Comprehensive Physical Therapy Management of Chronic Low Back Pain with Associated Remote Right Hamstring Injury: A Case Report

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Background

- Low back pain (LBP) is a health condition associated with back, core, and hip muscle dysfunction as well as reduced lumbar range of motion.
- Core muscle stabilization, hip abductor strengthening, and lumbar range of motion are all effective treatments for treating patients with chronic LBP.
- Lumbar muscular imbalance can lead to hamstring injury because of change in the functional lead.

Purpose

- The purpose of this case report was to review a therapeutic exercise approach to the treatment of chronic low back pain after a remote hamstring injury, including a focus on lumbar and core stabilization, lumbar and hamstring stretching and hamstrings strengthening, and a comprehensive home exercise program.

Case Description

- 31-year-old male Navy veteran who was an avid runner.
- Diagnosis of chronic LBP and reported a history of remote right hamstring injury.
- Symptoms: constant ache in the low back with occasional sharp bilateral pain in the paraspinal muscles greater than left from L3 to S1 spinal levels.
- Subjective pain reported with repetitive forward flexion and left rotation and occasional paresthesia’s in the right lower extremity (LE) in the L4 dermatome distribution.
- Initial deficits in strength, pain with range of motion, running form, and muscular tightness.
- Unrelated diagnosis of mild traumatic brain injury due to indirect blast exposures and a fall from a ladder well in 2012 with minimal residual effects.

Timeline

Initial Eval
- Oswestry Disability Index (ODI): 22% Moderate Disability
- Pain with left Lumbar Rotation
- 4+/5 strength in hip extension and knee flexion
- Running Gait Analysis: Left LE across midline, increased lateral sway of hips/trunk, weight shift to the left, increased pronation on the left with external rotation
- Lumbar Stretching
- Hamstring Stretching
- Gastrocnemius/Soleus Stretching

Treatment 1
- Lumbar, Hamstring, and Gastrocnemius/Soleus Stretching
- Lumbar and Core Stabilization Exercise
- Hip Abductor Strengthening
- Hip Abductor and Hamstring Strengthening

Treatment 2
- Lumbar, Hamstring, and Gastrocnemius/Soleus Stretching
- Lumbar and Core Stabilization Exercise
- Hip Abductor Strengthening
- Hamstring Stretching

Treatment 3
- Lumbar, Hamstring, and Gastrocnemius/Soleus Stretching
- Lumbar and Core Stabilization Exercise
- Hip Abductor Strengthening
- Hamstring Strengthening

Treatment 4
- Lumbar, Hamstring, and Gastrocnemius/Soleus Stretching
- Progression of Lumbar and Core Stabilization Exercise
- Progression of Hip Abductor Strengthening
- Progression of Hamstring Strengthening

Treatment 5
- Review of previously prescribed HEP
- ODI: 10% Minimal Disability
- No pain reported with Left Lumbar Rotation
- 5/5 strength of hip extension and knee flexion
- Running Gait Analysis: Noted decreased pronation and circumduction on the left, left LE no longer crosses midline

Discharge
- ODI: 5% Minimal Disability
- Hip Extension: 4+/5 Right Knee Flexion: 4+/5 Right
- Range of Motion
- Left rotation painless but unrestricted
- Palpation
- Mild to moderate paraspinous tightness noted at L4-S2 left greater than right

Tests and Measures

<table>
<thead>
<tr>
<th>Test</th>
<th>Result</th>
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</thead>
<tbody>
<tr>
<td>SLUMP</td>
<td>Negative on the left, Positive on the right (possible hamstring involvement)</td>
</tr>
<tr>
<td>Quadrant Test</td>
<td>Positive on the right</td>
</tr>
<tr>
<td>Straight Leg Raise (SLR)</td>
<td>Left negative to 60 degrees, right negative to 45 degrees due to hamstring tightness</td>
</tr>
<tr>
<td>FAIR</td>
<td>Positive on the right, Painful</td>
</tr>
<tr>
<td>Range of Motion</td>
<td>Left rotation painless but unrestricted</td>
</tr>
<tr>
<td>Palpation</td>
<td>Mild to moderate paraspinous tightness noted at L4-S2 left greater than right</td>
</tr>
</tbody>
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Interventions

- Lumbar, Hamstring, Gastrocnemius/Soleus Stretching
- Lumbar and Core Stabilization
- Hip Abductor and Hamstring Strengthening

Results

<table>
<thead>
<tr>
<th>Numeric Pain Rating Scale</th>
<th>Oswestry Disability Index Scores</th>
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<tbody>
<tr>
<td>0-4/10</td>
<td>22%: Moderate Disability</td>
</tr>
<tr>
<td>5-10</td>
<td>48%: Severe Disability</td>
</tr>
<tr>
<td>11-40</td>
<td>79%: Very Severe Disability</td>
</tr>
<tr>
<td>41-60</td>
<td>90%: Catastrophic Disability</td>
</tr>
<tr>
<td>61-100</td>
<td>100%: Total Disability</td>
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Discussion

- Over the treatment course the patient demonstrated improvements in LE strength, patient reported outcome measures, and lumbar spine range of motion.
- Discharge ODI suggests the combination plan of care contributed to the patients perceived decrease in disability level from LBP.
- Limiting factor: one treatment per week with heavy reliance on the home exercise program.
- Outcomes suggest combination plan of care used in this patient were beneficial in helping decrease subjective level of pain and improving his running ability.
- Patient ODI score improved from moderate to minimal disability but did not surpass the MCID level of 12.88.
- Findings are similar to those found by Kumar et al., who stated that a combination POC involving core/lumbar stabilization, lumbar/hamstring stretching, and hip strengthening can result in decreased ODI scores.

Conclusion

- A therapeutic exercise protocol focused on stabilizing and improving muscle imbalances was beneficial in reducing LBP during running and forward flexion in an active male Navy veteran with a remote right hamstring injury which aligns with the intended purpose of this case report.

Acknowledgements and References

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References:

Image Acknowledgments:
- Muscle Energy Technique: https://www.hep2go.com/therapy/muscle-energy-technique