**Lab: SM Selection**

**Case Scenario #3:**

**PATIENT NAME:** Tom Murphy

**INTAKE & HISTORY** *Describe the patient’s environment, functions, and activities/participation on a typical day including limitations and restrictions. Include as much objective information as possible.*

**Demographic Information: Age:** 39-year-old **Gender:** M **Weight:** 190# **Height:** 6’4”

**Referring Medical Diagnosis:** T10 ASIA A Paraplegia G82.21 **Onset Date:** Age 25

**Medical/Surgical hx:** At age 25, pt. involved in MVA with resultant complete T10 SCI with significant compression fractures s/p T9-10 laminectomy and spinal fusion. History of stage 3 pressure injury s/p flap surgery to sacral area at age 29.

**Reason for Referral/Chief Complaint:** Extremely active male, self-propels MWC several miles daily over various terrain. Current MWC is >5 years old and in poor condition with rusted and cracked components. Determine equipment needs.

**History of positioning and/or mobility problem:** Sits with posterior pelvic tilt/kyphotic posture decreased postural alignment impacting trunk movement and functional reach. Recently hired for part time job requiring him to clean and repair inside/outside of vehicles but having difficulty reaching into the vehicles due to configuration of current wheelchair and instability when reaching forward > 4”.

**Treatment diagnosis/ICD-10 related to positioning and/or mobility problem:** T10 ASIA A paraplegia, stage 3 PI sacral region s/p flap surgery (L89.159), thoracolumbar kyphosis (M40.205)

**Patient/Family/Caregiver Goals:**

* “I want a new manual wheelchair that will hold up to the way I use it. I go over all types of surfaces, curbs, dirt, gravel, grass. This wheelchair did not hold up like I needed it to.”
* ” I want to be able to get close and reach into cars for my job and other activities without losing my balance.”

**Social Status**: Pt resides alone and requires no assistance

**Home environment and accessibility:** Resides in fully accessible mobile home with ramp for entrance and egress.

**Environmental Accessibility:** Encounters a range of terrain on daily basis and able to self-propel on pavement, gravel, grass, dirt, hills and inaccessible obstacles e.g. potholes, curbs, inaccessible ramps and steps.

**Employment/work status:** New job working part time cleaning and repairing inside/outside of vehicles. Having difficulty getting close enough to vehicles and maintaining his stability when reaching forward.

**General Health Status:** Healthy, extremely active. No current health concerns, Exercises daily, non-smoker, no alcohol.

**Functional Status/Activity Level:** Ind. all transfers to and from WC including bed, car, floor and un/level surfaces. Ind. self-care, dressing, bathing, eating, tabletop activities and routine ADLs within home. Has ability to perform high level WC skills including wheelies, navigating 6” curbs, pot-holes etc.

**Transportation:** Owns a 2 door Honda Civic equipped with hand controls. Ind. loading/unloading current MWC which he stores in passenger seat of vehicle.

**EQUIPMENT ASSESSMENT:** *Provide equipment-specific information.*

**Existing Equipment:** Quickie GPV MWC 17” w x 19” d with 2” squeeze (front seat to floor height 2” higher than rear seat to floor height), adjustable tension back upholstery and a ROHO medium profile seat cushion obtained 3/2015

**Current Seating and Mobility Equipment:** Current WC is of proper width and depth, set with a 2” difference between front and rear seat to floor height to create a minimal seat squeeze. The angle of the front frame is 80 degrees relative to the seat rail/side frame of WC. Tom is able to reach 4” forward prior to loss of balance and trunk stability. He complains that his feet slide forward off the footrest when navigating on uneven surfaces. Despite multiple repairs over past year his MWC has the following problems:

* R adj. caster housing is bent and damaged beyond repair
* Casters need replacement despite replacement 3 months ago
* Sling upholstery has significant wear and tear placing him in more of a sacral sitting position
* Wheel locks and wheel assemblies are missing off left side
* Side guards are cracked with plastic sharp edges exposed
* L push handles/adjustable back canes are slightly bent causing him to sit with a R trunk rotation
* Rear tires have no tread and need replacement
* Many of the bolts for adj. components of WC have hollowed out attachment holes resulting in significant “play” including bracket that attaches backrest to seat rails
* Frame is not level when placed on level surface due to bent caster housing and bent frame resulting in poor tracking and veering right during propulsion

**FUNCTIONAL ASSESSMENT:** *Include subjective and objective evaluations of performance and functional abilities to establish activity level, level of positioning, and mobility impairment, and indicate the prognosis for potential restoration of function.*

**ADL/IADL Status:** Ind. all ADLs

**Mobility Status:** Ind. in configurable rigid MWC with 2” anterior COG adjustment

**Walking/Ambulation Status:** Tom is non-ambulatory, unable to bear weight through LEs without max external support

**Wheelchair Propulsion Status:** Tom demonstrated independence in higher mobility skills, with a 2” anterior COG axle configuration, including popping wheelies, navigating up/down a 2” curb, and maneuvering up/down ramps. He can propel WC on grass, gravel, smooth and unlevel surfaces. When descending hills, he decelerates by running the palmer surface of his hands bilaterally on the spokes of the wheelchair.

**Endurance:** Tom is very active and uses his WC full time >16 hours/day and travels extended distances over accessible/inaccessible terrain.

**SCREENING OF BODY FUNCTIONS:** *May require further physical examination, referral, or consideration of seating/mobility needs*

**Cardiovascular/pulmonary/circulatory status:** Intact

**GI system review:** Intact

**Cognitive status:** Intact

**Communication:** Intact

**Vision/Hearing Status:** Intact

**Bowel/bladder functions:** Ind. with bowel/bladder program, uses intermittent self-cath from WC

**PHYSICAL EXAMINATION & TEST MEASURES:** *Focus on body functions and structures that are responsible for the patient’s positioning and/or mobility impairment.*

**Sensation:** No sensation below level of injury T10

**Pain:** c/o intermittent back pain with prolonged sitting and travel across bumpy terrain.

**Skin Integrity:** Old healed surgical incision sacral area. Otherwise skin good condition. Pt performs skin check daily

**Skeletal Alignment/Posture:** Sits with a reducible posterior pelvic tilt with no pelvic rotation or obliquity noted. Reducible C curve kyphosis with forward head position impeding UE AROM and functional reach.

**Balance:** sittingbalance is impaired due to lack of motor control below T10. Can sit without UE support statically, requires UE support when reaching. Due to height of 6’4” and long LE, prefers to sit with hips/knees and ankles tucked (flexed) providing greater pelvic stability/trunk balance facilitating reach and ability to get close to surfaces.

**Strength** BUE Strength 5/5 with excellent muscular endurance for prolonged activity and repetition. Muscle strength in the trunk and both lower extremities impaired/absent below T10.

**ROM**: Active range of motion WNL both upper extremities. BLE WNL passively.

**Neuromuscular Status:** Fluctuating spasticity trunk and LE triggered with change in hip or knee position or contact with ball of foot. Manages spasticity with oral Baclofen.

***LAB ASSIGNMENT: Complete the following portion for this Case Scenario***

**WHEELCHAIR ASSESSMENT:** *Describe technology-specific trial, simulation, and specification.*

**Technology trial/simulation:** Equipment feature(s), rationale for selecting trial.

**Measurements:** Body measurements (provided)

|  |  |  |
| --- | --- | --- |
| **Anatomical Measurement** | **Left** | **Right** |
| **Thigh length** | 22” | 22” |
| **Knee to heel** | 21” | 21” |
| **Seat to PSIS** | 4” | 4” |
| **Inf. rib cage height** | 8” | 8” |
| **Seat to elbow** | 9” | 9” |
| **Seat to Inf. angle scapula** | 15” | 15” |
| **Seat to axilla** | 20” | 20” |
| **Seat to shoulder** | 24” | 24” |
| **Seat to top of head** | 33” | 33” |
| **Hip width** | 17” | |
| **Shoulder width** | 19” | |

**Person/technology match:** Discuss benefits/tradeoffs of equipment features with patient/family and identify technology features needed to attain identified goals

***INSTRUCTOR KEY TO PART 1 ASSIGNMENT – SAMPLE ANSWER OR COMPARABLE***

***LAB ASSIGNMENT PART 1: Complete the following portion for this Case Scenario***

**WHEELCHAIR ASSESSMENT:** *Describe technology-specific trial, simulation, and specification.*

**Technology trial/simulation:** Equipment feature(s), rationale for selecting trial.

SAMPLE ANSWER

Trial a MWC with different frame configurations to determine optimal angles for function, comfort and posture.

* Compare a 3” and/or 4" seat squeeze configuration (difference between the front and rear seat to floor height)– greater than current WC with 2” squeeze to provide proximation of femur and pelvis to improve proximal trunk stability for balance and reach.
* Compare current 80-degree front frame angle with tighter more compact front frame angle - eg. 85, 90, 95 degree)
* Compare adjustable tension back upholstery with precontoured posterolateral support e.g. Jay 3 back 10” high back with 3” curve for posterior lateral support or similar – to increase proximal lower trunk support with curvilateral support to improve functional reach and handsfree sitting balance.

Results: (Sample documentation of trial results)

* Demonstrated significantly improved stability and balance with 3” squeeze and was able to reach 3” further forward (for a total of 7") compared to when seated in his current wheelchair limited to 4” forward reach.
* Get closer to surfaces, maintain balance/posture while performing functional work activities.
* Navigate on a variety of different surfaces without having to reposition feet on the footplates.
* Navigate in tight confined spaces due to the decreased overall “footprint” of the frame (e.g. ramp platform, tight elevator space, small bathroom spaces)

**Measurements:** Body measurements (provided above)

**Person/technology match:** Discuss benefits/tradeoffs of equipment features with patient/family and identify technology features needed to attain identified goals

Tom demonstrated that his current wheelchair configuration no longer meets his needs. The adjustment back posts, caster housings, and frame itself will not hold up to his high activity level **needs a robust system to hold up to heavy duty use.**

He requires a **rigid frame MWC that can be configured through manufacturing with a combination of adjustable seat angle (squeeze) and fixed front frame angle** that are required for **robust heavy-duty** **use**, stability, and function. Minimal frame adjustment is available through configuration of the system such as seat to back angle, backposts and rear wheel position. The front frame angle is nonadjustable meaning that if it is not configured properly at time of order it cannot be changed. If his status changes for any reason, there are few adjustments that can be made to the system without additional frame changes (tire/caster/caster fork sizes).

A rigid frame MWC with 3 or 4” squeeze (difference between front and rear seat to floor heights) and 85 degree seat to back angle are custom configured and manufactured at the factory resulting in a configuration that meets his size (6’4”), postural, and functional needs.

***Consider and discuss with your group the following for this Case Scenario***

**EVALUTION & PLAN OF CARE:** *Describe goals, treatment procedures/interventions, recommended equipment, feature specification and clinical rationale, duration/frequency of services required to attain goals, anticipated discharge plan.*

**Diagnosis related to positioning and/or mobility limitation:** Factors that are influencing the individual’s condition and/or level of functioning in his or her environment. Diagnosis code must correspond to payer coverage policy. Review payer policy for eligibility criteria.

**Problem list:** Identification of problems pertinent to patient management/clinical services and necessary/recommended MAE

**Goals for treatment intervention:** Stated in measurable terms with expected completion date, appropriate for patient and diagnosis

**Goals for MAE intervention (Expected Outcome):** A realistic evaluation of the patient’s functional potential with the use of the recommended equipment, stated in measurable terms related to functional activity

**Plan for interventions and/or additional test and measures:** Pressure mapping, equipment trial/simulation, AT assessment, custom molding, fitting, manual wheelchair skills training, power mobility training, patient/family teaching, frequency/duration of visits, discharge plan/discharge summary

**Equipment Recommendation:** Details of recommended equipment features and clinical rationale for items requested

**Current Equipment:** Describe current primary mobility device and seating (age/manufacturer/model), pertinent features, hrs/day used, funding source, reason for new equipment (what worked/didn’t work)

**Patient/Caregiver Goals:** In their words

***STUDENT DOCUMENTATION ASSIGNMENT: USE PLANNING WORKSHEET- DEFENSIBLE DOCUMENTATION PROJECT: PART 2A & B TO DOCUMENT THE FOLLOWING:***

**Problem list:** Identification of problems pertinent to patient management/clinical services and necessary/recommended MAE

**Goals for MAE intervention (Expected Outcome):** A realistic evaluation of the patient’s functional potential with the use of the recommended equipment, stated in measurable terms related to functional activity

**Product Feature Recommendation:** Details of recommended equipment features and clinical justification/rationale for items requested

|  |  |  |  |
| --- | --- | --- | --- |
| **Pt Problem** | **Goal** | **Product Feature** | **Justification** |
| **ADD MORE ROWS AS NEEDED** |  |  |  |

1. Describe wheelchair configuration needed to maximize function (e.g. specific seat width/depth, back height, seat to floor height, axle position, seat to back angle, tilt, power assist, etc.)
2. Describe features of seat / back support and postural supports needed for functional mobility
3. Explain why the lower level MWC or PWC cannot be configured and/or will not meet patient’s needs.
4. Describe how recommended MWC or PWC will improve patient’s ability to participate in ADLs and IADLs.

***INSTRUCTOR KEY TO DOCUMENTATION ASSIGNMENT – USE RUBRIC FOR NARRATIVE SCORE & SAMPLE ANSWER OR COMPARABLE FOR QUESTIONS***

1. Describe wheelchair configuration needed to maximize function (e.g. specific seat width/depth, back height, seat to floor height, axle position, seat to back angle, tilt, power assist, etc.)

***Replacement MWC –*** ***Potential answer or comparable with rationale***

* Apex A Motion Composites aluminum rigid frame MWC (or similar)
* 17” wide 19” deep
* Front Seat to Floor height – 20”
* Rear Seat to floor height – 17”
* 85-degree front frame angle
* seat to back angle 2 degrees anterior of vertical
* adjustable axle, quick release axle, 2+COG setting
* 25” spoke wheels – with performance spokes
* Schwalbe high pressure pneumatic tires
* Scissor wheel locks
* 5” x 1.5” casters for rough terrain, Frog Legs shock absorbing casters
* angle adjustable foot plate ( vs loop)
* Calf strap
* Frame protectors (for car transfers)
* this patient would likely decline a pelvic positioning device - PPD (seat belt, arm rests and anti-tippers) – will keep it real.

1. Describe features of seat / back support and postural supports needed for functional mobility

**Seating - *Potential answer or comparable with rationale***

SEAT Mid profile Roho cushion - single valve with stretch air cover

BACK Comfort Company Acta TS back 16" wide 16" tall, mounted flush with top of cushion, Seat to Back angle with combination of seat to back angle setting and back mounting hardware – 2 degrees anterior of vertical

1. Explain why the lower level MWC or PWC cannot be configured and/or will not meet patient’s needs.

Tom is non-ambulatory and is unable to functionally propel a standard weight (K0001), lightweight (K0003) or high strength lightweight (K0004) manual wheelchair in which the axle is located posteriorly to his shoulder joints. During trials with a K0004, he displayed difficulty popping wheelies due to axle position impacting COG/tippiness of WC. He could not manage a ramp with a 10% grade. It took him 13 seconds to propel 15 feet. Use of this type of WC would limit his ability to manage his chair over thresholds, enter and exit his home via the ramp, and navigate on surfaces other than smooth, level terrain. He is, however, able to functionally self-propel a custom ultra-lightweight like the Apex A Motion Composites rigid frame (K0005) MWC. He could propel 15 ft. in 8 seconds, was able to propel up and down ramps and over both smooth and uneven surfaces. The ability to position the rear axle 2” anterior to his shoulder joint significantly impacted his functional mobility. The combination of 3” frame squeeze and 85-degree tighter front-end angle provided the added pelvic stability and trunk control necessary to improve forward reaching, pulling close to surfaces, and maneuvering in tight spaces that he required for function and his job..

1. Describe how recommended MWC or PWC will improve patient’s ability to participate in ADLs and IADLs.

A new MWC configured as specified above will:

1. improve postural control for reach and function without loss of balance
2. have a smaller turning radius and tighter front end to allow getting closer to work surfaces and maneuvering in tight spaces
3. disassemble the MWC to independently load/unload from vehicle and stow in passenger seat
4. support upright sitting posture to distribute pressures across greatest area AND improve proximal pelvic stability