Evaluation, Treatment, and Exercise Rx for Muscle Imbalance in the Lower Extremities

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Biomechanics of the Lumbar Spine and Lower Extremities

- Lower Extremity Pulley System affecting pelvis and spine. Optimal Function with symmetrical balance, posture, stretch and strength.
- Spine designed for weight bearing in correct alignment-posture
- Evaluate for Structural Asymmetries (Leg Length, Fracture, post surgical, pronation unilateral foot, scoliosis, varus/valgus deformities etc…)
- Goal is to “maximize function”

Rx Writing

- Form of Communication with Health care Team
- Individually prescribed
- Patient must take ownership of rehabilitation
- Principles of treatment of muscle Imbalances
  - Sensory Motor Balance Training
  - Stretching of short, tight, hypertonic muscles to symmetry
  - Strengthening of inhibited, weak, hypotonic muscles to balance
  - Aerobic Conditioning

Sensory Motor Balance Training

- Proprioceptor: Dysfunction following Joint Injury
- Automatic feedback mechanism to control muscular tone
- Evaluation and Training. May include special equipment as training progresses
  - Barefoot, carpet, shortened foot (lift arch-no toe curling)
  - One leg stance> cross arms> eyes closed (30 seconds)
  - Progress to more challenging movements

Muscle Imbalance

- Based on works of Vladimir Janda, MD
- Basic Concept is that there are two types of muscles:
  - Short/tight, facilitated, hypertonic muscles
  - Weak, inhibited, hypotonic muscles
    - When Particular Muscles are shortened/tight, they will inhibit other muscles, making them weak and hypotonic.
    - Stretch Shortened muscles to symmetry prior to strengthening Hypotonic Muscles and incorporate proprioceptive training

Stretching Short-Tight Muscles

- Muscles must be stretched to Symmetry
- Specific muscles respond to injury/structural change by becoming short, tight and hypertonic. In the lower quarter, these muscles include:
  - Illiopsoas
  - Rectus Femoris
  - TFL
  - QL
  - Short Adductors
  - Piriformis
  - HS
  - Lumbar Erector Spinae

Strengthen Inhibited Weak Muscles

- Specific Muscles respond to stress by becoming weak and hypotonic. These muscles are thought to become inhibited by the hypertonic, short and tight muscles previously mentioned and will not be able to maximize their strength until the inhibiting muscles are brought into balance.
- Muscles include:
  - Gluteus Max/med/min
  - Rectus Abdominis, Internal/External Obliques
  - Peroneal
  - Vastus Med/lat
  - Tibialis Anterior

Lower Crossed Syndrome

- Weak Glut. Max/med/min, Abdominals
- Tight Psoas, Erector Spinae, TFL and QL
- Increased Lumbar Lordosis and anterior pelvic tilt
- Hypermobility of lower lumbar levels
- Difficulty supine to sit

Lower Crossed Syndrome

- Weak Glut. Max vs. Short Hip Flexors
- Weak Abdominals vs. Short Lumbar Erector Spinae
- Weak Glut. Med/min vs. Short TFL and QL
- Anterior Pelvic Tilt and increased Lumbar Lordosis
- Hypermobility of L4-5 and L5-S1
  - Runners with tight HS/tears a/c weak glut and anterior hip capsule restriction

Evaluation and Treatment of Lower Quarter Hypertonic Muscles

- Supine Evaluation:
  - Hamstring: medial and Lateral
  - Gastroc/soleus
  - Piriformis (above and below 90 degrees)
  - Adductors (long and Short)
  - TFL/Quad/Psoas
  - Posterior Hip Capsule

Evaluation and Treatment of Lower Quarter Hypertonic Muscles

- Lateral: QL
- Prone:
  - Anterior Hip Capsule (runners, stretch prior to quad-psoas stretch)
  - Quads
  - External-Internal Hip Rotators

Evaluation and Treatment of Lower Quarter

- Seated Evaluation: Tibial Torsion
- Abdominal Strengthening: Sit Backs
- Leg Length Evaluation
- Scoliosis
- SIJ Evaluation
- Brace-belts-orthotics-heel lifts
- Foam Rollers, therabands
- Pilates, Yoga
- Interventional Techniques, MSK US, CT scanogram

Thank You Very Much!

- In Loving Memory to my very special mentors Richard Bachrach, DO and Stanley Schiowitz, DO

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