Spinal Cord Injury and Wheelchair Information
Wheelchair (W/C) Team:
Patient, Vendor, Physical Therapist, Insurance Company

- You are the captain of your team
- The team works together to coordinate the right chair
- The Vendor matches the right equipment to your needs (and services the product after delivery)
- The therapist informs the team of your physical traits and abilities
Wheelchair (W/C) Team:

- The Eval is done closer to your end of stay
- The vendor supplies you with a loaner w/c to go home with you
- It may take 2-3 months for you to get your custom w/c
W/C Types: Power

- **Mid Wheel Drive**: shorter turning radius, not as much power generated
W/C Types: Power

- Rear Wheel Drive:
  - has greater horsepower/torque capabilities, increased turning radius
W/C Types: Power

- Front Wheel Drive:
  - allows standing capabilities, increased turning radius, bigger wheels hit cracks first
W/C Types: Manual

- All have quick release axles which means the wheels can be taken off for transport

- **Rigid**: made of aluminum alloys or titanium, custom made, most efficient, lighter weight, no cross piece in the middle may be easier for individual to get in and out of car independently
W/C Types: Manual Continued

- **Folding Rigid**: made of aluminum alloys, custom made, has folding crossbar under seat, may be easier to manage for others because it is more familiar.

- **Folding**: aluminum, a typical wheelchair design, somewhat custom, least efficient, and heavy.
W/C Parts: Casters

- **Size:**
  - Smaller: more mobile, faster turns, less able to move over cracks, decreased shock absorption
  - Larger: smoother rides, increased friction, larger variation in materials for caster, moves over cracks easier

- **Material:** harder plastic (rollerblades wheels), solid rubber, air, airless inserts

- **Shock Absorbing:**
  - depends on the material
  - air is the best
  - also have casters called soft rolls
  - can also have shock absorbers added (Frog legs)
W/C Parts: Wheels

- Spokes: decrease weight, increase maintenance
- Mag wheels: plastic, heavier, no maintenance
- Carbon Fiber Spokes: Light and durable
W/C Parts: Tires

- **Hi Profile Polyurethane**: solid rubber, no maintenance, heavy, some traction

- **Mountain Bike Tires**: better traction, can be air vs. airless inserts, differences in comfort and weight (shown below)
W/C Parts: Tires (continued)

- **Ten Speed Bike Tires**: lighter, has to be air, increased maintenance secondary to flats and keeping them properly pumped up.

- **Air vs. Airless Inserts**: airless inserts have no maintenance (no flats), but are heavier with decreased shock absorption. Air tires give a smoother more comfortable ride with proper inflation, without proper inflation, there is increased resistance. They have the disadvantage of flats.
W/C Parts: Rims

- **Aluminum**: standard, durable surface, difficult with impaired hand grip

- **Rubber Coated**: for persons with decreased hand function, the rubber gets nicked, when going down inclines the rubber causes increased friction and heat build up

- **Projections**: for persons with decreased hand function, increase in width of w/c, interferes with pushing rhythm

- **Natural Fit**: more expensive, wider rim with a groove for thumb positioning, research shows less forces through wrists and shoulders during propulsion
W/C Parts: Leg Rests

- **Footplates**: not removable, make the chair more rigid, durable, less moving parts

- **Swing Away Foot Rests**: heavier, moves off of chair and out of the way, increases chair length

- **Elevating Leg Rests**: used for positioning, bulky, increasing length of w/c
W/C Parts: Arm Rests

- **Tubular**: lightweight, stays connected to the w/c

- **Removable**: heavier, sturdier, need good hand control to remove
W/C Parts: Wheel Locks

- **High Mount**: easier to reach, sometimes interfere during fast or forceful w/c propulsion (pictured to the right)

- **Scissor Locks**: mounted under the seat, need good balance to reach (pictured on the bottom right)
W/C Parts: Seating Cushions

- **Basic Foam**: lightweight, no maintenance, poor for pressure relief

- **High End Foam**: better for pressure relief, can be hot, increased sweating, increased weight, i.e. Tempur-Pedic Mattresses
W/C Parts: Seating Cushions (continued)

- **Gel**: better for positioning, must knead to redistribute the gel, heavy, low maintenance
- **Air**: not as good for positioning, high quality pressure relief, increased maintenance, must keep properly inflated
- **Custom**: perfect fit for individual, can increase difficulty with transfers (not pictured)
W/C Parts: Seating Backs

- **Adjustable Tension:** allows chair to be folded more easily, uses velcro to make the back tighter or looser.

- **Solid Back:** provides for better postural support, heavy, must be removed to fold the chair.
W/C Parts: Seating Systems for Power Wheelchairs

- **Standard**: does not move, person must be able to do their own pressure reliefs
- **Tilt**: good for pressure reliefs, must hold in full tilt for at least 5 minutes
- **Recline**: good for pressure reliefs, individual goes into a reclining position, good for performing catheterization while in w/c
- **Standing**: difficult to get funded, increased complexity of controls, allows for standing for bone growth and use in functional situations
W/C Terms

- **Dump**: rear of seat lower than front of seat, increases difficulty of transfer
- **Squeeze**: back of wheelchair inclined forward
- **Camber**: bottom of wheels angled out, increases lateral stability of wheelchair
- **Toe In/Toe Out**: wheelchair in need of alignment, means front wheel is out of line with the rear of the wheel
W/C Propulsion

- **Technique**: oval pattern with long smooth strokes
  - Start with elbows bent 100-120 degrees, hands at top of wheel and even with hips
  - Keep elbows in with shoulders up and back
  - Rear wheels as far forward as possible while maintaining stability (wheels back increases stability, wheels forward increases efficiency)

- **Why?**
  - Want to minimize forces and maximize efficiency, better for your shoulders over a lifetime of being in a wheelchair
Proper Sitting Technique

- Hips back
- Evenly sitting on pelvis
- Legs pointed straight ahead with knees even
- Weight distributed evenly among thighs the length of the cushion
Pros and Cons of Wheelchair Evaluation

- Each chair and its parts have pros and cons:
  - Differences in weight
  - Differences in appearance
  - Differences in efficiency
  - Differences in durability
  - Differences in shock absorption

- Your personal preferences and lifestyle will help to determine the chair that is appropriate for you

- Taking proper care of your wheelchair will help it last longer and to help it provide you with a comfortable, efficient, and safe ride
Aging with W/C Equipment

- Modifications in equipment may be needed as you age because of physical changes such as:
  - Increased risk for fall, even for those using a wheelchair
  - Loss of strength and endurance
  - Changes in weight
  - Skin changes
  - Upper limb problems that might affect your ability to perform pressure releases or transfers safely or properly with your w/c

- One may change from a manual w/c to power assist wheels or power w/c

- All equipment needs to be monitored for appropriateness as we change and age
The End!

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