Female Athlete Triad Update

Kelsey Logan, MD, FAAP
PMP Resources

Ohio AAP PMP Mobile App
Search Parenting at Meal and Playtime on Apple Store or Google Play

App Highlights....

- Physician-endorsed materials for parents to access on-demand
- Resources for parents organized by age
- Text reminders sent monthly and/or for age milestones
- Easy sign-up
- Videos on feeding, play, nutrition and more

Download on the Apple Store | GET IT ON Google Play

Register for the PMP Toolkit

PARENTING AT MEALTIME & PLAYTIME RESOURCE TOOLKIT

PLEASE TAKE THE PRE-SURVEY BEFORE USING THE TOOLKIT.

View a message from Dr. Sarah Adams, PMP Medical Director

- Module 1: Overview of PMP
- Module 2: Importance of PMP
- Module 3: How To Implement PMP Into Your Practice
- Module 4: PMP Resources
- Module 5: Using Social Media to Engage Families
- Module 6: Motivational Interviewing and How to Create SMART Goals
- Module 7: EMR Tools
- Module 8: Troubleshooting Tips
- Module 9: Navigating Well Care, Immunizations, and Mental Health
- Module 10: Practice Transformation Resources/Evaluation
- Additional Resources and Trainings
- Ohio AAP Advisory Committee

• [https://www.surveymonkey.com/r/PMPToolkitReg](https://www.surveymonkey.com/r/PMPToolkitReg)
• The speakers have no disclosures.
Objectives

• Review components of the female athlete triad and be able to identify women at risk.
• Describe how traits of the triad may influence injury risk.
• Offer treatment recommendations for women with the female athlete triad.
• Low energy availability.
  – With or without disordered eating.
  – Menstrual dysfunction.
• Low bone mineral density (BMD).

➢ Not separate – they are interrelated.
  ➢ Spectrum of energy availability, menstrual function, bone strength.
• ‘Triad refers to girls and women and is focused on low energy availability and associated clinically relevant outcomes’ (eating disorder, menstrual dysfunction, bone loss).

• ‘Relative Energy Deficiency in Sports (RED-S) covers a broader array of both physiological and performance outcomes in both women and men and calls for more research on the impact of race, ethnicity, and disability.’ ESSR 2019, Williams

– Authors of consensus statement call for replacement of FAT statement.
• Energy Availability (EA):
  – How much energy is available for daily physiologic function after exercise training.
  – Optimal: EA meets total energy expenditure, reproductive, and bone health needs.
How are these related?

• Psychologic
  – Pressure to perform +.
  – Perceived need to maintain low body mass →.
  – Results in high training volume, low intake.
  – Stress hormones produced.

• Physiologic
  – Altered endocrine control of menstrual cycle.
  – Amenorrhea = decreased estrogen production.
    → low bone mineral density.
  → increased injury risk
  → increased cardiovascular risk
From ACSM Position Stand, MSSE 2007 and reaffirmed in 2014 FAT coalition statement
Figure 2. Purported health consequences of Relative Energy Deficiency in Sport (RED-S) depicting an expanded view of the Female Athlete Triad to illustrate a wider range of outcomes and the application to male athletes (*Psychological consequences can either precede RED-S or be the result of RED-S). [Adapted from (5). Copyright © 2014 BMJ Publishing Group Ltd. Used with permission.]
Menstrual Disorders

• Normal menses
  – 26-35 days.
  – Divided into 2 phases by ovulation.
  – First half follicular phase, second half luteal.
    • Follicular – gradually increasing estrogen levels.
    • Luteal – high concentrations estrogen and progesterone.

• Menstrual dysfunction: strongest relationship to injury .Rauh, JAT 2010
  – Increased risk of stress fractures: college athletes, club track athletes, adult recreational runners, military recruits.
  – Longer time off from training after injury.
Range of Disturbance

From Mallinson, 2014, Int J Womens Health
• Population – 5%.
• Athletes – 1-44% (luteal phase defects 79%).
• Highest in
  – Aesthetic sports - Cheerleading, diving, gymnastics.
  – Endurance sports.
  – Weight class sports – rowing, judo, karate, body building, wrestling.
• **Decrease in energy availability.**
  – Expenditure > intake
    • Either by more exercise or decreased intake.

• **Menstrual cycle turned off or suppressed to conserve energy.**

• **NOT only by low level of body fat.**
  – Common range of body composition.
How much energy is enough?

• Multiple studies suggesting 30 kcal·kg/ffm·day.
  – Modulates LH pulse frequency.

• Recent research showing there may be no cutoff, just increased risk.
  – Likelihood of menstrual dysfunction decreased 9% for each unit increase in EA (23-34, 35-40, 41-51). – Lieberman, MSSE 2018
Estrogen, Nutrition, and Bone

• Protects skeleton from bone resorption.
• Stimulates bone formation.

• Inadequate nutrition
  ➢ Ca, Vit D deficiencies.
  ➢ Increased bone resorption.

➢ Reduced long term osteoporosis risk by
  • High peak BMD in early life.
  • Lifelong exposure to estrogen.
Stress Fractures

• ~2-4 x higher in athletes with menstrual dysfunction.
  – Varies between sports and teams.
• 11 x higher in servicewomen.
  – 16% of active-duty Army women have had stress fracture.
• Risk increased from 15-20% (one FAT risk factor) to 30-50% (with 2-3 risk factors). – Barrack 2014

• Pelvic/sacral.
• Femoral neck/shaft.
• Tibial.
• Tarsal/Metatarsal.
Athlete Specific Risks

• Prolonged periods of exercise.
• Restrict/limit food intake or food types.
• Dieting for any reason.
• Early dieting, sport specific training.
• Sudden increases in training.
• Injury/away from sport.
At-Risk Athletes

• Athletes in sports that
  – Subjectively score performance.
  – Have weight categories.
  – Emphasize prepubertal bodies to be successful.
  – Require revealing clothing for competition.  
    ACSM Position Stand, MSSE, 1997

• May start with ‘healthy dieting’ – evolve to more restrictive weight control and/or increased exercise.
  – Habits reinforced by athlete culture, snowballs into ED.
Risk Factors

- History of menstrual irregularity.
- History of stress fractures.
- History of critical comments about eating or weight.
  - Parent, coach, teammate.
- History of depression.
- History of dieting.
- Personality factors.
- Pressure to lose weight/weight cycling.
- Early start of sport-specific training.
- Overtraining.
- Recurrent or non-healing injuries.
- Inappropriate coaching behavior.

Box 1  Triad Consensus Panel Screening Questions*

- Have you ever had a menstrual period?
- How old were you when you had your first menstrual period?
- When was your most recent menstrual period?
- How many periods have you had in the past 12 months?
- Are you presently taking any female hormones (oestrogen, progesterone, birth control pills)?
- Do you worry about your weight?
- Are you trying to or has anyone recommended that you gain or lose weight?
- Are you on a special diet or do you avoid certain types of foods or food groups?
- Have you ever had an eating disorder?
- Have you ever had a stress fracture?
- Have you ever been told you have low bone density (osteopenia or osteoporosis)?

*The Triad Consensus Panel recommends asking these screening questions at the time of the sport pre-participation evaluation.
• Amenorrhea: Pregnant?
• Exclude organic disease.
  – Prolactinoma, thyroid disease, PCOS, premature ovarian failure.
• Unlikely to have abnormalities on endocrine labs.
• Usually reveals functional hypothalamic amenorrhea.
• ECG, especially if complains of chest pain or has significant bradycardia.
• Assess energy availability.
  – Nutrition Assessment:
    • 24h dietary intake (or 3, 4, 7 day dietary log).
  – Assess exercise energy expenditure (accelerometry or heart rate monitor), or 2011 Compendium of Physical Activities.
  – Fat free mass (calipers, DEXA).
Evaluation

- Low EA indicated by low energy stores.
  - Adult BMI \( \leq 17.5 \text{kg/m}^2 \).
  - Adolescent BMI (up to age 20) \( \leq 85\% \) expected body weight.
  - Reduced resting metabolic rate (indirect calorimetry).
  - Low T3.

- Ratio of measured RMR/predicted RMR \(< 0.9\).  
  
## Do you restrict training?

<table>
<thead>
<tr>
<th>Risk Factors</th>
<th>Magnitude of Risk</th>
<th>Cumulative Risk Score</th>
<th>Low Risk</th>
<th>Moderate Risk</th>
<th>High Risk</th>
</tr>
</thead>
<tbody>
<tr>
<td>Low EA with or without DE/ED</td>
<td>No dietary restriction</td>
<td>0 – 1 point</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Low BMI</td>
<td>BMI ≥ 18.5 or ≥ 90% EW** or weight stable</td>
<td>2 – 5 points</td>
<td>Provisional Clearance</td>
<td>Limited Clearance</td>
<td></td>
</tr>
<tr>
<td>Delayed Menarche</td>
<td>Menarche &lt; 15 years</td>
<td>2 – 5 points</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Oligomenorrhea and/or Amenorrhea</td>
<td>&gt; 9 menses in 12 months*</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Low BMD</td>
<td>Z-score ≥ +1.0</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Stress Reaction/Fracture</td>
<td>None</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

From: [2014 FAT Coalition Consensus Statement on Treatment and Return to Play of the FAT, CSMR 2014](https://www.fatcoalition.org/consensus-statement)
### Table 1. Relative Energy Deficiency in Sport risk assessment model for sport participation (modified from Skårderud et al.)

<table>
<thead>
<tr>
<th>High risk: no start red light</th>
<th>Moderate risk: caution yellow light</th>
<th>Low risk: green light</th>
</tr>
</thead>
<tbody>
<tr>
<td>► Anorexia nervosa and other serious eating disorders</td>
<td>► Prolonged abnormally low % body fat measured by DXA or anthropometry using the International Society for the Advancement of Kinanthropometry ISAK, non-ISAK approaches</td>
<td>► Healthy eating habits with appropriate energy availability</td>
</tr>
<tr>
<td>► Other serious medical (psychological and physiological) conditions related to low energy availability</td>
<td>► Substantial weight loss (≥10% body mass in 1 month)</td>
<td></td>
</tr>
<tr>
<td>► Extreme weight loss techniques leading to dehydration induced haemodynamic instability and other life-threatening conditions</td>
<td>► Attenuation of expected growth and development in adolescent athlete</td>
<td></td>
</tr>
<tr>
<td>► Abnormal menstrual cycle: FHA amenorrhoea &gt;6 months</td>
<td>► Normal hormonal and metabolic function</td>
<td></td>
</tr>
<tr>
<td>► Menarche &gt;16 years</td>
<td>► Healthy BMD as expected for sport, age and ethnicity</td>
<td></td>
</tr>
<tr>
<td>► Abnormal hormonal profile in men</td>
<td>► Healthy masculonskeletal system</td>
<td></td>
</tr>
<tr>
<td>► Reduced BMD (either from last measurement or Z-score &lt; -1 SD)</td>
<td>► History of 1 or more stress fractures associated with hormonal/ menstrual dysfunction and/or low EA</td>
<td></td>
</tr>
<tr>
<td>► Subacute or chronic stress fractures (including previous history)</td>
<td>► Reduced relative energy deficiency</td>
<td></td>
</tr>
<tr>
<td>► Disordered eating behaviour negatively affecting other team members</td>
<td>► Disordered eating behaviour negatively affecting other team members</td>
<td></td>
</tr>
<tr>
<td>► Lack of progress in treatment and/or non-compliance</td>
<td>► Prolonged relative energy deficiency</td>
<td></td>
</tr>
</tbody>
</table>

**Table 2**

<table>
<thead>
<tr>
<th>High risk red light</th>
<th>Moderate risk yellow light</th>
<th>Low risk: green light</th>
</tr>
</thead>
<tbody>
<tr>
<td>► No competition</td>
<td>► May compete once medically cleared under supervision</td>
<td>► Full sport participation</td>
</tr>
<tr>
<td>► Supervised training allowed when medically cleared for adapted training</td>
<td>► May train as long as is following the treatment plan</td>
<td></td>
</tr>
<tr>
<td>► Use of written contract (see supplementary appendix 1)</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

**BMD**: bone mineral density; **DXA**: dual-energy X-ray absorptiometry; **EA**: energy availability; **FHA**: functional hypothalamic amenorrhoea; **ISAK**: International Society for the Advancement of Kinanthropometry.
Restricting from Training

• Risk for injury related to low BMD greater with more risk factors.
  – More severe injury and longer recovery time.
• During restriction, improve health and reduce injury/illness risk associated with low EA/FAT.
• Multidisciplinary team needed.
  – Physician, sports dietician, mental health provider.
    • Include athletic trainer, coach, family, etc.
• Provisional training if follows plan.
1) Reverse recent weight loss.
2) Return to body weight associated with normal menses.
3) Weight gain to achieve BMI of >18.5kg/m² or >90% of predicted weight.
4) Energy intake minimum 2000 kcal/day; likely higher required, depending on exercise energy expenditure.
• Increase energy availability.
  – Reversal of symptoms of disordered eating.
    • Dry skin, lanugo, fatigue, constipation, etc.
  – Reverse menstrual disorders.
  – Reduce risk of low BMD.
• Treat comorbid issues (depression, anxiety, etc.)
• Medications
  – Estrogen replacement
    • No proven benefit to bone, overall health.
  – Bisphosphonates
    • Not approved for this use in this age.
American Medical Society for Sports Medicine
Five Things Physicians and Patients Should Question

#3 Don’t prescribe oral contraceptive pills as initial treatment for patients with amenorrhea or menstrual dysfunction due to female athlete triad (defined as low energy availability with or without disordered eating, menstrual dysfunction and low bone mineral density).
Prevention

• **Education**
  – Energy requirements for training.
  – Menstrual monitoring.
  – Calcium, vitamin D requirements.

• **Screening** at PPE and at intervals after.

• **Watch out** for one component, ask about the others.

• Eating must be done according to needs.
  – Intense exercise suppresses appetite.
  – Teach healthy nutrition early on for athletes.
Change the Culture

- Discourage unhealthy weight loss behavior.
- Educate athletes that leanness/thinness ≠ performance improvement.
- Encourage fun, skill development, sport sampling.
Female Athlete Nutrition

9 December 2022, AAP Training
Maria Scavuzzo Brumfield, MS, RDN, LD
Registered Dietitian Nutritionist
Introduction

• Maria Scavuzzo Brumfield, MS, RDN, LD, registered and licensed dietitian at Dayton Children’s Hospital.
  – Center for Female Athlete Registered Dietitian.
    • Multidisciplinary team style clinic to serve the female athlete.
  – A fun fact about me is that I ran Division 1 Collegiate cross country and track for Miami University and ran in the 2020 Olympic Marathon Trials.
Female Athlete Nutrition

• Female Athletes have unique nutrition needs.
  – Energy Balance.
    • Adequate energy with training load vs inadequate energy with training load.
  – Iron.
    • Increased Iron Needs.
  – Calcium/Vitamin D.
    • Nutrients necessary for proper bone growth along with muscle contraction.
Energy Balance

A female athlete is in energy balance when adequate energy (calories) are consumed daily to meet the combined energy demands from training, daily life and reproduction.

A female athlete may not be in energy balance either intentionally or unintentionally when they are expending more energy than they are taking in (i.e. changing body composition, increased training load without increased energy intake).

Female Athlete Triad

– Low energy availability (with and without disordered eating).
– Menstrual dysfunction.
– Low bone mineral density.
Energy Requirements

- Estimated Energy Requirement (EER)
  - Boys: 114 - (50.9 x age) + PA x (19.5 x wt (kg)) + 1161.4 x ht (m)
  - Girls: 389 - (41.2 x age) + PA x (15 x wt (kg)) + 701 x ht (m)

<table>
<thead>
<tr>
<th>Physical Activity Level</th>
<th>Boys</th>
<th>Girls</th>
</tr>
</thead>
<tbody>
<tr>
<td>Low Active</td>
<td>PA = 1.13</td>
<td>PA = 1.16</td>
</tr>
<tr>
<td>30-60 minutes of moderate activity, such as walking 3-4 miles/hour</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Active</td>
<td>PA = 1.26</td>
<td>PA = 1.31</td>
</tr>
<tr>
<td>At least 60 minutes of daily moderate activity</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Very Active</td>
<td>PA = 1.42</td>
<td>PA = 1.56</td>
</tr>
<tr>
<td>At least 60 minutes of daily moderate activity + additional 60 minutes of vigorous activity or 120 minutes of moderate activity</td>
<td></td>
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</tr>
</tbody>
</table>
• Per the CDC: “In a report *Dietary Reference Intakes for Energy, Carbohydrate, Fiber, Fat, Fatty Acids, Cholesterol, Protein and Amino Acids (Macronutrients)*, the Institute of Medicine of The National Academies sets the Dietary Reference Intake for energy as the Estimated Energy Requirement (EER).
  
  – This equation is used in the Nutrition Care Manual.
  
  – The EER is calculated from a set of equations and factors that account for an individual’s energy intake, energy expenditure, age, sex, weight, height, and physical activity level (PAL). The equations used to calculate the EER consider factors that affect an individual’s daily energy expenditure, account for increments in energy expenditure based on physical activity, and quantify the effect of the PAL on total energy expenditure. (TEE)
• The Athlete's Plate®
  – Developed by UCCS Sports Nutrition Graduate Program in collaboration with the US Olympic Committee's (USOC) Food and Nutrition Services.
  – The plates are reviewed by the USOC Sport Dietitians and are validated against sport nutrition recommendations.
  – The plates are published in the International Journal of Sports Nutrition and Exercise and Metabolism
  – The Athlete’s Plate® is a trademarked under the Regents of the University of Colorado.
  – The plates contain the 5 major groups.
Athlete’s plate - Easy Day
Athlete’s plate- Moderate Day
Athlete’s plate- Hard Day

HARD TRAINING:

FATS
2-3 Tablespoons

Grains
Pasta
Rice
Potatoes
Cereals
Breads

Poultry
Meat
Fish
Eggs

Lean Protein
Avocado
Oils
Nuts
Seeds
Cheese
Butter

Cooked Veggies
Vegetables

Water
Dairy/Nondairy
Beverages
Diluted Juice
Flavored
Beverages

Fresh Fruit
Stewed Fruit
Dried Fruit

Flavors
Salt/Pepper
Herbs
Spices
Vinager
Salsa
Mustard
Ketchup
Female Athlete Nutrition: SCOFF Questionnaire

- Do you make yourself **Sick** because you feel uncomfortably full?
- Do you worry that you have lost **Control** over how much you eat?
- Have you recently lost more than **One** stone (14 pounds) in a 3-month period?
- Do you believe yourself to be **Fat** when others say you are too thin?
- Would you say that food **Dominates** your like?

- Setting the threshold at **two or more yes answers** to all five questions provided 100% sensitivity for anorexia and bulimia, separately and combined (all patients: 95% confidence interval, 96.9%-100.0%; patients with bulimia: 92.6%-100.0%; and patients with anorexia: 94.7%-100.0%), with a specificity of 87.5% (79.2%-93.4%) for controls.
- Differentiating between clinically diagnosed eating disorder, or suspect EDO vs disordered eating
- [https://www.ncbi.nlm.nih.gov/pmc/articles/PMC1070794/](https://www.ncbi.nlm.nih.gov/pmc/articles/PMC1070794/)
Disordered eating vs Eating Disorder

- **Disordered eating** can include unhealthy food and body behaviors. Disordered eating is serious and can lead to complications in one’s life. It is critical to stay aware of the warning signs and symptoms.
- Disordered eating may be more common than we think due to the normalization of many disordered behaviors in society.
- “The level of obsession” around eating disorder thoughts and behaviors can differentiate disordered eating from an eating disorder.
- Examples:
  - Skipping meals
  - Supplement misuse
  - Extreme social media focused on appearance or on food
  - Undereating or overeating
  - Fad Diets
- It can be normal to think about food when we are hungry or what we might want to eat for their next meal. With an eating disorder, the thoughts are “all-consuming.”
• **Eating Disorders** are “severe and life-threatening brain-based illnesses.” – The Emily Program

• Eating disorder patients can experience serious disruptions in their behaviors, thoughts, and emotions, leading to devastating consequences such as medical complications and social isolation.

• Eating disorders patient’s often exhibit an extreme fixation on food or body that impairs daily life.

• A few signs and symptoms of eating disorders include:
  – Dramatic weight gain or weight loss.
  – Extreme preoccupation with food or body.
  – Changes in food intake.
  – Purging, restricting, or binge eating.
  – Abuse of diet pills or laxatives.
  – Eating in secret, hiding food, or feeling out of control with food.
  – Medical complications.
Female Athlete Nutrition

Iron

- Females: 18 mg/day (females ages 18-50 years old)
- Iron is a mineral found in food. The body needs iron to build blood cells that carry oxygen to all parts of the body.
- Without adequate circulating and stored iron in the body, oxygen is not delivered effectively to muscles, which then impairs muscle functions and aerobic capacity.
- 2 sources of iron
  - Heme Iron: animal food sources like meat, fish, and poultry. This type of iron is highly absorbed in the body.
  - Non Heme Iron: plant food sources such as legumes, dark leafy green vegetables, dried fruit, fortified whole grain cereal/grains. This form of iron can be increased when paired with Vitamin C rich foods.
- Aim for at least 2 servings of iron rich foods per day.
- Calcium can decrease the absorption of heme and non heme iron, aim to time nutrients!
Vitamin D/Calcium

- Calcium is essential for bone health, muscle contraction and normal enzyme activity.
- Vitamin D helps to form bone and maintain bone strength.
- Vitamin D aids in absorbing calcium in the body and is used in bone growth and remodeling.
- Sources/Servings of calcium and vitamin D include:
  - Female Athletes: 3-5 servings of dairy per day depending on individual needs
  - Dairy products such as cheese, milk, yogurt, cottage cheese, etc.
  - Salmon
  - Canned tuna
  - Orange juice (vitamin D fortified)
  - Egg
  - Cereal (Vitamin D fortified)
Grains/Starches

- The main source of fuel for athletes is Carbohydrates.
  - 50-60% of total calories.
  - If we picture a plate, can range from ¼ the ½ the plate depending on unique needs.
- Glucose releases from an athlete’s hard-working muscle three times faster than energy from fat stores.
- Muscle glycogen and blood glucose are limiting factors in performance.
  - During long periods of exercise, muscle glycogen and blood glucose levels decrease.
  - Refuel by 25-30g carb per 30min (if activity >90min).
- My recommended sources include:
  - Complex carbohydrates such as whole grain bread products, cereals, pastas, crackers, etc.
  - Fruit.
  - Milk and yogurt.
Aim for fast-acting carbohydrates 30-60 minutes before activity to top off your energy stores!

**Recommendations for pre-activity snacks:**

- Whole fruit such as a banana
- Applesauce
- Whole fruit + whole grain crackers
- Dried fruit + dry whole grain cereal
- Whole wheat English muffin + jelly
- Jam sandwich on whole grain bread
- Sweet potato
- Handful of pretzels
- Fig bar
- Granola bar
- Whole wheat bagel
- Dry cereal
Female Athlete Nutrition

Protein

- Protein=Recovery
  - Sources include meats, eggs, fish, dairy products. Aim for real food sources!
  - Quickest recovery occurs with protein and carbohydrates.
  - Add carbohydrates for a rich recovery snack to spare muscle loss and prevent injuries.

- Protein requirements can be athlete to athlete unique.
  - DRI to Increased Needs.
  - Adequate not excessive!
  - Females ages:
    - 9-13 years old: 0.92-1.5-2 gm/kg (DRI-Increased Needs)
    - 14-18 years old: 0.85-1.5 gm/kg (DRI-Increased Needs)
According to the American Academy of Pediatrics, the use of performance enhancing supplements in adolescents should be discouraged.

- The American College of Sports Medicine does not recommend, and discourages, creatine use in individuals younger than 18 years old because of unknown potential adverse health effects.

AAP urges education on these supplements in teens to prevent use.

- The American Academy of Pediatrics mentions the USADA website which contains information on specific supplements and information on how to make informed decisions regarding dietary supplement use for teens and parents.

A young athlete can obtain protein and other nutrients their body’s need from foods without taking supplements.

- For example, an example protein supplement may provide 35 grams of protein per shake. For a 100lb. female, this would provide 77% of her protein needs in just 1 supplement.

- Excess protein can lead to dehydration, urinary loss of calcium, weight gain, and stress on the kidney and liver.
Aim to receive nutrients within 60 minutes after activity for optimal recovery. Replenish your body with both carbohydrates and protein!

- Chocolate milk
- Greek yogurt + granola
- Turkey + cheese sandwich
- Banana/apple/pear with nut butter
- Dried fruit + nuts + dry cereal
- Hard-boiled egg + fruit or English muffin
- Cottage cheese + crackers or fruit
- Peanut butter roll up on whole grain tortilla
- Cheese stick + whole grain crackers
- "Powerball" made with oats and peanut butter
Fruit/Vegetables

• Offer vital and minerals for female athletes
• 5 or more servings per day for children and adolescents
• Fruits and vegetables contain fiber, which is a dietary substance that helps promote heart health, prevents constipation, and promotes healthy gut bacteria.
• Fruits and Vegetables contain various vitamins and minerals such as B vitamins, Calcium, Vitamin C, Vitamin D, Magnesium, Selenium, and Iron.
  – These vitamins and minerals can help to keep athletes healthy throughout their season.
• Don’t Wait for thirst.
  – Children and adolescents a greater risk for dehydration.
  – They have fewer sweat glands and sweat less per gland, thus this decreases their capacity to dissipate heat through evaporation.
• Water = Preferred beverage for athletes in sporting events lasting < 60 minutes.
  – For events lasting > 60 minutes, replace fluids and lost electrolytes with sports drinks.
• Athletic performance may be negatively impacted by as little as 2-3% body weight loss from fluid losses.
### Fuel Timing

<table>
<thead>
<tr>
<th>Time</th>
<th>Fuel Description</th>
<th>Examples</th>
</tr>
</thead>
<tbody>
<tr>
<td>3-4 hours before event</td>
<td>A meal rich in carbohydrates, include small amounts of protein. Aim for low fiber and low fat to ensure optimal digestion. Spicy or acidic foods eaten too close to competition may lead to indigestion and heart burn.</td>
<td>Oatmeal made with milk, topped with almonds and sliced bananas OR a turkey and cheese sandwich on whole wheat brad with a piece of fruit</td>
</tr>
<tr>
<td>30-60 minutes before event</td>
<td>Fast Acting carbohydrates. Aim for at least 15 grams carbohydrates, this amount may vary per athlete</td>
<td>A piece of fruit or a jam sandwich on whole wheat bread</td>
</tr>
<tr>
<td>30-60 minutes after event</td>
<td>Snack or meal rich in protein and carbohydrates. Aim for 30-60 grams carbohydrate</td>
<td>Graham crackers with peanut butter + low fat chocolate milk + banana OR brown rice with be</td>
</tr>
</tbody>
</table>
• **Food is Fuel, Food is our Friend!**
• **Allow nutrition to fuel athletic goals.**
• **Each female athlete’s nutrition plan is unique.**
• **If athletes do not consume adequate fuel, this can slow down their “engines”**.
  – **Without adequate fuel intake:**
    • **Athlete is at a greater risk for vitamin, nutrient and energy deficiencies.**
    • **loss of menstrual cycle in female athletes**
    • **Slowed growth**
    • **Increased health risks such as increased risk for fractures and other injuries**
    • **Go to the nutrition expert, a Registered Dietitian.**
  – **Develops a nutrition plan for the athlete's unique needs,**
  – **Identifies improvements in fueling, or if disordered eating habits are arising.**


Questions?
Ohio AAP PMP Mobile App

Search Parenting at Meal and Playtime on Apple Store or Google Play

App Highlights....

- Physician-endorsed materials for parents to access on-demand
- Resources for parents organized by age
- Text reminders sent monthly and/or for age milestones
- Easy sign-up
- Videos on feeding, play, nutrition and more

PMP Resources
For questions, please contact:
Alex Miller, MPH
Program Manager
Ohio AAP
Email: amiller@ohioaap.org
Phone: 614-846-6258
Register for the PMP Toolkit

PARENTING AT MEALTIME & PLAYTIME RESOURCE TOOLKIT

PLEASE TAKE THE PRE-SURVEY BEFORE USING THE TOOLKIT.

View a message from Dr. Sarah Adams, PMP Medical Director

- Module 1: Overview of PMP
- Module 2: Importance of PMP
- Module 3: How To Implement PMP Into Your Practice
- Module 4: PMP Resources
- Module 5: Using Social Media to Engage Families
- Module 6: Motivational Interviewing and How to Create SMART Goals
- Module 7: EMR Tools
- Module 8: Troubleshooting Tips
- Module 9: Navigating Well Care, Immunizations, and Mental Health
- Module 10: Practice Transformation Resources/Evaluation
- Additional Resources and Trainings
- Ohio AAP Advisory Committee

• https://www.surveymonkey.com/r/PMPToolkitReg