Current Evidence & Concepts on Myofascial Treatment

Course Faculty

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  California State University Dominguez Hills, Carson CA

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  – CEO Function First, San Diego, CA

Course Objectives

• At the conclusion, participants will be able to:
  – Describe the components of the myofascial complex.
  – Discuss common treatment techniques.
  – Appraise the research evidence on the effectiveness of common MF treatment techniques.
  – Discuss common corrective strategies to enhance myofascial mobility.
  – Discuss case study(s) related to myofascial dysfunction.

Defining the Myofascial System

• Definition:
  – Fascia is connective tissue fibers, primarily collagen, that form sheets or bands beneath the skin to attach, stabilize, enclose, and separate muscles and other internal organs.
  – Fasciae are classified according to their distinct layers, their functions and their anatomical location.

Myofascial Meridians (Slings)
Basic Science

Components of the Myofascial System

Fascia and Movement

A. Force transmission
B. Pre tension
C. Rich in contractile cells, proprioceptors and nociceptors
D. Interconnected tensional network for stability and communication
E. Adapts its fiber arrangement, length, and density according to local demand
F. Promotes sliding and reduces compartment friction during motion

Classification

- Superficial fascia - comprised of the subcutaneous loose connective tissue containing a web of collagen, as well as some fibers of mostly elastin
- Deep fascia - formed by a connective membrane that sheaths all muscles. devoid of fat and forms sheaths for the nerves and vessels, envelops various organs and glands.
- Epimysium - comprises the fascia that encloses each single muscle and is continuous with perimysium and endomysium. It is directly involved in the play of tension between the muscle spindles and the Golgi tendon organs.


Up to half of the total force generated by the muscle is transmitted to surrounding connective tissues & neighboring muscles. J. of Biomechanics 1999 Huijing

From “Muscle Attitudes” by Jean-Claude Guimberteau M.D.
An array of myofascial release techniques are currently being used in order to alleviate the effects of fascia restrictions. These techniques are normally performed manually by a therapist and are held for a period of 90-120 seconds. The purpose is to stretch the fascia and facilitate histological length changes to relieve some of the symptoms of fascial restriction such as pain and restricted ROM.” Sullivan et al. Int J Sports Phys Ther. 2013

Table 1
Mechanoreceptors in Fascia

<table>
<thead>
<tr>
<th>Receptor Type</th>
<th>Preferred Stimulation</th>
<th>Triggers of Stimulation</th>
<th>Areas of Sensitivity</th>
</tr>
</thead>
<tbody>
<tr>
<td>Ruffini end bulbs</td>
<td>Mechanical compression and stretch</td>
<td>Fatigue, stretch</td>
<td>Lower back, extensors</td>
</tr>
<tr>
<td>Pacinian corpuscles</td>
<td>Mechanical compression and stretch</td>
<td>Fatigue, stretch</td>
<td>Lower back, extensors</td>
</tr>
<tr>
<td>Semidisk receptors</td>
<td>Mechanical compression and stretch</td>
<td>Fatigue, stretch</td>
<td>Lower back, extensors</td>
</tr>
</tbody>
</table>


Table 2
Stress Ranges for Plastic Deformation of In Vitro Fascia, With Compression and Shear Ratio

<table>
<thead>
<tr>
<th>Fascia Type</th>
<th>Stress Range, kPa</th>
<th>Compression and Shear Ratio Under Stress</th>
</tr>
</thead>
<tbody>
<tr>
<td>Fascia lata</td>
<td>1275.06-1949.80</td>
<td>Negligibly small</td>
</tr>
<tr>
<td>Planter fascia</td>
<td>868.65-1504.08</td>
<td>Negligibly small</td>
</tr>
<tr>
<td>General Fascia</td>
<td>768.00-1507.00</td>
<td>Data not provided</td>
</tr>
</tbody>
</table>

* 1275-1949 Newton per square centimeter=1849-2827 Pounds per square inch

From Chaudhry et al. J. of American Osteopathic Association August 2008

Myofascial Restriction
(Martin 2011)

Restriction in normal muscle function due to injury or biomechanical force imbalance
Trigger Points (Martin 2011)

- Discrete, focal, hyperirritable spot in taut band of muscle
- Occurring in all patients with musculoskeletal pain
- Can be active or latent
- Symptoms:
  - Painful on compression
  - Referred pain/tenderness
  - Motor dysfunction
- No evidence for development mechanism of Trigger Points

Acute and chronic trauma, chronic lengthening, sleep disturbance, anxiety

Common Trigger Point Sites

What Occurs During Myofascial Release?

Myofascial Release

- Definition: Myofascial release (MFR) is a collection of approaches and techniques that focuses on freeing restrictions of movement that originate in the soft tissues of the body.
- History:
  - 1940's: "Myofascial" first used
  - 1960's: "Myofascial Release" first used
  - 1976: "Myofascial trigger point" Janet Travell
  - 1983: "Trigger Point Manual" Janet Travell
  - 2015: "Myofascial Therapy" "Myofascial Trigger Point Therapy" "Self-Myofascial Release"
Reported Benefits

- **Direct Benefits**
  - Pain Reduction
  - Improved Flexibility
  - Injury Recovery
  - Athletic Performance
  - Quality of Life

- **Indirect Benefits**
  - Depression
  - Quality of Sleep
  - Improvement of General Health

Key Principles of Treatment

- **Key Principles**
  - **Reflexive**
    - Autogen Inhibition
    - Stimulating GTO activity
  - **Mechanical**
    - Direct MFR
    - Mechanically release the restricted tissue
  - **Movement**
    - Movement Patterns
    - Specific movements to stretch and stimulate the specific meridian

Current Myofascial Treatments

- **Myofascial Manual Therapy**
  - Reflexive
  - Mechanical
  - Movement

What does the evidence say?

CEBM Levels of Evidence

<table>
<thead>
<tr>
<th>Level of Evidence</th>
<th>Grading Criteria</th>
</tr>
</thead>
<tbody>
<tr>
<td>Level 1</td>
<td>A: Systematic Review of RCT's</td>
</tr>
<tr>
<td>Level 2</td>
<td>A: Systematic review of cohort studies</td>
</tr>
<tr>
<td>Level 3</td>
<td>A: Systematic Review of case-control studies</td>
</tr>
<tr>
<td>Level 4</td>
<td>Case Series</td>
</tr>
<tr>
<td>Level 5</td>
<td>Expert's opinion</td>
</tr>
</tbody>
</table>

Current Myofascial Treatments

- Myofascial Manual Therapy
  - Ischemic Compression
  - Myofascial Manual Therapy
  - Instrumented Assisted Soft Tissue Mobilization (IASTM)
  - Self Myofascial Release
  - Dry Needling
  - Strain-Counterstrain Risting

Myofascial Manual Therapy

Myofascial Manual Therapy

- **Direct MFR:** tissue is loaded with a constant force until “release” occurs in the desired direction (e.g. deep tissue, Rolfing)
- **Indirect MFR:** tissue is lightly stretched and the therapist applies slow, steady pressure in the direction that the fascia can be felt to allow greatest ease of movement “unwinding”.
- **Trigger Point:** ischemic compression to a trigger point (latent or active).

Myofascial Manual Therapies

- Other Myofascial Therapies
  - **Dry needling**

Myofascial Trigger Point Therapy

**Ischemic Compression**

- 2015: Cagnie et al. Arch Phys Med Rehabil (Level 1a)
- 2015: Takamoto e al. Eur J Pain (Level 1b)
- 2015: Hains et al. J Can Chiropr Assoc (Level 1b)
- 2013: Cagnie et al. J Manipulative Physio Ther (Level 1b)

<table>
<thead>
<tr>
<th>Interventions</th>
<th>Parameters</th>
</tr>
</thead>
<tbody>
<tr>
<td>Treatment technique</td>
<td>Ischemic compression (TP site)</td>
</tr>
<tr>
<td>Treatment duration</td>
<td>15-60 seconds of compression (i.e. 6 reps)</td>
</tr>
<tr>
<td>Outcome measures</td>
<td>Pain (0-10), ROM, strength, pain threshold, questionnaires</td>
</tr>
<tr>
<td>Long-Term Outcomes</td>
<td>6 months</td>
</tr>
</tbody>
</table>

Myofascial Trigger Point Therapy

**Dry needling**

- 2015: Liu et al. Arch Phys Med Rehabil (Level 1a)
- 2015: Ong and Claydon. J Bodyw Mov Ther (Level 1a)
- 2014: Dunning et al. Phys Ther Rev (Level 1a)
- 2013: Kietry’s et al. J Orthop Sports Phys Ther (Level 1a)

<table>
<thead>
<tr>
<th>Interventions</th>
<th>Parameters</th>
</tr>
</thead>
<tbody>
<tr>
<td>Treatment technique</td>
<td>Dry needling (variable techniques)</td>
</tr>
<tr>
<td>Treatment duration</td>
<td>10-30 minutes</td>
</tr>
<tr>
<td>Outcome measures</td>
<td>Variable: pain (0-10), questionnaires</td>
</tr>
<tr>
<td>Long-Term Outcomes</td>
<td>Short: 3 days, Long: 1-6 months</td>
</tr>
</tbody>
</table>

Target Population: (+) results with individuals with MF pain

**Bottom Line:** The research for dry needling has shown favorable outcomes for treating MF trigger points. However, the treatment techniques were often variable and grouped with other interventions (ischemic compression) which makes it difficult for a direct comparison.

Does myofascial manual therapy provide benefits?

- 2015: Ajimsha et al. J Bodyw Mov Ther (Level 1a)
- 2015: Yuan et al. Man Ther (Level 1a)
- 2013: McKenney et al. J Athl Training (Level 1a)

<table>
<thead>
<tr>
<th>Interventions</th>
<th>Parameters</th>
</tr>
</thead>
<tbody>
<tr>
<td>Treatment technique</td>
<td>Variable, often combined with other interventions</td>
</tr>
<tr>
<td>Treatment duration</td>
<td>Variable among studies</td>
</tr>
<tr>
<td>Outcome measures</td>
<td>Variable: pain (0-10), questionnaires</td>
</tr>
<tr>
<td>Long-term outcomes</td>
<td>Poorly reported</td>
</tr>
</tbody>
</table>

Target Population: (+) results with orthopedic conditions, fibromyalgia, post breast cancer, TMD

**Bottom Line:** The research on MF therapy shows positive outcomes. However, the research is varied with the type of technique, combined interventions, and poorly reported long-term outcomes.
Self-Myofascial Release

Definition: This approach uses a device, such as a foam roll or roller massager, to apply external pressure to a region of the body using the person’s own bodyweight. SMFR is typically used to treat somatic dysfunction that often results in pain and restriction of motion.

Tools of the Trade

http://www.rumbleroller.com/

Does self-myofascial release improve range of motion?

Foam Roller or Roller Massager

Foam Roll: Acute Effects on ROM

<table>
<thead>
<tr>
<th>Interventions</th>
<th>Parameters</th>
</tr>
</thead>
<tbody>
<tr>
<td>Treatment technique</td>
<td>Foam roll</td>
</tr>
<tr>
<td>Treatment duration</td>
<td>1-20 minutes (2-6 sessions)</td>
</tr>
<tr>
<td>Outcome measures</td>
<td>ROM (measured 0-10 min post), questionnaires</td>
</tr>
<tr>
<td>Long-Term Outcomes</td>
<td>Acute outcomes studied</td>
</tr>
</tbody>
</table>

Target Motions: (+) Knee flexion ROM, hip flexion and extension ROM, and sit and reach test.

Bottom Line: Foam rolling seems to have favorable outcomes for improving acute lower extremity joint ROM. However, the research is varied with the intervention protocol (frequency and duration).

Roller Massage: Acute Effects on ROM

<table>
<thead>
<tr>
<th>Interventions</th>
<th>Parameters</th>
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</thead>
<tbody>
<tr>
<td>Treatment technique</td>
<td>Roller massager</td>
</tr>
<tr>
<td>Treatment duration</td>
<td>5 seconds to 2 minutes (2-4 sessions)</td>
</tr>
<tr>
<td>Outcome measures</td>
<td>ROM (measured 0-10 min post), Questionnaires</td>
</tr>
<tr>
<td>Long-Term Outcomes</td>
<td>Acute outcomes studied</td>
</tr>
</tbody>
</table>

Target Motions: Knee flexion ROM, ankle dorsiflexion ROM, sit and reach test.

Bottom Line: Roller massaging seems to have favorable outcomes for improving acute lower extremity joint ROM. However, the research is varied with the intervention protocol (frequency and duration).
Does self-myofascial release influence recovery of DOMS?

Foam Roller or Roller Massager

SMFR: Effects on Recovery and DOMS

- 2014: Jay et al. Int J of Sports Phys Ther (Level 1a)
- 2014: Pearcy et al. J of Athl Train (Level 1a)
- 2014: MacDonald et al. J Strength Cond Res (Level 2b)

<table>
<thead>
<tr>
<th>Interventions</th>
<th>Parameters</th>
</tr>
</thead>
<tbody>
<tr>
<td>Treatment technique</td>
<td>Foam roll</td>
</tr>
<tr>
<td>Treatment duration</td>
<td>10-20 minutes</td>
</tr>
<tr>
<td>Outcome measures</td>
<td>VAS, ROM, pressure pain threshold, muscle</td>
</tr>
<tr>
<td></td>
<td>performance</td>
</tr>
<tr>
<td>Long-Term Outcomes</td>
<td>Acute outcomes studied</td>
</tr>
</tbody>
</table>

Bottom Line: Foam rolling seems to have favorable outcomes for improving post intense exercise recovery and DOMS. However, the research is varied with the intervention protocols (frequency and duration).

Comments

- Precaution: subjects reported moderate pain. Help them choose the right tools.

Instrumented Assisted Soft-Tissue Mobilization

- Definition: various shaped tools are used to augment the mobilization of soft-tissue mobilization.
- Several patented tools and approaches exists

Instrumented Assisted Soft-Tissue Mobilization (IASTM)

- Graston® Technique
- Gua Sha Tools
- Hawk Grip®
IASTM Technique (Videos)

Does IASMT provide benefits?

IASTM Research

- 2014: Laudner K et al. Int J of Sports Phys Ther (Level 2b)
- 2014: Lee JJ et al. Biomed Mater Eng (Level 2 b)
- 2014: Strnk et al. J Chirurg Med (Level 4)
- 2013: Baker K et al. Int J of Athl Ther and Train (Level 4)
- 2012: Papa JA. J Can Chiropr Assoc (Level 4)

<table>
<thead>
<tr>
<th>Interventions</th>
<th>Parameters</th>
</tr>
</thead>
<tbody>
<tr>
<td>Treatment technique</td>
<td>IASTM</td>
</tr>
<tr>
<td>Treatment duration</td>
<td>Variable (40 seconds to 2 minutes)</td>
</tr>
<tr>
<td>Outcome measures</td>
<td>VAS, ROM, pain threshold, strength, EMG activity</td>
</tr>
<tr>
<td>Long-Term Outcomes</td>
<td>Poorly reported</td>
</tr>
</tbody>
</table>

Target Population: Shoulder ROM, lateral epicondylitis, achilles tendonitis, plantar fasciitis, knee arthrofibrosis, muscle inhibition in stroke patients

Bottom Line: The research on IASMT is emerging but is limited to only a couple of controlled studies and case reports. No systematic reviews have been done.

Enhancing Myofascial Mobility

Acute Variables for Strategic Movement

1. Less than the tissue’s barrier
2. Slow
3. Controlled
4. Rhythmical
5. Oscillating

Benefits of Strategic Movement for Myofascial Extensibility

Heat and fluid exchange to the tissue
Breaking down of cross bridges creating more parallel arrangement of collagen fibers
Down regulate activity of joint and soft tissue via mechanoreceptors
Positive Autonomic response
Case Study #1

Right Shoulder Impingement Secondary to Postural Dysfunction

Case History

- **Patient:** Female (28 years old)
  - Wt: 115 lbs, Ht: 65 inches (Ectomorphic build), right handed
  - Occupation: Corporate Attorney
  - Physical Activity: Occasional gym activity, jogging
- **Mechanism:** Insidious onset of right shoulder pain 4 weeks ago.
  - Right shoulder and upper back began to hurt after prolonged hours of computer work
- **Current Symptoms:**
  - Intermittent right “sharp” pain with reaching overhead, hand behind back, and lifting heavy objects.
  - Neck and upper back fatigue after 1 hour of computer work
- **Diagnosis:** Right shoulder impingement secondary to postural dysfunction
  - MRI (-), Radiograph (+) subacromial bone spur

Initial Examination

- **Initial Examination:** 1 week after referral
  - Pt cleared by physician for physical therapy and return to gym activity. Right arm restricted to pain-free activity.
- **Functional Status:**
  - Pt still working full-time with computer work up to 30 minutes.
- **Aggravating Factors:**
  - Overhead reaching, hand behind back lifting heavy objects
- **Relieving Factors:** Rest and meds (NSAIDS)
- **Pain:**
  - Worst: 6/10 (aggs), Average: 3/10, Best: 2/10 (with meds)
- **Medication:** NSAID (PRN)
- **Systems Review:** Insignificant for medical “red flags”

Test & Measures

**Observations/Screen**

- Neurovascular (WNL)
- Inspection (WNL)

**Posture**

- Standing: Kyphotic-Lordotic (Upper Cross Syndrome)
- Seated: Forward head, rounded shoulders

**Cervical ROM**

- Rotation: Right:60° and Left:65°
- Flexion: Chin to chest
- Extension: Hinging at C5-C7

**Thoracic Movement**

- Poor upper thoracic extension

Test & Measures

<table>
<thead>
<tr>
<th>Shoulder ROM</th>
<th>Motion Tested</th>
<th>Right</th>
<th>Left</th>
</tr>
</thead>
<tbody>
<tr>
<td>Shoulder Flexion</td>
<td>80°</td>
<td>165°</td>
<td></td>
</tr>
<tr>
<td>Shoulder Abduction</td>
<td>80°</td>
<td>165°</td>
<td></td>
</tr>
<tr>
<td>Shoulder Internal Rotation (ARD)</td>
<td>5°</td>
<td>10°</td>
<td></td>
</tr>
<tr>
<td>Shoulder External Rotation (ARD)</td>
<td>70°</td>
<td>95°</td>
<td></td>
</tr>
<tr>
<td>Hand Behind Back</td>
<td>NT</td>
<td>T9</td>
<td></td>
</tr>
<tr>
<td>Hand Behind Head</td>
<td>Occiput</td>
<td>Occiput</td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Muscle Performance</th>
<th>Motion Tested</th>
<th>Right</th>
<th>Left</th>
</tr>
</thead>
<tbody>
<tr>
<td>Passive Flexion/Scaption</td>
<td>3/5</td>
<td>4+/5</td>
<td></td>
</tr>
<tr>
<td>Abduction</td>
<td>3/5</td>
<td>4+/5</td>
<td></td>
</tr>
<tr>
<td>External Rotation</td>
<td>3/5</td>
<td>4+/5</td>
<td></td>
</tr>
<tr>
<td>Internal Rotation</td>
<td>3/5</td>
<td>4+/5</td>
<td></td>
</tr>
<tr>
<td>Scapular Abduction</td>
<td>3/5</td>
<td>3/5</td>
<td></td>
</tr>
<tr>
<td>Scapular Protraction</td>
<td>3/5</td>
<td>3/5</td>
<td></td>
</tr>
</tbody>
</table>
Test & Measures

<table>
<thead>
<tr>
<th>Muscle Length/Palpation</th>
<th>Joint Mobility/Special Testing</th>
</tr>
</thead>
<tbody>
<tr>
<td>• Latissimus Dorsi Tightness (+)</td>
<td>• Joint Mobility:</td>
</tr>
<tr>
<td>• Pectoralis Tightness (+)</td>
<td>- Spine: T1-78 hypomobile</td>
</tr>
<tr>
<td>• Right posterior shoulder tightness (+)</td>
<td>- Shoulder: A-P moderate hypomobility with muscular end-</td>
</tr>
<tr>
<td>• Palpation</td>
<td>- feel</td>
</tr>
<tr>
<td>- 4/5 over anterior shoulder</td>
<td>• Special Testing:</td>
</tr>
<tr>
<td>- 3/5 posterior shoulder</td>
<td>- Painful Arc (+)</td>
</tr>
<tr>
<td>• MF restriction</td>
<td>- Hawking's-Kennedy (+)</td>
</tr>
<tr>
<td>- Posterior shoulder, upper trapezius</td>
<td>- Neer (+)</td>
</tr>
<tr>
<td>and levator scapula</td>
<td></td>
</tr>
</tbody>
</table>

Assessment

• Posture & ROM:
  - Kyphotic-Lordotic Posture with increase forward head and
    rounded shoulder with sitting.
  - Right cervical, thoracic ROM is limited.
  - Right shoulder ROM is limited in all planes due to pain, fear,
    and soft-tissue impairments.

• Strength & Muscle Length:
  - Right shoulder and peri-scapular muscle weakness
  - Decreased muscle length noted in the latissimus dorsi,
    pectoralis major, and posterior rotator cuff muscles.

• Palpation:
  - Tenderness over the anterior-lateral and posterior shoulder.

• MF Restriction:
  - Posterior shoulder, upper trapezius, and levator scapula

• Special Testing: (+) for shoulder impingement

Confirmatory Diagnosis

• DX: Finding consistent with right shoulder impingement
  secondary to postural dysfunction

• Treatment Plan: (1-2x 4 weeks)
  - Right Shoulder Impingement: Pain control, restoration of ROM
    and function.
  - Cervicothoracic Hypomobility: Restore joint mobility
  - Posture Dysfunction: Correct both standing and seated postural
    dysfunctions.
  - MF Restriction/Muscle Length Deficits: Assisted and self-myofascial
    release, stretching
  - Strength Deficits: Periscapular and shoulder muscle strengthening
  - Patient Ed: Focus on work ergonomics and body mechanics
  - Home program: Develop home program and refer to fitness
    professional for further training.

Manual Treatment

Upper Quarter Interventions

Mobilization/Manipulation
Cervicothoracic Spine
Glenohumeral Joint

Manual MFR/IASTM
Anseri, Posterior Shoulder
Upper Trapezius

Dry Needling
Upper Quarter Trigger Points

Goal: Restore cervicothoracic
  and shoulder mobility

Goal: Restore MF mobility in
  upper quarter

Goal: Reduce TrP irritability,
  restore MF mobility

Therapeutic Exercise

Upper Quarter Interventions

Postural Correction
Specific Exercises
Patient Taping

Goal: Correct sitting and
  standing positions, focus on
  ergonomics

Assisted Stretching

Goal: Enhance MF mobility and
  lengthen shortened muscles

Resistance Training Program

Goal: Strengthens periscapular
  and shoulder muscles

Home Program
Percutaneous\therapeutic Dry Needling

Goal: Periscapular assessment,
  prescription, and IMF
  program

General conditioning
• Basic upper/lower body strengthening program
• Standard cardiorespiratory program
Advanced Program

Referral to Fitness Professional

<table>
<thead>
<tr>
<th>Sub Routine 1</th>
<th>Sub Routine 2</th>
<th>Sub Routine 3</th>
</tr>
</thead>
<tbody>
<tr>
<td>Lower level 1</td>
<td>Intermediate 1</td>
<td>Integrated</td>
</tr>
<tr>
<td>Lower level 2</td>
<td>Intermediate 2</td>
<td></td>
</tr>
<tr>
<td>Lower level 3</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

“local”  “bridging”  “unified”

Bottom Up T-Spine Mobilization

Snow Angels

3 Point Reach and Pull
Case Study #2

Non-Specific Low Back Pain

Case History

- **Patient:** Male (33 year-old)
  - Wt: 190 lbs, Ht. 65 inches (Endomorphic build)
  - Occupation: Regional Sales Manager
  - Physical Activity: Racket ball (2x week)
- **Mechanism:** Insidious onset of bilateral low back pain 6 weeks ago.
  - Low back began to hurt after sitting and driving for extended hours.
- **Current Symptoms:**
  - Intermittent "ache" in central low back with static activities
  - Low back hurts after 30 minutes of driving or computer work
  - No symptoms of referral down either leg
- **Diagnosis:** Non-specific low back pain
  - MRI (-) mild degenerative changes, Radiograph (-)

Initial Examination

- **Initial Examination: 1 week after referral**
  - Pt cleared by physician for physical therapy and development of home exercise program
- **Functional Status:**
  - Pt is still working full-time with limited static activity to 30 minutes
- **Aggravating Factors:**
  - Prolonged sitting, standing, lifting heavy objects, and bending
- **Relieving Factors:** Rest and meds
- **Pain:**
  - Worst: 6/10 (aggs), average: 3/10, best: 2/10 (with medication)
- **Medication:** NSAID (PRN), Pain meds (Norco), Meds for HTN
- **Systems Review:** Insignificant for medical "red flags"
Test & Measures

- **Observations/Screen**
  - Vascular (WNL)
  - Inspection (WNL)

- **Posture**
  - Standing: Sway-Back Posture
  - Seated: Slouched posture with increased thoracolumbar kyphosis

- **Posture: Lower Extremity**
  - Standing: right shift through lumbar spine
  - Hip, knee, ankle alignment (WFL)

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Test & Measures

**Motion Tested**

<table>
<thead>
<tr>
<th>Motion Tested</th>
<th>Right</th>
<th>Left</th>
</tr>
</thead>
<tbody>
<tr>
<td>Hip Internal Rotation</td>
<td>25°</td>
<td>25°</td>
</tr>
<tr>
<td>Hip External Rotation</td>
<td>40°</td>
<td>40°</td>
</tr>
<tr>
<td>Hip Flexion</td>
<td>WNL</td>
<td>WNL</td>
</tr>
<tr>
<td>Hip Extension</td>
<td>2°</td>
<td>2°</td>
</tr>
<tr>
<td>Hip Adduction</td>
<td>WNL</td>
<td>WNL</td>
</tr>
<tr>
<td>Side Bending</td>
<td>15% deficit</td>
<td>15% deficit</td>
</tr>
<tr>
<td>Thoracolumbar Flexion</td>
<td>40% deficit</td>
<td></td>
</tr>
<tr>
<td>Thoracolumbar Extension</td>
<td>50% deficit</td>
<td></td>
</tr>
</tbody>
</table>

**Motion Tested**

<table>
<thead>
<tr>
<th>Motion Tested</th>
<th>Right</th>
<th>Left</th>
</tr>
</thead>
<tbody>
<tr>
<td>Hip Flexion</td>
<td>4/5</td>
<td>4/5</td>
</tr>
<tr>
<td>Hip Extension</td>
<td>3/5</td>
<td>3/5</td>
</tr>
<tr>
<td>Hip Adduction</td>
<td>4/5</td>
<td>4/5</td>
</tr>
<tr>
<td>Hip Adduction</td>
<td>4/5</td>
<td>4/5</td>
</tr>
<tr>
<td>Hip External Rotation</td>
<td>2°/3</td>
<td>2°/3</td>
</tr>
<tr>
<td>Hip Internal Rotation</td>
<td>4/5</td>
<td>4/5</td>
</tr>
<tr>
<td>Hip External Rotation</td>
<td>3/5</td>
<td>3/5</td>
</tr>
<tr>
<td>Single Leg Squat</td>
<td>Weak</td>
<td>Weak</td>
</tr>
<tr>
<td>Plantar Test</td>
<td>Weak</td>
<td>Weak</td>
</tr>
</tbody>
</table>

**Assessment**

- **Posture & ROM:**
  - Sway-Back Posture with increased slouching during sitting.
  - Hip and thoracolumbar ROM is limited.

- **Strength & Muscle Length:**
  - Bilateral hip and abdominal core weakness
  - Decreased muscle length noted in the hip flexors, quadriceps, hamstrings, and hip external rotators.

- **Palpation:**
  - Tenderness over the lumbar region.

- **MF Restriction:**
  - Lumbar paraspinals, bilateral quadratus lumborum, multifidi, thoracolumbar fascia, anterior hip muscles

- **Special Testing:**
  - SLR (+) R+L
  - Slump Test (-)
  - DTR and Dermatomes (WNL)

**Confirmatory Diagnosis**

- **DX:** Finding consistent with non-specific low back pain with poor posture, lumbopelvic hip muscle weakness.

- **Treatment Plan:**
  - Lumbar Spine Hypomobility: Pain control, restoration of ROM and function.
  - Hip joint Hypomobility: Restore joint mobility
  - Posture Dysfunction: Correct both standing and seated postural dysfunctions.
  - MF restriction/Muscle Length Deficits: Assisted and self-myofascial release, stretching
  - Strength Deficits: Hip and abdominal core strengthening
  - Patient Ed: Focus on work ergonomics, body mechanics
  - Home program: Develop maintenance home program and refer to fitness professional.

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**Manual Treatment**

- **Lower Quarter Interventions**
  - Mobilization/Manipulation
  - Manual MFR/IASTM
  - Dry Needling

- **Dry Needling**
  - Lower Quarter Trigger Points

- **Goal:**
  - Decrease TrP irritability, restore MF mobility
Therapeutic Exercise

**Lower Quarter Interventions**

- **Postural Corrections**
  - Specific Exercises
  - Postural Taping
- **Assisted Stretching**
- **Resistance Training Program**
- **Home Program**
  - Postural Corrections
  - Diaphragmatic Breathing
  - Foam Rolling

**Goal:**
- Correct sitting and standing posture, focus on ergonomics

- **Assisted Stretching**
- **Goal:**
  - Enhance MF mobility and lengthen shortened muscles

- **Resistance Training Program**
- **Goal:**
  - Strengthen abdominal core and hip muscles

- **Home Program**
- **Goal:**
  - Postural awareness, relaxation, self MFR program

**General conditioning**
- Basic upper/lower body strengthening program
- Standard cardiorespiratory program

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**Advanced Program**

Referral to Fitness Professional

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**Opposite Arm/Leg Gliding**

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**Four Point Rotations**
3D Kneeling Hip Flexor

Bridging with Abdominal Control

Backbends (feet symmetrical and staggered)

Questions?

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References

### References

- Schleip & Muller (2012) Training principles for fascial connective tissue: Scientific foundation and suggested practical applications. J. of Bodywork and Movement Therapies

### References

- Martin M. Flexibility: Stretching vs. SMFR. Corrective Exercise Australia. (2011)