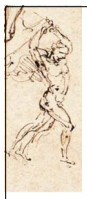

II) How to Use the Functional Assessment to Drive Therapeutic Decisions

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Functional Evaluation

Questions to ask:

- Is it **painful**/painless - **mechanical sensitivity (MS)**
- Is it **dysfunctional**/functional - **abnormal motor control (AMC)**
  - Stability (coordination) or mobility - what the clinician sees
  - Felt in target tissue - what the patient feels
- Is it *specific* to the patients activity goals or intolerances (home, sport, occupational)
- Is there *normative data*?

The Key Link

- During acute care the **Key Dysfunction** is typically painful (MS)
  - Guarded movements predominate & AMCs are unreliable
- But, as pain subsides the Key Dysfunction is typically painless (AMC)
  - Asymmetry of function
  - Related to past injury history
  - Related to activity intolerance
  - Related to activity goals

The Functional Training Range (FTR)?

- *"The Functional Range is the range which is both painless & appropriate for the task at hand."*

  Dennis Morgan, PT, DC

Functional Training Range (FTR)

Essential Points

1) Tolerates - no pain during exercise
2) Performs w/ good motor control
3) Re-assessment shows patient's ROM is no worse

Bonus

4) Re-assessment shows patient's ROM improved *(e.g. McKenzie system)*
5) Patient enjoys the exercise
6) Patient feels exercise in target tissue

The Magnificent Seven - A Functional Screen

1. Range of Motion
2. T4 Postural Mobility - Wall Angel
3. Squat - The Athletic Posture
4. Balance
5. 1 Leg Squat
6. Lunge
7. Respiration

Gray Cook's Scoring - Functional Movement Screens

- 0 - pain
- 1 - can't perform movement
- 2 - performs movement w/ compensation
- 3 - movement performed w/out compensation

Maximum possible score = 21

Every Exercise is a Test

Pain & Asymmetry most important

- Any test w/ a 0 score (pain) requires ortho evaluation
- Any test w/ a 1 or 2 (painless dysfunction) requires functional correction
  - Stabilization
  - Mobilization
- Greatest focus should be on asymmetry of function

1. Range of Motion - ROM

- Hyper or hypomobile
- Find movements or positions which reproduce, increase, or peripheralize pt's characteristic symptoms

Scoring

- 0 - pain
- 1 - can't perform movement - >50% loss of ROM
- 2 - performs movement w/ compensation
  - <50% loss of ROM
  - Hypermobile
  - Segmental dysfunction (ie. Side-bending w/out convexity)
- 3 - movement performed w/out compensation

A)Manipulation Classification

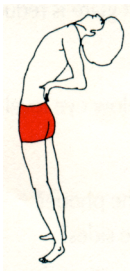
- **Segmental Hypomobility**
  - **Recent onset** of pain <16 days
  - No pain distal to the knee
  - Low fear avoidance beliefs score

- Proper classification improves the probability of improvement from 45% to 95%.

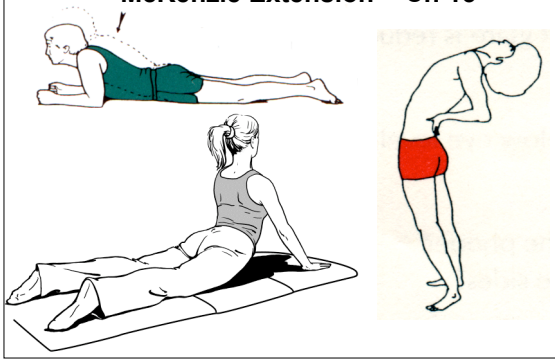
Flynn T, Fritz, J, et al. A Spine 2002.

B) Directional Preference Classification

- Peripheral Symptoms
- Movement Bias
  - Centralization w/ motion testing (i.e.flexion or extension)
  - Peripheralization in opposite direction as centralization
- Strong preference for sitting or walking



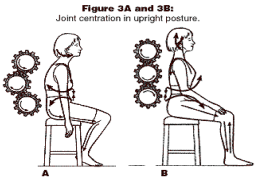
McKenzie Extension - Ch 15



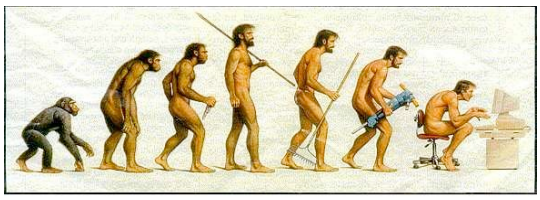
C. Stabilization Classification

- Tendency to hypermobility
  - –Avg. SLR > 91°
  - Chronic, recurrent history
  - Positive prone instability test
  - Aberrant motions present (e.g. instability catch, reversal of L/P rhythm)

2. T4 Postural Mobility



- **Indications:** poor posture in sagital plane
- 2 lordoses should meet between T4-8
- When they don't upright posture is compromised
  - Head forward posture >> Head/neck pain
  - Round shoulders >> Cervico-brachial pain
  - Sway back >> LBP



Somewhere, something went terribly wrong

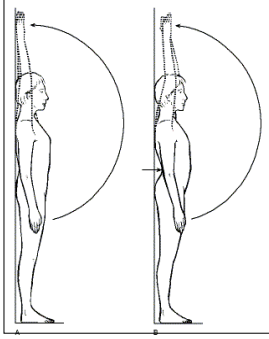
T4 Mobility Screen

- **Test**
- Stand vs. wall w/ feet shldr width apart & slightly forward
- The starting postion should have:
  - Back of head vs wall
  - Wrists vs wall
  - Elbows vs wall
- Try to flatten back
- Record
  - Does back flatten
  - Where does pt. feel tension (mid-back, left or right side, neck)

Scoring

- 0 - pain
- 1 - can't perform movement
  - Back of head doesn't touch wall (FHP)
  - ⇓ Shldr Ex Rot (wrist/elbow vs wall)
- 2 - performs movement w/ compensation
  - Difficulty flattening back (T/L junx)
  - C0-C1 hyperextension
- 3 - movement performed w/out compensation

T4 – Arm Overhead Test



Procedure:

- standing w/ back against a wall or door
- instruct patient to raise their arms overhead

P/F criteria:

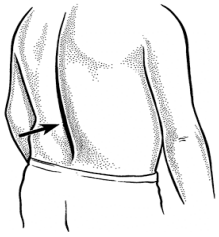
Failure if:

- L/P junction hyperextends
- arms don't reach vertical plane
- thoracic kyphosis remains

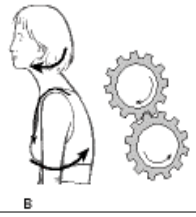
T4 Dysfunction

Signs of Global Muscle Hypertonus

- T/L hypertrophy



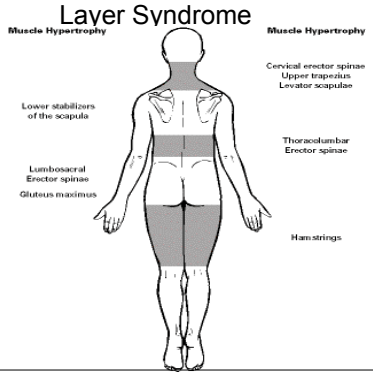
- Head forward/round shouldered posture



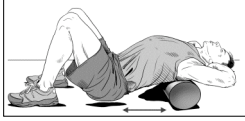
B

T4 Dysfunction

Layer Syndrome



Postural Exercises



3. Athletic Posture - Squat

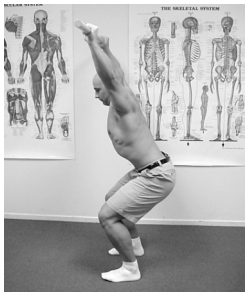
- **Signs of Dysfunction** *What signs are looked for in your posture or during exercise?*

- Head forward posture
- Shoulders rounded or shrugged
- Slouched/slumped/stooped
- Sway back
- Knock knees
- Fallen arches

Squat – p812-813

- What are the dysfunctions?

The Overhead Squat Test



Scoring

- 0 - pain
- 1 - can't perform movement
  - Thighs don't reach past horizontal
- 2 - performs movement w/ compensation
  - L/S flexion
  - Ant patellar shear
  - ⇓ Hip hinge
  - Knee valgosity
  - Heels raise
  - Hyperpronation
  - Arms don't reach vertically OH
- 3 - movement performed w/out compensation

Does form or quality of movement matter?

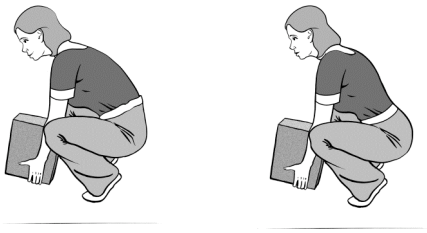
- **According to Dennis Morgan** "the functional range is the most stable and asymptomatic range of the joint for the task at hand."

Hip Hinge – p645

- Teach patient to spare their spine
- Use legs to get up & down from chair, bed, etc.
- Maintain upright spine position (neutral lordosis)

Squat Training

With Lifting



4. Balance – p807-809

Single Leg Standing Balance Test

- Indications
  - Elderly
  - Poor balance
  - History of ankle sprains
  - Subacute MSP
  - In particular
    - Lower extremity pain
    - LBP

Balance

- **Procedure**
  - Instruction: Stand on 1 leg & look straight ahead (w/ arms folded)
  - Person can choose preferred 1 leg stance position
  - If they can do 10s eyes open (EO) then, use this instruction
  - Stand on 1 leg & look straight ahead, focusing on spot on the wall in front of you.
  - Now, keep balancing & close your eyes (EC)

Balance

- **Score**
  - Patient gets up to 5 tries on each leg
  - Pass if they can last 10s w/ EC on both legs
  - Fail if:
    - Hop
    - Move foot
    - Reach out & touch something with either hand

Scoring

- 0 - pain
- 1 - can't perform movement
  - Less than 10s EO
- 2 - performs movement w/ compensation
  - Less than 10s EC
  - Hyperpronation
  - Trendelenberg sign
  - Shoulder unleveling
- 3 - movement performed w/out compensation

5. Single Leg Squat Test – p814-815

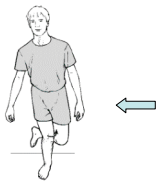
- Squat to approx 30 deg. Hip flexion
- Or, perform off stair step w/ non-wt. bearing leg straight until toes touch floor

Scoring

- 0 - pain
- 1 - Can't perform movement to approx 30 deg knee flexion
  - Knee valgosity
- 2 - performs movement w/ compensation
  - L/S flexion
  - Ant patellar shear
  - Hyperpronation
- 3 - movement performed w/out compensation

- What is the dysfunction?

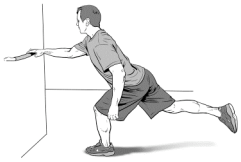
What are the dysfunctions?



Mechanism of Injury

- What structure is NOT stabilized?

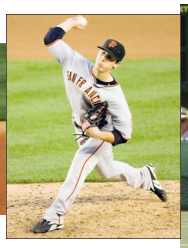
Functional Training



6. Lunges – p649

Flexibility: lunge stretch

Whole Body Tri-Planer Function



Scoring

R/L refers to forward leg

- 0 - pain
- 1 - can't perform movement
  - Cannot reach kneeling position & return
- 2 - performs movement w/ compensation
  - L/S flexion
  - Ant patellar shear
  - Knee valgosity
  - Hyperpronation
- 3 - movement performed w/out compensation

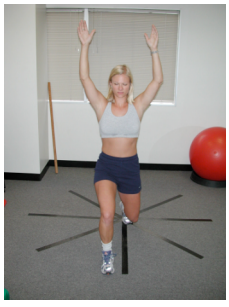
Is there sufficient co-contraction?

- Is there load sharing?
- Is she sparing the spine?
- Is there sufficient stability in the sagittal plane?

- Good Form

- Poor Form

Gary Gray "Tweakology"



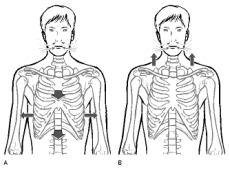
Star Lunge "Tweakology"

7. Respiration

- Most common faulty movement pattern
- Dysfunctional respiration usually occurs with **vertical** chest breathing predominating over lower abdominal and lower rib cage **horizontal** breathing
- Scalene & upper traps overactivity & poor abdominal function result from faulty breathing

Respiration Test - Upright

- Breathing with the chest & shoulders in a vertical direction is a common error
  - ⇑'es shoulder/neck tension
  - Disables the core



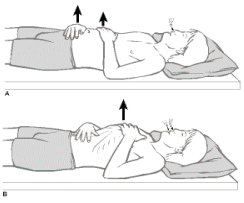
Standing or Sitting Breathing Test

- During a breath in do the shoulders rise up
- Ideally breathing occurs horizontally not vertically

Breathing Observation - Supine

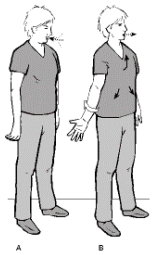
DURING INHALATION:

- Observe if chest breathing predominates over abdominal breathing (**minor dysfunction**)
- Observe during inhalation if the abdomen moves in, rather than out (*paradoxical respiration* – **major dysfunction)**



Active Exhalation Test

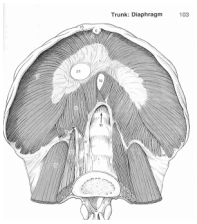
- On active exhalation
- Does the abdomen move in (functional)
- Or, does it move out (dysfunctional - paradoxical respiration)



Scoring

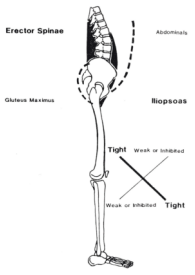
- 0 - pain
- 1 - can't perform movement
  - Paradoxical respiration
- 2 - performs movement w/ compensation
  - Vertical shift of anterior rib cage or clavicle on inhalation (clavicles rise)
  - Lower rib cage does not widen laterally
- 3 - movement performed w/out compensation

- Diaphragm
  - Sternal: arises from xyphoid process
  - Costal: arises from ribs 7-12; *slips interdigitate with TA*
  - Vertebral: Lumbar vertebra 1-4; fibers of the psoas
- 3 compartments
  - Anterior
  - Middle
  - Posterior



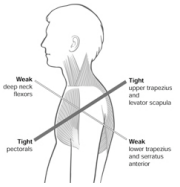
What results from Inspiratory position of thoracic cage (oblique angle of diaphragm)?

- T/L overload
- Hyperlordosis
- Poor centration of spinal joints
- Imbalanced activation of abdominal wall & core muscle groups
- > Lower Cross Syndrome (Janda)



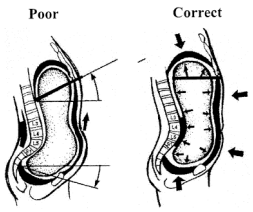
What else results from Inspiratory position of thoracic cage

- Anterior carriage (possibly hidden through compensation)
- Shoulder weakness/ instability
  - Lack of anterior serratus fixed point
- Tight pectorals, upper trapezius & levator scapulae
- > Upper Crossed Syndrome (Janda)

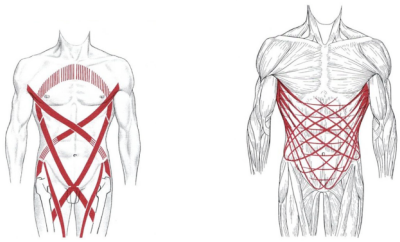


Horizontal Axis of Diaphragm

- Ideal position is based on the horizontal axis bisecting the costal and vertebral portion of diaphragm.
- Poor position results in –
  - Cranial movement of ribs
  - Imbalanced activity of core stabilizers
  - Decentration of spinal joints
  - Hyperactivation of the paravertebral m.
  - Overloading of lumbar spine & T/L Junction



Why does depression of thoracic cage matter in both phases of breathing?



<u>If + treatment</u>

- General relaxation training w/ belly breathing supine on floor or foam
- Brugger active exhalation (navel in)
- PIR scalenes
- T-spine CMT
- Practice breathing & bracing with all core exercises