

# Combination of Exercise and Education Versus Education Alone to Improve Walking Capacity in Patients with Lumbar Spinal Stenosis

Mariève Houle<sup>1</sup>, Charles Tétreau<sup>2</sup>, Claude-Édouard Châtillon<sup>3,4</sup>, Andrée-Anne Marchand<sup>5</sup>, Martin Descarreaux<sup>2</sup>

1. Department of Anatomy, Université du Québec à Trois-Rivières, Trois-Rivières, Canada

2. Department of Human Kinetics, Université du Québec à Trois-Rivières, Trois-Rivières, Canada

3. Centre intégré universitaire de santé et de services sociaux de la Mauricie et du Centre-du-Québec, Trois-Rivières, Canada

4. Division of Neurosurgery, Faculty of Medicine, University of Montreal, Montréal, Canada

5. Department of Chiropractic, Université du Québec à Trois-Rivières, Trois-Rivières, Canada

Email: [marieve.houle@uqtr.ca](mailto:marieve.houle@uqtr.ca)

## Summary

Lumbar spinal stenosis (LSS) with neurogenic claudication (NC) limits walking capacity and daily activities. While exercise and education are recommended as first-line treatments, previous studies often include manual therapy, which limits self-management. This study evaluated a 6-week rehabilitation program combining exercise and education versus education alone. Walking capacity and gait parameters were measured on five occasions over 12 weeks using the Self-Paced Walking Test (SPWT) and inertial sensors. Preliminary results showed that the program improved walking capacity and toe-off pitch angle.

## Introduction

LSS causing NC is a degenerative condition known to limit walking capacity and daily activities [1]. Current recommendations prioritize exercise and education as first-line treatments before multimodal approaches combining active and passive strategies [2]. To our knowledge, no previous studies have evaluated exercise and education alone, as most research includes also manual therapy [3], which requires in-person sessions and limits self-management. This highlights the need for effective home-based programs to help individuals manage symptoms and maintain functional capacities. This study assessed the effectiveness of a 6-week rehabilitation program combining exercise and education, compared to education alone, on walking capacity and gait parameters in individuals with LSS causing NC.

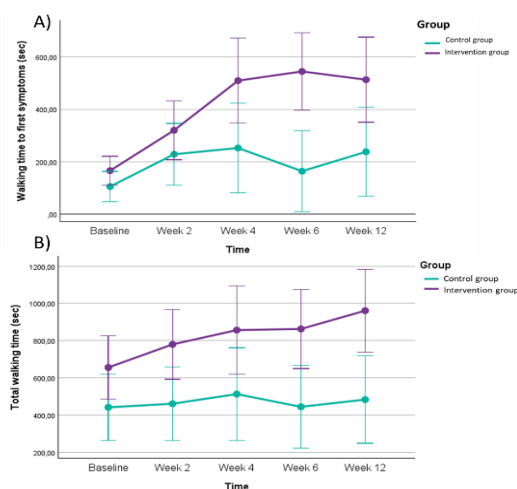
## Methods

Forty-four participants with a diagnosis of LSS causing NC were randomly allocated to the intervention group (exercise and education) or to the control group (education). Walking capacity was assessed using the SPWT and gait parameters were assessed using inertial sensors placed on the top of each foot. Data collection occurred at baseline, week 2, week 4, week 6 and at week 12. Between-group comparisons over time were conducted using mixed analyses of covariances.

## Preliminary results and Discussion

Participants in the intervention group had greater improvement in walking time and distance to first symptoms, and total walking time, compared to the control group ( $p < 0.01$ ). No significant difference was found for total

walking distance. Regarding gait parameters, the program had a superior effect on toe-off pitch angle only ( $p = 0.004$ ).



**Figure 1:** Between-group comparisons over time for A) walking time to first symptoms and B) total walking time

The 6-week rehabilitation program combining education and exercise showed a superior effect on the improvement of walking capacity and on the toe-off pitch angle gait parameter than education alone.

## Conclusions

The proposed rehabilitation program could provide individuals with additional tools to self-manage their condition over time.

## Acknowledgments

MH received a doctoral scholarship by the Fonds de recherche du Québec—Santé (FRQS). This study was also supported by the Chaire de recherche internationale en santé neuromusculosquelettique and its partner, the Centre intégré universitaire de santé et de services sociaux de la Mauricie-et-du-Centre-du-Québec.

## References

- [1] Katz JN et al. (2022). *JAMA*, 327(17), 1688-1699
- [2] Schneider MJ et al. (2019). *JAMA*, 2(1), 186828-186828
- [3] Bussi res A et al. (2021). *J. Pain*, 22(9). 1015-1039