Powered Seat Functions

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SEAT FUNCTIONS

Review:

- Body not designed to sit
- 90-90-90 doesn't always work
- Sitting can be pathological
- Different positions for functions
- Body wants to move
- What can we do?

Providing Movement

Power Seat Functions

- Tilt
- Recline
- Tilt and recline
- Seat elevator
- Power elevating leg-rests
- Standing

Seat Elevators

Addresses the following medical needs:

- **Transfers**
- **Reach**
- **Psychological considerations**
  - Sense of confidence and equality
  - Eye to eye conversation
  - self-esteem, integration with society
- **Physiological aspects**
  - Respiration
  - Gastro-intestinal
  - Bowel function
- **Pediatric considerations**

Medical Necessity - Reach

Limited use of upper extremities

Limited reach from a seated position

Replaces UE function same as a prosthetic or orthotic device

Reach — Health & Safety Justifications

- Meal preparation
- Medicine cabinet
- Thermostat
- Light switch
- Fire alarm
- Fire extinguisher

Medical Necessity — Transfers

- **Level of assistance with and without**
- **Sit to stand**
  - Seat to floor height issues
- **Lateral transfers**
  - Surface heights
  - Downhill vs. Uphill
  - Forces are reduced in the upper extremities when an individual is making a level or downhill transfer
    - » (Wang et al., 1994)

Sit to Stand



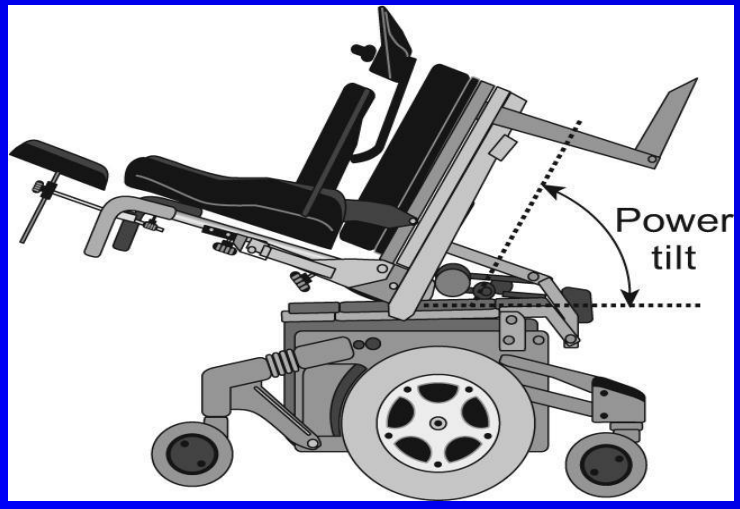
- Lower extremity weakness results in difficulty standing
- Rising from an elevated seat surface has been shown to require less lower extremity strength (Burdett et al, 1985; Edlich et al, 2003; Rodosky et al, 1989)
- . The use of a seat elevating device can assist with transfers (Alexander et al, 2001; Janssen et al, 2002; Weiner et al, 1993)

Standing

- **Indications**
  - Manual and power bases
  - Circulation
  - Tone
  - Spasticity
  - Pressure sores
  - Community environments
  - Psycho-social indications
- **Contraindications:**
  - Contractures
  - Poor standing tolerance
  - BMD loss
  - Fractures
  - Postural hypotension (dizziness complain???)
  - Highly contoured seating systems (shear)

Tilt & Recline: Postural Alignment

- **Important for children or adults with progressive or static scoliosis**
- **Independent management of tone**
- **Pressure distribution:**
  - Shift body-weight
  - Pressure Ulcer Prevention



Recline

Lateral Tilt

Pros:

- New design/old concept
- Alleviate leaning
- Comfort
- Pressure relief

Reclining Back

INDICATIONS

- **Pressure relief**
- **Recumbent position**

CONTRINDICATIONS

- **Issues with shear**
- **Slide out of seating system**

Conclusions on Tilt and Recline

- **Effective weight shift obtained when tilt > 20° /25°**
- **Recline reduces seating pressure but increases shear and peak pressure**
- **Combination reduces the seat mean pressure and peak pressure more than does each system separately**

Power Elevating Legrests

- Help manage edema
- Lower limbs of wheelchair users may act as a reservoir
- Elevate the legs above the heart
  - Increases arterio-venous pressure and capillary flow
  - Most effective when legrests used in combination with tilt
  - Sometimes must be combined with both tilt and recline systems for adequate elevation of legs

Effects of Position

- Key component in PU management
- Best tilt 20-25 degrees
- Better combined w/ recline & ELR
- Recline alone can increase shear but reduce seating interface pressure
- The biggest reduction in maximum pressure at the ITs was found at:
  45° of tilt-in space and 120° of backrest recline and an effective weight shift could be achieved only when tilt-in-space is >15°

Other Pressure Distribution Techniques

- **Pushups while seated**
  - **Recommendations ranging from 1/min to 1/hr**
  - **Each lift should last nearly 2 minutes, regardless of frequency**
- **Forward or side to side leaning**
  - **Can be effective**
  - **Not all have the UE strength or trunk control required to perform**
  - **May not be effective with some cushions (stability concern – i.e., Air cushions)**

Powered Seat Functions
Are Not a Luxury Rather Medically Necessary!

“There is nothing luxurious about having a disability!”

Case Study: George

- Age 65 with ALS – O2 and vent dependent
- Progressive weakness with difficulty standing and repositioning himself
- Unsafe transfers and fell
- Has no wheelchair
- In bed most of the time
- Lives with wife and part-time aids
- House is accessible on first floor

George J

- **Recommendation:**
  - **Power wheelchair (K0011)**
  - **Power tilt**
  - **Power recline**
  - **Power ELRs**
  - **Power seat elevator**
  - **Vent tray**

George J

Denied

- Convenience items of no medical or therapeutic benefit
- Manual seat functions will suffice as attendant can perform
- Reasons are contradictory

George — Appeal

- Necessary for continued independent position change
- Inability to change position is a major cause of pain and discomfort for individuals with ALS
- Major risk factor for pressure sore development

George J — Appeal

- The power seat elevator is needed to assist with transfers and he has fallen once already.
- Forcing him to be dependent, when he could be independent is inappropriate.
- If he is uncomfortable and the attendant is not in the room, he will have to wait until he returns.
- If the caregiver does not show, his wife will be required to constantly change his position.
- This problem is complicated by the fact that ability to generate verbal output is limited by his ventilator dependence.

Discussion