# WHEELCHAIR SEATING & ASSESSMENT

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**INTRODUCTION:**

Within the past 10 years, technology has provided members of the seating team with new approaches in dealing with severely physically disabled children and adults. The proximal stability provided by a therapeutically designed seating system will enhance motor potential. Presently, there are many approaches to providing dynamic seating. A thorough evaluation, with input from all team members including the client and his family is necessary to define clearly the goals for the seating device. Once these goals are defined, the team can investigate the possible technical solutions. Through ongoing re-evaluation and follow-up of both the client's needs and the possible technical solutions will ensure the persons with physical disabilities will be in the best possible posture to perform the task of daily living. [1] Growing numbers of elderly individuals spend much of their daylight time in chairs that do not fit them and do not allow them independence and comfort. Current seating methods clearly do not meet the needs of many elderly clients, though few caregivers question their use or know what to change. Individualized seating is needed and that requires identifying the client's body contours, range of motion, and orientation in space and implementing a seating system that positions and supports the person for comfort and function. [2] Sacral sitting is a poor seated posture with a posterior pelvic tilt and thoracic kyphosis. It is typically observed in frail older adults using a wheelchair and occurs when they lack the ability to retain a seated posture and/or their body size and function do not match the size and structure of the wheelchair. In some cases, the size of the standard wheelchair used in hospitals and elderly care facilities is not suitable for individual wheelchair users. [3] There are also structural problems with wheelchair design that can make it difficult to maintain a seated posture, such as the hammocking effect of sling seats and poor back support, both of which are likely to cause sacral sitting. Patients in care facilities often sit in wheelchairs with poor seated posture, including sacral sitting, for long periods of the day and it has been reported that sacral sitting with a posterior pelvic tilt increases the risk of pressure ulcers on the buttocks in frail older adults. [4]

**HISTORY:**

Pt recently referred to skilled PT services (09/25/17) 2° to C/O increased pain to LE's and UE's with ROM activities performed by family; Per Daughter Pt is experiencing increased pain when PROM performed by family while in bed; Pt currently presents with increased tone throughout B UE's and LE's; Pt displays facial grimace with passive stretch to B LE knee flexors; Pt had seating assessment performed for current W/C and Pt will benefit from adapted W/C; Pt will benefit from a standard 18" W/C with standard leg rests; Pt will benefit from a Jay Care back at

18" wide and a Jay Solid Seat to increase seat depth to 20"; Pt will benefit from a ROHO cushion for skin preservation to sacral wound while patient is OOB within W/C; Currently Pt has a high back W/C measuring 18"x18" with elevating leg rests and anti-thrust pommel cushion; Additionally, Pt displays bilateral knee flexion contractures and will benefit from additional contracture management to facilitate increased ROM to bilateral knee flexors to facilitate increased upright positioning within W/C; Pt will benefit from skilled PT services to address contracture management, pain management and W/C seating and positioning; MD orders for PT evaluation and treatment.

Medical History Includes: CVA, R Hemiparesis, Craniotomy, Decompression/Bone Flap, Respiratory Failure, Tracheostomy, PEG Tube, A-Fib, Leukocytosis, Anemia, Fibromyalgia, HTN, Dyslipidemia, DM, Pneumonia, Emesis.

Informed consent was obtained from the responsible party of the patient secondary to patient unable to give consent.

**EXAMINATION:**

PLOF: Pt is a long term resident of Las Palmas; Pt is total dependent for all functional mobility and transfers; Pt utilizes a geri-chair as PMOL within the facility; Family will have Pt placed in high back W/C; Pt is a fall risk while in W/C secondary to constant thrusting of Pt out of W/C and constant repositioning required while in W/C.

Prior Equipment: Air Mattress, Trach, G-Tube, R Elbow Orthotic, B Knee Orthotic, Highback W/C, Lateral Wedges, Anti-Thrust Pommel Cushion, Elevating Leg Rests.

Musculoskeletal System Assessment:

| | | | |
|---|---|---|---|
| LE ROM | R LE ROM = Impaired | L LE ROM = Impaired | |
| | | | |
| R LE ROM | R Hip = Impaired | R Knee = Impaired | R Ankle = WFL |
| L LE ROM | L Hip = Impaired | L Knee = Impaired | L Ankle = WFL |
| | | | |
| *PROM (R) Hip* | Flexion (70°) True Hip Flexion | *PROM (L) Hip* | Flexion (70°) True Hip Flexion |
| *PROM (R) Knee* | Extension (-35°) True Knee Extension ROM (75°) For Seating & Positioning Assessment | *PROM (L) Knee* | Extension (-80°) True Knee Extension ROM (60°) For Seating & Positioning Assessment |

Contracture: Functional limitations present secondary to contractures include functional mobility, skin integrity and upright sitting.

Current Orthotic Device: Bilateral knee extension splints (Static Flex Orthotic).

Location of Contractures: Right Knee and Left Knee.

Management/Orthotic Tolerance: Pt requires total dependence with donning and doffing of bilateral knee splints; Pt unable to currently tolerate splints now.

LE Tone: Hypertonic; LE Tone Severity = 3 on Modified Ashworth Scale (Considerable increase in muscle tone, passive movement difficult). Patient is receiving Baclofen at 10 mg per nursing orders).

Pain Assessment: Patient exhibits (6/10) pain to bilateral knee flexors with passive stretch; Pain limits ability to don bilateral knee flexion braces.

Functional Mobility Assessment: Pt is total dependent for all functional mobility; POC to address contracture management.

Skin Integrity: Sacral wound measuring (1.0cm L x 0.5cm W x 0.1cm D) as per nursing monthly skin assessment performed on (09/22/17). Pt has air mattress in place.

Posture/Position Assessment:

*In Current Seating:*

- Pelvis: Posterior Tilt/Flexible
- Cervical Spine: Head Forward
- Thoracic Spine: Kyphosis/Fixed
- Lumbar Spine: Functional Alignment
- Forearm & Elbow: Intact
- Overall Leg Position: Impaired
- Knees: Impaired
- Feet: Intact

*On Firm Surfaces:*

- Pelvis: Functional Alignment/Pelvic Obliquity Normal
- Cervical Spine: Head Forward
- Thoracic Spine: Kyphosis/Fixed
- Lumbar Spine: Functional Alignment
- Forearm & Elbow: Intact
- Overall Leg Position: Impaired
- Knees: Impaired
- Feet: Intact

**INTERVENTIONS:**

Skilled interventions focused on bed mobility training to increase and facilitate functional transfers. Hoyer lift system used for transfers. Patient was supine in bed and positioned into

blue hoyer sling. Hoyer lift was positioned with 2 staff members for safety and positioning. Hoyer lift apparatus was attached to sling; distal loops in green position and proximal loops in blue position. Patient was lifted into chair with the assistance of Hoyer lift apparatus controlled by one staff member while second staff member maneuvered sling into position. Once patient was over wheelchair, the patient's pelvis was positioned with pelvis into posterior of seating system.

W/C Mngmt: assessment of current seating system for appropriate modifications, measurement/design of new wheelchair to enable functional independence and analysis of patient's body alignment and functional skills in new or existing W/C.

Orthotic/Prosthetic Mngmt: analysis/checkout of patient's response to wearing orthotic/prosthetic device, analysis of skin for irritation, areas of pressure or breakdown, techniques to decrease and manage pain, techniques to improve time out of bed and techniques to prevent contractures.

Diathermy applied to left knee and right knee for 20 minutes in order to facilitate increased hamstring flexibility followed by prolonged stretch as to assist with donning of bilateral knee extension splints with SWD intensity level/settings at Thermal 4 Delta T Protocol. [5]

Manual Tx: Stretching of shortened connective tissue; Emphasis placed on bilateral knee flexors; Static stretch performed for 30 sec holds for 5-10 trials prior to application of knee splints and after SWD modality utilized; Stretching performed to increase ROM to bilateral knee flexors and facilitate donning of splints.

**OUTCOME:**

Pain in bilateral knee flexors decreased from a baseline score of (6/10) to (0/10).

Patient increased wear time of bilateral knee extension splints from a baseline of (0 Hours) to (6 Hours) of TERT-Total End Range Time with minimal signs/symptoms of redness, swelling, discomfort or pain.

Patient increased out of bed tolerance within adapted W/C from a baseline of bed bound to 6 hours of anatomically correct positioning with use of adaptive equipment (Standard 18” W/C, J Care Back, Roho Cushion, Standard Swing Away Leg Rests, and J Solid Seat Insert).

**DISCUSSION:**

Patient began skilled therapy services with emphasis of POC on pain management and contracture management. Pt received use of SWD for pain management and to facilitate increased ROM to bilateral knee flexors to allow for donning of bilateral knee splints with success. Pt increased wear time to 3-4 hours when POC was transitioned to transfer training and W/C seating and positioning. Adaptive equipment was ordered at time of evaluation. Upon receiving equipment, a standard 18” W/C was adapted with the J Care Back and Solid Seat Insert. For all seating there are the following goals: 1) Protect the skin integrity of the user. 2)

Allow optimal mobility of the user. 3) Create or maintain normal anatomic alignment with particular attention to the spine. Obtaining normal alignment is the primary goal as this establishes the foundation for optimal skin protection and mobility. [6] The J Care Back was opted for in lieu of a standard backing on the wheelchair because it would help accommodate the patient's fixed kyphosis. Pt was transferred into W/C with use of a hoyer lift and the W/C was adjusted as needed. A problem that arouse was attempting to fit patient properly in adapted W/C to increase upright posture. Pt presented with increased sacral sitting so seat was dumped to accommodate for lack of hip flexion. A Roho cushion was utilized for skin preservation 2° to sacral wound. Additionally, a major problem I ran into was that initial use of bilateral knee extension splints while patient was sitting upright in the newly adapted W/C. My rationale was that the splints would assist with knee extension and ultimately assist with increased upright sitting while in the adapted W/C. I soon realized that this was counterproductive. The use of the splints pushed the patient into further knee extension which was making the patient thrust out of the wheelchair 2° to the patient wanting to have his knees in a flexed and relaxed position. Upon identifying this problem, I then utilized the knee splints for contracture management only while patient was in bed. The patient was now transferred into the adapted W/C without the use of the knee extension splints and displayed increased tolerance and increased upright positioning within the adapted W/C. Pt increased total out of bed time to 6 hours. Staff was educated on hoyer lift transfer and correct positioning within W/C. Family educated on positioning and tolerance time while in the W/C. Family continued with carryover for splint management and staff would assist patient out of bed when family present.

**PREVIOUS W/C:** Highback W/C, Lateral Supports, Elevating Leg Rests, and Anti Thrust Pommel Cushion.


OMNICYCLE

**<u>NEW ADAPTED W/C</u>:** Standard 18” W/C, J-Care Back, Solid Seat Insert, Roho Cushion, and Standard Leg Rest.

**CONCLUSION:**

This case report describes the physical therapy management of patient in a nursing home with bilateral knee flexion contractures who required a W/C seating and positioning assessment to facilitate increased out of bed tolerance and safety with upright positioning to increase the overall quality of life of the patient. Total end range time of static flex splints increased to six hours and out of bed tolerance increased to six hours within an adapted wheel chair without patient sliding out of chair while achieving and maintain upright position.

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