

Dr Martin Lakie BSc PhD

Reader in Applied Physiology

[School of Sport, Exercise and Rehabilitation Sciences \(/schools/sport-exercise/index.aspx\)](/schools/sport-exercise/index.aspx)

Contact details

Telephone [+44 \(0\)121 414 4125 \(tel:+44 121 414 4125\)](tel:+441214144125)

Fax m.d.lakie@bham.ac.uk

Email [m.d.lakie@bham.ac.uk \(mailto:m.d.lakie@bham.ac.uk\)](mailto:m.d.lakie@bham.ac.uk)

School of Sport and Exercise Sciences
University of Birmingham
Edgbaston
Birmingham
B15 2TT
UK



Qualifications

BSc (Edinburgh) PhD (Edinburgh)

Biography

After completing his undergraduate Physiology degree at the University of Edinburgh, he stayed on there to do postgraduate research and was awarded a PhD in 1981. Following a MRC postdoctoral fellowship and a temporary lectureship at Edinburgh, he was appointed to a Wellcome Research Lectureship in the Department of Biological and Preclinical Sciences at the University of St Andrews in 1985. At the end of this appointment, in 1990 he was appointed to a senior lectureship in the School.

Research

His research interests are the mechanisms which control the stability with which postures are maintained. In part this is dictated by the properties of relaxed muscle, and in part by the nervous system. Humans are never entirely static (except when they are dead!), and he is particularly interested in the small movements (tremors and sways) that occur in normal life and in disease. He has published a number of journal articles and book chapters on these topics. He is a member of the Physiological Society and the Society for Experimental Biology.

Tremor: All human subjects have a fine muscular tremor that can be recorded by suitable techniques. In some subjects the tremor may be much larger than in others. To some extent the tremor is a product of the properties of the muscles and to some extent it is controlled centrally. Research is being carried out here and at Aston University in collaboration with clinical staff to investigate the central and peripheral components of physiological and pathological tremors.

Balance: Standing is a complicated activity which we all tend to take for granted. We are using a unique piece of apparatus where subjects balance a load equivalent to their own body. This reductionist approach permits us to study the precise neural strategy which is employed to balance the body and to minimise sway. For a brief overview click here.

Muscle tone: Muscle tone (the stiffness of relaxed muscle) is a property which depends on the interplay of muscular and neural mechanisms. Tone is thixotropic; that is it depends on the history of movement of the muscle which is being investigated. The role of muscle thixotropy as a contributor to postural stability is being studied.

Publications

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ID Loram, CN Maganaris and M Lakie (2005) The use of ultrasound to make non-invasive, in vivo measurement of continuous changes in human muscle contractile length *J Appl Physiol* (December 8, 2005) in press

ID Loram, CN Maganaris and M Lakie (2005). Human postural sway results from frequent, ballistic bias impulses by soleus and gastrocnemius *J Physiol* 564: 295-311.

ID Loram, CN Maganaris and M Lakie (2005). Active, non-spring-like muscle movements in human postural sway: how might paradoxical changes in muscle length be produced? *J Physiol* 564: 281-293.

M Lakie, N Hayes, N Combes and N Langford(2004). Is postural tremor size controlled by interstitial potassium concentration in muscle? *J Neurol Neurosurg Psychiatr* 75 (7) 1013-1018

ID Loram, CN Maganaris and M Lakie(2004). Paradoxical muscle movements in human standing. *J Physiol* 556 (3) 683-689 Rapid Communication

M Lakie, N Caplan and ID Loram (2003). Human balancing of an inverted pendulum with a compliant linkage: neural control employs an intermittent ballistic bias mechanism *J Physiol* 555: 357-370

ID Loram and M Lakie (2002). Human balancing of an inverted pendulum: position control by small, ballistic like, throw and catch movements. *J.Physiol* 540.3 pp1111-1124

ID Loram and M Lakie (2002). Direct measurement human ankle stiffness during quiet standing: the intrinsic mechanical stiffness is insufficient for stability in most subjects. *J Physiol* 545: 1041-1053

ID Loram, SM Kelly and M Lakie (2001). Human balancing of an inverted pendulum: is sway size controlled by ankle impedance? *J Physiol* 523.3 pp879-891

