

**Title:** Neuromuscular control of shoulder muscles in healthy individuals during a bench press task.

**Lay title:** How do we control our shoulder muscles during standard movement tasks?

**Researcher(s):**

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**Informed consent to participate**

Thank you for your interest in participating in this research project. Please read the following information about the project, so that you can decide whether you would like to take part in this research. Please feel free to ask any questions you might have about our involvement in the project.

If you decide to participate in this research, please keep in mind that your participation is voluntary. If you do not wish to take part, you do not have to. If you decide to take part and later change your mind, you are free to stop at any time, and you would not need to give any explanation for your decision to stop participating.

**What is this research about?**

Appropriate control of human movement is critical for good health. For example, the shoulder underpins many daily functions, e.g., self-care, and sport activities. Healthy shoulder function depends on the coordination of many shoulder muscles. Our research team is trying to understand how shoulder muscles are controlled in a healthy shoulder. This information may help us identify differences in muscle coordination in people with musculoskeletal issues and with potential to advance rehabilitation techniques.

**Who can participate?**

You can participate in this study if you are a male aged between 18 and 40 years of age and have no shoulder issues.

You are not eligible to participate in this study if you cannot understand spoken or written English. You are also not eligible if: i) have pain or an injury in upper lower limb(s) or back or have other medical conditions that may affect the results of the study, or ii) if you are unable to physically perform the testing procedures. Please discuss any concerns that you may have about eligibility to participate in this study with the investigators.

**What will I need to do?**

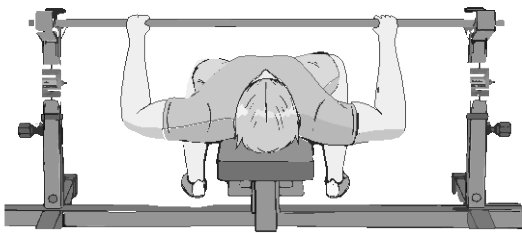
As a participant in these studies, you will be asked to attend one laboratory session of approximately two to three hours. Assessments will be conducted at The University of Queensland, St Lucia Campus, Otto Hirschfeld Building 81, School of Biomedical Sciences. You will be asked to wear comfortable clothes (i.e., singlet can be worn) for the assessment.

Although we will provide refreshments/water during the experiment, it is desirable that you have eaten your meal (breakfast or lunch, depending on the time of the experiment) and have hydrated prior to commencing the experiment.

### Tasks

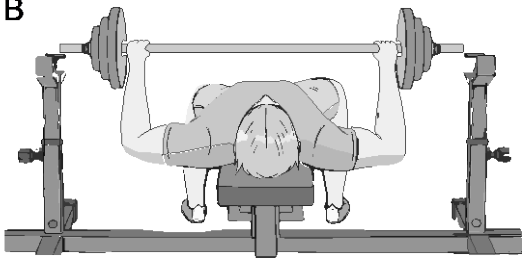
- You will be asked to perform bench-press type tasks (see figure below) whereby you contract shoulder muscles to produce force of a particular intensity. The specific muscles to be recorded will be explained to you prior to the study. Force will be measured by sensors placed embedded in the bench-press. Force tasks will range from very small to maximum voluntary effort. Some of these tasks may be fatiguing, for example, you will be asked to perform a series of maximum and sub maximum tasks.

A

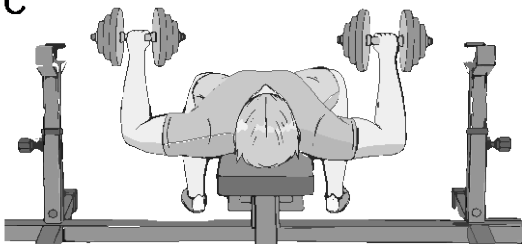


This figure shows the different bench press tasks you will be asked to perform: A) pressing against a fixed bar, B) lifting and holding a bench press bar, and C) lifting and holding dumbbell weights.

B



C



## **Assessment methods**

- To measure the activity of the shoulder muscles, surface electrodes will be placed on the skin overlying the muscles. These sensors have the shape of a grid and contain multiple electrodes that measure your muscle activity through your skin. An example of these sensors will be shown to you. Real-time ultrasound may be used to ensure accurate positioning of the electrodes. This is important as it allows us to accurately measure muscle activity.
- Questionnaires: All participants will be asked to provide details about age, height and weight, pain history and physical activity. The completion of all questionnaires will take ~10 minutes.

## **What are the possible benefits of taking part?**

Because this is a research project and not a treatment program, there may not be any direct benefit to you from your involvement. However, the findings may help us identify differences in muscle coordination in people with musculoskeletal shoulder issues in future research. Participants will receive a \$30 gift voucher to reimburse for their time and parking costs.

## **What are the possible risks and disadvantages of taking part?**

This study was designed to address our aims in such a manner that the research participants are exposed to the minimum possible degree of risk, inconvenience, and discomfort. However, you will have the opportunity to withdraw from these procedures at any time should you wish to do so, without penalty or affecting the ongoing management of your condition in any way. If your data are used for additional analyses, your privacy will be maintained at all times. We use tape to fix the electrodes to the skin, which may cause minor irritation in some cases. There is a potential risk of transient discomfort while performing maximum voluntary contractions. Procedures will include practice repetitions to familiarise you with the task, and appropriate rest between repetitions will be given. The weights you will lift are equivalent to ~20%-40% of your maximum voluntary contraction.

## **What will happen to the information about me?**

All information collected about you will remain confidential. You will be assigned a number with which all data forms and files, pertaining to you, will be labelled. Data collected for this research will be stored electronically in a non-identified manner on the UQ Research Data Manager (UQRDM) server. For data collection and analysis purposes, data may be stored on local computers that are password protected so that only the investigators will have access. Files will be kept in a locked filing cabinet in the School of Biomedical Sciences at The University of Queensland. Data will be stored for at least 5 years. Collected data might be used for future research upon reasonable request, but your privacy will be maintained at all times.

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

## **What will happen if I decide to withdraw?**

You can keep this copy of the Information sheet, and you will be given a copy of the signed Consent Form. Your decision whether you take part, or not to take part, or to take part and then withdraw, will not affect your relationship with The University of Queensland. If you choose to stop participating after the experiment has commenced, we will need to know if you are happy or not for us to retain the data that we have already collected, we ask for this information on the consent form. If you are a student from The University of Queensland, participation in (or refusal or withdrawing from) the experiment will have no influence (either positive or negative) on your grades and learning experience.

### **Can I hear about the results of this research?**

The data collected during the experiment will be explained. Overall outcomes of the study will be available at the completion of the research project. This can be in the form of a conference poster presentation or publication, made available outside the relevant offices and laboratories or via email. Should you have any questions regarding the nature of the research, please feel free to contact Dr Wolbert van den Hoorn ([w.vandehoorn@uq.edu.au](mailto:w.vandehoorn@uq.edu.au)) or A/Prof Kylie Tucker ([k.tucker1@uq.edu.au](mailto:k.tucker1@uq.edu.au)) who will be happy to provide you with more information.

### **Future research consideration**

You will be asked to indicate on the consent form if you consent to your personal details (email address, phone number) and participant ID number specific to the current study be included in an electronic data base which may be used to identify suitable participants (i.e., participants with knee pain or pain free) for our future studies of control of human movement and rehabilitation interventions. If you indicate NO, your details will not be included in the database. If you indicate YES, we may contact you in the future via the phone number and email address supplied, to invite you to participate in additional studies. Ticking this box does not imply your consent for future studies, only that you are happy to be contacted regarding them. Information collected for this database will be stored electronically in an identified manner on the UQ Research Data Manager (UQRDM) server, but only the investigators will have access to it. These data will be stored for at least 20 years and might be used for future research, such as follow-up studies. While this is not the aim of the current study, and we are not seeking approval currently for this kind of study, it is foreseeable that in 20 years we may seek ethics approval to use participant details from this study.

### **Who can I contact if I have any concerns about the project?**

This study adheres to the Guidelines of the ethical review process of The University of Queensland and the National Statement on Ethical Conduct in Human Research. Whilst you are free to discuss your participation in this study with the researcher contactable on ([w.vandehoorn@uq.edu.au](mailto:w.vandehoorn@uq.edu.au) / [k.tucker1@uq.edu.au](mailto:k.tucker1@uq.edu.au)) if you would like to speak to an officer of the University not involved in the study, you may contact the Ethics Coordinator on +617 3365 3924 / +617 3443 1656 or email [humanethics@research.uq.edu.au](mailto:humanethics@research.uq.edu.au)