Effects of Neuromobilization on Tendinopathy: Part II

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Tendon pain affects both sport and general populations. Achilles, extensor carpi radialis brevis (ECRB), rotator cuff, and patellar tendons are the most common sites for apparent overuse injuries. Mechanical, vascular, and neural theories have been proposed to explain the underlying mechanism of tendinopathy. While clinicians often treat using the mechanical and vascular theories, the neural component is often misunderstood or disregarded. The identification of tendinopathy patients who present with neural components, combined with the inclusion of targeted interventions for this presentation, may be important to improving patient outcomes associated with the treatment of tendinopathy.

Neuromobilizations are slow and controlled movements of the nervous system on the musculoskeletal system to restore and maintain health of the nervous system. During the classification-based evaluation, proper testing should be performed to identify the patient’s dysfunction and determine if neuromobilization is indicated as a treatment intervention. The upper limb neurodynamic test (ULNT), slump test, and straight leg raise test are the appropriate tests to assess upper and lower extremity neuromobilization dysfunctions.

Neurodynamic Dysfunctions and Classifications

Neurodynamic tests are used to diagnose two types of dysfunctions: sliding and tension dysfunctions. A sliding dysfunction would be indicated if a patient’s symptoms decreased as the patient was pushed further into the test. A tension dysfunction would be indicated if a patient’s symptoms increased as the patient was pushed further into the test. Sliding and tension dysfunctions should be treated differently and should guide the clinician when deciding on a treatment regimen. In addition to classifying the patient as a tensioner or slider, Shacklock has recommended for clinicians to further classify these patients across four levels.

When classified as a level zero, a neurodynamic test is contraindicated because the patient may have had psychosocial and psychological issues along with severe pain due to physical problems. A level one classification would consist of a limited exam, which likely would provoke symptoms and a neurological deficit would be present. The differentiating movement, for any neurodynamic test, would be applied first and the
clinician would use an off switch approach, meaning at the first sign of symptoms testing ceases. Standard evaluation would be performed for a level two classification, with the clinician taking the nerve through a full range of motion. Excessive pain and neurological symptoms should be avoided at this level. The level three classification has four subsets: A, B, C, and D. The four subsets are a gradual progression from subset A, the most sensitized patient, to subset D, the least sensitized patient. Subset A consists of applying the sensitizing maneuver, such as hip internal rotation, adduction, and lumbar contralateral lateral flexion. The clinician would start the subset B locally, followed by combining the test with muscle function to perform subset C. Subset D would consist of the patient being placed in the symptomatic position.

The purpose of this case study was to assess the effectiveness of neuromobilization in the treatment of an apparent tendinopathy in a patient classified with an underlying neurological dysfunction. Short-term outcomes related to pain, function, and disability were assessed to identify the results of the intervention.

**Patient History**

The patient was a 20-year-old female former soccer player who presented with pain at the right distal triceps tendon, as well as the medial and lateral elbow. The patient stated that the pain began eight months before the evaluation while performing bench press activities. The patient described feeling a “tug” on the lateral aspect of her elbow with pain (rated a 7 out of 10 on the Numerical Rating Scale [NRS]) in the medial elbow and triceps immediately following an exercise session. The patient also noted an immediate tingling sensation from the elbow to wrist along the C4 and C8 dermatome distributions. After four weeks of symptoms, the patient purchased a counterforce brace advertised to treat tennis elbow, but the symptoms continued to increase to an 8 or 9 out of 10 on the NRS over the next four weeks. After two months of persistent symptoms, the patient began physical therapy, which consisted of strengthening exercises (e.g., resistance tubing exercises), stretching, therapeutic ultrasound, and friction massage. Despite these treatments, the patient did not experience improvement and sought another opinion from a physician at five months postinjury.

During that exam, radiographs were taken to rule out fracture and other bony pathology. The patient was diagnosed with tendinitis of the common extensor mass and was treated with a steroid injection at the lateral epicondyle. Tendinitis implies inflammation is present in the painful tendon. Despite the lack of inflammatory markers present in painful tendons throughout research, many clinicians continue to use the term interchangeably with other, more appropriate terms, such as tendinopathy or tendinosis. The diagnosis was an issue because it led to a treatment designed for an inflammatory condition when one was not likely present and it is likely to have made a degenerative condition worse. The patient reported a short-term improvement in pain (3 out of 10 on the NRS) from the injection, but noted her pain quickly returned to previous levels. At seven months post initial injury, the patient’s pain remained at a constant 5 or 6 out of 10 on the NRS. Due to a lack of improvement, the patient was referred to an orthopedic surgeon, who repeated radiographs that were again negative for pathology. At that time, two additional steroid injections were administered: one at the lateral epicondyle and one into the extensor mass (approximately one inch distal to the lateral epicondyle injection site). Following the injections, the patient reported that her pain increased to an 8 out of 10 on the NRS at rest within 24 hr and lasted for two weeks. As a result of the pain increase, the patient refused the next set of recommended steroid injections and sought out another opinion with an athletic trainer.

**Evaluation**

During the initial evaluation with the athletic trainer (eight months after initial injury), the patient reported her pain was a consistent 5 out of 10 on the NRS. She also presented with tender points (TP) over the common extensor tendon on the lateral aspect of the elbow, flexor tendons on the medial aspect of the elbow, and distal triceps tendon. All ranges of motion were equal bilaterally during active and passive assessment. The patient reported pain over the distal triceps muscle and wrist extensors when resistance was applied against elbow extension and wrist extension, respectively. Manual muscle testing of the triceps group was graded a 4 out of 5, while testing of the wrist flexors and extensors resulted in grades of 3 out of 5. The valgus and varus stress tests were negative for laxity and pain. The medial and lateral epicondyle tests reproduced her radiating pain symptoms, which were rated 7 out of 10 on the NRS. Mulligan concept