ACCRAC Award Winning Paper

Clinical Outcomes for Neurogenic Claudication Using a Multimodal Program for Lumbar Spinal Stenosis: A Retrospective Study

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Abstract

Objective: The purpose of this preliminary study was to assess the effectiveness of a 6-week, nonsurgical, multimodal program that addresses the multifaceted aspects of neurogenic claudication.

Methods: In this retrospective study, 2 researchers independently extracted data from the medical records from January 2010 to April 2013 of consecutive eligible patients who had completed the 6-week *Boot Camp Program*. The program consisted of manual therapy twice per week (eg, soft tissue and neural mobilization, chiropractic spinal manipulation, lumbar flexion-distraction, and muscle stretching), structured home-based exercises, and instruction of self-management strategies. A paired *t* test was used to compare differences in outcomes from baseline to 6-week follow-up. Outcomes included self-reported pain, disability, walking ability, and treatment satisfaction.

Results: A total of 49 patients were enrolled, with a mean age of 70 years. The mean difference in the Oswestry Disability Index was 15.2 (95% confidence interval [CI], 11.39-18.92), and that for the functional and symptoms scales of the Swiss Spinal Stenosis Questionnaire was 0.41 (95% CI, 0.26-0.56) and 0.74 (95% CI, 0.55-0.93), respectively. Numeric pain scores for both leg and back showed statistically significant improvements. Improvements in all outcomes were clinically important.

Conclusions: This study showed preliminary evidence for improved outcomes in patients with neurogenic claudication participating in a 6-week nonsurgical multimodal Boot Camp Program. (J Manipulative Physiol Ther 2015;38:188-194)

Key Indexing Terms: *Spinal Stenosis; Lumbar Vertebrae; Osteoarthritis; Spine; Rehabilitation; Chiropractic; Claudication; Manual Therapy*

Neurogenic claudication is a leading cause of pain, disability, and loss of independence in older adults.[1] It is usually caused by degenerative lumbar spinal stenosis (DLSS), which refers to age-related degenerative narrowing of the spinal canals that often lead to compression and ischemia of the spinal nerves (neuroischemia).[2] The clinical syndrome of DLSS is known as *neurogenic claudication*. This syndrome is characterized by bilateral or unilateral buttock, lower extremity pain, heaviness, numbness, tingling, or weakness, precipitated by walking and standing and[3] relieved by sitting and bending forward.[4,5] Limited walking ability is the dominant functional impairment caused by neurogenic claudication due to DLSS.[4] Those with DLSS have greater walking limitations than individuals with knee or hip osteoarthritis[6] and greater functional limitations than those with congestive heart failure, chronic obstructive lung disease, or systemic lupus erythematosus.[1] Inability to walk among individuals with neurogenic claudication leads to a sedentary lifestyle and a progressive decline in health status.[7–9] The prevalence and economic burden of neurogenic claudication due to DLSS are growing

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exponentially due to the aging population. Although DLSS is the most common reason for spine surgery in individuals older than 65 years,[10] only very few DLSS patients receive surgery.[11] Most individuals with neurogenic claudication due to DLSS receive nonsurgical care. However, what constitutes effective nonsurgical care is unknown.[12–15]

Self-management strategies may be a practical and effective means to improve walking ability, functional status, and quality of life in this chronic and often progressive condition.[15] The goal of self management in DLSS is to provide patients with the knowledge, skills, self-confidence, and physical capacity to manage their symptoms and maximize their function on their own.

Based on this evidence, a multimodal self-management training program was developed at our institution and is known as the *Boot Camp Program for Lumbar Spinal Stenosis*; however, the clinical effectiveness of this program is unknown. Therefore, the purpose of this study was to assess the effectiveness of the Boot Camp Program for Lumbar Spinal Stenosis in improving symptoms and functional status among consecutive patients with neurogenic claudication who completed the 6-week program.

Methods

A retrospective medical record review was conducted of consecutive patients who enrolled in the Boot Camp Program for Lumbar Spinal Stenosis from January 2010 to April 2013 inclusively. Medical records were selected based on the inclusion and exclusion criteria listed in Figure 1.

Protection of Human Subjects

The Research Ethics Board at Mount Sinai Hospital in Toronto (MSH REB13-0058-C) gave approval for this study and exempted informed consent.

Description of Program. All patients received the following structured 6-week multimodal and self-management training program. The program consisted of one-on-one treatment sessions with one of the authors (C.A.). Each session was approximately 15 to 20 minutes in duration, and the frequency varied from 1 to 3 times per week depending on the severity of the symptoms and travel time to the clinic. The interventions were tailored and directed to the multifaceted aspects of neurogenic claudication, with an emphasis on instructing patients on self-management. The components of the Boot Camp Program for Lumbar Spinal Stenosis were as follows.

Education. Patients received instruction on self-management strategies using a cognitive behavioral approach.[16] They received information on the causes of pain and disability due to DLSS, its natural history, and prognosis. They received instruction on how to manage symptoms and maintain daily routines using problem solving, pacing, relaxation, and body positioning.[16,17] Reassurance, positive reinforcement, goal setting, and graded activity were provided to reduce pain-related fear, improve self-efficacy,[16,18] and improve function.[19] The emphasis at each session was on maximizing function particularly walking ability. Patients were instructed on how to reduce the lumbar lordosis when standing and walking using the pelvic tilt (body repositioning techniques).

Inclusion criteria:
1) 50 years of age or older
2) clinical evidence of neurogenic claudication due to lumbar spinal stenosis
3) symptoms for more than 3 months
4) Completed both the Boot Camp Program for Lumbar Spinal Stenosis and the pre- and post-treatment outcome measures and questionnaires.

Exclusion criteria:
1) Spondylitis, neoplasm, infection or metabolic diseases
2) Radiculopathy due to lumbar disc herniation
3) Psychiatric and/or cognitive disorders
4) Not able to read or comprehend English sufficiently enough to complete self-report

Figure 1. *Inclusion and exclusion criteria for medical record selection.*

Exercises. Patients received instruction on muscle stretching, strengthening, and conditioning exercises directed at improving overall back and lower extremity fitness and facilitating lumbar flexion.[20,21] Tight muscles that promote lumbar extension were progressively stretched, and muscles that promote and control lumbar flexion were strengthened. Muscles stretching exercises included supine knee to chest and knee to opposite stretches, side posture quadriceps stretches, and standing iliopsoas stretches.[21] Core strengthening exercises included supine pelvic tilt and half sit ups, side posture lateral stabilizer exercises, and prone lumbar and gluteal extension exercises.[21] Exercise instruction was provided and reviewed at each session and was part of a progressive structured home exercise program. Patients who had limited walking ability were instructed in a graduated cycling program using a stationary forward leaning bike. A graduated walk program was implemented among patients who were not limited in their walking ability. The aim of cycle or walk program was to improve lower extremity conditioning and overall fitness and was integrated as part of the home exercise program.[22] A written exercise and conditioning program schedule was provided to patients outlining the type, frequency, and intensity of the exercises to be performed. The exercises were performed twice per day at home, with the number, intensity, and frequency of each exercise increasing each week for a period of 6 weeks.

Manual Therapy. All patients received manual therapy aimed at improving the flexibility of the lumbar spine and