

# Wheeled Seated Mobility Physical Assessment: Mat Assessment and Postural Alignment Lab

## Prior Learning and Laboratory Preparation:

1. Complete the 3-part sequence on Wheeled Seated Mobility(WSM) Assessment: WSM Modules 4, 5 and 6. <https://www.anptsynapsecenter.com/public/page-courses/>
2. View 3 World Health Organization Intermediate WSTP videos:
  - a. 02 Wheelchair Service Steps (4:51 min)
  - b. 06 Physical Assessment Overview (1:10 min)
  - c. 07 Pelvis and Hip Posture Screen (2:19 min)

## Objectives of This Assignment:

1. Describe postural alignment in supine, side lying and sitting.
2. Palpate bony landmarks, identify postural deformities and establish if deformities are non-reducible, reducible or mixed.

## Materials:

1. Mat Table or Firm Surface
2. Mat Evaluation Form (pages 8 and 9)

## Laboratory Assignment:

You and your lab partner will practice your skills performing a postural mat assessment.

1. Pair up with a lab partner. Take turns being the 'clinician' and the 'patient'.
  - o *Patient:* Before starting think of a patient/wheelchair user scenario and complete the Wheelchair User Profile on page 9 describing essential clinical findings. Simulate this clinical picture as your lab partner examines you.
2. *Clinician:* Conduct your physical evaluation following the instructions provided on pages 2-7. Use pages 8 to record the clinical findings of your mat assessment.
3. Complete page 9 describing the essential clinical findings used with your lab partner.
4. Both partners reflect on your individual experience and complete the two questions at the bottom of page 9.

**Background:** It is important to make a visual assessment of the patient in their current wheelchair, then conduct a thorough supine postural evaluation before sitting them back up. A gravity eliminated position (supine and side lying) allows you an opportunity to establish the wheelchair users' range of motion, postural alignment and influences of tone without the influence of gravity in the upright posture. This helps establish a starting place for the sitting assessment to minimize risk of postural deformities and correct and/or accommodate existing postural deformities.

Before you sit the patient in a wheelchair system, take time to assess the patient's pelvis, trunk, shoulders and legs. If you know that there are postural deformities or ROM limitations, you will then be able to identify features needed in the recommended seating and mobility system.

**Instructions:**

Here are the steps of a mat evaluation:

**Supine evaluation.**

First, check the pelvis for obliquity or rotation.

For pelvic obliquities: Place your hands perpendicular on either side of the client's trunk so your thumbs point into the patient (see Image A) and slowly slide them down so that the index fingers of your hands rest on top of the client's iliac crests. (If the client is obese, and you cannot feel their iliac crests, then you can slide your thumbs up the client's lateral thigh until they are resting just under the ASIS (see Image B). Assess to see if your hands/thumbs are level.

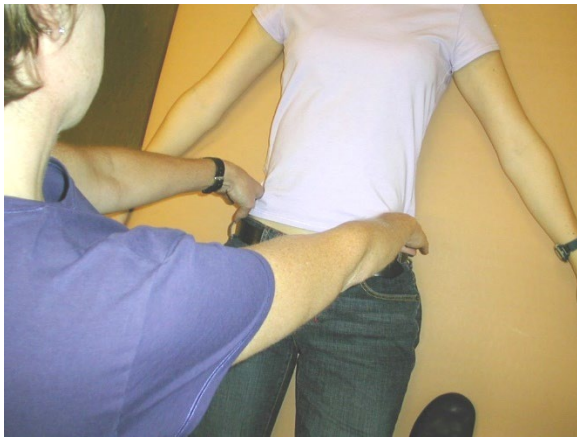


Image A



Image B

If one side is higher than the other, they could have a pelvic obliquity.





Then check to see if you can correct the obliquity by grabbing firmly around the client's pelvis and try to laterally flex the pelvis until the iliac crests/ASISs are level. There is an alternate method for checking flexibility if the client is large. Stand over the client with their legs flexed and held in between your legs. Place your hands underneath buttocks. Sit back as if you are sitting on a stool while lifting the buttocks with your arm. Use your legs to counterbalance the client's weight to protect your back. Laterally flex the pelvis side to side to determine if it is a nonreducible vs. reducible deformity. (See Image).

If the pelvis cannot move at all, it is a nonreducible pelvic obliquity. Make a note of any deformities.

### First, for pelvic rotation:

Place your thumbs on the ASISs of the client. Check to see if one thumb seems "higher" than the other. If one is higher, than the pelvis could be rotated. Place your hand flat over the ASIS of the higher side and grab under the pelvis on the lower side. Try to de-rotate the pelvis by pressing down on the high side while pulling up on the low side until the pelvis is level. If the pelvis will not rotate, it is a nonreducible deformity. Make a note of any deformities.



### Second, check hip flexion

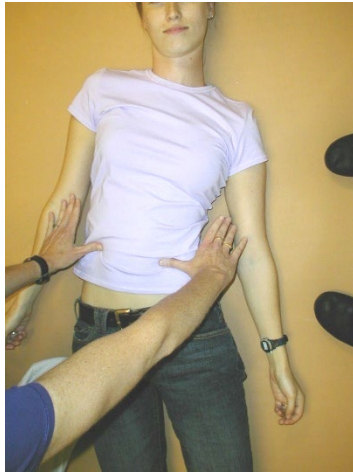
With the patient supine, hold the pelvis firmly with one hand by cupping the front (thumb on ASIS) and back of the pelvis. With the knee bent at 90 degrees, start to bring the knee to the chest with your other hand. Continue to bring the knee to the chest while holding the pelvis steady. When you feel the pelvis start to move under your hand, then stop, and measure how much hip flexion is achieved. When the pelvis starts to move, this means the limit of hip flexion has been reached and any further movement of the knee toward the chest is not femoral movement but is from the



pelvis posteriorly tilting. You don't want this to happen! If the patient can only flex his hip 80 degrees before his pelvis starts to rotate, he does not have adequate hip flexion for sitting at 90 degrees. To sit at 90 degrees, the patient must be able to achieve at least 90 degrees of hip flexion before pelvis movement. They must have greater than 90 degrees if you plan to sit them in a "bucketed" position or "squeeze seat" where the front seat height is higher than the rear seat height (typically in a rigid frame chair). Note how much hip flexion the patient has.

### Third, check for scoliosis

Examine the rib height when supine. Get up under the bottom of the ribs with the same hand position as you used for checking pelvic obliquity to see if the lower ribs are at the same height. If the lower ribs are not at the same height, there might be a scoliosis. Make sure to do a medical chart review to ensure that there are no ribs removed or fractured!



- Examine the shoulders. If they are obviously not level, (one is higher than the other), than there is probably a scoliosis. Note that if there is an "S" shape scoliosis, the shoulder height may appear level.
- Check to see if the scoliosis is reducible or nonreducible by trying to use 2 points of pressure. Place one hand low on the convex side and one hand high on the concave side. (Image A) If you can move the patient into better alignment, than the scoliosis is reducible. (Image B) Note any deformities.



Image A

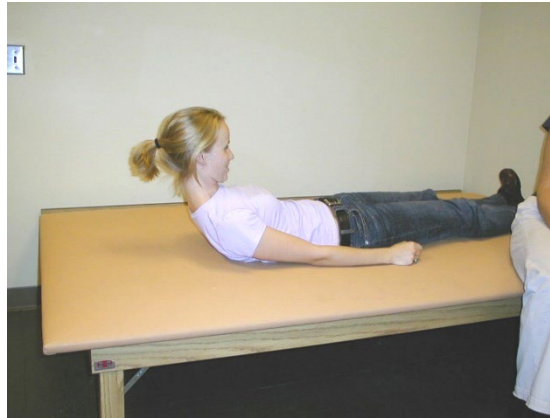


Image B

#### **Fourth, check for kyphosis**

If the client appears to have a kyphosis in sitting, but they flatten out and do not require multiple pillows to support the head in supine, the kyphosis is reducible.

If the client requires several pillows to support the head in supine, the kyphosis is non-reducible.



#### **Fifth- check for lower extremity ROM**

Check to make sure the client has adequate hamstring ROM for sitting in a wheelchair. Place one thumb on the ASIS. With the other hand bend the hip to 90 degrees (or the maximum amount of hip flexion the person could achieve before pelvic movement) Then extend the knee until you feel the pelvis starts to move. Measure the degree of knee flexion. This tells you the maximum angle that can be used for the front frame or the leg rests of the wheelchair without pulling the pelvis into a posterior tilt. Do they have enough knee ROM to sit with hips at 90 and, a 90-degree front angle, or an 80-degree front angle, or a 70-degree front angle? Note abnormalities.

Check to make sure they have adequate ankle ROM (dorsiflexion/plantarflexion, eversion/inversion, adduction/abduction) to allow their feet to lay flat on a standard 90 degree foot rest. If they have a plantar flexion contracture, they will need angle adjustable footplates or a modification to accommodate the limitation. Note abnormalities.

#### **Sidelying evaluation:**

In side lying, if the patient has a pre-existing scoliosis, you might be able to see a rib hump in back. You can usually identify an “S” shape scoliosis in side lying and see the severity of the scoliosis by following the spine with your finger.

While in side lying complete a visual inspection of the skin looking for any areas of pressure, discoloration, and scars. Be sure to look at bony prominences (e.g. ischial tuberosities, greater trochanters, heels, bottoms of feet, pelvis/sacrum/coccyx, ribs and scapula).

### **Sitting evaluation: (on mat)**

Supine is where you see the person's ideal posture without gravity or tonal influence, providing a good idea of ROM that is available/not available. In sitting, you will be able to see what happens when gravity/tone/spasticity takes over. You might need a second person to help with the sitting mat evaluation depending on the client's size, level of disability, etc.

In sitting check for anterior/posterior tilt. This is the most common form of deformity. You can statically check by placing the fingers of one hand on the ASIS and the fingers of the other hand on the PSIS to see if the pelvis sits level. If the patient has a posterior tilt, the ASIS will be higher than the PSIS. Vice versa for anterior tilt. You can check for pelvic tilt flexibility by sitting next to but facing the client (Image A), and using your leg to put pressure on the upper pelvis or lumbar area to move the client's pelvis forward. (Image B) See if you can rotate pelvis into a neutral or anterior tilt. OR you can sit in front of the client with a sheet around the back of the pelvis at about the level of the PSISs and pull forward to see if you can tilt the pelvis forward. Make sure someone is behind the client and counterbalancing the trunk if the client does not have trunk control.



Image A

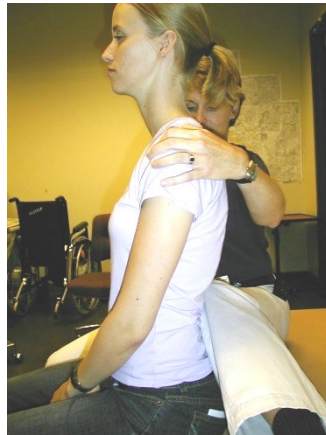


Image B

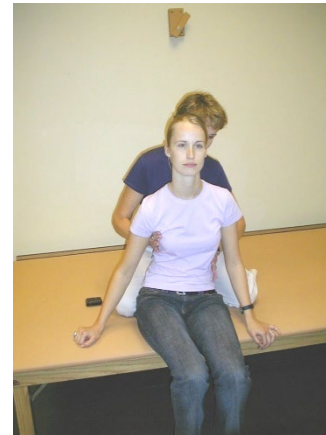


Image C

- Check for flattening of the lumbar spine and increased thoracic kyphosis by looking for rounded shoulders and forward head posture. (Image A) Assess for nonreducible /reducible kyphosis by applying pressure to the thoracic and lumbar spinous processes to see if there is movement. (Image B)

### **Sitting in the WC:**

Make sure the client's buttocks is all the way back in the wheelchair seat when sitting! Be aware that a client lifter may not initially place the patient in their best posture. Repositioning is needed. If the client cannot independently scoot their buttocks to the back of the seat, you can lean them forward and slide the buttocks all the way back so that they have good pelvic stability. Then place the anterior pelvic support appropriately to maintain the pelvis in the proper position and secure snugly. If the buttocks is not all the way back, then the patient will slide into a posterior pelvic tilt to obtain stability. You don't want that!

## **Making your assessment:**

After you have performed the mat evaluation and made a note of any abnormalities, you can then look at the whole big picture and determine what you need to do about it. The most common deformities are:

- Posterior tilt with flattened lumbar spine and excessive thoracic kyphosis
- Pelvic obliquity with scoliosis

## **Ways to Intervene:**

- If pelvic and lumbo thoracic ROM is WNL, supporting the pelvis in a neutral position should assist in promoting an upright trunk posture. Make sure the pelvis is all the way back in the wheelchair seat with the anterior pelvic support tightened underneath the ASIS, not above it.
- If the hip cannot achieve 90 degrees of flexion, use an open seat to back angle that accommodates the limitation.
- If the spinal kyphosis is non-reducible, use an open seat to the back angle to accommodate the limitation.
- If the spine is reducible adjustable tension back upholstery might be used to maintain an upright posture. Tighten the straps behind the pelvis and lumbar spine, then loosen the straps behind the thoracic spine to promote a neutral pelvic position and allow the shoulders to extend above or behind the hips. This can assist in promoting an upright trunk posture and sitting balance.
- For manual wheelchair users if the pelvis, hips and spine are reducible but the person tends to slide into the posterior pelvic tilt, add a bucket or squeeze to the wheelchair or seating such that the hip is held in more than 90 degrees of flexion (knees higher than hips). This closed seat-to-back angle can be achieved through configuration or adjustments to the wheelchair frame. It can improve balance and allow for pelvic stability and a more upright posture to propel the wheelchair. This will decrease the amount of recline (open seat-to-back angle) you need to use to maintain balance. **MAKE SURE ADEQUATE HIP FLEXION IS AVAILABLE!**
- Add a pelvic support once the pelvis is in good position to decrease posterior pelvic tilt (support neutral pelvis) and help minimize or correct kyphosis/forward head posture
- For scoliosis, a minimum of TWO lateral trunk supports to correct or accommodate the posture are required (one low on the convex side and one higher on the concave side). Using just one support to stop the client from falling to the side may just push them to the other side. If the wheelchair fits well, the armrest may serve as a pelvic guide. However, if the pelvis continues to slide laterally, a pelvic support on the concave side of the scoliosis may also be needed.
- For a non-reducible pelvic obliquity, an accommodation can be achieved by building up the surface of the seat cushion under the high side of the pelvis. This will distribute pressures and build a stable base. There are different products and materials (air, fluid, gel, foam) available to make this accommodation. **CAUTION:** be VERY careful regarding skin integrity and consult a seating specialist before doing this.
- For a reducible pelvic obliquity, a correction can be achieved by building up the surface of the cushion under the low side of the pelvis to level the reducible obliquity. **CAUTION:** be VERY careful regarding skin integrity and consult a seating specialist before doing this.

If you have any questions once the person is sitting, or need more help, a seating specialist can consult with you on the initial evaluations to make sure the client starts out sitting with the best posture available. Difficult posture situations beyond basic (intermediate and complex), when possible, should be seen initially in a seating clinic. It is important that seating equipment recommendations are made carefully to ensure that limited third-party funding benefits are used appropriately. Inappropriate equipment purchases are not easily replaced. Trials and simulations are a very important part of the process before making final decisions.

Prevention and patient/family education is the key. Make sure to educate the patient about skin inspection and effective pressure redistribution techniques (methods, frequency, duration). Educate OFTEN, and have the patient demonstrate and explain their understanding of your instructions. Have them use mirrors to do postural self-correction (if they can) or teach the family members how to properly position the patient too.



# Lab Assignment

Name:  
Lab Partner:

Date:

## Mat Evaluation Form: (to be filled out by the "Clinician")

Describe your clinical observations and findings in the comments section. Be specific in your description (e.g. 1" reducible pelvic obliquity R higher than L, Rib rotation backwards 2" on L) and quantify any ROM deficits.

### Sitting in Current WC:

### COMMENTS

Describe the posture observed when client arrived in WC?	
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### Supine:

### COMMENTS

Pelvic obliquity:	
Pelvic rotation:	
Hip flexion ROM:	
Scoliosis- shoulder height	
Scoliosis- lower rib height	
Hamstring ROM	
Ankle ROM	

### Side lying:

### COMMENTS

Rib rotation (hump)	
"S_ shape scoliosis	

### Sitting on mat:

### COMMENTS

Pelvic tilt	
Excessive lumbar lordosis	
Excessive thoracic kyphosis	
Forward head posture	
Noticeable scoliosis in sitting	
Pelvic obliquity	

# Lab Assignment

Name:

Date:

Lab Partner:

Pelvic rotation	
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## Sitting in Current WC:

## COMMENTS

Posture when repositioned in WC?	
Buttocks all the way back?	
Other observations	

## Lab Assignment

Name:

Date:

Lab Partner:

**Wheelchair User Profile (to be filled out by the “patient”):** Describe the characteristics of the patient/wheelchair user that you will use for your lab partner.

1. Demographics (age, gender, diagnosis)
2. Describe each postural deformity and whether it is non-reducible, reducible or mixed: scoliosis, pelvic obliquity, pelvic rotation, pelvic tilt, excessive kyphosis, excessive lordosis, etc.
3. ROM limitations: degrees of ROM, side (right, left, bilateral), joint (hips, knees, ankles)
4. Neuro considerations (tone, spasticity, reflexes)
5. Other

**Upon completion of the lab, answer the following:**

1. What stood out as most important in this lab?
2. What ideas from the physical mat evaluation lecture and lab are still unclear?