

Wheeled Mobility and Seating Equipment

1.0 Executive Summary

Wheelchairs and seating are one of the most important and most frequently used assistive technologies for people who have a spinal cord injury (World Health Organization, 2008; Bergstrom & Samuelsson 2006; Di Marco et al. 2003). With the development and improvement of materials and manufacturing, the availability and diversity of these products has increased dramatically over the past several decades. This has increased the ability to “fine tune” the wheelchair set up to fit the individual’s needs. However, this has also made the process of choosing an appropriate wheelchair more complex (Gagnon et al. 2005) both for the person with SCI and the clinician prescribing the equipment. In this chapter, section 3.0 reviews the research literature related to manual wheelchairs, from the optimal positioning of the upper extremities for propulsion from kinetic and kinematic perspectives to the effect of different features and options on fit and function. The section also reviews the research about wheelchair training and manual wheelchair use.

There currently is less research related to power wheelchairs, but this does not diminish the importance of power for those people who are unable to propel a manual wheelchair or choose to have both a manual and a power wheelchair for various physical and functional reasons. Section 4.0 reviews the research literature related to the characteristics of power wheelchairs, and driver controls. The larger area of research for power wheelchairs is in the realm of power positioning technology. There are two aspects to power positioning technology; 1) how it is used in daily life and, 2) the impact it has on skin integrity.

Wheelchair seating equipment, particularly cushions, has experienced the same growth in products to support postural, comfort, functional and skin integrity needs. The diversity of equipment now available has also created challenges with finding the optimal seating system; seat cushion, back support, head support, and all other body supports. The acceleration of development related to seat cushions is likely in response to estimates that indicate 50% to 80% of persons with SCI will develop a pressure ulcer (Brienza & Karg 1998) in their lifetime and the costs associated with treating wounds. Section 5.0, *Seating equipment for wheelchairs*, reviews the research related to cushions and back supports, with the studies often comparing equipment to determine optimal pressure management, implications on posture and effects on functional tasks. This section includes a review of interface pressure mapping (IPM) as it is a clinical tool that holds potential to assist the clinician but there are limitations in how it can be used clinically. Researchers also use IPM to compare cushions, research the effect of changing body position and different postural changes on pressure to better understand the implications of sitting pressures on pressure management. There are benefits and limitations with this technology that have implications for application clinically and in evaluating the research using IPM.

Because sitting surface pressures and the need for pressure management is critical for most people with spinal cord injury regardless of the type of wheelchair they use, section 6.0 reviews the research related to body position changes, whether through power positioning technology or physically changing body position.

The final section was added during the previous revision, due to the growth of research exploring wheelchair provision. Obtaining a properly fitting wheelchair has a significant impact on all aspects of a person’s life, from comfort and function to affecting secondary complications such as pressure injuries. This section rounds out this chapter on wheelchairs and seating. While there are many aspects of life for a person with a spinal cord injury that overlap with wheelchairs and seating, the focus of this chapter has remained on the equipment itself.

