Wheelchair and Seating Equipment Following Spinal Cord Injury

Chapter Summary

For people who have a spinal cord injury, wheelchairs and seating can be the most important and most frequently used assistive technologies (World Health Organization, 2008; Bergstrom & Samuelsson 2006; Di Marco et al. 2003).

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. A wheelchair and the associated seating equipment must support effective mobility in a variety of different environments. It must enable and influence the extent and quality of activity and participation while providing comfort, stability and safety not only when sitting, but also when participating in dynamic activities. Concurrently this equipment also needs to meet the individual’s needs for function, comfort, postural support and, tone management (World Health Organization, 2008; May et al. 2004).

Properly fitted wheelchairs and seating support and augment the prevention of secondary complications such as: pressure injuries; progression of negative postural changes, both muscular and skeletal; and pain (upper limb and back) from the mechanical stress of pushing a wheelchair and; the gravitational impact on the body when sitting for long periods of time (World Health Organization, 2008; Curtis et al. 1999).

With the development and improvement of materials and manufacturing, the availability and diversity of wheelchair and seating 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 who uses a wheelchair and seating and the clinician assisting them with choosing the equipment.

This chapter reviews studies that explore wheelchairs and seating research that address these areas and are applicable to clinical practices. Manual wheelchairs have the largest body of associated research literature, from the optimal positioning of the upper extremities for propulsion from kinetic and kinematic lens, to the effect of different features and options have on fit and function, wheelchair training and manual wheelchair use.

There is less research related to power wheelchairs currently, 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. The research literature relates to the characteristics of power wheelchairs, and driver controls however 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 also experienced significant growth in availability and diversity of products to support postural, comfort, functional and skin integrity needs. This growth 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.
The need to manage sitting surface pressures is critical for most people with spinal cord injury regardless of the type of wheelchair they use. Research literature relates to body position changes, whether through power positioning technology or physically changing body position focuses primarily on pressure management.

There are many aspects of life for a person with a spinal cord injury that overlap with wheelchairs and seating such as the influence of the wheelchair and seating on the perception of self, or on accessibility. While these topics are important, the focus of this chapter has remained on the equipment itself.