

# WHEELCHAIR POSITIONING FOR OLDER ADULTS

“Older adults” are defined in the United States as those “65 and over.” Since the advent of Social Security and Medicare, this has been the age after which an adult enters later life stages of retirement as well as making several other physiological and psychosocial transitions from “middle age” into the stages of later life. Many older adults do not begin experiencing mobility deficits until much later in life, if at all. Therefore, many wheelchair users in this population are actually over the age of 75, or even 85. It is important to remember chronological age may provide very little information regarding the functional capacity of this diverse population. In spite of the differences between chronological age and physiological age, most statistical data sources continue to use the ages of “65 and over” when describing this population.

With the aging of the “baby boom” generation, older adults are a rapidly expanding demographic in the U.S. Baby boomers began turning 65 in 2011, and current projections are that this population will number 70.2 million, or 22 percent of the population, by the year 2030.<sup>1</sup> Additionally, the segment of “old-old” (over 85) is the fastest growing portion of this population. In the U.S., approximately 850,000 individuals older than 65 regularly use wheelchairs for mobility.<sup>2</sup> This is the largest population of all wheelchair users.<sup>3</sup> Combining these two critical statistics, the older adult population is a very important, yet largely underserved, population of wheelchair users in this country.

When considering the wheelchair seating and mobility needs of older adults, there are two main populations of interest. One involves the population of older adults who acquire a mobility disability late in life due to the occurrence of a stroke, a progressive disease like Parkinson’s disease, or a musculoskeletal condition like osteoarthritis. Another is a population of people who acquired a mobility disability earlier in life and are now aging into this life stage with this pre-existing condition including spinal cord injury, cerebral palsy, spina bifida, multiple sclerosis or muscular dystrophy, among others. Individuals with disabilities are living significantly longer, many into this “older adult” stage. These two populations have distinct seating and positioning needs, however all are affected by the aging process and therefore share some characteristics.

Wheelchair seating and positioning is critical for this population for many of the same reasons it is critical for all persons who use wheelchairs. Optimal seating supports good health, optimizes comfort, improves mobility, maximizes function, and ultimately provides access to “activity and participation.” All persons who rely on wheelchairs

for mobility incur risks as a result. These risks include: development of pressure ulcers, loss of strength and range of motion, development of postural deformities, general declines in multiple body systems including the cardiopulmonary and circulatory systems, and impaired access to social activities, which is so critical for quality of life and health. Older adults frequently experience higher levels of risk due to the combination of the physiological effects of aging and the risks normally associated with loss of the ability to stand and walk.

Older adults experience physiological changes due to the aging of the body’s cells, tissues and systems. These include changes in the musculoskeletal system, the skin, and the muscles and bones themselves. Three main areas relevant to wheelchair seating are affected: posture, body tissue changes, and skin changes. Posture is significantly influenced toward flexion and this postural change is further exacerbated by prolonged sitting.<sup>4</sup> A loss of water from the disks of the spine and muscle weakness leads to increased thoracic kyphosis, frequently with a forward head posture, and a reduction in the normal lumbar curve. Additionally, this posture is more likely to be “fixed,” because the tissues themselves are less elastic and more susceptible to permanent changes. General changes in the body’s tissues, including the tendons, ligaments and other connective tissues, also include a loss of water content, loss of elastic materials and overall loss of extensibility or “stretchiness.” Tissues are at greater

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risk of damage caused by mechanical forces, and losses of range of motion, particularly in the lower body joints, are very common. Changes include reduced mobility of hip, knee and ankle joints, among others. Finally, several changes in the aging skin lead to significant fragility of the skin with greater risk of pressure ulcers and mechanical trauma injuries, such as skin tears or easy bruising. These changes complicate wheelchair seating interventions and make more precise application of technology critical for this population.

In addition to these normal age-related changes, older adulthood is associated with increased prevalence of multiple diseases, including cerebrovascular disease, which may result in one or more strokes (or cerebral vascular accidents), diseases causing dementia (such as Alzheimer's disease), Parkinson's disease, many types of cancer, and multiple other pathological conditions. Although not a normal part of the aging process, older adults experience these diseases in greater numbers and frequently acquire mobility disabilities as a consequence of these conditions. In addition to these primary disease processes, older adults also experience co-morbidities, such as diabetes, hypertension, osteoarthritis, and peripheral neuropathies. While these conditions may not cause primary losses in mobility, they complicate the application of postural supports in a safe and effective seating system.

As if the older adult "positioning puzzle" is not complicated enough with all of the above factors, there is great variety of living circumstances, caregiver arrangements, and funding complications experienced by this population. Approximately 95 percent of older adults live in the community, in a variety of living environments, including: privately owned homes, rented apartments, subsidized independent living environments, and assisted living environments. Only about 5 percent of older adults live in skilled nursing or long term care facilities, however this percentage goes up to approximately 20 percent for individuals over 85.<sup>1</sup> Different living environments offer different challenges associated with wheelchairs. Many older adults are cared for (if they require assistance) by older-adult spouses or other family members. The caregivers may be experiencing age-related changes themselves and may have impairments of their own. It is critical to consider the needs of the caregiver when working with an older adult. Finally, the funding picture for a positioning device may be very complex. Although Medicare is frequently the primary funding source, there may be involvement of Medicaid, private insurance companies, the VA system and other funding sources. Older adults living in long term care facilities may be "spending down" their own resources until they become eligible for Medicaid program funding. Access to some technologies, such as manual ultra lightweight wheelchairs with configurable frames may be quite limited and if an older adult lives in a long term care facility, they may have little to no access to third party payment for custom mobility or seating technologies.

In spite of the many challenges associated with this population, seating and positioning goals and principles still apply and there is evidence that helps guide practitioners towards the best possible solutions. Seating and positioning goals for older adults, much like those for other populations, include: supporting optimal posture, facilitating function, optimizing mobility in the living

environment, and improving safety or reducing risk of complications like pressure ulcers, falls or other injuries. There are many positive benefits of optimal seating for older adults, including reducing the need for potentially harmful restraints while improving comfort and function<sup>5</sup> and enhancing manual wheelchair propulsion.<sup>3</sup>

Older adult positioning, as with any wheelchair positioning solution, begins with a thorough assessment process.<sup>4</sup> During this process, it is critical to pay close attention to the specific risk areas associated with aging including range of motion restrictions, particularly in the lower extremity hip and knee joints, the postural changes of the individual, the general skin and soft tissue of the older adult, and the general physiological health. Optimal positioning cannot be achieved if these conditions are overlooked or underestimated. A thorough medical history must accompany this physical examination as well, so there is a complete understanding of all associated pathologies, co-morbidities and risk factors associated with the application of wheelchair seating and positioning. As with any other comprehensive evaluation process, a simulation with the desired positioning and mobility solution is important to gaining a full understanding of the potential success of the system and documenting potential outcomes.

Common complaints associated with positioning of older adults include the occurrence of "sliding out of the wheelchair," sitting with a slumped

posture, having the inability to propel the wheelchair effectively, and general discomfort in the seating system. Most of these seating problems are caused by ill-fitting or poorly configured systems. Many older adults are positioned in “one size fits all” standard manual wheelchairs with sling seat and back upholstery and few, if any, positioning options. These wheelchairs are not optimally configured to meet the positioning and mobility needs of older adults and subsequently perform very poorly. Standard wheelchair configurations do not accommodate losses in range of motion, particularly of the hip and knee joints, that occur frequently in older adults. The lack of ability to accommodate to these common problems leads to compensatory postures, including sliding the hips forward on the seat (hence, “sliding out of the wheelchair”) to allow for a more open, or larger, thigh to trunk angle. Additionally, the standard depth of the sling seat upholstery may just be too long for the older adult, which will also result in the pelvis losing posterior support and falling into a posterior tilt, which results in sliding forward on the seat. Although not seemingly insurmountable problems, with the complications in funding and technology access, these situations are difficult to resolve in some circumstances.

Optimal wheelchair positioning for older adults relies very heavily on several key strategies. A careful and thorough evaluation and assessment process is critical. Clinicians must pay particular attention to lower extremity range of motion limitations, hamstring flexibility, postural changes of the trunk and head, and strength changes throughout the body to achieve a positive outcome. If there are already problems identified (like sliding out of the wheelchair), then the root causes of the problems must be determined. For example, if the cause of sliding out of the wheelchair is a lack of posterior pelvis support, then just providing a larger seat to back support angle will not fix it.

A carefully fitted seating system with the proper seat width, depth, back height, arm support and leg support configuration is essential. Wheelchair seat to back support angles must accommodate limitations in hip flexion and, if possible, orient the upper body such that gravity is facilitating extension, rather than flexion. This may be done with an after-market back support with adjustability in angle or a wheelchair with an adjustable angle back support or an adjustable tilt mechanism. Lower extremity positioning systems must accommodate excessive tightness of the hamstring muscles and allow adequate flexion of the knees so that the client's pelvis is not being pulled forward on the seat. Additionally, the wheelchair seating must be flexible enough to allow the desired mobility method. Older adults frequently use various combinations of upper and lower extremity movement, which allows them to be most effective and efficient in propulsion.

All surfaces in contact with the body must be supportive, but also contain properties to minimize the risk of pressure ulcers. All surfaces must be soft and pliable to reduce the risk of mechanical stresses on skin and other at-risk tissues. Many older adults require a combination of positioning and pressure management supports, although access may be limited by their medical diagnoses or living circumstances. It is critical to find the right balance between restrictive and supportive positioning to facilitate function and mobility without increasing risks.

There are many technology solutions available that will meet the needs of this population, however finding the right match between the client and the technology may be challenging and requires creativity and perseverance. The outcomes can be dramatic and, if done correctly, can make all the difference in both function and quality of life for older adults ➤

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