**Participant Information Sheet**

**Study Title**: Acute effects of force and vibration on finger blood flow and finger temperature

**Researcher**: Shuxiang Gao

**ERGO number:** 55633

You are being invited to take part in the above research study. To help you decide whether you would like to take part or not, it is important that you understand why the research is being done and what it will involve. Please read the information below carefully and ask questions if anything is not clear or you would like more information before you decide to take part in this research. You may like to discuss it with others but it is up to you to decide whether or not to take part. If you are happy to participate you will be asked to sign a consent form.

**What is the research about?**

The research is for a PhD dissertation. The purpose of the research is to investigate the acute change in finger circulation during and after exposure to combined vibration and force. This study will also investigate the transmission of vibration from finger, palm through arm. This study will provide further understanding on how vibration and force affect the workers occupational exposure to hand-held tools. Also, this study will provide guidance to tool manufactures and users on the suitable active force applied while using hand-held vibrating tools to minimise the negative impact.

**Why have I been asked to participate?**

You have been selected for this experiment as you are between the age of 18 and 50 years inclusive, with no self-reported working history of hand-held vibration tools.

**What will happen to me if I take part?**

1. You will be required to complete a consent form and health questionnaire. The questionnaire is designed to assess any hand-arm vibration history and eligibility for participation.

2. You will be asked to avoid alcohol for 12 hours and caffeine assumption for 2 hours before the test to minimise the influence of alcohol and caffeine on your blood circulation. Your maximal voluntary contraction (MVC) will be measured to give an idea on how much grip strength you have.

3. You will attend one session (around 1.5 hour) with your right hand exposed to 10 combined vibration and force stimuli conditions. Each stimulus lasts less than 5 minutes. For each condition, you will grasp a handle using different grip (less than 50% of MVC) and push forces (less than 50N) with bending-arm position. A sinusoidal 125-Hz vibration at 0.6522 ms−2 rms (A(8) value) will be applied to the handle. For testing you are asked to take a relaxed upright seating position with arm and hands supported at the heart level.

4. To monitor the vibration transmitted to your forearm, two small accelerometers weighted around 5g will be positioned at your right wrist and right elbow separately. They are light enough and will not affect the movement of your arm. During and after exposure to motion, your finger skin temperature will be recorded with digital thermometers attached to your fingers every minute. The change in your digital circulation will be recorded every 30s using venous occlusion plethysmography. The digit flow will be collected via HVLab Multi-channel Plethysmograph (<https://www.southampton.ac.uk/hvlab/diagnostic-inst/multi-channel.page>). During test, the air cuffs are placed at the middle phalange of your testing fingers and strain gauges placed at your nail base to track the changes of finger volume. This is a non-invasive method used to monitor the finger circulation and you can find more information about plethysmograph at <https://www.healthline.com/health/plethysmography.>

**Are there any benefits in my taking part?**

By taking part you will help to expand knowledge regarding how different active forces affect the dynamic interaction of the vibrating tools with users and find out the suitable hand forces exerted on the hand-held vibratory tools to minimise the negative impact on users.

**Are there any risks involved?**

There are some minimal risks including discomfort in the hand and arm induced by vibration exposure. The vibration and force will be monitored throughout the experiment by the experimenter to make sure the accuracy of testing stimuli. Vibration magnitude and duration used in this study are designed in accordance with the Institute of Sound and Vibration Research (ISVR) report on noise and vibration and the daily exposure limit set by Health and Safety Executive (HSE). If you are not comfortable with the vibration exposure, you can stop the testing at any time by removing your hand from the handle.

**What data will be collected?**

As part of this study, your email address, questionnaire and a signed consent form will be collected; the consent form will be digitised and the hard copy version shredded. These are personal to you and will be kept securely on a University of Southampton, password-protected desktop that only the project supervisor can access.

Other than that, measurements will be taken during the session as described in the section What will happen to me if I take part? above. Although personal to you, it will not be possible to identify you from these measurements. The measurements will only be used for the purpose of this study.

All data will be kept for future research.

**Will my participation be confidential?**

Your participation and the information we collect about you during the course of the research will be kept strictly confidential.

Only members of the research team and responsible members of the University of Southampton may be given access to data about you for monitoring purposes and/or to carry out an audit of the study to ensure that the research is complying with applicable regulations. Individuals from regulatory authorities (people who check that we are carrying out the study correctly) may require access to your data. All of these people have a duty to keep your information, as a research participant, strictly confidential.

**Do I have to take part?**

No, it is entirely up to you to decide whether or not to take part. If you decide you want to take part, you will need to sign a consent form to show you have agreed to take part.

If at any time you decide you do not wish to continue, please just let the researcher know.

**What happens if I change my mind?**

You have the right to change your mind and withdraw at any time without giving a reason and without your participant rights being affected.

Your participation is voluntary and you may withdraw consent at any time without your legal rights being affected and without the need for justification.

If you withdraw from the study, we will keep the information about you that we have already obtained for the purposes of achieving the objectives of the study only.

**What will happen to the results of the research?**

Your personal details will remain strictly confidential. Research findings made available in any reports or publications will not include information that can directly identify you without your specific consent.

The results of this study will be reported in my dissertation and published solely within the University of Southampton. Results will typically be aggregated across all participants; no single participant will be identified.

**Where can I get more information?**

Should you require any additional information, please contact either the investigator (e-mail: S.Gao@soton.ac.uk) or the project supervisor (e-mail: [y.ye@soton.ac.uk](mailto:y.ye@soton.ac.uk)).

**What happens if there is a problem?**

If you have a concern about any aspect of this study, you should speak to the researchers who will do their best to answer your questions.

If you remain unhappy or have a complaint about any aspect of this study, please contact the University of Southampton Research Integrity and Governance Manager (023 8059 5058, [rgoinfo@soton.ac.uk](mailto:rgoinfo@soton.ac.uk)).

**Data Protection Privacy Notice**

The University of Southampton conducts research to the highest standards of research integrity. As a publicly-funded organisation, the University has to ensure that it is in the public interest when we use personally-identifiable information about people who have agreed to take part in research. This means that when you agree to take part in a research study, we will use information about you in the ways needed, and for the purposes specified, to conduct and complete the research project. Under data protection law, ‘Personal data’ means any information that relates to and is capable of identifying a living individual. The University’s data protection policy governing the use of personal data by the University can be found on its website (<https://www.southampton.ac.uk/legalservices/what-we-do/data-protection-and-foi.page>).

This Participant Information Sheet tells you what data will be collected for this project and whether this includes any personal data. Please ask the research team if you have any questions or are unclear what data is being collected about you.

Our privacy notice for research participants provides more information on how the University of Southampton collects and uses your personal data when you take part in one of our research projects and can be found at <http://www.southampton.ac.uk/assets/sharepoint/intranet/ls/Public/Research%20and%20Integrity%20Privacy%20Notice/Privacy%20Notice%20for%20Research%20Participants.pdf>

Any personal data we collect in this study will be used only for the purposes of carrying out our research and will be handled according to the University’s policies in line with data protection law. If any personal data is used from which you can be identified directly, it will not be disclosed to anyone else without your consent unless the University of Southampton is required by law to disclose it.

Data protection law requires us to have a valid legal reason (‘lawful basis’) to process and use your Personal data. The lawful basis for processing personal information in this research study is for the performance of a task carried out in the public interest. Personal data collected for research will not be used for any other purpose.

For the purposes of data protection law, the University of Southampton is the ‘Data Controller’ for this study, which means that we are responsible for looking after your information and using it properly. The University of Southampton will keep identifiable information about you for until successful completion of my degree after the study has finished after which time any link between you and your information will be removed.

To safeguard your rights, we will use the minimum personal data necessary to achieve our research study objectives. Your data protection rights – such as to access, change, or transfer such information - may be limited, however, in order for the research output to be reliable and accurate. The University will not do anything with your personal data that you would not reasonably expect.

If you have any questions about how your personal data is used, or wish to exercise any of your rights, please consult the University’s data protection webpage (https://www.southampton.ac.uk/legalservices/what-we-do/data-protection-and-foi.page) where you can make a request using our online form. If you need further assistance, please contact the University’s Data Protection Officer ([data.protection@soton.ac.uk](mailto:data.protection@soton.ac.uk)).

**Thank you.**

Thank you for taking the time to read the information sheet and considering taking part in the research.