



A JUSTIFICATION GUIDE FOR LETTERS OF MEDICAL NECESSITY: A supplement for wheelchair evaluations

APEX

An ultra lightweight wheelchair is required for _____ to accomplish one or more of the following activities:

- Dressing
- Grooming/Hygiene
- Bathing
- Feeding
- Meal Prep
- Home Management
- Work/school access

_____ is unable to independently complete _____ activities of daily living from a standing position, or with a cane, walker or crutches or standard wheelchair due to (choose reason individual cannot complete these activities with cane, walker or crutches, or standard wheelchair) _____.

_____ has demonstrated the ability to use an optimally configured ultra lightweight manual wheelchair within their home for mobility related activities of daily living.

This wheelchair must be adjusted to meet _____ needs, without these specific adjustments to _____ (insert specific adjustment, see below), _____ will not be able to independently move themselves within their environment or complete their tasks.

- Center of Gravity (axle position)
- Seat Slope/Back Angle (seat to floor height different in front and rear of wheelchair)
- Camber

_____ does not have the ability to accomplish mobility related ADLs without the requested optimally configured ultra lightweight manual wheelchair. They do not have the ability to stand to accomplish these activities with cane, crutches or a walker as stated above.

They cannot propel a standard, or high-strength lightweight manual wheelchair as they are both too heavy, and cannot be adjusted properly to fit the unique needs of _____ because they do not have the ability to adjust in the way an ultra lightweight manual wheelchair does and is manufactured to do.

The adjustments on the ultra lightweight manual wheelchair allow the device to be fit to _____ to decrease strain on the upper extremities, decrease rolling resistance, and make the device overall more efficient to push.¹⁻²⁻³ This ability to fit the wheelchair to _____ and not _____ to the wheelchair will allow for optimum independence in whatever capacity is required_____. Without this device, _____ may be dependent on a caregiver and not be able to complete activities without assistance.

- Home
- School
- Community
- Work

Adjustments to Center of Gravity (COG) are individual and need to be adjusted both horizontally and vertically to ensure _____ is properly positioned for the least amount of strain on their upper extremities, and to make the wheelchair as maneuverable as possible. With a standard or high-strength lightweight manual wheelchair, these adjustments are extremely limited if they exist at all. On the APEX models, the COG can be infinitely adjusted both horizontally and vertically, allowing _____ to be seated for optimal efficiency. Because it is adjustable, the COG can be adjusted as _____ changes over time, ensuring the ultralightweight wheelchair can be used for a longer period than a standard wheelchair or high-strength lightweight manual wheelchair.

Evidence states that an optimal axle position can make the wheelchair more efficient and therefore easier to propel. (see references at end of document).¹⁻²⁻³

Adjustments to seat slope in the ultra lightweight manual wheelchair can allow _____ to sit more INTO the wheelchair rather than ON it. To clarify, it has been shown with research that a person sitting properly between the rear wheels with seat slope will help with access to the rear wheels for optimal propulsion stroke efficiency as well as improved pelvic posture, due to the assistance of gravity, and will assist with sitting tolerance in the wheelchair for the entire day. Because the front of the wheelchair can be placed higher than the rear of the wheelchair, _____ trunk can rest into the back support of the wheelchair. In a standard or high strength lightweight manual wheelchair, there is extremely limited or zero ability to change the amount of seat slope in the wheelchair. Without the seat slope, _____ could become fatigued over time, leading to a kyphotic, more forward posture, development of musculoskeletal posture impairments and will be susceptible to other health conditions including decreased sitting tolerance and ultimately more dependence on a caregiver for assistance with ADLs.

Camber is NOT available on any other type of wheelchair other than an ultra lightweight manual wheelchair. _____ requires camber in their wheelchair to assist them with maneuverability, turning easier, and increasing the overall stability. Because _____ requires camber on their wheelchair, the ultra lightweight manual wheelchair is the only option for maximum independence.

The customization of seat width, seat depth, rear axle position (COG), rear seat-to-floor height (slope) and camber, together provide optimal axle position for propulsion and function. This is individually measured and configured for optimal push-rim biomechanics of _____. The ultra lightweight manual wheelchair will accommodate the postural needs of _____, promoting a lifetime of independence and improved quality of life.

RIGID SPECIFIC JUSTIFICATION

- Lighter weight option, can be lesser weight by lbs. depending on models
- Easier for independent transportation, transfers across body
- Can dial in specific positioning and configurations with infinite adjustments vs. limitations on folding models
- More responsive, flexible ride for decreased fatigue and improved efficiency

CARBON FIBER

_____ requires an even lighter material than standard aluminum. _____ will benefit from carbon fiber because it is exceptionally lightweight as well as very strong. Their pain, spasticity and weakness make it difficult to even propel the aluminum ultra lightweight manual wheelchair. The vibration damping quality of carbon fiber can eliminate a large portion of the everyday vibration that is transmitted up to _____ which can help to decrease pain, increase energy, and decrease the number of spasms.
(See CF Justification sheet)

COMPONENTS

The following section details wheelchair components that are essential in making _____ independent and efficient in their environment to perform MRADLs.

| TIE DOWN | |
|-----------------------|--|
| | WC-19 TRANSIT TIE DOWN WITH Q'STRAIT BELT SHORT BELT |
| | WC-19 TRANSIT TIE DOWN WITH Q'STRAIT BELT LONG BELT |
| | <ul style="list-style-type: none"> • To utilize public transportation |
| | <ul style="list-style-type: none"> • Q'straint belt can be attached to in vehicle system |
| | <ul style="list-style-type: none"> • For transportation IN the wheelchair |
| | WC-19 TRANSIT TIE DOWN WITHOUT BELT |
| | <ul style="list-style-type: none"> • To utilize public transportation |
| | <ul style="list-style-type: none"> • For transportation IN the wheelchair |
| CASTER OPTIONS | |
| | PNEUMATIC CASTERS |
| | <ul style="list-style-type: none"> • Softer ride to help to control pain and spasticity |
| | NEWTON ULTRACASTERS COMPOSITE OR ALUMINUM |
| | <ul style="list-style-type: none"> • For use in multi-terrain environments |
| | <ul style="list-style-type: none"> • Material of tire is softer |
| | <ul style="list-style-type: none"> • Smoother ride to potentially help control pain |
| | <ul style="list-style-type: none"> • Aluminum hub material for added durability |
| | <ul style="list-style-type: none"> • Aluminum red sleeve between metal bearings and metal hub ensures easier bearing maintenance |
| | CARBON FIBER FROG LEGS SUSPENSION FORKS |
| | <ul style="list-style-type: none"> • Provides additional shock absorption |
| | <ul style="list-style-type: none"> • Provides increased comfort to ride |
| FOOTPLATE | |
| | TUBULAR OPEN LOOP |
| | <ul style="list-style-type: none"> • Standard, no charge option |
| | <ul style="list-style-type: none"> • Lightest weight |
| | <ul style="list-style-type: none"> • No angle adjustment |
| | TUBULAR WITH ABS COVER |
| | <ul style="list-style-type: none"> • Lightweight option with cover for more surface area for foot support |
| | ADJUSTABLE ANGLE ALUMINUM (ONE PIECE) |
| | <ul style="list-style-type: none"> • Foot coverage with adjustment to match user/foot and ankle position |
| | NEWTON ADJUSTABLE ANGLE CARBON FIBER (ONE PIECE WITH RUBBER INSERTS) |
| | <ul style="list-style-type: none"> • Lightweight and strong foot coverage with adjustment to match user/foot and ankle position |
| | <ul style="list-style-type: none"> • Rubber grips for maintaining foot position |
| | FLIP-BACK ADJUSTABLE ANGLE ALUMINUM |
| | <ul style="list-style-type: none"> • Adjustability for proper foot/ankle position |
| | <ul style="list-style-type: none"> • Flip back to allow for foot placement on the ground for transfers or to allow for closer placement to surfaces |

| FOOTPLATE | |
|------------------------------|--|
| | FLIP-BACK ADJUSTABLE ANGLE CARBON FIBER |
| | <ul style="list-style-type: none"> • Adjustability for proper foot/ankle position • Flip back to allow for foot placement on the ground for transfers or to allow for closer placement to surfaces • Lightest weight option |
| | HIGH-MOUNT WITH ADJUSTABLE ANGLE FOOTPLATE (ALUMINUM – ONE PIECE) |
| | <ul style="list-style-type: none"> • Ability to accommodate shorter seat to footplate lengths initially • Will allow for additional growth over lifetime of chair |
| | HIGH-MOUNT WITH ADJUSTABLE ANGLE FOOTPLATE (CARBON FIBER WITH RUBBER INSERTS – ONE PIECE) |
| | <ul style="list-style-type: none"> • Ability to accommodate shorter seat to footplate lengths initially • Will allow for additional growth over lifetime of chair • Lightest weight option |
| FOOTPLATE ACCESSORIES | |
| | 2" RISER |
| | <ul style="list-style-type: none"> • Can be used if lower leg length isn't sufficient for standard footplate position • Can be used in between standard footplate and high mount footplate |
| | CALF STRAP |
| | <ul style="list-style-type: none"> • To provide posterior support to the calf region • Will be used anteriorly to the lower leg to prevent legs from falling off the footplates toward the front of the wheelchair |
| | BODYPOINT AEROMESH PADDED CALF STRAP |
| | <ul style="list-style-type: none"> • To provide posterior support to the calf region • Will be used anteriorly to the lower leg to prevent legs from falling off the footplates toward the front of the wheelchair • Padding to prevent skin breakdown and for improved tolerance to user |
| FOLD DOWN BACKREST | |
| | ULTRALIGHT NON-LOCKING BACKREST (NOT LOCKING IN UPRIGHT AND DOWN POSITION) |
| | <ul style="list-style-type: none"> • Lightest possible option for backrest • About 1.5 lbs. lighter than locking option |
| PUSH HANDLE OPTIONS | |
| | FOLD DOWN PUSH HANDLES |
| | <ul style="list-style-type: none"> • To allow for handles to be out of the way for transport especially in smaller spaces • To prevent user being "pushed" by someone when not necessary or not wanted |
| | CLAMP ON HEIGHT ADJUSTABLE PUSH HANDLES (9-20", 9-23") |
| | <ul style="list-style-type: none"> • To allow for user to be pushed at times with caregivers of different heights • To allow for push handles to be placed completely out of the way when desired |
| BACKREST OPTIONS | |
| | DEPTH ADJUSTABLE BACK (1-, 2- OR 3-INCH DEPTH ADJUSTMENT) |
| | <ul style="list-style-type: none"> • May be required to mount some custom back supports • May be required for built in depth growth for children/adolescent users |

BACKREST OPTIONS

CUSTOM HEIGHT RIGIDIZER BAR

- May be required for mounting some after-market back supports

BACK UPHOLSTERY

BACK UPHOLSTERY TENSION ADJUSTABLE

- Option for mild postural support
- Allow wheelchair to fold down without extra step of removing rigid back support

REAR WHEEL OPTIONS

MAG

- Limited to no maintenance
- May be required by some institutions

NEWTON GRAVITY ULTRALIGHT WHEEL

- Increased efficiency and lighter weight than standard

SPINERGY SPOX

- Good balance of lightweight wheel and stability

SPINERGY LX

- Minimal spokes
- Reach through access to underneath wheelchair from the side if necessary

SPINERGY CLX

- High stiffness
- Responsive
- Low weight, high strength to weight ratio

TIRE OPTIONS - SOLID

SOFT URETHANE 1 3/8" - LOW TREAD

- Designed to be fully puncture proof and low maintenance
- Wears at a slower rate compared to pneumatics
- Higher tensile strength allowing it to carry heavier loads
- No maintenance requirements

SOFT URETHANE 1 3/8" - MEDIUM TREAD

- Designed to be fully puncture proof and low maintenance
- Will have increased traction on outdoor terrain compared to std. urethane.
- No maintenance requirements

SOFT URETHANE 1" - NO TREAD - SHOX

- Designed to be fully puncture proof and low maintenance
- Performs best on hard indoor surfaces
- No maintenance
- No maintenance requirements

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| PNEUMATIC WITH AIRLESS INSERT 1 3/8" - MEDIUM TREAD |
| <ul style="list-style-type: none"> • Designed to be fully puncture proof and low maintenance • Increased traction compared to solid tires • Softer ride than solid tires due to air tire • No maintenance requirements • Heaviest tire option |
| TIRE OPTIONS - PNEUMATIC |
| PNEUMATIC 1 3/8" - MEDIUM TREAD |
| <ul style="list-style-type: none"> • Lower rolling resistance than solid tires • The right amount of tire pressure can offer a softer ride over bumpy surfaces and provide that tactile grip for wet surfaces |
| PNEUMATIC HP 1" - LOW TREAD, PUNCTURE RESISTANT - SpeedLite |
| <ul style="list-style-type: none"> • Dual layer for extremely high puncture resistance • High pressure achieves the least rolling resistance |
| PNEUMATIC HP 1" - MEDIUM TREAD, PUNCTURE RESISTANT - TrailBlazer |
| <ul style="list-style-type: none"> • Dual layer for extremely high puncture resistance • High pressure achieves the least rolling resistance • Increased traction compared to low tread option |
| PNEUMATIC 2" - LARGE TREAD - HIGH TREAD KNOBBY TIRE WITH BUILT IN PUNCTURE RESISTANCE |
| <ul style="list-style-type: none"> • Larger tread increases traction on variety of terrains providing increased versatility and grip |
| HANDRIMS |
| ALUMINUM BLACK HARD ANODIZED |
| <ul style="list-style-type: none"> • Dark colored anodization to seal the rim to prevent oxidation |
| PLASTIC COATED |
| <ul style="list-style-type: none"> • Higher friction than standard for increased grip and energy transfer • Wider diameter than standard, doesn't require as much of a pincer grasp |
| HIGH FRICTION COATED |
| <ul style="list-style-type: none"> • High friction for high energy transfer • Less diameter than plastic coated |
| NEWTON AIR GRIP |
| <ul style="list-style-type: none"> • High friction for high energy transfer • Same diameter as aluminum anodized |
| SURGE/ SURGE LT |
| <ul style="list-style-type: none"> • Oval aluminum ergonomic handrim with rubber high friction strip on top for normal hand function • Available in two diameters for best fit • May help reduce amount of grip needed to push on handrim • May help decrease symptoms of carpal tunnel or other overuse injuries common in persons who use manual wheelchairs |

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| NATURAL FIT | |
| <ul style="list-style-type: none"> • Oval aluminum ergonomic handrim • May help decrease symptoms of carpal tunnel or other overuse injuries common in persons who use manual wheelchairs • Allows a dual surface for propulsion and braking | |
| SIMI H | |
| <ul style="list-style-type: none"> • Oval hard aluminum anodized ergonomic handrim with high friction silicone strip • May allow hand to stay in contact with handrim even when wet • May help decrease symptoms of carpal tunnel or other overuse injuries | |
| NOVA H | |
| <ul style="list-style-type: none"> • Oval hard aluminum anodized ergonomic handrim with high friction grip • May allow hand to stay in contact with handrim even when wet • May help decrease symptoms of carpal tunnel or other overuse injuries | |
| OPTIMUM H | |
| <ul style="list-style-type: none"> • Heart shaped hard aluminum anodized ergonomic handrim with built in thumb groove • May help decrease symptoms of carpal tunnel or other overuse injuries | |
| ASSEMBLY POSITION OF HANDRIM (FOR ALUMINUM ANODIZED, NEWTON AIRGRIP) | |
| NARROW HANDRIM POSITION WITH CUT | |
| <ul style="list-style-type: none"> • Custom more narrow position with decreased space between handrim and wheel • Decreases overall width of wheelchair for doorway access • May be more comfortable for grip for person using the wheelchair | |
| SUPER NARROW HANDRIM | |
| <ul style="list-style-type: none"> • Custom most narrow position with very minimal space between handrim and wheel • Decreases overall width of wheelchair to its most narrow with still having a handrim attached for doorway access • Will not allow fingers/hands to get stuck between handrim and wheel • May be appropriate for pediatric client who grabs tires, can help get them used to handrim at the same time | |
| THUMB PIECE SELECTION FOR SURGE, SURGE LT, AND NATURAL FIT | |
| STANDARD GRIP | |
| <ul style="list-style-type: none"> • Has a powder coating and no friction • Enhances ergonomic position of hand combined with handrim to potentially decrease symptoms of overuse injuries and carpal tunnel syndrome | |
| SUPER GRIP | |
| <ul style="list-style-type: none"> • Has an advanced copolymer coating with high friction surface • Enhances ergonomic position of hand combined with handrim to potentially decrease symptoms of overuse injuries and carpal tunnel syndrome | |
| AXLE | |
| QUAD RELEASE AXLE | |
| <ul style="list-style-type: none"> • Limited hand function may impair ability to release the standard push button on quick release • This small circular lever will allow individual to disengage axle | |
| WHEEL LOCK | |
| 6" REMOVABLE EXTENSION HANDLE FOR PUSH TO LOCK | |
| <ul style="list-style-type: none"> • Will allow for better access to reach wheel locks • Decreased strength in UE requires the longer lever arm for easier engagement and disengagement of lock • Often appropriate for geriatrics and pediatrics | |

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| ALUMINUM PUSH TO LOCK WITH EXTENSION |
| <ul style="list-style-type: none"> • Will allow for better access to reach wheel locks |
| NEWTON GRADE AID PUSH TO LOCK |
| <ul style="list-style-type: none"> • Integrated anti-roll back to assist with up a graded surface without having to always maintain hand contact with rear wheel |
| 6" REMOVABLE EXTENSION HANDLE FOR PULL TO LOCK AND GRADE AID |
| <ul style="list-style-type: none"> • Will allow for better access to reach wheel locks • Decreased strength in UE requires the longer lever arm for easier engagement and disengagement of lock |
| SCISSORS LOCK |
| <ul style="list-style-type: none"> • Remains under the seat rail and out of the way of hands to prevent potential injuries to fingers from propulsion strokes |
| ARMREST |
| HEIGHT ADJUSTABLE T ARMREST |
| <ul style="list-style-type: none"> • Height adjustment to ensure proper positioning for UE and shoulder while seated in the wheelchair • T Armrest for most stability for push up with transfers or repositioning |
| 10" DESK LENGTH ARMPAD |
| <ul style="list-style-type: none"> • Allows for getting closer access to surfaces for ADLs |
| 14" FULL LENGTH ARMPAD |
| <ul style="list-style-type: none"> • Pushing self to standing for transfers • Safe transfers into wheelchair to have a surface to hold onto |
| HEIGHT ADJUSTABLE SWING AWAY ARMREST |
| TUBULAR ARMREST WITHOUT SIDE GUARD |
| <ul style="list-style-type: none"> • Lightweight swingaway armrest for support when needed for transfers or repositioning |
| SHORT PAD |
| <ul style="list-style-type: none"> • Allows for getting closer access to surfaces for ADLs |
| LONG PAD |
| <ul style="list-style-type: none"> • Allows for getting closer access to surfaces for ADLs |
| TUBULAR ARMREST WITHOUT SIDE GUARD |
| <ul style="list-style-type: none"> • Lightweight swingaway armrest for support when needed for transfers or repositioning • Side guard for protection LEs including skin from moisture from wheels • Maintaining midline position |
| SHORT PAD |
| <ul style="list-style-type: none"> • Allows for getting closer access to surfaces for ADLs |
| LONG PAD |
| <ul style="list-style-type: none"> • Allows for getting closer access to surfaces for ADLs |

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| FLAT ARMPAD WITHOUT SIDE GUARD |
| <ul style="list-style-type: none"> • Lightweight swingaway armrest for support when needed for transfers or repositioning • Flat pad for larger surface area for resting UE or for repositioning |
| 10" DESK LENGTH |
| <ul style="list-style-type: none"> • Allows for getting closer access to surfaces for ADLs |
| 14" FULL LENGTH |
| <ul style="list-style-type: none"> • Allows for getting closer access to surfaces for ADLs |
| FLAT ARMPAD WITH SIDE GUARD |
| <ul style="list-style-type: none"> • Lightweight swingaway armrest for support when needed for transfers or repositioning • Side guard for protection LEs including skin from moisture from wheels • Maintaining midline position |
| 10" DESK LENGTH |
| <ul style="list-style-type: none"> • Allows for getting closer access to surfaces for ADLs |
| 14" FULL LENGTH |
| <ul style="list-style-type: none"> • Allows for getting closer access to surfaces for ADLs |
| SIDE GUARDS |
| PLASTIC SIDE GUARDS (REMOVABLE) |
| <ul style="list-style-type: none"> • Protection to LEs including skin from moisture from wheels • Maintaining midline position • Can remove for transfers or other functional activities |
| CARBON FIBER SIDE GUARDS (REMOVABLE) |
| <ul style="list-style-type: none"> • Extreme lightweight • Protection to LEs including skin from moisture from wheels • Maintaining midline position |
| PLASTIC FENDER SIDE GUARDS - STRAIGHT BRACKET (REMOVABLE) |
| <ul style="list-style-type: none"> • Follows the contour of the wheel • Covers the rear wheel to prevent any moisture or dirt to be transferred from the tire to the user |
| PLASTIC FENDER SIDE GUARDS - OFFSET BRACKET (REMOVABLE) |
| <ul style="list-style-type: none"> • Follows the contour of the wheel • Covers the rear wheel to prevent any moisture or dirt to be transferred from the tire to the user • Offset bracket allow for guards to be mounted more midline than standard orientation, getting it closer to user |
| CARBON FIBER FENDER SIDE GUARDS - (REMOVABLE) |
| <ul style="list-style-type: none"> • Lightest weight material • Follows the contour of the wheel • Covers the rear wheel to prevent any moisture or dirt to be transferred from the tire to the user |
| POSITIONING BELT |
| HARDWARE ATTACHMENT FOR 2 EXTRA POINTS (1 PAIR) |
| <ul style="list-style-type: none"> • Additional hardware required for mounting pelvic belt |

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| VELCRO ADJUSTABLE BELT |
| <ul style="list-style-type: none"> • Pelvic positioning belt to support proper sitting position in wheelchair • Velcro attachment for user ease, does not require much hand function |
| AUTO BUCKLE |
| <ul style="list-style-type: none"> • Pelvic positioning belt to support proper sitting position in wheelchair • Auto buckle for user ease • Small 35" • Medium 48" • Long 60" |
| BODYPOINT HIP BELT 2 POINT (NON-PADDED) |
| <ul style="list-style-type: none"> • Pelvic positioning belt to support proper sitting position in wheelchair • 2 point allows for adjustment for proper angle of pull for best positioning |
| BODYPOINT HIP BELT 2 POINT (PADDED) |
| <ul style="list-style-type: none"> • Pelvic positioning belt to support proper sitting position in wheelchair • 2 point allows for adjustment for proper angle of pull for best positioning • Padding allows for tight fit over bony prominences without risk of skin irritation or injury |
| BODYPOINT HIP BELT 4 POINT (PADDED) |
| <ul style="list-style-type: none"> • Pelvic positioning belt to support proper sitting position in wheelchair • 4 point allows for more control and adjustment for proper angle of pull for best positioning, quite often for someone with higher muscle tone • Padding allows for tight fit over bony prominences without risk of skin irritation or injury |
| BODYPOINT EVOFLEX |
| <ul style="list-style-type: none"> • Pelvic positioning belt to support proper sitting position in wheelchair • Form of material with functional implications to allow for movement of LEs without pelvic movement • Usually mounted at 90 degrees |
| ACCESSORIES |
| ANTI-TIPPERS |
| <ul style="list-style-type: none"> • Mount directly off the frame • Prevent tipping over backwards when used and installed correctly |
| CANE AND CRUTCH HOLDER |
| <ul style="list-style-type: none"> • Mounts onto back of wheelchair to hold a cane or pair of crutches |
| SPOKE GUARDS |
| <ul style="list-style-type: none"> • Plastic guard that clips to spokes in 4 places to hold in place • Blocks spokes and prevents fingers or other objects from being caught in spokes |

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- 2- Joseph Ott, Holly Wilson-Jene, Alicia Koontz & Jonathan Pearlman (2022) Evaluation of rolling resistance in manual wheelchair wheels and casters using drum-based testing, Disability and Rehabilitation: Assistive Technology, 17:6, 719-730, DOI: 10.1080/17483107.2020.1815088
- 3- Paralyzed Veterans of America Consortium for Spinal Cord Medicine (PVACSCM). (2005). Preservation of upper limb function following spinal cord injury: A clinical practice guideline for health-care professionals. The Journal of Spinal Cord Medicine, 28(5), 433-470.