Providing Movement for Sensory Input, Decreasing Agitation, and/or Increasing Alertness - Clients Who Seek out Movement

Contents

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Seating Dynamics

Clients Who Seek out Movement

Where Movement Occurs, What Happens if Movement is not Provided, Dynamic Solutions, and Expected Outcomes

Introduction

Dynamic seating provides movement within a wheelchair. When the client moves, the dynamic seating components move with the client, maintaining alignment with the seating system for postural support, skin integrity preservation, and stability. Clients who seek out movement may benefit from dynamic seating. These clients may simply choose to move, stretch, or even rock repeatedly. Dynamic components absorb and diffuse force, protecting both the client and the wheelchair seat and frame from damage (Lange, et al, 2017; Lange, 2016). Providing movement can increase alertness, decrease agitation, and reduce maladaptive behaviors.

Clients with a high threshold sensory processing modulation disorder seek out sensory input, secondary to the inability to detect where their head is in space in relation to gravity within normal sensory parameters. Banging against the back or bouncing on the seat provides increased tactile and vestibular sensory input, providing the client with feedback necessary to calm and quiet their emotional as well as their physical state for postural improvement. Dynamic seating can improve quality of life for many wheelchair users and their caregivers.

This document is designed to provide Clinical Guidelines for the use of Dynamic Seating with clients who seek out movement and /or have behavioral issues. Please refer to our other Clinical Guidelines for additional Dynamic Seating applications.

Where Movement Occurs: Hips / Knees / Ankles / Torso / Head

What Happens if Movement is not Provided?

1) The client may continue to rock or bang against unyielding surfaces. This could lead to the wheelchair moving or tipping over. A central gravity axis (CG) tilt is recommended for clients needing a tilt who display excessive movement, to prevent destabilization of the wheelchair frame. Also, the CG tilt is a very stable base on which to add dynamic components.

2) Breakage can occur due to strong and repeated movements at:

- a) Footrest hangers and footplates
- b) Back canes
- c) Seat frame
- d) Seating system mounting hardware
- e) Head support mounting hardware. Even if breakage does not occur, excessive forces can more the head support out of alignment.

3) Breakage can occur while in transport, placing the client at risk of injury.

4) Injury can occur:

- a) Client may be injured from the wheelchair tipping over or moving.
- b) Client may be injured from significant and repeated forces against the seating system and mobility base.

c) Client may be injured from significant and repeated forces against the head support pads. A concussion can occur when the head collides with force against a surface. According to the Dr. Kim Gorgens (University of Denver, 2010), a concussion can occur at 95 g's. G-Force is a unit of force equal to the force exerted by gravity. The average football player receives 103 g's when hit during a game. Some clients using wheelchairs bang against the head pad with significant force, perhaps even enough force to cause brain injury. Degree of force and repetitive impacts only increase risk of injury.

d) Client may be injured from contact with sharp, broken objects after or during breakage.

5) Loss of desired or optimal postural alignment can occur:

a) Client may move out of a beneficial position, resulting in poor alignment, poor pressure distribution, and decreased function.

b) Poor alignment may specifically reduce trunk and head alignment and control.

c) If the head moves into hyperextension as the result of undiffused forces or if the head support moves out of position, reflexive responses may be elicited and postural insecurity, startle, and anxiety may increase.

d) The client may come off of the head pad which can lead to the client being caught under the head pad and/or choking.

6) Pain or discomfort can occur:

a) Client may experience discomfort / pain due to significant and repeated forces against the seating system and mobility base.

b) Pain or discomfort can decrease sitting tolerance.

7) Excessive energy expenditure can occur as the client continues to move within the static seating system and mobility base. This can increase caloric output, body temperature, sweating, and fatigue.

8) Client agitation may occur if movement is not allowed. Movement can promote calming.

9) Client alertness may decrease if movement is not allowed. Movement can increase alertness.

10) Maladaptive behaviors may be reduced by allowing movement within the seating system and mobility base.

(Eason, et al., 2019)

Dynamic Solutions

What Dynamic Components may be used to Address or Reduce the Likelihood of the Above Issues?

1) Dynamic Back support hardware

2) Dynamic Legrest support hardware

3) Dynamic Head support hardware

4) Dynamic secondary support components (i.e. shoulder straps)

Expected Outcomes

1) When client movement occurs, the dynamic component will move, forces will be diffused (Avellis, et al., 2010: Hahn, et al., 2009), and the energy built up in the dynamic component will return the client to their starting position without loss of postural alignment.

2) Due to force diffusion:

- a) Reduced equipment breakage (Hahn, 2009; Crane et al., 2007; Incoronato, 2007; Hong, 2006).
- b) Reduced client injury (Whitney et al., 2018; Lange et al., 2017; Avellis, et al., 2010; Cimolin, 2009; Crane, et al., 2007; Hong, 2006).
- c) Reduced loss of posture (McNamara & Casey, 2007; Crane et al., 2007; Ferrari, 2003).
- d) Reduced energy expenditure (Ferrari, 2003).

3) Due to provision of movement:

- a) The seating components will move with the client during any intermittent or continual rocking patterns.
- b) Increased sitting tolerance / comfort (Lyons, et al., 2017; Frank & DeSouza, 2017; Cimolin, et al., 2009; Crane et al., 2007; Incoronato, 2007).
- c) Increased sensory input (Presperin-Pedersen & Eason, 2015).
- d) Increased alertness (Rollo, et al., 2017; Pfeiffer, et al., 2008; Crane et. al., 2007).
- e) Reduced agitation (Pfeiffer, et al., 2008; Crane et al., 2007; Watson, et al., 1998).
- f) Reduced maladaptive behaviors (Pfeiffer, et al., 2011).

Conclusion

Many people use seating and wheeled mobility. It is well documented that wheelchair users spend many hours each day in a seated, and often static, position. People need to move for sensory input, to remediate pain and discomfort, for functional purposes, to increase alertness and to decrease agitation. For many people with disabilities, movement is actively sought out and frequent and/or forceful movement within a static wheelchair base can lead to equipment damage and/or client injury. Behavioral improvements have even been noted when movement is provided.

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