FUNCTIONAL EXERCISES FOR THE
NON-WEIGHT BEARING PATIENT
Course Narrative

2 GOALS OF INTERVENTIONS FOR THIS PATIENT:
1. Functional while NBW
2. Prepare for function when they are no longer NBW

Functional While NBW:
The patient needs to be able to perform ADL’s, transfers and mobilize through ambulation
or wheelchair propulsion while they are NBW’ing. We can’t change what they CAN’T do in
this timeframe but we can maximize how they function with the mobility and muscles they
do have. That means, how they perform everyday tasks will be different from how it was
done BEFORE the injury and different from how it will be performed AFTER WB’ing
restrictions are lifted.

IE: 45 year old construction worker falls, femur fracture, NBW left LE. Prior to injury... bipedal
gait (2 good legs! Very familiar, very efficient form of mobility). Now, will be reliant on UE to
compensate for the one limb which can not hold the bodyweight in single limb stance phase of
gait. CHANGES EVERYTHING!!! The therapist needs to understand the new task- use of a walker
to maintain NBW, needs to understand the upper body demand and teach that task through
interventions in therapy. BUT.... 3 months from now, WB’ing restrictions will be lifted and,
assuming therapist did their job (provided HEP or interventions which address muscle activation,
muscle length and core activation), patient will return to normalized, bipedal mobility.

FUNCTION WHILE NBW’ING = TASK ANALYSIS
Provide interventions that maximize neural adaptations and coordinated movement
patterns of the muscles they do have, of the movement they do have.

**DO NOT DO RANDOM EXERCISES FOR RANDOM MUSCLES THAT DO NOT ADD
TOGETHER TO CREATE A TASK THEY NEED FOR ADL’s, TRANSFERS or MOBILITY!!!!!

Seriously..... what benefit does overhead press with a one pound weight have
to improve a patients ability to push self up from sidelying or reach behind the
body to pull pants up??? NONE!!!!!!!

TASK ANALYSIS
Instead of looking at the body as a whole... look at the task they can not complete and focus on
one task at a time.... You will see quicker more consistent changes when interventions are focused
on addressing one task at a time.

IE: If you want a child to be better at baseball..... you don’t just play a game of baseball.... You
spend time on hitting. Correcting and practice the timing, alignment and positioning needed for
that task... then you focus on throwing- the timing, coordination and consistency of that task...
then you practice catching, etc. YOU WOULD NEVER TEACH A CHILD BASEBALL BY LIFTING WEIGHTS, BIKE RIDING, etc. – TASK SPECIFIC DRILLS!!!! Strengthening the muscles they do have for improved coordination and timing for ONE TASK AT A TIME!!!! This is neural adaptation.

SIMPLE TASK ANALYSIS:
Where does task initiate from?
Success of any task we do is dependent on our ability to offer proximal control before distal mobility. If we do not have a stable base, the limb movements we attempt will be unsuccessful.
Every task we perform has a point of initiation – a movement proximally within the body (more specifically, the trunk) that creates the stability needed for the rest of the task.
i.e. Sit-stand initiates from ant pelvic tilt.

WHAT IF THEY CAN NOT ACCESS THE MOVEMENT NEEDED?
If they can not access it do to lack of muscle activation or ROM- Then before you continue with task training, you need to STOP and prepare the body to be successful for the task. Create an intervention that will give them the muscle activation and/or range of motion for that movement.

i.e. Patient is stuck in post pelvic tilt from prolonged w/c sitting and can not get to ant pelvic tilt. The intervention the therapist gives IS NOT tugging the gait belt and repeated mod assist sit-stand x 5. The intervention address the piece of the puzzle that is missing for the task to be successful. Give them ant pelvic tilt.

Which muscles/joint motion?
Hint- Think trunk when deciding which muscles/movements initiate the movement to provide proximal control before distal mobility.
When describing trunk movement, break it down and describe as follows:

**UPPER TRUNK:** the ribcage on a stable pelvis.
Name the movements by basic motion occurring.

*Sagittal Plane:* Upper Trunk Flexion
Upper Trunk Flexion

*Front Plane:* Upper Trunk Lateral Flexion

*Transverse Plane:* Upper Trunk Post Rotation

*Combined Plane:* Upper Trunk Diagonal Flexion
Upper Trunk Diagonal Extension
LOWER TRUNK: pelvis on ribcage
Name the movements by basic motion occurring.

Sagittal Plane: Ant Pelvic Tilt
Post Pelvic Tilt

Front Plane: Lateral Weight shift

Transverse Plane: Pelvic rotation (scooting back)

Combined Plane: Ant Diagonal Pelvic Tilt
Post Diagonal Pelvic Tilt

What are the joint movements needed at limbs?
(distal movement)

Once the body has a stable base, build the task through your understanding of biomechanics and kinesiology. Which muscles are active next? What joint motions are needed? In what order are the muscles activated?

Consider: Is the muscle active in open-chain or closed-chain?
Which muscle fiber type is predominant in the activity?
What speed is the muscle being asked to work at?
What demand does the muscle have to work against

(LAQ with 2 lb cuff WILL NEVER give a 200 pound lady the “strength” in her legs to stand up!!!!!)

INTERVENTIONS MUST LOOK LIKE THE TASK YOU ARE TRYING TO LEARN!!
Prepare for function when they are no longer NWB

3 Goals of Interventions:

1. **Activate muscles susceptible to atrophy or are inactive due to immobilization/lack of weightbearing**
2. **Maintain length in muscles, especially those susceptible to contractures due to disuse during immobilization/non-weight bearing**
3. **Maintain core activation in all planes of movement**

*** Keeping the body alive so it will be READY for function when restrictions are lifted!!!

**INTERVENTION IDEAS**
(expand your toolbox... make therapy more effective, fun and interesting!!)

**ACTIVATE**

**Scap Stabilizers:**
Scap Depression (pull shoulders down)
Scap Depression (use theraband around shoulders, straighten elbows)
Prone on elbows
Side sitting on elbow or hand
Quadraped
Plank (Prone, side, standing, semi-reclined, reversed, 1 arm, 2 arm.. progress to adding limb movement)
Partial roll up from supine to elbow support

**Retractors:**
Prone is great!
Rows with theraband or pulleys (prone, seated, semi reclined, supine)
Rows with 1 or 2 arms
Rows with trunk rotation
Supine isometric push of elbows into mat (to “pop” up trunk)
Bent over row with weight (support, standing, one arm, two arms)

**Hip Extensors**
**PRONE. PRONE. PRONE.**
Prone on mat or bed or tilt table.
Prone terminal knee extension (ankle dorsiflexed.... Glut squeeze, knee lift)
Prone hamstring curl
Prone hip extension (think length not height to engage hip versus low back)
Supine or seated hip extension with theraband from above
Supine leg extension with theraband as resistance to engage extensors
Bridging (variations limitless!) ½ bridging, legs extended bridging, off edge of mat
Standing frame: release one leg from support, open chain work into extension
Step ups to front
Single Limb Stance- work standing leg closed chain
Single Limb stance – work other leg in open chain
Seated glut squeeze
Seated push heel into ground (add theraband)- hip hikes (pelvis on ribcage)
**Hip Abductors**
- Sidelying elbow planks
- Sidelying clam shells
- Side step ups
- Seated abduction (theraband for resistance)
- Sidelying theraband hip abduction
- Straddled over bench, theraband for resistance, abduct and hold (picture above)

**LENGTH**

*Manual work is appropriate for any muscles needing more length*

*Best way to get length is to ACTIVATE opposite side of joint*

(i.e. want pecs stretched - do scap retraction!)

*** Therefore… The length and activate section really work together to create balanced, symmetrical alignment throughout the whole body!*

**Heel Cords**

*Stretch with knee straight to get carryover to walking/standing*
- Standing wedged front of foot
- Standing leaning forward against solid surface (be sure knees stay straight!)
- Tilt table prone (can take out NWB limb and support off to side)
- Standing frame (can take out NWB limb and support off to side)
- Supine or prone against wall
- Self-stretching with towel/strap
- Counter with active ant tib muscle activation

**Pectoralis Muscle**

*Supine over foam roller*
- Supine lateral trunk rotation (knees to one side chest opened to ceiling)
- Half rolls… sustaining half rolled positioned for opened chest position stretch
- Seated with roll behind body, opening chest around post. Roll
- Post trunk rotation with reach behind
- Shoulder extension work
- Reverse plank (supine, seated, perched)
- Reclined sitting (arms supporting body from behind body)
- Counter with active scap retraction muscle activation

**Hip Flexors**

*Prone. Prone. Prone. Anything prone… With pelvic neutral*
*Consider that if abdominals are not engaged for pelvic stability, hip flexor length will not be function. Consider pelvic neutral being maintained in ALL hip flexor stretches and hip extensor activation exercises.

Supine with wedges under hips to open front side of hips
One leg off side of mat for length over quad/hip flexors
Consider activation of gluts and hamstrings for hip extension
Seated roll downs/sustained post pelvic tilt

**Pelvic Disassociation**
Ant/post Pelvic tilts
Hip hikes in sitting or supine for one side elevation of hip (push though heel to activate extensors to drive hip up!
Wedged sitting (under one ischial) then added ant/post pelvic tilts, lateral reaches or trunk rotations
Lower trunk initiated lateral movements (reaching tasks)
Half rolling
Adductor stretches (reversed chair sitting!!)
Reversed chair sitting with lateral reaches, pelvic tilts and hip hikes
Single leg open chain hip flexion (femur isolated on pelvis with pelvis stable)
Split straddle stretch over edge of mat – add movement of pelvis, reaching
Split stance standing with trunk rotations posteriorly to both sides
THINK: Functional tasks require the following access to movement
  Trunk on Pelvis & Pelvis on Trunk
  Femur on Pelvis & Pelvis on Femur
  Humerus on Scapula and Scapula (body) on Humerus

DON’T LET COMPENSATIONS OCCUR!!!!!!!
BEST ALIGNMENT, MUSCLE LENGTH, ACTIVATION POTENTIAL
will make for best recovery
when weightbearing restrictions are lifted!!!!!!!
Period.
REFERENCES:  *FUNctional Exercises for the Non-Weight Bearing Patient*


