

Assessment of Fueling Needs and Health Status in Adolescent Athletes

IRB #: 21-91

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Laboratory: Exercise and Performance Nutrition Laboratory, Lindenwood University

Study Overview

The purpose of this study is to learn more about how well adolescent athletes are fueling their bodies to support training, performance, and overall health. Many young athletes have higher energy and nutrition needs than they realize, and not meeting those needs can affect things like growth, recovery, bone strength, injury risk, and performance. There is limited research on this in adolescent athletes, therefore, more information is needed to help athletes, parents, and coaches make informed decisions.

This study includes assessments of body composition, bone density, resting metabolism, energy expenditure, fitness, strength and power, dietary intake, and nutrition knowledge. These results will help researchers create better resources to support healthy fueling, performance, and recovery in young athletes.

Participation at a Glance

- Total Study Duration: 1 week
- Number of Visits: 2
- Time per Visit: 30-60 min each
- Participant Pre-Visit Requirements:
 - 8-hour food and fluid fast
 - Refrain from exercise for 24 hours
 - Wear athletic clothing (without hard metal/plastic components or reflective logos) and shoes
- Compensation: EPNL T-shirt

How to Get Started

1. Complete the [screening form](#).
2. Our team will review your info and contact you with eligibility.
3. If eligible, we will schedule Visit 1 (see next section for details).
4. Visit 1 includes: informed consent, intake paperwork (health history, study questionnaires), strength and power testing, and instructions for diet and activity tracking

Study Visit(s) Outline

	Visit 1 (Day 0)	Visit 2 (Day 5-7)
Visit Length	30-60 mins	30-60 mins
Consent	X	
Screening	X	
Height & Body Mass	X	X
Resting Heart Rate & Blood Pressure	X	X
Body Composition (DEXA)	X	
Body Water Scan	X	

Sport Nutrition Knowledge Questionnaire	X	
Urine Sample Collection	X	
Lower Body Strength/Power Tests	X	
Diet Log	5-day continuous log between visits	
Activity Log	5-day continuous log between visits	
VO2Max Aerobic Assessment (Tier 2 only*)		X
Provide Compensation and Results		X

*Tier 2 is an opt-in option. It is entirely optional - if you opt-in you will complete the lower body strength & power tests

Procedure Details

- **DEXA Scan** – A DEXA scan is a low-dose X-ray that measures bone, muscle, and body fat. Participants lie still on a padded table while a scanner passes over the body. The scanner does not touch the body, and the participant will not feel anything. The test takes about 7 minutes, and additional bone density scans of the hip and lumbar spine take about 2 minutes each.
- **Body Water Assessment** – This test estimates body water levels using a safe, very small electrical signal. Electrodes are placed on the wrist and ankle after cleaning the skin with alcohol. Participants are asked to remain still during the measurement. Participants do not feel the signal. The test will take a total of about 5 minutes.
- **Sport Nutrition Knowledge Questionnaire (A-SNKQ)** – Participants will complete a 37-question online survey that asks about general and sport-specific nutrition topics. This assessment helps the research team understand how much athletes currently know about fueling, hydration, and basic nutrition. The questionnaire includes 37 multiple-choice and true/false questions and is completed through a secure online survey platform (Qualtrics).
- **Urine Sample Collection** – Participants will provide a mid-stream urine sample during the visit to help the research team check hydration status. Participants should hydrate well the day before their first visit but should still follow the food and fluid fast for the 8 hours before.
- **5-day Logs** – During the same 5-days between visits, participants will complete a set of food logs and activity logs.
 - **Diet/Food Log:** Participants will record everything they eat and drink each day using the ASA24 online nutrition tracking system. This includes meals, snacks, beverages, and portion sizes. The goal is to get an accurate picture of usual eating habits across the five days.
 - **Activity Log:** Participants will also track their physical activity for the same five days. This includes the type of activity (such as school, sleep, cleaning, practice, gym workouts, running, etc.), a brief description when needed, and how long the activity lasted. These logs help researchers understand daily energy intake and energy use during training.
- **Lower Body Strength and Power Assessments** – This assessment is used to measure lower body strength and jump power.

- **Countermovement Jumps:** Participants perform 5 vertical jumps on force plates after a warm-up. The goal is for the participant to jump as high as possible and to stick the landing.
- **Isometric Mid-Thigh Pull:** Participants stand on force plates and pull upward on a fixed bar as hard as possible for about 5 seconds. This movement is similar to a deadlift without the bar moving. Participants will repeat this movement for a total of 3 attempts.
- **VO₂Max Aerobic Capacity (Tier 2 Only):** This test measures aerobic fitness and how efficiently the body uses oxygen during exercise. Participants walk or run on a treadmill while wearing a mask that measures breathing, with heart rate monitored throughout. The test begins with a brief one-minute warm-up, and then the treadmill gradually increases in speed and incline every 2 minutes until the participant reaches their maximum effort. This test is supervised by trained staff, and participants may stop at any time if they feel uncomfortable.
- **Tier 2 Description:** The VO₂max assessment is optional. Participants and their legal guardian have the option to opt-in to this during the consent process. It adds approximately 20-30 minutes to the Visit 2 testing visit duration.

Compensation & Benefits

- Total Compensation Amount: EPNL T-shirt
- Compensation Distribution: The t-shirt will be provided during the final research visit.
- Non-monetary Benefits:
 - Body Composition Results
 - Personalized feedback on your energy intake and energy use
 - Strength and Power Results
 - VO₂Max (aerobic/endurance capacity) testing results (if opted into Tier 2)

Risks & Safety

- *Loss of Privacy and Confidentiality:* One risk from participation in this research study stems largely from people being able to identify unique identifiers such as age, height, weight, ethnicity, race, etc. that researchers will collect and report. Every effort will be made to keep your child's information secure. Only members of the research team will be able to see any data that may be identifying. Additionally, all data will be de-identified with a randomly assigned alphanumeric code. Only members of the research team will be able to see this code.
- *Radiation Exposure:* Your child will have a DEXA scan completed to assess body composition. This scan will expose your child to a dose of radiation that is considered by medical experts to be small or trivial. The dose received is similar to the same amount of radiation you will be exposed to by living in a populated community.

- *Risk of Injury:* Because your child will be performing a maximal exercise test, it is possible that your child will experience muscle soreness and fatigue. While possibly your child may experience an injury, however, this is not likely. Injury risk is reduced as all tests and exercises performed are of an intensity presumed to be completed by individuals of good health and active fitness level.
- *Risk of Discomfort:* Due to performing maximal exercise testing that require your child to wear a heart rate monitor for the duration of the bout, skin irritation or discomfort may occur where the monitor is placed. In addition, the monitors will be worn for prolonged periods of time while your child is exercising. While it is possible that your child may experience this discomfort, it is not likely as the strap will be properly fitted and can be adjusted at any point to ease or eliminate discomfort.

Frequently Asked Questions (FAQs)

Q: Will I receive my test results?

A: Yes. You will be provided with a summary of your results for body composition, dietary intake and energy expenditure (how many calories you expend and consume), strength and power assessments, and maximal aerobic/endurance capacity (if you opted into Tier 2 testing which includes the Treadmill VO₂max assessment) at the end of your participation.

Q: Can I withdraw from the study at any time?

A: It is always your choice to participate in this study. You may withdraw at any time. You may choose not to answer any questions or perform tasks that make you uncomfortable. If you decide to withdraw, you will not receive any penalty or loss of benefits. If you would like to withdraw from a study, you can contact the research team at epnl@lindenwood.edu or (636) 949-4676; the Principal Investigator, Chad Kerksick, PhD directly at (636) 627-4629 or ckerkicksick@lindenwood.edu. You may also contact the laboratory coordinator, Anthony Hagele at (636) 949-4785 or ahagele@lindenwood.edu.

Q: Will my information be kept private?

A: We will do everything we can to protect your privacy. We do not intend to include information that could identify you in any publication or presentation. Any information we collect will be stored by the researcher in a secure location. The only people who will be able to see your data are: members of the research team, qualified staff of Lindenwood University, representatives of state or federal agencies.

Q: What if I miss a visit?

A: Contact the research team as soon as possible. We will attempt to reschedule within the study timeframe, when possible.

Q: Do I have to be an athlete or highly trained?

A: You do not need to be a year-round or highly trained athlete to take part. You just need to have participated in a team or individual sport at some point within the last 12 months. The sport can be school-sanctioned or something you do on your own (like rock climbing). You also must be currently cleared by your school or a medical professional to participate in sports.

Q: Can I bring a friend or family member to visits?

A: Yes, you are welcome to bring a friend or family member to your visits. They will not take part in the study procedures, but they are welcome to wait in the designated areas during your appointment.

Location

Lindenwood University
Exercise and Performance Nutrition Laboratory (EPNL)
Fieldhouse, Rm 126
209 S Kingshighway St., Saint Charles, MO 63301

