

Management of a Patient Lumbar Spinal Stenosis and Carotid Aneurysm Using Therapeutic Exercise, Education, and Manual Therapy: A Case Report



Nicholas Adriance, ATC, CSCS, Physical Therapy Student
University of New England, Department of Physical Therapy, Portland, ME

Background

- Lumbar spinal stenosis (LSS) is “a clinical syndrome of buttock or lower extremity pain, which may occur with or without back pain, associated with diminished space available for the neural and vascular elements in the lumbar spine.”¹
- Comorbidities frequently complicate the exercise selection of patients in physical therapy. One such comorbidity is a carotid artery aneurysm. A carotid Aneurysm is a bulging or ballooning in the wall of the internal or external carotid artery
- Patient’s who undergo surgical management for carotid artery aneurysm are placed on exercise restrictions based on the size and location of the aneurysm.^{2, 3, 4, 5}

Case Description

- 60-year-old female
- Low back pain
- Bilateral lower extremity radiculopathy
- MRI revealed multi level lumbar disc disease with central stenosis and foraminal narrowing most pronounced at L4-L5 and disc protrusion impinging on both the L4 and L5 nerve roots
- Complex medical background, including 20 year history of intermittent back pain, right carotid artery aneurysm with coils, depression
- Previous physical therapy and chiropractic interventions failed to provide relief

Purpose

- Describe physical therapy management for a patient with low back pain with bilateral lower extremity radiculopathy in the presence of a complex medical background including carotid artery aneurysm

Examination

Pain Intensity Level Visual Analogue Scale:

- At Rest: 2/10, With Movement: 8/10

Special Tests:

- Straight Leg Raise: (+) Onset Right 30°, Left 45°
- Slump: (+) bilaterally onset Right: 20°, Left: 15°
- Sensory: L5 Diminished on the Right

Trunk and Hip Mobility Testing

- Trunk Flexion: 25% limited
- Side bend and Trunk Rotation: Grossly limited R>L
- Extension: 75% limited

Joint Mobility

- Pain and hypomobility with A-P glide L2-L5; Sacral flexion

Manual Muscle Test

- Hip Flexion: 4-/5 bilaterally
- Hip abduction: 4-/5 bilaterally
- Abdominals not tested due to pain

Outcome Measure:

- Oswestry Low Back Pain Questionnaire: 42%
- Lower Extremity Functional Scale: 23/80

Outcomes

Pain Intensity Level Visual Analogue Scale:

- At Rest: 1/10, With Movement: 2/10

Special Tests:

- Straight Leg Raise: (-)
- Slump: (-)
- Sensory: L5 normal

Trunk and Hip Mobility Testing

- Trunk Flexion: 25% limited
- Side bend and Trunk Rotation: Slight limitation R>L
- Extension: 25% limited

Joint Mobility

- Hypomobility with A-P glide L4, L5

Manual Muscle Test

- Hip Flexion: 4+/5 bilaterally
- Hip abduction: 4+/5 on right 4/5 on left
- Upper abdominals: 4+/5
- Lower abdominals: 4+/5
- Obliques: 4+/5 bilaterally

Outcome Measure:

- Oswestry Low Back Pain Questionnaire: 22%
- Lower Extremity Functional Scale: 45/80

Discussion

The use of a comprehensive rehabilitation program including therapeutic exercise, manual therapy, and consistent patient education has been recommended for the treatment of patients with spinal stenosis. In the presence of a repaired carotid artery aneurysm, exercise modification including the avoidance of the Valsalva maneuver coupled with careful monitoring allowed this patient to successfully complete her rehabilitation program and achieve significant functional gains. Careful planning and execution may allow for the successful treatment of patients with substantial co-morbidities

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• Contact: nadriance@une.edu; UNE Dept. of Physical Therapy, 716 Stevens Ave, Portland, ME 04103

Interventions

Weeks	Manual Therapy	Therapeutic Exercise	Home Exercise
Weeks 1-6	<ul style="list-style-type: none"> STM/release per findings Side-lying side-bend QL stretch/mobilization Segmental Traction L5-S1 	<ul style="list-style-type: none"> Single knee to chest Supine lumbar stabilization PN in hook-lying (No Valsalva) Cat-Camel Supine piriformis stretch 	<ul style="list-style-type: none"> Educated on examination findings and diagnosis Supine single knee to chest Lumbar stabilization PN in hook-lying (No Valsalva)
Weeks 7-12	<ul style="list-style-type: none"> Same as previous added SL lumbar segmental rotation with flexion grade II-IV mobilization to L1-L5 with neuromuscular re-education 	<ul style="list-style-type: none"> ¼-½ squat/sit to stand (No Valsalva) QL stretch (SL/stand) ½ kneel Hip flexor stretch with antagonistic glute contraction Abdominal stiffening with and without/curl up (No Valsalva) Standing QL stretch 	<ul style="list-style-type: none"> Log walking hours Log onset of pain and activities prior to pain Supine lumbar stabilization PN in HL single leg march with hold (No Valsalva) Standing QL stretch Supine abdominal stiffening with curl-up (No Valsalva) ½ kneeling hip flexor stretch with antagonistic glute contraction Monster walks

Figure 1: ¼ squat with band resistance

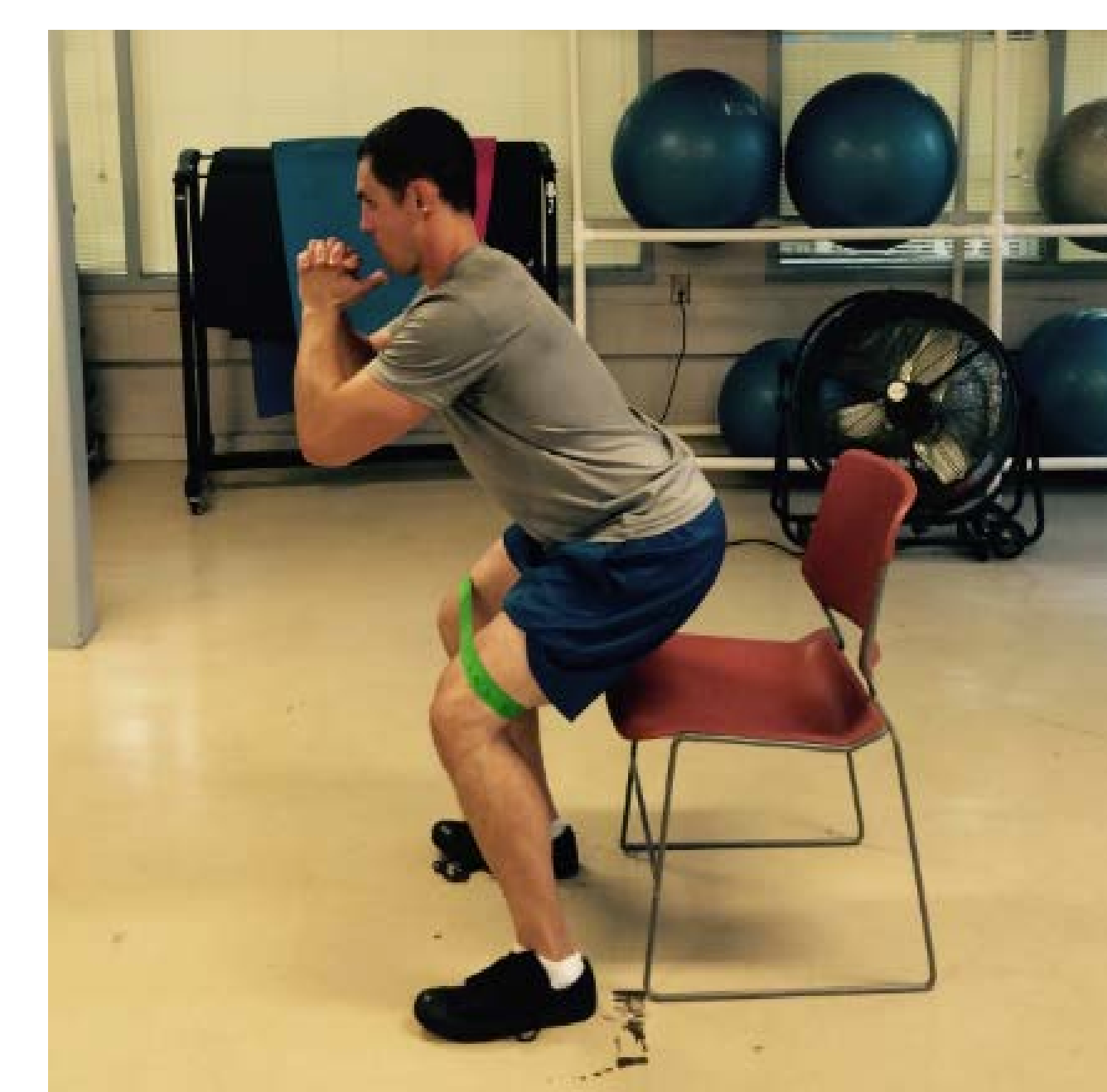


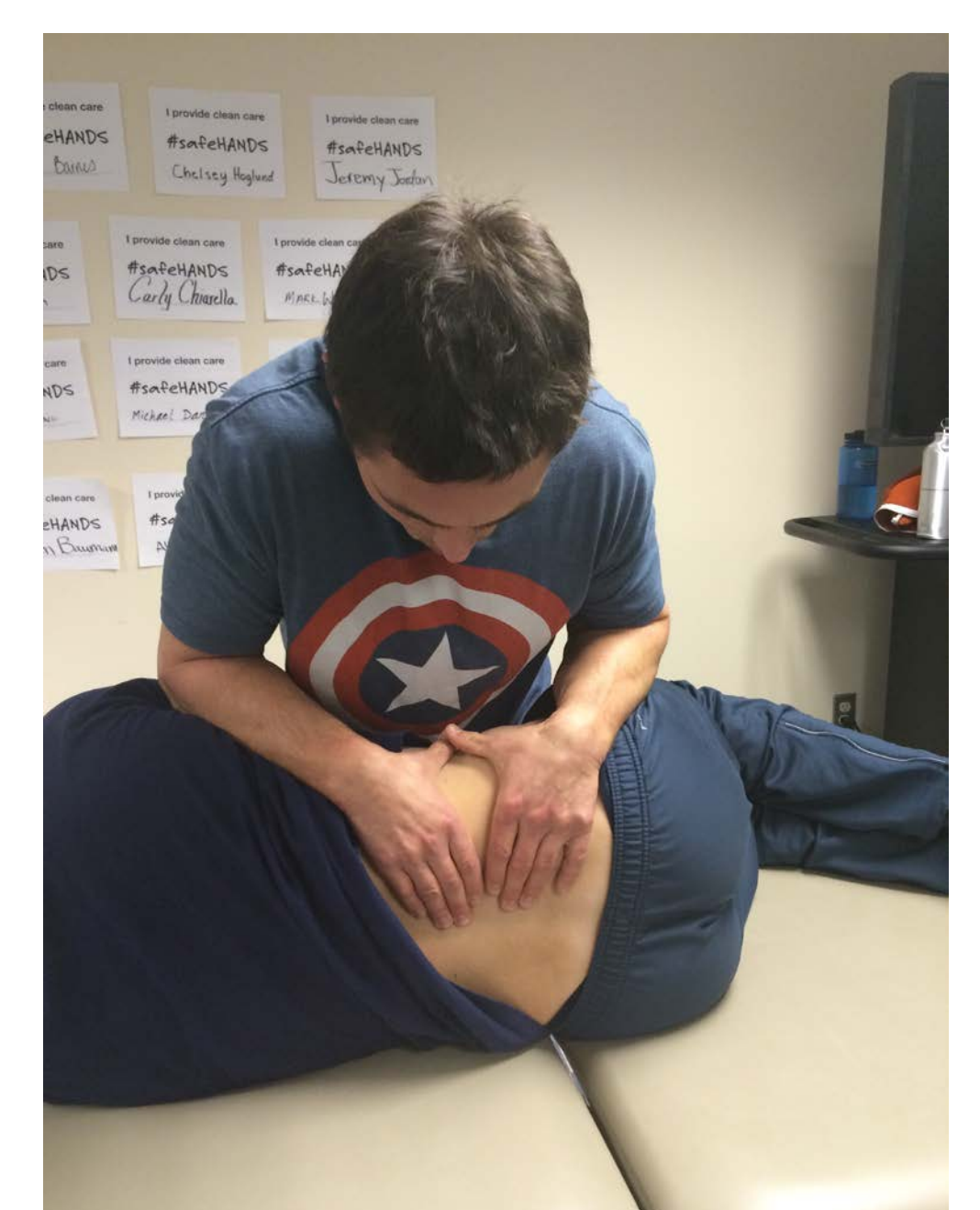
Figure 2: supine abdominal stiffening without curl up



Figure 3: lumbar mobilization



Figure 4: Side-lying QL mobilization



Neuromuscular re-education was applied to the multifidus muscle of the joint to promote stability at the segment after joint mobilization (week 5).The patient decreased the activation time and increased the strength of the multifidus muscles from weeks 5-20 as evidence by palpation.

Prior to performing abdominal stiffening exercises, the patient was educated on; what a Valsalva maneuver is, contraindications to performing the maneuver, and improper techniques related to the maneuver. When performing a Valsalva maneuver, the patient’s blood pressure can elevate, increasing the risk of rupturing the repaired aneurysm. The exercises were modified to allow the patient to breath in/out while performing a gentle contraction/stiffening of the abdominal muscles. The patient was also monitored for any signs and symptoms of increased headache, dizziness, or lightheadedness, as this would indicate she was not tolerating the exercise modifications.