Ambulation & Wheelchair Assessments

OT 9542 Evaluating Occupation in Context

Rebecca Timbeck

After today, you will….

i. Understand how to assess mobility, from ambulation to wheelchairs
ii. Understand how to assess a client for mobility equipment needs
iii. Understand the assessment and eligibility criteria for the Ontario Ministry of Health, Assistive Devices Program (ADP)
iv. Have an opportunity to practice mobility assessments

Ontario

MINISTRY OF HEALTH AND LONG-TERM CARE

Ministry of Health & Long-Term Care
Assistive Devices Program (ADP)

Mobility Devices Policy and Administration Manual

February 2016

http://www.health.gov.on.ca/adp

Assistive Devices Program (ADP)

- Ontario funding program
- Function based funding program (not income based)
- Must have a valid Ontario Health Card
- Must not be eligible for VAC Group A funding or WSIB funding

Assistive Devices Program (ADP)

- Assessment process involves three parties:
  - The client/caregivers
  - The ADP authorizer (OT/PT)
  - The vendor

Assistive Devices Program (ADP)

- ADP will pay 75% of the approved price, and the client will pay the remaining 25%
- However, ADP will pay 100% for clients receiving Social Assistance Benefits:
  - Ontario Works (OW)
  - Ontario Disability Support Program (ODSP)
  - Assistance to Children with Severe Disabilities (ACSD)

Assistive Devices Program (ADP)

There are three types of devices funded by ADP:

1. Ambulation Aids
2. Wheelchairs
3. Positioning Devices (Seating)

Assistive Devices Program (ADP)

Designated Funding Period

The funding period is the minimum period of time that a device is expected to remain useful.

1. Ambulation Aids - 5 years
2. Wheelchairs - 5 years
3. Power Dynamic Positioning Devices - 5 years
4. Positioning Devices (Seating) - 2 years.

Assistive Devices Program (ADP)

Eligibility Criteria

1. Ambulation Aids: The applicant must be able to operate the device independently.
2. Manual Wheelchairs: The applicant may or may not be able to propel the device independently.
3. Power Wheelchairs: The applicant must be able to operate the device independently.
4. Positioning Systems (Seating): The applicant must require the device to support posture in order to facilitate mobility.

Assistive Devices Program (ADP)

Basic Mobility Requirements

- Funding is restricted to those devices that meet the applicant's basic mobility requirements
- The device must be used on an ongoing daily basis.
- The required and intended use of the device must be to provide mobility within the applicant's place of residence and to gain entry/exit from the applicant's place of residence.
- Equipment required for a minimum of 6 months

Assistive Devices Program (ADP)

Funding is not provided for mobility devices, including components, used solely for:

- Travelling to and from destinations in the community
- Post-operative needs
- Pain management
- Training, exercise or therapeutic purposes
- Sports
- Recreation and social activities
- Work
- School
- Feeding, sleeping and other non-mobility related activities.

Assistive Devices Program (ADP)

In order to determine what device is clinically required and basic for ADP funding purposes, the authorizer must:

- Complete a comprehensive functional assessment.
- Complete device trials from most basic to the more complex, taking the individual's medical condition and all environmental and safety issues into consideration.
- Provide medical diagnosis, avoid including a list of symptoms.
- Provide details related to the need for the device must be provided within the functional mobility section of the form using precise language to confirm eligibility

Ambulation Assessment

Ambulation

- What is ambulation?
  - to walk about or move from place to place
- What influences ambulation?
  - Balance
  - Pain
  - Fatigue
  - Muscle weakness
  - MSK conditions
  - Neurological conditions
  - Cardiorespiratory conditions

Dr. Susan Hunter, PhD
Western's School of PT

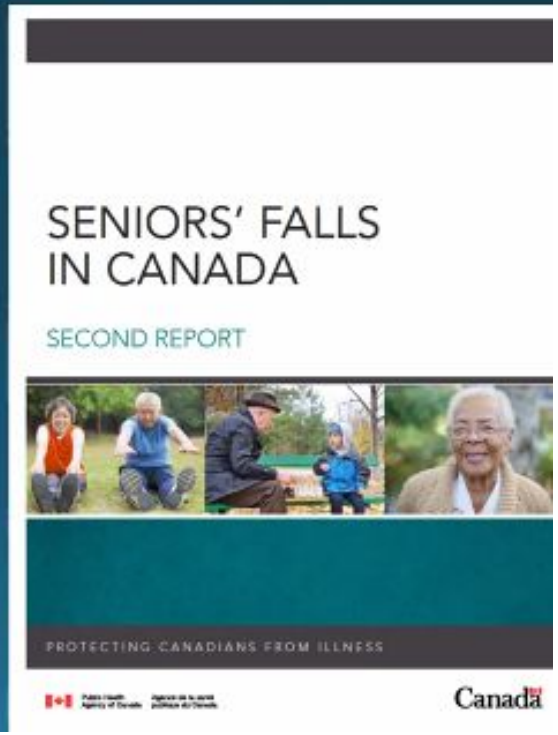
Canadian Centre for Activity and Aging: Research Seminar 6: "Mobility aids and falls in older adults"

https://www.uwo.ca/ccaa/research/events/seminars/past_seminars.html

Falls in Older Adults in Canada

Falls in older adults are common (PHAC 2014)

- 30-35% community-dwelling adults over the age of 65 will fall at least once each year
  - 50% will have recurrent falls
  - 50% will sustain an injury
- Incidence of falls increases with age
- Adverse outcomes:
  - 95% of hip fractures due to falls
  - 30% admitted to hospital will have new admission to LTC
  - Negative mental health outcomes
    - Concern for falling, loss of autonomy, greater isolation, depression
- Direct health care costs for falls = $2 billion



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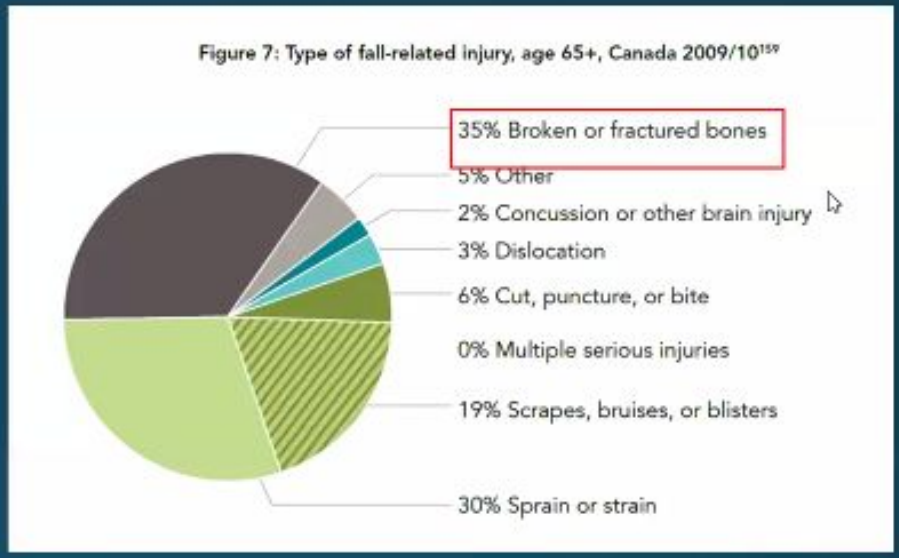
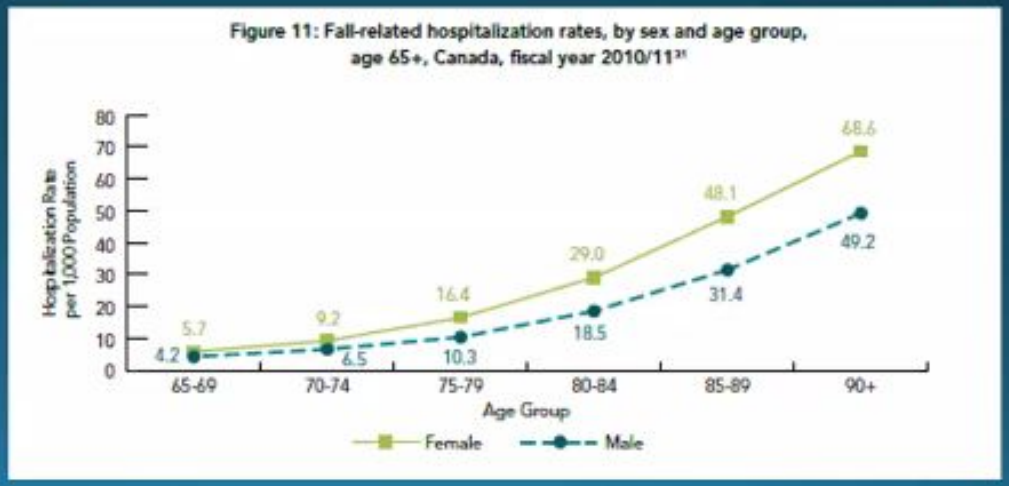
Fall-related Injury – Canadian Data

- Most common activities at time of falling:
  - Walking on a level surface
  - Stairs
- Fall-related injuries:
  - Number and rate is increasing
  - Females report higher rates of fall-related injuries than males
- 67% of older adults sought treatment in emergency room after a fall
- Increase in number and rate of deaths due to falls

(PHAC 2014)





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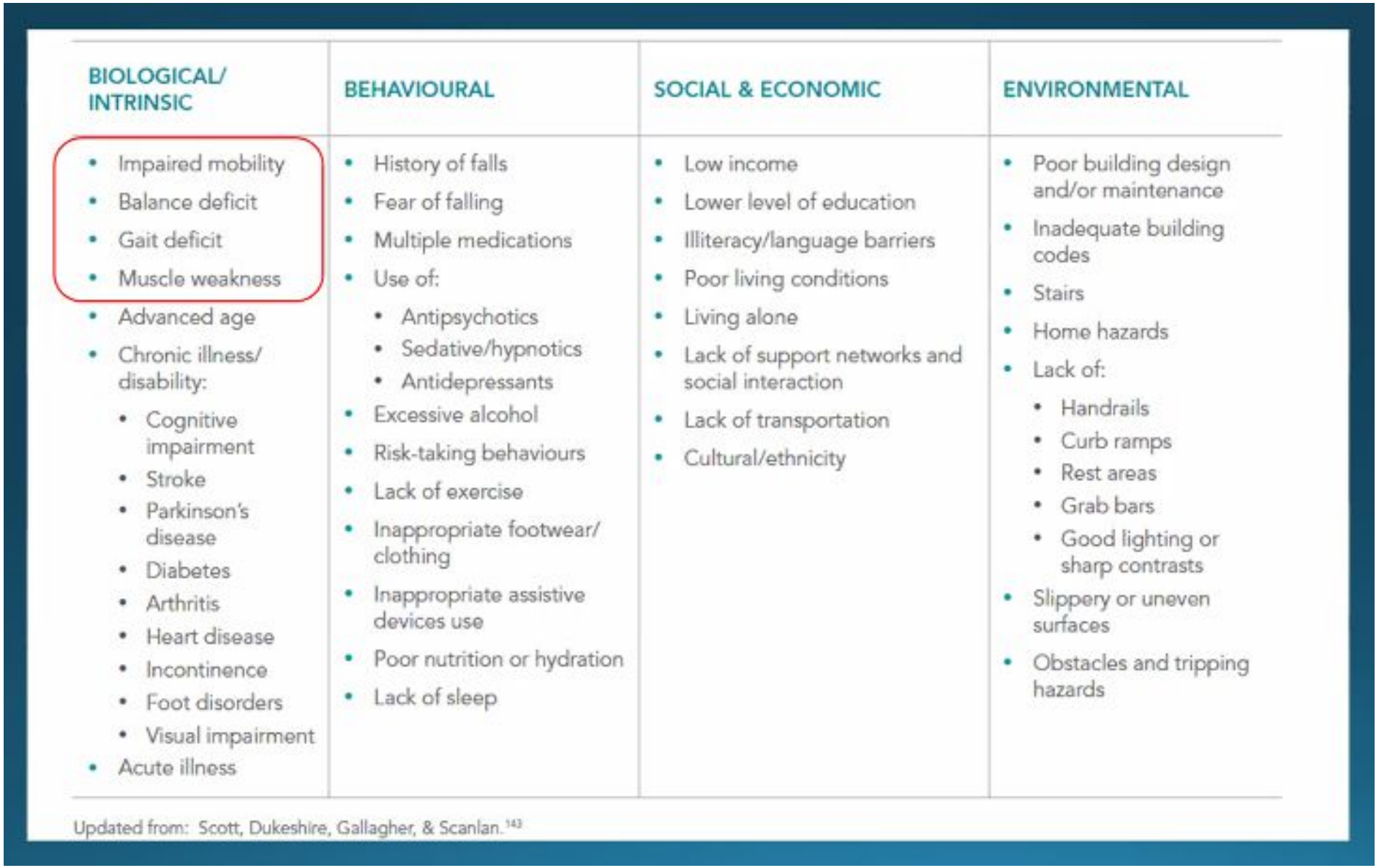
Risk Factors Associated with An Increased Falls Risk



BIOLOGICAL/ INTRINSIC	BEHAVIOURAL	SOCIAL & ECONOMIC	ENVIRONMENTAL

• Impaired mobility
• Balance deficit
• Gait deficit
• Muscle weakness
• Advanced age
• Chronic illness/ disability:
  • Cognitive impairment
  • Stroke
  • Parkinson's disease
  • Diabetes
  • Arthritis
  • Heart disease
  • Incontinence
  • Foot disorders
  • Visual impairment
• Acute illness
	• History of falls
	• Fear of falling
	• Multiple medications
	• Use of:
	  • Antipsychotics
	  • Sedative/hypnotics
	  • Antidepressants
	• Excessive alcohol
	• Risk-taking behaviours
	• Lack of exercise
	• Inappropriate footwear/ clothing
	• Inappropriate assistive devices use
	• Poor nutrition or hydration
	• Lack of sleep
		• Low income
		• Lower level of education
		• Illiteracy/language barriers
		• Poor living conditions
		• Living alone
		• Lack of support networks and social interaction
		• Lack of transportation
		• Cultural/ethnicity
			• Poor building design and/or maintenance
			• Inadequate building codes
			• Stairs
			• Home hazards
			• Lack of:
			  • Handrails
			  • Curb ramps
			  • Rest areas
			  • Grab bars
			  • Good lighting or sharp contrasts
			• Slippery or uneven surfaces
			• Obstacles and tripping hazards

Updated from: Scott, Dukeshire, Gallagher, & Scanlan.[143]

Hunter, S. (2022). Canadian Centre for Activity and Aging: Research Seminar 6, Mobility aids and falls in older adults. Retrieved from https://www.uwo.ca/ccaa/research/events/seminars/past_seminars.html

Ambulation Assessment Process

1. Referral
2. Assessment
3. Prescription (selection)
4. Funding and ordering
5. Product preparation
6. Fitting
7. User training

Depending on setting and availability, may occur in one visit, or over multiple visits

Ambulation Assessment Referral

Referral Screening

- May differ for in-patients vs. community setting
- Client goals
- Outline assessment expectations and process
- Discuss potential funding options
  - ? Previous funding

Two parts of a mobility assessment

1. Assessment interview
2. Physical assessment

Mobility Assessment - Interview

- Consent
- Client/caregiver concerns and goals
- Mobility and functional status
- Medical history (physical and cognitive)
- Planned surgeries
- Comfort/pain/altered sensation
- **History of falls**
- Current equipment
- Occupational and Leisure Needs

Mobility Assessment - Interview

What is the client's current:

- Mobility status (? medical restrictions)
- Endurance
- Safety
- Type of Residence/home environment
- Transportation Methods

Mobility Assessment - Interview

Residence and Community Access:

- Type of residence (house, apartment, rent vs. own)
- Entrance to and accessibility within the home
  - Level entrance
  - Stairs, Ramp, Lift
  - Doorways
  - Flooring
  - Turning radius
- Outdoor surfaces - paved versus gravel; even versus uneven, curb cut outs
- Work and/or school environments
- Vehicle access

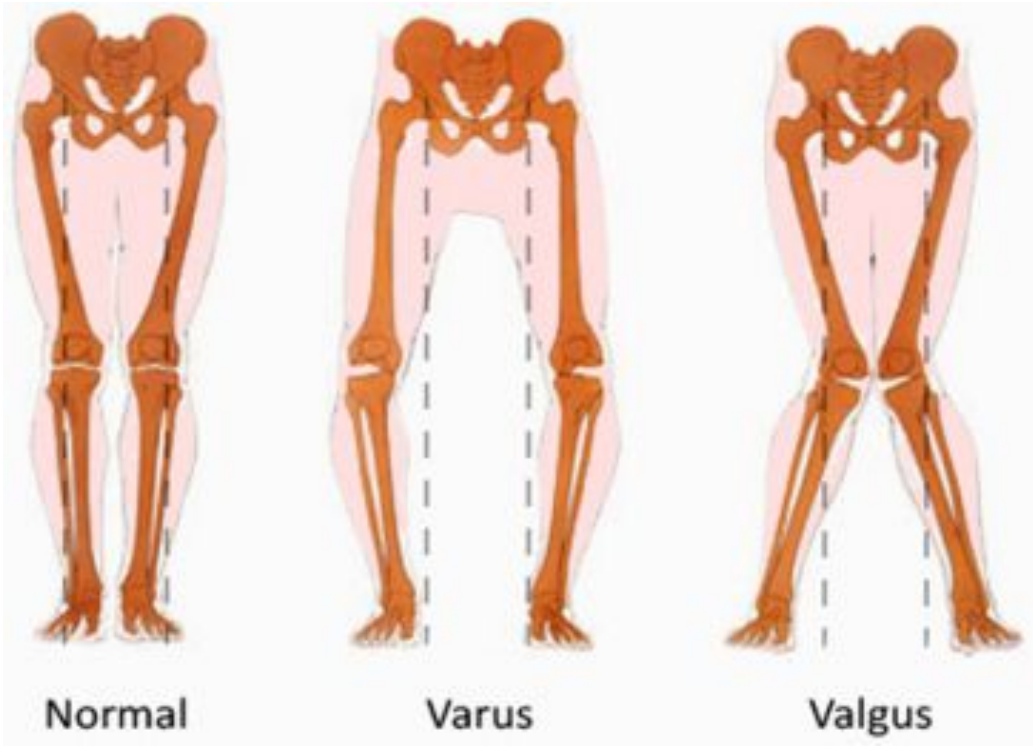
Mobility Assessment – Physical Assessment

- OBSERVATION
- ROM, MMT and 4+1
- Functional Ambulation
- Standardized Assessment – Berg Balance Scale

Mobility Assessment – Physical Assessment

- OBSERVATION
  - Begins as soon as you meet the client
  - Things to look for…
    - Altered gait pattern
    - Decreased balance (i.e. furniture walking)
    - Difficulty with sit to stand/stand to sit transfers
    - Difficulty with turning, walking backwards, etc.
    - SOB, endurance and cadence
    - Edema, inflamed joints
    - Valgus or varus

Mobility Assessment – Physical Assessment



Mobility Assessment – Physical Assessment

- ROM, MMT and 4+1
  - Functional ROM
    - shoulders, hands/wrists, hips, knees and ankles
  - MMT
    - shoulders, elbows, wrists/hands, hips, knees
  - Pelvic and back alignment
  - 4+1

Mobility Assessment – Physical Assessment

- Functional Ambulation
  - If client is currently ambulatory, ask them to demonstrate current abilities (? with close supervision)
  - If not currently ambulatory, based on 4+1 and physician restrictions, decide if ambulation is safe
  - As appropriate, proceed with ambulation assessment, preferably in client's home environment – more observation!
  - Trial gait aid if appropriate
  - Ask for additional assistance as required!

Mobility Assessment – Physical Assessment

- Standardized Assessment – Berg Balance Scale
  - 10-15 minutes to administer
  - 14 tasks (score 0-4)
  - Total score out of 56
  - Results Interpretation:

≤20	wheelchair user
>20≤40	walking with assistance
>40≤56	independent

Mobility Assessment – Physical Assessment

Berg Balance Scale

1. Sitting to standing
2. Standing unsupported
3. Sitting unsupported
4. Standing to sitting
5. Transfers
6. Standing with eyes closed
7. Standing with feet together
8. Reaching forward with outstretched arm
9. Retrieving object from floor
10. Turning to look behind
11. Turning 360 degrees
12. Placing alternate foot on stool
13. Standing with one foot in front
14. Standing on one foot

Indications for Gait Aids

- **Overall Purpose:**
  - To enable independent walking
- **Short-term use:**
  - Reduced weight-bearing ability on a lower extremity after an injury or surgery
    - e.g., ankle fracture, total hip joint replacement
- **Long-term use:**
  - To compensate for a relatively permanent impairment

- Gait aids compensate for:
  1. Decreased balance
  2. Decreased strength
  3. Decreased coordination
  4. Relieve pain during ambulation
  5. Decreased ability to put full weight through a lower extremity
- Benefits of gait aids:
  - Increases the base of support
  - Provides haptic cues

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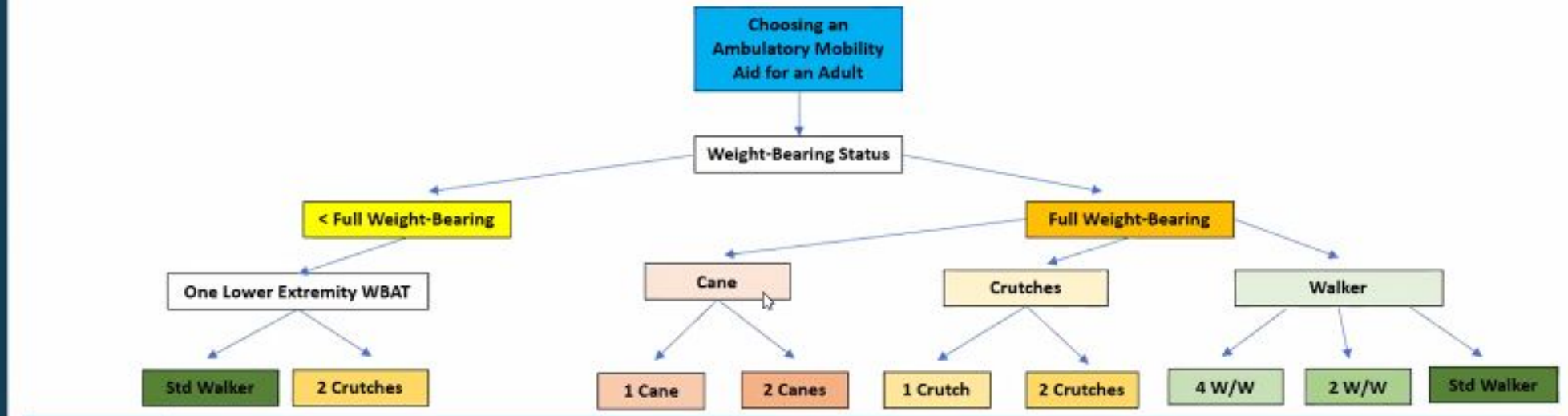
Clinical Algorithm for Choosing a Gait Aid



Clinical Factors										
Support	High	Moderate	Low	Low	Low	Moderate	Low	Moderate	High
Physical Demands	Moderate	High	Low	Low	Low	High	Low	Low	Moderate
Accessibility	Low	High	High	High	High	High	Moderate	Low	Low
Age Limitations	None	None	None	None	None	None	None	None	None
Cognitive Demands	Moderate	High	Moderate	Moderate	Moderate	High	Low	Moderate	High

Now consider the following factors: short-term versus long-term needs, co-morbidities, cognition, lifestyle, environment, physical ability – strength (upper & lower), balance, gait, sensory (vision, proprioception, vestibular), pain, client's perceived need & acceptability

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Assistive Devices Program (ADP)

Ambulation Aids

- If the individual can ambulate, determine if and what devices can be used safely and independently
- The applicant must be able to operate the device independently.
- Factors that will influence the prescription details include the applicant's medical condition and prognosis, and ambulation needs now and in the foreseeable future

Assistive Devices Program (ADP)

Ambulation Aids

- Forearm crutches
- Wheeled walkers (two, three and four wheels)
- Paediatric specific standing frames
- Approved options for ambulation aids

Mobility Equipment Recommendations

Single Point Cane

Quad Cane

Standard Walkers

Rollator Walker

Mobility Equipment Recommendations

- Assess client using mobility devices to determine which is the safest choice for them, starting with the most basic to the more complex
- To size the equipment for the client, you require the client's:
  - Weight to inform weight capacity and overall width
  - Overall height to inform seat height choice
  - Wrist crease height to inform the handle height
- Provide equipment education and opportunities to practice
  - i.e. brake application, walking posture, transfer safety, etc.
- Complete funding application if applicable for recommended equipment

Mobility Equipment Recommendations : Sizing a rollator example

To size the equipment for the client, you require the client's:

- Weight to inform weight capacity and overall width
- Overall height to inform seat height choice
- Wrist crease height to inform the handle height

Human Care Nexus 3 Rollator

Technical specifications

Part Name	Part no.	Handle Height (Min - Max)	Seat Height	Overall Width	Width between Handles	Distance between Rear Wheels	Wheel Size	Product Weight
neXus 3 Super Low Black Blue Red (Burgundy)	 470018 470018B 470018R	78 cm - 86 cm 30.5" - 34.1"	48 cm 19"	58 cm 23"	45 cm 17.5"	47 cm 18.5"	20 cm x 3 cm 8" x 1.2"	7.6 kg 16.9lb
neXus 3 Low Black Blue Red (Burgundy)	 470022 470022B 470022R	78 cm - 93 cm 30.5" - 36.5"	56 cm 22"	58 cm 23"	45 cm 17.5"	47 cm 18.5"	20 cm x 3 cm 8" x 1.2"	7.7 kg 17.1lb
neXus 3 Standard Black Blue Red (Burgundy)	 470024 470024B 470024R	83 cm - 101 cm 32.5" - 39.8"	61 cm 24"	58 cm 23"	45 cm 17.5"	47 cm 18.5"	20 cm x 3 cm 8" x 1.2"	7.8 kg 17.3lb

Maximum User Weight: 200 kg / 441 lb

Mobility Assessment - Ambulation

- Additional Funding Options:
  - March of Dimes
  - Veterans Affairs Canada (VAC)
  - Workplace Safety and Insurance Board (WSIB)
  - Insurance
  - Easter Seals
  - Disability Groups

Assistive Devices Program (ADP)

Manual Wheelchair Mobility

- Where independent ambulation is not possible
- The individual’s basic mobility requirements cannot be met by the use of a generic/transport chair
- Factors that will influence the prescription details include the applicant's medical condition and prognosis, and seating needs now and in the foreseeable future.

Assistive Devices Program (ADP)

Manual Wheelchair Mobility Aids funded by ADP:

- Manual wheelchairs
- Paediatric dependent wheeled bases
- Power wheelchairs, power bases, power add-on devices, power scooters
- Approved options for manual and power wheelchairs

Assistive Devices Program (ADP)

Positioning Devices (Seating) funded by ADP:

- must be required to support posture and/or provide pressure relief in a wheelchair specifically to facilitate mobility.

Types of positioning products funded by ADP include:

- Modular/commercially available and custom fabricated devices to support the head, neck, trunk, pelvis and extremities in a wheelchair
- Power dynamic seating systems (tilt/recline/elevating leg rests)

Assistive Devices Program (ADP)

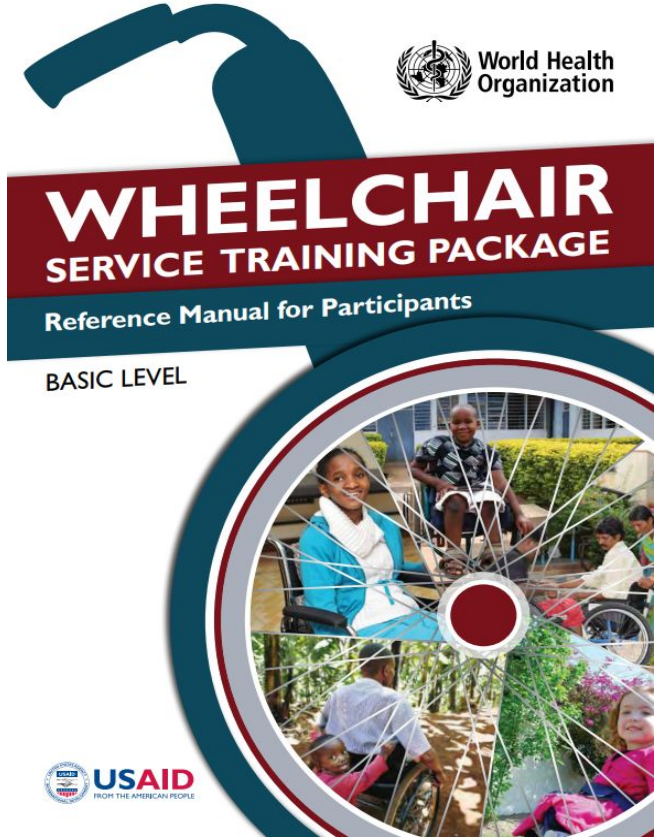
Manual Wheelchair with Manual Dynamic Tilt System

Manual dynamic tilt system must achieve one or more of the following goals:

- Increase sitting tolerance where there is risk of tissue trauma due to unrelieved pressure and inability to weight shift independently and/or there is an inability to maintain a functional postural position
- Maintain skin integrity where there is past/present history of tissue trauma, inability to weight shift independently and fixed seating alone is not an adequate solution.

Seating Resources

Waugh, K., & Crane, B. (2013). *A Clinical Application Guide to Standardized Wheelchair Seating Measure of the Body and Seating Support Surfaces, 3rd Edition. Retrieved from:* https://www.ncart.us/uploads/userfiles/files/GuidetoSeatingMeasuresRevisedEdition.November2013.pdf



Frost, S. et al. (2012). *World Health Organization: Wheelchair Service Training Package - Basic level.* WHO Press. Geneva, Switzerland. Retrieved from: https://apps.who.int/iris/bitstream/handle/10665/78236/9789241503471_reference_manual_eng.pdf?sequence=1

Goals for Wheelchair and Seating

1. Improve mobility
2. Improve upper extremity function
3. Improve postural alignment; reduce/maintain progression of postural deformities
4. Improve respiratory function
5. Improve feeding and swallowing
6. Improve comfort
7. Improve social interaction and self-esteem
8. Maintain and/or improve skin integrity

In order to achieve the goals, one must…

- Address the influence of pathological reflexes and pathological tone
- Provide support as necessary to substitute for muscle groups that may not be functioning
- Respect orthopedic limitations
- Respect client's level of functioning
- Respect lifestyle of client and caregivers and the environment in which they function
- Respect the client's age and level of ability

Who Needs a Wheelchair Assessment and Why?

- A person usually needs a wheelchair if:
  - they cannot walk
  - they can walk, but:
    - with difficulty
    - only for a short distance
    - only for portions of the day

- Why complete a wheelchair and seating assessment?
  - gather information – person, environment and occupations
  - choose the most appropriate wheelchair for the wheelchair user
  - choose the most appropriate wheelchair components from those available;
  - find out what training the wheelchair user and/or the family need to make the best use of the wheelchair

WHO: 8 stages of the seating and wheelchair assessment process

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

(World Health Organization, 2008)

Two parts of a wheelchair assessment

1. Assessment interview
2. Physical assessment

Allows for systematic approach to wheelchair assessments and prescriptions.

Seating and Wheelchair Assessment Interview

If a person already has a wheelchair:

- Does the wheelchair meet the user's needs?
- Does the wheelchair meet the user's environmental conditions?
- Does the wheelchair provide proper fit and postural support?
- Is the wheelchair safe and durable?
- Does the cushion provide proper pressure relief (if user has pressure sore risk)?

If yes to all questions, the user may not need a new wheelchair. If no to any of these questions, the user needs a different wheelchair or cushion; or the existing wheelchair or cushion needs repair or modifications

Seating and Wheelchair Assessment Interview (con't)

- Consent
- Client/caregiver concerns and goals
- Mobility and function
- Comfort/pain?
- Posture/positioning/repositioning?
- Skin concerns and/or pressure sores
- Current equipment not meeting basic and essential needs (i.e. change of status or repair needs)

Seating and Wheelchair Assessment Interview (con't)

- Medical history
- Personal Care Needs
- Hearing/Vision
- Augmentative Communication Needs
- Feeding and Swallowing Concerns
- Occupational and Leisure Needs

Seating and Wheelchair Assessment Interview (con't)

What is the client's current:

- Sitting tolerance
- Comfort/Pain
- Ability to reposition
- Safety
- Skin condition
- Method/Ability to Self Propel
- Transfer method
- Residence
- Transportation methods

Seating and Wheelchair Assessment Interview (con't)

Residence and Community Access:

- Type of residence (house, apartment, rent vs. own)
- Entrance to and accessibility within the home
  - Level entrance
  - Stairs, Ramp, Lift
  - Doorways
  - Flooring
  - Turning radius
- Outdoor surfaces - paved versus gravel; even versus uneven, curb cut outs
- Work and/or school environments
- Vehicle access

Seating and Wheelchair Assessment Interview (con't)

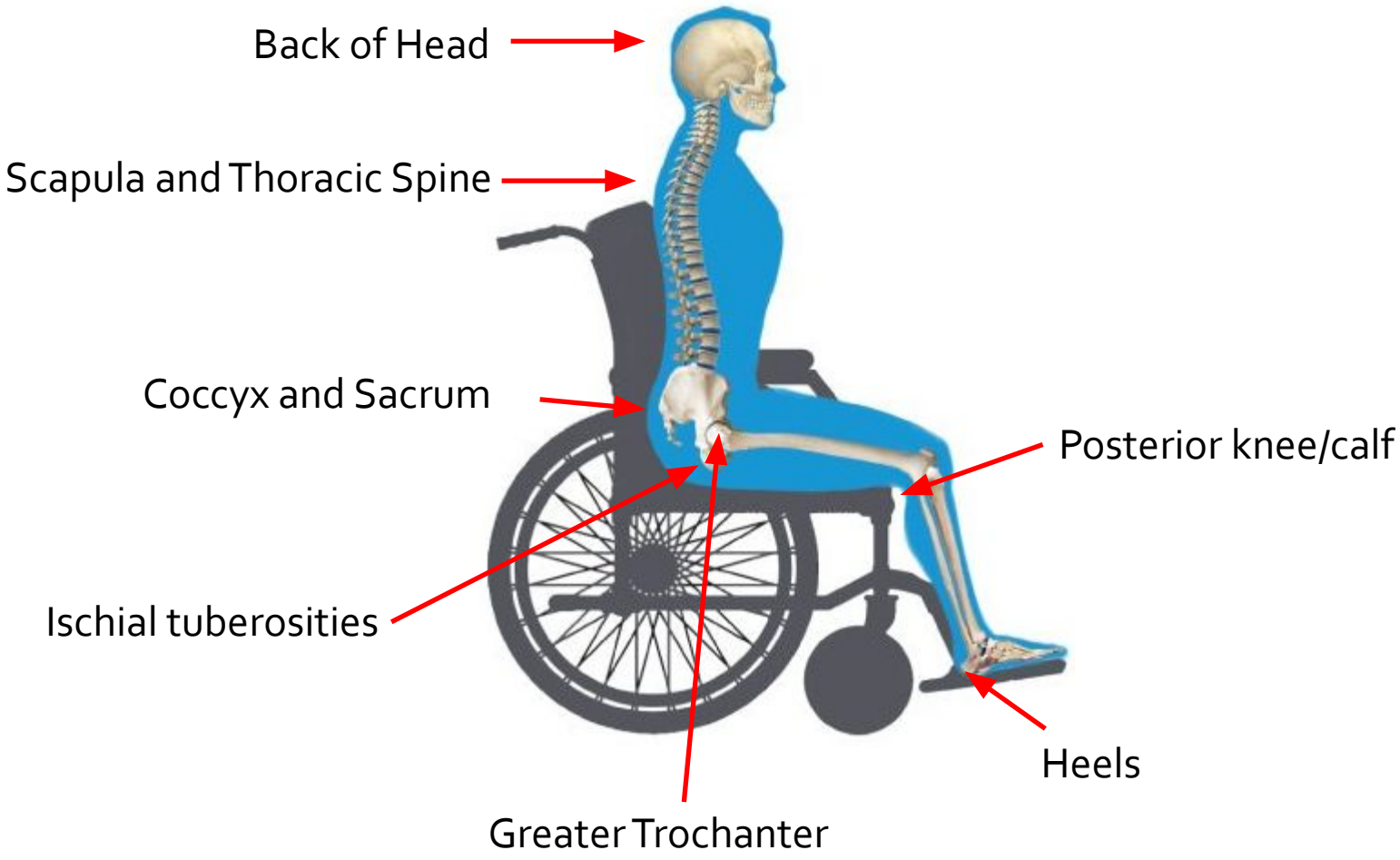
- Additional Funding Options:
  - March of Dimes
  - Veterans Affairs Canada (VAC)
  - Workplace Safety and Insurance Board (WSIB)
  - Insurance
  - Easter Seals
  - Disability Groups

Remember…. Pressure Injuries

"A pressure injury is localized damage to the skin and underlying soft tissue usually over a bony prominence or related to a medical or other device. The injury can present as intact skin or an open ulcer and may be painful. The injury occurs as a result of intense and/or prolonged pressure or pressure in combination with shear. The tolerance of soft tissue for pressure and shear may also be affected by microclimate, nutrition, perfusion, co-morbidities and condition of the soft tissue."

http://www.npuap.org/resources/educational-and-clinical-resources/npuap-pressure-injury-stages/

Skin Health: Areas at risk for pressure injuries in sitting



Remember…. Pressure

Pressure is the applied force over an area

$P = F/A$

To decrease the effects of pressure:

- Decreased the magnitude of the force
- Increase the area of application
- Decrease the time of application

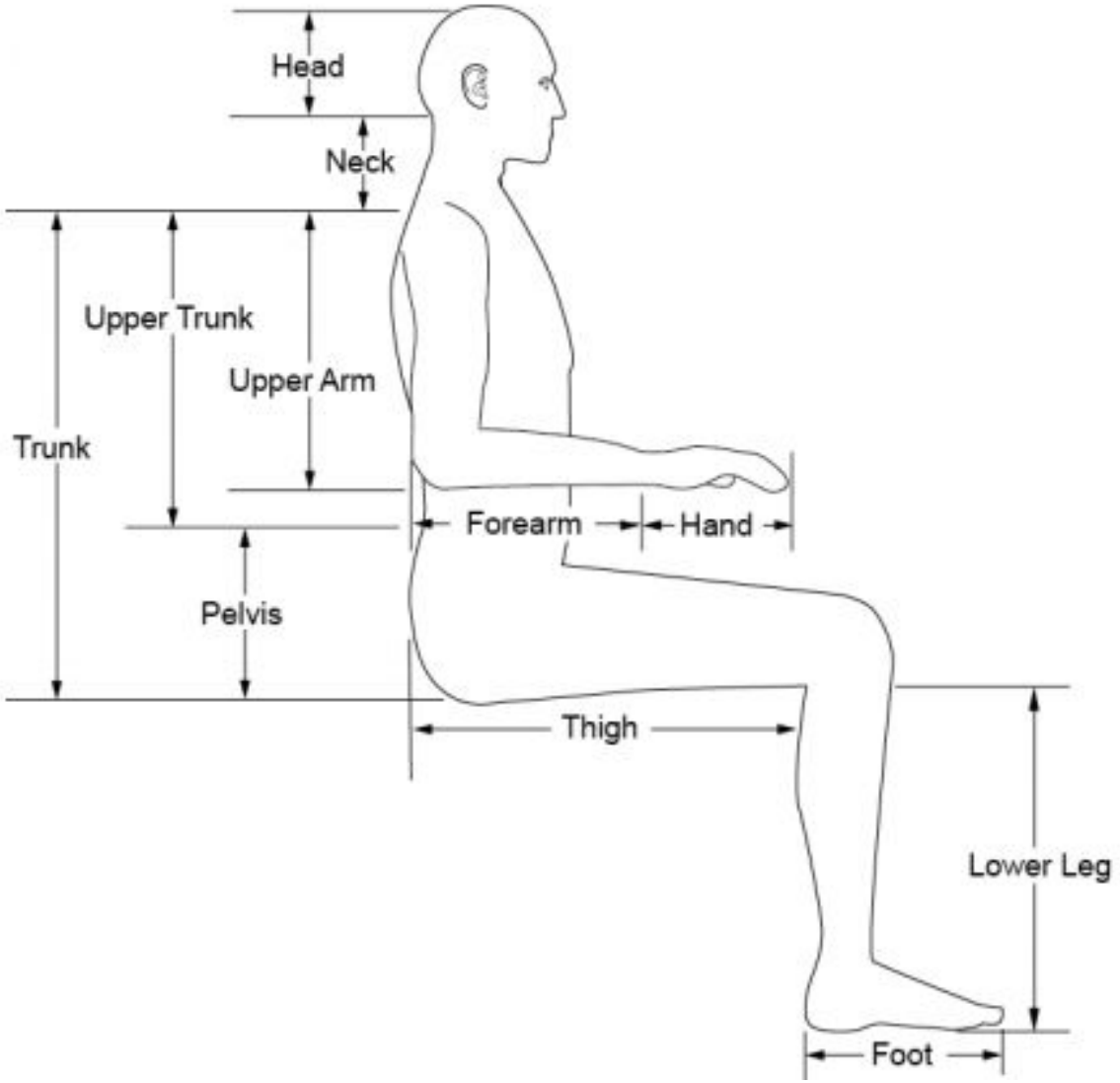
Risk factors for pressure injuries

- Impaired mobility
- Seated posture
- Impaired sensation/neuropathy
- Diseases that affect blood flow
- Age
- Fragile skin
- Urinary or fecal incontinence
- Poor nutrition or dehydration
- Decreased mental awareness
- Obesity

#2 Physical Assessment

Let's start with language and terminology

Body Segment Terminology



https://www.ncart.us/uploads/userfiles/files/GuidetoSeatingMeasuresRevisedEdition.November2013.pdf

Seating support terminology

Labeling convention for postural support devices

- Surfaces in a wheelchair intended to contact the user's body are called "supports" as opposed to a "rest" or "pad"
- Examples:
  - foot support, not a footrest
  - lateral trunk support, not a lateral trunk pad
- A support surface in a wheelchair seating system is labeled by the body segment it is intended to contact and the side of that segment where it is typically placed.
- Example:
  - a pad placed on the lateral side of the thigh would be called a "lateral thigh support"
  - a support surface is intended to contact just the pelvic area of the thigh segment, it can be called a "lateral pelvic support"

Seating support terminology

- Reference terms are used to indicate which side of the body segment the surface is intended to contact:
  - Anterior (in front)
  - Posterior (behind)
  - Superior (above)
  - Inferior (below)
  - Medial (on the inside)
  - Lateral (on the outside).

- If a postural support device is intended to contact a body segment on its primary weight bearing side, the directional term does not need to be used because it is implied.
- Example:
  - instead of saying "inferior foot support", the term "foot support" is used
- However, if an additional support surface is added to the foot support, use of the directional reference is required for clarification.
- Example:
  - a surface intended to contact the medial side of the person's foot would be called a "medial foot support"

Seating support terminology

- Some pleasant exceptions….
  - "seat" is used instead of "inferior buttock/thigh support
  - "back support" is used instead of "posterior trunk support
  - "arm support" is used instead of "inferior forearm support

Describing wheelchair seated posture

- **Body Segment Angles** – measurement of the spatial orientation of individual body segments, either relative to an adjacent segment (relative angles) or relative to an outside reference (absolute angles)
  - Allows one to define the static seated posture of an individual
- **Support Surface Angles** - the corresponding angles of the body support system.
  - the same conventions are used for assigning a numerical value to angular measures of the body and the seating support surfaces.
  - Therefore, if a body segment is parallel to its supporting surface, then the body segment angle will be the same as the support surface angle.

- In order to accurately and consistently define all the measurements, a coordinate axis system was established, with three axes labeled X, Y and Z.
- The axis system is "orthogonal", which means these three axes are at 90 degrees to each other.

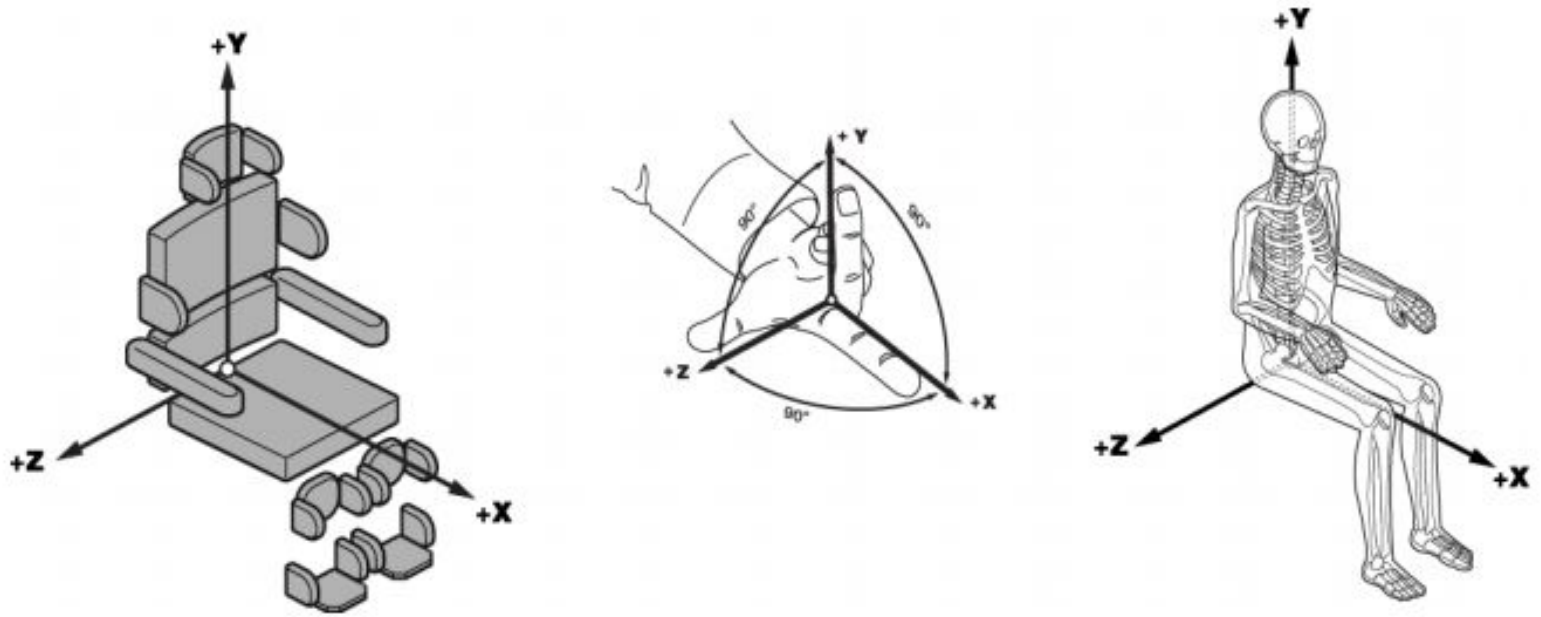
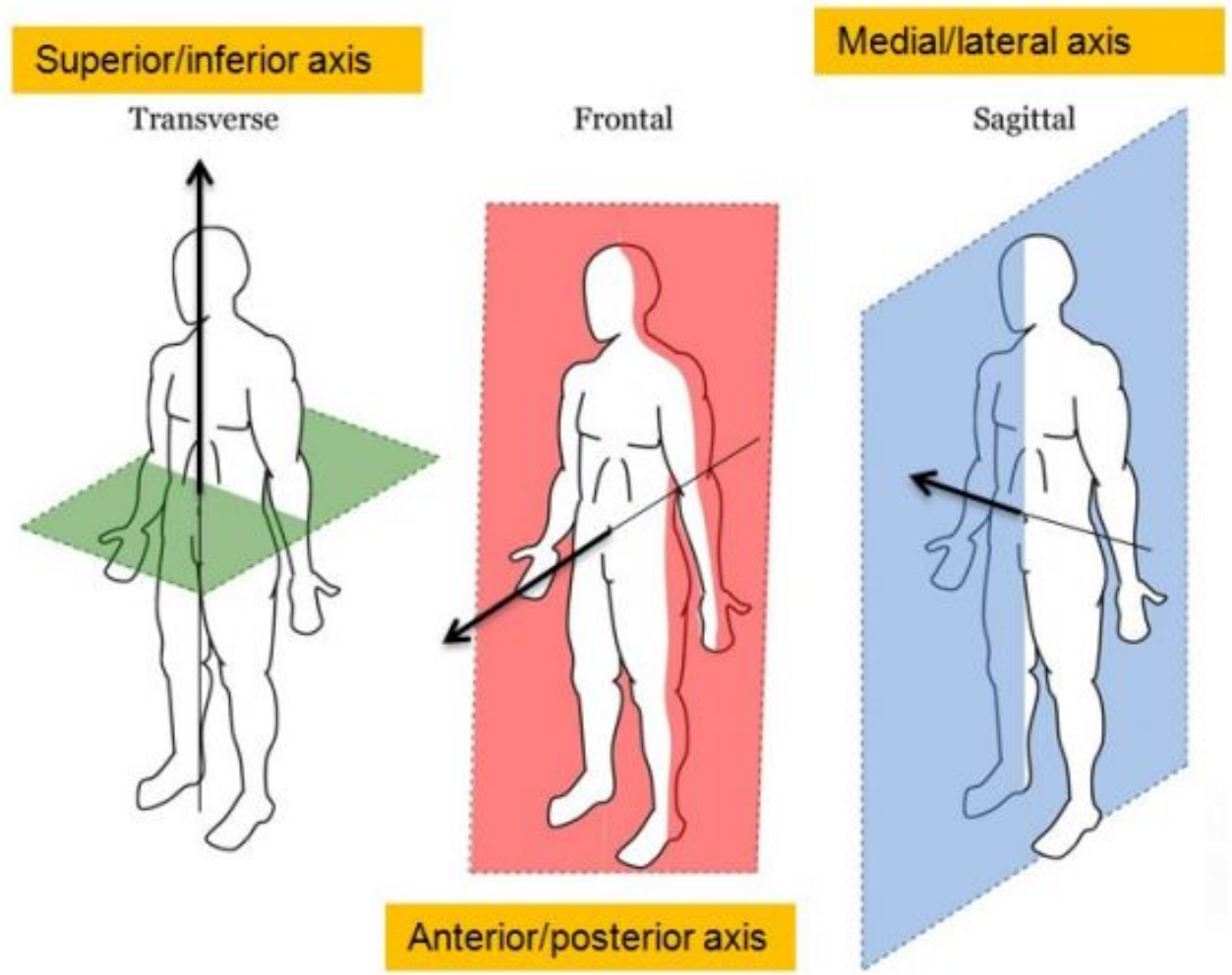


Fig. 1.3: Coordinate axis system superimposed on seat and person

Axis of rotation for movement in three planes



Seated posture deviations in the three planes

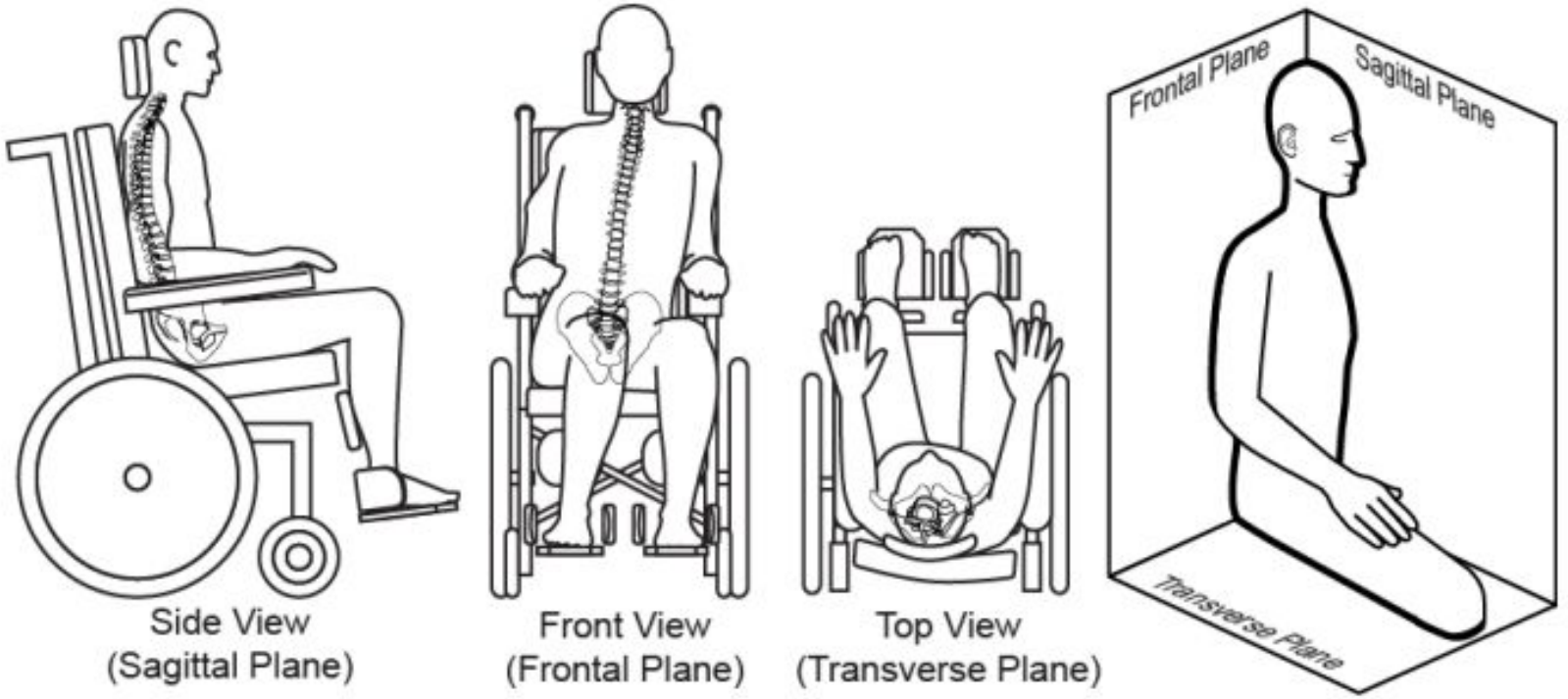
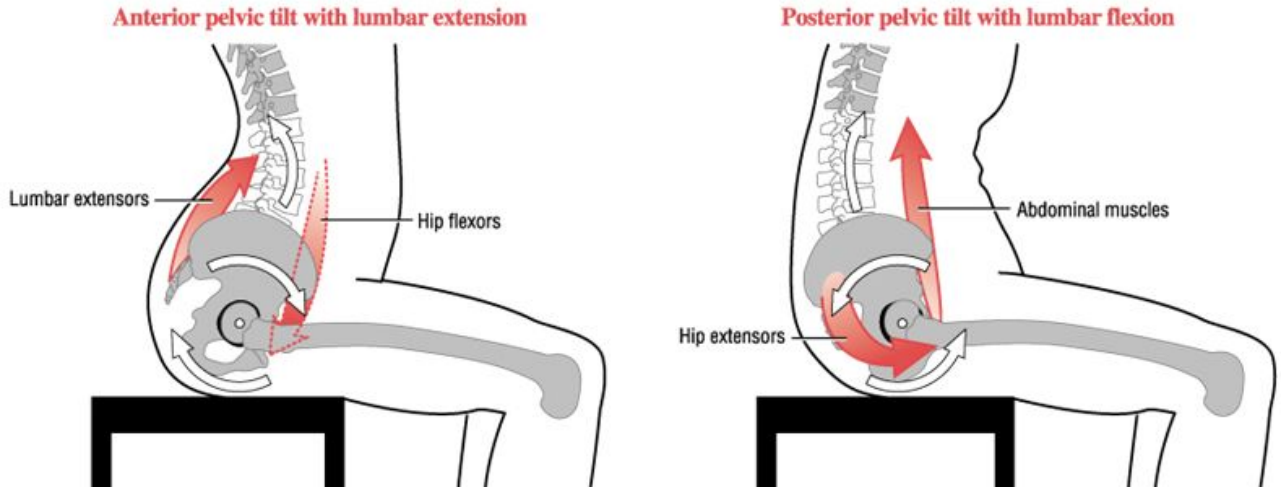
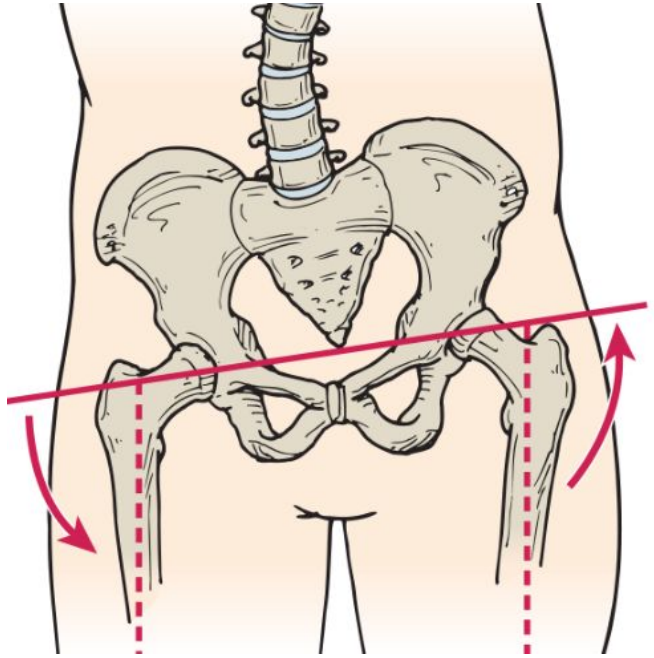


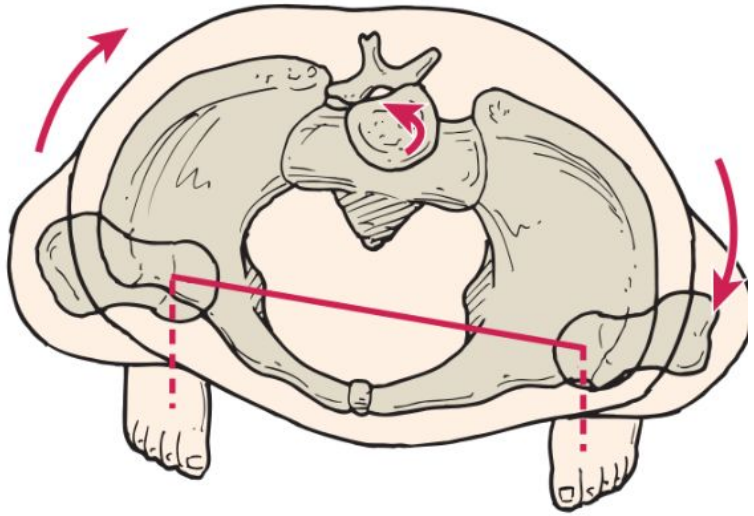
Fig. 1.5: Describing postural deviations in three planes



Sagittal Plane – Pelvic tilt

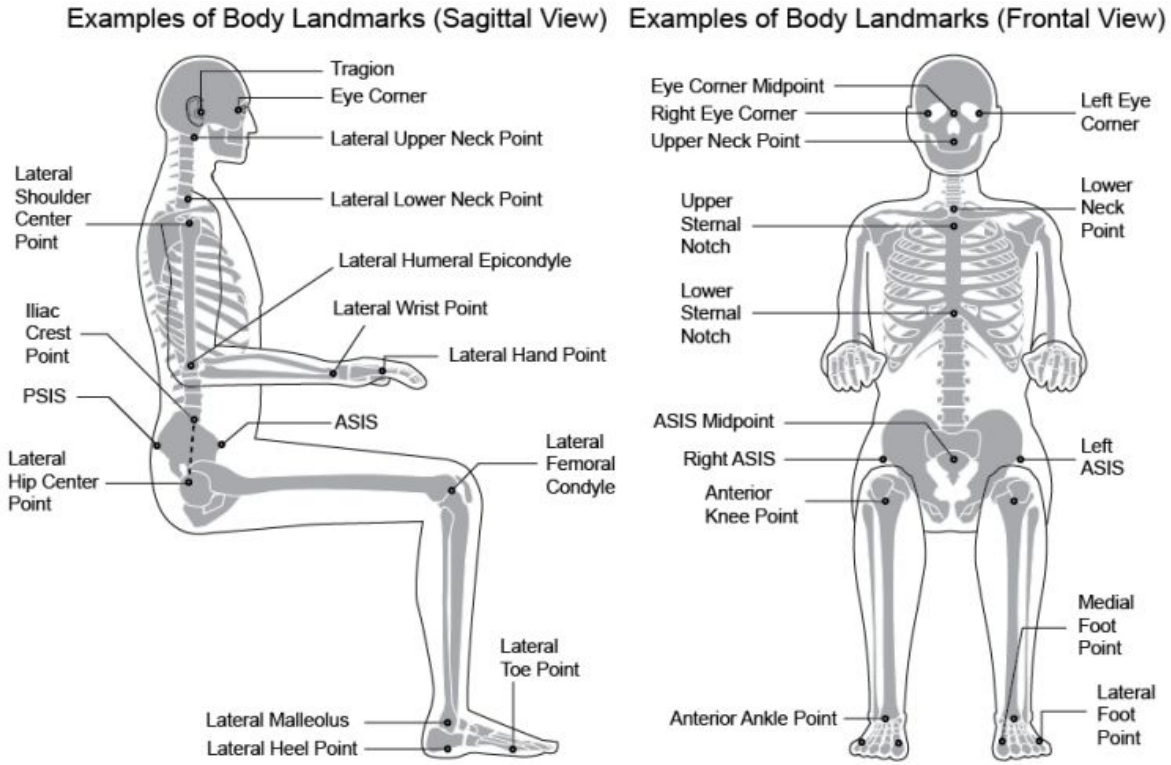


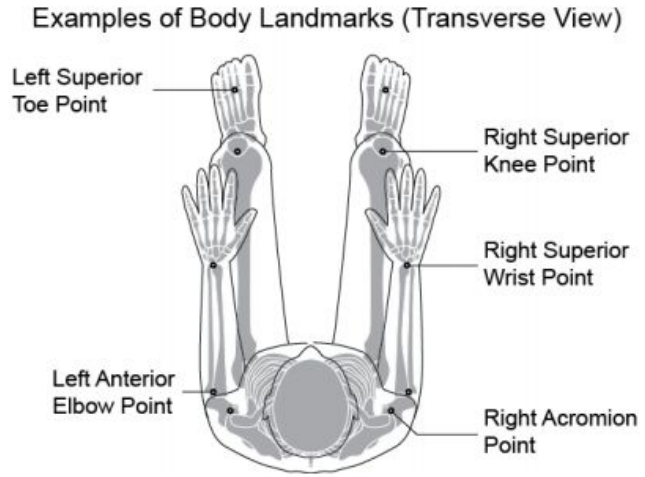
Frontal Plane – Pelvic Obliquity



Transverse Plane – Pelvic Rotation

Anatomical Landmarks in Three Views





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Body Segment Lines

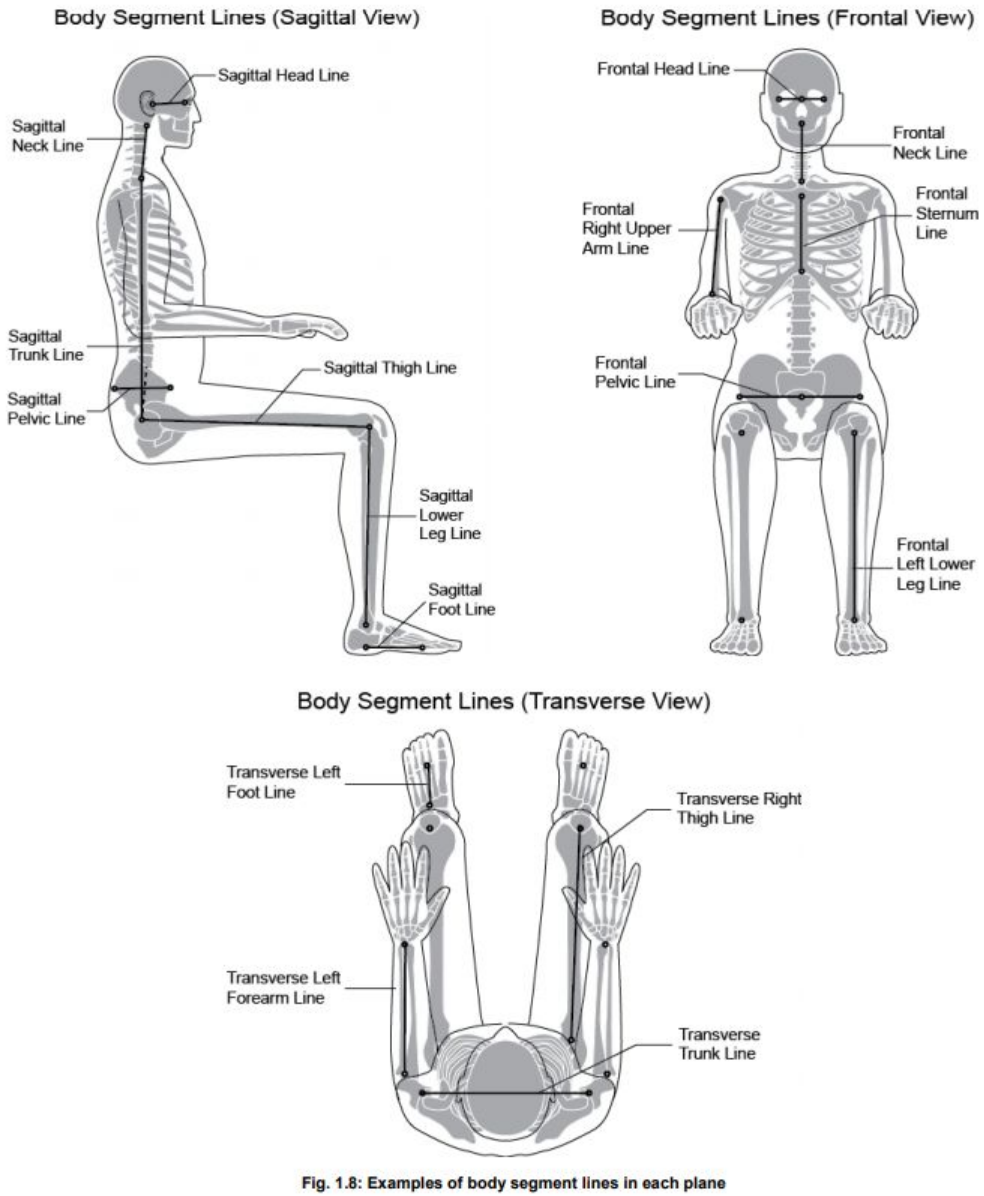


Fig. 1.8: Examples of body segment lines in each plane

Linear Body Measurements

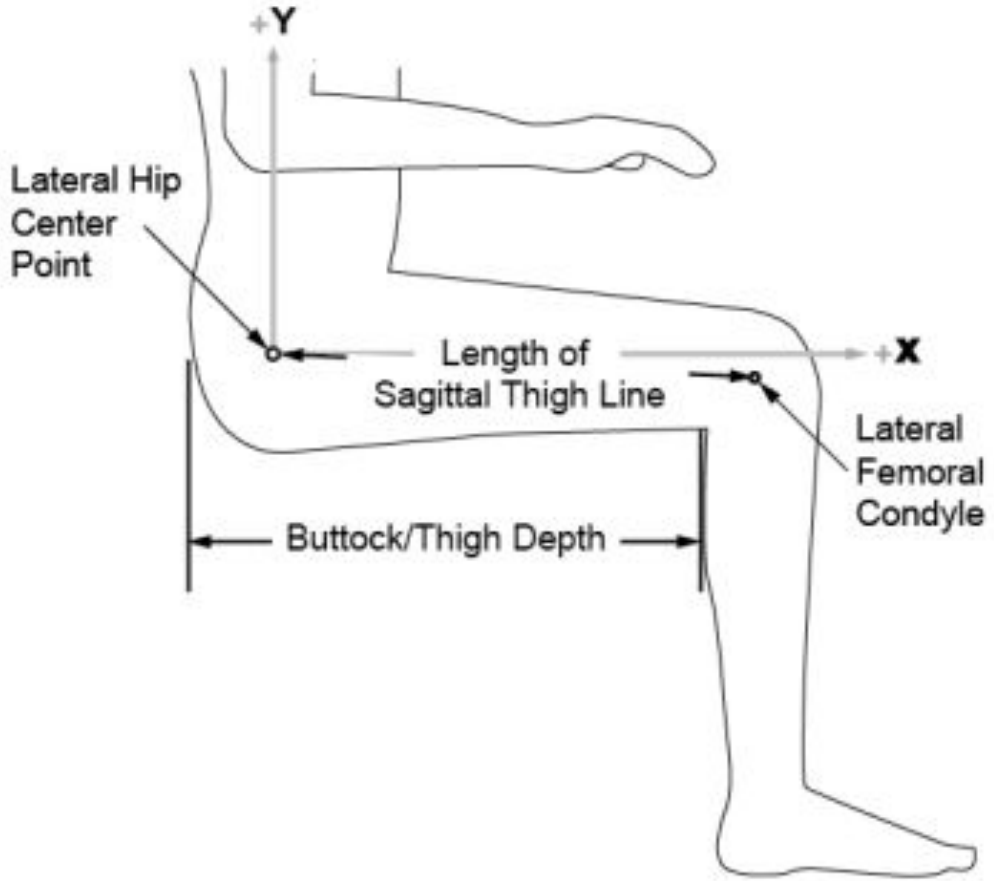
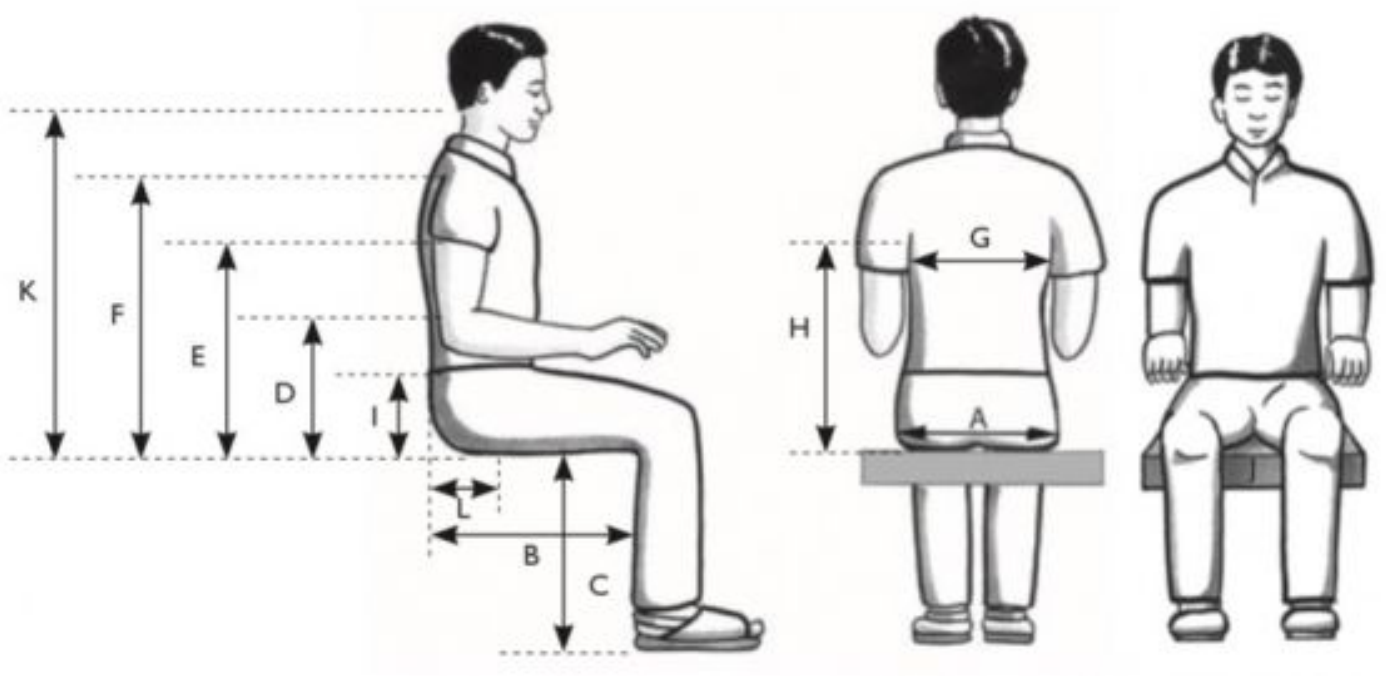


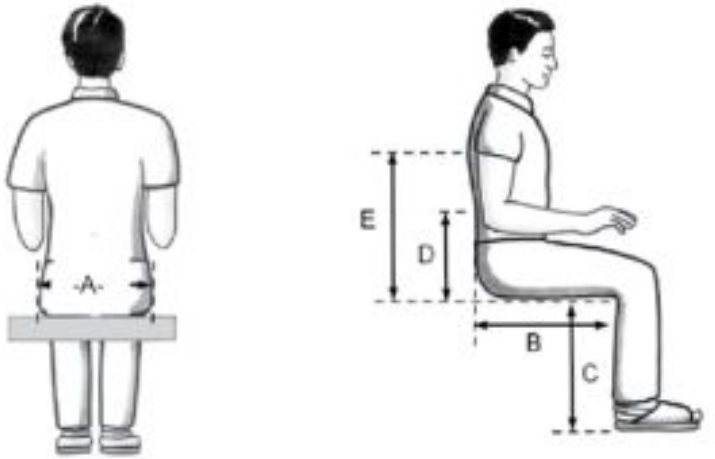
Fig. 1.9: Sagittal thigh line vs. buttock/thigh depth

What measurements do I need?



- Not all measurements are needed for all clients
- Basic measurements include A, B, C, E, G
- Additional measurements are required for more complicated seating

What measurements do I need?



	Body Measurement		Measurement (mm)	Change body measurement to ideal wheelchair size	Wheelchair measurement (mm)
A	Hip width			Hip width = seat width	
B	Seat depth	L		B less 30–60 mm = seat depth (if length is different, use shorter one)	
		R			
C	Calf length	L		**= top of seat cushion* to footrests height *or* = top of seat cushion* to floor for foot propelling**	
		R			
D	Bottom of rib cage			= top of seat cushion* to top of backrest (measure D or E – depending on the user's need)	
E	Bottom of shoulder blade				

***check the height of the cushion that the wheelchair user will use.**

Frost, S. et al. (2012). *World Health Organization: Wheelchair Service Training Package - Basic level.* WHO Press. Geneva, Switzerland. Retrieved from: https://apps.who.int/iris/bitstream/handle/10665/78236/9789241503471_reference_manual_eng.pdf?sequence=1

Where do I complete a wheelchair assessment?

- Mat assessment
  - sitting on a firm surface allows you to see the client's natural postures when not supported in a wheelchair
- Supine assessment – primarily for lower extremity evaluation

When assessing and evaluating postural variations, determine if they are:

Flexible?
(able to correct to neutral)

or

Fixed?

Informs decisions as to whether you decide to:

- Correct
- Partially correct
- Accommodate

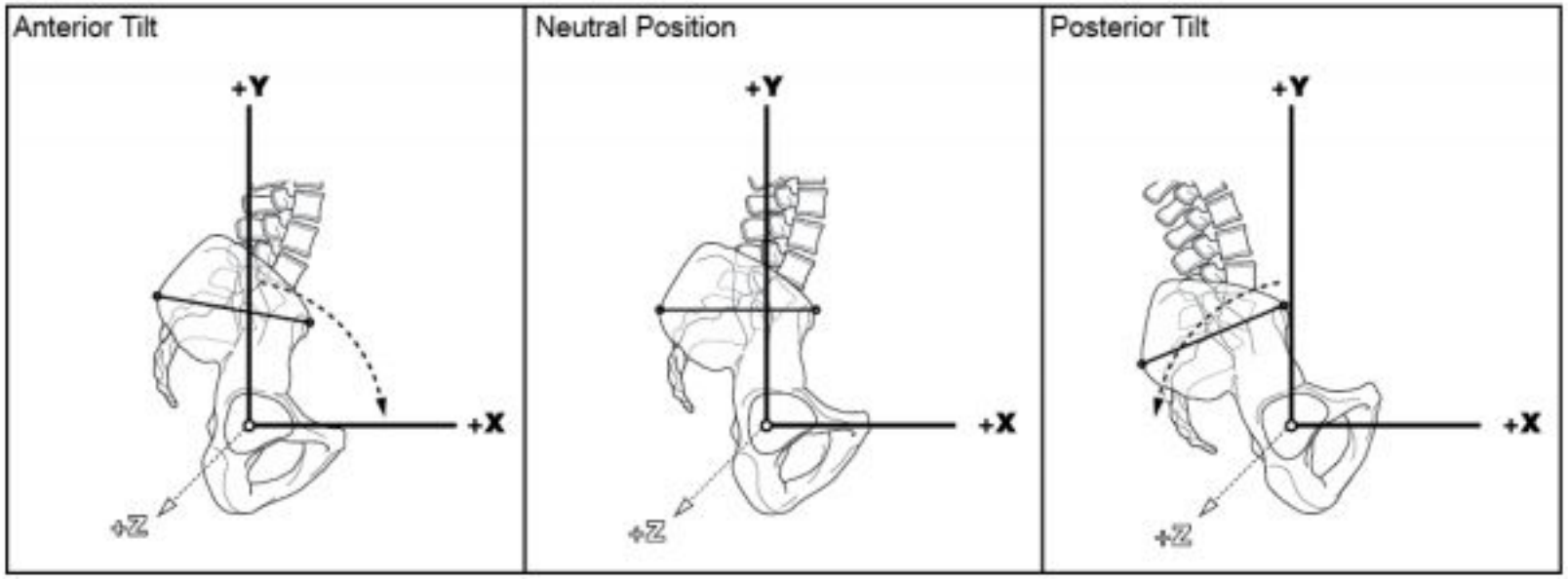
Where do you start?

Need a stable base of support…

START AT THE PELVIS!

Then, move on to trunk, head and lower extremities.

Pelvic Movement in the Sagittal Plane (side view)



Anterior

- PSIS higher than ASIS

Neutral Alignment

- Anterior superior iliac spine (ASIS) and Posterior superior iliac spine (PSIS) are level.
- Ischial tuberosities are weight bearing

Posterior

- PSIS lower than ASIS
- Center of gravity shifted posteriorly
- Coccyx is weight bearing

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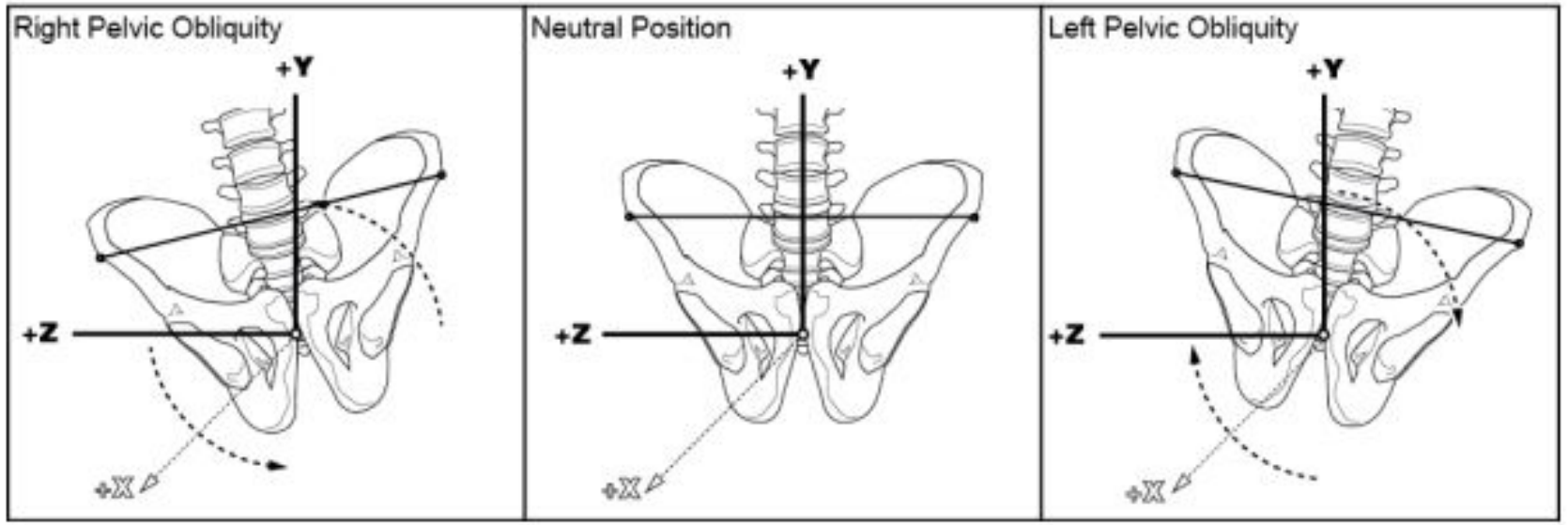
Pelvic Movement in the Sagittal Plane (side view)

Pelvic Movement in the Frontal Plane (front view)



- When one iliac crest is lower than the other
- Named for the lower side

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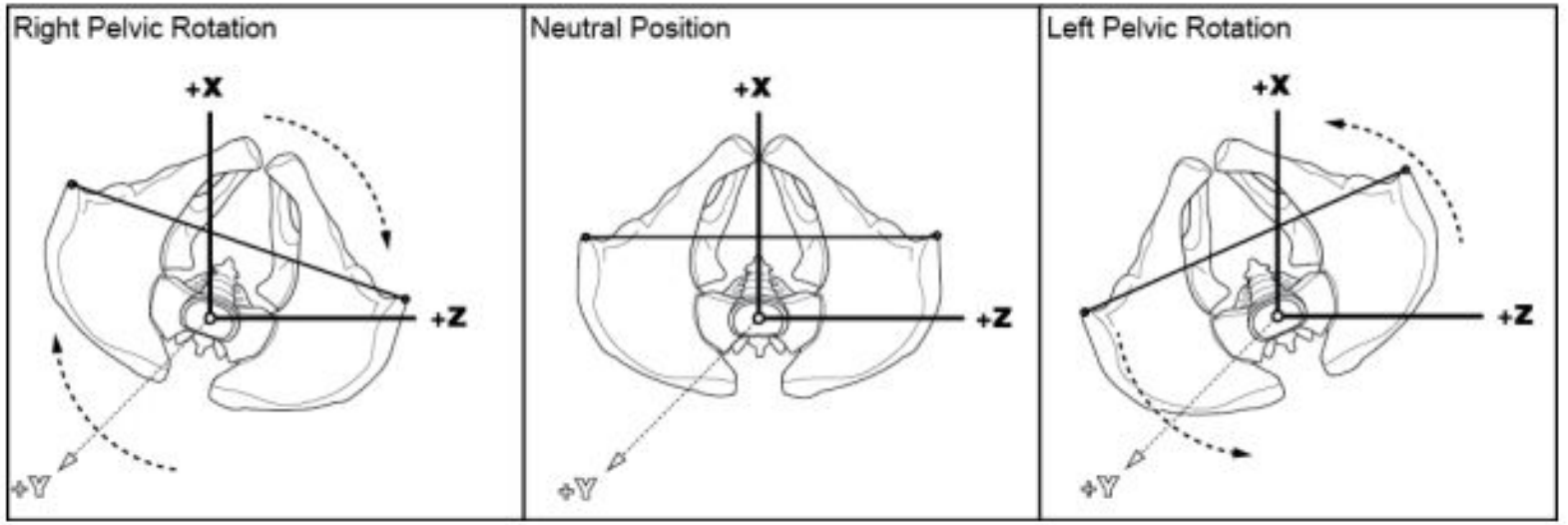
Pelvic Movement in the Frontal Plane (front view)

Pelvic Movement in the Transverse Plane (top view)



- When one ASIS is posterior relative to the other
- Named for the most posterior side

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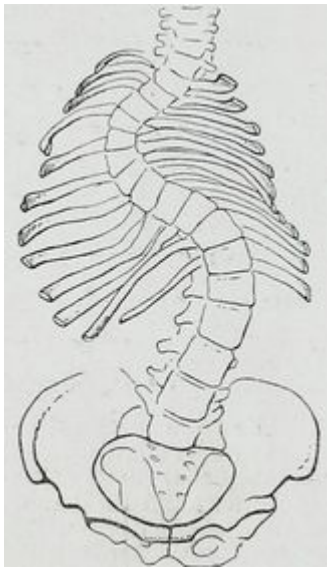
Pelvic Movement in the Transverse Plane (top view)

Scoliosis

Lateral Curvature of the spine

- Can be either:
  - Single Curve
  - S Curve
- Name for side of convexity

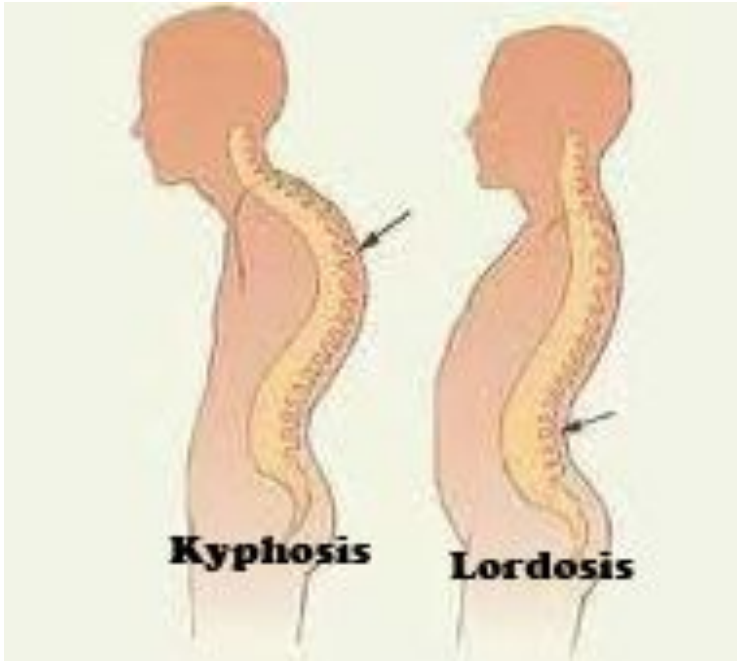
Right convexity

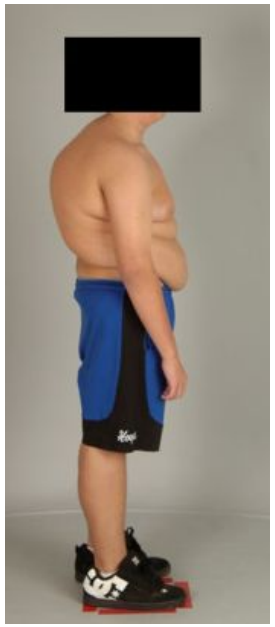


S curve

Left convexity

Kyphosis vs. Lordosis





Kyphosis
- Abnormal rearward curvature spine
- Full trunk kyphosis often accompanied by a posterior pelvic tilt and shoulder protraction

Lordosis
- Usually at the lumbar level with exaggerated lumbar curve
- Often accompanied by anterior pelvic tilt

Lower extremity positioning

Transverse thigh angle

- Neutral
- Abducted
- adducted

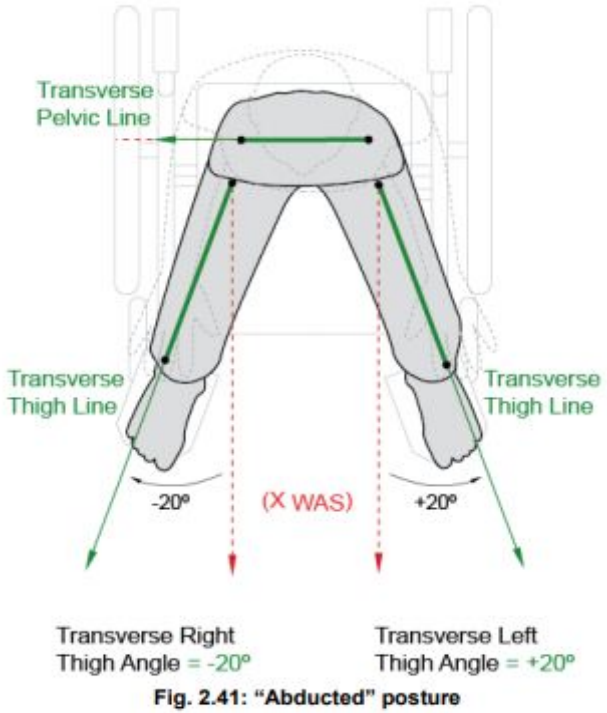


Fig. 2.41: "Abducted" posture

Frontal Lower Leg Angle

- Neutral
- Internal rotation
- External rotation

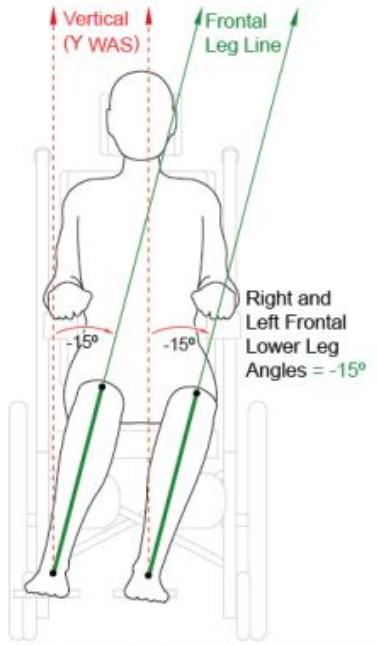


Fig. 2.32: Lower legs windswept to right

Lower extremity positioning

Wind sweeping

- abduction and external rotation of one hip with the adduction and internal rotation of the other

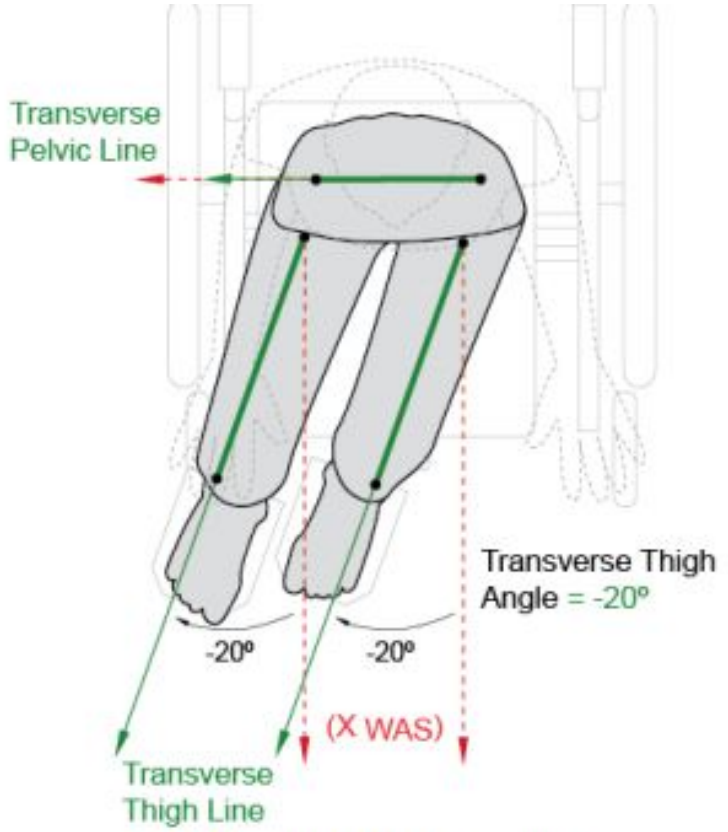


Fig. 2.40: Right windswept posture

In Supine….

- **Hip PROM**
  - Flexion – to/past 90°
  - Internal/External Rotation
  - Adduction/Abduction
- **Hamstring PROM**
- **Ankle PROM**
  - Dorsiflexion/plantar flexion
  - Inversion/Eversion
- Observe associated or substitution movements (i.e. shortened hamstrings may cause posterior pelvic tilt during PROM)

Evaluate existing wheelchair

- Make and model
- Sizing/dimensions and set-up
- Seating
- Features (i.e. scissor brakes, angle adjustable foot plates, belts, etc.)
- Wear patterns and personal modifications

Prescription

- Take into account all the information learned to create your equipment prescription in conjunction with the client and vendor:
  - Client and caregiver goals
  - Mobility and function
  - Skin health
  - Postural tendencies – fixed vs. flexible, correct vs. accommodate
  - PROM
  - Measurements

Equipment Trial

- Once have the equipment for trial, evaluate:
  - Client's goal
  - Fit and comfort
  - Correct/accommodate/position client as desired
  - Mobility?
  - Function?

DALHOUSIE UNIVERSITY Faculty of Medicine
Wheelchair Skills Program

WHEELCHAIR SKILLS PROGRAM

nova scotia health authority

Wheelchair Skills Program Manual 5.0

https://wheelchairskillsprogram.ca/en/

Wheelchair Skills Test (WST) Version 5.0 Form
Manual Wheelchairs

Name of wheelchair user: _____
Caregiver assisting (if any): _____
Tester: _____ Date: _____

#	Individual Skill	Capacity (0-3)*	Comments
1	Rolls forward short distance		
2	Rolls backward short distance		
3	Stops on command		
4	Turns in place		
5	Turns while moving forward		
6	Turns while moving backward		
7	Maneuvers sideways		
8	Picks objects from floor		
9	Relieves weight from buttocks		
10	Performs level transfers		
11	Folds and unfolds wheelchair		
12	Gets through hinged door		
13	Rolls longer distance		
14	Ascends slight incline		
15	Descends slight incline		
16	Ascends steep incline		
17	Descends steep incline		
18	Rolls across side-slope		
19	Rolls on soft surface		
20	Gets over obstacle		
21	Gets over gap		
22	Ascends low curb		
23	Descends low curb		
24	Ascends high curb		
25	Descends high curb		
26	Performs wheelchair-ground transfers		
27	Performs stationary wheelie		
28	Turns in place in wheelie position		
29	Rolls forward and backward in wheelie position		
30	Descends high curb in wheelie position		
31	Descends steep incline in wheelie position		
32	Ascends stairs		
33	Descends stairs		
	Total score:**	%	Total testing time (minutes):

* See criteria on next page.
** See formula on next page.

General Scale for Scoring Skill Capacity*		
Advanced pass	3	The subject carries out the skill in a highly proficient or advanced manner.
Pass	2	The subject carries out the skill independently and safely, but imperfectly.
Partial pass	1	The subject completes a majority of the evaluation criteria.
Fail	0	The subject does not complete a majority of the evaluation criteria, is unsafe or unwilling.
Not Possible	NP	The wheelchair does not have the parts to allow this skill.
Testing Error	TE	The tester cannot assess the skill for some reason.

* More details, including criteria specific to individual skills can be found in the WSP Manual.

Formula for calculating total percentage score:
Total WST Capacity Score = sum of individual skill scores/([number of possible skills – number of NP scores – number of TE scores] x 3) X 100%

General comments including any suggestions for remediation:

Details about the WST can be found in the WSP Manual at http://www.wheelchairskillsprogram.ca/eng/manual.php/.

WST 5.0 Form for Manual Wheelchairs
Originally approved for distribution and use: August 17, 2018
Current version: August 17, 2018

Wheelchair Skills Test (WST) Version 5.0 Form
Powered Wheelchairs

Name of wheelchair user: _____
Caregiver assisting (if any): _____
Tester: _____ Date: _____

#	Individual Skill	Capacity (0-3)*	Comments
1	Positions and operates controller		
2	Operates body positioning options		
3	Rolls forward short distance		
4	Rolls backward short distance		
5	Stops on command		
6	Turns in place		
7	Turns while moving forward		
8	Turns while moving backward		
9	Maneuvers sideways		
10	Picks objects from floor		
11	Relieves weight from buttocks		
12	Performs level transfers		
13	Gets through hinged door		
14	Rolls longer distance		
15	Ascends slight incline		
16	Descends slight incline		
17	Ascends steep incline		
18	Descends steep incline		
19	Rolls across side-slope		
20	Rolls on soft surface		
21	Gets over obstacle		
22	Gets over gap		
23	Ascends low curb		
24	Descends low curb		
25	Performs wheelchair-ground transfers		
	Total score:**	%	Total testing time (minutes):

* See criteria on next page.
** See formula on next page.

General Scale for Scoring Skill Capacity*		
Advanced pass	3	The subject carries out the skill in a highly proficient or advanced manner.
Pass	2	The subject carries out the skill independently and safely, but imperfectly.
Partial pass	1	The subject completes a majority of the evaluation criteria.
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Not Possible	NP	The wheelchair does not have the parts to allow this skill.
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WST 5.0 Form for Powered Wheelchairs
Originally approved for distribution and use: August 17, 2018
Current version: August 17, 2018

- Once equipment trial is completed:
  - complete funding application(s)
  - follow-up with client once the new equipment has been delivered

Assistive Devices Program (ADP)

Power Mobility Devices

- Where manual mobility is precluded

Types of Power Mobility Devices:

- Power wheelchairs
- Power bases
- Power add-on devices
- Power scooters

Assistive Devices Program (ADP)

Assistive Devices Program (ADP)

Power Scooter:

ADP funding should only be requested for a power scooter when:

- Power mobility is basic mobility device
- The Applicant does not have seating requirements now or in the foreseeable future
- The scooter is not intended to be a replacement for a car or another transportation modality
- The Applicant can transfer independently on to and off the scooter

Assistive Devices Program (ADP)

Central Equipment Pool (CEP)

High technology power wheelchairs, defined as a power wheelchair and/or power base that includes a power dynamic positioning device - tilt and/or recline – as a component.

Eligibility Criteria:

1. Maintain skin integrity where there is a high risk of tissue trauma and a loss of ability to effectively weight shift independently;
2. Maximize respiratory function
3. Maintain independent mobility through increased sitting tolerance

Assistive Devices Program (ADP)

Central Equipment Pool (CEP)

Practice Lab Room 1523/ 1526/1529

- Three Stations:
  1. Practice the Berg Balance Scale
  2. Practice Wheelchair Measurements
  3. Assess wheelchair fit

References

- Dalhousie University, Faculty of Medicine, Wheelchair Skills Program. Retrieved Jan 2019 from: https://wheelchairskillsprogram.ca/en/
- Frost, S. et al. (2012). *World Health Organization: Wheelchair Service Training Package - Basic level.* WHO Press. Geneva, Switzerland. Retrieved from: https://apps.who.int/iris/bitstream/handle/10665/78236/9789241503471_reference_manual_eng.pdf?sequence=1
- Ontario Ministry of Health and Long Term Care, Assistive Devices Program (Jan. 11, 2019). Retrieved from http://www.health.gov.on.ca/en/pro/programs/adp/
- Waugh, K., & Crane, B. (2013). *A Clinical Application Guide to Standardized Wheelchair Seating Measure of the Body and Seating Support Surfaces, 3rd Edition. Retrieved from:* https://www.ncart.us/uploads/userfiles/files/GuidetoSeatingMeasuresRevisedEdition.November2013.pdf