

The repeatability in measuring lower limb muscle strength using two handheld dynamometers in healthy adults and elderly

QUT Ethics Approval Number 2000001078

Research team

Principal Researcher:	Yuet Yee Or	Honours student
Associate Researcher(s):	Dr Aaron Wholohan	Principal Supervisor
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Why is the study being conducted?

This research project is being undertaken as part of an Honours study for Yuet Yee Or.

The purpose of this project is to investigate the use of two handheld dynamometers, which are the devices that can be used to measure foot and ankle muscles strength. This study aims to identify if the two handheld dynamometers can measure foot and ankle muscles strength differences between healthy adult and healthy elderly. Lower limb muscle weakness is increasingly common in older people and people with foot and ankle pathologies, ankle injuries and ankle instability. This research is important as simple and quick methods of assessing foot and ankle strength are needed.

This research will enhance our understanding of the reliability of clinical- and laboratory-based handheld devices in measuring lower limb muscle strength in healthy adults and elderly. Results from this study may help determine muscle weakness and improve managements and treatments by increasing muscle strength in people with foot and ankle muscle weakness.

You are invited to participate in this research project because you are eligible to form part of either the healthy adult group or healthy elderly group.

Inclusion criteria are as follows:

- Healthy adults aged between 18 and 65 or elderly aged 65 or above
- Available to attend 2 data collection sessions that are 1 week apart

To minimise the risks, you will be excluded if:

- Are pregnant
- Under 18 years old
- Self-reported neurological disorders that may influence lower limb muscle strength such as stroke, polio or motor vehicle accident
- Lower extremity injuries
- Lower extremity amputation
- Lower extremity pain lasting for more than one day from last month
- History of lower extremity surgery

- Unable to ambulate household distances (10 metres) without the use of an assistive device

What does participation involve?

Your participation will involve attendance at two measurement sessions at either the QUT Health Clinics or QUT Podiatry Biomechanical room in O Block B Wing Room 661, Kelvin Grove Campus, that will take approximately 30 to 45 minutes for each session, a total of 1.5 hours of your time for both sessions. Several initial screening questions will be asked prior to measurement, followed by foot and ankle muscle strength measurements by two handheld dynamometers (Diagrams 1 and 2).

Questions will include:

- Your medical history to confirm your eligibility for this research project.
- Your age, gender, height, weight and dominant foot.

Your participation in this research project is entirely voluntary. If you do agree to participate you can withdraw from the research project without comment or penalty. If you withdraw with six weeks after the measurement session, on request any information already obtained that can be linked to you will be destroyed. Your decision to participate or not participate will in no way impact upon your current or future relationship with QUT (for example your grades or treatment at the QUT Health Clinics).



Diagram 1: ActivForce Handheld Dynamometer (1) Diagram 2: Microfet II Handheld Dynamometer (2)

[1] MeyerPT. Activforce Digital Dynamometer System [image from the Internet]. [place unknown]: MeyerPT; 2021 [cited 2021 Feb 17]. 1 photograph, colour. Available from: <https://www.meyerpt.com/activforce-digital-dynamometer-system>

[2] Hoggan Scientific, LLC. Ankle dorsiflexion [image from the Internet]. Utah (UT): Hoggan Scientific, LLC; [date unknown] [cited 2021 Mar 7]. 1 photograph, colour. Available from: <https://hogganscientific.com/wp-content/uploads/2019/06/HogganScientific-MuscleTestingPositions-11x17-Poster.pdf>

What are the possible benefits for me if I take part?

It is expected that this research project will not benefit you directly as this research will be conducted purely for altruistic reasons. The outcomes of the research, however, may benefit people with muscle weakness as the knowledge gained from this research may improve management for them. You can request a brief summary of the outcomes of the study by providing an email address. A report rephrased by lay language will be provided to you after data analysis. At the end of the second data collection session, verbal feedback will be given to you, including your lower limb muscle strength and its implications of risks of foot and ankle instability, injuries, pathologies and falls.

Your contribution to this research project is greatly appreciated.

What are the possible risks for me if I take part?

There are minimal risks associated with your participation in this research project. These include

- You might experience minimal fatigue and/ or discomfort during and/ or after measurement sessions. This is usually self-resolving within 3 days.
- You might experience ankle strain from pushing too hard against the handheld dynamometers and researcher during measurements, particularly for elderly who are not familiar with pushing against a force.
- Slipping on the floor.
- Sliding down the Podiatry treatment chair.
- Inconvenience of travel time as you are required to attend two separate measurement sessions.

All the potential risks mentioned on the above are at low risks and unlikely to occur. Also, the severity of harms is low.

What about privacy and confidentiality?

All comments and responses are coded, i.e., it will be possible to re-identify you. A re-identifying code stored separately to personal information (e.g., name, address), will only be accessible to the research team.

Any data collected as part of this research project will be stored securely as per QUT's Management of research data policy. Data will be stored for a minimum of 5 years and can be disclosed if it is to protect you or others from harm, if specifically required by law, or if a regulatory or monitoring body such as the ethics committee requests it.

The data collected in this research project may be used for other studies. At the end of this study your identity will be removed (the data will be coded) and only non-identifiable data will be used in future research.

How do I give my consent to participate?

We would like to ask you to sign a written consent form (enclosed) to confirm your agreement to participate.

What if I have questions about the research project?

If you have any questions or require further information please contact one of the listed researchers:

Dr Aaron Wholohan	a.wholohan@qut.edu.au	07 3138 5860
Mr Matthew Rixon	m2.rixon@qut.edu.au	07 3138 0676
Yuet Yee Or	yuetyee.or@connect.qut.edu.au	

What if I have a concern or complaint regarding the conduct of the research project?

QUT is committed to research integrity and the ethical conduct of research projects. If you wish to discuss the study with someone not directly involved, particularly in relation to matters concerning policies, information or complaints about the conduct of the study or your rights as a participant, you may contact the QUT Research Ethics Advisory Team on +61 7 3138 5123 or email humanethics@qut.edu.au.

Thank you for helping with this research project. Please keep this sheet for your information.