

Biomechanical analysis of lying postures.

Research team contacts

Principal Researcher:	Dr J. Paige Little	Senior Research Fellow
Associate Researchers:	Dr Caroline Grant	Post Doctoral Research Fellow
	Mrs Maree Izatt	Project Coordinator, PSRG

Science and Engineering Faculty, Queensland University of Technology (QUT)

What is the purpose of the research?

The purpose of this research is to assess the biomechanics of lying down. Capturing 3D scans of you while lying down, as well as looking at the pressure distribution and the deformation of the bed underneath you, and combining them with looking at the angles of your spine and hips from an MRI scan.

Are you looking for people like me?

The research team is looking for healthy adults, aged 18 to 30, with a BMI in the healthy to underweight range, and with none of the following exclusion criteria:

Exclusion criteria:

- Claustrophobia.
- Unable to complete the 3 week at home trial for any reason.
- Maximum shoulder width of 50cm (required to be able to comfortably fit inside the MRI scanner).
- Pacemaker, neurostimulator or metallic implants.
- Prior history of spinal conditions.

What will you ask me to do?

On the testing day, firstly you will be asked to complete a short survey recording some demographic information such as height, weight, age, gender and any family or personal history of spinal or back muscle disorders or injuries.

In the next part of the study your participation will involve standing still for a few minutes while a 3D scan is captured of you.

You will then be asked to lie on three different surfaces, a rigid board, and then two foam mattresses, one firm and the other soft. You will be asked to lie on each on your back for a few minutes while measurements are taken underneath you, and another 3D scan is done; and then to lie on your side for a few minutes while each of the measurements are repeated.

After selecting your preferred of the firm or soft mattress, some of the tests will be repeated on a thicker version of the same mattress.

Finally you will be asked to lie on the two different mattresses inside an MRI machine, again on your back and then on your side.

You will then have a foam mattress of your choice (either the firm or the soft) delivered to your house to use in a three week home trial. During this time you will be sent links to online questionnaires on your sleep quantity and quality, and your comfort on the mattress. A questionnaire will be sent at the start of the trial and towards the end of the trial.

Are there any risks for me in taking part?

The research team has identified the following possible risks in relation to participating in this study: slight discomfort from lying on the rigid surface.

Please note that MRI does not expose the participant to any radiation and so is safe for use as long as you do not have any metallic implants such as pace makers, neurostimulators or other implants.

It should be noted that if you do agree to participate, you can withdraw from participation at any time during the project without comment or penalty.

Are there any benefits for me in taking part?

It is expected that this project will not benefit you directly. However, it may benefit the general public in the future as lessons learned in terms of the biomechanics of lying comfort feed into the bedding industry leading to more supportive and comfortable beds being created and sold.

Will I be compensated for my time?

Participants will be given \$40 to compensate them for their participation in the study.

A car park may be available onsite during your participation in the research project with prior arrangement; please contact the research team if this is needed.

Who is funding this research?

The project is funded by **Sealy of Australia**. To facilitate the in home trial, Sealy will have access to personally identifying information about you such as your name, address and contact details. They will only have access to other research data obtained during the project in a non-identifiable manner.

I am interested – what should I do next?

If you would like to participate in this study, please speak to the person who gave you this form, or email the principle researchers at j2.little@qut.edu.au.

You will be provided with further information to ensure that your decision and consent to participate is fully informed.

Thank You!

QUT Ethics Approval Number: 170000335

Biomechanical analysis of lying postures.

QUT Ethics Approval Number 1700000335

RESEARCH TEAM

Principal Researcher:	Dr J. Paige Little	Senior Research Fellow
Associate Researchers:	Dr Caroline Grant	Post Doctoral Research Fellow
	Mrs Maree Izatt	Project Coordinator, Paediatric Spine Research Group

Science and Engineering Faculty, Queensland University of Technology (QUT)

DESCRIPTION

In the QUT Paediatric Spine Research Group (PSRG) we are currently conducting a study into the biomechanics of lying. In western society we spend more time lying down to sleep than any other single daily activity. However, the scientific literature describing the biomechanical evaluation of lying substrates, particularly commercial mattresses, is scarce.

The present study aims to provide a broader understanding of:

- How healthy individuals lie on surfaces of differing stiffness/firmness,
- Biomechanical parameters which are relevant for lying comfort, and
- How the internal spinal anatomy, external spinal posture and lying pressures (i.e. pressure between the person and the mattress) are related.

You are invited to participate in this project because you are a healthy male or female between the ages of 18 and 30, and you do not suffer from Claustrophobia, have a Pacemaker, neurostimulator or other metallic implants and have no prior history of spinal conditions. Currently to comfortably participate, you can only have a maximum shoulder width of 50cm to fit inside the MRI scanner. You should also be able to complete a 3 week at home trial of a foam mattress.

PARTICIPATION

On the testing day, firstly you will be asked to complete a short survey recording some demographic information such as height, weight, age, gender and any family or personal history of spinal or back muscle disorders or injuries.

In the next part of the study your participation will involve standing still for a few minutes while a 3D scan is captured of you.

You will then be asked to lie on three different surfaces, a rigid board, and then two foam mattresses, one firm and the other soft. You will be asked to lie on each on your back for a few minutes while measurements are taken underneath you, and another 3D scan is done; and then to lie on your side for a few minutes while each of the measurements are repeated.

After selecting your preferred firm or soft mattress, some of the tests will be repeated on a thicker version of the same mattress.

Finally you will be asked to lie on the two different mattresses inside an MRI machine, again on your back and then on your side.

You will then have a foam mattress of your choice (either the firm or the soft) delivered to your house to use in a three week home trial. During this time you will be sent links to online questionnaires on your sleep quantity and quality, and your comfort on the mattress. A questionnaire will be sent at the start of the trial and towards the end of the trial.

Your participation in this project is entirely voluntary. If you do agree to participate you can withdraw from the project without comment or penalty. Your decision to participate or not participate will in no way impact upon your current or future relationship with QUT.

EXPECTED BENEFITS

It is expected that this project will not benefit you directly. However, it may benefit the general public in the future as lessons learned in terms of the biomechanics of lying comfort feed into the bedding industry leading to more supportive and comfortable beds being created and sold.

To recognise your contribution should you choose to participate, you will be given \$40.

A car park may be available onsite during your participation in the research project with prior arrangement; please contact the research team if this is needed.

RISKS

There are minimal risks associated with your participation in this project. These include mild discomfort from lying on the rigid surface.

Please note that MRI does not expose you to any radiation and so is safe for use as long as you do not have any metallic implants such as pace makers, neurostimulators or other implants.

There is a risk that abnormal findings may be found on the MRI scans of healthy participants. If any abnormality is found on an MRI scan, Mater Medical Imaging Radiographers/Radiologists will follow their normal procedures, such that the participant and the researchers will be advised of any findings, and told what to do next and/or a referral to an appropriate medical doctor will be arranged.

PRIVACY AND CONFIDENTIALITY

All comments, responses and imaging will be treated confidentially unless required by law.

As the project involves 3D scanning:

- You will have the opportunity view the models created of yourself at the end of testing.
- Identifying features (i.e. your face), can be obscured or removed from the scan if requested
- It is not possible to participate in the project without being 3D scanned.

Any data collected as part of this project will be stored securely as per QUT's Management of research data policy.

The project is funded by **Sealy of Australia**. To facilitate the in home trail, Sealy will have access to personally identifying information about you such as your name, address and contact details. They will only have access to other research data obtained during the project in a non-identifiable manner.

Please note that non-identifiable data from this project may be used in future projects or stored on an open access database for secondary analysis.

CONSENT TO PARTICIPATE

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

QUESTIONS / FURTHER INFORMATION ABOUT THE PROJECT

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

J. Paige Little

j2.little@qut.edu.au

07 3138 9967

CONCERNS / COMPLAINTS REGARDING THE CONDUCT OF THE PROJECT

QUT is committed to research integrity and the ethical conduct of research projects. However, if you do have any concerns or complaints about the ethical conduct of the project you may contact the QUT Research Ethics Advisory Team on 07 3138 5123 or email humanethics@qut.edu.au. The QUT Research Ethics Advisory Team is not connected with the research project and can facilitate a resolution to your concern in an impartial manner.

**THANK YOU FOR HELPING WITH THIS RESEARCH PROJECT.
PLEASE KEEP THIS SHEET FOR YOUR INFORMATION.**