

Check The Neck First

Student Researchers: **Meilin Hu, Yuan-Hui Hsieh**

Faculty Researchers: Julia Barker, Brenna Beard, Mabel Plourde-Doran



ABSTRACT

This study investigates the role of neck strength in preventing concussions and head injuries, emphasizing the importance of effective assessment methods. The research aims to evaluate a new prototype for neck strengthening exercises, identify effective interventions, and assess isometric neck flexion strength in athletes and non-athletes. Findings will provide insights into enhancing athlete safety and developing evidence-based guidelines for neck strength training.

INTRODUCTION

Neck strength plays a crucial role in preventing and managing concussions by stabilizing and positioning the head during impacts (Collins et al., 2014; Peek, 2022).



Current assessment methods for neck strength, including manual muscle testing, have been criticized for their validity and reliability (Selistre et al., 2021). Research indicates that isometric neck strengthening exercises can significantly decrease the risk of sport-related concussions (SRC), with a 5% reduction in risk for every 1-pound increase in neck strength (Collins et al., 2014). However, disparities exist in the effectiveness of these interventions across different sports and genders, highlighting the need for tailored approaches to neck strength training (Elliot et al., 2021; Nutt et al., 2022).

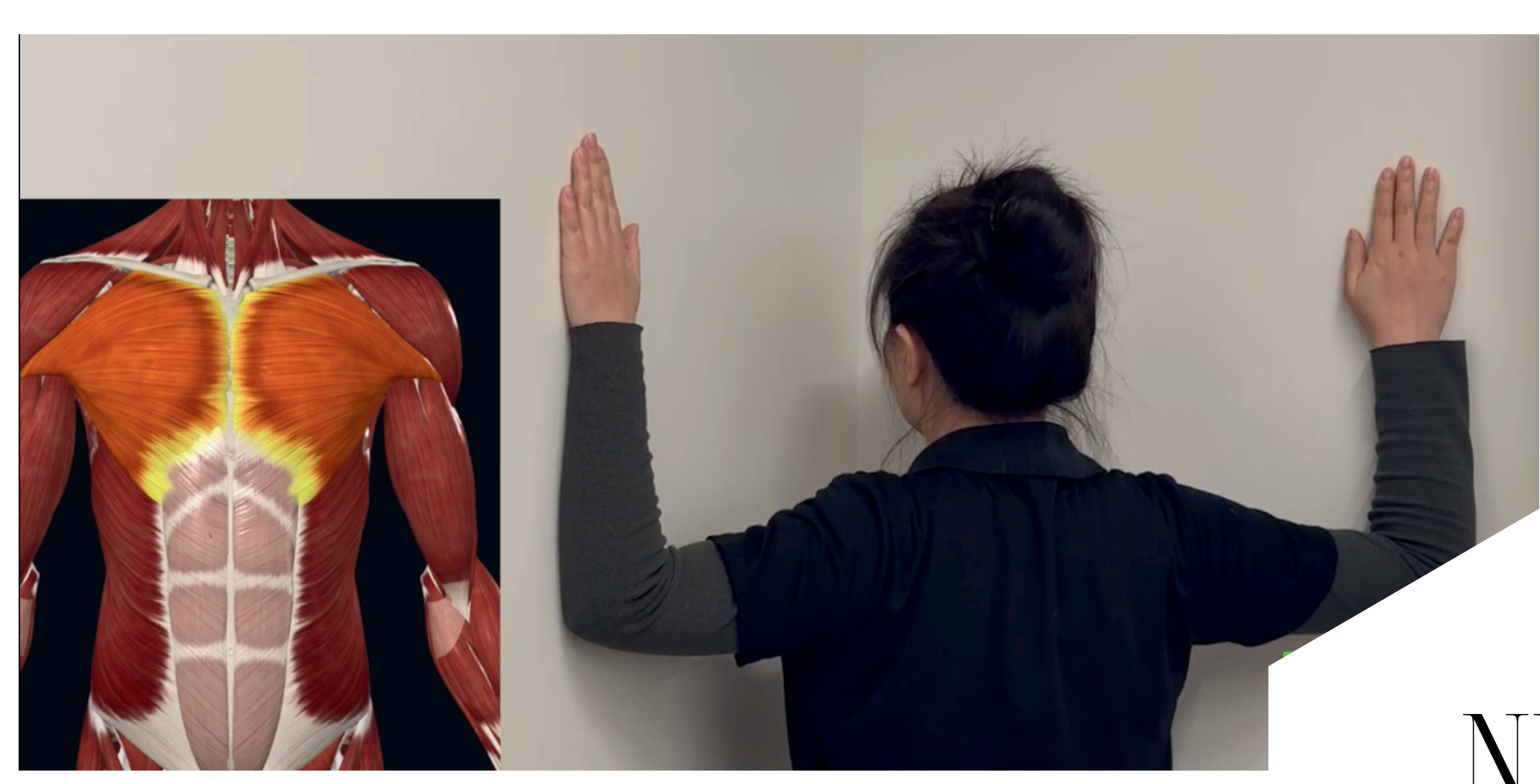
This study aims to evaluate a new technological prototype, "Check the Neck First," designed to measure neck flexion strength and enhance athlete safety. Participants aged 18–65 are invited to engage in exercises that will be assessed for their effectiveness in improving neck strength and reducing head and neck injuries. The study will also evaluate the design efficacy of the neck strength measurement device and compare its results to traditional handheld dynamometers.

By addressing these objectives, the research seeks to establish evidence-based guidelines that can contribute to reducing head and neck injuries in sports, ultimately enhancing athlete safety and performance.

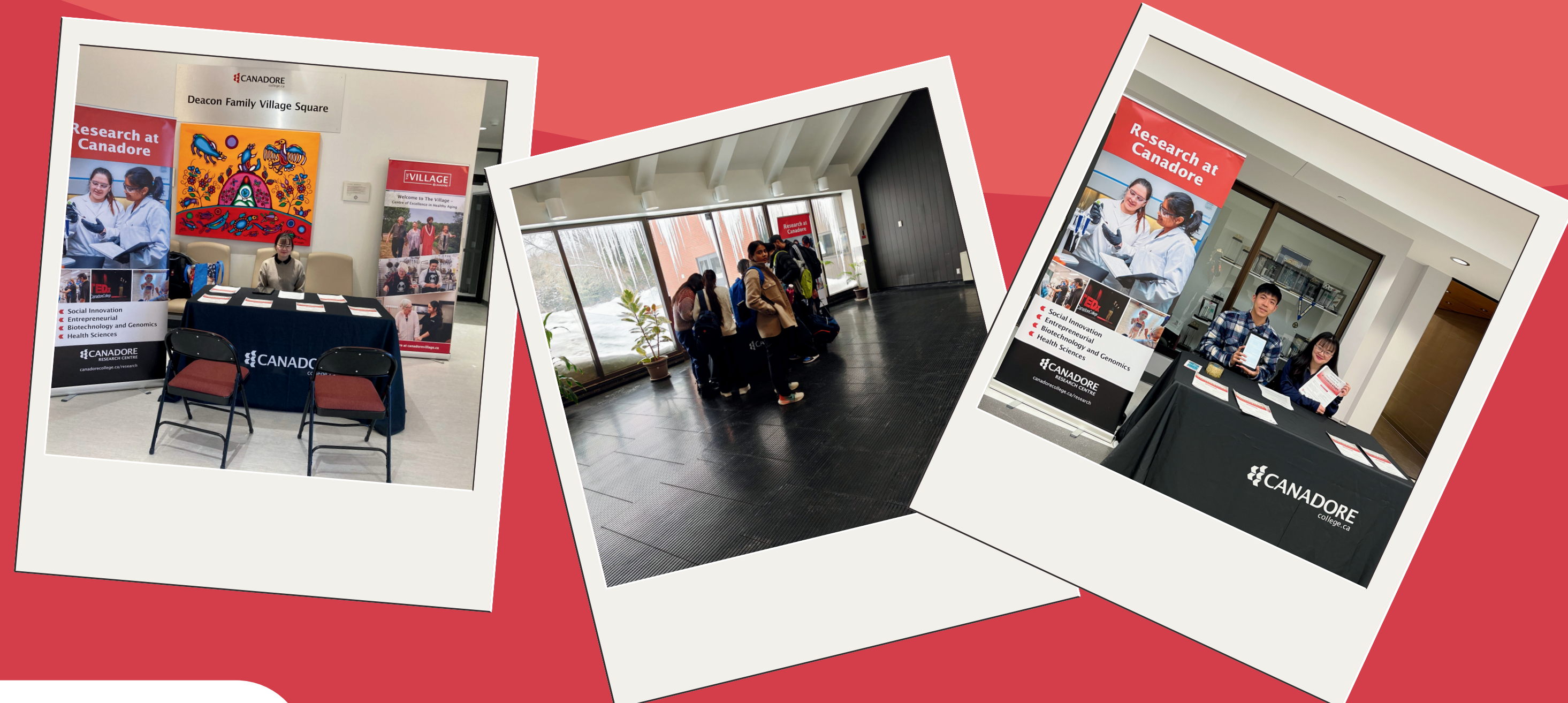
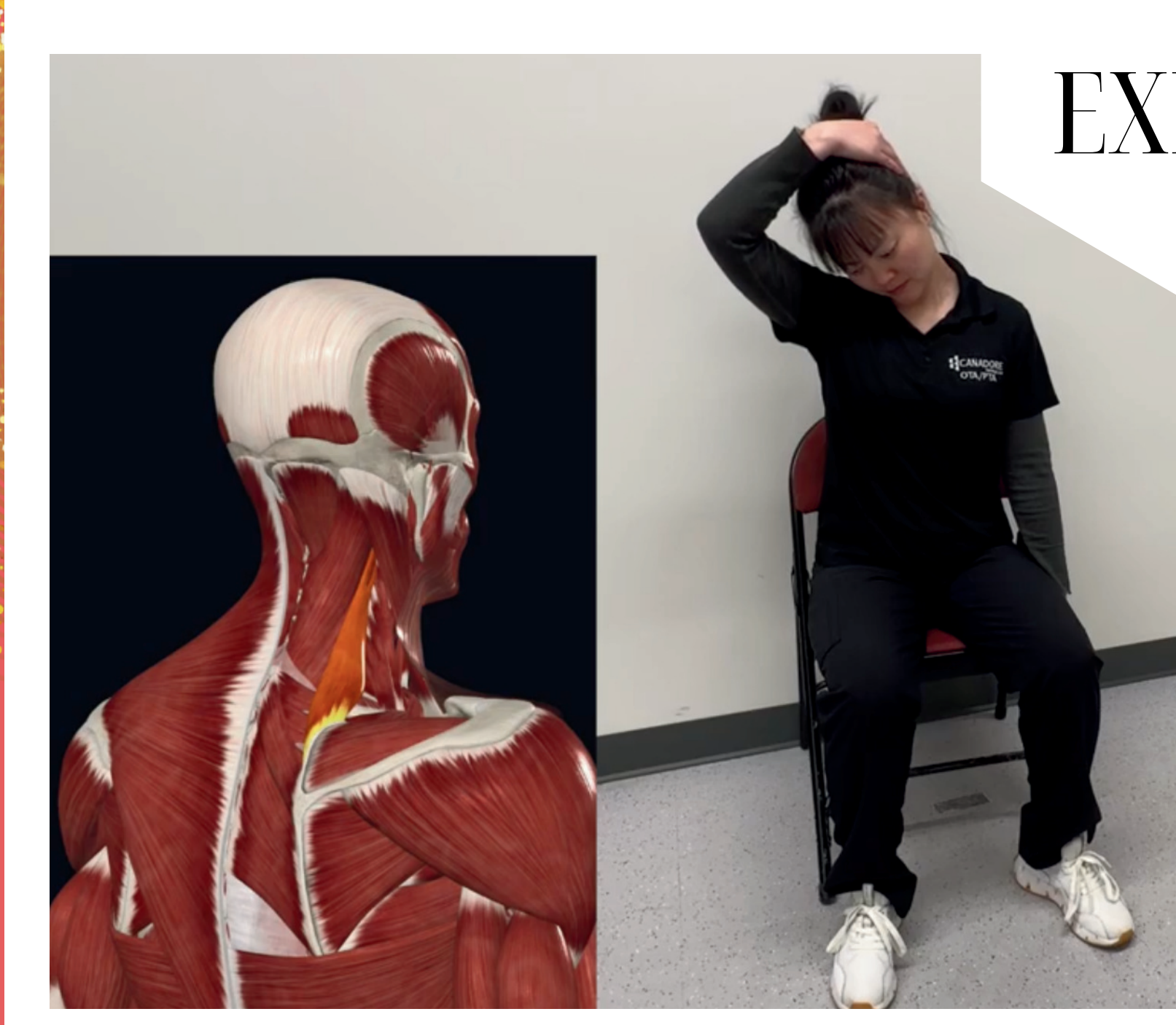


METHODOLOGY

Participants aged 18–65 will be recruited and pre-tested. They will be divided into control and treatment groups, with the control group using the "Check the Neck First" device. Phase 1 includes a literature review to identify effective neck exercises. Phase 2 will assess the device's efficacy with 50 participants performing neck flexion exercises over two sessions. Phase 3 will evaluate the device's portable performance with another 50 participants, ensuring accuracy across diverse demographics.



NECK EXERCISES



REFERENCES

- Collins, C.L., Fletcher, E.N., Fields, S.K., et al. (2014). Neck Strength: A Protective Factor Reducing Risk for Concussion in High School Sports. *Journal of Primary Prevention*, 35, 309–319.
- Elliot, J.M., Peek, K., et al. (2021). The Effectiveness of Neck Strengthening Interventions in Reducing Head Injuries. *Journal of Science and Medicine in Sport*.
- Nutt, S., McKay, M.J., Gillies, L., Peek, K. (2022). Neck Strength and Concussion Prevalence in Football and Rugby Athletes. *Journal of Science and Medicine in Sport*, 25, 632–638.
- Peek, K. (2022). The Measurement of Neck Strength: A Guide for Sports Medicine Clinicians. *Physical Therapy in Sport*, 55, 282–288.

ACKNOWLEDGMENTS

- Collaborators: Tony and Martin Furtado (Project Partners).
- Support from Canadore College and NSERC:
Christina Deroche,
Siddharth Manoj Ramani