Participant Information Sheet

Study title:	**Can non-invasive brain stimulation enhance the effect of exercise on knee OA pain?**		
Locality:	**Auckland University of Technology**	Ethics committee ref:	**21/STH/128**
Lead investigator:	**Dr. David Rice**	Contact phone number:	**02108435809**
Co-ordinating investigator:	**David Toomey**		**Email: david.toomey@aut.ac.nz**

You are invited to take part in a study on whether non-invasive brain stimulation can enhance the effect of exercise on knee OA pain. Whether or not you take part is your choice. If you don't want to take part, you don't have to give a reason, and it won't affect the care you receive. If you do want to take part now, but change your mind later, you can pull out of the study at any time.

This Participant Information Sheet will help you decide if you'd like to take part. It sets out why we are doing the study, what your participation would involve, what the benefits and risks to you might be, and what would happen after the study ends. We will go through this information with you and answer any questions you may have. You do not have to decide today whether or not you will participate in this study. Before you decide you may want to talk about the study with other people, such as family, whānau, friends, or healthcare providers. Feel free to do this.

If you agree to take part in this study, you will be asked to sign the Consent Form on the last page of this document. You will be given a copy of both the Participant Information Sheet and the Consent Form to keep.

This document is 9 pages long, including the Consent Form. Please make sure you have read and understood all the pages.

Voluntary Participation and Withdrawal From This Study

Participating in this study is voluntary (your choice). You are free to decline to participate or to withdraw from the research at any time, without any disadvantage to you or effect on your ongoing health care.

WHAT IS THE PURPOSE OF THE STUDY?

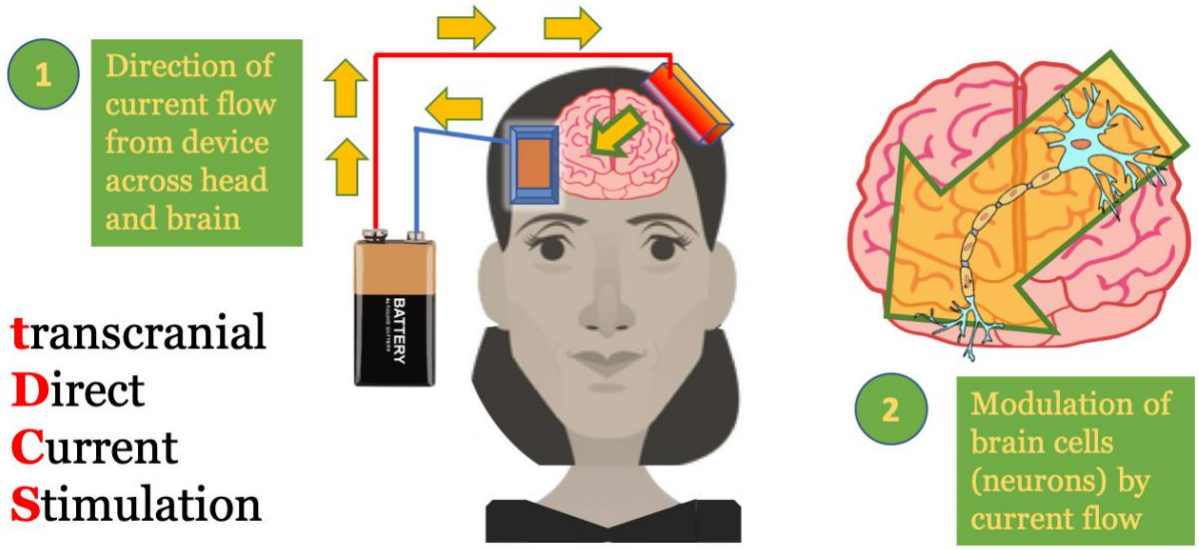
Exercise is a treatment often used by physiotherapists and other health professionals to relieve pain and improve function in people with knee osteoarthritis. However, the immediate effects of exercise are often variable in people with knee osteoarthritis, with some people experiencing a decrease in pain and others, no change or even an increase in joint pain. Previous research suggests that a type of non-invasive brain stimulation - transcranial Direct Current Stimulation (tDCS) - can boost the activity of our own in built pain relieving pathways in the brain. The main purpose of this study is to see whether anodal (active) tDCS is more effective than sham (fake) tDCS on making exercise more tolerable and effective for people with knee osteoarthritis.

WHAT IS TRANSCRANIAL DIRECT CURRENT STIMULATION?

Transcranial Direct-Current Stimulation (tDCS) is a portable brain stimulation technique that delivers a very weak electric current to the scalp via sponge electrodes that are held in place with an elastic strap

This weak current safely and painlessly passes through your skull and changes the activity in the brain cells (neurons) underneath the electrodes, helping to boost the activity of your own, in built pain relieving pathways in the brain.

The stimulation lasts for 20 minutes and most people will feel a mild tingling, prickling, itching, or warm sensation, that typically goes away or becomes much less intense after approximately one minute.



WHO CAN TAKE PART IN THE STUDY?

We aim to involve 27 people with knee osteoarthritis in this study.

To take part in this study you will:

- Be at least 45 years old

- Meet the diagnostic criteria for knee joint osteoarthritis
- Have had ongoing knee pain for ≥ 3 months
- Have ≥ 3/10 average pain intensity in the last week

We will exclude people from this study who:

- Have conditions preventing safe participation in physical activity (Failed Physical Activity Readiness Questionnaire (PAR-Q))
- Have had a total knee joint replacement or recent knee surgery (past 6 months)
- Have a history of lower limb resistance training (minimum of 2 times per week for a minimum of 6 weeks within the past 6 months)
- Have any other form of arthritis (e.g., rheumatoid arthritis)
- Have a history of musculoskeletal pain or injury in the lower limb (other than osteoarthritis) in the past 6 months
- Have any neurological condition
- Have any unstable/uncontrolled cardiovascular condition
- Have a current diagnosis of a major psychiatric disorder
- Have any cognitive problems with thinking and remembering
- Are not fluent in English
- Are physically unable to climb 2 flights of stairs
- Any reasons you may not be suitable to undergo tDCS (e.g., epilepsy, specific medications, frequent headaches)

WHAT WILL MY PARTICIPATION IN THE STUDY INVOLVE?

If you meet the criteria above and agree to take part in this study you will come to two 1-2 hour long testing sessions (minimum 7 days apart) at Auckland University of Technology, North Shore Campus. You will be randomly (by chance, like flipping a coin) assigned to receive the real or fake tDCS in the first session and will then receive the opposite one in the second session. Neither you nor the researchers testing your response to exercise will be told which type of tDCS you received in each session.

At each of the testing sessions, you will undergo some strength tests of the muscles in your thigh, fill in some questionnaires about your health and undergo several tests of your pain pathways. For these tests, we will ask you about any pain you have when your joint is not moving, you will have a rubber tipped rod pushed into your knee and forearm until it becomes slightly painful and we will ask you to complete a task where you are stepping up and down off a small step 24 times in a row while rating your joint pain. You will then hold a muscle

contraction in your thigh for as long as you can (up to a maximum of 5 minutes). After this you will repeat some of the same tests of your pain pathways as mentioned above.

WHAT ARE THE POSSIBLE RISKS OF THIS STUDY?

tDCS may result in minor redness and irritation of the skin under the electrode site that may last for a few hours afterwards. You may also experience some skin prickling/tingling and heat or warm sensations under the electrodes. Some people describe getting a short-lasting headache during or following stimulation.

How this will be managed?
The skin will be cleansed with alcohol before and after stimulation to reduce the chance of skin irritation occurring. The tingling/heat sensation typically goes away or becomes much less intense after approximately one minute of stimulation. The chances of getting a headache appear the same regardless of whether you receive real or sham (fake) tDCS stimulation. People who are most at risk of headache will be excluded from participating in the study. You are free to take your normal pain-relieving medications or have any other treatment you need after completing the testing sessions with us. We will call you ~24 hours and ~72 hours after the 2nd testing session to check in on you, and, if necessary, refer you for appropriate follow up medical care.

The tests of your pain pathways may be briefly uncomfortable or, for some people, painful. Any discomfort/pain is likely to be short lived.

How this will be managed?
As soon the pressure sensation on your arm or knee becomes slightly painful the testing is stopped, making it highly unlikely that you will experience more than a few seconds of mild discomfort/pain. For any of the tests, you can ask us to stop at any time.

Particularly if you are unaccustomed to exercise, there is a risk that the strength and exercise tests you complete in the 2nd session could lead to an increase in your joint pain or muscle discomfort/pain (e.g. delayed onset muscle soreness) that could last from a few minutes, up to a few days after the testing session.

How this will be managed?
You are free to take your normal pain-relieving medications or have any other treatment you need after completing the testing sessions with us. We will call you ~24 hours and ~72 hours after the 2nd testing session to check in on you, provide you with clinical advice regarding any ongoing joint/muscle discomfort and, if necessary, refer you for appropriate follow up medical care.

COVID-19

We also have strict COVID protection protocols in place, including both you and the researchers being at least double vaccinated, wearing N95 masks and santising surfaces etc.

WHAT ARE THE POSSIBLE BENEFITS OF THIS STUDY?

You are unlikely to receive any direct benefits on your osteoarthritis pain from participating in this research. However, we will provide a copy of the results of your muscle strength tests to you, at no cost. These may be useful for your health care provider (e.g. physiotherapist, general practitioner) in designing an appropriate exercise based treatment for you. The project outcomes will tell us more about the relationship between tDCS and the immediate effects of exercise on osteoarthritis pain. It is possible this could improve the future effectiveness of exercise for people who suffer from chronic pain, including those with knee osteoarthritis.

WHAT ARE THE ALTERNATIVES TO TAKING PART?

You can continue to receive your current treatment as usual from your regular healthcare professionals. Choosing not to participate will not affect your current treatment in any way.

WILL ANY COSTS BE REIMBURSED?

At the end of your second session, you will receive $40 koha (petrol vouchers) to thank you for your time and contribution to the research.

WHAT IF SOMETHING GOES WRONG?

If you were injured in this study, you would be eligible **to apply** for compensation from ACC just as you would be if you were injured in an accident at work or at home. This does not mean that your claim will automatically be accepted. You will have to lodge a claim with ACC, which may take some time to assess. If your claim is accepted, you will receive funding to assist in your recovery.

If you have private health or life insurance, you may wish to check with your insurer that taking part in this study won't affect your cover.

WHAT ARE MY RIGHTS?

Participating in any research study is voluntary and you are not obliged to take part. If you decide to take part and later change your mind, you are free to withdraw from the study at any stage. Please be aware that if this happens the information collected from you up to that point may still be included in the study results. You have a right to request access to any information about you that is collected as part of the study and request a correction if you think any of this information is incorrect.

During the research project, new information about the risks and benefits of the study may become known to the researchers. If this occurs, you will be told about this new information. This new information may mean that you can no longer participate in this research.

No material that could personally identify you will be used in any reports on this study. All participants will be assigned a study number and only the researchers involved in this study will have access to your name and other personal information.

WHAT WILL HAPPEN TO MY INFORMATION?

During this study the researchers will record information about you and your study participation. This includes the results of any study assessments. You cannot take part in this study if you do not consent to the collection of this information.

Identifiable Information

Identifiable information is any data that could identify you (e.g. your name, date of birth, or address). The following groups may have access to your identifiable information:

The researchers (to complete study assessments)

Ethics committees, or government agencies from New Zealand or overseas, if the study or site is audited. Audits are done to make sure that participants are protected, the study is run properly, and the data collected is correct.

Your usual doctor, if a study test gives an unexpected result that could be important for your health. This allows appropriate follow-up to be arranged.

De-identified (Coded) Information

To make sure your personal information is kept confidential, information that identifies you will not be included in any report generated by the researchers. Instead, you will be identified by a code. The lead researcher will keep a list linking your code with your name, so that you can be identified by your coded data if needed.

The following groups may have access to your coded information:

- Regulatory or other governmental agencies worldwide.

The results of the study may be published or presented, but not in a form that would reasonably be expected to identify you.

All participant records will be stored under lock and key by the researchers or on a password protected computer for 10 years, after which they will be destroyed. It is possible that during this time, your results may be made available for future research investigating osteoarthritis pain and its treatment. If this occurs, no material that could personally identify you will be made available. An approved auditor appointed by the New Zealand Health and Disability Ethic Committees, or any relevant regulatory authority or their approved representative may review relevant data and records for the sole purpose of checking the accuracy of the information recorded for the study.

The results from this study will be presented at meetings, academic conferences and written up for publication in international journals. No information that could personally identify you

will be included. A one page summary of the results can be sent to you after the whole study is finished and the results have been published. There will be a box on the Consent Form to tick if you would like to get this. Please note there may be a delay of up to three years from you taking part in this study to getting the one page summary.

Risks

Although efforts will be made to protect your privacy, absolute confidentiality of your information cannot be guaranteed. Even with coded and anonymised information, there is no guarantee that you cannot be identified. The risk of people accessing and misusing your information (e.g. making it harder for you to get or keep a job or health insurance) is currently very small, but may increase in the future as people find new ways of tracing information.

WHAT HAPPENS AFTER THE STUDY OR IF I CHANGE MY MIND?

You may withdraw your consent for the collection and use of your information at any time, by informing the lead researcher, Dr Rice.

If you withdraw your consent, your study participation will end, and the study team will stop collecting information from you.

Information collected up until your withdrawal from the study will continue to be used and included in the study. This is to protect the quality of the study.

WHO HAS APPROVED THE STUDY?

This study has been approved by an independent group of people called a Health and Disability Ethics Committee (HDEC), who check that studies meet established ethical standards.

WHO DO I CONTACT FOR MORE INFORMATION OR IF I HAVE CONCERNS?

If you have any questions, concerns, or complaints about the study at any stage, you can contact:

Dr David Rice, Lead Investigator
09 921 9999 ext 7032
david.rice@aut.ac.nz

If you want to talk to someone who isn't involved with the study, you can contact an independent health and disability advocate on:

Phone: 0800 555 050
Fax: 0800 2 SUPPORT (0800 2787 7678)
Email: advocacy@advocacy.org.nz
Website: https://www.advocacy.org.nz/

For Maori health support please contact :
He Kamaka Waiora (Waitemata DHB Māori Health Team) by telephoning (09) 486 8324 ext 2324.

You can also contact the health and disability ethics committee (HDEC) that approved this study on:

Phone: 0800 4 ETHIC
Email: hdecs@health.govt.nz

Consent Form

Can non-invasive brain stimulation enhance the effect of exercise on knee OA pain?

Please tick where appropriate and sign to indicate you consent to the following:

I have read and I understand the Participant Information Sheet.		
I have been given sufficient time to consider whether or not to participate in this study.		
I have had the opportunity to use a doctor, legal representative, whanau/family support or a friend to help me ask questions and understand the study.		
I am satisfied with the answers I have been given regarding the study and I have a copy of this consent form and information sheet.		
I understand that taking part in this study is voluntary (my choice) and that I may withdraw from the study at any time without this affecting my medical care.		
I consent to the research staff collecting and processing my information, including information about my health.		
If I decide to withdraw from the study, I agree that the information collected about me up to the point when I withdraw may continue to be processed.		
I consent to my GP or current provider being informed about my participation in the study and of any significant abnormal results obtained during the study.		
I agree to an approved auditor appointed by the New Zealand Health and Disability Ethics Committees, or any relevant regulatory authority or their approved representative reviewing my relevant medical records for the sole purpose of checking the accuracy of the information recorded for the study.		
I understand that my participation in this study is confidential and that no material, which could identify me personally, will be used in any reports on this study.		
I agree for my study results to be stored and used in future research related to chronic pain and its treatment	Yes ☐	No ☐
I understand the compensation provisions in case of injury during the study.		

I know who to contact if I have any questions about the study in general.	
I understand my responsibilities as a study participant.	
I wish to receive a summary of the results from the study.	Yes ☐ No ☐

Declaration by participant:
I hereby consent to take part in this study.

Participant's name: _____

Signature: _____ Date: _____

Declaration by member of research team:

I have given a verbal explanation of the research project to the participant and have answered the participant's questions about it.

I believe that the participant understands the study and has given informed consent to participate.

Researcher's name: _____

Signature: _____ Date: _____