



Invited Topical Review

Physiotherapy rehabilitation for people with spinal cord injuries

Lisa A Harvey

John Walsh Centre for Rehabilitation Research, Kolling Institute, Sydney Medical School/Northern, University of Sydney, Australia

KEY WORDS

Rehabilitation
Spinal cord injury
Physical therapy



[Harvey LA (2016) Physiotherapy rehabilitation for people with spinal cord injuries. *Journal of Physiotherapy* 62: 4–11]

© 2016 Australian Physiotherapy Association. Published by Elsevier B.V. This is an open access article under the CC BY-NC-ND license (<http://creativecommons.org/licenses/by-nc-nd/4.0/>).

Introduction

The most obvious consequence of spinal cord injury (SCI) is paralysis. However, SCI also has widespread consequences for many body functions, including bladder, bowel, respiratory, cardiovascular and sexual function. It also has social, financial and psychological implications, and increases people's susceptibility to late-life renal complications as well as musculoskeletal injuries, pain, osteoporosis and other problems.

People with SCI require not only initial medical care and rehabilitation, but also ongoing access to wheelchair-friendly environments and appropriate homecare, equipment, transport, employment and financial support. The management of people with SCI is therefore complex, involving many healthcare professionals, organisations and government services. Physiotherapists treat an array of different problems related to SCI and these involve many body systems, even though the underlying pathology is neurological in nature.

This review outlines the principles of physiotherapy rehabilitation for people with SCI and the evidence underpinning the effectiveness of commonly used physiotherapy interventions. It focuses on three common problems: weakness, contractures and poor motor control. Only the rehabilitation phase is discussed here, although physiotherapists also have an important role to play immediately after injury and in the community once patients are discharged from hospital.

Types of spinal cord injuries

Spinal cord injuries are defined as complete or incomplete according to the International Standards for the Neurological Classification of SCI¹ and the American Spinal Injuries Association Impairment Scale (AIS). Complete lesions are defined as AIS A, and incomplete lesions are defined as AIS B, AIS C, AIS D or AIS E. This classification system was introduced in 1982 to replace the original, but perhaps more intuitive, Frankel system whereby a person was classified as having an incomplete SCI if they had any motor or sensory preservation more than three levels below the level of injury. In contrast, the International Standards for the Neurological Classification of SCI¹ distinguishes between complete

and incomplete injuries on the basis of sensory and motor preservation in the S4/5 segments. A lesion is classified as complete if a person has no voluntary anal contraction (indicative of S4/5 motor preservation) and/or sensation in or around the anus (indicative of S4/5 sensory preservation), regardless of how much motor or sensory function they have below the level of the lesion. The distinction between different types of incomplete lesions is based on a detailed motor and sensory assessment. The precise definitions of different types of SCIs are surprisingly complex and contain ambiguities that continue to be debated.

Principles of management

Acute medical management of people with SCI focuses on minimising further neurological damage to the spinal cord and optimising recovery. Stability of the spine is clearly a priority. This is established either conservatively with bed rest (with or without traction) or surgically (typically with decompression and fusion). While surgical management is now more common than conservative management, there is still a lot of debate about the superiority of each approach. However, management of the spine is just one aspect of acute medical care. There are many other aspects related to maintaining blood pressure, circulation, respiration, bladder drainage, bowel care, nutrition and body temperature, and minimising psychological distress for patients and their families. During this stage, physiotherapy is predominantly focused on treating respiratory complications and preventing secondary musculoskeletal problems related to prolonged bed rest. Readers interested in the physiotherapy management of people in the period immediately after injury are directed to the official textbook² or online learning modules (www.elearnSCI.org)³ of the International Spinal Cord Society.

Rehabilitation following SCI commences as soon as the patient is medically stable after injury. This can vary from a few days to many weeks, depending on whether the patient suffered other injuries at the time of the accident or subsequently developed medical or respiratory complications. Rehabilitation involves a team and patient-centred approach. The overall aim of rehabilitation is to enable the person to return to a productive and satisfying life. This means different things to different people. For example,

some people place a high priority on independence and/or walking, while others do not. Studies have attempted to identify the priorities of people with SCI, although none have used representative samples and therefore all need to be interpreted with caution. A widely cited study from a sample of over 650 people in the USA found that those with tetraplegia placed the highest priority on regaining hand and upper limb function, and those with paraplegia ranked return of sexual function as their most important priority.⁴ Regaining the ability to walk was also a high priority for both groups of people but, contrary to what is often assumed, it was not the highest priority.

Physiotherapy during the rehabilitation phase focuses on goals related to motor tasks such as walking, pushing a wheelchair, transferring and using the upper limbs.⁵ The setting of goals for a person with SCI is fraught with difficulties because it relies, at least in part, on physiotherapists' and patients' predictions of likely outcomes. Much has been written about likely outcomes (see the paper by Scivoletto and Di Donna for a summary)⁶ but the best estimates of outcome come from a European cohort study in which data were collected within 15 days of traumatic SCI and then 1 year later.⁷ Unfortunately, data were only available for 492 of the original 1282 eligible patients, thereby limiting the confidence in the derived prediction rule. Nonetheless, the results indicated that the ability to walk at 1 year is best predicted from five variables collected within 15 days of injury: age, quadriceps strength, gastrocnemius strength, light touch sensation at L3 and light touch sensation at S1 (area under the curve (AUC) 0.956, 95% CI 0.936 to 0.976). There are other studies based on large databases looking at factors predicting outcomes other than walking, but they are less rigorous and invariably do not reflect the population at large.

A recent study examined physiotherapists' ability to predict the likelihood of patients walking (and performing an array of other motor tasks) at 3 months⁸ and then 1 year from injury;^{9,10} this was based on physiotherapists' assessments of patients at the time of admission to rehabilitation. The predictions were made a median of 45 days (IQR 31 to 73) after injury. Importantly, 50 of the potentially eligible 67 participants were included in the analysis. The results of this study indicated that physiotherapists were good at predicting the likelihood of walking at 1 year. The positive likelihood ratio associated with predictions of walking around the home at 1 year was 5.7 (95% CI 2.3 to 14.4) and the negative likelihood ratio was 0.2 (95% CI 0.1 to 0.5). Patients were also asked to predict their own future mobility. Interestingly, but perhaps unsurprisingly, there was an obvious discord between patients' expectations of walking and final mobility, with patients expecting to attain a higher level of mobility than the mobility predicted by their physiotherapists. The authors have since hypothesised that this discord may, in part, be due to the recent tendency of the media to encourage the public to believe that recovery and walking is now a realistic outcome for all people with SCI regardless of the severity of the injury.¹⁰⁻¹² This is clearly not the case and physiotherapists need to play their role in educating the media on this issue.

Assessment

The assessment of a patient with SCI is an important initial step in physiotherapy management. This step is not only important for setting realistic goals, but also for identifying key problems. Often, assessments conducted for this purpose are subjective. For example, a physiotherapist may subjectively assess a patient's ability to transfer from a wheelchair to a bed in an attempt to identify any underlying problems. The assessment may involve watching and analysing a patient's attempts at transferring, in order to determine which part of the transfer the patient is having difficulties performing and to isolate the underlying problems. This type of assessment helps to guide treatment.

Assessments are also used to provide an objective way of monitoring improvement over time. More standardised and objective assessments are required for this purpose. So, rather

than observing a patient's attempts at a transfer, a therapist may quantify the amount of assistance the patient requires to transfer or measure the time taken to transfer using a standardised assessment that captures these constructs. Of course, some standardised and objective assessments can also be used to identify underlying problems and guide treatment, particularly assessments of impairments.

Standardised assessments of impairments are similar to those used across all areas of physiotherapy, although there are some that are specific to SCI. For example, assessments of sensation are performed according to the International Standards for Neurological Classification of SCI and are specific to SCI.¹³ In this assessment, only one precise spot is tested to represent each dermatome. So to determine if the C6 dermatome is intact, a very small and precise spot is tested on the dorsal aspect of the thumb just distal to the metacarpophalangeal joint. Light touch and pinprick are separately scored on a 3-point scale, where a score of 0 reflects no sensation, a score of 1 reflects altered sensation and a score of 2 reflects normal sensation. The sensation of all 56 dermatomes needs to be compared with sensation on the face for both light touch and pinprick. The test is therefore very time-consuming. Studies have reported reasonable reliability of the sensory tests with better reliability for the light touch test than the pinprick test.^{14,15}

Assessments of impairments are of limited interest to a physiotherapist without accompanying assessments of activity limitations to quantify a person's ability to move and complete purposeful motor tasks. There are just as many different standardised assessments of activity limitations as there are assessments of impairments, and again some are generic assessments while others are specific to SCI. The most commonly used assessments that are specific to SCI and physiotherapy include the Spinal Cord Independence Measure (SCIM)^{16,17} and the Walking Index for SCI (WISCI).¹⁸ The SCIM is equivalent to the Functional Independence Measure and provides a score out of 100 to reflect a person's ability to live and move independently.¹⁹ It includes items that address a person's ability to transfer, walk, dress, feed, breathe and maintain bladder and bowel continence. There is a self-report version of the SCIM that has good reliability and is simple to administer.²⁰ The WISCI is a 21-point scale that summarises a person's ability to walk after taking into account need for assistance, orthoses or walking aids.²¹ The WISCI also includes a 10-m timed walk test. Both the SCIM¹⁹ and WISCI²¹ have problems with their scoring algorithms, but nonetheless they are widely used in most SCI units around the world.

Despite the obvious importance of assessments for physiotherapists, there is no general international consensus on the most appropriate battery of physiotherapy-specific assessments.²² However, representatives of the Spinal Cord Injury Group of the American Physical Therapy Association have put together a list of their recommendations,²³ and the international SCI community has developed basic datasets for people with SCI.²⁴ Some of the basic datasets are relevant to physiotherapists^{25,26} and include assessments that could be used to both guide treatment and monitor improvements over time (see www.iscos.org.uk/international-sci-data-sets).

Physiotherapy interventions

The results of the assessment and goal-setting process are used to guide treatment. Clearly, treatments need to be based on evidence, but this poses a real challenge for the physiotherapy profession because of the surprisingly few high-quality and conclusive randomised, controlled trials involving people with SCI.²⁷ A recent count put the number of clinical trials at approximately 60 (excluding trials designed to determine the effectiveness of interventions for respiratory function or trials involving education or the provision of mobility-related equipment).²⁸ Most of these trials have been conducted in recent years and focused on interventions such as treadmill walking with

Download English Version:

<https://daneshyari.com/en/article/2621972>

Download Persian Version:

<https://daneshyari.com/article/2621972>

[Daneshyari.com](https://daneshyari.com)