

Falling victim to balance

Balance: In Search of the Lost Sense

by Scot McCredie

Little, Brown: 2007. 304 pp. \$24.95

Timothy Miles

Balance, or more precisely when people fall over because of imperfect balance, is an important issue for our ageing population. As the author of *Balance*, journalist Scott McCredie, points out, the social and medical costs resulting from falls are rising rapidly. One-third of people over the age of 65 and more than half of those aged 75 and over fall at least once a year, and many fall more frequently. A lot of these end up in hospital, and some never leave. Perhaps, as governments now begin to tackle the growing problem of obesity, they may also begin to think about strategies for tackling the increasing number of fall victims, which could be equally costly to society.

Scientists, pedantic folk that they are, will argue that the title of this book is misleading, given that 'balance' is not strictly a sense. Rather, balance is the outcome of an interaction of sensory signals that describe the orientation and movement of the head — which in turn stops one falling over. Thus, as the book is mainly about balance and not primarily about sensation, the reference to the "lost sense" seems rather inappropriate.

The emphasis is strongly on the workings of the vestibular system in the inner ear, with less discussion of the role of vision in balance and next to none on the important roles of sensory receptors in muscles and skin (collectively known as proprioception). This is a pity, as there is equally interesting information from both the laboratory and the clinic on the effects of disturbed proprioceptive inputs on balance and movement.

The book is wide-ranging in scope. There are many entertaining historical and anecdotal allusions ranging from Van Gogh's ear (sliced off in a futile response to intractable tinnitus or vertigo?) to The Flying Wallendas aerial balancing circus act. I was fascinated to read about the aptly but morbidly named 'lawn dart effect'. Apparently, when fighter pilots flying at low altitude accelerate horizontally at more than 1 g, the resulting 'off-the-scale' stimulation of the vestibular system can lead to the perception that the plane is climbing. In response, the pilot pushes the joystick forward to lower his trajectory and, well, yes, that's where the name came from.

The author is clearly intrigued by alternative (read unproven) therapies in which balance/vestibular-related interventions are used to treat a range of cognitive disorders including dyslexia and even autism. In one of these, hippotherapy, children with severe neurological disorders ride horses (rather than the large



Perfect poise: balance is as important for elderly people as it is for acrobats.

African mammals) to improve their "sensory integration". The author does qualify his description of these therapies by pointing out that most of them lack proper investigation and validation, although it remains to be seen whether this disclaimer would influence parents who are desperate for an effective therapy for their autistic child, for example.

Given the breadth of material covered, there

are some surprising omissions of fascinating vestibular/balance-related phenomena. Among these is the ability to "steer" subjects by stimulating their vestibular system with weak electric currents. Turning on this stimulus in blindfolded people who are walking or pushing themselves in a wheelchair causes them to veer away from their target.

There are a number of errors in the science that will cause professionals in this field to mutter darkly. These are not hugely consequential, but it is a pity that they escaped pre-publication screening. However, my major concern with this book is the appendix, and in particular, the exercises that are suggested therein for improving balance. The book is obviously written for lay readers rather than health-care professionals, and it seems likely that it will appeal to patients with balance disorders or their carers who are seeking more information about a particular condition and on methods for addressing it.

The strong consensus among the therapists that I consulted is that elderly or balance-compromised patients should not attempt most of the exercises recommended in the appendix without professional supervision because of the high risk of falling while doing so: in the elderly, falling has a high probability of causing serious injuries such as a hip or wrist fracture.

I found *Balance* to be an entertaining read, and one that should appeal to the lay reader. However, it would benefit greatly from editing by a therapist, who would either axe the appendix or add a strong disclaimer, and a neuroscientist who would sharpen the science and encourage a more even-handed view of the roles of the many sensory receptors that contribute to balance. ■

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Science with flare

The Sun Kings: The Unexpected Tragedy of Richard Carrington and the Tale of How Modern Astronomy Began

by Stuart Clark

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Jan Stenflo

During the nineteenth century, astronomy was transformed from a mathematically oriented science preoccupied with mapping the positions and movements of celestial bodies to a physical science aiming to understand their nature and constitution. In *The Sun Kings*, science writer Stuart Clark offers a captivating account of this tortuous and passionately fought century-long transformation.

The tale centres around the solar astron-

omer Richard Carrington and his observations of the gigantic solar flare of 1 September 1859. Carrington, who today is little known outside the field of solar physics, happened to witness this event while drawing sunspots at his private observatory. Most solar flares can be seen only with modern spectroscopic equipment and so this white-light flare was very rare. The nearby Kew geomagnetic observatory recorded a weak magnetic disturbance lasting only 10 minutes, but exactly coincident with Carrington's flare. There was a violent geomagnetic storm 18 hours later and a worldwide display of the most magnificent aurorae, together with electric surges that disrupted telegraph communications.

Carrington's suggestion of a connection between the flare on the Sun and the geomagnetic disturbances and aurorae was largely