

Understanding the functional ability of older adults using neuromuscular strength and power measures on pneumatic resistance machines: A study to find out how using new exercise machines to measure muscle strength and power can help us understand the functional ability of older adults.

QUT Ethics Approval Number 4155

Research team

Principal Researcher: Amelia Shea, MPhil Student
Associate Researcher(s): Justin Holland, Principal Supervisor
Anthony Shield, Associate Supervisor
Neil King, Associate Supervisor
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Why is the study being conducted?

This research project is being undertaken as part of research by Amelia Shea to complete her Master of Philosophy (Exercise Physiology) degree.

The purpose of this research is to determine if we can use HUR air resistance equipment (as used in the QUT Exercise Physiology Clinic and gyms and rehabilitation facilities worldwide) to test the muscular strength and power of older adults. We know that resistance training can improve power – the rate at which your muscles contract to produce force – which is used for tasks that get harder as we get older like standing up from chairs, climbing stairs, and walking. Before prescribing resistance training to an individual, we need to assess their ability using tests that are evidence-based and provide useful information without being too complex or time consuming. Right now, the best way to measure muscle power requires expensive equipment that is rarely available outside of research, but many gyms and clinics are adopting new technology like the HUR machines. If we can use this technology to measure muscle strength and power, exercise clinicians will be able to have a better understanding of their clients' abilities, which will help their exercise programs to be more effective.

You are invited to participate in this research project because you are aged 60 years or over and live independently. You may have controlled chronic conditions such as diabetes or heart disease, but you should not participate in this study if you have severe conditions that prevent you from standing, sitting, walking, or performing a leg press exercise, or if you live in a residential care facility and/or have high support needs. All researchers involved in data collection for this study are Accredited Exercise Physiologists who will work with you to ensure the exercises you complete during each session will not increase your risk of illness or injury.

What does participation involve?

Your participation will involve attending the QUT Exercise Physiology Clinic for a one-hour session where we will measure your strength and power as well as some tests that measure your ability to perform normal daily activities. You will also be invited to volunteer to attend a second one-hour

session in which we will re-test the same strength and power measurements on the HUR equipment. Point-of-care health checks will be performed at the start and finish of your data collection sessions to ensure you are safe to exercise and leave. This will include measuring your heart rate, blood pressure and oxygen saturation (the amount of oxygen in your blood – measured by a non-invasive device clipped onto your fingertip that also measures your heart rate) for all participants, and measurement of blood glucose levels for diabetic participants. You will be using the HUR leg press machine to complete two assessments: determining the heaviest weight you can move and pushing against the machine as fast and hard as possible. You will also be asked to perform tests involving hand-grip strength measurement; sitting down and standing up from a chair repeatedly for 30 seconds; standing up, walking a short distance, and sitting down again as fast as you are capable; and balancing on one leg for as long as you are able to. All procedures will be fully explained to you, and you are not required to participate in any part of the session if you do not wish to for any reason. We will also collect information about you including your age, gender, weight, and height.

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. You can withdraw anytime during the data collection session. If you withdraw after your data collection sessions, 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 or your treatment at the QUT Health Clinics.

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

It is expected that this research project will benefit you directly through understanding of your neuromuscular strength and power as it relates to your ability to complete functional tasks (standing, walking, climbing stairs). You will be given a summary of the results from your assessments – you may like to show them to your Exercise Physiologist/Physiotherapist/Personal Trainer so they can better understand your exercise needs. If you wish to receive a summary of the findings of this project, please tick the box on the enclosed consent form.

To recognise your contribution should you choose to participate, the research team is offering a \$25 VISA gift card after completion of each data collection session. You will also be reimbursed for any parking or transport costs associated with participation in this study. An enclosed map shows the car park location for the QUT Health Clinics. If found to not be suitable for the study at your data collection session, you will be reimbursed for parking and travel costs, however you will not receive a gift card.

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

The research team has identified the following possible risks in relation to participating in this study:

Discomfort: the assessments we are studying will require you to use your maximal strength and power which may feel unpleasant for a short period of time. If you do not regularly participate in heavy resistance training, you may feel some muscle soreness for 1-2 days after the session.

Injury: while the movements and equipment being assessed are very safe, there is a risk of injury or aggravation of a previous injury. All members of the research team are Accredited Exercise Physiologists and will work with you to determine whether participation in any aspect of the data collection protocol may increase any risk of injury based on your individual history.

Part of minimising the risk of participating in this study will include point-of-care health checks including measuring your pulse and blood pressure, as well as measurement of your blood sugar levels

if you are diabetic. Measuring blood sugar requires pricking the skin on your finger to draw a small amount of blood. You may request to not have these measurements; however the researcher will discuss what this means for participation as it may interfere with the researchers' ability to identify and manage risk.

What about privacy and confidentiality?

By signing the consent form, you consent to the research team collecting and using personal information about you for the research project. We are requesting extended consent to the use of your data, meaning the data we collect could be used for future research projects similar to this one by the current researchers or others in Australia. All data collected will be 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. The personal information that the research team collect and use are your date of birth, age, sex, and medical history, and the results of the tests you complete during each session. Only your age, sex, and test results will be included in data for future research and data sharing purposes.

Point-of-care health checks will be performed during your data collection sessions to ensure you are safe to exercise and leave. This will include measuring your heart rate, blood pressure and oxygen saturation for all participants, and measurement of blood glucose levels for diabetic participants. This information will not be included in reporting of results, future research, or data sharing, and will only be stored as required by law. You will be able to receive a copy of this information upon request.

Information about you may be obtained from your health records held at QUT Health Clinics for the purpose of ensuring you are suitable to participate in this research project. By signing the consent form you agree to the research team accessing health records if they are relevant to your participation in this research project. This information will not be included in reporting of results, future research, or data sharing, and will only be stored as required by law.

It is anticipated that the results of this research project will be published and/or presented in a variety of forums. In any publication and/or presentation, information will be provided in such a way that you cannot be identified.

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.

This project is funded by HUR and they will not have access to the data obtained during the project. HUR, based in Finland, is a manufacturer of air resistance exercise equipment with a focus on developing products for healthy ageing, rehabilitation, and inclusive wellness. HUR allocated the funding for this project to the QUT Exercise Physiology Clinic when the clinic purchased HUR equipment with no requirement for access to data and will only receive a copy of any completed publications or presentations that arise as a result of this project.

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?

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Page 3 of 5

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

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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.



QUT Health Clinics parking

Entrance to the car park is via Blamey Street. Drive down the ramp, past the delivery dock to the boom gate. If the boom gate is down, press button 2 on the QUT keypad and hold for 3 seconds. The phone

will ring, and the boom gate will open. Drive through and turn right, continue up the ramp and park in a QUT designated space only. Maximum clearance is 2.2 metres.