PARTICIPANT INFORMATION SHEET

Project Title
Relationship between Training Load and Menstrual Cycle Function in Female Team Sport Athletes

Researchers:

- **Surabhi Date - PhD Candidate, AUT**
- **Professor Michael McGuigan (AUT),**
- **Dr Casey Watkins (AUT), and**
- **Dr Kimberley Linnea (California State Polytechnic University).**

Kia ora!
You are invited to take part in a student research study examining the relationship between training load and menstrual-cycle function in female team-sport athletes. This Participant Information Sheet explains why the study is being conducted, what participation involves, the possible benefits and risks, how your information and blood samples will be handled, and what will happen when the study ends.
Please read this information carefully. You may discuss the study with your whānau, family, friends, teammates, healthcare provider or another person you trust before deciding.

Voluntary Participation and Withdrawal
It is your choice whether to take part in this study. If you don't wish to take part, you don't need to provide a reason. If you do want to take part right now but change your mind later, you can withdraw from the study at any point, without any disadvantage to you. If you withdraw, you will be offered the choice of having any data belonging to you removed or allowing it to continue to be used. Once the study analyses have been completed, removal of your data may no longer be possible.

What is the purpose of this study?
With increased female participation and professionalisation in team sports, training demands are increasing for female athletes. In addition, menstrual function is now increasingly being recognized as a barometer of health and performance. This study aims to investigate whether training stress incurred while pursuing performance goals alters menstrual function in athletes We want to better understand if the menstrual cycle can serve as a monitoring tool to manage training loads and ultimately enhance performance. The findings of this research will inform female team sport practitioners in better understanding whether current training load prescription guidelines are optimal or if we need to rethink this aspect of high performance.

How is the study designed?
This observational study forms Phase 3 of a wider doctoral research programme examining training load and menstrual-cycle function in female team-sport athletes. Phase 1 consisted of a global survey exploring current trends in training load and menstrual monitoring practices in female team-sport athletes. Phase 2 involved focus groups with female team-sport athletes and strength and conditioning coaches to explore experiences and perspectives on menstrual-cycle information within training-load monitoring and performance planning. Phase 3 builds on these earlier phases by collecting training, wellness, menstrual-cycle and blood-test data from female team-sport athletes over the study period. Together, the three phases will provide contextual and empirical evidence to inform monitoring and training practices in female high-performance sport.

We will be recruiting 20 naturally menstruating team sport athletes over the course of the study (e.g., rugby, football, hockey, cricket, lacrosse). The study will have simultaneous tracking of training load and menstrual cycle over a duration of approximately three months (to be able to track three full cycles) while you are training/ preparing for competition. We will then analyse your training load data against your menstrual data to explore any plausible correlations between the two variables.

How was I identified and why am I being invited to participate in this study?
You have been invited to take part in this study after responding to our recruitment advertisement.

Who can take part in this study?
To be **eligible**, you must:

- Be a female (assigned at birth) between 18 to 40 years of age,
- Be a team sport athlete,
- Be representing provincial level or higher, reflecting you as an athlete regularly training for competition,
- Be eumenorrheic (naturally menstruating) with no use of hormonal contraceptives for at least three months prior to the start of this study.
- Have a normal menstrual cycle during the pre-screening period, defined as a cycle length of 21–35 days, evidence of ovulation through detection of a luteinizing hormone (LH) surge, and a serum progesterone concentration ≥16 nmol/L measured 7–9 days after the LH surge.

We will **not** be able to include you if you fall under any of the criteria below:

- Your involvement in team sport is at a recreational, social, or non-competitive level,
- You have a clinically diagnosed reproductive or eating disorder e.g. endometriosis, polyendocrine metabolic ovarian syndrome (PMOS) and anorexia nervosa,
- You are currently pregnant, breastfeeding or have been pregnant within the past 12 months,
- You are currently nursing an injury that is restricting you from training at your full potential,
- You have an abnormal cycle tested during baseline screening.

What will my participation involve?

Stage 1: Meet, greet and screen:

Once you indicate your interest by emailing me, you will be asked to attend an in-person appointment, where I will explain the study in detail and provide you with the opportunity to ask questions. Once you are satisfied with all the answers and details, you will sign the Consent Form. We will then commence the baseline screening. This will include:

(a) Gathering your training and menstrual cycle history, specifically information about your typical cycle length, your last period dates, and your expected period dates.
(b) You will be provided with 10 urinary ovulation test strips and will also be trained in how to use them (from day 8 to day 20 of your next or ongoing cycle)
(c) To confirm luteal phase progesterone levels, you will be booked in for a blood sample at AUT Millennium approximately seven days before your next expected period.

Stage 2: Study Commencement

Once a normal menstrual cycle is confirmed at baseline, you will then begin the main study. This will include tracking your menstrual cycle (same procedure as baseline screening), training load, wellness and lastly, low energy availability.

Training Load Tracking:
You will be provided with a link to an online form which you will have to complete between 10 and 30 minutes after every training session you complete, every day for the entire study duration. The form will require you to enter the session type, session duration in minutes and a rating of perceived exertion on a scale of 1-10.
Additionally, if you use a wearable device (Whoop band, smartwatch or GPS device) you may submit metrics such as total distance, high-speed running distance, Player Load, average and peak heart rate, and heart rate variability scores.

Wellness Tracking:
A form link will be sent to you to track your subjective recovery ratings on aspects such as sleep, fatigue, mood, muscle soreness and motivation to train.

Low Energy Availability Tracking:
Since being in a caloric deficit whilst training hard can contribute to menstrual dysfunction, we will use the Low Energy Availability in Females Questionnaire (LEAF-Q) once every Sunday. This questionnaire is a surrogate measure of your caloric status and takes about 10 minutes to complete.
Alongside, we will also track your body weight to track any drastic weight loss due to caloric restriction. This will be measured every morning upon waking up. Please make sure you follow the same conditions every time you weigh

in. For example, if you choose to measure with clothes and after passing urine and bowels every morning, then this must be followed throughout the study duration.

Menstrual Tracking:
Cycle Length - There will be a menstrual check-in question added to the wellness form for you to fill in your period dates, only on your bleeding days.
Ovulation - You will be provided with 30 urinary ovulation test strips to track your ovulation for your next three consecutive cycles. Similar to the screening process, we will require you to provide one blood sample in each of the three cycles, approximately seven days before your next period.
Luteal Phase Confirmation - A blood sample will be taken once in every cycle to evaluate your progesterone peak in the late luteal phase. This will be approximately seven days before your next bleed, and you will be informed about the testing window approximately seven days in advance. The researcher has undergone venipuncture training and has undertaken a period of supervision before being certified to take blood.

Data Collection
All data will be collected with a unique identifier, assigned to you when you enter the study. We use this participant identification number and not your name to protect your privacy.

Time Commitment Overview
The total estimated time commitment for the entire study would be ~10-12 hours in the four months (including the screening month). See Figure 1 below for more information.

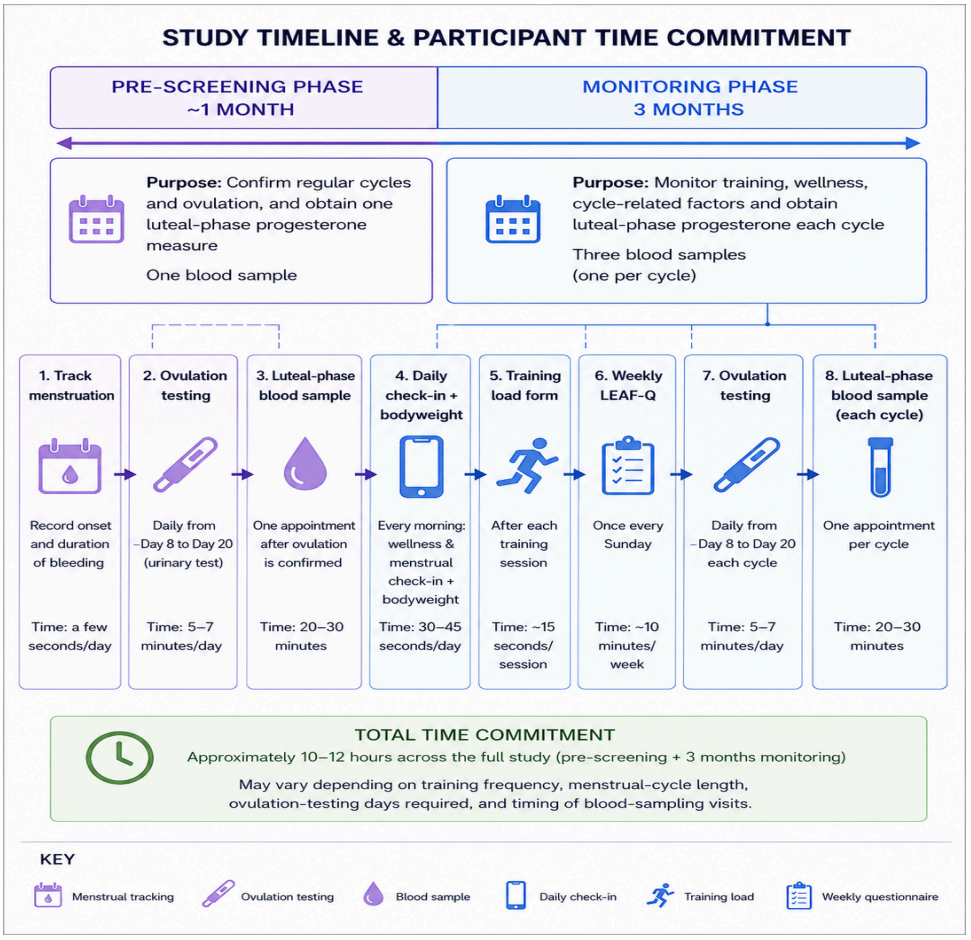


Figure 1: Study timeline and time commitment requirements

Stage 3: Wrap up
All tracking will end after we fully record your last cycle (ovulation, progesterone and cycle length). Your data will then be analysed against your training load, wellness and LEA information. Alongside sharing with you your original menstrual cycle and training load report, aggregate and deidentified findings will feed into training prescription practices in female team sport settings.

What happens to my blood sample?
Blood sampling would be the same process as a routine blood test that you may have done in the past. For reference, the amount of blood drawn during a blood donation is ~470 ml. We will need ~4 ml per test from you. The drawn blood will be spun into a centrifuge to separate out the watery part (serum), which is then stored at -80 degrees Celsius, before being analysed.

If you would like to have your blood sample returned to you, please let the researcher know beforehand. These samples cannot be posted by mail so you will need to return to the site where you donated the blood (AUT Millennium, 17 Antares Place, Rosedale).
You may hold beliefs about a sacred and shared value of all, or any tissue samples removed. You may want to discuss cultural implications associated with storing your tissue with your whānau as appropriate. You have the right to choose what happens to your tissue.

What are the possible risks of this study?
Blood collection procedures are generally very safe. However, you may feel minor discomfort in the form of a sharp scratch when drawing blood. Your arm may be a little sore for a few hours afterwards. There is a minor risk of bruising or hematoma i.e., pooling of blood under the skin causing a dark-coloured bump to form. Although they are not serious conditions, they may cause some distress. Blood draws will be performed by me - I have been well trained and certified in venipuncture. Should you have any concerns about this, please feel free to contact me.

How will these discomforts and risks be alleviated?
If you feel discomfort or pain beyond your comfort level at any point, please let me know and we will adjust and/or stop the test immediately.

Management of incidental findings
Menstrual abnormalities identified during the study will be managed according to their clinical significance. Subtle abnormalities that form part of the study outcomes, namely anovulation, luteal phase deficiency, irregular cycle length, will be monitored closely. Secondly, findings of persistent (≥3 consecutive cycles) heavy menstrual bleeding, intermenstrual bleeding, severe dysmenorrhea (painful menstruation) will be flagged. In such cases participants will be advised to seek appropriate medical assistance. Lastly, abnormalities requiring urgent medical attention will be flagged promptly and the participant will be advised to stop training and seek medical attention immediately. These abnormalities may include:

(a) acute heavy bleeding associated with symptoms of fainting, marked dizziness, shortness of breath, severe weakness, and pallor.
(b) Sudden, severe abdominal or pelvic pain markedly different from participant's usual menstrual pain

The primary researcher will inform the participant about every finding, development and recommended action promptly. Subtle menstrual abnormalities will not automatically require cessation of training or withdrawal from the study. Where urgent medical assessment is required, training will be paused until the participant has received appropriate medical advice. In any case, the participant has the choice to withdraw anytime they wish to.

What happens to my information?
I will record information about your training, wellness and menstrual health throughout the study period. This includes the responses from all the questionnaires, ovulation and blood tests. You cannot take part in this study if you do not consent to share this information.
Nobody other than myself or my supervisors, Prof. Michael McGuigan and Dr. Casey Watkins will be able to trace your participation back to you, and you will not be identifiable in any documentation associated with this research, including any academic publications. The data generated from your participation will be codified with numbers/letters, and only myself and my supervisors will have access to the study coding system. Furthermore, all digital data associated with this study will be stored on a password-protected computer that only I have access to. Hard-copy consent forms and screening questionnaires will be stored separately in a locked cabinet in our office. All study data and consent forms will be retained securely for 10 years after the study, after which electronic data will be deleted and paper records shredded. Lastly, if you are deemed ineligible following the baseline menstrual screening, your data will be deleted immediately and permanently.

What are the benefits?
By participating in this study, you will receive a Koha (NZD $100). You will also receive a personalized report of your menstrual cycle and training load profile over the three-month period, which may give you further insights to better achieve your performance and health related goals.

We also intend to translate the study results into written form and publish them in a peer-reviewed academic journal. The results of this study will be intriguing to sport science and medicine practitioners involved in female team sports, especially in the high-performance sector.

What compensation is available for injury or negligence?
In the unlikely event of a physical injury because of your participation in this study, rehabilitation and compensation for injury by accident may be available from the Accident Compensation Corporation, providing the incident details satisfy the requirements of the law and the Corporation's regulations.

Will I receive feedback on the results of this research?
We will send a summary of the research to you at the end of the study, if you request this. I will send you a copy of your individual results if you indicate this on the Consent Form.

What do I do if I have concerns about this research?
Any concerns regarding the nature of this project should be notified in the first instance to the Project Supervisor, *Prof. Michael McGuigan, michael.mcguigan@aut.ac.nz, and* +64 9 921 9999 ext 7580.

Concerns regarding the conduct of the research should be notified to the Executive Secretary of AUTEC, *ethics@aut.ac.nz*, (+649) 921 9999 ext 6038.

How do I agree to participate in this research?
After you contact the researcher to express your interest, you will be invited to attend an in-person appointment. You will be explained the study in detail and given an opportunity to ask any questions. If you decide to take part, you will be asked to sign the Consent Form before any screening or data collection begins.

What opportunity do I have to consider this invitation?
We will be recruiting for this study until we have the required number of participants, and we will operate on a first come, first served basis. We will send you a friendly reminder if we have not heard from you after two weeks.

Researcher Contact Details:
Surabhi Date (PhD Candidate)
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Project Supervisor Contact Details:
Prof Michael McGuigan
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Approved by the Auckland University of Technology Ethics Committee on 16/10/26, AUTEC Reference number 26/261.