

# Steps Apart: Gait Differences in Patients with Lumbar Spinal Stenosis and Pain-Free Older Adults

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## Summary

Walking is a key activity for maintaining independence in older adults. Knowing that degenerative lumbar spinal stenosis (LSS) with neurogenic claudication (NC), an age-related condition, significantly impairs walking capacity, it is important to understand how gait parameters are affected by the condition. This study compared gait parameters between 35 patients with LSS causing NC and 35 pain-free older adults aged of at least 50 years of age. Participants performed a 30-meter walking task, with gait parameters recorded using wearable inertial measurement units (IMUs). Results showed that patients with LSS causing NC had longer cycle duration, stance phase, foot-flat subphase, and double support phase, but lower cadence, stride length, speed, loading and pushing subphases, swing phase, peak angular velocity, heel strike pitch angle, and toe-off pitch angle compared to pain-free older adults. These findings suggest compensatory strategies in patients with LSS causing NC to reduce pain and ensure stability.

## Introduction

Walking is the most common form of physical activity for older adults and represents an important activity for maintaining independence [1-2]. Knowing that degenerative LSS NC, an age-related condition, significantly impairs walking capacity [3], it is important to understand how gait parameters are affected by the condition. The aim of this study was to compare gait parameters between patients with LSS causing NC and pain-free older adults.

## Methods

Seventy participants (35 with a diagnosis of LSS causing NC and 35 pain-free older adults) aged 50 and above were recruited. All participants performed a 30-meter walking task (see figure 1) with general, spatial, temporal and clearance gait parameters recorded using IMUs. Between-group comparisons were conducted using analyses of covariance.

## Results and Discussion

Comparison between groups showed that cycle duration, stance phase, foot-flat subphase and double support phase were longer in patients with LSS causing NC than in pain-free older adults, while cadence, stride length, speed, loading and pushing subphases, swing phase, peak angular velocity, heel

strike pitch angle and toe-off pitch angle were lower in patients with LSS causing NC than in pain free older adults. There was no significant difference between groups for clearance parameters. Between-group differences in general, spatial and temporal gait parameters suggest that compensatory strategies are adopted by patients with LSS causing NC during walking to reduce leg pain related to NC and ensure stability.

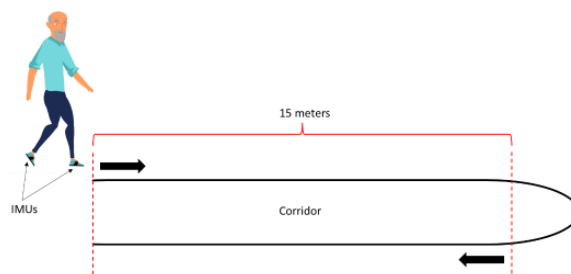


Figure 1: Walking task and IMUs positioning

## Conclusions

Except for clearance parameters, patients with LSS causing NC had altered gait parameters when compared to pain-free older adults. Further studies assessing the association between gait changes and walking capacity are needed to better understand the impact of LSS causing NC on functional capacities.

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## References

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