

Assessment measures of a preoperative muscle training program on postoperative recovery and function

Jane A, Vogel K, Dobransky J, Beaulé PE, Poitras S
Division of Orthopaedic Surgery
University of Ottawa/The Ottawa Hospital; Ottawa, Ontario

INTRODUCTION

- The number of total joint arthroplasty surgeries in Canada has grown significantly in recent decades.
- Improving postoperative function has traditionally been accomplished through postoperative rehabilitation exercises in physiotherapy, yielding contradictory results [1].
- Preoperative interventions to ameliorate postoperative function have shown some potential; however, further high-quality randomized controlled trial studies are needed to confirm the effectiveness of such a program.
- To test this with the patient population at The Ottawa Hospital (TOH), a single-blind randomized controlled trial of exercise vs control groups on preoperative total hip or total knee arthroplasty (THA and TKA) candidates is currently underway.

PURPOSE

- The primary objectives of the study are to assess participants using various measures to establish a baseline, and eventually statistical differences in outcome scores between control and experimental study groups.
- These results aim to answer the research question of the study: will a preoperative muscle strengthening program have a positive effect on postoperative recovery and function?

METHODS

- Various assessment methodologies are used to measure outcomes, with each method shown to be valid and reliable [2-5].
- Assessments are conducted at four time points: baseline, immediately prior to surgery, six weeks post-surgery, and six months post-surgery.

Measure 1 – Muscle Strength and Muscle Mass

- For patients undergoing THA, hip abductor strength is assessed using a hand-held dynamometer with the patient in the side-lying position.
- For patients undergoing TKA, quadriceps strength is assessed using a dynamometer with the patient in supine position and the knee flexed at 60 degrees.



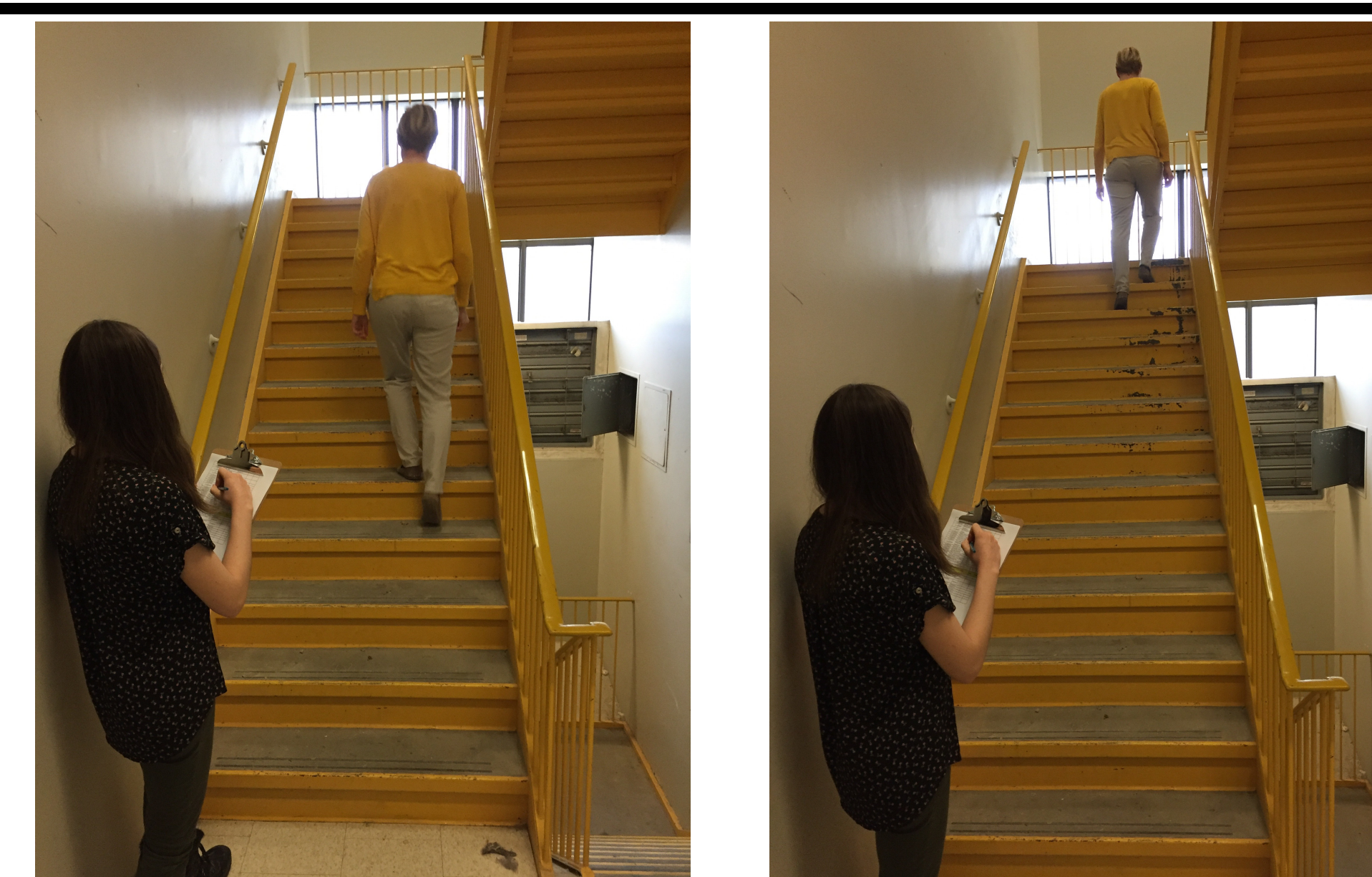
Measure 2 – Timed-Up-and-Go

- The Timed-Up-and-Go (TUG) assesses the time that a patient takes to rise from a chair, walk three metres, turn around, walk back to the chair, and sit down.
- The preoperative and postoperative TUG has been shown to be predictive of hospital length of stay (LOS), hospital discharge destination, short-term function, and long-term function [6].



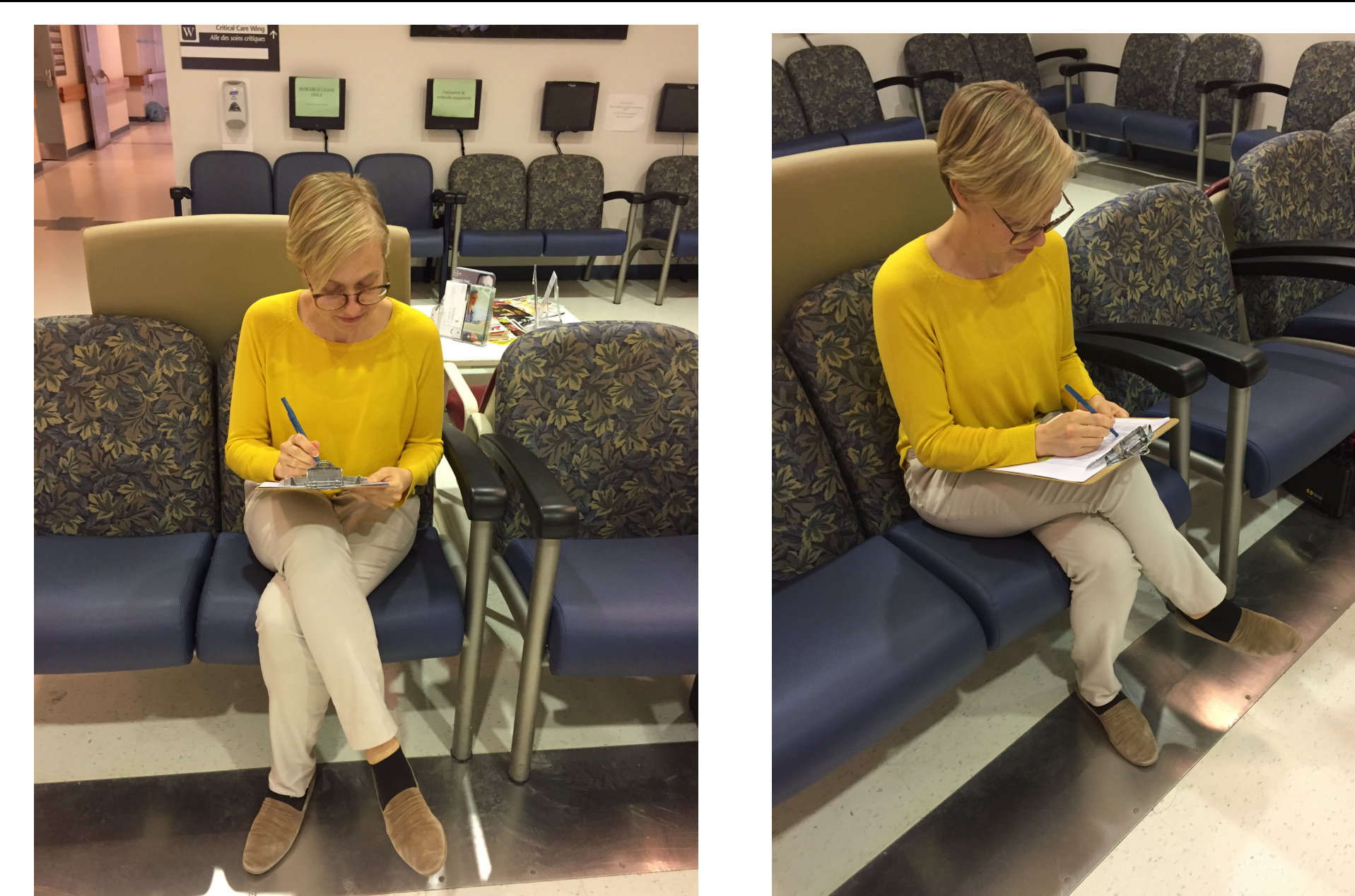
Measure 3 – Timed Stair Test

- The Timed Stair Test assesses the time that a patient takes to ascend and descend a flight of 10 stairs, while holding on to the handrail.
- The Timed Stair Test is a recommended test for TJA patients [4].



Measure 4 – Patient-Reported Function

- The HOOS (Hip Osteoarthritic Outcome Score) and the KOOS (Knee Osteoarthritic Outcome Score) are questionnaires used to assess the patient-reported function of THA and TKA patients, respectively. They are both widely used in this field.
- The EQ-5D-5L is used to assess generic health status and quality of life for both THA and TKA patients.



RESULTS

- As this study is still early in the recruitment phase, data collection is still ongoing and analysis of results has not yet been conducted.

CONCLUSION

- Results from this study will contribute to our understanding of the importance of preoperative function and muscle strength, and could influence the standard of care by providing a basis for the implementation of a program to improve postoperative muscle strength for patients awaiting total joint arthroplasty surgery at The Ottawa Hospital and across Canada.

REFERENCES

- Valkenet K, van de Port IG, Dronkers JJ, de Vries WR, Lindeman E, Backx FJ. The effects of preoperative exercise therapy on postoperative outcome: a systematic review. *Clin Rehabil* 2011 Feb;25(2):99-111.
- Widler KS, Glatthorn JF, Bizzini M, Impellizzeri FM, Munzinger U, Leunig M, et al. Assessment of hip abductor muscle strength. A validity and reliability study. *J Bone Joint Surg Am* 2009 Nov;91(11):2666-2672.
- Kennedy DM, Hanna SE, Stratford PW, Wessel J, Gollish JD. Preoperative function and gender predict pattern of functional recovery after hip and knee arthroplasty. *J Arthroplasty* 2006 Jun;21(4):559-566.
- Terwee CB, Mokkink LB, Steultjens MP, Dekker J. Performance-based methods for measuring the physical function of patients with osteoarthritis of the hip or knee: a systematic review of measurement properties. *Rheumatology (Oxford)* 2006 Jul;45(7):890-902.
- Bellamy N, Buchanan WW, Goldsmith CH, Campbell J, Stitt LW. Validation study of WOMAC: a health status instrument for measuring clinically important patient relevant outcomes to antirheumatic drug therapy in patients with osteoarthritis of the hip or knee. *J Rheumatol* 1988 Dec;15(12):1833-1840.
- Poitras S, Au K, Wood K, Dervin G, Beaulé PE. Predicting hospital length of stay and short-term function after hip or knee arthroplasty: are both performance and comorbidity measures useful? *International Orthopaedics* 2018 Feb;1-6. <https://doi.org/10.1007/s00264-018-3833-y>

ACKNOWLEDGMENTS

- I would like to thank all the research staff and surgeons at TOH for their help and support throughout this project, especially Kristina Vogel, Johanna Dobransky, Dr. Stéphane Poitras, Émilie Simoneau, Sara Ruggiero, and Dr. Paul E. Beaulé.
- I would also like to thank Sheridan Parker, Julie Vaillancourt, and everyone at the UROP office for making this opportunity possible.