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Dynamic Seating

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Learning Objectives

1. The participant will be able to list 3 clinical indicators for a dynamic movement of the pelvis.
2. The participant will be able to list 3 clinical indicators for dynamic movement of the lower extremities.
3. The participant will be able to list 3 clinical indicators for dynamic movement of the neck.

What we are covering today:

- What is Dynamic Seating?
- Pelvis
- Lower Extremities
- Head

Dynamic Seating – a definition

- Dynamic Seating is movement which occurs within the seat and/or wheelchair frame in response to force from the client. Dynamic components absorb force which in turn assists the client back to a starting position.

Dynamic Seating – Goals

- Primary Goals:
1. To allow movement
2. To diffuse force
3. To protect the client, seating system, mounting hardware, and mobility base
4. To improve postural control

Goal #1: To Allow Movement

- What are the benefits of movement in the wheelchair?
  - To increase sitting tolerance and compliance
  - To provide vestibular input
  - To increase alertness
  - To decrease agitation
  - To increase function
  - To provide active range of motion
  - *video

Goal #2: To Diffuse Force

- By diffusing force, we achieve these goals:
  - *To reduce active extension
  - To reduce energy exertion
- Which in turn, may also help:
  - To increase sitting tolerance and compliance
  - To decrease agitation
  - To increase function

Goal #3: To Protect

- To protect the client
  - If the client is exerting enough force to break components, injury is very possible
  - Micro-concussions
  - Other injuries
- To protect the seating system, mounting hardware, mobility base frame

Goal #4: Postural Control

- By providing movement against light force, strength may build
- This can lead to improved trunk and head control
- **Warning**: the primary purpose of dynamic seating is not therapeutic

Dynamic Seating: the pelvis

- Allowing movement at the pelvis has advantages and disadvantages

Pelvic Dynamic Seating: advantages

- If pelvic movement is blocked, this force can be transferred to other body areas, resulting in increased extension. Providing movement at the pelvis reduces overall extension.
- Movement of the pelvis shifts weight which provides pressure relief and comfort

Pelvic Dynamic Seating: disadvantages

- Movement may open seat to back angle which could result in a posterior pelvic tilt
  - This may be acceptable is the pelvis returns to neutral upon return to upright

Pelvic Dynamic Seating: disadvantages

- Allowing movement of the pelvis can lead to **assumption of a destructive posture**
- Allowing movement of the pelvis into posterior pelvic tilt can lead to **increased extension and spasms**
- The client may not be able to **return to a neutral position**

Pelvic Dynamic Stability: product options

- Integrated systems
- Dynamic Backs
  - Miller's Adaptive Equipment
  - Otto Bock
  - Seating Dynamics
  - Stealth
  - Sunrise Medical

Integrated Systems

- These systems are a complete seat and wheelchair, generally, and not retrofittable to other bases
- Multiple dynamic movements work together
- Most are only available outside of the United States

Integrated Systems available outside the US

- Adacta Klim
- Aktivline
- Netti

Elevation

- Elevation Ultra Lightweight wheelchair
- PDG
- Seat can rise at rear, 10 degrees in height
- 30 degrees back rest angle adjustment


Leggero Dyno

- Activator Dynamic Seating Component
  - Active knee range 15 degrees
  - Active seat to back angle 35 degrees
  - Folds
  - *video

Kinetic Innovative Seating System

- KiSS for Wheelchairs, in USA (not yet available)
- Allows constant articulated motion
- Can fit on most manual wheelchair frames
- Seat Back and Seat Base can be installed separately or together

Dynamic Backs

- Movement occurs only at the back
- Can often be combined with other dynamic options to provide movement in other areas

Miller's Dynamic Backrest Interface

- Extends at level of biangular back
- *video

Miller's Dynamic Back

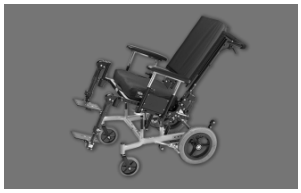
- *video

Otto Bock Dynamic Back

- Dynamic Extension Relief Back
- 4 sets of springs between back and mounting hardware
- Captures movement back and rotation
- Springs are shrouded

Seating Dynamics Dynamic Back

- Seating Dynamics
  - Dynamic rocker back
  - Resistance is adjustable through a set of elastomers



Seating Dynamics Dynamic Back

- Seating Dynamics
  - Dynamic rocker back
  - *video
  - *video

Stealth Products Dynamic Back

- Stealth Dynamic Backrest Mounting Hardware
  - Encased to protect mechanism

Stealth Products Dynamic Back

- Tarta back
- Off the shelf, can customize
- Similar to the Ortho Flex back
  - Made in Italy, but available in the USA
- Goal: to assist movement to improve function
- *video

Sunrise Medical Dynamic Back

- Mono Back or Dual Cane
- Available on Quickie manual wheelchairs
- Locks out
- Dynamic option

Questions?

Dynamic Seating: the lower extremities

LE Dynamic Seating: advantages

- Many clients will not tolerate having their feet restrained
- Stability is often required at the feet, however, to improve function
- Dynamic seating may improve tolerance and compliance, while providing function
- Limiting lower extremity movement may protect the feet from injury

LE Dynamic Seating: disadvantages

- Restricting the feet in any way will prevent independent transfers
- Some clients will continue to fight any restraint of the feet

Lower Extremity Dynamic Seating: product options

- Miller's Adaptive Equipment
- Seating Dynamics

Miller's Dynamic Footrests

- Dynamic Footrest Gas Spring
  - Extends downward 2"
- Dynamic Footrest Coil
  - Allows some rotation at the footplate

Miller's Dynamic Footrests

- Dynamic, Articulating Footrest Hanger
- *video

Seating Dynamics Dynamic Footrests

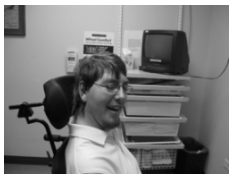
- Dynamic footrest
- Telescopes 1 ½"
  - Use alone for clients who may otherwise lose the position of their pelvis
    - Tight hamstrings
- Optional knee extension 30 degrees
- Optional dynamic dorsi/plantar flexion, 17 degrees each direction
- Resistance is adjustable through springs

Seating Dynamics Dynamic Footrests

- Dynamic footrest
- *video
- *video

Questions?

Dynamic Seating: the head



Head Dynamic Seating: advantages

- Providing some movement can:
  - Absorb force and protect the neck and brain
  - Reduce breakage of head support mounting hardware
  - Reduce loss of alignment of head support
  - Diffuse force

Head Dynamic Seating: disadvantages

- Movement can lead to postural insecurity
- Excessive movement can trigger reflexive response
  - Moro
  - Tonic neck

Head Dynamic Seating: product options

- Metalcraft
- Miller's Adaptive Equipment
- Otto Bock
- Seating Dynamics
- Stealth Products
- Symmetric Designs

Dynamic Headrest Options

- Metalcraft
  - Bi-directional
  - Prototype
  - *video

Dynamic Headrest Options

- Miller's Dynamic Headrest Interface
- *video

Dynamic Headrest Options

- Miller's Dynamic Headrest Horizontal Adjustment Bar
- *video

Dynamic Headrest Options

- Otto Bock Dynamic Rock-n-Lock Headrest Bra
- Spring loaded mechanism, 1 ½" travel
- Shrouded to protect hands and hair

Dynamic Headrest Options

- Seating Dynamics Dynamic Headrest
  - Single Axis moves along midline or the Y Axis, 8 degrees
    - Resistance can be changed using different elastomers
  - Multi-Axis moves in both X and Y Axis and anywhere in between
    - Capturing posterior and rotational movements
  - *video

Dynamic Posterior Head Supports

- Stealth Tone Deflector
  - 10 degrees any direction
    - Works well for clients who do not tolerate a larger degree of movement
    - Protects hardware
  - Absorb and Avert!
  - *video

Dynamic Headrest Options

- Symmetric Designs Axion Rotary Interface
  - Friction knob

Dynamic Headrest Options

- Whitmyer Flex Interface Bracket
  - Provides movement upward and then back to neutral

Movement and Dynamic Components at the head

- Phillip doesn't have dynamic head components…yet
  - Note bald spot!
  - *video

Questions?

Combination Approach

- Remember, these components can be used in combination
- *video

Daniel

- Daniel
- Cerebral palsy
- Age 9
- Manual tilt in space wheelchair
- Linear seating system

Daniel

- The Problem:
- Daniel is extremely strong. He routinely breaks seating components, has dislocated both elbows and has injured his knees from strong extension
- He has a Baclofen pump, but cannot tolerate increased doses due to seizures

Daniel

- Kid Rock
- Daniel trialed a Kid Rock for 2 weeks. He liked this system and could easily engage the springs
- The spring tension in the back was inadequate to consistently return to upright
  - Stronger springs

Daniel

- Daniel did very well in a Kid Rock 2
- He eventually moved into an Aspen Seating Orthosis (2 piece) as he was beginning to develop a scoliosis

Daniel

- As he grew, he was out of proper alignment with the pivot points and the system was no longer meeting his needs
- The Kid Rock 3 fits him, but is so large that the family returned it
- He has a new tilt in space MWC with Seating Dynamic components
- This has met his needs very well!

Questions?

Take home message:

- Dynamic Seating can either allow movement of the client within the seating system or provide movement of the seating component and/or frame
- Dynamic Seating can protect the seat and frame from damage by diffusing force
- Dynamic Seating can protect the client from undue forces and reduce tone and posturing by diffusing force
- Dynamic Seating can provide active movement

Thanks!

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