

Stroke Rehabilitation: Issues for Physiotherapy and Physiotherapy Research to Improve Life after Stroke

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In recent decades, there has been a controversy about what physiotherapists should be doing by way of neurological rehabilitation to enhance the optimal performance and well-being of people who have suffered from stroke. The development of different stroke physiotherapy concepts and their commercialization has sometimes given rise to heated debates between the philosophical beliefs of practitioners on one side and academia on the other.

But the physiotherapist is just one part of the multidisciplinary, or rather interdisciplinary, team necessary to handle the rehabilitation process of some of the more unfortunate who have had a stroke. For some, they may be the only therapists available in the immediate aftermath of stroke. This introduces the theme that physiotherapy services need to adjust so as to be able to deal with the disability in each of its stages: hyper-acute and acute, post-acute rehabilitation and post-rehabilitation community services. The aims and goals at the various post-stroke stages change; therapy in the (hyper) acute stage is often a 'life or death' scenario, whereas for persons with stroke in the post-acute rehabilitation stage, it is a matter of going back to live a life as normal as possible and with the hope that will be followed by therapy in the community when the person who has suffered a stroke is at home, and he or she is trying to pick up life as it was, sometimes coping, sometimes struggling with disabilities.

Patient-centred physiotherapy

A key focus and goal for people recovering from stroke is therapy and treatment directed at their particular problems. Though this may seem obvious, it is unfortunately frequently neglected. We believe the same is true in stroke research. Pollock and Fenton (2012) reported on the top 10 research priorities relating to life after stroke by conducting an extensive investigation involving persons who have survived a stroke, carers and health professionals. The top 10 priorities reported from this survey include cognition, long-term

consequences, aphasia, arm recovery and function, visual problems, fatigue, balance, gait and mobility, coping with speech problems, confidence after stroke and persevering with exercise and fitness. In passing, it is worth noting that this investigation was conducted in Scotland only, as it would be interesting to see whether the priorities would be similar in other regions of the world. Although many people with stroke receive early rehabilitation and are satisfied with that, many are dissatisfied with the way they are followed up and the level of rehabilitation provided in the year following a stroke. A survey conducted in Sweden revealed that 42% of 7,000 persons who had had a stroke reported dissatisfaction with receiving only a few or even no rehabilitation services during the first post stroke year. These two surveys happen to have been held in northern Europe, but this dissatisfaction with the level of post stroke services may not be restricted to this part of the world (Report from Riks Stroke, 2011).

Health politics and the strength of the economy influence the implementation of stroke physiotherapy

Health politics governs how public health services are provided, and obviously, this differs from country to country. The services may be financed by taxes; they may be paid for by the individual through private insurance. The first scenario depends on how much can be carried out and for how long rehabilitation services are provided by the public health system. This in turn relies upon evidence of effective treatment, probably at the lowest cost. The focus, however, needs to remain on the individual but within the *limits* of society, as health services in this scenario are ultimately financed by the tax payer.

Individually based health insurance, by contrast, is based on the free market and is governed by the laws of demand and supply. Furthermore, a patient can pick whatever services and treatment they like if they can

afford to pay for them. In this scenario, the financial situations of individuals certainly steer the use of the services, and these people will have to rely upon the providers to give them truthful and conscientious information.

As a result, different rules seem to guide recommendations: for public health insurance, evidence-based therapy is adopted by policy makers who try to judge from objective research what will be most effective. For private health, recommendations from trusted sources, the personal choice of patients and the personal charisma of those who deliver the services may be the guiding forces. With regard to the latter, the stroke physiotherapy profession should beware of recommending stem cell shops or non-invasive brain stimulation boutiques, complementing their previous experience with evidence from high-quality studies to inform the treatment needed by their specific patients with stroke may be more effective.

Stroke physiotherapy and the International Classification of Functioning, Disability and Health model

In responding to the classical question: 'What is physiotherapy?', the World Confederation for Physical Therapy has produced the following definition:

'The nature of physical therapy is providing services to people and populations to develop, to maintain and to restore maximum movement and functional ability throughout the lifespan. Physical therapy includes the provision of services in circumstances where movement and function are threatened by the process of ageing or that of injury or disease. Full and functional movements are at the heart of what it means to be healthy.' (WCPT Policy statement. 2012 Description of physical therapy, 2011).

Movement, therefore, should be at the heart of physiotherapy, and one way to make people move is to make them perform physical exercises to have the most out of body structures and body functions (WHO, ICF, 2012). Over the years, physiotherapists have focused specifically on aspects such as flexibility, strength, endurance and the capacity of the heart and lungs, defining each body function as it relates to the structure of the body 2012(WHO, ICF, 2010). 'Restoration to normal' and 'normality' has been the mantra for many years, but the problem is that normality is not easily

achieved in individuals and even more difficult to interpret when it has to be considered from a group perspective. Thus, 'normal' has been altered to 'optimal capacity, activity level and participation', and we should add, 'related to person, disability and context'.

In the early years of the discipline, it was believed that physiotherapy aimed at improving body structures and functions would automatically improve the patient's performance of the activities of daily living (ADL). So much effort was invested in stretching, strengthening specific muscles, decreasing tone and increasing static balance. Additionally, exercises were not progressed until the person could control movement on what was considered the basic level in a hierarchical understanding of how movement was developed (Bobath, 1990; Brunnstrom, 1985; Voss et al., 1970). In worst case scenarios, this led to therapy without progress. Today, we know that improved capacity in relation to body functions does not automatically transfer into independence in the performance of the ADL or participation in activities. The notion that 'you get better at what you practise' is well established so that to perform well in an activity such as transfer, we need to practise components as well as the whole task. As this seems to be the general rule for all activities of human performance (Ericsson et al., 1993), the same applies to people with neurological conditions; to maintain or develop skills, they need to practise these skills (Carr & Shepherd, 2003; Schmidt 1988, 1991).

But people with a neurological disability, such as stroke may impose and experience important secondary limitations; they have a reduced cardiorespiratory capacity and consume energy more rapidly when doing the same activities as non-affected people. These limitations may lead to fatigue, loss of motivation and/or depression, which will result in inactivity and so create a vicious circle. Thus, to take part in activities, body functions need to be strengthened as well. Needless to say, to enhance patients' motivation and participation to a maximal level, exercises need to be tailored to each individual. Patients need to feel that they can reach their goals, at the same time as body functions and activities are exercised and repeated, so that they become automatic and may be performed with the least expenditure of energy. Recent research implies that this can actually be combined (Brazzelli et al., 2011; English and Hillier, 2010). So a bit of 'body building' and then practising a skill, with repetition and intensity seems to work for both muscles and brain

(Gjellesvik et al., 2012; Hill et al., 2012; Langhammer et al., 2009, 2010, 2012; Carr & Shepherd, 2003; Remple et al., 2001).

The challenge for physiotherapy now is to build up various exercise protocols that are effective within the different stages of stroke, taking into account the various comorbidities that might complicate performance and motivation. Participation in society must be factored in, but it is also an individual choice and is dependent on the environmental context. The services of physiotherapists in this respect are to enable the individual recovering from stroke to reach their optimal capacity regarding body functions and activities to enhance participation in social activities.

Stroke physiotherapy: from concepts to treatments

The time has come to move on, and stroke physiotherapy should change its focus from the elementary concepts to the delivery of complex services at the various stages after stroke seen from the patient's perspective. Physiotherapy services are related to the health service provided in each country. So where does stroke physiotherapy stand and where should we go? Through the different stages of life after stroke, we should deal with motor function, control and learning, both at an individual level and as part of a complex intervention.

(Hyper) Acute stroke

Physiotherapy is truly an essential service in the acute stage. Physiotherapy should be focused on early mobilization, task-oriented exercises related to daily activities, and preparing individuals with different disabilities for optimal capacity and physical function. This process starts on the very first day by making the individual aware of their own needs (reduced capacity), by asking for maximal performance (the patients' own maximum) and by using standardized outcome measures to evaluate capacities, functions and progress. The process should enhance the users' participation by means of goal setting and dialogue. Physiotherapy is a pertinent part of this acute stroke treatment/rehabilitation. Physiotherapy — including early mobilization and physical exercise — has been proven to enhance

physical function and activities, shorten in-hospital stays and be cost-effective (Kalra et al., 2005; Grieve et al., 2000; Indredavik et al., 1999).

In accordance with both research and users' feedback, in this phase, exercises should be offered continuously and not phased out (Langhammer et al., 2009; Langhammer and Lindmark, 2012). Physiotherapy services are needed for different scenarios in the (hyper) acute phase and should, therefore, be differentiated. Services should be related to disability after stroke, whether mild, moderate or severely disabled. Mild stroke does not mean 'no therapy', but counselling to discover what needs to be considered when things are settling down post stroke. Moderate and severely disabling stroke needs to be followed up in rehabilitation and with differentiated exercises and treatments.

The rehabilitation process

This is a period of intensive treatment where physiotherapy should be focused on both building up capacities (body functions) and repeating task-oriented activities. For most patients, this needs to be an interactive process, that is: task-oriented exercises need to be built up as exercises for capacity so that by repetition, intensity and varying the same tasks, the patient's maximum level is reached. Treadmill walking, virtual reality and games related to balance, arm and hand function, intensive treatment with bilateral hand exercises and robot-assisted training all seem to be effective (Ada et al., 2010; Gjellesvik et al., 2012; Kim et al., 2009; Saposnik et al., 2010; Whittall et al., 2011; Mehrholz et al., 2012). But this is a field that needs to be expanded with trials of different types of activities focusing on the tasks that need to be improved and also with regard to the individual's preferences. A variety of different physiotherapy methods is vital to individualize the physical rehabilitation, to enhance physical performance, to improve performance in the ADLs and to prepare for social participation in the 'rest of life'.

Chronic stage after stroke

There are no miracle therapies that will change levels of disability 6 months after stroke, but capacities must be used if they are not to be lost. To improve endurance, strength or balance may require *blood, sweat and tears*. This is the most demanding task for therapists as well as for individuals with stroke; to keep morale high

when so much effort is demanded for so little apparent change or improvement. After all, the maximum effort may only lead to maintaining an activity or capacity and not gaining what is often called the minimal clinical change. However, this service is most likely not supported by health authorities in today's tough economic climate but is probably considered to be the individual's own responsibility. Physiotherapists are, therefore, not routinely involved at this stage and are often involved on a more random and intermittent *need for therapy* basis. But perhaps the initiative for supporting people in the chronic phase after stroke should start in the earlier phase with self-management programmes. Recent research indicates that physiotherapists might be required to change their practice from traditional hands-on treatment to incorporating aspects such as facilitating an individual's problem solving, collaborative goal setting and decision-making (Jones et al., 2012). Cadilhac and colleagues (2011) have established the safety and feasibility of a stroke self-management programme in a phase II trial, but larger efficacy trials are now required.

Research into stroke physiotherapy

Stroke physiotherapy remains a complex phenomenon, and trials evaluating stroke physiotherapy are now needed. Craig and colleagues (2008) reported on the new Medical Research Council guidance. The process of developing and evaluating a complex intervention (development, feasibility and piloting, evaluation, and implementation) may not always follow a linear or cyclical sequence; indeed, research trials of stroke physiotherapy should start with the therapies that have already been implemented. Furthermore, a sound theoretical understanding of how the intervention causes change in such complex interventions as physiotherapy is essential. To sway the health policy makers' judgement in favour of physiotherapy, it will become increasingly important to set out the theory behind its use. Finally, it may not be appropriate to evaluate standardized methods strictly; the intervention may work better if a specified degree of adaptation to local settings is allowed for in the protocol.

Conclusion

To reiterate, physiotherapy is vital for physical performance after a stroke at every stage. However, the need

varies at different time points after stroke, and the therapy needs to be tailored accordingly. So far, the debate in stroke physiotherapy has tended to be one in which the therapists have taken a standpoint with regard to concepts, instead of getting down to deciding which exercise programmes are advantageous, at what stage and for whom. Physiotherapy is one small — but crucial — part of the entire health care system. As therapists, we need to unite in our efforts to improve life together with, and for, our clients. One unanimous voice proclaiming the essential need for our services in the chain of stroke rehabilitation is most likely to be heard by health policy makers and health care providers. Physiotherapists should continue to make a difference and not be diverted by their differences about concepts or ideological standpoints.

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