



Exercise after stroke

6 From research to practice in exercise and fitness training

3 Stroke pharmacists working together

4 Bridging the gap with diffusion fellows

10 How telemedicine enhances care in East Kent

12 Further session reports from UK Stroke Forum Conference 2010

Exercise and fitness training after stroke: from research to practice

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I first became interested in the role of exercise and fitness training after stroke when I was appointed as a Senior Lecturer in Geriatric Medicine at The University of Edinburgh in March 2000.

I spent my weekends roaming the Scottish mountains with the Edinburgh Mountaineering Club, enjoying the health benefits of exercise. Each Monday, I would return to the stroke unit at the Royal Infirmary in Edinburgh, and I couldn't help wondering whether the immobility and inevitable loss of physical fitness that followed a stroke might have a detrimental effect on outcome. So, in collaboration with Professor Archie Young, now Emeritus Professor of Geriatric Medicine, University of Edinburgh, and Dr Carolyn Greig (now Senior Research Fellow, University of Edinburgh), I embarked on a programme of research into exercise and fitness training after stroke. Our first study, funded by The Stroke Association, confirmed that muscle strength and power, even in the legs unaffected by stroke, were substantially lower compared with age-matched controls.¹ This study provided the scientific justification for exploring the role of strength training in the rehabilitation of stroke survivors.



ABOVE Measurement of hand grip strength is a simple and practical method of measuring muscle strength in stroke survivors (courtesy of Dr Carolyn Greig)

We then conducted a randomised exploratory trial of physical fitness training for ambulatory stroke survivors, and demonstrated that mixed aerobic and strength training three times a week for 12 weeks was feasible.² Although the trial was not powered to detect differences between our control intervention (relaxation) and exercise training, those who were allocated exercise training reported better physical function, took less time to 'get up and go' and had higher aerobic fitness than those allocated to relaxation at the end of the interventions. This trial was included in the Cochrane systematic review of physical fitness training after stroke (last updated in 2009), which demonstrated the beneficial

effects of aerobic training using walking as a mode of exercise.³ This Cochrane review has helped to provide the scientific justification for incorporating exercise and fitness training into the rehabilitation of stroke survivors. Exercise and fitness training is recommended in the recently published Scottish Intercollegiate Guideline Network Number 118³ and The Better Heart Disease and Stroke Care Action Plan.⁴

We subsequently developed a specialist course for exercise instructors to teach them the skills required for the safe and effective delivery of exercise to stroke survivors after discharge from hospital. The course development was led by Dr Frederike van

Wijck, now Reader in Neurological Rehabilitation at Glasgow Caledonian University. This is the only course endorsed by Skills Active and the Register of Exercise Professionals. It is supported by all the UK stroke charities including The Stroke Association, Different Strokes, Chest Heart & Stroke Scotland and Northern Ireland Chest Heart and Stroke. The course is now available UK-wide through Later Life Training (www.laterlifetraining.co.uk).

To help drive forward the development of community Exercise after Stroke services, a multidisciplinary group developed best practice guidelines for service development. They can be downloaded from www.exerciseafterstroke.org.uk. The guidelines contain step-by-step advice on collaborative working between health and leisure services to develop pathways into exercise after stroke. These guidelines have been widely disseminated to

stroke managed clinical networks, to attendees at the UK Stroke Forum in Glasgow in 2009, to council-run leisure services in Scotland, and to stroke care networks throughout the UK. The website also contains a searchable resource so that service users, exercise and health professionals can identify Exercise after Stroke services in the community (this is currently limited to Scotland but there is clear potential to extend this resource to England).

Now that community Exercise after Stroke services are beginning to be developed throughout the UK, we are turning our attention again to further research, which will underpin future service development. We are also training a new generation of researchers to further develop research in this area. For example, Sarah Carroll, a Stroke Association Junior Research Training fellow, is exploring barriers and motivators to physical activity after stroke, and will explore

whether a behavioural change intervention combined with pedometers might increase physical activity after stroke.

Another important strand to our programme of research is to better understand the causes of post-stroke fatigue. Fatigue is frequently mentioned by stroke survivors as a barrier to exercise. In collaboration with Professor Martin Dennis, Fiona Duncan, a PhD student, is conducting a longitudinal cohort study to explore associations between post-stroke fatigue after stroke, including directly measured physical activity patterns and mood. We are also exploring neuro-anatomical correlates of fatigue and associations with cortisol dysregulation in collaboration with researchers from the University of Edinburgh Centre for Cognitive Ageing and Cognitive Epidemiology. Understanding the associations of fatigue after stroke is critical to the development of new interventions to treat this serious and debilitating post-stroke problem.

Stroke survivors often say that they feel 'abandoned' after discharge from hospital. More research is needed to find ways to improve quality of life for stroke survivors. We would be delighted to hear from anyone who wishes to know more about our research on exercise, fitness and fatigue after stroke, and from those who would like to collaborate in this previously neglected area. ■

For examples of good practice in community Exercise after Stroke services visit www.improvement.nhs.uk/stroke/CommunityStrokeResource/CSRLifeafterstroke



ABOVE Exercise professionals attending the Exercise and Fitness Training after Stroke course are practising a sit to stand exercise during the strengthening phase of the class (courtesy of John Dennis)