

## Clinical Study

# The spinal stenosis pedometer and nutrition lifestyle intervention (SSPANLI): development and pilot

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## Abstract

**BACKGROUND CONTEXT:** Owing to mobility limitations, people with lumbar spinal stenosis (LSS) are at risk for diseases of inactivity, including obesity. Therefore, weight management in LSS is critical. Body mass index is the strongest predictor of function in LSS, suggesting that weight loss may promote physical activity and provide a unique treatment option. We propose a lifestyle modification approach of physical activity and nutrition education, delivered through an e-health platform.

**PURPOSE:** The purpose of this study was to develop and pilot an e-health intervention aimed at increasing physical activity and decreasing fat mass in people with LSS.

**STUDY DESIGN:** The study design was based on intervention development and pilot.

**PATIENT SAMPLE:** Ten overweight or obese individuals with LSS were confirmed clinically and on imaging.

**OUTCOME MEASURES:** Self-reported measures were food record, Short-Form 36 (SF-36), pain scales, Swiss Spinal Stenosis Symptom and Physical Function Scales, Oswestry Disability Index (ODI), Pain Catastrophizing Questionnaire, Tampa Scale for Kinesiophobia, Center for Epidemiologic Studies (Depression) Scale, Behavioral Regular in Exercise Questionnaire, and Regulation for Eating Behavior Scale and physiologic measures were dual-energy X-ray absorptiometry (DXA), blood draw, 7-day accelerometry, self-paced walking test, and balance test.

**METHODS:** The e-health platform was developed. Intervention: during Week 1, participants received a pedometer and a personalized consultation with a dietitian and an exercise physiologist. For 12 weeks, participants logged on to the e-health Web site to access personal step goals, nutrition education videos, and a discussion board. Follow-up occurred at Week 13.

**RESULTS:** Nine participants had a mean age of  $67.5 \pm 6.7$  years (60% women). Significant improvements were observed for fat mass (DXA), trunk fat mass, symptom severity (Swiss Symptom Scale), energy intake, maximum continuous activity (accelerometry), and mental health (SF-36) ( $p < .05$ ). Nonsignificant improvements were observed for waist circumference, pain, ODI, and obesity biomarkers. Seventy percent lost weight, 50% increased walking capacity, and 60% increased quality of life. The mean increase in steps was 15%.

FDA device/drug status: Not applicable.

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**CONCLUSIONS:** The spinal stenosis pedometer and nutrition lifestyle intervention was shown to be feasible, attractive to participants, and effective in this small sample. This intervention provides people with LSS the opportunity to participate in their own health management, potentially improving access to care. Efficacy is currently being assessed in a randomized trial. © 2015 Elsevier Inc. All rights reserved.

**Keywords:** Lumbar spinal stenosis; Obesity; Physical activity; Nutrition; e-Health; Weight loss

## Introduction

Given their symptoms, people with lumbar spinal stenosis (LSS) avoid physical activity. This symptom-related inactivity has many implications for overall health, obesity, and risk for diseases of inactivity. Research demonstrates a specific link between obesity and physical activity in people with LSS. A recent study found body mass index (BMI) to be the strongest predictor of community-based performance in this population [1]. This suggests that a reduction in BMI may promote physical activity and provide a unique nonsurgical treatment option for increasing function in LSS. It is possible that increased physical activity and reduced fat mass may reduce chronic inflammation and associated musculoskeletal pain in this population.

Pedometers have become a popular means for assessing and motivating physical activity in older adults [2–4]. It is possible that when motivated by a pedometer, people with LSS could increase their physical activity and promote weight loss by accumulating small bouts of walking throughout the day. However, sustainable weight loss cannot be accomplished through increased physical activity alone; dietary intake plays a major role. This suggests that lifestyle education intervention programs should combine both diet and exercise [5–7].

Successful interventions such as “Eat Better and Move More” have demonstrated that simple nutrition education and physical activity programs can improve lifestyle behaviors [7]. However, the Eat Better and Move More intervention implies a significant time burden for both participants and program delivery staff. One way to offset some of this burden is the delivery of educational elements through computer-based tools (e-health). The use of e-health interventions provides an opportunity for people to take an active role in their own health. Therefore, we hypothesized that an e-health tool that provides nutrition education and pedometer goals would be effective as part of lifestyle intervention for individuals with LSS.

The objective of this study was to develop and pilot an e-health lifestyle intervention aimed at increasing physical activity and decreasing fat mass in overweight and obese people with LSS. The main components of this intervention included pedometer-based physical activity promotion and nutrition education combined with behavior change strategies. This study represents the first time electronic media has been used in an attempt to manage LSS

and risk for associated chronic diseases of inactivity concurrently.

## Methods

This project consisted of two phases described in detail subsequently. Pilot data and participant feedback were used to evaluate the efficacy, content, and feasibility of the intervention, with the goal of conducting a randomized controlled trial (RCT). The trial protocol has been submitted for the publication, and recruitment is underway. Ethics approval for this study was provided through the Conjoint Health Research Ethics Board of the University of Calgary.

### *Phase 1: e-health tool and 12-week intervention development*

In Phase 1, the protocol for the 12-week intervention was developed, including the e-health Web site.

### *Behavior change strategies*

The behavior change strategies used to design our intervention primarily source from the cognitive behavioral theory and therapy, including aspects of self-monitoring, goal setting, problem solving, and improving social support [8].

### *Development of nutrition education sessions*

The first step in creating the e-health tool was content development for the weekly nutrition education sessions. Content development was based on a review of the literature and consultation with dietitians and behavior modification experts from Alberta Health Services. We identified specific topics to be covered in each of the weekly education sessions, based on nutrition and behavior change priorities for aging individuals who are overweight and obese with mobility limitations.

### *Development of pedometer goals and physical activity tips*

We chose pedometers as the primary method for motivating physical activity. Pedometers facilitate self-monitoring and ongoing feedback, resulting in the awareness of physical activity and motivation to move more [9]. Factors identified in the literature to be most important

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