LAYING THE FOUNDATION FOR PROPER POSITIONING: INTRODUCTION TO POSITIONING FOR FUNCTIONAL ABILITY AND WHEELCHAIR SEATING

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Rehabilitation Institute of Michigan
Patricia Tully, OTR
TIRR Memorial Hermann Hospital
Sheila Blochlinger, PT, ATP
Children's Specialized Hospital

SCHEDULE

9:00-9:30 Objectives, Introduction and background

9:30-10:30 Wheelchair evaluation, mat assessment, posture issues, assessment tools

10:30-10:45 Break

10:45-12:15 Wheelchairs, cushions and backs

12:15-1:15 Lunch

1:15-2:15 Pediatrics

2:15-2:45 Documentation, advocacy

2:45-3:00 Break

3:00-4:15 Case Studies

4:15-4:30 Discussion/questions

OBJECTIVES

- Take standard measurements and apply those measurements to seating choices.
- Discuss three ways to simulate equipment trials when the equipment is not available.
- Process through a decision making tree for equipment funding sources.
- Identify two special considerations for various diagnostic groups, including brain injury, spinal cord injury, degenerative neurologic disorders, bariatric needs, pediatric equipment needs.

WHO WE ARE

- **Sheila Blochlinger, PT, ATP**
  - Has been working at Children's Specialized for 15 years
  - Practicing PT for almost 30 years, primarily pediatrics with approximately 10 years running a seating clinic for disabled adults
  - Currently Manager of the Rehabilitation Technology Department
  - Responsibilities include direct care in outpatient clinic, attending to all positioning needs of Long Term care patients, Assisting with difficult positioning cases in our inpatient program and managing the department
  - Research - Dynamic Standing - published 2013 and currently working on a pediatric wheelchair project comparing standard and ultralight chairs in children

Children's Specialized Hospital

CHILDREN'S SPECIALIZED HOSPITAL

- Nation's leading provider of inpatient and outpatient care for children from birth to 21 years of age facing special health challenges - from chronic illnesses and complex physical disabilities to developmental and behavioral issues.
- 13 New Jersey locations
- 2 Rehabilitation Technology Clinic sites
- Treated almost 600 new patients in the Rehab Tech clinic in 2015

WHO WE ARE

Patricia Tully, OTR

- BS Education 1992
- BS OT 1999
- TIRR Memorial Hermann, 2000
- BI & Stroke Team: 2000-2007
- Pedi, Adolescent, Special Rehab Team: 2004-2007
- OP WC Clinic 2005-2014
- TIRR Memorial Hermann Education Academy: 2014-present.
- Community Work:
  - Rehab Service Volunteer Project (RSVP) Non-Profit Board Member
  - Pro-Bono WC Seating Evals
  - www.rsvptexas.org


MEMORIAL HERMANN
MEMORIAL HERMANN

TIRR MEMORIAL HERMANN CORE PROGRAMS

- Brain Injury
- Stroke
- Spinal Cord Injury
- Specialty Rehabilitation Program
  - Neuromuscular disorders
  - Amputation
  - Multiple Trauma
- Cancer Rehabilitation
- International Services Program
- Out-Patient Physician Medical Clinic
- Medical Home Model
- Wellness Programs

- 6 TIRR Branded facilities
- 11 Facilities in the Memorial Hermann Rehab Network
- BI Model Center

TIRR MEMORIAL HERMANN

Operating Beds: 134
Patient Days 34,240
Average LOS 27.5
Average Daily Census 95
Discharges 1,244
All General Outpatients
Adult 271,980 *
Pedi 31,763 *

FTEs: 741

WHO WE ARE

- Diane Thomson, MS, OTR/L, ATP
  - Worked at The Rehabilitation Institute of Michigan since 1995
  - Senior Occupational Therapist on SCI inpatient unit and outpatient wheelchair seating clinic
  - Responsible for mentoring inpatient and outpatient staff on wheelchair seating and positioning
  - Received a BA in psychology from Washington University in St. Louis in 1993 and a MS in Occupational Therapy from Rush University in 1995
  - Enjoys advocating for her clients including attending the CRT conference and Roll on Capitol Hill in Washington DC
  - Is a board member of the Michigan Spinal Cord Injury Association


Rehabilitation Institute of Michigan
Rehabilitation
Institute
Brazza Outpatient
Center

REHABILITATION INSTITUTE OF MICHIGAN

- 94 bed inpatient free standing rehabilitation hospital
  - Spinal Cord Injury Unit
  - Neuroscience Unit
  - PMR Unit
- 30 outpatient sites throughout Southeast Michigan
- Center for Spinal Cord Injury Recovery
- Has been serving the Metro Detroit area for over 60 years

DISCLAIMER

- We are not partial to any particular manufacturer. We choose the most appropriate equipment for the patient and their caregivers including family. The equipment shown in this presentation is reflective of what is typically provided through our clinics.
- Equipment varies throughout the country due to climate, funding sources and the environment.

"CONFINED TO A WHEELCHAIR?" NOT!

- Without a chair, people would be confined to bed or home
- An appropriate chair provides comfortable, efficient mobility, maximizes function and independence in multiple settings
- Minimizes risk for medical complications
- Second nature, not ever-languishing "day in a chair"
- ["Chair user" terminology is appreciated; rehab professionals should disavow the Telethon mentality]

IMPORTANCE OF PROPER SEATING AND POSITIONING

Two key elements:

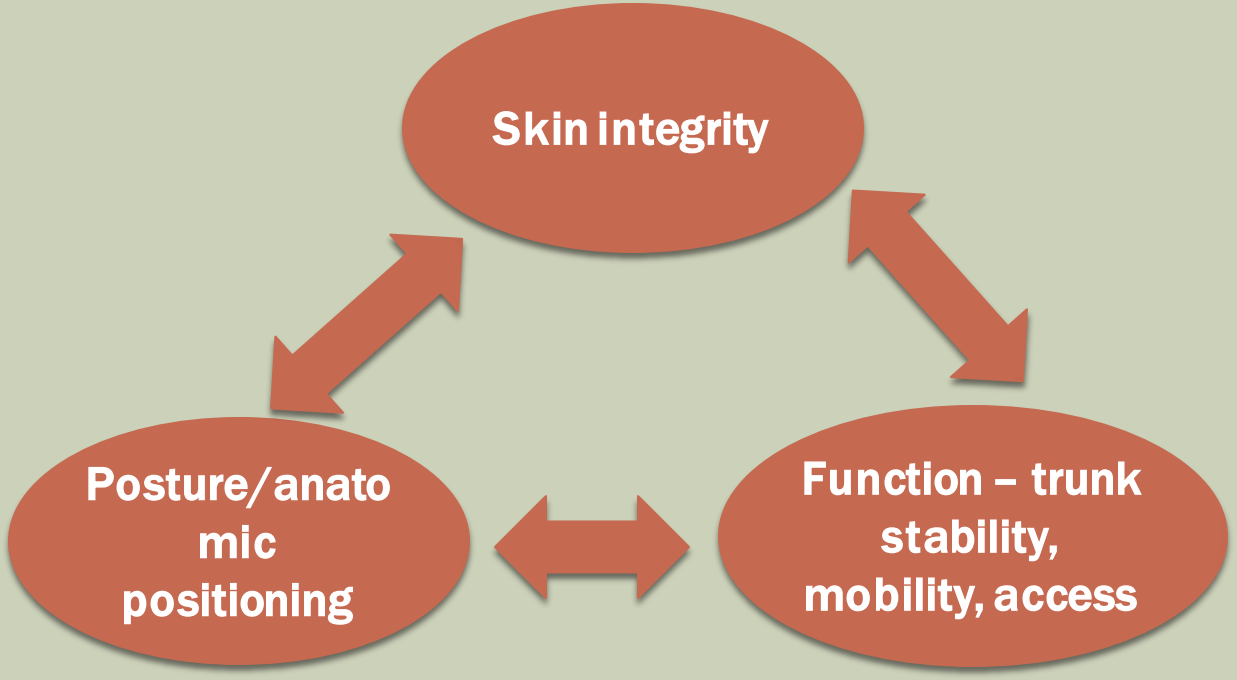
medical

functional

COMPLICATIONS- INAPPROPRIATELY PRESCRIBED/FITTED EQUIPMENT

- Limited mobility, function, independence
- Pressure sores
- Contractures
- Postural asymmetries
- Spasticity
- Pain
- UE repetitive stress injury
- Psychosocial impact
- Impaired respiratory function

SEATING GOALS



POSTURE VERSUS FUNCTION

- Skin integrity must be maintained to maintain health
- Function must be maintained to maintain health and independence
- Anatomic postures must be maintained in the best way possible to promote skin integrity and function

SEATING FOR POSTURE AND FUNCTION

DEFINITION OF FUNCTION

- Person must be able to complete daily functions which may include
  - Breathing
  - Eating
  - Bathing
  - Dressing
  - Toileting – cathing, entering bathroom
  - Mobility throughout environment
  - Community re-entry
  - School/work
  - Communication

RELATIONSHIP BETWEEN POSTURE AND FUNCTION

- Position
  - Static/inactive
  - Supportive surface that is inactive
- Posture
  - Active
  - Dynamic
  - How the body parts are aligned
  - Need postural options in order to function in sitting

POSTURE AND POSTURAL TENDENCIES

- When documenting talk about the posture the person is in and the movement away from this posture
- Posture
  - Resting posture - optimal alignment, should rest into supports
  - Fine motor posture – support for stability to encourage activity, need to be able to get back to resting posture
  - Gross motor posture – support for activity with ability to get back to resting posture
- Postural tendency – movement from posture
  - Posterior
  - Anterior
  - Lateral/rotational

STABILITY/MOBILITY

- Learned in School: Stability *before* Mobility
- Real World: Stability *to achieve* Mobility
  - Posture shifts/changes to achieve movement and function
  - In order to move one part of our body we stabilize another part of our body
  - Postural options/choices=necessary to function in sitting

FUNCTIONAL STABILITY

INDIVIDUAL ROLES

Therapist
Supplier
Manufacturer's rep
Client

THERAPIST ROLE

- Complete a comprehensive assessment including client's medical history, functional needs, and mat assessment
- Simulation or trial of equipment
- Training on use of equipment
- Education to client on use of recommended equipment, precautions, medical concerns/issues, responsibilities
- Education to client on insurance issues
- Completion of proper documentation for funding of equipment
- Education to physicians on insurance qualifications for equipment
- Insure proper fit at delivery of equipment

SUPPLIER ROLE

- Check insurance for same or similar
- Assist with comprehensive assessment of equipment
- Education of client and therapist on available equipment
- Education of client on insurance issues
- Assist with providing trial or simulation equipment
- Training on use of equipment
- Home assessment
- Submitting documentation to insurance for approval
- Ordering and supplying equipment
- Insuring proper fit on delivery
- Education of client and physician on insurance qualifications
- Repair equipment in a timely manner

MANUFACTURER'S REPRESENTATIVE ROLE

- Assist with providing equipment for trial or simulation
- Educating supplier, therapist, and client on available equipment
- Providing updates on new equipment through samples, in-services, etc.
- Assist with specialized set up – ie stander, high level electronics

CLIENT ROLE AND COMMITMENT

- Understanding of not entitled to equipment (insurance has requirements)
- Attend all scheduled appointments and notify clinic of cancellation of appointment
- Understand how to maintain, clean and repair the equipment
- Have maintenance performed to keep the chair in good working condition
- Goals for use of equipment

ASSISTANCE WITH MAINTAINING ROLES AND BOUNDARIES

- “We can’t care more about getting a wheelchair or maintaining a wheelchair than our clients do”
- RIM developed maintenance day to assist with upkeep of wheelchairs
- Maintenance day is on same day as spinal cord injury support group for increased convenience to end users
- Clients needs are different throughout different regions of the US as well as lifestyles
  - Rural vs Urban
  - Temperature/climate
  - Sedentary vs active

INITIATION OF WHEELCHAIR ASSESSMENT

INTAKE

- Clinic scheduler receives referral and initiates phone call to client
- Intake form completed
  - Insurance verified by hospital
  - Form provided to therapist
  - Form faxed to supplier
  - Insurance verified by supplier
- Supplier goes to the home
- IVR-same or similar background check
- Repair vs replace eval
- What's on file for the patient from previous visits
- Phone call prior to clinic?
  - RIM sends letter to client to confirm
  - Some suppliers call prior to appointment (sometimes confuses client)
  - Children's Specialized sends a letter, reminder phone call and a text message

WHEELCHAIR SEATING EVALUATION

COMPONENTS OF EVALUATION

- History
- Observation in current seating system (if re-evaluation)
- Discuss goals of equipment
- Mat evaluation
- Trial wheelchairs/ standers, gait trainers and any other appropriate equipment
- Pressure mapping if necessary

HISTORY

- Diagnosis
- Medical history/surgeries (For pediatrics need results of last spine and hip films)
- History of skin issues
- Cognitive status / history of seizures
- Ability to complete MRADL's
- Amount of assistance required, if any, while in w/c
- Pros/cons of current seating system and other equipment
- Pain
- Caregiver needs
- Discuss current lifestyle needs

OBSERVATION OF CURRENT EQUIPMENT

- Resting/static
  - How is their posture? Consider all elements- head, spine, pelvis, extremities
  - Categorize existing scoliosis/deviations from anatomic position
  - Shoulder/UE relative to hand rim or joystick
- Dynamic
  - Influence of movement, spasticity on postural control
  - Ease/efficiency of propulsion, eg shoulder girdle
  - Transfer ability
  - Condition of current equipment - disrepair/what is broken

MAT ASSESSMENT

SEATING IS PART OF THE WHOLE PICTURE

- Wheelchair
- Seating
- Support
- Pressure re-distribution
- Function
- Stability
- Mobility
- Reach
- Tolerance of sitting

PERFORM MAT EVALUATIONS

Feel what's happening and observe their facial expressions

SEE WHAT IS HAPPENING…

BECAUSE THINGS ARE HAPPENING…

MAT ASSESSMENT

- Posture
- Function
- Breathing
- Transfers
- How they use the chair or other piece of equipment

MAT ASSESSMENT

- What is the most important item for the person
- Seating
- Aesthetics
- Chair or other type of equipment i.e. supportive stroller
- Posture
- Function
  - Functional as possible even if you have to give up posture
- If I make a change, how will that impact you?
- Perfect posture, perfect set up vs. functional

FUNCTIONAL MOBILITY

- OBSERVE HOW THE PERSON MOVES
  - FUNCTIONAL UE USE
  - TRUNK STABILITY
  - FUNCTIONAL WEIGHT SHIFT
  - FUNCTIONAL REACH
  - INFLUENCE OF TONE AND PRIMITIVE REFLEXES ON MOVEMENT

Observe movements wheelchair and mat level with and without positioning assist

MAT EVALUATION - ROM

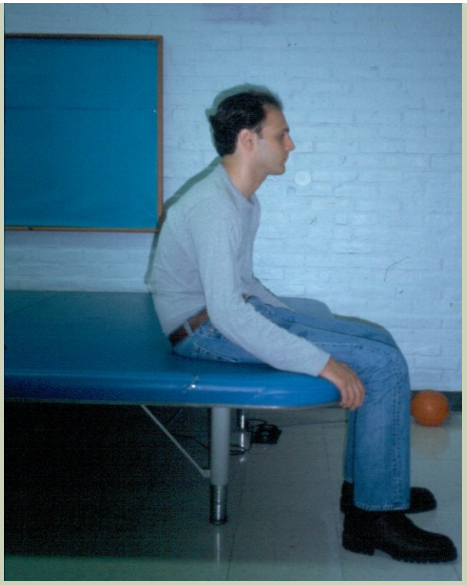
- Assess all aspects of ROM supine on firm, level surface
- Looking for functional LE ROM
- Looking for pelvic malpositioning in particular
- Looking for reducibility of spinal/postural deviations in general

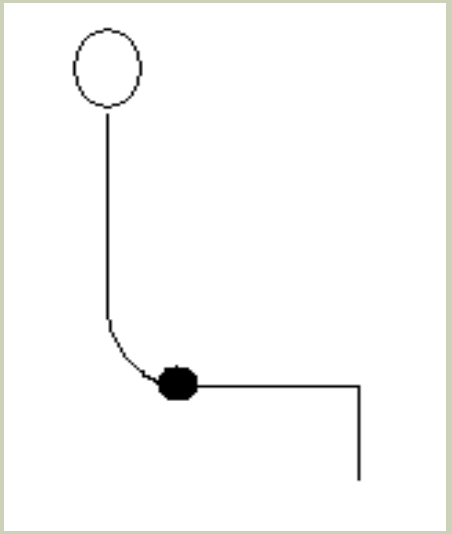
KNOW WHAT IS HAPPENING: POSTURAL DEVIATIONS SEEN

- Excessive Posterior or Anterior Pelvic Tilt
- Pelvic Obliquity
- Pelvic Rotation
- Kyphosis
- Hyperextension of the head and neck
- Lordosis
- Lateral Scoliosis
- Anterior / Posterior Scoliosis
- Hip Adduction/Abduction, Internal/External Rotation
- Windswept Deformity
- Ankle inversion/eversion/plantar flexion/dorsiflexion

POSTERIOR PELVIC TILT

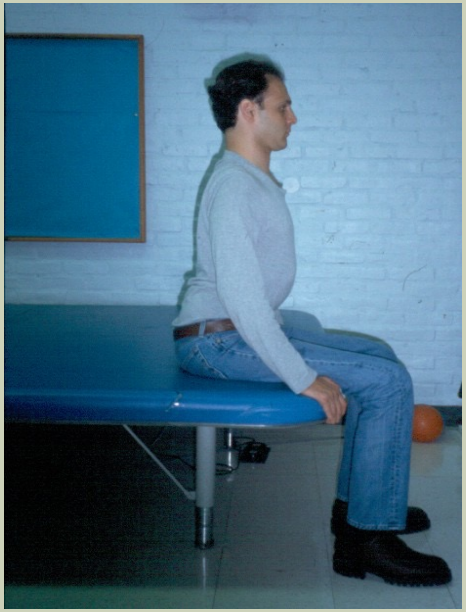
- Pelvis tilts backward creating pressure on the sacrum and coccyx.
- Seat depth looks longer than it really is.
- May need longer seated depth if not flexible
- Pressure
- Instability

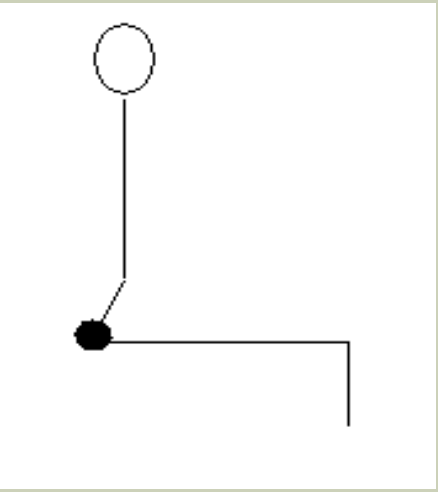




ANTERIOR PELVIC TILT

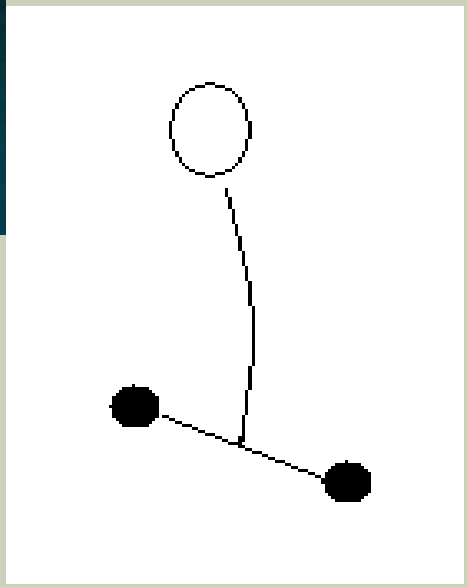
- The entire pelvis tilts forward.
- A small amount of anterior tilt can be a good functional position that encourages spinal elongation.
- Too much anterior tilt can lead to lordosis and excessive pressure on the pubic bone.





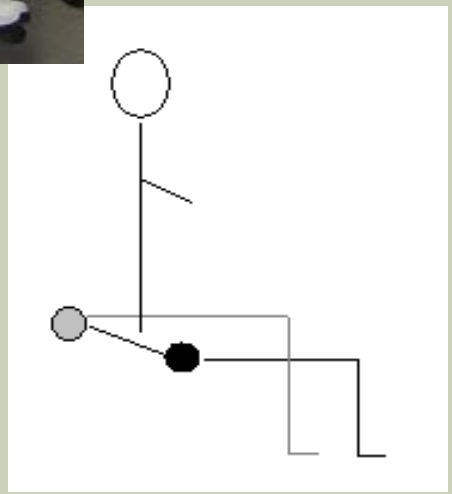
PELVIC OBLIQUITY

- The pelvis tilts down on one side.
- Determined by feeling the pelvic crest and ASIS.
- The side that is lower is the side that has the obliquity. It is often associated with scoliosis and hip dislocation.



PELVIC ROTATION

- The pelvis rotates forward on one side, backward on the other side.
- The rotation is labeled by the forward side.
- Often appears like a leg length discrepancy.

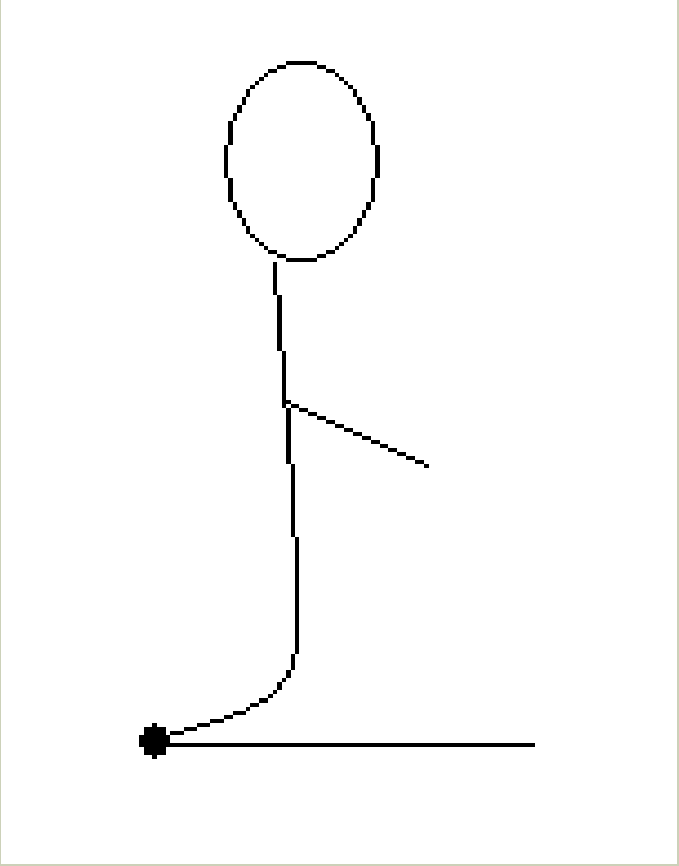


KYPHOSIS

- Posterior convex angulation of the spine.
- Creates a hunched over look.
- Augments function
- Repetitive strain
- Can impair safe swallowing

LORDOSIS

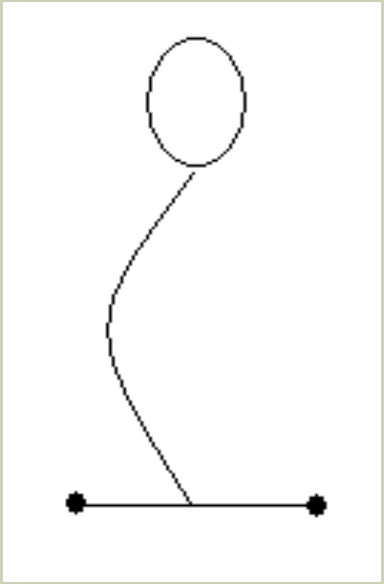
- Abnormally increased anterior convex of the spine as viewed from the side.
- Looks like an arched back.

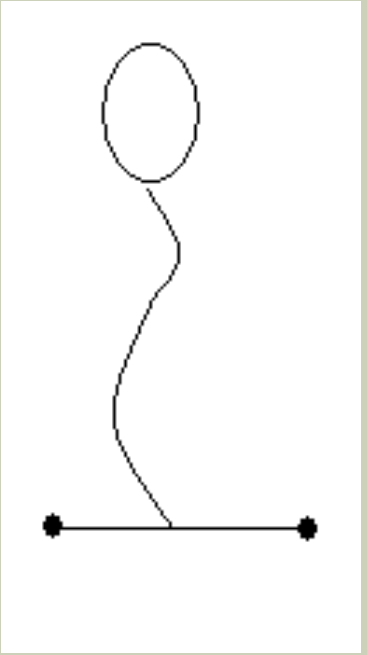


SCOLIOSIS: LATERAL LEANING

- **Functional-**
  A lateral deviation of the spine which is postural and compensatory that can be passively corrected.

- **Structural**-A lateral deviation of the spine with rotation of the vertebrae. A curve that has a structural component that is not actively correctable.

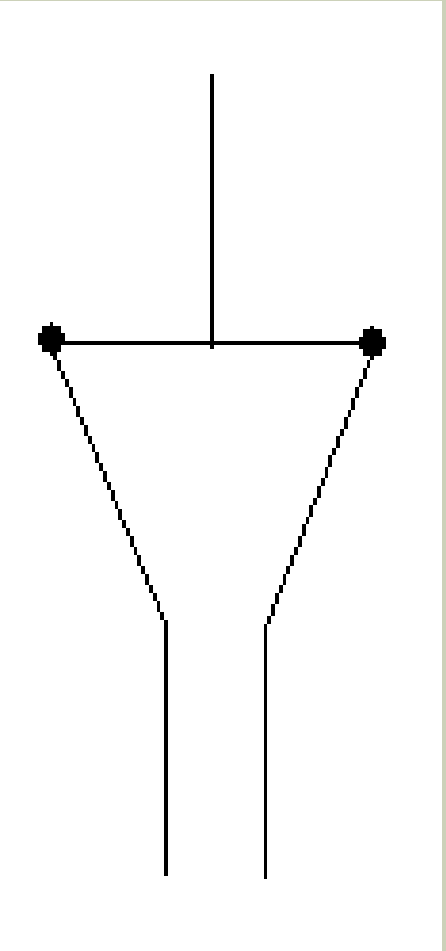




SCOLIOSIS / MULTIPLE DEFORMITIES

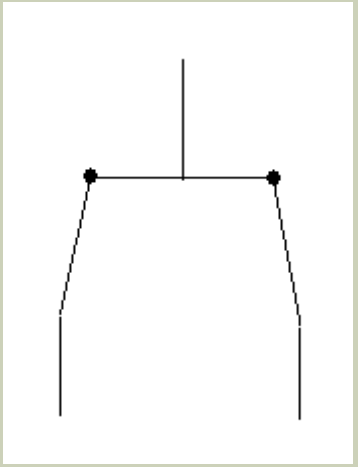
HIP ADDUCTION

- The legs come together creating limited space between them.
- It is very important to prevent excessive adduction in pediatrics as this can lead to hip dislocation.



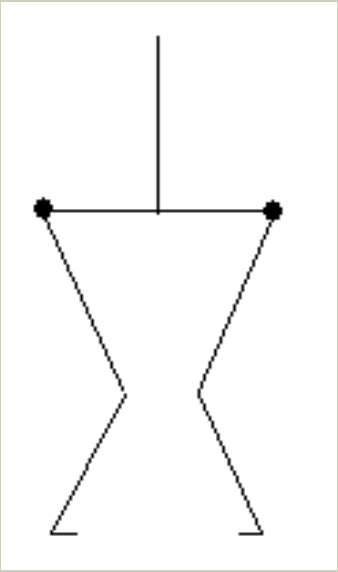
HIP ABDUCTION

- The legs are spread apart. Extreme abduction may be called “frogging”.
- Prevention of too much abduction is important in pediatrics as excessive abduction will limit accessibility in adulthood.



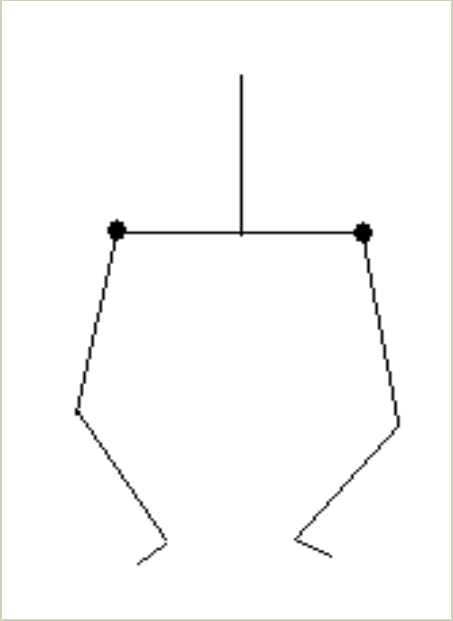
HIP INTERNAL ROTATION

- The knees come together towards the middle of the body, the feet will move lateral away from the middle of the body.
- This also leads to hip dislocation and needs to be prevented if possible.



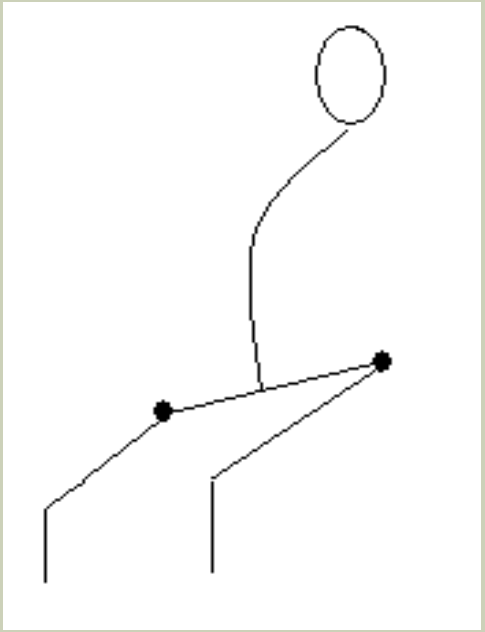
HIP EXTERNAL ROTATION

- The knees separate and the feet will come back together towards the center of the body.
- Can lead to difficulty with access if knees are too wide.



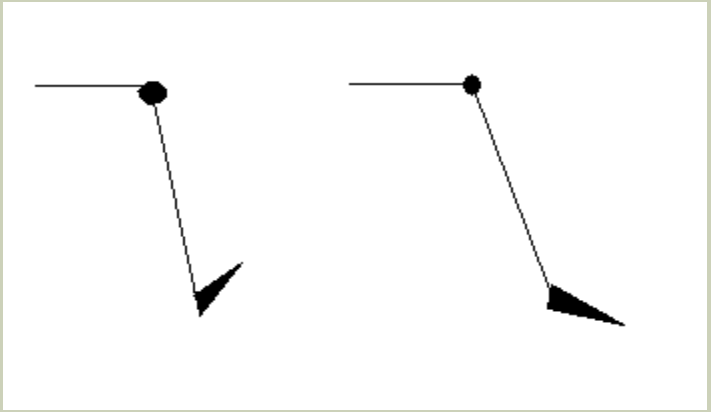
WINDSWEPT DEFORMITY

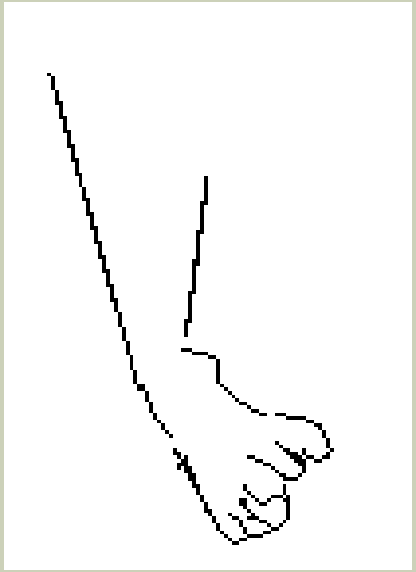
- ✓Abduction and external rotation of one hip with the opposite hip in adduction and internal rotation.
- ✓May occur with hip dislocation and scoliosis.
  - ✦Pelvic obliquity with the hip on the high side dislocated or subluxed, or with pelvic rotation.
  - ✦Scoliosis-Convex to the opposite side.
  - ✦Flexion, adduction and internal rotation of one hip (the side with the dislocation); Flexion, abduction, and external rotation of the other side.

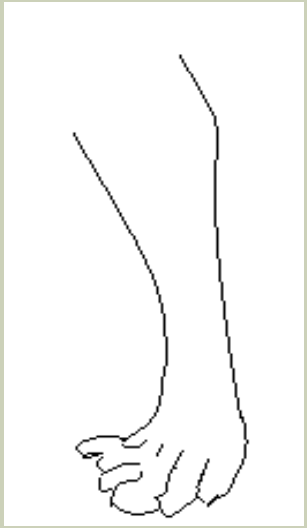


ANKLE INVERSION/EVERSION/PLANTAR FLEXION/DORSIFLEXION

ANKLE INVERSION/EVERSION/PLANTAR FLEXION/DORSIFLEXION



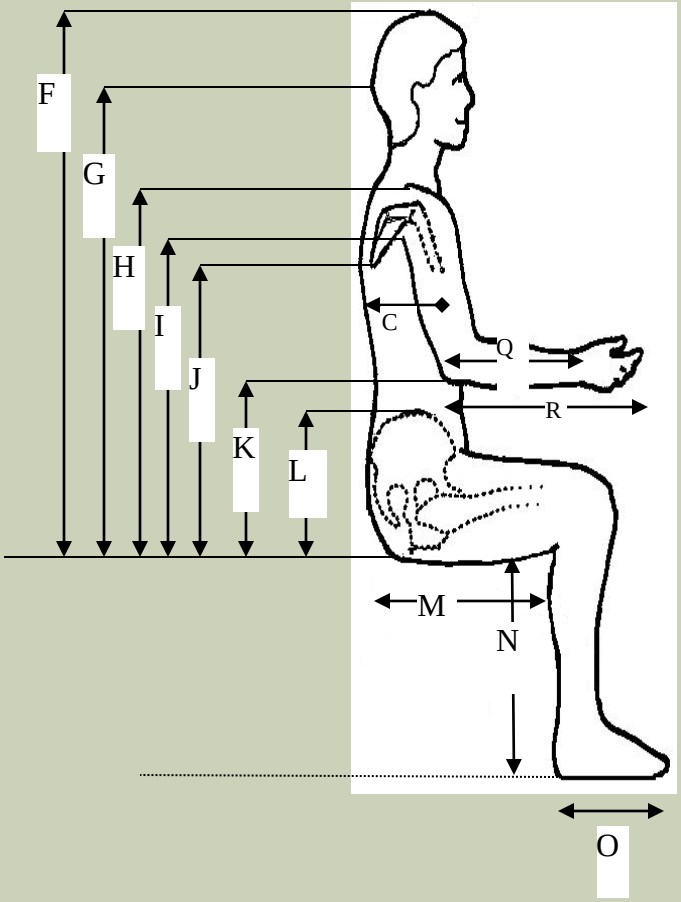


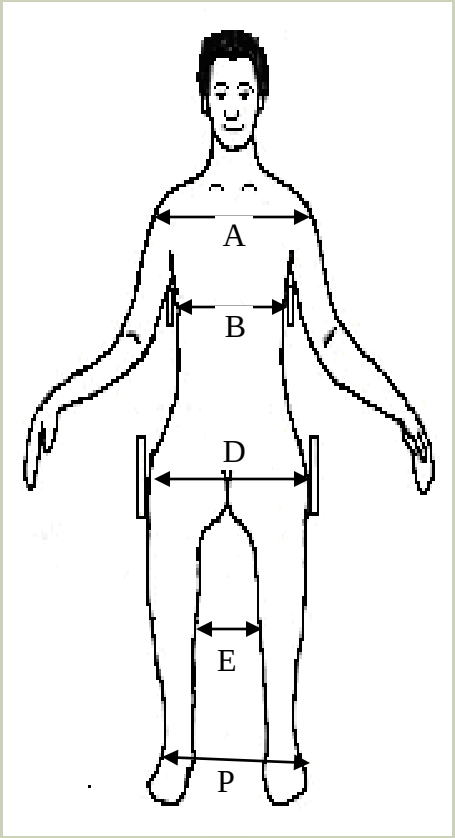


MAT EVALUATION – OTHER SEATING ISSUES

- Dislocated hip
- H.O.
- Knee/ankle contractures
- Subluxation of shoulder joint/impingement/contractures
- Repetitive use injury
- Influence of primitive reflexes
- Tone/spasticity
- Movement disorder

MAT EVALUATION - MEASUREMENTS





MAT EVALUATION - MEASUREMENTS

A. Shoulder width
B. Chest width
C. Chest depth
D. Hip width
E. Between knees
F. Top of head
G. Occiput
H. Top of shoulder
I. Axilla
J. Inferior angle of scapula
K. Elbow
L. Iliac Crest
M. Sacrum to popliteal fossa
N. Knee to heel
O. Foot length
P. Foot width
Q. Elbow to wrist
R. Elbow to finger

ADDITIONAL MEASUREMENTS FOR BARIATRIC CLIENTS

Current weight:_____ Weight history:_____

_____

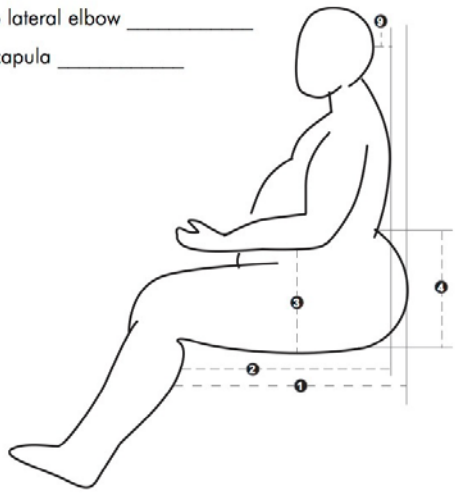
_____

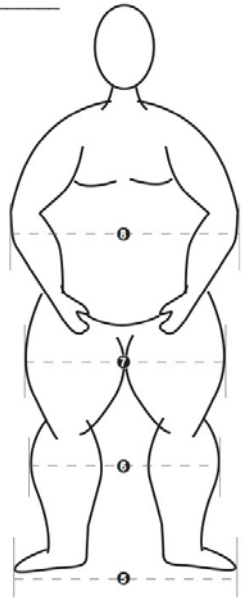
_____

_____

_____

1. Back of knee/calf to back of buttocks (seat pan depth) _____
2. Back of knee/calf to thoracic-lumber trunk (for seat depth) _____
3. Seat pan to under forearm (armrest height) _____
4. Seat pan to top of gluteal tissue (lower aspect of back support height) _____
5. Width at toes (lateral aspect) _____
6. Width from lateral calf to lateral calf (at widest aspect) _____
7. Overall hip width _____
8. Lateral elbow to lateral elbow _____
9. Back of head scapula _____





Motion Concepts

matrx SEATING SERIES

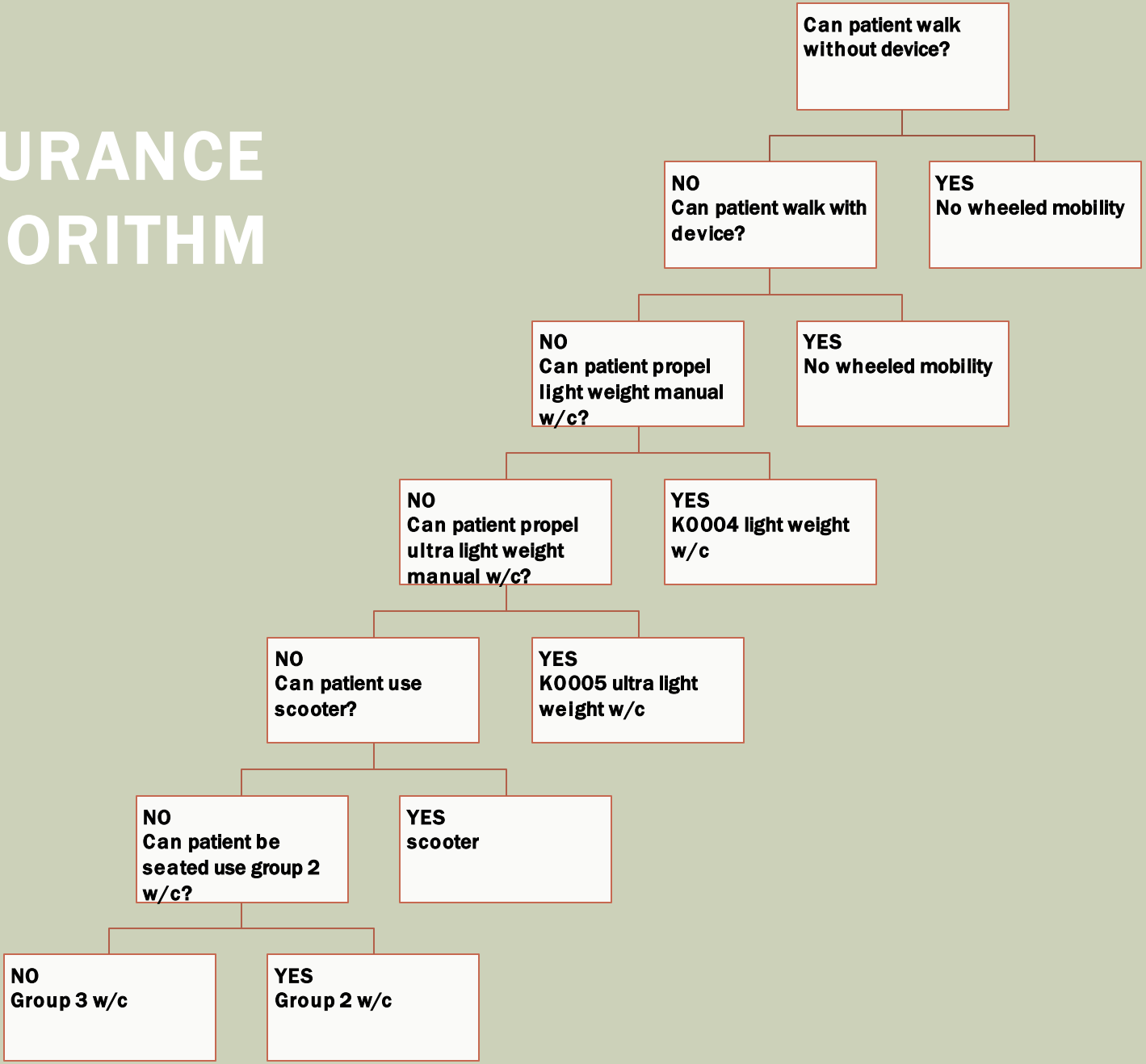
pdq MOBILITY TECHNOLOGIES

FUNCTIONAL EVALUATION

FUNCTIONAL ASSESSMENT

- Ability to ambulate
  - Timed up and go (TUG)
  - Distance in 1 min
  - Functionality – ie walk and carry item
  - Assess through report ability throughout day
- Ability to propel manual w/c
- Safety with use of scooter or power w/c
- Transfers
- MRADL's including dressing tasks
- Functional Mobility Assessment

INSURANCE ALGORITHM



WHEELCHAIR SKILLS PROGRAM (WSP)
DALHOUSIE UNIVERSITY
HTTP://WWW.WHEELCHAIRSKILLSPROGRAM.CA/ENG/

- Wheelchair Skills Test (WST)
- Wheelchair Skills Test-Questionnaire (WST- Q)
- Wheelchair Skills Training Program (WSTP)
- Wheelchair Propulsion Test (WPT)
- “Low tech, high impact”
- Assess and train wheelchair users, caregivers, and clinicians
- Helps quantitate a qualitative process

WORLD HEALTH ORGANIZATION (WHO)

WHO Wheelchair-Provision Service Model

1. Referral and appointment
2. Assessment
3. Prescription
4. Funding and ordering
5. Product preparation
6. Fitting
7. User training
8. Follow-up, maintenance and repairs

WHO Guidelines 2008, Section 3.2.1, p 76

PRESSURE MAPPING

GOAL OF PRESSURE MAPPING

- Patient education
  - Assess patient's ability to perform weight shift (push up, lateral, tilt)
  - Good opportunity for skin care education
    - the importance of proper positioning
    - why should not sit too long on hard surfaces (bathroom equipment, floor, etc.)
    -Moisture climate between person and cushion
- Determine appropriate equipment
  - Assess on various cushions and bathroom equipment
  - Focus on combining pressure redistribution with function and comfort
  - Justifying equipment to an insurance company
  - consider how the patient functions while sitting on cushion
- How does the cushion effect the patient's positioning, balance and comfort?
- Can the patient/caregiver perform maintenance on a cushion?

INTERFACE PRESSURE MAPPING

- Pressure Mapping Systems are designed to measure the pressure points between your patients and various support surfaces.
- Visual representation of the degree of pressure relief achieved by a particular piece of equipment. If pressure is low enough, the skin and tissue will receive adequate blood flow.
- Pressure mapping is only a tool, much like a goniometry. It only measures something and must be interpreted clinically to have any meaning.
- A particular statistic, at a particular area, does not indicate success or safety.
- Color is just color. By adjusting the measurement scale, you can choose to see it any way. All red, all blue, all in-between.

WHAT PRESSURE MAPPING DOES NOT SHOW

- Shearing forces (reclining seating system, poor transfer technique)
- Skin temperature
- Moisture
- General tissue health
- How much time do they spend on other surfaces (toilet, bed, vehicle)
- Other risk factors: nutrition, habits (smoking, drinking), medications, overall health status
- Poor home environment and support

TAKE HOME POINTS

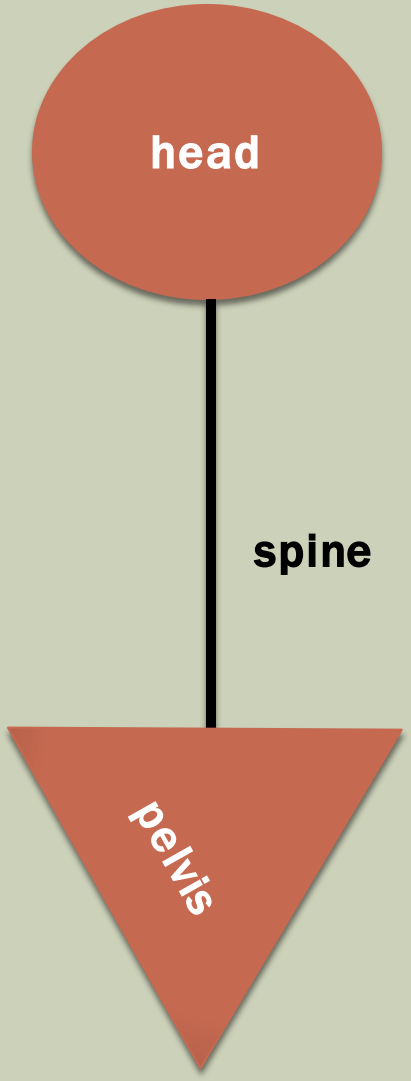
- We can not relieve or reduce pressure, we can only re-distribute with surfaces
- High pressure indicates potential trouble and focuses attention on higher risk areas
- Larger, more even pressure redistribution is more desirable
- Assessment Hierarchy: Patient, Position, Pressure, Moisture
- Consider the patient, their caregivers and their home environment prior to making a decision

I HAVE THE INFORMATION…NOW WHAT?

IDEAS TO KEEP IN MIND

- Improper fit can cause postural asymmetries which may lead to medical complications
  - Not “90,90,90”
  - “Should fit like skinny jeans not comfy sweats”
- Positioning can increase or decrease function
- Must look at whole picture to meet needs of client
- The recommended equipment needs to work in the client’s and family’s lifestyle

How do you make this functional?

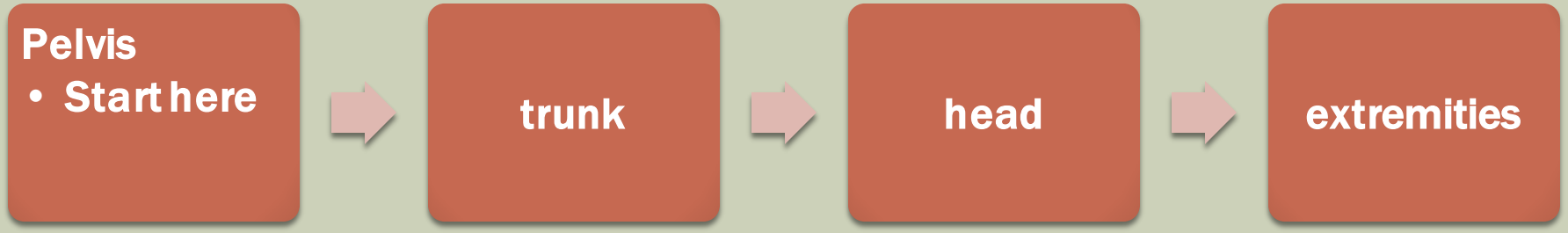


Credit: Mark Schmeler

STABILITY

How do you support a bowling ball on a stick on an inverted triangle?

TYPICAL POSITIONING FOR STABILITY



SIMULATION / TRIALS

- Seat slope
- Lateral Support
- Obliquity
- Trunk rotation
- Joystick access
- Custom Molding

- Your body
- Newspaper / magazine
- Towels / face cloth
- Blankets
- Bubble wrap
- Foam pieces
- Splinting scraps
- Bean Bag
- Pillows

SEATING SYSTEMS

ITEMS IN A SEATING SYSTEM

- Wheelchair
- Back Cushion
- Seat Cushion
- Trunk supports
- Pelvic supports
- Leg rests / foot supports
- Armrests
- Headrests
- Other ancillary supports - chest strap, pelvic strap, upper extremity support surface, etc.

MANUAL WHEELCHAIRS

- Standard
- Light weight
- Ultra light weight
- Totally rigid vs folding back/frame components

- Rigid
- Folding
- Recline
- Tilt
- Tilt and recline
- Specialty - basketball, track, tennis, rugby, offroad, handcycle

MANUAL WHEELCHAIR CLASSIFICATION

- Standard wheelchairs
  - Generally useful for very short term use
  - Airports, hospital waiting rooms, shopping malls
  - Heavy
  - Limited adjustment
  - Not really good for any sort of self propulsion

STANDARD WHEELCHAIR

-300# weight capacity
-Carbon steel, chrome plated frame
-Swing away foot rests or ELRs
-Padded removable arm rests
-Overall weight 40 #

MANUAL WHEELCHAIR CLASSIFICATION

- Light weight wheelchair
  - Weigh less than standard wheelchairs
  - Offer more flexibility with seat width/depth & adjustment of back height.
  - Can add off shelf back and cushions
  - Need to be able to functionally self propel on multiple surfaces and situations throughout daily living

LIGHTWEIGHT WHEELCHAIR

-Weight capacity 250#
-Desk or full length armrest that swing away
-Swing away leg rests
-Overall weight 29#

MANUAL WHEELCHAIR CLASSIFICATION

- Ultra lightweight Wheelchairs
  - What you should be considering for an individual that will be using a w/c as primary means of mobility!
  - Weighs less than lightweight wheelchairs
  - Custom Sizes
  - Made to order
  - More adjustable
  - High quality materials that are meant to last
  - Allows for proper UE positioning as well as pressure redistribution
  - AXLE ADJUSTABILITY
    - Horizontal
    - Vertical

ULTRA LIGHTWEIGHT WHEELCHAIR

-Fine adjustments of the rear axle for seat height, caster adjustability, center of gravity, width and camber, allowing you to achieve optimum wheel positioning
-more options for accessories
-Overall weight 23 lbs.*

RIGID FRAME

Cantilever frame

Box frame

FRAME STYLE – RIGID VS. FOLDING

Rigid Frame	Folding Frame
Frame stiffness makes propulsion more efficient	Has a cross or "x" brace that allows chair to fold from the middle
More durable, lighter weight	Heavier than rigid frame Requires less space when folded
Wheels must be removed to load into car	Requires less space when folded
Person uses less energy when self-loading into car	Propulsion less efficient
Less maintenance	More moving parts= less durability

RECLINING WHEELCHAIR

TILT IN SPACE WHEELCHAIR

FRAME STYLE – POSITIONING CHAIRS TILT IN SPACE VS RECLINER

Recliner	Tilt-in-Space
Allows quick change in space	Allows quick change in space
Lay back down, elevate legs	Body remains in same position
Shearing, sacral pressure ulcer	Decreased shearing due to no change in position
Functional needs – cathing, lap tray, communication device, line of sight	Functional needs - spasticity management, maintenance of body against gravity
Limited hip PROM, hamstring concerns	

FROM RECLINE TO TILT

SPECIALTY

- Sports chairs

PUSH RIM ACTIVE ASSIST

- Battery operated wheels with an installed motor that decrease wheelchair user's amount of effort during self-propulsion by up to 80%.
- Recommended for individuals
  - who self-propel over long distances,
  - who experience difficulty going over steep hills/ramps, carpet
  - with upper extremity dysfunction secondary to overuse of shoulder complex
  - with decreased strength and endurance.
- Heavy (~50 lbs each) which may make it difficult for user to switch out between power assist and regular wheels.
- Offers choice – bridge between manual and power

PUSH RIM ACTIVE ASSIST

ONE ARM DRIVE

- Left and right wheel axles are linked allowing the user to propel themselves utilizing one hand rim.
- Provides independence to an individual who only has the use of one arm to self-propel (hemiplegic, amputee)
- May be confusing for some individuals to learn how to self-propel
- These wheelchairs are generally larger, heavier and more difficult to fold and transport.

SMART DRIVE

- Speed: 1.5 – 5.5 mph
- Range: 10 miles
- Indoor Mode and outdoor mode
- 8 lb battery, 11lb motor
- Push Activated Cruise Control
- More transportable

- Reduces # of repetitive pushes
- Still allows wheelies and curbs

- Requires specific skills for safe use

FREE WHEEL

- Wheelchair casters are lifted off the ground , turning chair into a 3-wheeler
- Allows for rolling over obstacles: curbs, dirt trails, grass, gravel, snow, and sand

POWER WHEELCHAIRS

- Scooters
- Group 2/Consumer power
- Group 3/Complex Rehab power
  - Rear wheel drive
  - Mid wheel drive
  - Front wheel drive
- Specialty
- Pediatric/ group 5

SCOOTER

- Longer wheel base with increased turning radius
- Requires use of both UE's for safe use of tiller
- Safe transfers on/off
- No positioning needs

- Some individuals like the anterior protection
- Find stability by holding onto tiller
- Able to transport items on foot board
- Consumer interest

GROUP 2 POWER/CONSUMER

- Limited positioning
- Can do off shelf back and cushion vs captain's seat
- Single power only
- Decreased stability

GROUP 3 POWER/COMPLEX REHAB

Average Technical Specs

Top Speed	3.5-6.5 mph
Ground Clearance	2.5-4.5 inches
Range	15-25 miles

FRAME TYPES:

Standard	250-300 lb weight limit Lighter in weight Lighter chair weight can require lighter weight vehicle lift which can decrease costs.
Heavy Duty	Up to 450 lb weight limit High activity level Severe Spasticity Increased chair weight Decreased range Decreased speed

REAR WHEEL DRIVE

- Advantages:
  - Stable at top speeds.
  - Higher top speed than mid or front wheel drive chairs.
  - Power
- Disadvantages:
  - Largest turning radius.
  - Challenging in tight spaces.
  - Swings at the front during turning.

MID WHEEL DRIVE

Advantages:

- **Smallest turning radius.**
- **Ideal for maneuvering in small places.**
- **More stable than front-wheel drive chairs at top speeds.**

Disadvantages:

- **Front/Rear casters can get caught up on rough terrain or curbs.**

FRONT WHEEL DRIVE

Advantages:
•Ideal for climbing and rough terrain.
•No front casters allows for more foot options.
•Transfer function
•Reach function

Disadvantages:
•Higher learning curve for driving.
•Slower at top speed than mid or rear wheel drive chairs.
•Swings at the back during turning.

POWER STANDER

- Increased environment access.
- Has beneficial effect on bones, leg muscles, circulation, bladder, digestion and respiratory functions.
- Can drive in stand function at programmable reduced speeds

4WHEEL DRIVE POWER

- Can be RWD, MWD or FWD
- Allows for increased access such as grass, woods, and sand
- Limitations for accessibility
- Has limitations of abilities (ie 15” incline)
- Some state parks have them for rental

PEDIATRIC POWER WHEELCHAIRS

- Low seat to floor
- Ability to maintain level of peers
- Safety features for safe use by child as well as caregiver
- Parental acceptance

POWER POSITIONING

- Options can be combined to meet patient specific needs.
- May require specific drive control system options.
- Need to be compatible with the backrest and cushion that the patient will use.

POWER TILT

- Up to 50 degrees of tilt.
- Permits independent weight shifts.
- Changes pressure points depending on amount of tilt used.
- Doesn't change hip angle.
- Can assist with positioning for sling transfers.
- Can be operated through joystick or switches mounted on the wheelchair which can be activated by the patients head, knee, foot, elbow or other body parts.
- Pre-programmed amount of tilt can be used while driving wheelchair.
- For safety, drive lockout function prevents driving when preprogrammed amount of tilt is reached.

POWER RECLINE

- Opens hip angle.
- Can help with catheter change.
- Accommodates ADL care.
- Recommended to be used with anti-shear back/cushion to decrease pressure sore risk.
- Recommended to be used with power elevating leg rests.
- For safety, drive lockout function prevents driving when preprogrammed amount of recline is reached.

- Disadvantages:
- Recline position creates shearing which increases patients pressure sore risk.
- Loss of position in upright

POWER SEAT ELEVATE

- Up to 10” of vertical lift.
- Increased environment access.
- Assists with transfers.

Disadvantages:

- May be difficult to justify why the patients insurance should pay for this option
- Raises seat to floor height of most chairs

DRIVE CONTROL SYSTEMS

JOYSTICK CONTROLS

- Joystick units are proportional control units that allow the patient to grade turns and speed.
- This feature requires the patient to have the insight, functional ability and reaction time to adapt to the environment.
- A wide range of handles are available to adapt wheelchair control units to the patient's specific functional ability.
- Ideal for patients with limited grip, hand function or arm movement.

SPECIALTY CONTROLS

- Specialty controls provide an adaptive method for patients to drive and control wheelchair functions.
- These control units can require less functional movement and energy.

MINI CHIN CONTROL

- Proportional control unit that allows the patient to grade speed and turns.
- Can be controlled by chin or lips.
- Ideal for patients with good head control but limited functional use of UE's.
- Tip can be changed out to accommodate user.
- Removable for convenience during transfers and ADL's.
- Can be programmed to use with driving, power positioning, blue tooth, infrared, and various other modes.

Disadvantage:

- Difficult for patient to speak while driving.
- Neck muscles can get tired

PROPORTIONAL HEAD CONTROL

- Allows for independent wheel chair mobility through the use of head movements.
- Forward/reverse functions can be activated by using the head to quickly depress the head unit.
- Can be used for independent power positioning.
- Ideal for patients with limited functional use of UE's.

Disadvantage:

- Requires good head control and coordination to activate modes and turn wheelchair appropriately.

HEAD ARRAY

- Uses sensors located in the headrest to control wheelchair functions.
- Allows patients with limited mobility to use power wheelchair.
- Sensors require no pressure to activate requiring less work by the patient.
- Requires left, right forward and back head movements.

Disadvantage:

- Patients with cognitive or memory issues might have trouble remembering sensor functions.
- Non-proportional, meaning there is no grading for speed or turns.

SIP-N-PUFF

- Allows the patient to access various wheelchair modes/functions including driving and positioning through expiration and inhalation.
- Allows for increased independence by high cervical level SCI patients.
- Can be programmed to drive for preprogrammed distances for each puff of air given.

Disadvantages:

- Control unit must be properly placed for use by patient.
- Can be difficult for patient to talk while operating wheelchair.

ENHANCED DISPLAY

- Large color LCD screen helps patients with low vision.
- Data displayed: speed, battery life, clock, odometer, mode, speed settings, drive status and seat function.
- Built in controls for electronics that uses infrared remote controls such as TV’s and DVD players.
- Compatible with blue-tooth computer mouse controller.

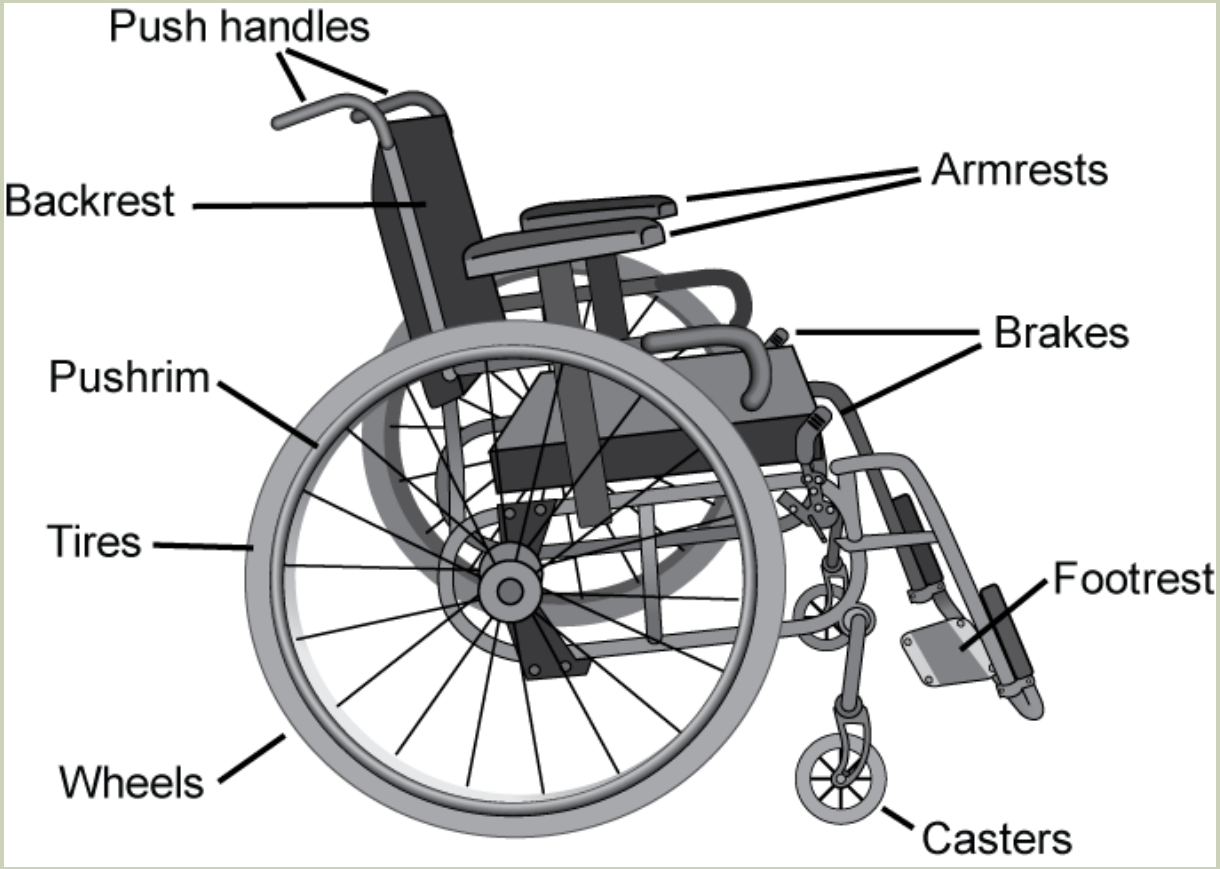
SINGLE SWITCH OPTIONS

- Single switch option allows for the access of various wheel chair modes/functions through a single switch using one time movements from patients various body parts including but not limited to: head, finger, elbow, and knee.
- Non-proportional, meaning driving modes/functions are activated in an all or nothing fashion meaning there is no grading of turns or speeds.
- Switches may be placed in various locations throughout the wheelchair including: headrests, lateral supports, arm rests, knee supports, and on mounting hardware.





WHEELCHAIR PARTS



Push Handles

These are used to assist the client with mobility and propulsion. They can attach to the backrest or the frame

Bolt on

Fold Down

Integrated on back post

Bolt-on height adjustable

Stroller handle

ARMRESTS

Height adjustable, removable desk length

Tubular, swing away

Flip-up mounted to seat posts

ARMREST LENGTH

Full Length	Desk Length
From wheelchair back to front of seat	From wheelchair back to the middle of seat.
Support entire length of arm and forearm	Decreased upper extremity support
Attachment of arm supports, i.e. lap tray	Fit under desks, tables, etc.
More surface area to use functionally	Different use functionally

Full Length

Desk length

FRONT ANGLE/RIGGINGS

- Fixed at 70, 80, or 90 degrees
  - closer the feet are to being directly under the knees the shorter the turning radius
  - Shorter turning radius makes wheelchair more functional in tight places such as washrooms, hallways doorways and elevators.
- Elevating
  - Maintains the leg in an extended position.
  - This works well for users who have limited knee flexion or for require this position post operatively.
  - Changing leg position is sometimes helpful in resolving discomfort or pain issues in the lower extremities.
  - Will add a considerable amount of weight and length to the wheelchair

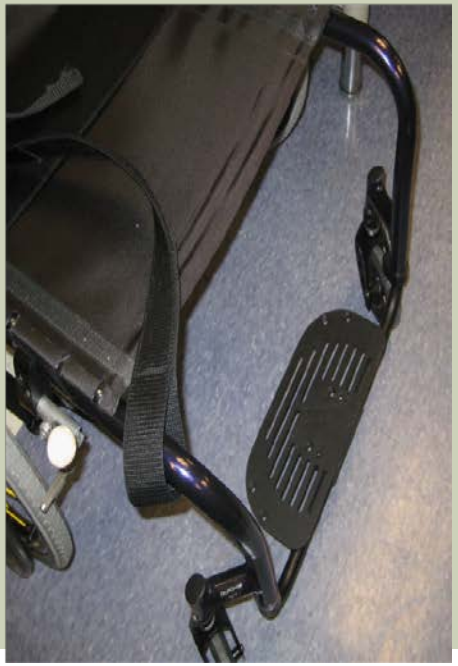
70 degree, swing away

Fixed 85 degrees

Elevating leg rest

LEG RESTS

Swing Away	Fixed
Allows patient to place feet on ground during transfers	Less removable parts= more durability
Good for patient's who may use their feet to self-propel in wheelchair	Work well for persons who are very active in their wheelchairs
More moving parts = less durability	



FOOT SUPPORT/FOOT PLATE

- There is a variety of footplates available depending on user's particular needs.
- High mount footrests are also available to individuals who may have a leg length discrepancy.
- Adjustability of these plates is usually front to back and/or side to side

Composite

Angle adjustable platform

Angle Adjustable

WHEEL LOCKS

Push-to-lock brakes are the most common form of wheel locks.

Push-to-lock work well for many because the handle engages forward, and downward, increasing transfer clearance.

Pull-to-lock wheel locks are the same as a push-to-lock, only the operational motion is reversed.

When pull-to-locks are engaged, the handle protrudes upward, which can interfere with transfers. Commonly used on very short frame depths, where pushing the brake forward might interfere with swing-away leg rests.

Scissor-Lock/Retractable wheel locks eliminate any protruding parts, fold under the seat when not in use, leaving the hand rim's full path unobstructed when propelling.

To operate scissor-lock, one reaches under the seat, and folds them outward, engaging them. Require dexterity and coordination compared to push- and pull-to-lock

EXTENSIONS

- Attachment for wheelchair locks to extend the handle length 6-7 ½ inches.
- Useful for users who cannot lean far enough to reach brakes, and for those with limited hand function.

Anti-tippers

- Anti-Tippers are devices which are attached to the back of the wheelchair to prevent it from tipping over backward.
- This option is commonly prescribed for users who rock in their wheelchair, tend to flop into the chair when transferring, or have difficulty climbing ramps and slopes.
- Anti-tippers can be removed or flipped up in situations where the wheelchair might get hung up such as negotiating a curb but removal must be done by someone besides the user.

Caster Housing

- The caster housing is a tubular extension of the wheelchair frame.
- It is filled with ball bearings and receives the caster fork projection.
- Together they form a pivot joint about which the caster can rotate 360 degrees.
- This arrangement increases the maneuverability of the chair.

- The shorter the caster fork, the better the maneuverability of the caster wheels
- Caster housing needs to be angle adjustable if seat dump in wheelchair is ever changed.
- Frog Legs provide shock absorption to decrease vibration during self-propulsion over uneven terrain, bumps, etc.

Frog Legs

Caster Forks

Caster Size

Large Diameter	Smaller Diameter
Easier to propel over uneven terrain	Easier to maneuver on even surfaces
Provide better forward stability Chair less likely to tip over forward	Provide greater clearance between caster's and user's heels Reduce chair's forward stability
Good for inexperienced wheelchair users	More experienced users typically, wheelies
Heavier than smaller caster tires	Propulsion over uneven terrain more difficult
	Good for skilled riders who can negotiate obstacles by riding over them using the rear wheels only

CASTERS

- The small wheels that provide frontal support for a wheelchair base.
- They range in size from 2.75-8.25 inches.
- The smaller the caster the greater the mobility
- **Smaller casters are more responsive, contribute to more efficient propulsion, better feet positioning but rougher ride**
- Small casters can get caught in crevices, better for high level users
- The larger the caster the greater the stability
- **Larger casters give smoother ride & are less responsive & can interfere w/ foot placement**
- **Many individuals who use w/c's choose 5" or 6"**

CASTER STYLE

Pneumatic	Semi-Pneumatic	Solid
Best shock absorption Smoother ride	Intermediate shock absorption	Less cushioned ride
Do not "bog down" on sand or soft soil	Do not "bog down" in sand or soft soil	Obstacle negotiation more difficult
May extend life of wheelchair due to shock absorption	Heaviest caster tires	Lightest
Require more maintenance, periodic inflation	Intermediate maintenance	Most durable Do not puncture Do not require inflation
Susceptible to puncture	Do not puncture, no inflation	

WHEELS

- The standard size of a rear wheel in an upright manual wheelchair is 24'' but can go from 22'' up to 26'' depending on needs of patient to allow for more optimal push stroke, or to accommodate for seat to floor height
- For the most optimal push stroke, with the least physical exertion, there should be a 30 degree elbow bend when the wheelchair user grasps the top crest of the wheel.
- For a tilt-in-space, the rear wheels can be 12'' to decrease the length of the wheelchair.

WHEELS

- Wheels
  - Mag or composite wheels
    - Less maintenance
    - Less risk of hand getting caught in wheel
    - More rigid = less comfortable ride
    - Increased weight
  - Spoke
    - More maintenance
    - Less vibration= more comfortable ride
    - Less weight than Mag

OTHER WHEEL OPTIONS

Spinergy

High performance, lightweight, durable, low maintenance, expensive

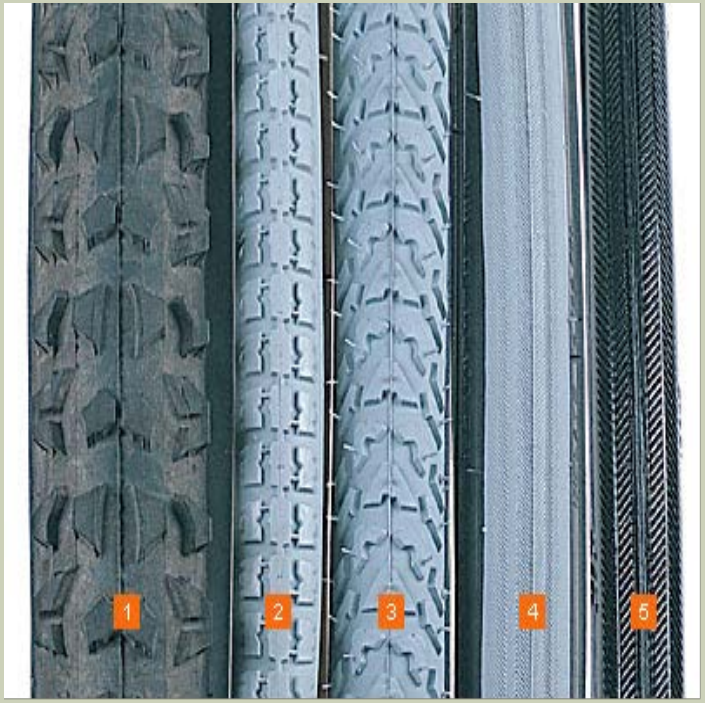
X-Core

Made of composite material, strong, durable

Tire Style

Pneumatic	Solid	Tire Tread
Air filled	Durable	Traction
Shock absorption Smoother ride	Maintenance free Do not require inflation	
Less rolling resistance, making propulsion on soft surfaces easier	Provide less cushioned ride due to decreased shock absorption	Knobby over variable terrain Smooth over indoor, smooth terrain
Treaded pneumatic provide superior traction	Variable traction	Knobby tires greater resistance Smooth tires less resistance
Require more maintenance, susceptible to flats, periodic inflation needed.	Recommended for indoor use mostly	
Add width to the chair	Add less width to chair	Wider tires better on rough terrain while narrow ones better on smooth flat surfaces.

Tire Style



1.	**Aggressive Knobby Tire** **Wide thick black BMX tread - Think dirt, mud, snow, extreme outdoor use**
2.	**Standard Gray Tire** **for everyday use**
3.	**Moderate Knobby Tire** **Gray conservative tread - everyday active use**
4.	**High Pressure Primo Tire Gray with black walls - high performance design. These tires are also available with tread**
5.	**Solid Tire KIK - narrow solid maintenance free tires - variety of colors - long lasting wearability**

OTHER TIRE CONSIDERATIONS

- Schwalbe tires – puncture resistant with Kevlar lining and no skid black color
- Pneumatic tires can have a flat free insert which have better ride than solid but not as good as pneumatic
  - Maintenance free

PUSH RIMS

- Anodized Aluminum
  - Standard
  - Cost effective
  - Can be difficult to use w/ decreased dexterity
  - Can get cold in winter
- Plastic Coated
  - Grip issues- can give just enough friction to assist in propulsion (especially w/dycem gloves)
  - Prevent rims from getting cold
  - Add minimal increased width to chair
- Projections
  - Used for decreased fine motor control
  - Varying types- vertical/oblique
  - Can be obtrusive & add width to chair
- NaturalFit ®/Surge®
  - Protect hand & provide more ergonomic push mechanics @ interface
  - Add width to w/c, weight is nominal
  - Reimbursement issues

EXAMPLES OF HANDRIMS

CAMBER

- The term camber describes the inward or outward tilting of a wheel in its vertical plane
- Usually 0-4 degrees
- Increases wheelchair stability (lower rear seat to floor height)
- Hand protection
- increased push mechanics (increased wheel access) & decreased shoulder strain
- Increased over all width of wheelchair
- Zero camber provides the narrowest wheelchair width.

CAMBER

Advantages	Disadvantages
Makes turning quicker and easier	Wheelchair will be wider
Adds lateral stability to the wheelchair	3 degrees of camber increases width by 1.3” 6 degrees increases width by 2.5”
Places push rims in a more ergonomic position	May add cost to chair
Protects the hands when pushing in tight areas	Excessive camber may cause wheels to rub against armrest side panels or against user
Less strain on shoulders The wheel is closer to alignment of the shoulder	Diminished traction and uneven tire wear on a conventional tire

CUSHIONS AND BACKS

CUSHIONS

CUSHION CONSIDERATIONS

- Diagnosis
- Skin integrity
- Postural deformities/positioning needs
- Sensation
- Weight capacity
- Incontinence

(Must have absent or impaired sensation or a pressure ulcer or history of pressure ulcer to qualify for pressure relieving cushion)

CUSHIONS

- Cushion Qualities
  - Distribute pressure
  - Provide stable support surface for pelvis and thighs
  - Function effectively in different climates
    - Limit heat retention in the heat/freezing in the cold
  - Dissipate heat and moisture
  - Be lightweight
  - Be durable

CUSHIONS: IMPORTANT CONCEPTS

- Cushions
  - protect skin from damage that can lead to pressure ulcers
  - affect many functional activities such as reaching, transfers and wheelchair propulsion.
  - No ONE cushion is the ‘perfect cushion’
  - Cushions are one part of the seating concept
  - Cushions are one part of skin protection
- Design
  - Distribute body weight over its surface or
  - Re-distribute pressure away from areas considered 'at risk' for pressure ulcer formation.
- Many different materials and combinations of materials are used in cushions
  - Understand the materials used

CONSIDERATIONS

- Context
  - Who are the major players
  - Why did you pick the cushion
  - How reliable will it be
  - Will a rep be available
  - How quickly will the medium wear out
  - What circumstances will it be used in
  - How reliable are the caretakers? (especially in pediatrics)

SKIN INTEGUMENTARY FACTORS

- Extrinsic Factors
  - Pressure: Tissue cell death with sustained high pressure
  - Heat: Tissue damage with increased temperature
  - Moisture: Weakens tissue; reduces air flow
  - Shear: Tissue between bone and skin slides/rubs with movement; restricts blood flow and damages tissue
  - Friction/Trauma: Scrapes and Bruises contribute to sore formation and/or limit sore healing

SKIN INTEGUMENTARY FACTORS

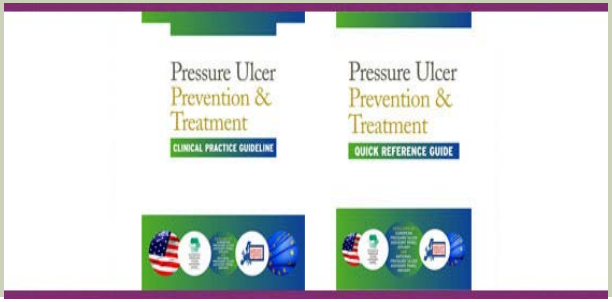
- Intrinsic Factors:
  - Age –decreased elasticity w/increased age
  - Sensation –impaired/absent sensation limit signals to weight shift
  - Scar tissue –abnormal tissue with decreased blood flow
  - Posture -pressure distribution over seating surface. Posterior pelvic tilt increases pressure at sacrum and ischial tuberosities. Lateral pelvic tilt increases pressure under lower ischial tuberosity and greater trochanter
  - Activity level and movement –more active= more blood flow and improved organ health. Increased tone and movement may lead to increased shear.
  - Pressure relief routine

DON'T LET SOMETHING ELSE BE "MORE COMFORTABLE!"

DON'T FORGET…

PRESSURE ULCER PREVENTION RECOMMENDATIONS

- Remember, products are only one element of care
- Ultimate responsibility is with the individual users, physicians and/or caregivers.



- Risk Assessment
- Skin Assessment
- Nutrition
- Repositioning
- Support Surfaces: Bed and Sitting
- Special Population: Operating Rooms

CONSIDERATIONS

- Knowing the durability of a cushion is important so you know how often it should be replaced
- Set-up and maintenance requirements should be considered
- Support surfaces can be thought of as having one or more of these characteristics
  - Materials that compress include air and foam
  - Solid gel, water and viscous fluid displace when loaded (bear weight) as these are incompressible materials
  - Covering materials such as vinyl, cotton, and Lycra support the body in tension
- Regardless of the materials used, the effectiveness of a support surface depends on its ability to distribute pressure without hindering function or increasing the potential for skin damage
- Not one cushion is best for all people.

CLINICAL REASONING

- What are your reasons for putting the person on the specific cushion? Forget everything else…..just the cushion. You need to think about shape and texture when you look at a cushion.
- Next, what is it about introducing movement (into the pelvis and therefore the cushion) that makes the person sit differently?
- After we figure out the cushion, we will move onto the next thing.

MATERIALS

- **Foam or flexible matrix: a lightweight, flexible cellular material used in support surfaces.**

- **Viscoelastic foam or matrix: a compressible cellular material that has both elastic (spring-like) and viscous (time-dependent) properties.**
  - **Viscoelastic foam is different from regular foam by having time-dependent behaviors such as creep, stress relaxation, and hysteresis. This type of foam is sometimes called 'memory foam' because it maintains the shape of an indentor (like your hand) before springing back to its original shape. NASA invented the first visco-elastic foam, T-foam, about 40 years ago.**

- **Non-deforming foam or matrix: a support material that does not compress, deflect, or deform under sitting forces; often-used in cushion bases (Sunrise Medical Quickie Jay; Otto Bock Cloud cushions use non-deforming foam bases).**

MATERIALS

- Knowing the durability of a cushion is important so you know how often it should be replaced.
- Set-up and maintenance requirements should be considered
- Support surfaces can be thought of as having one or more of these characteristics to distribute load (the weight of your body):
  - compression, displacement and tension.
    - Materials that *compress* include foam and air.
    - Solid gel, water and viscous fluid *displace* when loaded (bear weight) as these are incompressible materials.
    - Covering materials such as vinyl, cotton, and Lycra support the body in *tension*.
- Regardless of the materials used, the effectiveness of a support surface depends on its ability to distribute pressure without hindering function or increasing the potential for skin damage.
- No one cushion is best for all people

MATERIALS

- Water cushion: a cushion with an impermeable membrane containing water.
- Gel or solid elastomer: solid rubber-like, relatively incompressible material.
- Segmented cushion: a cushion whose surface is divided into separate and distinct segments. (Span America's PRT)
- Convoluted cushion: cushion surface composed of convex protrusions separated by depressions or sulci; often called 'egg-crate'. (Span America)
- Contoured: shaped to fit or reflect the form or shape of the body, specifically, the buttocks. (Invacare Ultimate, MATRx Vi)
- Cut-out cushion: surface having a disruption or removal of material to alter the load bearing characteristics of the surface.

EFFICACY?!

IMPORTANT SUPPORT SURFACES CHARACTERISTICS

These 9 characteristics impact efficacy and should be considered when selecting support surfaces. (Krouskop & van Rijswijk, 1995)

- Redistribution of Pressure -- A cushion should support your body weight without causing harm to your skin.
- Skin Temperature Control -- You should not sweat when seated on a cushion. Some materials such as foam are naturally hotter than other materials such as gel.
- Skin Moisture Control -- A cushion should help keep your skin dry and should not allow moisture or wetness to build-up next to the skin because wet skin is more easily damaged.
- Patient/Product Friction -- The friction between the cushion cover and your clothes should not be too great (prevents you from transferring) or too little (allows you to keep sliding off the cushion).
- Life Expectancy -- You should know how long a cushion is expected to last so it can be replaced before problems arise.
- Flammability -- A cushion should not ignite into flames if a cigarette is dropped on it.
- Fail Safety -- You should know what happens to your cushion if it breaks or becomes unusable.
- Infection Control -- A cushion should not encourage or promote the formation of bacteria or other germs.
- Product Service Requirements -- An owner's manual should tell you how to clean and maintain your cushion and who to contact if a problem arises.

www.npuap.org

CUSHION EFFECTIVENESS BASED ON:

- Immersion
- Envelopment (Off Loading?)
- Friction / Shear
- Micro-climate
- Stability
- ADLs
- User fatigue

- RESNA – U.S. seating
- S3I / NPUAP – U.S. support surfaces
  - New support surface terms and definitions
- ISO Seating and Support Surface Workgroups

CUSHIONS

- Foam
  - Provides level base of support
  - Varying degrees of density/compressibility
  - If different densities and contours of foam are used-good pressure relief can be obtained.
  - Heat retention
  - Break down quicker than air, fluid and gel.
  - Absorbs impact loads well, so it can help absorb the shock of going over bumps or obstacles.

VISCOUS FLUIDS

- Heavier than foam
  - often used in combination with foams.
- Minimizing heat
  - Gels are typically encased by a protective cover so are easily cleaned.
- Because of their incompressible nature
  - Viscous fluid/ gels often use a contoured non-deforming foam base or a flat, compressible foam base to better enable the cushion to conform around the body.
- Gels and fluids absorb vibration but cannot absorb impact well.
  - These materials can absorb the vibrations that one might experience in a car, but not the impact one gets when bumping over a curbcut.

FLUID CUSHIONS

- Fluid
  - Designed for the client who has moderate to aggressive postural needs
  - Suitable for the client who may have changing postural needs over time
  - Suitable for the client who is at higher risk for skin breakdown and who has poor skin integrity

GEL

- Gel
  - Flow somewhat like fluid but with less dispersion
  - Provides more stability than Air
  - Good pressure distribution
  - Heavy
  - May freeze in cold weather / get soft and hot in warm weather

CUSHIONS

- Hybrid
  - Combination of various cushion materials
  - Firm contoured base for pelvic stability
  - Covered with air, viscous fluid, gel or foam for pressure relief
  - Provides both pressure distribution and postural stability

CUSHIONS

- Air

  Types of “ROHO”:
  - High profile
  - Low profile
  - There can be univalve, bivalve and a Quadtro select, and more
  - Must be inflated correctly

AIR CUSHIONS

- Highly compressible
  - Shapes to the buttocks
  - Provides good pressure distribution by dispersing air and balancing pressure.
  - Segmented so that separate compartments can provide greater postural stability
  - Maintenance requirements
    - An improperly inflated air cushion can be either too hard or two soft.
  - Dissipate heat well
  - Can handle moisture without harm
  - Absorbs impact loads.

CUSTOM CUSHIONS

- Designed specifically to the person
- May be made from a template: planar / contoured
- May be made from simulator
- Need to be sent off to the company to fabricate
- Multiple mediums

CUSHION THOUGHTS

- Wheelchair Cushion covers made from fabric that does not stretch and are fitted tight around a cushion tend to negate the compressive benefits of foam. Foam wheelchair cushions absorb impact loads well, so it can help absorb the shock of going over bumps or obstacles.

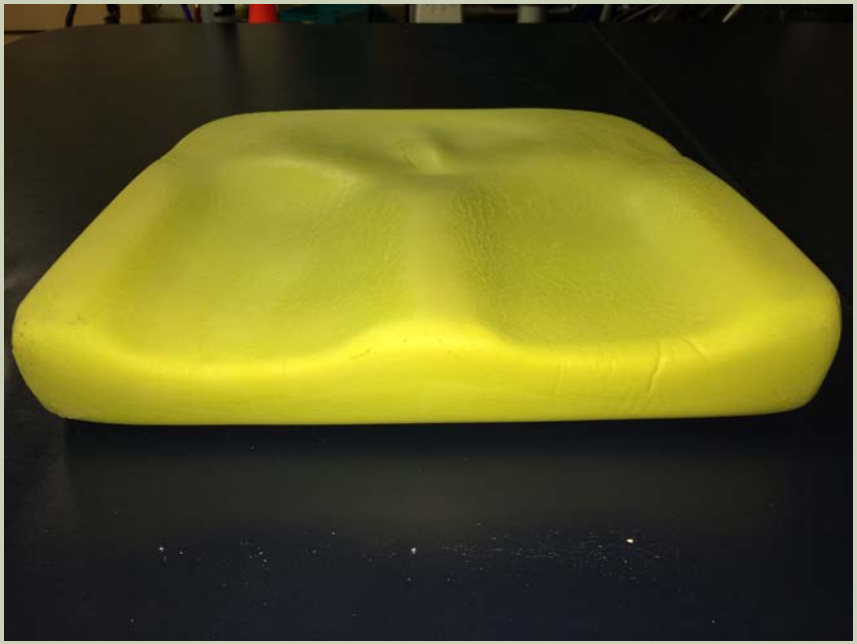
CUSHION SUMMARY

- In summary, many characteristics must be considered before you select a cushion.
  - Cushion materials
  - Design characteristics.
- All the cushion materials described have positive and negative features.
  - Understanding these features, you'll be better able to make choices about your wheelchair cushion.
  - Anytime you decide to change wheelchair cushions, involve a clinician for evaluation and trial.

Wheelchair Cushions

GENERAL USE

VISCO FOAM



DIFFERENCE IN FOAMS

General use

Visco foam

FLUID

AIR

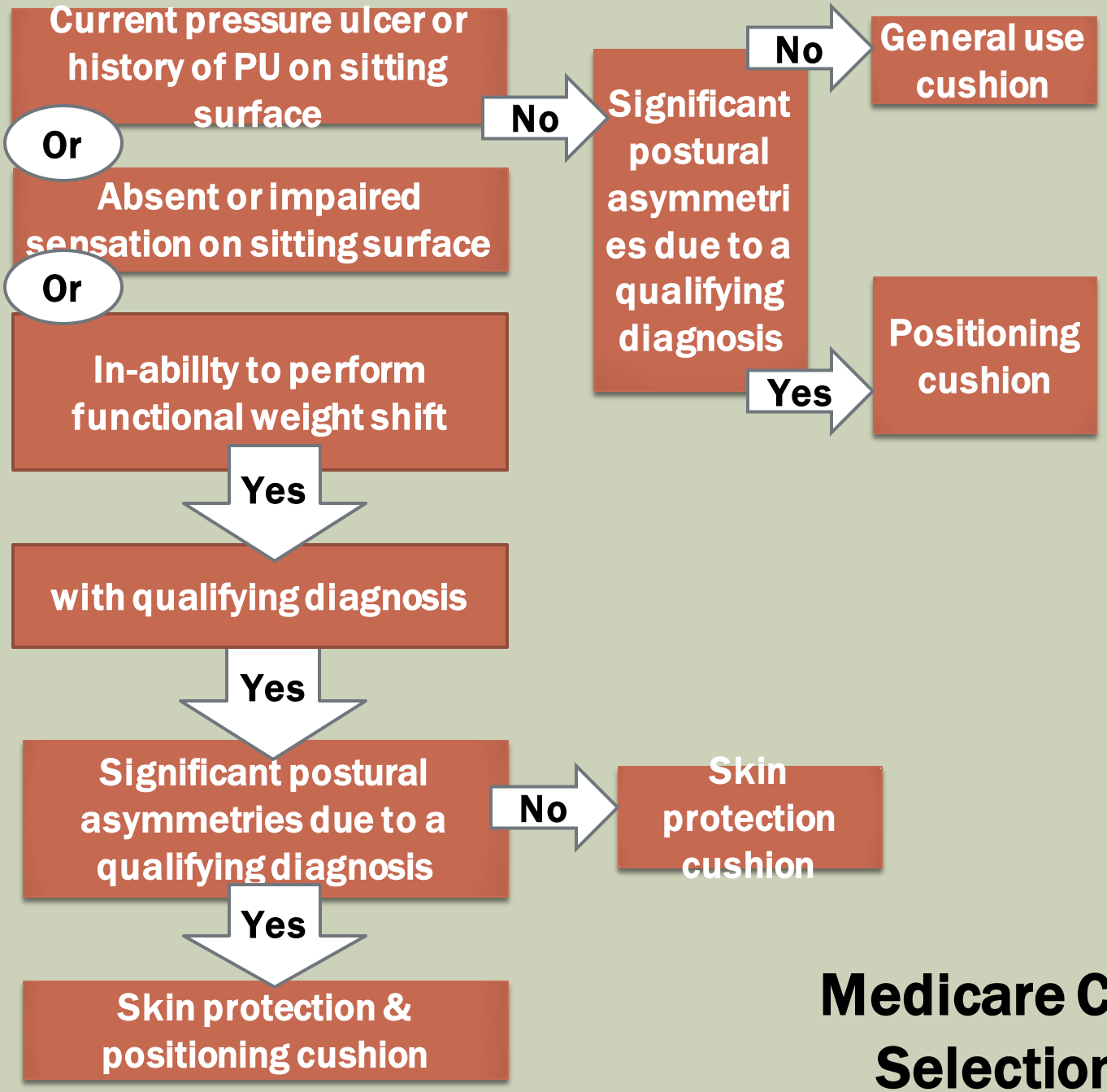
Air Floatation

AIR

Air and Foam – before deflation

Air and Foam – after deflation

CUSTOM MOLDED



Medicare Cushion Selection Guide

BACKS

BACK TO BASICS

- Pressure management and weight distribution on support surface.
- Movement patterns and efforts required for functional tasks such as reaching and wheelchair propulsion.
  - It is a priority to preserve upper limb function.
- Balance and stability for safe wheeled mobility
- Vision and interaction with the environment
- Respiration and digestive systems
- Comfort
- Perception/body image of oneself.

INDICATIONS FOR POSTURAL ASSESSMENT AND INTERVENTION

- Non-healing, sitting-acquired pressure areas; Pressure ulcers
- History of recurrent pressure ulcers as posture had effect on pressure
- Significant postural deformities
- Custom-fabricated products that require replacements, such as foam on ply backrests…
- Complex postural and functional needs where commercial products are not able to meet the desired outcome
- Ventilator-dependant quadriplegics

INDICATIONS FOR POSTURAL ASSESSMENT AND INTERVENTION

- Increased pain and discomfort with sitting
- Inability to balance during static sitting or a dynamic task, or to perform weight shift for pressure management.
- Safety concerns of client or caregivers
- Reduced function
- Increased asymmetry and risk of fixed deformity
- Replacement of seating and wheeled mobility system
- Postural-related aspiration and respiratory restrictions.

CONSIDERATIONS WITH PRODUCT CHOICES

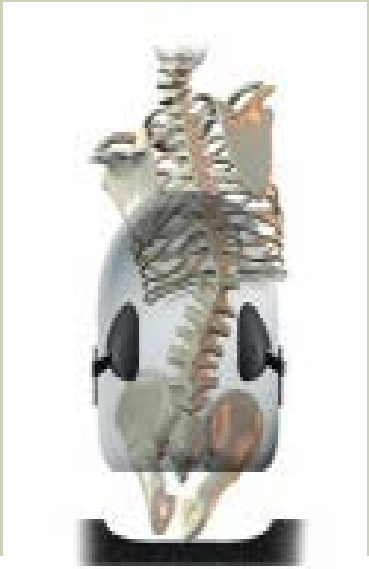
- When it comes to backrests, preventing excess moisture and regulating temperature are two of the requirements to consider.
- Seat depth when adjusting the backrest angle
- Contour depth, the level of support, the back support height, the user's back width, and the hardware preference.

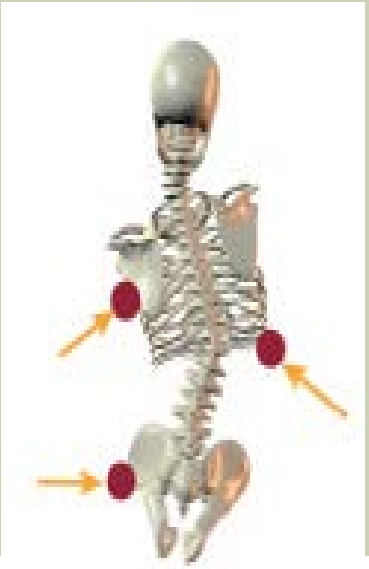
CONSIDERATIONS WITH PRODUCT CHOICES

- The backrest support should be contoured to the client's shape to maximize support surface.
- The backrest should be chosen to achieve
  - Preferred posture and
  - Balance skill
  - Derived form the mat evaluation.

POSITIONING

- Scoliosis can be managed in the early stages with 2-point, usually symmetrical, contact.
- If the condition is more advanced it may be necessary to use 3-point contact.
- Check for pressure areas and add extra padding/gel or increase the surface area if necessary.





FUNCTION

- An unstable trunk requires the use of the upper limbs for stability
- Instability reduces functional reach.

REACH is VITAL

THINGS THAT MAKE YOU GO HMMMM…

- What is the goal with a solid back and how will this help patient's functional status with MRADL's?
- Is the patient falling side to side when completing his MRADL's?
- Is the patient sitting with increased kyphosis, scoliosis, posterior pelvic tilt?
- Does the patient have back pain? Neck pain? Shoulder pain?
- Is patient's sitting posture compromised when he is propelling the wheelchair? Are the asymmetries in patient's posture making wheelchair propulsion less functional?
  - Take a look at the patient sitting in the wheelchair at all angles.

PURPOSE OF A BACK

- Promote pelvic posture
- Increase spinal extension
- Decrease lateral trunk leaning
- Enhance cardiopulmonary functioning
- Provide support to decrease the reliance on the arms to hold the body upright
- Increase functional reach
- Provide a base for neck and head control
- Increase efficiency of w/c propulsion
- Support/stabilization
- Point of relaxation
- Substitution of weak or absent muscles
- Maintain natural curves of spine
- Decrease postural deformities

BACK CONSIDERATIONS

- Diagnosis
- Postural deformities/positioning needs
- Back height
- Lateral support
- Back angle

CONSIDERATIONS

- Hip Range of motion
- Trunk and neck flexibility and range
  - Amount of flexibility into lumbar extension and thoracic extension
  - Visual field
- Spasticity
- "Burrito test" for bilateral tasks
- Other methods of trunk stability used
- Need for use of push handles for functional tasks
- Functional reach
- Back height

BACK HEIGHT CONSIDERATIONS

- Trunk control
- UE functional use
- Pelvic mobility
- Tolerance

16” vs. 12” Back Height to Improve Function


matrix-pv


matrix-pv

LATERAL SUPPORT

PRO's

- Maintains postural alignment
- Decrease risk for scoliosis
- Decrease use of UE for balance and support
- Increase in functional use of UE
- Lateral stability

CON's

- Limits lateral lean
- If able to lean forward, need to be able to return between lateral support
- Increased pressure points at lateral trunk
- Difficult to move forward for transfers

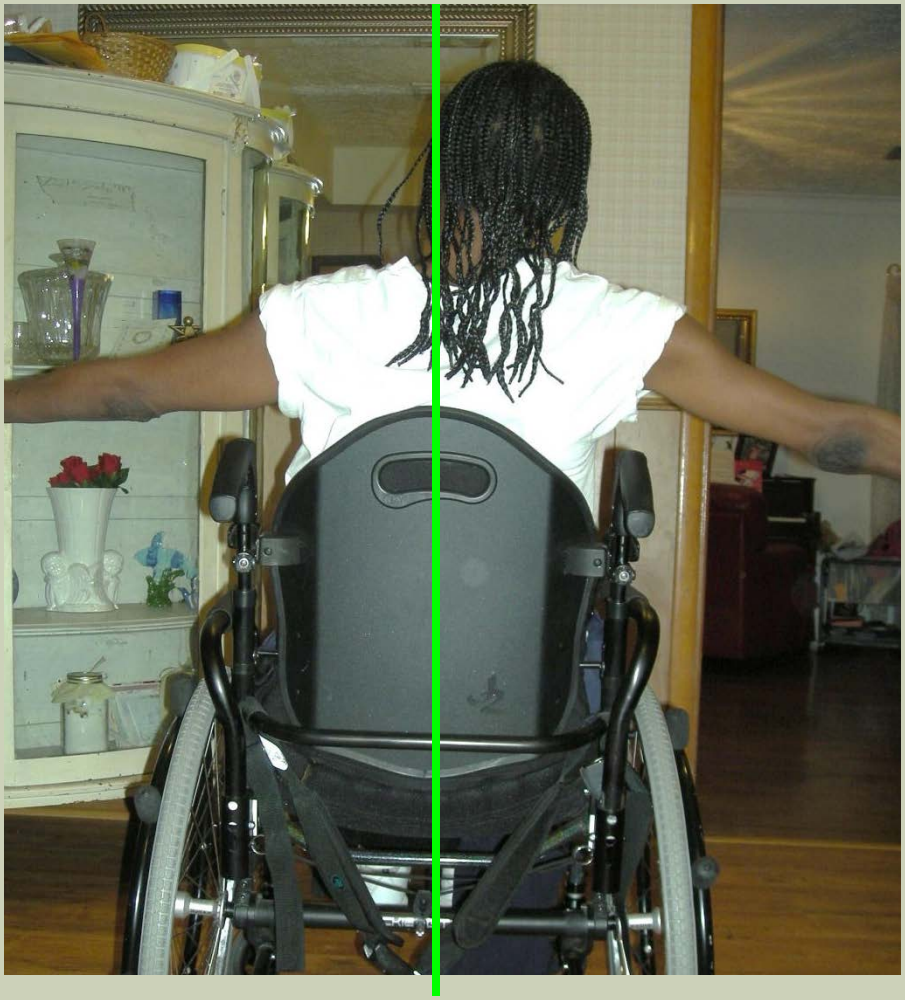
LATERAL SUPPORT CONSIDERATIONS

- Trunk muscles available for support
- Functional use of upper extremities
- Presence of postural issues (i.e. scoliosis)
- Chest width
- Balance with/without upper extremity support
- Type of transfer completed
- What will happen
  - Not enough
  - Too much

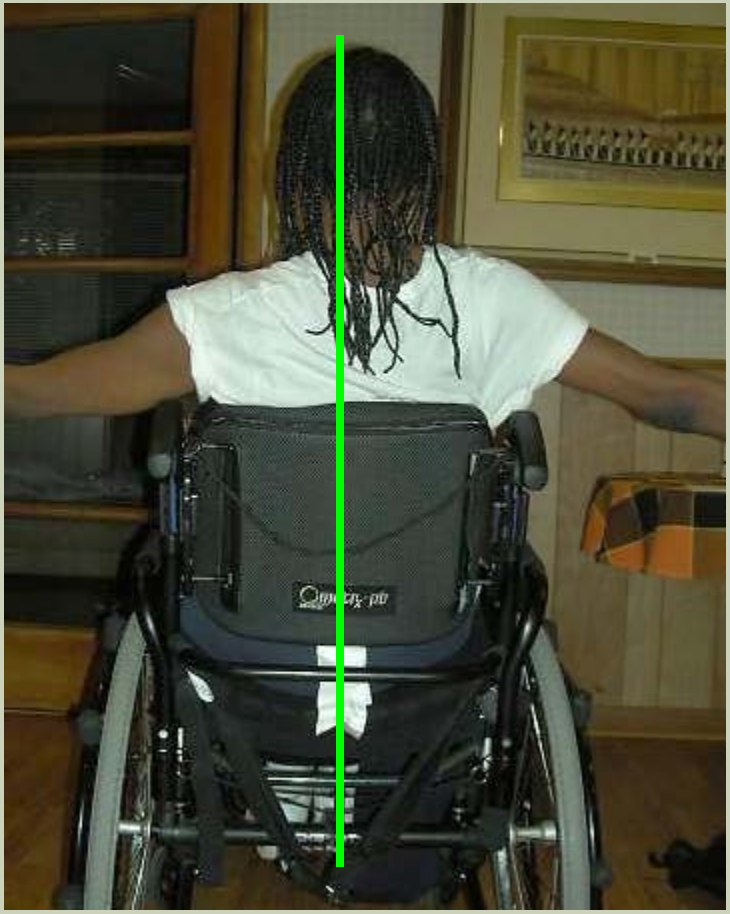
Narrow trunk with a wider chair and decreased stability due to a C-6 level SCI.

For Shelia, this lack of trunk stability has compromised her upper extremity function.

This 18” wide chair is too wide for Shelia.



Minimally Contoured Back (18” wide) without lateral thoracic supports = inadequate trunk stability.



Although the contoured PB back (right) is 12” tall, the 5” contour provides significant lateral trunk stability.

Proper Back Support should increase Stability which can enhance function.

SLING BACK

BACKS

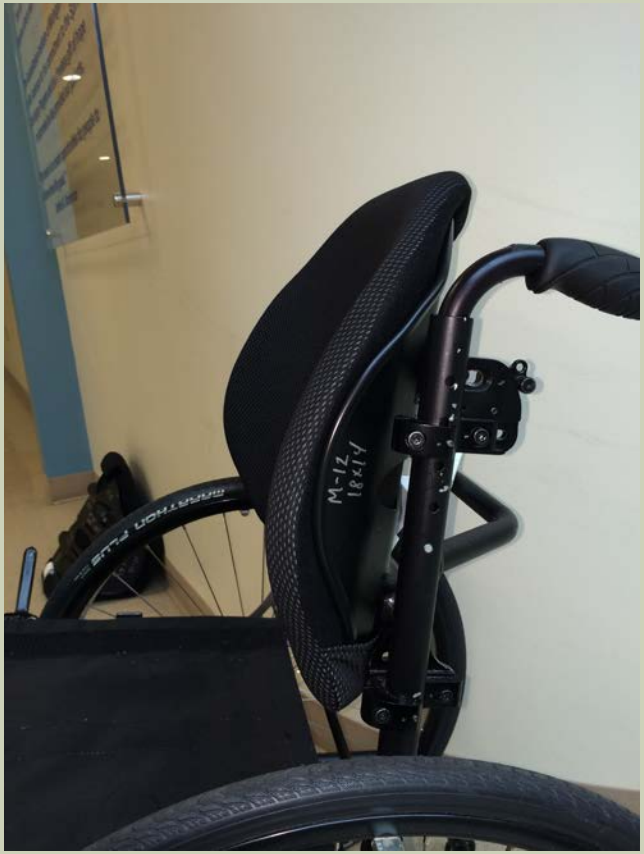
- Tension adjustable upholstery
  - Light weight
  - Low profile
  - Easy to fold / load
  - Minimal posture support
  - Sags over time
  - Vary brand to brand

ADJUSTABLE TENSION UPHOLSTERY

BACKS

- Low Profile Solid back
  - High functioning trunk frequently
  - Low support
  - Limited back contact to trunk

OFF SHELF



BACKS

- Solid Contoured
  - Support for propulsion
  - Lateral contour
  - Affects movement to the side
  - Affects spastic responses
  - Ability to adjust

OFF SHELF

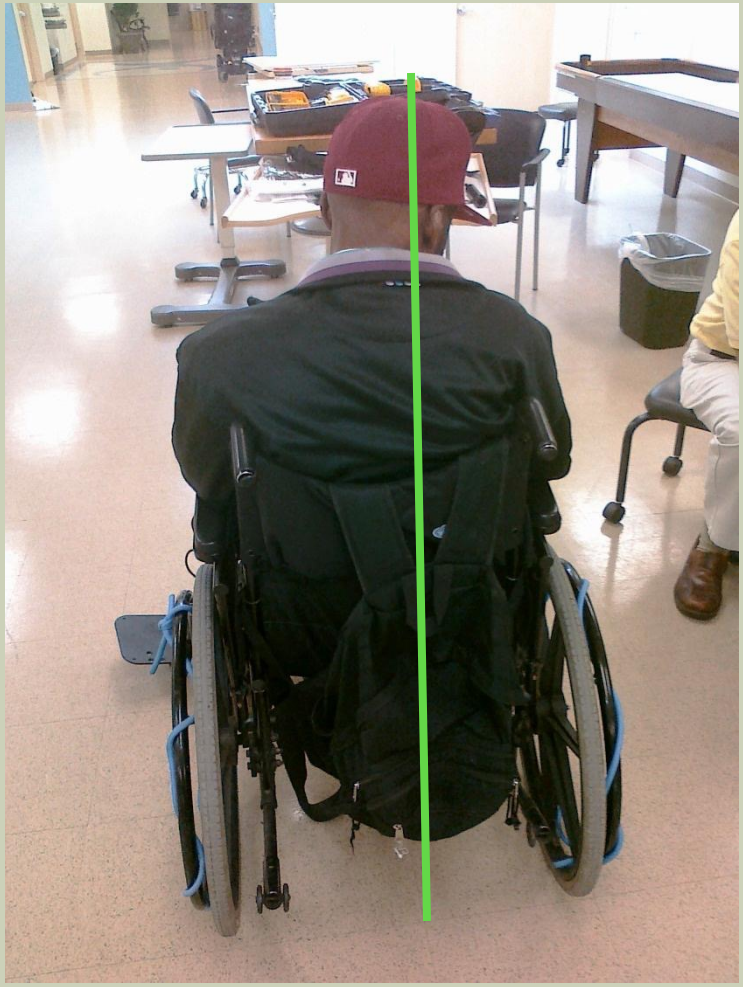
OFF SHELF

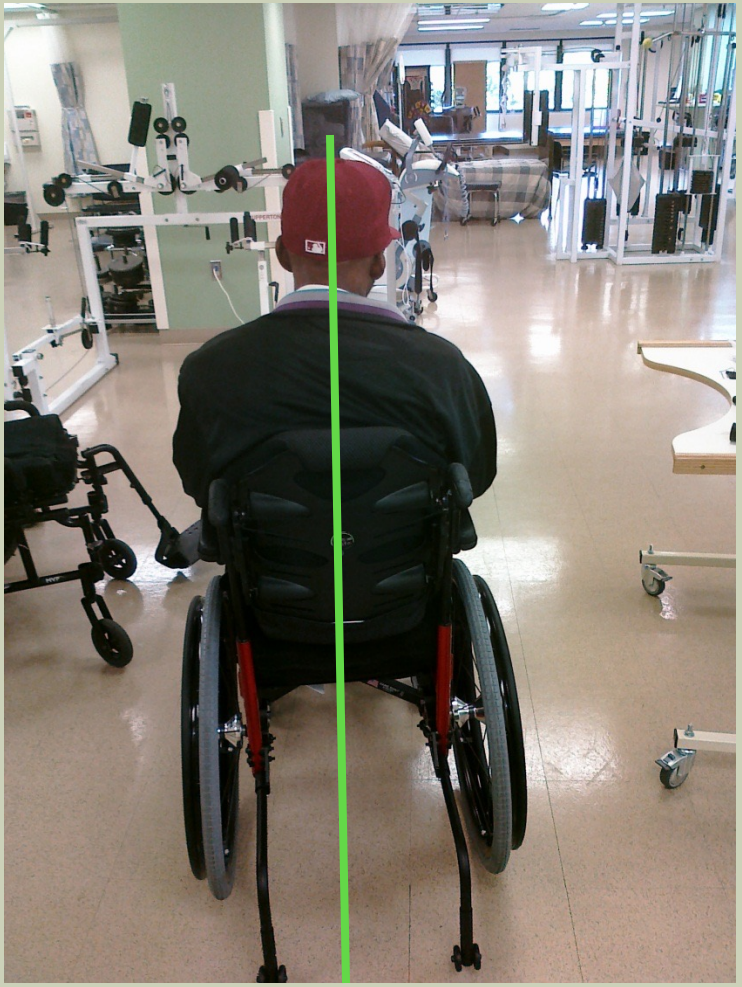
OFF SHELF

PROPER BACK SUPPORT

Sling back

Off shelf back





BACKS

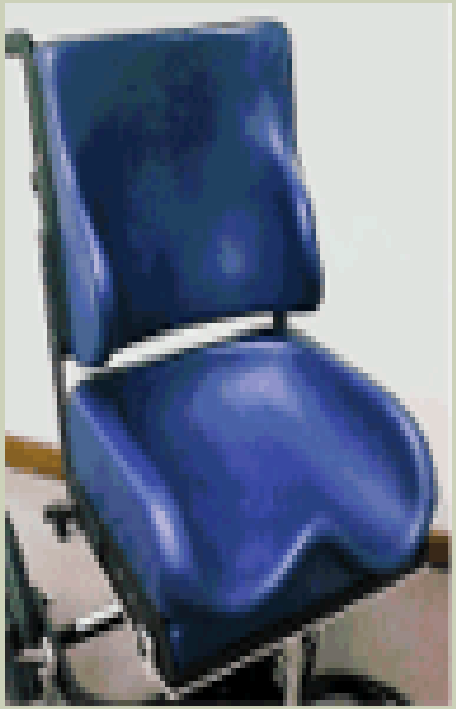
- **Custom Contoured**
  - Increased support
  - Off the shelf backs do not provide adequate positioning
  - Limited flexibility of posture
  - Limited control of posture
  - Skin breakdown / concern

BACKS

- Planar systems
  - Generic
  - Adjustable
  - Variable foams
  - Easy to accommodate change in size
  - Limited support
  - More modular – can add support accessories

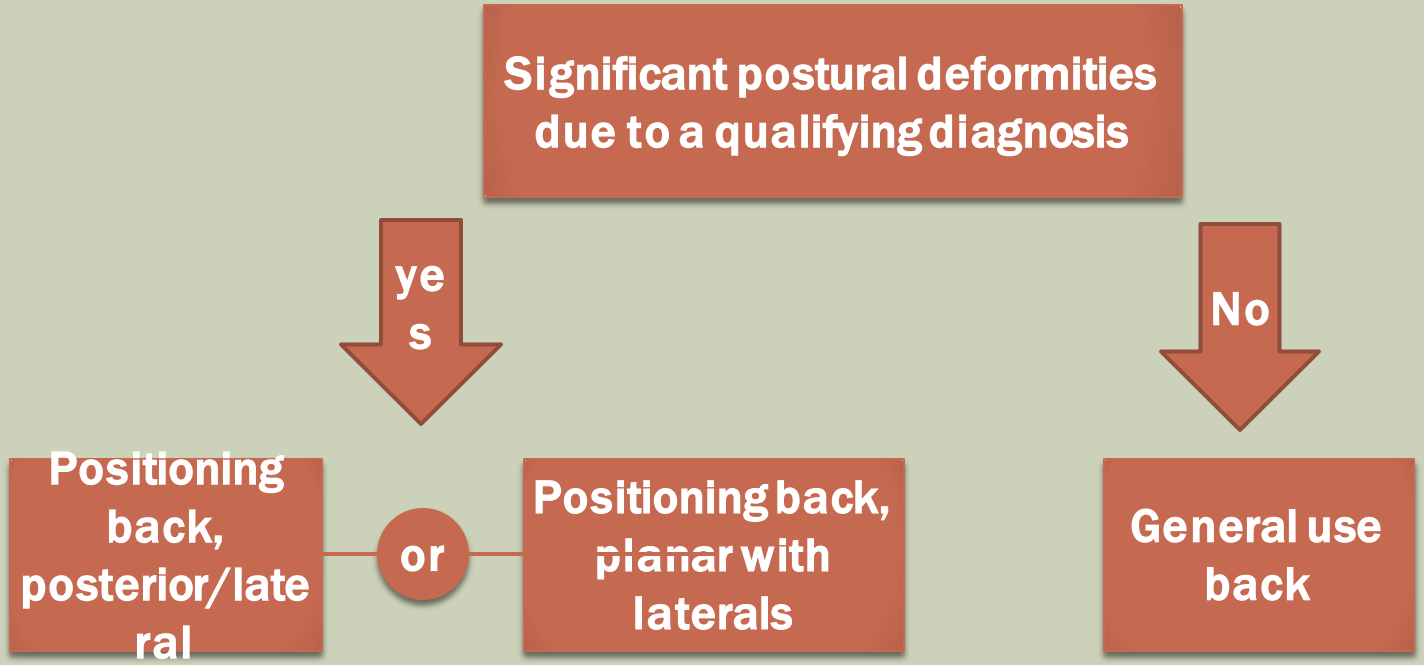
FREEDOM SP3

CUSTOM MOLDED BACKS



CUSTOM MOLD

MEDICARE BACK QUALIFICATIONS



PROPER SEATING

PVA RECOMMENDATIONS
FOR PRESERVATION OF UPPER LIMB FUNCTION

- Ergonomics
  - Minimize the frequency of upper limb tasks
  - Minimize the force required to complete upper limb tasks
  - Minimize extreme or potentially injurious positions at all joints
    - Avoid extreme positions of the wrist
    - Avoid positioning the hand above the shoulder
    - Avoid potentially injurious or extreme positions at the shoulder including extreme internal rotation and abduction.

PVA RECOMMENDATIONS
FOR PRESERVATION OF UPPER LIMB FUNCTION

- Equipment selection
  - With high risk patient's –discuss pro's/con's of changing to a power wheelchair system to prevent repetitive injuries
  - Provide manual wheelchair users with a high strength, fully customizable manual wheelchair made with the lightest possible material.
  - Adjust rear axle as far forward as possible without compromising the stability of the user
  - Position the rear axle so that when the hand is placed at the top dead-center position on the push rim, the angle between the upper arm and forearm is between 100 and 120 degrees

PVA RECOMMENDATIONS
FOR PRESERVATION OF UPPER LIMB FUNCTION

Advantages of power wheelchairs:

- Reduced propulsion-related repetitive strain
- Conserved energy=reduced fatigue
- Increased speed
- Increased ease of traversing uneven terrain and inclines.

Disadvantages of power wheelchairs:

- Decreased transportability
- Increased maintenance
- Increased cost
- Possible weight gain
- Possible decreased fitness

PROPER AXLE POSITION

PVA RECOMMENDATIONS
FOR PRESERVATION OF UPPER LIMB FUNCTION

- Manual wheelchair classifications (Medicare K-codes)
  - The Depot (K0001)
    - Designed for short-term hospital or institutional use
    - Weighs >35 lbs
    - NOT adjustable
  - Lightweight (K0004)
    - Weighs 30-35 lbs
    - Minimal adjustability
  - Ultralight weight (K0005)
    - Weighs <30 lbs
    - Lots of adjustability

PVA RECOMMENDATIONS
FOR PRESERVATION OF UPPER LIMB FUNCTION

Making the case for Ultra Light Weight manual wheelchair

- **Less rolling resistance = reduced forces needed to propel wheelchair thus reducing forces transmitted to the upper limb joints.**
- **Only ultralight wheelchairs are adjustable and customizable to fit the user to maximize propulsion mechanics.**
  - **Adjustable rear axle position**
  - **Adjustable seat angle**
  - **Camber**
- **Ultralight wheelchairs are made of stronger, higher grade materials, better components, better bearings that reduce rolling resistance**

PEDIATRICS

THE FIRST OUTPATIENT ADAPTIVE EQUIPMENT CLINIC

- Typically between 9-12 months
- Diagnoses include but are not limited to:
  - Cerebral Palsy
  - Spinal Muscular Atrophy (SMA) / MD
  - Chronic Lung Disease/ Prematurity
  - Chromosomal Abnormalities
  - Traumatic Brain Injuries

WHY DO THEY NEED SUPPORT?

- Hypotonia (low muscle tone)
- Hypertonia (high muscle tone)
- Weakness
- Postural Asymmetries
- Influence of Primitive Reflexes
- Support for life support equipment
  - Ventilator, Oxygen, Pulse Ox, etc.

INITIAL VISIT

- Supportive seating for feeding
  - Proper postural alignment
  - Prevent aspiration
- Safe Bathing
  - Seizure Disorder
  - Vent Dependent
- Lower Extremity Weight Bearing
- Mobility

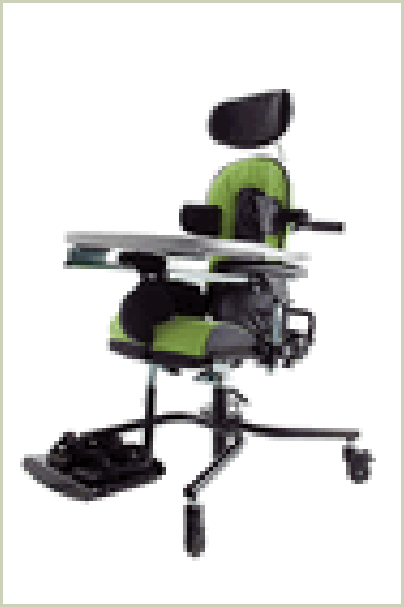
SUPPORTIVE SEATING AND MOBILITY OPTIONS

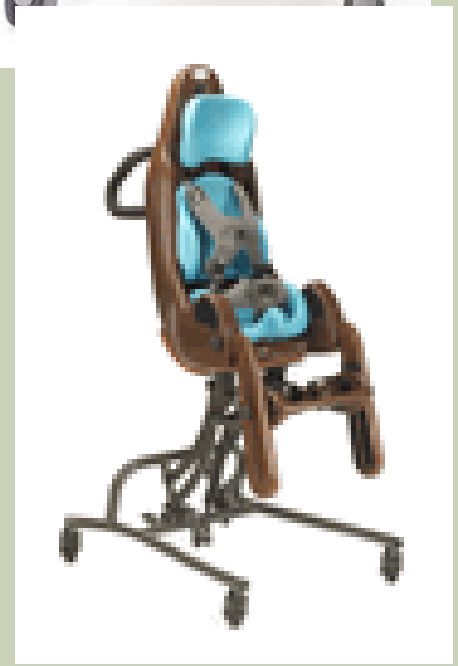
- Supportive strollers
  - Kid Kart
  - Voyage
  - Kimba
  - Kozi
  - Squiggles
  - Mygo
  - Easy


WARNING
Lascal

SUPPORTIVE FEEDING CHAIRS

- Rifton Activity Chair
- Snug Seat
- Ottobock
- Tumble forms
- Special Tomato





BATHING EQUIPMENT

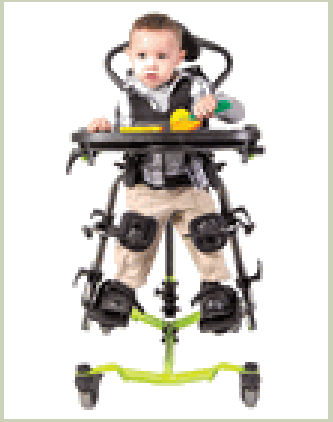
- Why???
  - Vent dependent, trach, lack postural control, seizures
  - Rifton
  - Starfish
  - Manatee
  - Columbia
  - Often double as beach chairs / pool time

WHY STAND?

- Weight bearing is part of normal development and crucial to bone development and formation of the hip joint
- Muscle imbalance often leads to hip subluxation/dislocation
- Bowel and Bladder motility
- Respiration
- Digestion
- Postural control
- Play, Visual Stimulation

TYPES OF STANDERS

- Supine
- Prone
- Prone and Supine
- Mobile Prone
- Dynamic Standers
- Sit to stand
- Upright



THE FIRST 3 YEARS

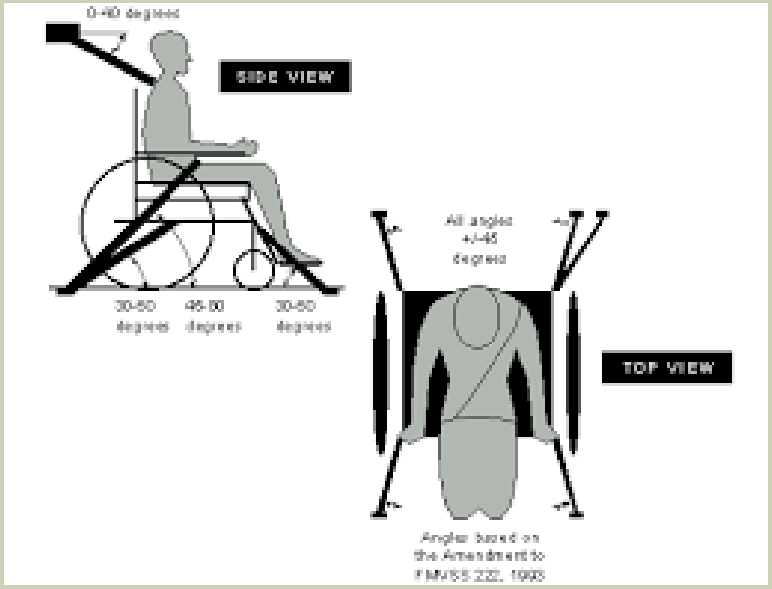
- Typically this equipment recommended will last approximately their first 3 years.
- Specific equipment varies depending on their postural support needs and motor control.
- Growth revisions to the equipment typically needs to be done every 6 months.

NOW THEY START SCHOOL…

Supportive Stroller / Tie downs for bus

www.travelsafer.org

Transition from supportive stroller to wheelchair - Need to return to clinic for a new assessment


0-40 degrees
SIDE VIEW
30-60 degrees
45-90 degrees
30-60 degrees
All angles +/-45 degrees
TOP VIEW
Angles based on the Amendments FMVSS 222, 1993


Special Needs Equipped

COLLABORATION

- Remember you are not the only one taking care of this child
- You only get to see them for a short time
- Collaborate with home therapists, school therapists, classroom teacher, etc.
- Discuss equipment available in the school for seating and standing - may effect your decision in regards to what is best for the family

WHAT'S AFTER THE SUPPORTIVE STROLLER?

- Lightweight Stroller
- Manual Wheelchair
  - Folding
  - Rigid
  - Tilt in Space
- Power Wheelchair
  - Readiness
  - Drive Control Options

NEED TO CONSIDER….

- Home Accessibility
  - Stairs, Car/Size of Trunk, Van/Adaptions, Other Children
  - Mom and Dad don't live together
  - Goes to Babysitter every day
  - Has 5 siblings…
  - **LISTEN TO YOUR FAMILIES!**

NEED FOR MORE MOBILITY

- Transition from Stander to Gait Trainer
  - Rifton Pacer
  - Mustang
  - Kid walk
  - Croc
  - Kaye Walker

MANUAL MOBILITY IS TOO SLOW…

- Power mobility
- When do you start????
  - Family Acceptance
  - Home Access
  - Cognitive Level
  - Motivation to move
  - Vision
  - Funding

POWER ACCESS

- Separate Switches
- Joystick
- Head Array
- Power Add On
- Go Baby Go

mobility & sociability

GO BABY go!

Marianjoy Foundation
Wheaton Franciscan Healthcare

http://www.udel.edu/gobabygo

Driver Control Packages

100 Series

Mechanical Switches

300 Series

POWER ADD ON SYSTEMS

PEDIATRIC POWER


BROTHER
FOR
SALE!

HOW TO DETERMINE THE BEST DRIVE CONTROL METHOD:

- Review their active movement: arms, hands, fingers, head
- Think about what movement you want to encourage
- Pick the movement where they will have the most success, i.e. pushing a button
- Depending on their most successful movement, pick their access method, i.e. if their head control is good - try a head array

IS THERE ONE EASY SOLUTION?

- NO! Unfortunately not.
- Each child is different and motivated by different things
- The key is to find what motivates them and then make it FUN!!!
- Power mobility should be enjoyable, not forced and not stressful! Initial power chair trials should be self directed so the child can learn about movement.

SUGGESTIONS

- Typically with a very young child, single switches work best initially
- With a child with a strong STNR reflex, a head array often gives them a reason to hold their upright
- For an older child, i.e. 4 or 5 years, a joystick maybe the best solution
- Don’t be afraid of alternative drive controls - they can make the difference between independence and dependence

TOILET TRAINING TIME….

- Rifton HTS
- Columbia toileting support
- Ottobock Aquanaut

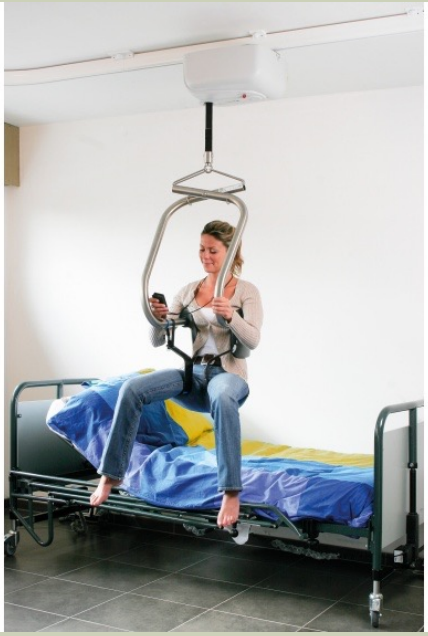
AS THEY GROW… TOO BIG FOR MOM TO LIFT IN AND OUT OF THE TUB

- Standard tub transfer benches
- Aquatech
- Tub Slider Systems
  - Columbia
  - Nuprodx

  - Roll in Shower chair options
  - Rifton
  - RAZ
  - Ocean VIP
  - Flamingo

PATIENT LIFTS

- Hoyer - rental
- Hoyer Advance / Molift - Folding
- Overhead Lift Systems
  - Sure Hands
  - Barrier Free



DEPENDENT FOR MOBILITY

- Tilt in Space Strollers
  - Convaid Rodeo / Safari
  - Convaid Trekker

- Tilt in Space Wheelchairs
  - Quickie Iris
  - Ki Mobility Focus
  - Invacare Solara
  - Freedom Designs NXT

Tilt

WHY RECLINE?

- Change diaper / self catheterization
- Respiratory treatments

SEATING SYSTEMS

- Off the shelf
- Consider:
  - Material / Fabric
  - Weight
  - Ease of removal from wheelchair
  - Growth *** Very important in pediatrics
  - Caregivers
  - Incontinence
  - Tube Feeding
  - Temperature
  - Braces - body jacket, SWASH brace for hips
  - Hip and spine status

TOO COMPLEX FOR OFF THE SHELF SEATING…

- Custom Seating – AES, BioDynamics
- Foam in Place
- Custom Molded Seating
  - Ottobock
  - Pindot
  - Matrix

HOW TO CHOOSE:

- Amount of support needed
  - Laterals, Body Jacket, Tone
- Weight of product
  - Does mom have to lift it everyday?
- Removable or not removable
  - Does it have to fold easily?
- Family dynamics
- Ease of cleaning
- Is the child's condition progressive?

SEATING SUPPORT

- How firm does the foam have to be?
- How contoured does the seat and back need to be?
- Are there any skin issues?
- How does tone effect this child's posture?
- Does the seating need to grow easily?
- Would they benefit from molded support?
- Is their weight going to change significantly?

HIGH TONE!!! THE EQUIPMENT KEEPS BREAKING

- Dynamic Backs
  - Dégagé
  - Seating Dynamics
  - Sunrise
- Dynamic Legrests
  - Seating Dynamics
  - Miller's
- Double hardware
- Dynamic Headrest
- Tone management

ADDITIONAL SUPPORTS NEEDED

- Foot supports
- Ankle huggers / foot sandals
- Upper Extremity Supports
  - Padded Arm support
  - Trays

ANCILLARY SUPPORTS

- Pelvic belts
  - Single pull, dual pull, 4 point, pelvic harness
  - Chest Harnesses
    - Slimcut, full cut, dynamic, rigid, back pack straps
    - *** Monitor respiration
    - Consider G Tube location
  - Ventilator support - mounting brackets
  - Oxygen holders / suction machine
  - Communication System
  - Computer /Ipad

NOT WALKING, STILL NEED TO WEIGHT BEAR

- EZ Stand
  - Bantam small, Medium and Evolve
  - Removable Back option / Swing Away Front End
- Horizon - Supine / Prone
- Rifton - Supine / Prone
- Standing Power Wheelchairs

Vicki Price
Cerebral Palsy, 4'11" (150 cm)

The Power of Standing

For the first time in many years this child was able to stand up and give his grandmother a hug! Brought her to tears:)

TOO BIG FOR COMMERCIALLY AVAILABLE CAR SEATS……

- Special Needs Car Seats
  - Traveler Plus
  - Columbia Spirit
  - Convaid Carrot
  - Merritt
  - Thomashilfen
- EZ On Vests
- Roosevelt
- Ride Safer


Shown with Sherpa Neck Pads

MOM CAN'T FIT THE WHEELCHAIR IN HER CAR ANYMORE….

- Accessible vans
- Van adaptions
- Lift systems


M.C. MOBILITY SYSTEMS, INC.
MCMOBILITYSYSTEMS.COM
1.800.503.0052

SLEEP…..

- Special needs cribs
- Sleep safe beds
- Beds by George
- Special needs mattresses
- Symmetrix sleep positioning system


Springfield Crib with optional IV Pump Bracket

NOT CODED ITEMS

- Go to seat
- Upsee

- Adaptive clothing
- Adaptive Bikes
- Swimming supports
- Bike Seats
- Portable ramps

REMEMBER IT'S ABOUT FUN TOO!

DOCUMENTATION

DOCUMENTATION OF NEED

- From Therapist
  - Written evaluation
  - Detailed Prescription
  - Letter of Medical Necessity/ required justification
- From Supplier
  - Detailed Prescription/quote
- From Physician
  - 7 element
  - Progress Note
  - Signatures on all of above

INSURANCE REQUIREMENTS
(AS DEFINED BY MEDICARE)

- Patient unable to functionally ambulate within home environment with or without device (may use Timed Get up and go (TUG) to determine ability or distance walked in 1 minute)
- Wheelchair to be utilized within home
- Patient has a mobility related activity of daily living (MRADL) impairment (i.e. unable to get to bathroom for bathing & toileting but could with w/c)
- Patient unable to propel manual wheelchair functionally throughout home (for power)

MEDICARE REQUIREMENTS

- Wheelchair evaluation must be completed by supplier with ATP credentials and OT/PT
- Patient must be seen by physician within 45 days of wheelchair evaluation
- Physician must sign 7 element form and detailed Rx from supplier as well as Rx from therapist and LMN
- Physician must write progress note with required elements

MEDICARE REQUIRED ELEMENTS FOR PROGRESS NOTE

- Physician must write progress note including the following:
  - Patient seen for mobility evaluation
  - Patient unable to functionally/safely ambulate with cane or walker due to …
  - Patient unable to functionally propel a manual wheelchair (if power) due to …

MEDICARE 7 ELEMENTS

1. Patient name
2. Diagnosis
3. Wheelchair prescribed
4. Length of need
5. Date of face to face evaluation w/ physician
6. physician name printed
7. physician signature

DOCUMENTATION

- Use objective findings
- Paint a clear picture of the need
- Personalize each section
- Can break into subcategories for clearer picture

M W is a 63 year old female who presented at the Rehabilitation Institute of Michigan (RIM) for a wheelchair seating evaluation on 4/21/2014. Diane Thomson, MS, OTR/L, ATP completed the evaluation and is the writer of this document. Clarence Dorey, CRTS/ATP was present and had direct in-person involvement in the selection of equipment for this person. She is 6 feet 1 inches tall and weighs 165 pounds.

Medical History:
Ms. W was diagnosed with C6-7 quadriplegia due to a motor vehicle accident in 1976. She has had her right acetabulum removed due to heterotropic ossification as well as osteoarthritis limiting her passive range of motion. In 1994, she fractured her right tibia and fibula decreasing the range of motion in her right ankle. She also has bilateral rotator cuff tears.

Current wheelchair/seating system:
Ms. W attended the evaluation in an Invacare A4 with a Jay 2 back and Roho low profile quadtro cushion. She is also utilizing e-motion power assist handrims. This wheelchair was provided in 2009 and is in need of multiple repairs. Her lower extremities are no longer properly positioned on the footplate. This positioning is not possible without a wider foot box which requires a different wheelchair frame. At this point, the most cost effective option would be a new wheelchair.

Home/Community environment:
Ms. W lives with her daughter and grandsons in a house with a ramp to enter. Her current wheelchair fits throughout the necessary areas of the home. She is an independent driver in a modified van with a lift. She transfers to her driver's seat using a lateral scoot technique and drives with hand controls. The prescribed wheelchair will continue to allow her to function throughout her home and in her van.

Mobility Related Activities of Daily Living:
Ms. W is independent for all basic activities of daily living including feeding, grooming, bathing and dressing. She is also able to complete meal preparation and household management tasks. She is independent for lateral scoot transfers. She is active in the community participating in shopping and going out with friends. She also participates in RIM's peer mentoring program and many local advocacy groups. She works as a

Current wheelchair/seating system:

His current wheelchair was a TiLite AeroZ which he received in 2009. This wheelchair was stolen in 10/2013 when his car was stolen. After that time, he was using his previous wheelchair which is a Quickie R2 however this wheelchair sustained significant damage from bullets during the barber shop shooting making it unsafe for use. The wheelchair had significant structural damage with sharp metal pieces protruding from the frame increasing the risk for injury due to the wheelchair not being structurally sound and from the increased risk of deep cuts that H will be unable to feel. He was provided a loaner wheelchair from National Seating and Mobility until a new wheelchair can be procured due to these safety issues. He has utilized a K0005 wheelchair since the time of his injury due to his need for custom positioning for the ability to remain independent in his daily activities with the proper positioning and placement of the wheel under his upper extremities. He currently has no wheelchair of his own as described above.

ADVOCACY

Being part of a community, being knowledgeable about resources.

TAKING PRACTICE TO NEXT LEVEL

- Engaging with consumer organizations
- Make self available to organizations for community education on funding issues
- Join local and national organizations (ie United spinal)
- Advocate for consumers through private insurance companies as well as community, state and federal levels
- Role model and mentor professional colleagues to advocate and motivate consumers

HR 3229 & S 2196

- Legislation to stop CMS for applying competitive bid pricing to CRT wheelchair accessories
- Impacts 171 wheelchair accessory codes with payment reductions ranging from 10% and 40%
- MAJOR disruption to access to CRT manual and power wheelchairs with Medicare and other payers

HR 1516 & S 1013

- Creates separate category for CRT within the Medicare DMEPOS benefit
- Designates HCPCS specific codes as CRT and allows for creation of new codes
- Elimiates “in-the- home” restriction for CRT and adds functional considerations
- Expands clinical evaluation to all CRT mobility bases
- Increases supplier standards
- Allows nursing home residents to access CRT if part of move to community residence
- Clarifies exemption of CRT from competitive bidding

FIGHTING FOR COMPLEX REHAB

- National CRT conference
  - Attended by manufacturers, suppliers, clinicians and consumers
  - Provides information to Congressman and Senators re: CRT and the need for a separate benefit
  - Combined with RESNA conference this year –
    - July 14 Capitol Hill Visit Day with information sessions throughout conference
- ROCH – Roll on Capital Hill
  - Attended by consumers and caregivers, and a few clinicians
  - Consumer led which is much more powerful
  - Clinicians provided support with funding and clinical info the consumer may not know

FIGHTING FOR COMPLEX REHAB

- The manufacturers, suppliers and clinicians need to advocate for appropriate reimbursement AND support consumer efforts
- Consumer organizations can advocate on a civil rights platform (decreased freedom of movement when they have limited access to CRT)
- Contact Representative and Senators and ask to cosponsor bills
- Keep Representative and Senators up to date with information

- Informational websites
  - www.access2crt.org
  - www.protectmymobility.org
  - www.ncart.us
  - Contact at NCART – Don Clayback – dclayback@ncart.us

IS YOUR PRACTICE BEING CONTROLLED BY FUNDING SOURCES?

- Your clinical judgment is at stake
  - Needed equipment is being denied
    - K0004 instead of K0005
    - Group 2 with tilt instead of group 3
    - Non expandable electronics instead of expandable
  - Equipment is being designed to fit into lower payment rates
    - Increased cost for maintenance
    - Increased cost for medical complications
    - Increased need to replace vs repair

PATIENCE THROUGH THE PROCESS: ADVOCACY IS NOT FAST

- Difficult to find consumers who are willing to fight the fight – might just choose lesser w/c
- Requires continued education to consumers, caregivers, clinicians, clinic managers, physicians, insurance and legislators
- Might need to join local or national organizations to effect change
- When consumers organize, the process can be accelerated – ie 1400 consumers contacted Gov in 3 days for changes to IL Medicaid

STANDARDS OF PRACTICE

- RESNA Wheelchair Service Provision Guide – “Prescribing an appropriate mobility device for a client requires the professional involved to remain current and informed regarding technological advances, to balance reimbursement and productivity management issues, and to accurately assess their client’s needs and goals”
- RESNA Code of Ethics – “Inform and educate the public on rehabilitation/assistive technology and its applications”
- RESNA Standards of Practice – “10. Individuals shall inform the consumer about all device options and funding mechanisms available regardless of finances, in the development of recommendations for assistive technology strategies”

STANDARDS OF PRACTICE

- AOTA – “Principle 4. Occupations therapy personnel shall provide services in a fair and equitable manner. E. Make efforts to advocate for recipients of occupational therapy services to obtain needed services through available means.” AOTA, 2010
- APTA – “Principle #8: Physical therapists shall participate in efforts to meet the health needs of people, locally, nationally, or globally. 8B. Physical therapsit shall advoacte to reduce health disparities and health care inequities, improve access to health care services, and address the health, wellness, and preventive health care needs of people.” APTA, Code of Ethics for the Physical Therapist

ATTRIBUTES NEEDED FOR CLINICIAN ADVOCACY

- Educated
  - Know what is available and needs of client
  - Distinguish between wants and needs
- Curious
  - Look for ways to connect consumers to resources
- Perseverance – hang in there
- Understand the business side of things within the service delivery process

WHAT CAN WE DO?

- Educate in clinic
- Go to state and national legislators, private insurances
- become involved in consumer organizations
- Know and understand entire process
  - Evaluation
  - Ordering of equipment
  - Funding
  - laws

ADVOCATING ON DIFFERENT LEVELS

- To other clinicians
- To suppliers
- To manufacturer reps
- To consumer
- To families
- To insurance companies
- To state government
- To federal government

WHY AND HOW TO ADVOCATE

- Learning
- attend courses/webinars
- Participate in community events
- This is what sets a good seating therapist apart from someone who just does seating

WHAT TO KNOW

- What can we do to help you.
- What is needed for the health and safety of the disabled population
- The need for Independent living
- Medicaid requirements
- Medicare requirements
- Involve a Vocational Rehab Counselor – this can be another avenue for funding
- Know what your population needs – urban vs. rural, young vs elderly, dx specific, active or not

COMMON SEATING PROBLEMS

COMMON PROBLEMS

- Problem: My patient is always sitting slumped in wheelchair
  - Seat depth
  - Lumbar support
  - Back height
  - Back angle
  - Foot rests
  - Tight Hamstrings

COMMON PROBLEMS

- Problem: My patient is always leaning to the side
  - Width
  - Cushion height
  - Lateral supports
  - Improper pelvic support

COMMON PROBLEMS

- Problem: The patient always slides out of the wheelchair
  - Back angle/seat depth
  - Wedge cushion
  - Footrests
  - Pelvic positioning
  - Seat slope

COMMON PROBLEMS

- **Problem: The patient's head continues to fall forward while seated in the wheelchair**
  - Change back angle
  - Change hip angle
  - LE positioning
  - Recline or tilt
  - Address pelvis
  - Headrest modifications
  - Add anterior chest support

COMMON PROBLEMS

- Problem: The wheelchair tips over during mobility
  - Eliminate backpack
  - Anti-tippers
  - Axle position
  - Lower mass
  - Check center gravity of wheelchair

COMMON PROBLEMS AFFECTING SEATING AND MOBILITY

It may not be the cushion or back product, but more the set up or dimensions

COMMON PROBLEMS WITH MANUAL WHEELCHAIRS

- Seat width too narrow/wide
- Seat depth too short/long
- Footrests too short/long
- Seat to floor height to low/high
- Armrest height too short/tall
- Seat/back upholstery hammocking

SEAT WIDTH TOO NARROW / WIDE

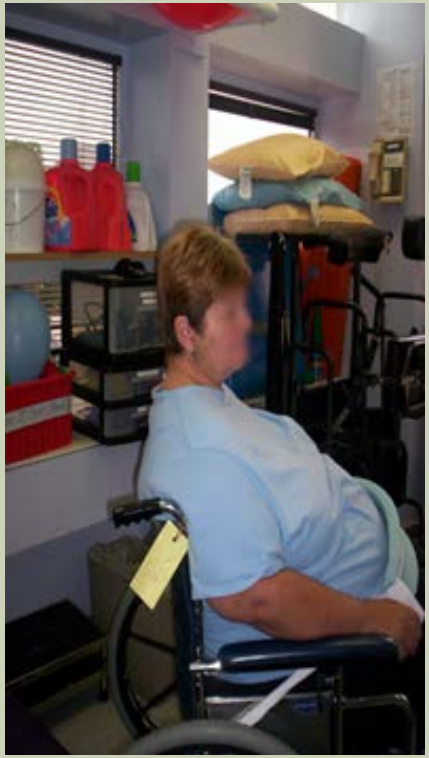
- Too wide
  - Obtain wheelchair with seat width customized to client
  - Use solid back with lateral supports to accommodate extra room

COMMON PROBLEMS

- Too narrow
  - Obtain wheelchair with seat width customized to client
  - Reverse armrests (place plate on outside) to allow for increased girth at hips or use armrests without side plates
  - Remove armrests and use wider cushion

SEAT DEPTH TOO SHORT/LONG

- Too Long
  - Seat depth too long add solid back or adjust back support
  - Shorten upholstery at front end of wheelchair



SEAT DEPTH TOO SHORT/LONG

- Too Short
  - Increase seat length with new upholstery
  - Adjust hardware backward if possible
  - Open up back canes to wheelchair and adjust

UPHOLSTERY STRETCHED

- Seat upholstery stretched out
  - Replace or tighten seat upholstery
  - Use solid insert under cushion
- Back upholstery stretched out
  - Replace or tighten back upholstery
  - Use solid back

“BE BRAVE ENOUGH TO DREAM BIG ENOUGH!”


Questions?

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