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Manual therapy and neurodynamic mobilization in a patient with peroneal nerve paralysis: a case report

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Abstract

Objective: The purpose of this case report is to describe a therapeutic intervention for peroneal nerve paralysis involving the sciatic nerve.

Clinical features: A 24-year-old man presented with peroneal nerve paralysis with decreased sensation, severe pain in the popliteal fossa, and steppage gait, which occurred 3 days prior to the consultation. Magnetic resonance imaging and electromyography confirmed lumbar disk herniation with sciatic common peroneal nerve entrapment in the popliteal fossa.

Intervention and outcome: A combined treatment protocol of spinal and fibular head manipulation and neurodynamic mobilization including soft tissue work of the psoas and hamstring muscles was performed. Outcome measures were assessed at pretreatment, 1 week posttreatment, and 3-month follow-up and included numeric pain rating scale, range of motion, pressure pain threshold, and manual muscle testing. Treatment interventions were applied for 3 sessions over a period of 1 week. Results showed reduction of the patient's subjective pain and considerable improvement in range of motion, strength, and sensation in his left foot, which was restored to full function.

Conclusion: A combined program of spinal and fibular head manipulation and neurodynamic mobilization reduced pain, increased range of motion and strength, and restored full function to the left leg in this patient who had severe functional impairment related to a compressed left common peroneal nerve.

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Introduction

Drop foot can arise from various musculoskeletal or neurologic etiologic processes. Leg pain, sensory loss, and weakness in ankle dorsiflexion comprise a symptom complex that is most frequently caused by degenerative disk disease of the lumbar spine.[1] The condition involves the muscles of foot dorsiflexion (tibialis anterior, extensor hallucis longus, and extensor digitorum longus) and the nerves that supply them, primarily the common peroneal nerve. Common causes of drop foot include compartment syndrome, diabetes, stroke, lumbar disk protrusions, musculoskeletal compression, myopathies, neuropathies, and peripheral nerve injuries[2-4] and corresponding steppage gait—also known as *drop-foot gait*.[5] Peroneal nerve paralysis (PNP) is the most common mononeuropathy in the lower limb, and it is vulnerable to damage around the fibular head because of the anatomical position between the peroneal nerve and fibula.[6] Hence, a lesion of the common peroneal nerve would result in foot drop.

The purpose of the current study is to describe the combination of care using spinal and fibular head manipulation for PNP with neurodynamic mobilization (NM).

Case report

A 24-year-old man presented with signs of PNP, decreased sensation, and motor weakness in the lateral aspect of his left leg and foot resulting in a steppage gait. The symptoms began 3 days prior to the consultation. Clinical examination no revealed a low back pain. His medical history revealed a single episode of sciatic pain and subsequent magnetic resonance imaging (MRI) indicating a lumbar disk herniation in the previous 4 months. Results of laboratory blood tests were unremarkable for metabolic, inflammatory, or infectious joint disease.

The patient's subjective reports indicated increased severity of symptoms associated with his occupational tasks as an electrician, particularly kneeling for long periods. Pretreatment examination for manual muscle testing of the left tibialis anterior, extensor hallucis longus, extensor digitorum longus, and peroneus muscles revealed muscle strength at the level of 1/5, 2/5, 2/5, and 1/5, respectively. Diminished sensation in the first toe web space, an area of tenderness over the region of the fibular head, and a positive Tinel sign near the head of the fibula on the left leg were also detected during the examination. No mass lesion was palpable. Pain was located in the region of the fibular head and was described as a "constant achy feeling," with occasional "sharp" pain with specific movements, and graded at 7 out of 10 on a numeric pain scale (NPS). Electromyography (EMG) was used to confirm the diagnosis[2] the previous day in the hospital by the patient's medical physician (neurologist). The EMG revealed a left common peroneal neuropathy below the branch leading to the short head of the biceps femoris muscle, which predominantly affected the common peroneal nerve.

The NPS was used to measure the patient's subjective pain,[7] and the Hospital Anxiety and Depression Scale was used to capture psychosocial adjustment.[8,9] Pressure pain threshold (PPT) at the fibular head was measured by algometry, which has previously been shown to be a valid and reliable measure, with higher PPT values indicating less severe sensitivity.[10,11] Manual muscle testing was performed to assess strength and based on the analysis of physical impairment assessment standard from the *Guides to the Evaluation of Permanent Impairment*.[12]

The above outcome measures were performed at pretreatment, 1 week posttreatment and 3-month follow-up. Before initiation of treatment, the patient was advised about the potential benefits of physiotherapy treatment as well as its potential adverse effects (ie, decreased sensation); and informed consent was obtained and documented.

During the 3 intervention sessions over the course of 1 week, the patient received spinal and fibular head manipulation and NM.

Method of application of manipulation

Lumbar manipulation in supine position

A long-lever rotary spinal manipulation technique was used with the patient positioned in a lateral recumbent or side-lying position with the superior or free hip and knee flexed and adducted across the midline. During the procedure, the clinician stabilized the participant's free leg with his own leg while holding the participant's superior shoulder; and the manipulative force was applied with the clinician's forearm resting on the pelvis. The rotatory thrust on the pelvis was directed at a localized lumbar segment (L3-4) and was delivered by a quick, short, controlled movement of the shoulder and arm combined with a slight body drop. The manipulation force applied was localized to the dysfunctional vertebral segment using alignments of force vectors secondary to participant positioning (Fig 1).