Power Assist for Manual Wheelchair Users
Staying Active, Staying Healthy

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Power Assist for Manual Wheelchairs Users

What we won’t be discussing today

- Push technique

- Configuration of MWC for optimal propulsion
  - Weight
  - Rear axel plate movement up and down and forward
  - Impact of seat width and depth on propulsion
  - Impact of seating and positioning on mobility

Nothing replaces the benefits of an optimally designed MWC and proper user technique
Learning Objectives

Compare and contrast at least two different types of power assist technologies.

Identify 2 functional advantages to power assist on MWC

Identify 2 physiological benefits to power assist on MWC
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Poll Question

Which client indications could benefit from power assist on MWC?

A. New injury/ new manual wheelchair user
B. Long time manual wheelchair user
C. Progressive neurological diagnosis
D. Older adult with multiple diagnoses/co-morbidities
E. Pediatric – CP, MD, Spina Bifida
Poll Question

Which client indications could benefit from power assist on MWC?

- New high level spinal cord injury
- Long time manual wheelchair user
- Progressive neurological diagnosis
- Older adult with multiple diagnoses/co-morbidities
- Pediatric – CP, MD, Spina Bifida

All of these clients could benefit from power assist for their MWC.
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What is Power Assist?

Power assist is a motorized system that is added to a manual wheelchair, that will reduce the physical effort needed for propulsion.
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Why Power Assist?

Reduce incidence of repetitive use injuries UE

- 70% of MWC users suffer from chronic shoulder pain
- UE pain in MWC users impacts their entire life; their arms are their mobility
- The highest intensity of pain is reported when:
  - Pushing up an incline
  - Pushing longer than 10 minutes
  - While sleeping

Source: Preservation of Upper Limb Function; Consortium for Spinal Cord Medicine Guidelines April 2005
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Why Power Assist?

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Three Major Factors Contributing to UE Pain and Injury in MWC

1. Frequency of upper limb tasks – repetitive motion
   Active MWC users perform 2000-4000 pushes/day
   Using power assist may reduce this by up to 90%

2. Force required to perform upper limb tasks
   Force is reduced with properly fitted wheelchair but not eliminated

3. Technique and wheelchair configuration
   - Arm angle during propulsion
   - Following good stroke technique reduces but does not eliminate risk
Benefits of Power Assist for MWC

- Less strain over various terrains: carpet, slopes, gravel, etc
- Multiple studies have shown:
  - Decreased metabolic energy costs
  - Decreased HR and O2 consumption
  - Decreased fatigue – benefits beyond just wheelchair propulsion. More energy for living!
- One study found 80% of the subjects reported decreased fatigue while using power assist.
- Increased speed means going more distance faster
- Power assist users report being able to complete more activities throughout the day
Why not just get a power chair then?
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Why not just get a power chair then?

Transportation challenges

Accessibility challenges

“Look more handicapped”
Defining Power Assist for MWC

Various Configurations for Power Assist

- All of them have pros and cons
- Recommend trialing with client in diverse environments before prescribing
- Considerations: Cognition, hand function, reaction time, lifestyle, vehicle, transfers, versatility, funding, environment

Motion/Vibration activated rear add-on

Push Rim Activated

Joystick/motor drive wheel

Front Add-On
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Motion Activated

- Proprietary watch connects via Bluetooth to the motor/wheel unit
- Motion/vibration activated signals start and stop of motor unit
- Need good reflexes and cognition to “tap watch in time”
- Small buttons on watch display not functional if impaired fine motor
- Easily removable and weighs 12 lbs
- Will pick up speed going down hill
- Can get hung up on high curbs or down hill with steep incline
- Dual tires don’t grip well in grass and soil
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Push Rim Activated

- Remains in motion and same speed until another force is applied
- When going down hill, will provide braking to keep same speed
- Power assist in all directions
- Each wheel weighs between 12 lbs (Twion) or 24 lbs (Emotion)
- 1 or 2 Programmable settings
- Makes the chair profile 2” wider/ must use 24” wheels
- Emotion allows independent programming right and left wheel
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Power Add-On For Joystick / Switch Driving

- Converts a MWC into a power chair (batteries, motors and usually a joystick mounted to a MWC)

- Compatible with:
  - Manual tilt-in-space chairs,
  - Ultralight Weight MWC
  - MWC without tilt (E1235)

- Great for pediatrics and geriatrics

- Some compatibility for specialty controls, like an ASL head array.

- Option to provide power attendant control.

- Funding can be a challenge
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Power Add-On For Joystick / Switch Driving
Front Wheel Add-On

- Turns your wheelchair into a scooter
- Goes fast! (6-12 mph)
- 15 miles on single charge/ 1-2 hours
- Speed limiter is available
- Castors are raised off the ground so you won’t flip over
- Goes through grass and various terrain well
- WC minimum width 10”
- WC must have fixed front frame
- MWC user can attach it independently
- Weighs 24 lbs
- Tiller steering- must of good use of hands, shoulders, core stability
- Poor maneuverability indoors/tight places
- Funding may be a challenge
- Cost is about $2600
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Medicare Coverage Criteria for Push Rim Activated Power Assist

A push-rim activated power assist device (E0986) for a manual wheelchair is covered if all of the following criteria are met:

- All of the criteria for a power mobility device listed in the Basic Coverage Criteria section are met; and

- The patient has been self-propelling in a manual wheelchair for at least one year; and

- The patient has had a specialty evaluation by a PT or OT, or physician that documents the need for the device in the patient’s home.

- The PT, OT or physician may have no financial relationship with the supplier; and

- The wheelchair is provided by a supplier that employs a RESNA-certified Assistive Technology Professional (ATP) who specializes in wheelchairs and who has direct, in-person involvement in the wheelchair selection for the patient.
Writing an Effective LMN

LMN Documentation Tips:

• Document if client cannot perform MRADLs
  • Independently
  • Timely
  • Safely
  • Without the addition of power assist

• Document pain level and whether multiple breaks are needed during mobility

• Document whether implementing power assist reduced pain and supported more timely, independent and safe achievement of MRADLs and lifestyle goals.

• Document risk for further health implications (surgeries, heart attack etc)

• Power assist wheels are the least costly and least restrictive option to restore the clients independent mobility without going to a power wheelchair
Writing an Effective LMN

LMN Documentation Tips

**DO**

- Document how the equipment increases independence and function in the home, child care, at work, throughout the school day.
- Focus on how the equipment has changed their participation
- Use measurable explanations (reports 3/5 shoulder pain)
- Recognize the impact endurance has on functional participation at the end of the day

**DON’T**

- Redirect the true need by having statements of leisure that can distract the reviewer from understanding the true benefit
Case Story 1

Rick Cooper ATP National Seating and Mobility Dallas

Background-
Pro-baseball player for Oakland A’s who had a car accident resulting in aortic bleed and spinal cord ischemia.
35 years as a MWC user has caused should UE injuries
Four UE Surgeries
- Right arm bicep tendon tear
- 8 years later right arm rotator cuff surgery repair
- Bilateral arthroscopic surgery of shoulders
- Left torn bicep and rotator cuff repair
Reports no pain post surgeries

Product Choice:
Emotion – Push Rim Activation
Safe transfers into his modified van with a ramp.
Likes the braking going downhill / out of van.
Likes the movement in arms though not pushing hard.
Feels more normal.
Never takes them off.
On some surfaces like carpet a little tougher to push since not activated.
Has to use 24” wheels/used to use 26”
Adds 2” to the width of the chair
Case Story 2

Tim Robinson ATP National Seating and Mobility Dallas

Background-
Subacute Transverse Myelitis secondary to bee sting. Two weeks later wheelchair bound. In 1999, his first wheelchair was 100 lbs.

Currently experiences chronic pain in shoulders. Decided it was time for power assist.

Product Choice:
Chose Smart Drive because he has an unmodified van. The transfer of the wheelchair is easiest.

Cruise on the Smart Drive is very nice.

Otherwise he says Emotion push rim assist is superior in every way. You get assistance in all directions; it’s easier to go uphill.

Doesn’t recommend Twion due to lack of programming options and does not have cruise.
Equipment Trials

Take your turn and learn!
LET’S GET moving