

Cervical Spondylotic Myelopathy: Surgical Decompression Helps With Gait?

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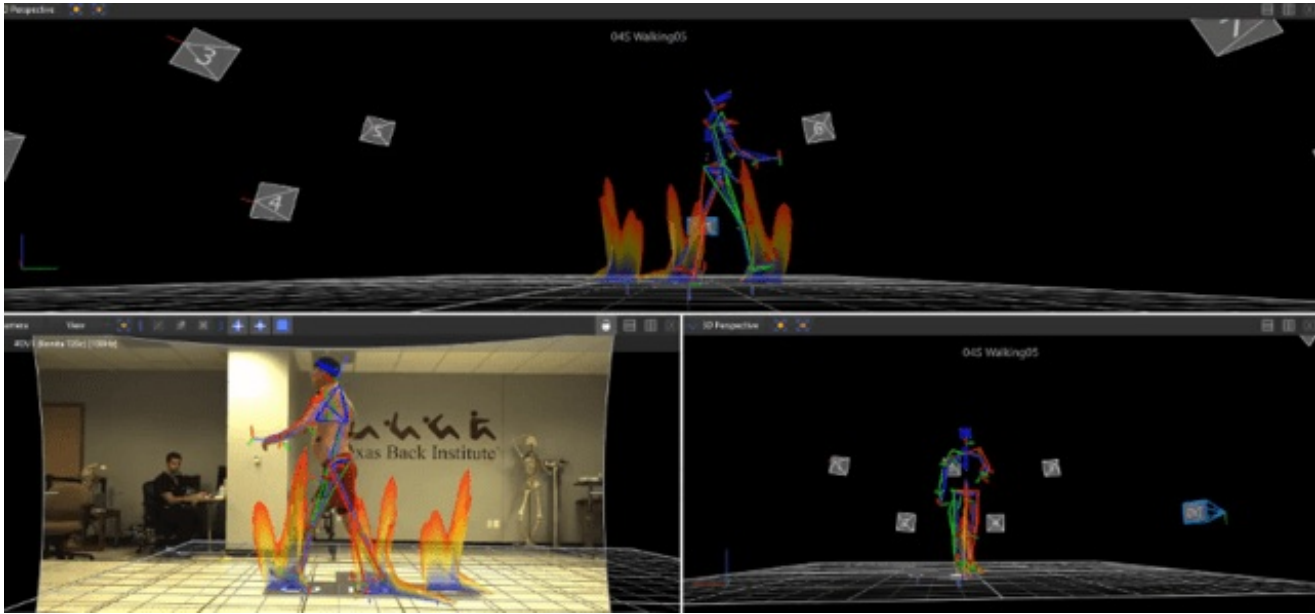
by Elizabeth Hofheinz, M.P.H., M.Ed.

Two researchers from the Texas Back Institute (TBI) in Plano, Texas undertook a study looking at whether cervical decompression surgery helps normalize gait parameters. Their work, “Cervical Decompression Surgery Normalizes Gait Ground Reaction Forces in Patients With Cervical Spondylotic Myelopathy,” was published in the September 15, 2020 edition of *Spine*.

Explaining the origin of this work was **Ram Haddas, Ph.D.**, Director of Research at TBI, who told **OSN**, “Cervical spondylotic myelopathy [CSM], the most common cause of spinal cord dysfunction, is a progressive degenerative condition that causes spinal cord impingement and resultant gait impairment, sensory dysfunction, extremity weakness, and loss of manual dexterity. Functional capacity and independence slowly decline as symptoms progress.”

Enhanced measurement needed

“Traditional in-office physical exam maneuvers to assess gait and balance suffer from subjectivity and may not be optimally suited to quantifying gait and balance impairments,” stated **Dr. Haddas**. The purpose of this investigation was therefore to quantify the effect of cervical decompression and fusion on gait using gait lab and high-tech measurements in patients with cervical spondylotic myelopathy and to compare these values to those of a group of healthy controls.”



A total of 40 patients with symptomatic CSM underwent gait analysis with measurement of horizontal and vertical gait ground reaction forces (GRFs) both prior and 3 months after surgery; 30 healthy controls had the same tests.

The authors wrote, “Before surgery, patients with CSM exhibited disturbances in GRF magnitudes: significantly greater maximum weight acceptance and push off forces, and timing: maximum weight acceptance occurred earlier while mid-stance, toe-off, braking, and propulsion occurred later compared with healthy controls.”

Fundamentally impaired walking

Co-author **Peter B. Derman, M.D., M.B.A.** added, “The findings of the present study demonstrate that the gait cycle is altered in patients with cervical spondylotic myelopathy. These individuals struggle with ambulation because they are in a perpetual state of falling. Steps are poorly controlled without the measured flow of a normal gait. Rather than gradually accepting their weight with their forward foot, patients lurch forward and rapidly produce a spike of force as they catch themselves. Moreover, these patients’ muscles have difficulty reacting to this jolt, causing the remainder of the gait cycle to be delayed and necessitating greater forces to transition to the next step. Surgical intervention results in significant improvements but not complete normalization of gait parameters. These data include ground reaction force parameters that were previously unreported in the setting of cervical spondylotic myelopathy and provide a more nuanced understanding of the associated gait abnormalities.”

SCM...not a hopeless situation

“Cervical spondylotic myelopathy was traditionally believed to be an irreversible condition,” stated **Dr. Derman**. “The goal of surgery was to halt progression, but improvement in symptoms after surgery was not expected. However, recent studies are beginning to demonstrate that patients often do experience some recovery. Our objective gait data confirms that this is indeed the case.”

“While the advanced equipment necessary to perform functional analysis (i.e. human motion capture and dynamic EMG) is currently prohibitively expensive for widespread clinical use, force plates for ground reaction force measurement can now be obtained for several thousand dollars and are likely to become even more affordable with time. Portable models that require limited space and can be used in multiple locations exist. They are relatively straightforward to use such that both gait and balance tests can be administered by a nurse or medical assistant in the clinical setting. The overall goal of this study was achieved by providing surgeons with a practical method for producing objective gait parameters from a force plate.”

Dr. Haddas added, “This quantitative tool may assist with pre-operative planning and patient counseling as well as recovery monitoring. Identification of specific abnormalities may also help inform individualized physical therapy treatment protocols. Moreover, this type of data is used clinically in our practice with patients undergoing pre-op and serial post-op analyses. These results are provided to the physicians and patients to quantify recovery and the potential need for additional intervention. More physicians may consider incorporating this technology into their clinical practice as force plates are relatively affordable, portable, and straightforward to use.”