
- 14 Benbadis SR, Wolgamuth BR, Goren H, *et al.* Value of tongue biting in the diagnosis of seizures. *Arch Intern Med* 1995; **155**:2346-9.
- 15 Benditt DG. Syncope. In: Topol EJ, ed. *Textbook of cardiovascular medicine*. Philadelphia: Lippincot-Raven Publishers, 1998: 1807-27.
- 16 Bjornstad H, Storstein L, Meen HD, *et al.* Electrocardiographic findings in athletic students and sedentary controls. *Cardiology* 1991; **79**:290-305.
- 17 Blanc JJ, L'Her C, Touiza A, *et al.* Prospective evaluation and outcome of patients admitted for syncope over a 1 year period. *Eur Heart J* 2002; **23**:815-20.
- 18 Bland JM, Altman DG. Statistical methods for assessing agreement between two methods of clinical measurement. *Lancet* 1986; **1**:307-10.

- 19 Blinn KA, Noell WK. Continuous measurement of alveolar CO<sub>2</sub> tension during the hyperventilation test in routine electroencephalography. *Electroencephalogr Clin Neurophysiol* 1949; **1**:333-42.
- 20 Blume WT, Luders HO, Mizrahi E, *et al.* Glossary of descriptive terminology for ictal semiology: report of the ILAE task force on classification and terminology. *Epilepsia* 2001; **42**:1212-8.
- 21 Boiardi A, Munari L, Milanesi I, *et al.* Impaired cardiovascular reflexes in cluster headache and migraine patients: evidence for an autonomic dysfunction. *Headache* 1988; **28**:417-22.
- 22 Boudoulas H, Nelson SD, Schaal SF, Lewis RP. Diagnosis and management of syncope. In: Fuster V, Alexander RW, O'Rourke RA, eds. *Hurst's the heart*. New York: McGraw-Hill, 1998: 995--1000.
- 23 Bouvette CM, McPhee BR, Opfer-Gehrking TL, *et al.* Role of physical countermeasures in the management of orthostatic hypotension: efficacy and biofeedback augmentation. *Mayo Clin Proc* 1996; **71**:847-53.
- 24 Bradbury S, Eggleston C. Postural hypotension. A report of three cases. *Am Heart J* 1925; **1**:73-86.
- 25 Brain P. Galen on bloodletting. A study of the origins, development and validity of his opinions, with a translation of the three works. 1st ed. Cambridge: Cambridge University Press, 1986.
- 26 Brecher GA. The respiratory pump. In: Brecher GA, ed. *Venous Return*. New York: Grune & Stratton, 1956: 71-90.
- 27 Brenner RP. Electroencephalography in syncope. *J Clin Neurophysiol* 1997; **14**:197-209.
- 28 Brignole M, Alboni P, Benditt D, *et al.* Guidelines on management (diagnosis and treatment) of syncope. *Eur Heart J* 2001; **22**:1256-306.
- 29 Brignole M, Alboni P, Benditt DG, *et al.* Guidelines on management (diagnosis and treatment) of syncope--update 2004. *Europace* 2004; **6**:467-537.
- 30 Brignole M, Thijs R, Wieling W, *et al.* Is a syncope a syncope? *Ital Heart J* 2003; **4**:145-7.
- 31 Brown CM, Hainsworth R. Assessment of capillary fluid shifts during orthostatic stress in normal subjects and subjects with orthostatic intolerance. *Clin Auton Res* 1999; **9**:69-73.
- 32 Brown CM, Stemper B, Welsch G, *et al.* Orthostatic challenge reveals impaired vascular resistance control, but normal venous pooling and capillary filtration in familial dysautonomia. *Clin Sci (Lond)* 2003; **104**:163-9.
- 33 Brown GE, Wood EH, Lambert EH. Effects of tetra-ethyl-ammonium chloride on the cardiovascular reactions in man to changes in posture and exposure to centrifugal force. *J Appl Physiol* 1949; **2**:117-32.
- 34 Bruni J. Episodic impairment of consciousness. In: Bradley WG, Daroff RB, Fennel GM, Jankovic J, eds. *Neurology in clinical practice. Principles of diagnosis and management*. Philadelphia: Butterworth Heinemann, 2004: 11-21.

- 35 Buckey JC, Peshock RM, Blomqvist CG. Deep venous contribution to hydrostatic blood volume change in the human leg. *Am J Cardiol* 1988; **62**:449-53.
- 36 Burnum JF, Hickam JB, McIntosh HD. The effect of hypocapnia on arterial blood pressure. *Circulation* 1954; **9**:89-95.
- 37 Burnum JF, Hickam JB, Stead EA, Jr. Hyperventilation in postural hypotension. *Circulation* 1954; **10**:362-5.
- 38 Calkins H, Zipes DP. Hypotension and syncope. In: Braunwald E, Zipes DP, Libby P, eds. *Heart Disease: a textbook of cardiovascular medicine*. Philadelphia: W.B.Saunders Company, 2001: 932.
- 39 Calkins H, Byrne M, el Atassi R, *et al*. The economic burden of unrecognized vasodepressor syncope. *Am J Med* 1993; **95**:473-9.
- 40 Calkins H, Seifert M, Morady F. Clinical presentation and long-term follow-up of athletes with exercise- induced vasodepressor syncope. *Am Heart J* 1995; **129**:1159-64.
- 41 Calkins H, Shyr Y, Frumin H, *et al*. The value of the clinical history in the differentiation of syncope due to ventricular tachycardia, atrioventricular block, and neurocardiogenic syncope. *Am J Med* 1995; **98**:365-73.
- 42 Carey BJ, Eames PJ, Panerai RB, *et al*. Carbon dioxide, critical closing pressure and cerebral haemodynamics prior to vasovagal syncope in humans. *Clin Sci (Lond)* 2001; **101**:351-8.
- 43 Chadwick D, Smith D. The misdiagnosis of epilepsy. *BMJ* 2002; **324**:495-6.
- 44 Chandler MP, Mathias CJ. Haemodynamic responses during head-up tilt and tilt reversal in two groups with chronic autonomic failure: pure autonomic failure and multiple system atrophy. *J Neurol* 2002; **249**:542-8.
- 45 Charcot JM. Séance du 19 Novembre 1876. *Gazette Medicale Paris* 1876; **5**:588-9.
- 46 Chaudhuri KR, Thomaidis T, Mathias CJ. Abnormality of superior mesenteric artery blood flow responses in human sympathetic failure. *J Physiol* 1992; **457**:477-89.
- 47 Chen L, Chen MH, Larson MG, *et al*. Risk factors for syncope in a community-based sample (the Framingham Heart Study). *Am J Cardiol* 2000; **85**:1189-93.
- 48 Chen-Scarabelli C, Scarabelli TM. Neurocardiogenic syncope. *BMJ* 2004; **329**:336-41.
- 49 Christianson SA. Emotional stress and eyewitness memory: a critical review. *Psychol Bull* 1992; **112**:284-309.
- 50 Chung SS, Gerber P, Kirilin KA. Ictal eye closure is a reliable indicator for psychogenic nonepileptic seizures. *Neurology* 2006; **66**:1730-1.
- 51 Colivicchi F, Ammirati F, Biffi A, *et al*. Exercise-related syncope in young competitive athletes without evidence of structural heart disease. Clinical presentation and long-term outcome. *Eur Heart J* 2002; **23**:1125-30.
- 52 Colman N, Nahm K, Ganzeboom KS, *et al*. Epidemiology of reflex syncope. *Clin Auton Res* 2004; **14 Suppl 1**:i9-i17.



- 53 Colman N, Nahm K, van Dijk JG, *et al.* Diagnostic value of history taking in reflex syncope. *Clin Auton Res* 2004; **14 Suppl 1**:37-44.
- 54 Convertino VA, Doerr DF, Flores JF, *et al.* Leg size and muscle functions associated with leg compliance. *J Appl Physiol* 1988; **64**:1017-21.
- 55 Convertino VA, Ratliff DA, Crissey J, *et al.* Effects of inspiratory impedance on hemodynamic responses to a squat-stand test in human volunteers: implications for treatment of orthostatic hypotension. *Eur J Appl Physiol* 2005; **94**:392-9.
- 56 Convertino VA, Ratliff DA, Eisenhower KC, *et al.* Inspiratory impedance effects on hemodynamic responses to orthostasis in normal subjects. *Aviation Space and Environmental Medicine* 2006; **77**:486-93.
- 57 Convertino VA, Ratliff DA, Ryan KL, *et al.* Hemodynamics associated with breathing through an inspiratory impedance threshold device in human volunteers. *Crit Care Med* 2004; **32**:S381-S386.
- 58 Cooke WH, Lurie KG, Rohrer MJ, *et al.* Human autonomic and cerebrovascular responses to inspiratory impedance. *J Trauma* 2006; **60**:1275-83.
- 59 Cotton TF, Lewis T. Observations upon fainting attacks due to inhibitory cardiac impulses. *Heart* 1918; **7**:23-34.
- 60 Crane SD. Risk stratification of patients with syncope in an accident and emergency department. *Emerg Med J* 2002; **19**:23-7.
- 61 Critchley HD, Mathias CJ, Josephs O, *et al.* Human cingulate cortex and autonomic control: converging neuroimaging and clinical evidence. *Brain* 2003; **126**:2139-52.
- 62 Curran-Everett D. Multiple comparisons: philosophies and illustrations. *Am J Physiol Regul Integr Comp Physiol* 2000; **279**:R1-R8.
- 63 Daroff RB, Carlson MD. Faintness, syncope, dizziness, and vertigo. In: Braunwald E, Fauci AS, Kasper DL, Hauser SL, Longo DL, Jameson JL, eds. *Harrison's principles of internal medicine*. New York: McGraw-Hill, 2001: 111-8.
- 64 Day SC, Cook EF, Funkenstein H, *et al.* Evaluation and outcome of emergency room patients with transient loss of consciousness. *Am J Med* 1982; **73**:15-23.
- 65 de Jong-de Vos van Steenwijk CC, Wieling W, Harms MP, *et al.* Variability of near-fainting responses in healthy 6-16-year-old subjects. *Clin Sci (Lond)* 1997; **93**:205-11.
- 66 Deacon C, Wiebe S, Blume WT, *et al.* Seizure identification by clinical description in temporal lobe epilepsy: how accurate are we? *Neurology* 2003; **61**:1686-9.
- 67 Denq JC, Opfer-Gehrking TL, Giuliani M, *et al.* Efficacy of compression of different capacitance beds in the amelioration of orthostatic hypotension. *Clin Auton Res* 1997; **7**:321-6.
- 68 Diagnostic and statistical manual of mental disorders D-I. Washington: American Psychiatric Association, 1994.
- 69 Ebbesen EB, Rienick CB. Retention interval and eyewitness memory for events and personal identifying attributes. *J Appl Psychol* 1998; **83**:745-62.

- 70 Eckberg DL. Bursting into space: alterations of sympathetic control by space travel. *Acta Physiol Scand* 2003; **177**:299-311.
- 71 Ellison KE, O'Gara PT. Approach to the patient with syncope. In: Hunes HD, ed. *Kelley's textbook of internal medicine*. Philadelphia: Lippincott Williams & Wilkins, 2000: 396-405.
- 72 Engel J, Jr. A proposed diagnostic scheme for people with epileptic seizures and with epilepsy: report of the ILAE Task Force on Classification and Terminology. *Epilepsia* 2001; **42**:796-803.
- 73 Faulkner M, Sharpey-Schafer EP. Circulatory effects of trumpet playing. *Br Med J* 1959; **1**:685-6.
- 74 Fitzpatrick AP, Banner N, Cheng A, *et al*. Vasovagal reactions may occur after orthotopic heart transplantation. *J Am Coll Cardiol* 1993; **21**:1132-7.
- 75 Fontana F, Bernardi P, Pich EM, *et al*. Opioid peptide modulation of circulatory response to hyperventilation in humans. *Peptides* 2000; **21**:1223-30.
- 76 Frey MA, Hoffler GW. Association of sex and age with responses to lower-body negative pressure. *J Appl Physiol* 1988; **65**:1752-6.
- 77 Fu Q, Arbab-Zadeh A, Perhonen MA, *et al*. Hemodynamics of orthostatic intolerance: implications for gender differences. *Am J Physiol Heart Circ Physiol* 2004; **286**:H449-H457.
- 78 Furlan R, Piazza S, Dell'Orto S, *et al*. Cardiac autonomic patterns preceding occasional vasovagal reactions in healthy humans. *Circulation* 1998; **98**:1756-61.
- 79 Gamble J, Christ F, Gartside IB. The effect of passive tilting on microvascular parameters in the human calf: a strain gauge plethysmography study. *J Physiol* 1997; **498** ( Pt 2):541-52.
- 80 Ganzeboom KS, Colman N, Reitsma JB, *et al*. Prevalence and triggers of syncope in medical students. *Am J Cardiol* 2003; **91**:1006-8, A8.
- 81 Ganzeboom KS, Mairuhu G, Reitsma JB, *et al*. Lifetime cumulative incidence of syncope in the general population: a study of 549 Dutch subjects aged 35-60 years. *J Cardiovasc Electrophysiol* 2006; **17**:1172-6.
- 82 Gardner WN. The pathophysiology of hyperventilation disorders. *Chest* 1996; **109**:516-34.
- 83 Gardner WN, Meah MS, Bass C. Controlled study of respiratory responses during prolonged measurement in patients with chronic hyperventilation. *Lancet* 1986; **2**:826-30.
- 84 Gastaut H. Syncopes: generalized anoxic cerebral seizures. In: Vincken PJ, Bruyn GW, eds. *Handbook of Clinical Neurology, Volume 15*. Amsterdam: North-Holland Publishing Company, 1974: 815-35.
- 85 Gastaut H, Fischer-Williams M. Electro-encephalographic study of syncope; its differentiation from epilepsy. *Lancet* 1957; **273**:1018-25.
- 86 Gisolf J, Wilders R, Immink RV, *et al*. Tidal volume, cardiac output and functional residual capacity determine end-tidal CO<sub>2</sub> transient during standing up in humans. *J Physiol* 2004; **554**:579-90.

- 87 Goadsby PJ, Lipton RB, Ferrari MD. Migraine--current understanding and treatment. *N Engl J Med* 2002; **346**:257-70.
- 88 Goldstein DS, Holmes C, Frank SM, *et al.* Sympathoadrenal imbalance before neurocardiogenic syncope. *Am J Cardiol* 2003; **91**:53-8.
- 89 Gotoh F, Komatsumoto S, Araki N, *et al.* Noradrenergic nervous activity in migraine. *Arch Neurol* 1984; **41**:951-5.
- 90 Gowers WR. A lecture on vagal and vasovagal attacks. *Lancet* 1907;1551-4.
- 91 Grubb BP, Karras B. Neurally mediated syncope. In: Mathias CJ, Bannister R, eds. *Autonomic Failure. A textbook of clinical disorders of the autonomic nervous system*. Oxford: Oxford University Press, 1999: 437-47.
- 92 Grubb BP, Samoilo D, Kosinski D, *et al.* Cerebral syncope: loss of consciousness associated with cerebral vasoconstriction in the absence of systemic hypotension. *Pacing Clin Electrophysiol* 1998; **21**:652-8.
- 93 Grubb BP, Temesy-Armos PN, Samoilo D, *et al.* Tilt table testing in the evaluation and management of athletes with recurrent exercise-induced syncope. *Med Sci Sports Exerc* 1993; **25**:24-8.
- 94 Guyenet PG. The sympathetic control of blood pressure. *Nat Rev Neurosci* 2006; **7**:335-46.
- 95 Guyton AC. *Textbook of Medical Physiology*. 8th ed. Philadelphia: WB Saunders Company, 1991.
- 96 Haack S. *Manifesto of a passionate moderate. Unfashionable essays*. 1st ed. Chicago: The University of Chicago Press, 1998.
- 97 Haidet P, Paterniti DA. "Building" a history rather than "taking" one: a perspective on information sharing during the medical interview. *Arch Intern Med* 2003; **163**:1134-40.
- 98 Hainsworth R. Syncope and fainting: classification and pathophysiological basis. In: Mathias CJ, Bannister R, eds. *Autonomic Failure. A textbook of clinical disorders of the autonomic nervous system*. Oxford: Oxford University Press, 1999: 428-36.
- 99 Hainsworth R. Pathophysiology of syncope. *Clin Auton Res* 2004; **14 Suppl 1**:18-24.
- 100 Hainsworth R, Drinkhill MJ. Counterpoint: active venoconstriction is not important in maintaining or raising end-diastolic volume and stroke volume during exercise and orthostasis. *J Appl Physiol* 2006; **101**:1264-5.
- 101 Harms MP, Wesseling KH, Pott F, *et al.* Continuous stroke volume monitoring by modelling flow from non-invasive measurement of arterial pressure in humans under orthostatic stress. *Clin Sci (Lond)* 1999; **97**:291-301.
- 102 Havanka-Kannianen H, Tolonen U, Myllyla VV. Autonomic dysfunction in adult migraineurs. *Headache* 1986; **26**:425-30.
- 103 Havanka-Kannianen H, Tolonen U, Myllyla VV. Autonomic dysfunction in migraine: a survey of 188 patients. *Headache* 1988; **28**:465-70.

- 104 Havanka-Kannianinen H, Juujarvi K, Tolonen U, *et al.* Cardiovascular reflexes and plasma noradrenaline levels in migraine patients before and during nimodipine medication. *Headache* 1987; **27**:39-44.
- 105 Headache Classification Subcommittee of the International Headache Society. International Classification of Headache Disorders: 2nd edition. *Cephalalgia* 2004; **24** (Suppl 1):9-160.
- 106 Heaton KW. Faints, fits, and fatalities from emotion in Shakespeare's characters: survey of the canon. *BMJ* 2006; **333**:1335-8.
- 107 Henry RA, Lu IL, Beightol LA, *et al.* Interactions between CO<sub>2</sub> chemoreflexes and arterial baroreflexes. *Am J Physiol* 1998; **274**:H2177-H2187.
- 108 Hernandez JP, Franke WD. Age- and fitness-related differences in limb venous compliance do not affect tolerance to maximal lower body negative pressure in men and women. *J Appl Physiol* 2004; **97**:925-9.
- 109 Hoefnagels WA, Padberg GW, Overweg J, *et al.* Transient loss of consciousness: the value of the history for distinguishing seizure from syncope. *J Neurol* 1991; **238**:39-43.
- 110 Holtzhausen LM, Noakes TD. The prevalence and significance of post-exercise (postural) hypotension in ultramarathon runners. *Med Sci Sports Exerc* 1995; **27**:1595-601.
- 111 Honda N. Temperature compensation for mercury strain gauge used in plethysmography. *J Appl Physiol* 1962; **17**:572-4.
- 112 Honda Y. Respiratory and circulatory activities in carotid body-resected humans. *J Appl Physiol* 1992; **73**:1-8.
- 113 Hornsveld HK, Garssen B, Dop MJ, *et al.* Double-blind placebo-controlled study of the hyperventilation provocation test and the validity of the hyperventilation syndrome. *Lancet* 1996; **348**:154-8.
- 114 Horrocks IA, Nechay A, Stephenson JB, *et al.* Anoxic-epileptic seizures: observational study of epileptic seizures induced by syncopes. *Arch Dis Child* 2005; **90**:1283-7.
- 115 Howard P, Leathart GL, Dornhorst AC, *et al.* The mess trick and the fainting lark. *Br Med J* 1951; **2**:382-4.
- 116 Ide K, Eliasziw M, Poulin MJ. The relationship between middle cerebral artery blood velocity and end-tidal PCO<sub>2</sub> in the hypocapnic-hypercapnic range in humans. *J Appl Physiol* 2003.
- 117 Imholz BP, Wieling W, van Montfrans GA, *et al.* Fifteen years experience with finger arterial pressure monitoring: assessment of the technology. *Cardiovasc Res* 1998; **38**:605-16.
- 118 Immink RV, Secher NH, Roos CM, *et al.* The postural reduction in middle cerebral artery blood velocity is not explained by PaCO<sub>2</sub>. *Eur J Appl Physiol* 2006; **96**:609-14.
- 119 Immink RV, van den Born BJ, van Montfrans GA, *et al.* Impaired cerebral autoregulation in patients with malignant hypertension. *Circulation* 2004; **110**:2241-5.
- 120 Jacob G, Costa F, Shannon JR, *et al.* The neuropathic postural tachycardia syndrome. *N Engl J Med* 2000; **343**:1008-14.

- 121 Jaeger P, Fawer R, Brunner HR, *et al.* Immersion and venous occlusion plethysmography in patients with idiopathic orthostatic hypotension. *Clin Exp Hypertens* 1981; **3**:919-27.
- 122 Jellema WT, Wesseling KH, Groeneveld AB, *et al.* Continuous cardiac output in septic shock by simulating a model of the aortic input impedance: a comparison with bolus injection thermodilution. *Anesthesiology* 1999; **90**:1317-28.
- 123 Johnston I. Galen. On diseases and symptoms. 1st ed. Cambridge: Cambridge University Press, 2006.
- 124 Jordan J, Shannon JR, Black BK, *et al.* The pressor response to water drinking in humans : a sympathetic reflex? *Circulation* 2000; **101**:504-9.
- 125 Jordan J, Shannon JR, Diedrich A, *et al.* Interaction of carbon dioxide and sympathetic nervous system activity in the regulation of cerebral perfusion in humans. *Hypertension* 2000; **36**:383-8.
- 126 Jordan J, Shannon JR, Grogan E, *et al.* A potent pressor response elicited by drinking water. *Lancet* 1999; **353**:723.
- 127 Joyner MJ, Dietz NM, Shepherd JT. From Belfast to Mayo and beyond: the use and future of plethysmography to study blood flow in human limbs. *J Appl Physiol* 2001; **91**:2431-41.
- 128 Kanjwal Y, Kosinski D, Grubb BP. The postural orthostatic tachycardia syndrome: definitions, diagnosis, and management. *Pacing Clin Electrophysiol* 2003; **26**:1747-57.
- 129 Kapoor WN. Current evaluation and management of syncope. *Circulation* 2002; **106**:1606-9.
- 130 Katz AM, Katz PB. Diseases of the heart in the works of Hippocrates. *Br Heart J* 1962; **24**:257-64.
- 131 Kegel-Brinkgreve E, Luyendijk-Elshout AM. Boerhaave's orations. Leiden: Leiden University Press, 1983.
- 132 Kenny RA, Traynor G. Carotid sinus syndrome--clinical characteristics in elderly patients. *Age Ageing* 1991; **20**:449-54.
- 133 Kimmerly DS, O'Leary DD, Menon RS, *et al.* Cortical regions associated with autonomic cardiovascular regulation during lower body negative pressure in humans. *J Physiol* 2005; **569**:331-45.
- 134 Klein LJ, Saltzman HA, Heyman A, *et al.* Syncope induced by the Valsalva maneuver. A study of the effects of arterial blood gas tensions, glucose concentration and blood pressure. *Am J Med* 1964; **37**:263-8.
- 135 Koizumi K, Kollai M. Control of reciprocal and non-reciprocal action of vagal and sympathetic efferents: study of centrally induced reactions. *J Auton Nerv Syst* 1981; **3**:483-501.
- 136 Kosinski D, Grubb BP, Karas BJ, *et al.* Exercise-induced neurocardiogenic syncope: clinical data, pathophysiological aspects, and potential role of tilt table testing. *Europace* 2000; **2**:77-82.
- 137 Kosinski D, Grubb BP, Kip K, *et al.* Exercise-induced neurocardiogenic syncope. *Am Heart J* 1996; **132**:451-2.

- 138 Krediet CT, de Bruin IG, Ganzeboom KS, *et al.* Leg crossing, muscle tensing, squatting, and the crash position are effective against vasovagal reactions solely through increases in cardiac output. *J Appl Physiol* 2005; **99**:1697-703.
- 139 Krediet CT, Wieling W, Edward P. Sharpey-Schafer was right: evidence for systemic vasodilatation as a mechanism of hypotension in cough syncope. *Europace* 2008;(in press).
- 140 Krediet CT, Wieling W. Situational syncope. *Autonomic failure: a textbook of clinical disorders of the autonomic nervous system*. Oxford: Oxford University Press, 2008.
- 141 Krediet CT, Wilde AA, Wieling W, *et al.* Exercise related syncope, when it's not the heart. *Clin Auton Res* 2004; **14 Suppl 1**:25-36.
- 142 Krishnamurthy S, Wang X, Bhakta D, *et al.* Dynamic cardiorespiratory interaction during head-up tilt-mediated presyncope. *Am J Physiol Heart Circ Physiol* 2004; **287**:H2510-H2517.
- 143 Kruit MC, van Buchem MA, Hofman PA, *et al.* Migraine as a risk factor for subclinical brain lesions. *JAMA* 2004; **291**:427-34.
- 144 Landau WM, Nelson DA. Clinical neuromyology XV. Fainting science: Neurocardiogenic syncope and collateral vasovagal confusion. *Neurology* 1996; **46**:609-18.
- 145 Laplace LB. Observations on a case of intermittent postural hypotension. *Ann Intern Med* 1942; **17**:339-48.
- 146 Launer LJ, Terwindt GM, Ferrari MD. The prevalence and characteristics of migraine in a population-based cohort: the GEM study. *Neurology* 1999; **53**:537-42.
- 147 LeMarbre G, Stauber S, Khayat RN, *et al.* Baroreflex-induced sympathetic activation does not alter cerebrovascular CO<sub>2</sub> responsiveness in humans. *J Physiol* 2003; **551**:609-16.
- 148 Lempert T, Bauer M, Schmidt D. Syncope: a videometric analysis of 56 episodes of transient cerebral hypoxia. *Ann Neurol* 1994; **36**:233-7.
- 149 Lempert T, von Brevern M. The eye movements of syncope. *Neurology* 1996; **46**:1086-8.
- 150 Lennox WG, Gibbs EL. The blood flow in the brain and the leg of man, and the changes induced by alteration of blood gases. *J Clin Invest* 1932; **11**:1155-77.
- 151 Lewis T. A lecture on vasovagal syncope and the carotid sinus mechanism with comments on Gowers's and Nothnagel's syndrome. *Br Med J* 1932; **1**:873-6.
- 152 Lin JT, Ziegler DK, Lai CW, *et al.* Convulsive syncope in blood donors. *Ann Neurol* 1982; **11**:525-8.
- 153 Lipp A, Sandroni P, Ahlskog JE, *et al.* Calf Venous Compliance in Multiple System Atrophy. *Am J Physiol Heart Circ Physiol* 2007.
- 154 Lipsitz LA, Hayano J, Sakata S, *et al.* Complex demodulation of cardiorespiratory dynamics preceding vasovagal syncope. *Circulation* 1998; **98**:977-83.
- 155 Loftus EF, Schooler JW, Boone SM, *et al.* Time went by so slowly: overestimation of event duration by males and females. *Applied Cognitive Psychology* 1987; **1**:3-13.

- 156 Low PA, Opfer-Gehrking TL, Textor SC, *et al.* Postural tachycardia syndrome (POTS). *Neurology* 1995; **45**:S19-S25.
- 157 Ludbrook J. The musculo-venous pumps of the human lower limb. *Am Heart J* 1966; **71**:635-41.
- 158 Ludbrook J, Loughlin J. Regulation of volume in postarteriolar vessels of the lower limb. *Am Heart J* 1964; **67**:493-507.
- 159 Lüderitz B. History of the disorders of cardiac rhythm. 2nd ed. New York: Futura Publishing Company, 1998.
- 160 Luft UC, Noell WK. Manifestations of brief instantaneous anoxia in man. *J Appl Physiol* 1956; **8**:444-54.
- 161 MacLean AR, Allen EV, Magath TB. Orthostatic tachycardia and orthostatic hypotension: defects in the return of venous blood to the heart. *Am Heart J* 1944; **27**:145-63.
- 162 Mann S, Altman DG, Raftery EB, *et al.* Circadian variation of blood pressure in autonomic failure. *Circulation* 1983; **68**:477-83.
- 163 Mannan JB, Wiesmann UC. How accurate are witness descriptions of epileptic seizures? *Seizure* 2003; **12**:444-7.
- 164 Marey EJ. Recherches sur le pouls au moyen d'un nouvel appareil enregistreur, le sphygmographe. Paris: Thunot, 1860.
- 165 Markush RE, Karp HR, Heyman A, *et al.* Epidemiologic study of migraine symptoms in young women. *Neurology* 1975; **25**:430-5.
- 166 Martinez JM, Coplan JD, Browne ST, *et al.* Hemodynamic response to respiratory challenges in panic disorder. *J Psychosom Res* 1998; **44**:153-61.
- 167 Martinon-Torres F, Rodriguez-Nunez A, Fernandez-Cebrian S, *et al.* The relation between hyperventilation and pediatric syncope. *J Pediatr* 2001; **138**:894-7.
- 168 Mathias CJ. To stand on one's own legs. *Clin Med* 2002; **2**:237-45.
- 169 Mathias CJ, Deguchi K, Schatz I. Observations on recurrent syncope and presyncope in 641 patients. *Lancet* 2001; **357**:348-53.
- 170 McCann WS, Bruce RA, . Tussive syncope; observations on the disease formerly called laryngeal epilepsy, with report of two cases. *Arch Med Interna* 1949; **84**:845-56, illust.
- 171 McKeon A, Vaughan C, Delanty N. Seizure versus syncope. *Lancet Neurol* 2006; **5**:171-80.
- 172 Meendering JR, Torgerson BN, Houghton BL, *et al.* Effects of menstrual cycle and oral contraceptive use on calf venous compliance. *Am J Physiol Heart Circ Physiol* 2005; **288**:H103-H110.
- 173 Melby DP, Lu F, Sakaguchi S, *et al.* Increased impedance to inspiration ameliorates hemodynamic changes associated with movement to upright posture in orthostatic hypotension: a randomized blinded pilot study. *Heart Rhythm* 2007; **4**:128-35.

- 174 Mikamo K, Takeshima T, Takahashi K. Cardiovascular sympathetic hypofunction in muscle contraction headache and migraine. *Headache* 1989; **29**:86-9.
- 175 Miller JD, Pegelow DE, Jacques AJ, *et al.* Skeletal muscle pump versus respiratory muscle pump: modulation of venous return from the locomotor limb in humans. *Journal of Physiology-London* 2005; **563**:925-43.
- 176 Mirchandani S, Phoon CK. Sudden cardiac death: a 2400-year-old diagnosis? *Int J Cardiol* 2003; **90**:41-8.
- 177 Mitsis GD, Zhang R, Levine BD, *et al.* Cerebral hemodynamics during orthostatic stress assessed by nonlinear modeling. *J Appl Physiol* 2006; **101**:354-66.
- 178 Monahan KD, Dinunno FA, Seals DR, *et al.* Smaller age-associated reductions in leg venous compliance in endurance exercise-trained men. *Am J Physiol Heart Circ Physiol* 2001; **281**:H1267-H1273.
- 179 Monahan KD, Ray CA. Gender affects calf venous compliance at rest and during baroreceptor unloading in humans. *Am J Physiol Heart Circ Physiol* 2004; **286**:H895-H901.
- 180 Morgagni GB. The seats and causes of diseases investigated by anatomy. Translation from the Latin by Alexander B. New York: Hafner Publishing, 1960.
- 181 Morgan-Hughes NJ, Kenny RA, Scott CD, *et al.* Vasodepressor reactions after orthotopic cardiac transplantation: relationship to reinnervation status. *Clin Auton Res* 1994; **4**:125-9.
- 182 Morillo CA, Eckberg DL, Ellenbogen KA, *et al.* Vagal and sympathetic mechanisms in patients with orthostatic vasovagal syncope. *Circulation* 1997; **96**:2509-13.
- 183 Mosqueda-Garcia R, Furlan R, Tank J, *et al.* The elusive pathophysiology of neurally mediated syncope. *Circulation* 2000; **102**:2898-906.
- 184 Nahm F, Freeman R. Vasovagal syncope: the contributions of Sir William R. Gowers and Sir Thomas Lewis. *Arch Neurol* 2001; **58**:509-11.
- 185 Nahm F, Freeman R. Syncope and the history of nervous influences on the heart. *Arch Neurol* 2003; **60**:282-7.
- 186 Newman BH, Graves S. A study of 178 consecutive vasovagal syncopal reactions from the perspective of safety. *Transfusion* 2001; **41**:1475-9.
- 187 Norcliffe-Kaufmann LJ, Kaufmann H, Hainsworth R. Enhanced vascular responses to hypocapnia in neurally mediated syncope. *Ann Neurol* 2007; (**in press**).
- 188 Novak V, Honos G, Schondorf R. Is the heart "empty" at syncope? *J Auton Nerv Syst* 1996; **60**:83-92.
- 189 O'Donnell TV. Studies in postural hypotension following ganglion blocking drugs. *Clin Sci (Lond)* 1959; **18**:237-48.
- 190 Okel BB, Hurst JW. Prolonged hyperventilation in man. Associated electrolyte changes and subjective symptoms. *Arch Intern Med* 1961; **108**:757-62.



- 191 Omboni S, Smit AA, van Lieshout JJ, *et al.* Mechanisms underlying the impairment in orthostatic tolerance after nocturnal recumbency in patients with autonomic failure. *Clin Sci (Lond)* 2001; **101**:609-18.
- 192 Onrot J, Bernard GR, Biaggioni I, *et al.* Direct vasodilator effect of hyperventilation-induced hypocarbia in autonomic failure patients. *Am J Med Sci* 1991; **301**:305-9.
- 193 Peebles K, Celi L, McGrattan K, *et al.* Human cerebrovascular and ventilatory CO<sub>2</sub> reactivity to end-tidal, arterial and internal jugular vein PCO<sub>2</sub>. *J Physiol* 2007; **584**:347-57.
- 194 Peroutka SJ. Migraine: a chronic sympathetic nervous system disorder. *Headache* 2004; **44**:53-64.
- 195 Pezdek K, Sperry K, Owens SM. Interviewing Witnesses: The Effect of Forced Confabulation on Event Memory. *Law Hum Behav* 2007;463-78.
- 196 Plum F, Posner JB. The diagnosis of stupor and coma. Philadelphia: F.A. Davis Company, 1980: 1-3.
- 197 Pogacnik T, Sega S, Pecnik B, *et al.* Autonomic function testing in patients with migraine. *Headache* 1993; **33**:545-50.
- 198 Porter R. The Cambridge illustrated history of medicine. 1st ed. Cambridge: Cambridge University Press, 2006.
- 199 Poulin MJ, Liang PJ, Robbins PA. Fast and slow components of cerebral blood flow response to step decreases in end-tidal PCO<sub>2</sub> in humans. *J Appl Physiol* 1998; **85**:388-97.
- 200 Quinn JV, Stiell IG, McDermott DA, *et al.* Derivation of the San Francisco Syncope Rule to predict patients with short-term serious outcomes. *Ann Emerg Med* 2004; **43**:224-32.
- 201 Richardson DW, Kontos HA, Raper AJ, *et al.* Systemic circulatory responses to hypocapnia in man. *Am J Physiol* 1972; **223**:1308-12.
- 202 Rossen R, Kabat H, Anderson JP. Acute arrest of cerebral circulation in man. *Arch Neurol Psychiatr* 1943; **50**:510-29.
- 203 Rothe CF. Point: active venoconstriction is/is not important in maintaining or raising end-diastolic volume and stroke volume during exercise and orthostasis. *J Appl Physiol* 2006; **101**:1262-4.
- 204 Rugg-Gunn FJ, Harrison NA, Duncan JS. Evaluation of the accuracy of seizure descriptions by the relatives of patients with epilepsy. *Epilepsy Res* 2001; **43**:193-9.
- 205 Sagrista-Sauleda J, Romero B, Permanyer-Miralda G, *et al.* Reproducibility of sequential head-up tilt testing in patients with recent syncope, normal ECG and no structural heart disease. *Eur Heart J* 2002; **23**:1706-13.
- 206 Sakaguchi S, Shultz JJ, Remole SC, *et al.* Syncope associated with exercise, a manifestation of neurally mediated syncope. *Am J Cardiol* 1995; **75**:476-81.
- 207 Salazar CF. Die Ohnmacht in der griechisch-römischen Medizin, insbesondere im traumatologisch-chirurgischen Umfeld. *Sudhoffs Arch* 2001; **85**:169-74.

- 208 Saltzman HA, Heyman A, Sieker HO. Correlation of clinical and physiologic manifestations of sustained hyperventilation. *N Engl J Med* 1963; **268**:1431-6.
- 209 Sarasin FP, Louis-Simonet M, Carballo D, *et al.* Prospective evaluation of patients with syncope: a population-based study. *Am J Med* 2001; **111**:177-84.
- 210 Savage DD, Corwin L, McGee DL, *et al.* Epidemiologic features of isolated syncope: the Framingham Study. *Stroke* 1985; **16**:626-9.
- 211 Selby G, LANCE JW. Observations on 500 cases of migraine and allied vascular headache. *J Neurol Neurosurg Psychiatry* 1960; **23**:23-32.
- 212 Serletis A, Rose S, Sheldon AG, *et al.* Vasovagal syncope in medical students and their first-degree relatives. *Eur Heart J* 2006; **27**:1965-70.
- 213 Serrador JM, Hughson RL, Kowalchuk JM, *et al.* Cerebral blood flow during orthostasis: role of arterial CO<sub>2</sub>. *Am J Physiol Regul Integr Comp Physiol* 2006; **290**:R1087-R1093.
- 214 Serrador JM, Picot PA, Rutt BK, *et al.* MRI measures of middle cerebral artery diameter in conscious humans during simulated orthostasis. *Stroke* 2000; **31**:1672-8.
- 215 Shakespeare W. The Complete works of William Shakespeare. <http://shakespeare.mit.edu/>.
- 216 Shannon JR, Diedrich A, Biaggioni I, *et al.* Water drinking as a treatment for orthostatic syndromes. *Am J Med* 2002; **112**:355-60.
- 217 Sharpey-Schafer EP. The mechanism of syncope after coughing. *Br Med J* 1953; **2**:860-3.
- 218 Sharpey-Schafer EP. Effects of squatting on the normal and failing circulation. *Br Med J* 1956; **1**:1072-4.
- 219 Sharpey-Schafer EP. Syncope. *Br Med J* 1956; **1**:506-9.
- 220 Sharpey-Schafer EP, HAYTER CJ, Barlow ED. Mechanism of acute hypotension from fear or nausea. *Br Med J* 1958; **2**:878-80.
- 221 Shechter A, Stewart WF, Silberstein SD, *et al.* Migraine and autonomic nervous system function: a population-based, case-control study. *Neurology* 2002; **58**:422-7.
- 222 Sheldon R, Rose S, Connolly S, *et al.* Diagnostic criteria for vasovagal syncope based on a quantitative history. *Eur Heart J* 2006; **27**:344-50.
- 223 Sheldon R, Rose S, Ritchie D, *et al.* Historical criteria that distinguish syncope from seizures. *J Am Coll Cardiol* 2002; **40**:142-8.
- 224 Sheldon RS, Sheldon AG, Connolly SJ, *et al.* Age of first faint in patients with vasovagal syncope. *J Cardiovasc Electrophysiol* 2006; **17**:49-54.
- 225 Shen WK, Low PA, Rea RF, *et al.* Distinct hemodynamic profiles in patients with vasovagal syncope: a heterogeneous population. *J Am Coll Cardiol* 2000; **35**:1470-7.
- 226 Shoemaker JK, O'Leary DD, Hughson RL. PET(CO<sub>2</sub>) inversely affects MSNA response to orthostatic stress. *Am J Physiol Heart Circ Physiol* 2001; **281**:H1040-H1046.

- 227 Siegel RE. Galen's system of physiology and medicine. An analysis of his doctrines and observations on bloodflow, respiration, humors and internal diseases. Basel (Switzerland): S. Karger, 1968.
- 228 Siegel RE. Galen on the affected parts. Basel: S.Karger, 1976.
- 229 Sjostrand T. The regulation of the blood distribution in man. *Acta Physiol Scand* 1952; **26**:312-27.
- 230 Smit AA, Halliwill JR, Low PA, *et al.* Pathophysiological basis of orthostatic hypotension in autonomic failure. *J Physiol* 1999; **519 Pt 1**:1-10.
- 231 Smit AA, Wieling W, Fujimura J, *et al.* Use of lower abdominal compression to combat orthostatic hypotension in patients with autonomic dysfunction. *Clin Auton Res* 2004; **14**:167-75.
- 232 Sneddon JF, Scalia G, Ward DE, *et al.* Exercise induced vasodepressor syncope. *Br Heart J* 1994; **71**:554-7.
- 233 Soteriades ES, Evans JC, Larson MG, *et al.* Incidence and prognosis of syncope. *N Engl J Med* 2002; **347**:878-85.
- 234 Stead EAJ, Ebert RV. Postural hypotension. A disease of the sympathetic nervous system. *Arch Int Med* 1941; **67**:546-62.
- 235 Stephenson J, Breningstall G, Steer C, *et al.* Anoxic-epileptic seizures: home video recordings of epileptic seizures induced by syncopes. *Epileptic Disord* 2004; **6**:15-9.
- 236 Stephenson JBP. Anoxic seizures or syncopes. In: Stephenson JBP, ed. *Fits and faints*. Oxford: Mac Keith Press, 1990: 41-58.
- 237 Stevens PM. Cardiovascular dynamics during orthostasis and the influence of intravascular instrumentation. *Am J Cardiol* 1966; **17**:211-8.
- 238 Stickland MK, Morgan BJ, Dempsey JA. Carotid chemoreceptor modulation of sympathetic vasoconstrictor outflow during exercise in healthy humans. *J Physiol* 2008; **586**:1743-54.
- 239 Sun BC, Emond JA, Camargo CA, Jr. Direct medical costs of syncope-related hospitalizations in the United States. *Am J Cardiol* 2005; **95**:668-71.
- 240 Takase B, Kastushika S, Hamabe A, *et al.* Significance of circulatory epinephrine levels in exercise-induced neurally mediated syncope. *Clin Cardiol* 2001; **24**:15-20.
- 241 Ten Harkel AD, van Lieshout JJ, Wieling W. Effects of leg muscle pumping and tensing on orthostatic arterial pressure: a study in normal subjects and patients with autonomic failure. *Clin Sci (Lond)* 1994; **87**:553-8.
- 242 The Consensus Committee of the American Autonomic Society and the American Academy of Neurology. Consensus statement on the definition of orthostatic hypotension, pure autonomic failure, and multiple system atrophy. *Neurology* 1996; **46**:1470.
- 243 Thijs RD, Benditt DG, Mathias CJ, *et al.* Unconscious confusion--a literature search for definitions of syncope and related disorders. *Clin Auton Res* 2005; **15**:35-9.

- 244 Thijs RD, Bruijnzeels M, Kamper AM, *et al.* Assessment of orthostatic fluid shifts with strain gauge plethysmography. *Clin Sci (Lond)* 2007.
- 245 Thijs RD, van Dijk JG. Stress induced hypotension in pure autonomic failure. *Journal of Neurology Neurosurgery and Psychiatry* 2006; **77**:552-3.
- 246 Thijs RD, Wieling W, Kaufmann H, *et al.* Defining and classifying syncope. *Clin Auton Res* 2004; **14 Suppl 1**:4-8.
- 247 Todd GP, Chadwick IG, Yeo WW, *et al.* Pressor effect of hyperventilation in healthy subjects. *J Hum Hypertens* 1995; **9**:119-22.
- 248 van de Borne P, Mezzetti S, Montano N, *et al.* Hyperventilation alters arterial baroreflex control of heart rate and muscle sympathetic nerve activity. *Am J Physiol Heart Circ Physiol* 2000; **279**:H536-H541.
- 249 van de Borne P, Montano N, Narkiewicz K, *et al.* Importance of ventilation in modulating interaction between sympathetic drive and cardiovascular variability. *Am J Physiol Heart Circ Physiol* 2001; **280**:H722-H729.
- 250 van Dijk JG. Fainting in animals. *Clin Auton Res* 2003; **13**:247-55.
- 251 van Dijk N, Boer KR, Colman N, *et al.* High Diagnostic Yield and Accuracy of History, Physical Examination, and ECG in Patients with Transient Loss of Consciousness in FAST: The Fainting Assessment Study. *J Cardiovasc Electrophysiol* 2007; **19**:48-55.
- 252 van Dijk N, de Bruin IG, Gisolf J, *et al.* Hemodynamic effects of leg crossing and skeletal muscle tensing during free standing in patients with vasovagal syncope. *J Appl Physiol* 2005; **98**:584-90.
- 253 van Dijk N, Quartieri F, Blanc JJ, *et al.* Effectiveness of physical counterpressure maneuvers in preventing vasovagal syncope: the Physical Counterpressure Manoeuvres Trial (PC-Trial). *J Am Coll Cardiol* 2006; **48**:1652-7.
- 254 Van Giezen AE, Arensman E, Spinhoven P, *et al.* Consistency of memory for emotionally arousing events: a review of prospective and experimental studies. *Clin Psychol Rev* 2005; **25**:935-53.
- 255 van Lieshout JJ, Ten Harkel AD, Wieling W. Physical manoeuvres for combating orthostatic dizziness in autonomic failure. *Lancet* 1992; **339**:897-8.
- 256 van Lieshout JJ, Ten Harkel AD, Wieling W. Fludrocortisone and sleeping in the head-up position limit the postural decrease in cardiac output in autonomic failure. *Clin Auton Res* 2000; **10**:35-42.
- 257 van Lieshout JJ, Wieling W, Karemaker JM, *et al.* Syncope, cerebral perfusion, and oxygenation. *J Appl Physiol* 2003; **94**:833-48.
- 258 Vandenbroucke JP, de Craen AJ. Alternative medicine: a "mirror image" for scientific reasoning in conventional medicine. *Ann Intern Med* 2001; **135**:507-13.
- 259 Vanderheyden M, Goethals M, Nellens P, *et al.* Different humoral responses during head-up tilt testing among patients with neurocardiogenic syncope. *Am Heart J* 1998; **135**:67-73.

- 260 Verel D. Postural hypotension: the localization of the lesion. *Br Heart J* 1951; **13**:61-7.
- 261 Verheyden B, Gisolf J, Beckers F, *et al.* Impact of age on the vasovagal response provoked by sublingual nitroglycerine in routine tilt testing. *Clin Sci (Lond)* 2007; **113**:329-37.
- 262 Warlow CP, Dennis MS, van Gijn J, Hankey GJ, Sandercock PAG, Bamford JM *et al.* Stroke. A practical guide to management. 2nd ed. Oxford: Blackwell Science, 2001.
- 263 Wayne HH. Clinical differentiation between hypoxia and hyperventilation. *J Aviat Med* 1958; **29**:307-15.
- 264 Weiss S, Baker JP. The carotid sinus reflex in health and disease. Its role in the causation of fainting and convulsions. *Medicine* 1933; **12**:297-354.
- 265 Wells GL, Olson EA. Eyewitness testimony. *Annu Rev Psychol* 2003; **54**:277-95.
- 266 Westerhof BE, Gisolf J, Karemaker JM, *et al.* Time course analysis of baroreflex sensitivity during postural stress. *Am J Physiol Heart Circ Physiol* 2006; **291**:H2864-H2874.
- 267 White C. Doctor referred to GMC after inquiry into epilepsy diagnoses. *BMJ* 2001; **323**:1323.
- 268 White C. Rate of misdiagnosis of childhood epilepsy "may not be unusual". *BMJ* 2003; **326**:355.
- 269 Wieling W, Colman N, Krediet CT, *et al.* Nonpharmacological treatment of reflex syncope. *Clin Auton Res* 2004; **14 Suppl 1**:i62-i70.
- 270 Wieling W, Ganzeboom KS, Krediet CT, *et al.* Initiële diagnostische strategie bij wegrakingen: het belang van de anamnese. *Ned Tijdschr Geneesk* 2003; **147**:849-54.
- 271 Wieling W, Krediet CT, Wilde AA. Flush after syncope: not always an arrhythmia. *J Cardiovasc Electrophysiol* 2006; **17**:804-5.
- 272 Wieling W, van Lieshout JJ. Maintenance of postural normotension in humans. In: Low PA, ed. *Clinical Autonomic Disorders: Evaluation and Management*. Philadelphia: 1997: 73-82.
- 273 Wolthuis RA, Froelicher VF, Jr., Fischer J, *et al.* The response of healthy men to treadmill exercise. *Circulation* 1977; **55**:153-7.
- 274 Yakinci C, Mungen B, Er H, *et al.* Autonomic nervous system function in childhood migraine. *Pediatr Int* 1999; **41**:529-33.
- 275 Young TM, Asahina M, Nicotra A, *et al.* Skin vasomotor reflex responses in two contrasting groups of autonomic failure: multiple system atrophy and pure autonomic failure. *J Neurol* 2006; **253**:846-50.
- 276 Young TM, Mathias CJ. The effects of water ingestion on orthostatic hypotension in two groups of chronic autonomic failure: multiple system atrophy and pure autonomic failure. *J Neurol Neurosurg Psychiatry* 2004; **75**:1737-41.
- 277 Ziegler MG. Psychological stress and the autonomic nervous system. In: Robertson D, Biaggioni I, Burnstock G, Low PA, eds. *Primer on the autonomic nervous system*. Amsterdam: Elsevier, 2004: 189-90.