SPORTS NUTRITION GUIDE

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ISSUE 2

NUTRITION FOR PERFORMANCE

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KEY TERMS

Anthocyanins

Type of flavonoid responsible for the purple pigment in plant foods that may protect against cognitive decline and cardiovascular disease. Anthocyanin-rich foods include tart cherries, eggplant, blackberries, red cabbage, grapes, apples and plums.

Antibodies

Protective proteins produced by your immune system to help your body function optimally. They attach to foreign substances like bacteria, fungi, viruses and toxins to remove them from your body.

Anti-inflammatory

The reduction of inflammation in the body through medication, diet or other means. Inflammation can significantly affect recovery time and performance in athletes.

Antioxidant

Man-made or natural substances that may prevent or delay some types of cell damage. Antioxidants are found in many foods like fruits and vegetables and also available as dietary supplements. Examples include:

Vitamins: A, C, and E
Minerals: copper, manganese, selenium, and zinc

Phytonutrients including polyphenols, lycopene, lutein, lignans, isoflavonoids, indoles, flavonoids, catechins, beta-carotene, anthocyanins and more.

Bioavailability

The extent to which a substance is absorbed into the bloodstream and used by the body. High bioavailability means a large proportion of the substance reaches systemic circulation.

Blood pressure

The amount of force your blood uses to move through your arteries. When your heart pumps, it pushes oxygen-rich blood out to your arteries which connect to cells and tissues.

Blood vessels

The channels that carry blood throughout your body. They form a closed loop that begins and ends at your heart. Part of your circulatory system.

Cognitive function

Mental abilities that include learning, thinking, reasoning, remembering, problem solving, decision making and attention.

Creatine

A substance found naturally in our bodies, mainly in muscles. It's also in foods like red meat and fish. When we consume creatine through foods or supplements, it increases our muscles' energy storage. This can give athletes a little edge during high-intensity, short-duration activities like sprinting, jumping or lifting weights.

Creatinine

A waste product formed from the normal breakdown of muscle tissue. As your muscles use creatine to power through activities, like sprinting or lifting weights, they produce creatinine as a byproduct of energy use.

Delayed onset muscle soreness

Muscle pain that begins after you've worked out. It normally starts a day or two after a workout.

Endurance exercise

Activities that increase your heart rate and breathing for an extended period. Think running, cycling, swimming, rowing and even walking. The key is persistence and duration, not just short bursts of high intensity.

Enzymes

Proteins that speed up chemical reactions in our bodies. They help build some substances and break others down. Enzymes are naturally produced in our bodies, but they can also be consumed through food. They're essential for digestion, liver function and overall health.

Flavonoid

One type of antioxidant phytonutrient, present in foods including tea, green tea, citrus, apples and onions.

Free radicals

Unstable atoms that can damage cells in your body, accelerate aging and cause illness like heart disease, some cancers, arthritis, vision loss and more. Free radicals can be neutralized by antioxidants.

Glucose

The sugar your body makes when you eat foods containing carbohydrates, like bread, pasta, fruits and vegetables. Glucose enters your bloodstream and is transported to your cells, where it's used as energy. Think of it as fuel for your muscles and brain, enabling you to run, jump, think and play.

Glycogen

A form of sugar (or glucose) stored in muscles and liver. The body's go-to energy source for anything that requires a quick burst of energy, like sprinting to score a goal or swimming fast.

KEY TERMS

Hormones

Chemicals in your body that coordinate different functions by carrying messages to organs, muscles and other tissues.

Inflammation

Your immune system response to tissue damage, injury, infection and other harmful substances. Appears as redness, heat, swelling, pain and sometimes loss of function in the affected body part.

Joint health

The well-being of the joints in the body, important for movement and function, especially in athletes.

Melatonin

A hormone that helps regulate sleep-wake cycles, found naturally in certain foods. Increased production is triggered by darkness late in the day and leads to feelings of relaxation to promote sleep.

Metabolism

The chemical reaction inside cells that converts food into energy.

Muscle tissue

Cells that have the special ability to shorten or contract in order to produce movement in the body.

Neuroprotective effects

Actions that can defend the central nervous system (CNS) from various types of damage.

Oxidation

The metabolism of oxygen that leads to the production of free radicals, which damage cell membranes, cellular proteins, lipids and DNA. Smoking, alcohol, sunlight exposure, pollution and stress all increase oxidative processes in your body.

Oxidative stress

An imbalance between free radicals and antioxidants in your body, which leads to cell and tissue damage.

Phytonutrients

Also called phytochemicals, these plant compounds provide health benefits to humans upon consumption, often including antioxidant activity.

Rate of Perceived Exertion (RPE)

A subjective measurement of how hard your body works during physical activity. Uses a scale of 0–10 to rate how much effort an activity takes.

Reaction time

The time between the beginning of the application of a stimulus and the beginning of an organism's response to it.

Skeletal muscle

Connected to your bones, they allow you to perform a wide range of movements and functions. Skeletal muscles are voluntary, meaning you control how and when they work.

Stimulant

Substances that speed up the messages between our brain and body. Caffeine, a common natural stimulant is found in everyday items like coffee, tea, chocolate and some soft drinks.

Superfoods

Foods that are extremely nutrient dense, meaning that they are high in antioxidants and have significant amounts of vitamins and minerals.

Systemic inflammation

Chronic, low-grade inflammation throughout the body that can contribute to the development of disease.

Vasodilation

The medical term for when blood vessels in your body widen, allowing more blood to flow through and lowering blood pressure.

Vegan

Someone who chooses not to consume meat, dairy products, eggs or honey. Instead, they fill their plate with fruits, vegetables, grains, legumes (beans and lentils), nuts and seeds.

FUELING TIMELINE

When it comes time to train, practice and play, it always helps to have a good game plan! Fuel like an athlete and give your body what it needs to perform your best. We'll help you map everything out in this guide.

Develop a Fueling Plan

Your fueling plan needs to be individualized depending on:

- Duration
- Intensity
- Type of competition
- Ability to consume additional fuel during the competition
- Previous day's intake

Pro Tip | Practice your fueling plan during training before utilizing it during competition. A good **rule of thumb** is to avoid trying anything new on the day of competition!

Before Competition

As an athlete, you need to consume adequate amounts of carbohydrates to optimize the energy stores (glycogen) in your liver and muscles. This helps maintain your blood sugar levels and fuels muscle contraction.

Insufficient carbohydrate intake decreases your ability to sustain heavy loads, high-intensity exercise, mood state, mental acuity and power output during intermittent high-intensity performance.

Fueling and hydrating before competition is essential to replenish/top off your energy stores and optimize your hydration status.

Pro Tip | Read more about pre-training nutrition in Volume 1 of the Youth Sports Nutrition Guide!

Not Accustomed to Eating Early?

As an athlete, you can train your stomach and digestive system to tolerate food and fluid before competition.

Try: introducing foods and fluids before training in the weeks prior to competition to see how you tolerate them. Start with things that are easy to digest, like toast, a banana, water or juice. Gradually add additional foods over time. If you can't tolerate solid foods, try a liquid snack or meal, such as a sports drink or smoothie.

Fueling Strategies for Competition

- Feel comfortable.
- Start and stay hydrated.
- Top off with carbs for brain and muscle energy.

Days Leading up to Competition

- No need to carb load unless competition duration is > 2-3 hours.
- Make sure your carbohydrate intake is adequate at each meal and snack.
- Consider reducing fiber intake if using the restroom becomes an issue during competition.
- Maintain adequate hydration levels.
- You don't need to have a "special" meal, just stick to familiar foods and fluids.
- Be mindful of food safety and only eat foods from trusted sources and restaurants.

Day of Competition

- Choose familiar foods that made you feel good during training.
- Eat a balanced meal 3-4 hours before or a smaller meal/larger snack 2 hours before.
- Add protein to your meal to help delay the onset of hunger during competition.
- If you ate a meal 3–4 hours before competition, then also top off energy stores with familiar and easily digestible carbohydrates within 15–60 minutes of competing. Top up with a sports drink, carbohydrate chews/gel, fruit or a granola bar.
- Foods higher in fat and fiber slow digestion and may cause stomach distress if consumed too close to competition.
- Spicy or acidic foods eaten close to competition may also lead to indigestion and heartburn.
- Make sure your fueling plan is adaptable to different competition times and food availability/travel.
- If you are particularly nervous before competition, you may prefer to consume a meal or snack in liquid form for easier digestion.
- Maintain adequate hydration in the 24 hours prior to competition and sip on fluids leading up to competition.

FUELING TIMELINE

Caffeine

If using any performance-enhancing aids (e.g., caffeine), make sure you are aware of the effects and potential side effects.

Every athlete responds differently to varying amounts of caffeine, so choosing the right amount for performance should be done gradually and tested in training before being used in competitions.

SPECIAL CONSIDERATIONS BY SPORT

Endurance Sport

Cycling triathlon, distance running, distance swimming, cross-country skiing and biathlon

If eating **breakfast 3-4 hours** before your morning competition is not possible, eat a carbohydrate-rich dinner the night before along with a light breakfast.

The aggressiveness of **fueling before competition** depends on your ability to ingest additional carbohydrates during the event.

Fueling during the event should **be prioritized.**

SPECIAL CONSIDERATIONS BY SPORT

Intermittent High-Intensity, Team Sports

Volleyball, basketball, hockey, water polo and soccer

- If your competition is in the afternoon or evening, eat balanced meals leading up to competition. Top off hydration and energy stores with water and a carbohydrate-rich snack before the game.

Multiple Short Duration, High-Intensity Events

Track and field, swimming and diving, alpine skiing, snowboarding and rugby 7s

- Refueling between events is the key to performing repeatedly throughout the same day.

Long Duration, Low-Intensity Technical Sports

Archery, shooting and curling

- Eat a balanced meal 3-4 hours before competition.
- Choose small carbohydrate-based snacks and water during competition.

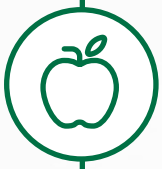
Combat Sports

Boxing, judo, taekwondo and wrestling

- After weigh-ins, replenish hydration and energy stores before competing.
- Consume sports drinks and small, high-carb meals between events.
- Add salt to foods in the evening to ensure adequate replenishment of fluids and electrolytes.

Fueling Between Events

If < 1 hour
stick to fluids
(water and sports drinks)



If 1–2 hours
Eat a small snack
(1/2–1 bar or banana + fluids)

If > 2 hours
Grab a more substantial snack with protein (sandwich, chocolate milk, fruit or yogurt)

If 24 hours or more
Have a good recovery snack, then eat normally throughout the day

Pro Tip

Read more about fueling during training in Volume 1 of the Youth Sports Nutrition Guide!

Fueling for Kickoff

Carbohydrates are the main source of energy for your body and brain. They help maintain intensity, prevent muscle breakdown and assist in maintaining hydration.

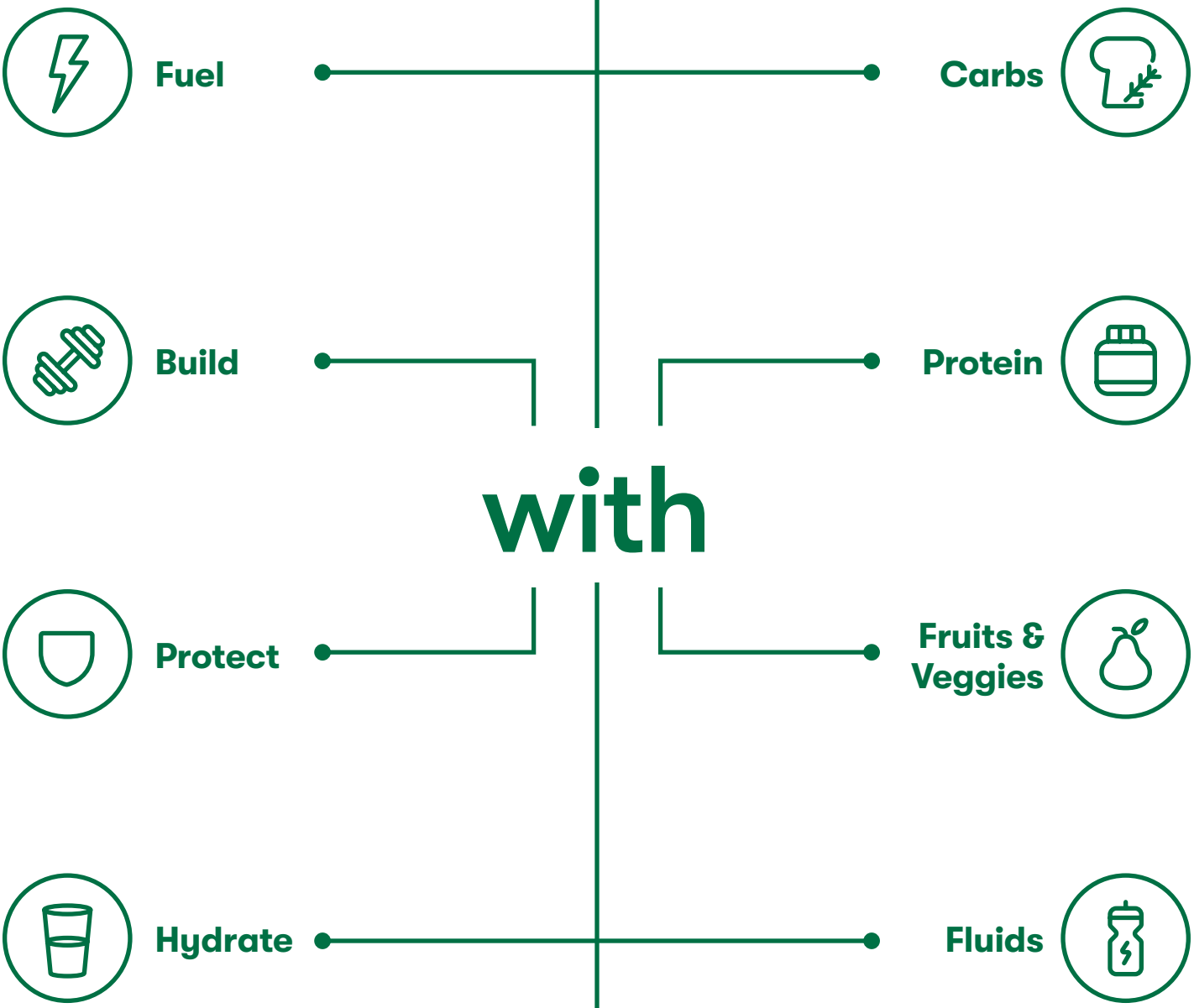
Some carbs fill your fuel stores for later use (fiber-rich carbs like oats and whole-grain bread/pasta/rice), while others provide a quick source of fuel (white bread/rice/pasta, pretzels, sports drinks, applesauce and fruit). Avoid high-fiber foods like veggies (broccoli and Brussels sprouts), beans, whole grains, high-fat food (junk food and nuts) and anything spicy.

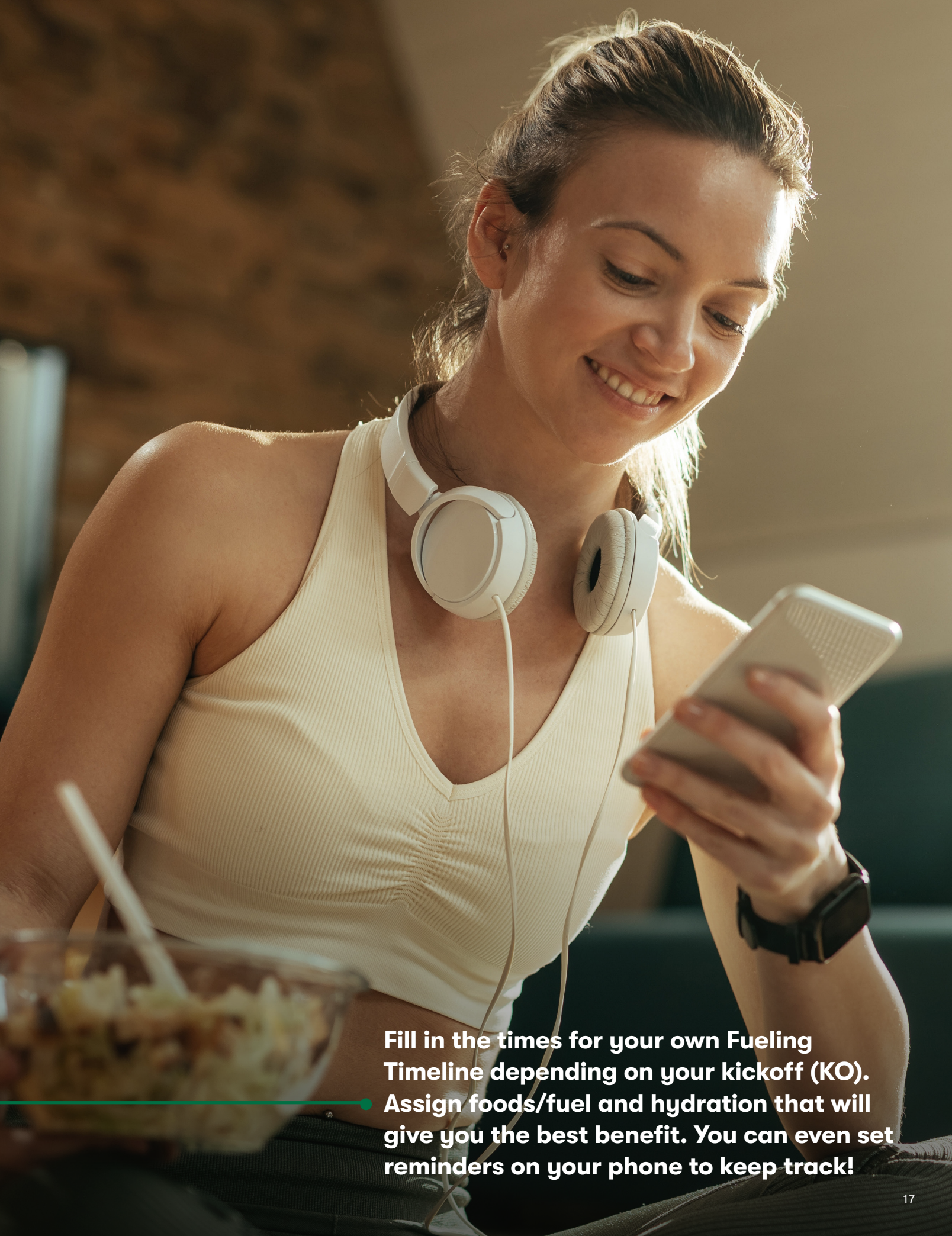
TRY: matching meals to training to optimize your performance!

Pro Tip

Read more about fueling during training on pages 12–21 of Volume 1 of the Youth Sports Nutrition Guide!

SPECIAL CONSIDERATIONS BY SPORT





Fill in the times for your own Fueling Timeline depending on your kickoff (KO). Assign foods/fuel and hydration that will give you the best benefit. You can even set reminders on your phone to keep track!

Countdown to KO Fuel

- 3.5 hours

- Hard Performance Plate
- Carbs (1/2 of your plate) +
- Fruits and veggies (1/4 of your plate) +
- Protein (1/4 of your plate) +
- 16–32 fl oz (473–946 ml) fluids

- 1 hour

- 30–60 g simple carbs (easy to digest) +
- Electrolytes +
- 8–12 fl oz (237–354 ml) fluids

Half-Time

- Fuel + Hydrate
- 30–60 g carbs +
- Electrolytes +
- 12–24 fl oz (354–710 ml) fluids

- Recover with a ratio of 3 carbs:1 protein* (e.g., 60–120 g carbs and 20–40 g protein) +
- 8 fl oz tart cherry juice*

ASAP After the Match

+ 1 hour

+ 3 hours

- Regen Performance Plate
- Fruits and veggies (1/2 of your plate) +
- Carbs (1/4 of your plate) +
- Omega-3/fish (1/4 of your plate) +
- 16–24 fl oz (473–710 ml) fluids

Kickoff + 3.5 hours

- Regen Performance Plate
- Fruits and veggies (1/2 of your plate) +
- Carbs (1/4 of your plate) +
- Omega-3s/fish (1/4 of your plate) +
- 16–24 fl oz (454–680 g or 473–710 ml) fluids

SPECIAL CONSIDERATIONS BY SPORT

Remember

Carbs at half-time help refuel your muscles, brain and nervous system to maintain high performance levels, skills and improve your mood. Aim for 30-60 grams per hour (120-240 calories).

Drink 12–24 fl oz (354–710 ml) or 4–8 fl oz per 15 min (118–237 ml per 15 min) of fluids with electrolytes (especially sodium, aka salt), to minimize body weight changes during exercise and cool your body temperature.

Dehydration can increase perceived exertion and impair sprinting and dribbling skills.

Don't forget about the importance of protein!

Protein makes up:

- **Tissues** (including muscle)
- **Enzymes** (which help facilitate reactions in the body like metabolizing food into energy) and hormones (your body's messengers)
- **Antibodies** (for proper immune function)

Protein is critical in athletic recovery and muscle building. It's most effective when spread throughout the day.

Try consuming 20–40 grams every 3–4 hours with each meal or snack.

RECOVERY NUTRITION

It's important to consume protein within 1 hour after training or competing. Also make sure to eat enough in the 24–48 hours after. Protein takes longer than carbs to digest and can help you feel fuller for longer.

Rebuild with Protein:
Protein powder/shake, yogurt, cottage cheese, milk, eggs, lean meats, seafood and tofu

Refuel with Carbs:
Fresh or frozen fruit, chocolate milk, 100% fruit juice, whole grains, potatoes and rice

Restore and Repair with Color and Omega-3:
Colorful fruit and veggies (tart cherries), fish, herbs and spices, nuts and seeds

Rehydrate with Fluids and Electrolytes:
Water, milk, 100% fruit juice (tart cherry juice), protein shake and sports drinks

Try this ratio for recovery:
3:1 carb to protein (60–120 g carbs, 20–40 g protein) +
Hydration (16–24 fl oz or 473–710 ml) +
Tart cherry juice (8 fl oz or 237 ml)

Pro Tip

Tart cherries, the most antioxidant-rich superfruit, and curcumin (turmeric), a super spice, help speed up strength recovery, reduce muscle soreness, rebuild muscle faster and promote deeper sleep.

TRAINING IN EXTREME ENVIRONMENT

While everything we just learned applies regardless of the training environment, it is important to be aware that certain climates may require additional considerations.

Altitude, Cold Climates and Heat

ALTITUDE

What Happens to Your Body at Altitude?

At higher elevations, oxygen molecules are more spread out than they are at sea level. As a result, each breath of air delivers less oxygen to working tissues.

Fluid losses: the lower air humidity associated with most elevated altitude environments can also increase fluid losses at rest and during training. Therefore, fluid needs at altitude are increased to prevent dehydration.

Body mass losses: at low to moderate altitudes (~1,600–2,400 meters), athletes are also at risk for body mass losses. At high altitudes (> 3,000 meters) there are often losses in body mass due to appetite suppression, lower endocrine system functions and increased resting metabolic rate compared to sea level.

Delayed recovery: exercise at both low to moderate and high altitudes is associated with increased production of reactive oxygen species with reduced antioxidant capacity, leading to oxidative stress, which may impair cell and immune function and potentially delay post-exercise recovery. This increased oxidative stress may persist for up to 2 weeks post-altitude training.

Decreased energy availability and increased iron requirements at training altitudes (~1600–2400 meters) can also interfere with optimal adaptations.

Initial Effects of Altitude Exposure

(within the First 72 Hours)

- Decreased restful sleep (due to breathing pattern changes)
- Increased risk of dehydration (frequent urination)
- Increased headaches
- Increased resting metabolism and decreased appetite (weight loss)
- Adaptive pro- and anti-inflammatory responses
- Increased reliance on stored carbohydrates (glycogen)
- Increased iron needs

How Does Altitude Impact Performance?

Athletes native to sea level may suffer a performance decrement even at altitudes as low as 1,200–1,750 meters and can experience extreme reductions at altitudes over 3,000 meters.

- Can influence the completion of sport specific activities.
- Increases recovery time from high-intensity efforts.
- May impair execution of skills.
- Reduces maximum oxygen delivery to the skeletal muscle compromising aerobic capacity.
- Hinders the ability to perform consecutive accelerations (i.e., sprinting), especially towards the end of matches.
- Reduces total distance covered per minute and high-velocity running per minute.

Altitude Training

This generally takes place at moderate altitudes that range anywhere from 1,500–3,000 meters (4,920–9,840 feet) above sea level.

Although performance may be significantly decreased at first, the body adapts to lower levels of oxygen by using less oxygen to do the same amount of work. This is especially beneficial for endurance sports, high-intensity team sports, and anaerobic sports like track sprinting or mogul skiing. Athletes may use altitude training to improve performance at both sea level and altitude.

Every person is different, so when preparing for altitude training, it is important to determine an individualized dose, time and type of training per player rather than prescribe the same approach to all members of a team.

How Long Should It Take to Adapt?

A minimum of 3 weeks of altitude exposure is recommended for athletes if they are healthy, well-rested and have sufficient iron stores before arriving. There may be additional benefits after 4 weeks of altitude exposure due to increases in red blood cells.

Altitude	Classification	Implication
0–500 m	Near sea level	-
>500–2,000 m	Low altitude	Minor impairment in aerobic performance. 3–5 days acclimation.
>2,000–3,000 m	Moderate altitude	Risk of mountain sickness begins; acclimation gets increasingly important. 1–2 weeks acclimation.
>3,000–5,500 m	High altitude	Performance is considerably impaired, acclimation becomes clinically relevant. >2 weeks acclimation.
>5,500 m	Extreme altitude	Prolonged exposure results in progressive deterioration.

Effects of Acclimatization (2–3 Weeks Training at Altitude)

- Increased oxygen-carrying capacity of blood
- Increased efficiency of oxygen utilization in muscles
- Increased formation of new blood vessels
- Increased pH regulation = increased exercise tolerance
- Decreased heart rate
- Increased red blood cell volume for 10–14 days after leaving altitude
- No or minor changes in body mass at moderate altitudes
- 5%–15% reductions in body mass, with 60%–70% of the weight loss coming via muscle atrophy (the loss of muscle mass and strength) at altitudes of 4,300 m

Pro Tips for Altitude

Hydrate

Drink regularly throughout the day, at meals, during training and in competition. Don't wait until you're thirsty! Continual hydration monitoring can help athletes recalibrate their hydration requirements at the new altitude. Check morning urine color and body weight as well as bathroom frequency to monitor status.

Check Iron Status

Iron (and overall blood work) should be monitored annually to ensure optimal iron stores and blood health. Aim for additional pre-altitude blood work 4–6 weeks prior to departure to allow for more precise pre-altitude ferritin (the protein that stores/releases iron) assessment, to give time to supplement and correct prior to altitude, if required. Increase the intake of lean beef, eggs, oysters, lean pork, tuna, lentils, beans, tofu and fortified cereal.

- This is particularly important for vegetarians and those with a history of iron deficiency.
- Consult with a sports dietitian or medical provider to determine if an iron supplement should be used prior to or during altitude training.

Maintaining Health

Eat the rainbow of colorful fruits and vegetables to combat the increased oxidative stress associated with moderate to high altitude exposure. Prioritize adequate rest and recovery to reduce the impact of sleep disturbances in the first few nights at altitude.

Focus on Performance Plates and Your Nutrition Goals

Eat 3 balanced meals and 2–3 protein-containing snacks per day. Consider adding a few extra servings of carbohydrates to your usual dietary intake to support the additional stress of altitude. Attempt to maintain your body weight during intense altitude training.

Sleep

Have a plan in place to prevent sleepless nights. Read more in the Sleep chapter of Volume 1 of the Youth Sports Nutrition Guide!

- Foods that may enhance sleep: tart cherry juice, dairy, herbal teas, lean meats, whole grains and nuts
- Foods that negatively affect sleep: caffeine, alcohol, fried food and high-calorie meals close to bedtime

Manage Training Load

Minimize high-intensity training for the first few days at altitude, if possible.

Optimize Dietary Nitrates

Consume 300–600 mg of nitrates from beetroot juice 75–150 min before exercise for at least several days to improve oxygen flow and reduce muscle breakdown and metabolism, especially during high-intensity exercise.

Use Caffeine

Upon arrival, ease into training and, if jet-lagged, use meal timing and sources of caffeine (i.e., coffee) to help re-establish yourself.

Get Familiar with the New Training Location

Shared accommodations can result in altered nutrition and hydration practices compared to home. Use your nutrition knowledge and cooking skills to prepare adequate food while away from home.

TRAINING IN EXTREME ENVIRONMENT

Cold Climates

What Happens to Your Body in the Cold?

When your body is exposed to a cold environment, exercise-induced thermogenesis (the energy your body burns during exercise which creates heat) helps prevent excessive body cooling. That's why hypothermia (reduced core body temperature of 35°C/95°F or less) is more likely to occur during rest than during exercise. In fact, during moderate and intense physical activities performed in the cold, the rate of metabolic heat production often exceeds the rate of heat loss to the environment. So even with exposure to very cold environments, core temperature often rises during exercise.

Since fat is a good thermal insulator (helps prevent heat from leaving the body), the thicker the fat layer, the slower heat is lost from the body.

The rate of heat loss also depends on skin surface area (total amount of skin covering your body).

The smaller a person, the faster the heat loss. Children may lose more heat in a cool environment than adults.
Men, who tend to be larger and have more body mass, can maintain their body core temperature for at least 1 hour longer when they combine rest with mild exercise.

Body heat loss may be 25–30 times faster during swimming than during cycling or running at equivalent air temperatures. When exercising in cool water (swimming, water polo, water aerobics, etc.), children have a harder time preventing hypothermia.

Considerations in the Cold

The main detrimental effects of exercising in a cold environment are:

Hypothermia (occurs when core body temperature drops below 95 degrees Fahrenheit/35 degrees Celsius)

People prone to hypothermia are those with malnutrition, low body fat, or those who have thin layers of fat. Children with a small body size are also at risk.

Frostbite (injury to body tissues caused by exposure to extreme cold)

Anyone can get frostbite if their skin is exposed to the cold (cheeks, chin, nose and ears). Some even get it when they are covered (fingertips and toes), and people with smaller bodies are more prone to frostbite.

Bronchoconstriction

When you're in the cold, muscles tighten around the main airways in your lungs. That can cause wheezing and shortness of breath. This mostly affects people with asthma because inhaling cold air increases respiratory heat loss. That's a trigger for bronchoconstriction, especially during exercise.

Pro Tips for the Cold

Water Temperature

Water temperature for child swimmers should be warmer (by 1–2°C or 2°F) than for adults.

Rest Time

During practice, allow children to warm up every 15–20 min to avoid hypothermia.

Supervise

Small and lean children should be especially well-supervised. Children who feel too cold will often want to come out, however, it is possible that a highly ambitious young athlete may ignore cold discomfort and will not leave the cold water or training unless told to do so.

Cover up

In long-distance swimming in cool water, a 1–2 mm layer of lanolin or petroleum jelly can be applied over the skin to help keep warm. Use several layers of dry clothing for activities performed in near-freezing or below-freezing conditions. Particular protection must be given to fingers and toes. Whenever the windchill factor is minus 15–20°C or 59–69°F or lower, the child's face should be covered.

Asthma

The mouths and noses of children with asthma should be covered with a surgical mask or a scarf when exercising in cool air (at or below 10°C or 50°F). The additional pocket of air thus created will help to humidify and warm the air breathed in. It is also important to reduce training intensity when outdoors on cold days.

Hot Climates

What Happens to Your Body in the Heat?

Heat in the human body results from the interaction of environmental conditions (temperature, humidity and solar radiation), physical work rate, intensity (body heat production) and wearing heavy clothes or equipment that impedes heat loss. The greatest source of heat in most sports-related settings is solar radiation, the electromagnetic energy emitted by the sun, which is dependent on the time of day, season, cloud cover and latitude of the location.

The amount of heat energy stored inside the body during exercise and/or heat exposure is determined by the human heat balance:

Heat stored = heat energy produced - heat energy lost from skin surface

While a small amount of heat loss occurs through breathing, heat energy lost from your body takes place on the skin's surface through evaporation (sweating).

Evaporation of sweat is the most important way to lose heat. As your skin becomes wetter, sweating efficiency (evaporation) declines drastically. In other words, less sweating will have a smaller impact on heat evaporating.

Body composition plays a role in acclimatization in hot climates. Fat has a low specific heat, which means a relatively small amount of heat is needed to increase the temperature of fat. Fat also has a lower water content than most other muscle tissues.

Athletes with more body fat may be at a higher risk of water loss and dehydration. There is a large individual variation in response to dehydration and its influence on exercise performance. Hydration recommendations must be individualized to each player.

Exercising in warm-hot conditions increases body temperature, elevates cardiovascular strain, and alters metabolism. Aerobic performance becomes impaired and the risk of serious heat illness (such as heat stroke) increases. Core body temperature rises by ~0.4°C (1°F).

Well-trained individuals can often tolerate higher core temperatures (>40°C/104°F) without experiencing symptoms of heat stroke. Athletes with more body fat have higher core temperatures.

Impact of Heat on Children

Smaller bodies heat up faster and produce more heat. Children also have a lower sweating capacity and different compositions of sweat (i.e., higher electrolyte concentrations). This may lead to excessive fluid losses or insufficient drinking, increasing the risk for heat-related illness during exercise in the heat.

How Does the Heat Impact Performance?

Training in hot (~30°C/86°F to 41°C/106°F) to very hot (~43°C /109°F or higher) environments reduces performance:

- Reduced exercise capacity
- Impaired aerobic performance
- Decreased total distance, sprint distance and high-intensity activity
- Improved technical skills (passing, crossing, etc.)
- Decrease in player duels and turnovers of possession
- Earlier onset of exhaustion especially due to prolonged, intermittent, high-intensity shuttle running
- Elevated muscle glycogen utilization

Pro Tip | The cooler athletes stay, the better they play.

Heat Stroke

Heat stroke is always a risk in summer sports, not just because of the temperature, but because of the combination of heat and humidity. Heat stroke is typically caused by a combination of a hot environment, strenuous exercise, clothing that limits the evaporation of sweat, inadequate adaptation to the heat, too much body fat and/or lack of fitness. Preventing heat stroke hinges on acclimation, cooling, hydration, body composition, fitness and awareness.

Acclimation and Cooling

After 1–2 weeks, drinking/hydration practices typically improve and the body holds onto water and salt better, increasing blood volume so the heart pumps more blood at a lower heart rate. Heat-fit athletes also sweat sooner, more, and over a wider body area, so they stay cooler.

Hydration

When athletes drink less than they sweat, the result is dehydration. Dehydration (losing 2% or more of pre-training body weight) can impair physical performance. Dehydration increases heart rate and decreases cardiac output. Dehydrated players also heat up faster, increasing skin, core and muscle temperatures. The misconception is that hydration prevents heat stroke. The truth is that hydrating is critical, but not sufficient to prevent heat stroke.

Body Composition

Athletes with more body fat are more prone to heat stroke. Extra fat is an extra load, increasing heat production with exertion.

Physical Fitness

Being aerobically fit results in some of the same benefits as heat acclimation. Fitness also makes workouts less taxing.

Awareness

Early warning signs of heat stroke may include irritability, confusion, apathy, aggressiveness, emotional instability, irrational behavior, giddiness, fatigue and vomiting.

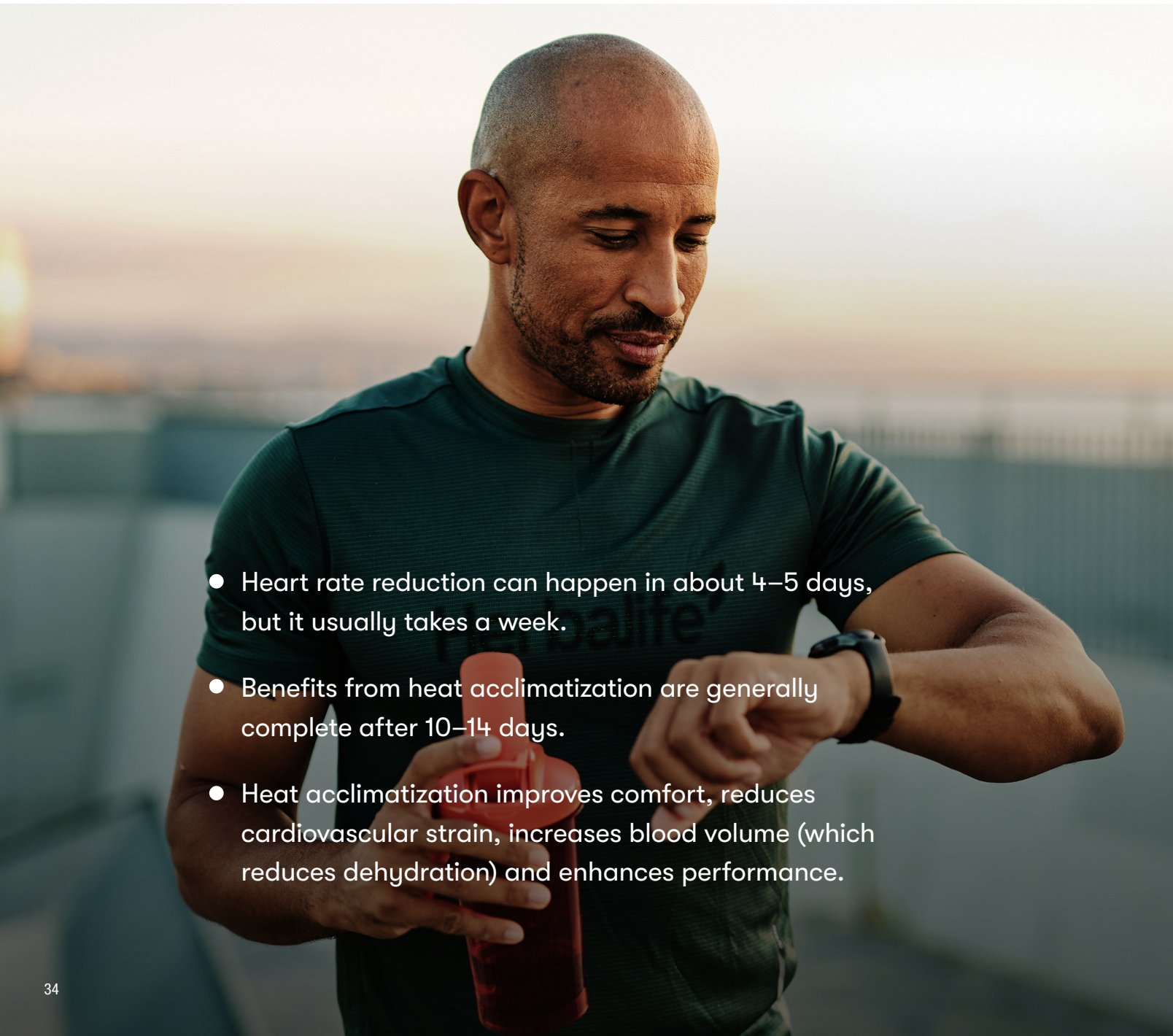
Dizziness and a drop in blood pressure signal fluid and electrolyte (sodium) depletion and dehydration. Chills and goosebumps signal the shutdown of skin circulation or a faster rise in temperature. Athletes may hyperventilate (breathing at a rapid rate) to shed heat. Poor coordination and staggering are late signs, followed by collapse with seizure and/or coma.

How Long Does It Take to Acclimate to Heat?

Heat acclimatization protocols traditionally take between 4 to 14 days. 6 days is the most common.

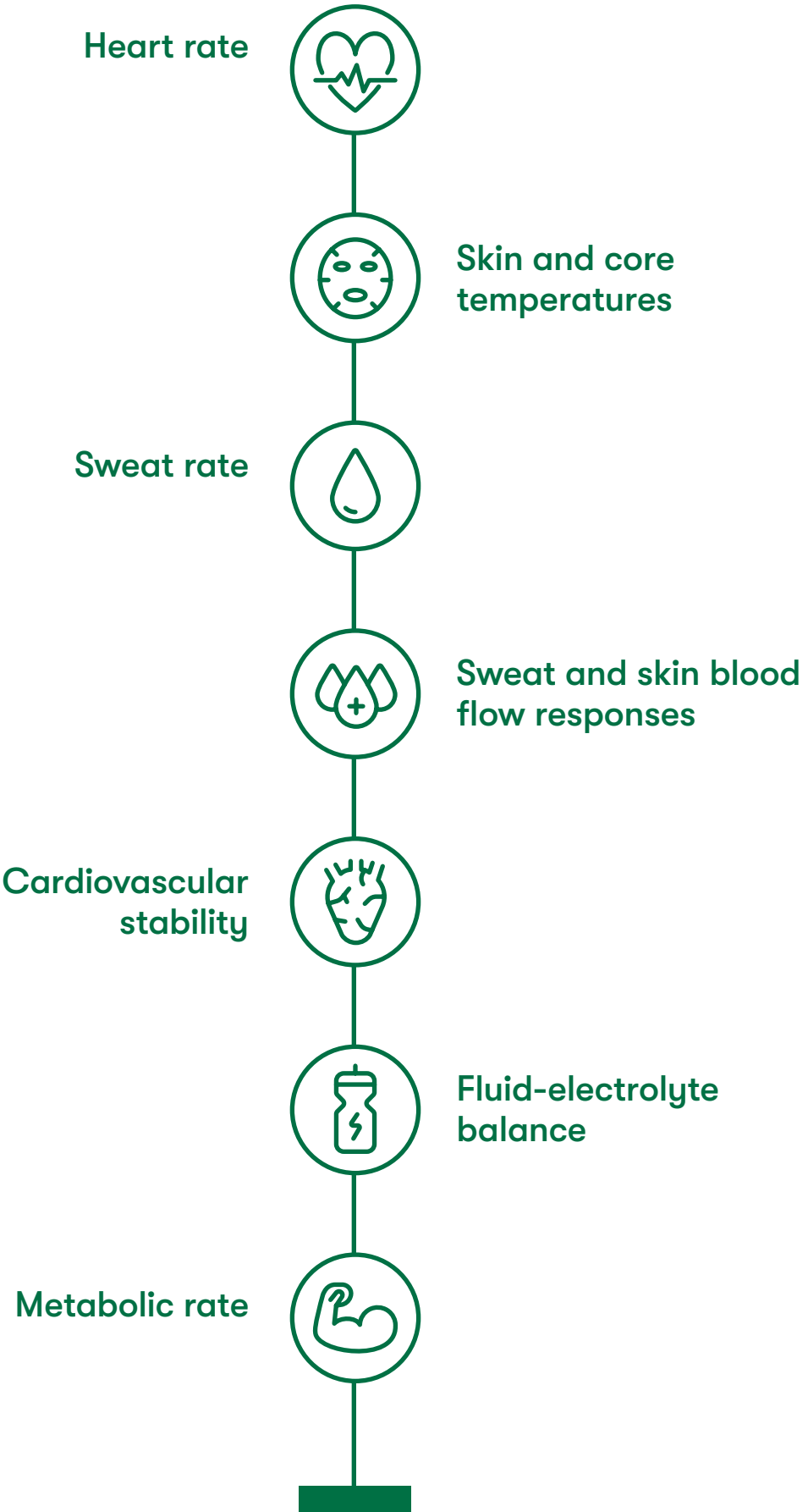
Optimal heat acclimatization requires a minimum daily heat exposure of about 90 minutes (up to 2 hours total, broken into 1-hour sessions). Combine this with aerobic exercise instead of resistance training.

TRY: to gradually increase your exercise intensity and duration, or duration of heat exposure, each day of heat acclimatization.



- Heart rate reduction can happen in about 4–5 days, but it usually takes a week.
- Benefits from heat acclimatization are generally complete after 10–14 days.
- Heat acclimatization improves comfort, reduces cardiovascular strain, increases blood volume (which reduces dehydration) and enhances performance.

Daily exercise in a hot climate for one week will improve:



The three classic signs of heat acclimatization are:

- Lower heart rate
- Lower core temperature
- Higher sweat rate during exercise-heat stress

The benefits of heat acclimatization are retained for about a week after exposure ends.

In the heat, you sweat earlier and your sweat glands conserve sodium, increasing total body water, lowering the risk of dehydration and better matching thirst to body water needs. While exercising in the heat is the most effective method to develop heat acclimatization, resting in the heat may also be beneficial.

Aerobic athletes adjust faster and retain benefits longer.

Not all athletes can train in hot environments for several days before a competition.
Sometimes those training days are lower in intensity, which negatively impacts performance.

There are other methods to acclimate!

Step in the sauna

Make sure it's (90°C–108°C or 104°F–226°F) for 30 minutes 3 times a week after training for three weeks.

Saunas have recovery benefits:

- Increase blood flow to muscles (increased body temperature dilates blood vessels and increases blood flow, delivering oxygen and nutrients to muscles to improve recovery and growth).
- Trigger the release of growth hormone, which promotes muscle growth and repair.
- Improve muscle strength and power.
- Reduce inflammation and muscle soreness.
- Improve circulation.
- Increase flexibility, strength and range of motion by improving joint mobility, decreasing stiffness and relaxing joints.

Hot bath

Submerge up to the neck in 40°C (104°F) water for 40 minutes after the typical training at "regular" temperatures.

Do this for six days to induce heat acclimation. Hot water baths reduce core body temperature, sweat threshold, perceived exertion, and heat, while improving performance.

Cooling Methods

Ice Slushies and Cold-Water Immersion

Body cooling methods in the heat can reduce core, skin, and muscle temperatures and increase heat storage capacity, work rates and time to exhaustion.

Common cooling methods:

- Cold water immersion (2–20°C or 36–68°F)
- Ice vests and/or neck cooling collars
- Ingestion of a cold fluid/ice slurry
- Application of ice packs onto the skin
- Wearing ice-cooling garments
- Whole-body cryotherapy: a chamber that blasts you with freezing air (no water required)

Drinking cold fluids can help you feel cooler within minutes, even though you might not actually be cooler.

Icy drinks can lower core temperature in athletes wearing protective equipment that blocks sweat evaporation (think: American football, ice hockey, motor sports and fencing).

Cold water and crushed ice lower body temperature directly before, during and/or after exercise.

Half an hour in a cold bath reduces core temperature and increases the buffer against heat illness.

Cooling Before Exercise

The cooling effect of cold drinks is optimal before you sweat. Ingestion of cold drinks before exercise may also extend exercise duration.

During Exercise

Cool drinks may lower your core body temperature and reduce skin surface sweating.

After Exercise

You usually stop sweating by 50% within 5 minutes of finishing the exercise. Cold drinks will help reduce your core temperature during recovery and are most effective during sports with regular breaks (like tennis or tournament-style events).

Cold water immersion (ice baths) in water 2–20°C (36–68°F) works by cooling the skin, muscle and core temperature. This constricts blood vessels slowly and may decrease muscle damage.

Ice baths:

- Reduce body temperature.
- Reduce swelling and inflammation.
- Decrease muscle soreness.
- Decrease creatine kinase levels (a stress marker that indicates muscle damage).
- Improve neuromuscular performance (jumps and sprints).
- Enhance perceived recovery.
- Decrease cortisol (the stress hormone).
- Decrease fatigue.

Keep it personal. Your ice bath's effectiveness depends on the size of your body and the surface area. Core temperatures decrease faster for people with less body mass and lower body fat percentages.

Ice Bath Formula

Low body mass and body fat athletes:
8–10 minutes at 15°C (or 59°F)

High body mass and higher body fat athletes:
8–10 minutes at 10°C (or 50°F)

Higher body mass/fat athletes could benefit from two sets instead of one. 2 x 10 minutes at 10°C/50°F with up to 10 minutes in between.

Consider your training goals when planning an ice bath:

If you're trying to add muscle mass, ice baths should be avoided because they decrease the muscle-building response, especially after weight training.

If your goal is to increase training volume, using ice baths may maintain high outputs of strength, speed and power.

PRO TIPS FOR THE HEAT

Acclimate

Train, don't strain. The pace and duration should start low and build slowly. Optimize physical conditioning prior to initiating heat acclimatization. Start at least 3 weeks prior to competition. Be flexible and patient. Give yourself time to experiment with heat exposure to build confidence.

Mimic the Climate and Exercises

In warm climates, acclimatize during the heat of the day, and conduct physical training in cooler parts of the day (morning or evening). In temperate climates, work out in a warm room wearing cotton sweats. Exercise induces greater adaptations than resting in the heat.

Optimize Acclimatization with Alternatives

Use hot baths and saunas post-training for added heat exposure sessions.

Hydrate

Every person's body is different. The amount of fluid your body needs is individualized. Weigh in before and after a workout and learn to adjust fluid intake to minimize weight loss during training. If weight loss occurs, rehydration after activity is critical.

Try: drinking 20–24 ounces of fluid for every pound of weight lost.

Also, eat foods with a high water content (fruits and vegetables). A sports drink beats plain water because it includes sugars to fuel your muscles and brain, has flavoring to encourage drinking, and contains sodium to hold fluid in the body and help replace sweat electrolyte losses. Pay attention to fluids/foods containing electrolytes during the first week of heat acclimatization. Do not skip meals, as this is when your body replaces most of its water and salt losses.

Pro Tips

Drink above and beyond thirst at frequent intervals (about every 20 minutes). An athlete, 10 years old or younger, should drink until they do not feel thirsty and should then drink an additional half a glass (100–125 ml or 3–5 fl oz).

Monitor urine color and status. Urine should resemble lemonade (pale yellow), not apple juice.

Read more about hydration in Volume 1 of the Youth Sports Nutrition Guide!

Cool off

Make sure you have shade, ice water, and misting fans for rest breaks. Use cold towels or splash cold water on the face, head and neck. As the temperature rises, reduce practice pace and duration, and increase rest breaks. Sit in cold tubs/ice baths after training sessions.

Beat the Heat

Train Early

Hold practices in cooler parts of the day (morning or evening).

Monitor Signs of Heat Stroke

Incoherence, irrational or bizarre behavior, or poor competitive posture.

Ensure Adequate Heat Stress Resistance

Induce profuse sweating. Use exercise rest cycles to progressively increase your physical work capacity. Work up to 100 min of continuous physical exercise in the heat for at least 7-14 days with added exercise intensity.

Ensure Adequate Recovery

Sleep in air-conditioned rooms to aid in recovery from heat stress. Allow more time for rest, recovery, and cooling in between training sets, intervals, sessions, etc.

THE SCIENCE OF SWEAT

Why We Sweat
One of the things to consider is that in the heat you will be sweating a lot, but what exactly is sweat? Sweating helps us control our body temperature (aka, thermoregulation).

- We sweat when our bodies get heated.
- The water in sweat evaporates off the skin to help cool the surface.

Composition of Sweat
Sweat is made up of water and electrolytes, along with a very small amount of vitamins, trace minerals, and other compounds.

- The major electrolytes in sweat include sodium and chloride (together, sodium and chloride make SALT!).
- Other electrolytes in sweat are potassium, magnesium and calcium.

Roles of Electrolytes
Sodium, chloride, potassium, magnesium and calcium are all electrolytes that help regulate fluid balance, and aid in muscle function, energy metabolism and bone/teeth health.

Sodium
- Balances body fluid levels
- Blood pressure regulation
- Nerve signaling
- Muscle contraction

Chloride
- Balances body fluid levels
- Blood pressure regulation

Potassium
- Nutrient delivery to the body's cells
- Muscle and nerve function
- Heart function

Magnesium
- Muscle and nerve function
- Bones and teeth

Calcium
- Muscle contraction
- Nerve signaling
- Helps stabilize blood pressure
- Bones and teeth

Athletes can lose anywhere between 1–3 liters (34–101 fl oz) of sweat per hour of training.

The exact amount lost really depends on who you are and what you're doing!

What Impacts Your Sweat Rate?

- Heat
- Humidity
- Training intensity
- Training duration
- Fitness level
- Genetics
- Body composition
- Body size
- Equipment/Clothing
- Gender
- Diet and hydration status

All these things play a role in how much sweat your body produces and how many electrolytes you lose.

Ever feel that stinging sensation when sweat gets in your eyes? How about seeing white marks on dried clothing, hats or skin? Or feeling gritty skin after a workout? These are all signs you're losing a lot of salt through sweat.

Pro Tip | Weigh yourself before training and again after training to get a sense of how much fluid you lost through your sweat.

Did you drop weight?

- Just a 2% weight loss due to fluid losses can lead to performance detriments.
- A 4% weight loss can have more drastic consequences and likely requires medical attention.

Did you gain weight?

- This means your fluid intake exceeded your losses.
- This can lead to fluid overload and sodium imbalances.
- Next training session, pay closer attention to your fluid intake.

Read more about sweat rate and rehydration in Volume 1 of the Youth Sports Nutrition Guide (page 28).

Signs of Dehydration

- Thirst
- Dry lips/tongue
- Cramping
- Muscle spasms, twitching
- Weakness
- Fatigue
- Headache
- Reduced reaction time
- Nausea
- Constipation
- Dizziness
- Dark urine
- Fast or irregular heartbeat

PRO TIP:

Stay hydrated.

- Start your day with a glass of water.
- Drink when you're thirsty.
- Consume both water and electrolytes (through food and/or a sports drink) consistently throughout the day to maintain hydration levels.

TRY carrying a reusable water bottle with you to refill on the go.

Plan Your Fluids Around Training

- **Before exercise:**
  1 bottle of water or sports drink about
  1 bottle = 16.9 fl oz or 500 ml
- **During exercise:**
  1 bottle of water or sports drink per hour
  For high intensity or 1+ hour sessions, very hot temperatures, or if you are a heavy or salty sweater choose a sports drink to replenish lost electrolytes
- **After exercise:**
  1 bottle of water or sports drink per 1 lb or 0.5 kg of weight lost

Read more about hydration on page 25 of Volume 1 of the Youth Sports Nutrition Guide!

Get Electrolytes from Food

Na

Sodium:
Table salt, pickles, pretzels, saltine crackers, salted nuts and seeds, trail mix, cheese and canned soups/ vegetables

K

Potassium:
Bananas, potatoes, leafy greens, citrus fruit, mushrooms, milk, salmon, avocados, dates, almonds, walnuts, pecans, brussels sprouts, pumpkin and tomatoes

Mg

Magnesium:
Peanut butter, cashews, almonds, pumpkin seeds, spinach, beans, tuna, brown rice, edamame and whole-wheat bread

Ca

Calcium:
Dairy products (milk, yogurt and cheese), tofu, soy milk, edamame, almonds, broccoli, fortified orange juice and nut milk, black-eyed peas, baked beans and peas

TRAVEL NUTRITION

Just like a change in climate can impact performance, so can travel!

You spend hours training to prepare for competition. Don't forget that traveling prep also plays a critical role in your performance and recovery!

Step 1: Planning

Take time before traveling to consider how flights, travel environments and food safety may affect your normal nutrition habits. To arrive at your destination feeling well-fueled, hydrated, and organized, develop a travel nutrition plan before you leave.

Temperature /Humidity	↑Temperature/Humidity =↑ Fluids + electrolytes ↓Temperature/Humidity = maintain fluids
Altitude /Elevation	↑Altitude/Elevation = ↑ Fluids + energy (add ~100–500 kcal/day) ↓Altitude/Elevation = maintain fluids and energy
Travel East → (e.g., US → Europe)	Consider traveling in advance 1 day per time zone change. For 3 nights before your flight, go to bed 1 hour earlier than normal. Try to eat in-flight meals and sleep in line with your destination time. At your destination, try to get early morning sunlight. Consider a sleep aid ~30 minutes before local bedtime until you have adjusted.
← Travel West (e.g., Asia ← US)	Consider traveling in advance 1 day per time zone change. For 3 nights before your flight, go to bed 1 hour later than normal. Try to eat in-flight meals and sleep in line with your destination time. At your destination, try to get late afternoon light. Consider a sleep aid ~30 minutes before local bedtime until you have adjusted.
Access to Safe Foods	When in doubt: drink bottled water, choose cooked fruit/vegetables or fresh fruits with peels, pack dehydrated meals or protein options if animal proteins are a concern (*China and Mexico) and consider using probiotics 1 week before travel, during travel and 1 week after travel. Stay consistent throughout the entire trip! Check out more tips for your specific travel destination: http://www.iamat.org/getting_ready_guide_to_healthy_travel.cfm
Length of Travel	Consider the total NUMBER and TYPE of snacks you need for each flight, training session, post-training/game, recovery and individual fueling plans/nutrition goals.

Be conservative on the first day of training! Within 24–36 hours of arriving, you will be almost fully adjusted to the new time zone. Do your normal training and tapering in preparation for competition.

At hotel dining, be considerate of food temperatures (are hot foods hot and are cold foods cold?) and use smart judgment on food safety. Refrigerate any perishable food within 2 hours.

Practice good personal hygiene (washing hands, using hand sanitizer and not sharing water bottles) to help keep yourself and your teammates healthy, especially before meals or gatherings.

If you are using daily supplements or medications (or if you use travel supplements), make sure to pack enough for the entire trip.

Pro Tip | Consider multivitamins, calcium, vitamin C, vitamin D, iron, electrolyte tabs/sticks, constipation solutions, sleep aids and tart cherry.

Step 2: Packing

Once you've considered your travel environment, start to make a list of things you'll need to bring, like equipment, food to carry on each flight, foods to pack for when you arrive (fueling, recovery and meal replacement). Keep in mind the purpose of travel nutrition is to aid in your performance during training and competition: eat to compete!

- Pack an empty, reusable water bottle in your carry-on (fill it up at the airport). Choose hydrating fluids while flying (water, juice, tea and low-fat milk). Drink 1 cup per hour in flight.
- Consider packing a cooler bag in your carry-on for in-flight snacks (travel fuel bags).
- Adjust sleep schedule to destination time zone. Pack a pillow, eye mask, ear plugs, compression socks, pistachios and tart cherries to help you sleep, relax and recover, or caffeine, coffee, tea and dark chocolate to help keep you awake.
- Follow a fueling timeline adjusted to your destination time zone. Plan your in-flight meal (request high-carb, vegetarian plates if training/game is close to arrival time). Avoid unnecessary snacking.
- Pack dried goods (cereal, oats and granola bars) and get milk/yogurt at the airport or on the flight.
- Optimize gut health by choosing adequate amounts of fluid, high-fiber and low-fat foods like fresh and dried fruits, veggies and legumes, whole grains, bars/snacks with >3 g fiber.
- Choose a combo of fruits/veggies, grains and proteins to eat on the plane.

Pro Tip | Consider nutrition for each flight and every day you're away during your travel.

Fruits and vegetables

- [ ] Single-serve fruit cups
- [ ] Applesauce cups or packs
- [ ] Dried fruits (look for no added sugar)
- [ ] Cut veggies (carrot, cucumber and peppers)
- [ ] Dried veggies (snap peas and wasabi peas)
- [ ] Pureed fruit and veggie packets
- [ ] Fruit and veggie bars
- [ ] Edamame pods

Whole grains and healthy fiber

- [ ] Whole grain bread/tortilla
- [ ] Graham crackers
- [ ] Whole grain or rye crackers
- [ ] Whole grain pita wedges
- [ ] Dry cereal
- [ ] Fig/Fruit bars
- [ ] Oatmeal packets
- [ ] Pretzels or chips
- [ ] Popcorn

Portable proteins

- [ ] Hummus packs
- [ ] Hard-boiled eggs
- [ ] Nuts, seeds and nut/seed butter
- [ ] Sliced deli meat/sandwich
- [ ] Single-serve cottage cheese
- [ ] Single-serve Greek yogurt
- [ ] String cheese
- [ ] Tuna/Salmon/Chicken packets
- [ ] Beef/Turkey/Chicken jerky

During Travel

You're eating to compete, so choose fueling/recovering foods!

- Pack 1 empty, reusable water bottle or shaker bottle in your checked luggage. Consider packing a small, portable blender for meal replacement or recovery smoothies.
- Bring plastic utensils, Tupperware, plastic heat-safe bowl, and Ziploc bags in your checked luggage to save snacks from meals or make/eat meals in your hotel room.
- Especially during longer trips, pack some "can't live without" foods that might be hard to find at your destination (e.g., certain coffee brands, BBQ/hot sauce, Nutella, nut butter and cinnamon).
- Consider packing back-up meals and game day foods in a checked bag for longer travel.

Meal replacements

- [ ] Oatmeal packets
- [ ] Protein cookies + nut butter packets
- [ ] Dehydrated camping meals
- [ ] Tuna/Salmon/Chicken packets
- [ ] Couscous

Gameday fueling/recovery

- [ ] Pureed fruit + veggie + protein pouches
- [ ] Beef/Turkey/Chicken jerky
- [ ] Protein powder
- [ ] Protein or granola bar
- [ ] Bread/Tortilla + nut butter + jelly or honey

In-Flight Nutrition Packing List

(Remember to prepare for each flight)

☐ Empty Water Bottle (Fill After Security)

☐ Fruit/Vegetable Option

- Apple, orange, banana, peach, grapes or berries
- Baby carrots, bell peppers or cucumbers
- Fruit cups, dried fruit/veg, fruit/veg bars or pouches

☐ Protein Source

- Deli meats / Fish or chicken packets / Beef jerky
- Hard-boiled eggs
- String cheese
- Hummus, bean dip, edamame or nut butter packet

☐ Extra “Backup” Snack

- Dry cereal or oatmeal packets
- Trail mix, mixed nuts or seeds
- Whole grain crackers/bread and peanut butter packet
- Sports bar or granola bar

Checked Luggage Nutrition Packing List

(Remember to consider each major meal's food quality)

☐ Empty Water Bottle or Shaker Bottle

☐ Protein Source

- Fish or chicken packets / Beef jerky
- Black bean, chickpea or lentil packets
- Nut butter / Peanut butter powder / Mixed nuts and seeds
- Protein powder or nonfat milk powder

☐ Meal Supplements

- Dehydrated meal pouches
- Oatmeal packs / Drinkable oat pouches
- Dry cereal or granola
- Instant mashed potatoes
- Dry soup mixes
- Quick cook rice, pasta or quinoa

☐ Extra "Backup" Snack

- Fruit snacks / Dried fruit or veggies
- Graham crackers, rice cakes or whole-grain pretzels
- Granola bars, fig bars or protein bars

Game Day Nutrition Packing List

(Remember to consider each game day)

☐ Pre-Game

- Water bottle to hydrate throughout the day
- Foods to supplement regular meals as needed

☐ Mid-Game

- Sports drink powder / Electrolyte mix or tablets
- Sport gummies, blocks, beans, fruit ropes or gels
- Energy balls/bites
- Energy and carbohydrate-rich bars

☐ Post-Game

- Shaker bottle and/or portable blender
- Protein powder / Recovery drink mix
- Protein bars (>15 g protein)
- Foods to supplement regular meals as needed

One of the challenges with traveling is that you may encounter environmental conditions that are much different than you experience at home.

FUELING AROUND THE WORLD

Athletics can take you around the world—whether through physical travel, learning cultures of diverse teammates or eating new foods with your team. The closer you get to playing at a professional level, the more important it is to be aware of cultural food differences and to be open to trying new dishes, so you can fuel like a pro in any situation.

Culture: ways of life of a group of people, often passed down through generations (language, food, art, traditions, beliefs, holidays, etc.).

Pro Tip

Never make assumptions about a person's culture. Each person is an individual, and people within each culture vary in their daily lives and preferences. People can also have multiple cultural influences and can choose to not partake in certain cultural practices.

NORTH AMERICA

Canada

Many local foods have a French influence like poutine (French fries topped with gravy and cheese curds) and maple syrup.

Loma Linda, CA, USA (Seventh Day Adventists)

Follow a lacto-ovo-vegetarian diet: eat a vegetarian diet, including dairy and eggs. Avoid caffeine, alcohol, and tobacco. Considered one of the Blue Zone regions, where there is a high concentration of centenarians (people who live to be over 100 years old).

Utah, USA (Mormons)

Practice fasting to show self-control and humility. Avoid alcohol, caffeine and sometimes soda. Focus on whole, in-season foods and reducing food waste.

The South, USA

Food influenced by the melting pot of various cultures who settled in this region: Spanish, French, Mexican and African. Common foods: BBQ, pulled pork, shrimp and grits, cornbread, apple pie, tacos and enchiladas.

Northeast, USA

Food in this region reflects the cultures who settled here, including British, Italian, Irish and Jewish. Common foods: chowders, stews, succotash, lobster rolls, lobster bisque, turkey, apple pie, pasta, New York style pizza, Chicago deep dish pizza, bagels, pickles, buffalo wings, Reuben sandwich, Philly cheesesteak, crab cakes and New York Cheesecake.

MEXICO/CENTRAL AMERICA

Heavy influence from indigenous cultures and domesticated crops over the centuries. Corn, rice, beans, tomatoes, cheese, tortillas, chilies and spicy sauces are foundational to Central American cuisines.

Mexico

Tacos, tostadas, chilaquiles (fried tortilla strips with red or green salsa served with meat and cheese), chiles rellenos (poblano pepper stuffed with cheese/meat), cochinita pibil (marinated pork), enchiladas (corn tortillas rolled filled with meat, cheese, beans and topped with a sauce), gazpacho (cold soup), huevos rancheros (over-easy eggs with beans and rice) and mole (thick sauce, often brown due to inclusion of unsweet chocolate).

Costa Rica

Casado (black beans with rice, plantains and meat or poultry).

Honduras

Anafres (bean and cheese dip).

Nicaragua

Baho (beef brisket with plantains and yucca on a banana leaf).

Caribbean

Blend of indigenous, Spanish, French, English and Asian cultures.
Common foods: seafood (saltfish, shrimp and flying fish), conch fritters, jerk chicken, spices (nutmeg and cinnamon) and plantains.

SOUTH AMERICA

South American foods are influenced by indigenous cultures as well as African, Asian and European cultures. Similarly to Central America, common foods include rice, beans, plantains, yucca, corn, meats and spicy sauces. Yerba mate, a strong tea, is also popular—often shared with friends and family.

Brazil

Feijoada (smoky stew of beans, beef, pork).

Peru

Ceviche (fresh, raw fish marinated in lemon/lime juice and served with tomatoes, onions, cilantro and mango/pineapple), cuy (guinea pig) and alpaca.

Venezuela

Arepas (grilled corn flour bun sandwich).

EUROPE

Northern Europe

Foods in this region range from local fresh, foraged foods to hearty portions of meats and starches.

England, Scotland and Ireland

Bangers and mash (sausages with mashed potatoes and gravy), English breakfast (fried egg, bacon, sausage, black pudding, mushrooms, baked beans, potatoes and grilled tomatoes with toast), fish and chips (battered, fried white fish like cod with French fries and malt vinegar), haggis (Scotland's savory meat pudding encased in sheep's stomach lining), Irish stew, meat pies, soda bread and Sunday Roast (roasted meat with vegetables and potatoes).

Scandinavia

Farikal (lamb and cabbage stew), reindeer meat, schnitzel (thinly sliced, breaded, and fried meat), pickled herring and whale meat.

Iceland

Hakarl (fermented shark).

Mediterranean

Diets are rich in seafood, whole grains and olive oil.

France

Bouillabaisse (fish stew), cassoulet (slow-cooked meat with white beans), quiche (egg dish cooked into flaky pie crust), ratatouille (thinly sliced stewed vegetables) and Escargot (snails sauteed in butter and garlic).

Italy

Arancini (Sicilian fried rice balls), gelato (creamier than regular ice cream due to less air mixed in), pizza, pasta, ribollita (bread soup with beans and vegetables) and risotto (creamy rice dish).

Spain

Paella (rice dish with chicken or seafood, vegetables and saffron), tortilla Espanola (omelet made with potato).

Greece

Kabobs (roasted, marinated meat/chicken pieces on skewers), dolmades (grape leaves stuffed with herbed rice), gyros (shaved lamb on pita), Greek salad (feta, cucumber, onion and olives with olive oil) and spanakopita (flaky phyllo dough spinach pies).

Israel

Judaism: Many follow Jewish dietary laws that specify which foods are kosher (fit for consumption). Commonly avoid pork, shellfish, mixing meat and milk and foods not marked as kosher.

Shabbat: Weekly day of rest to connect with loved ones. Often involves group gatherings to share food with one another.

Eastern Europe

Colder climates of this region led to the preference of heartier, comfort foods like stews, grains, gravy, smoked meats and sausages, pies and potatoes.

Ukraine

Borscht (sweet and sour beet and vegetable soup, often served with boiled potato and sour cream).

Germany

Bratwurst (grilled pork sausage, served with onions).

Hungary

Goulash (a stew made with beef, potatoes, carrots and onions, in a herby tomato sauce).

Poland

Pierogi (dumplings made with various fillings like mashed potato, cheese, onion, meats and sauerkraut).

Middle East

Many follow Islamic dietary laws that specify which foods are halal (lawful, permitted) or haram (harmful). Commonly avoid pork and alcohol.

Ramadan: Holy month of fasting and prayer. Muslims will fast (not eat or drink) from dawn until sunset, then break their fasts by sharing a meal with family and friends. Athletes observing Ramadan can work with a registered dietitian to ensure their fueling needs are met while honoring the commitment to fast. Common food: Baba ganoush (creamy eggplant dip), hummus (creamy chickpea dip), pita bread, falafel (fried chickpea patties), haloumi (goat's or sheep's-milk cheese), shawarma (lamb, chicken or goat cooked then shaved off of a rotating spit), tabbouleh (bulgur cracked wheat salad with onion, parsley and mint), Turkish coffee, spices (turmeric, sumac, cardamom and cumin) and dates.

ASIA

India

Indian cuisine is known for rich dishes, curries and spices. Many who practice Hinduism follow a vegetarian diet and believe cows are sacred. Common foods: Biryani (mixed rice with meat, dried fruits, nuts, cinnamon and cloves), chana masala (spiced chickpea stew), chicken tikka masala (spicy curry dish), dal (lentil stew often added to rice), naan (puffy flatbread used as a vessel to eat the other foods on your plate) and samosas (savory pastries).

China, Japan and South Korea

Rice and noodle dishes are very popular here.

Japan

Sushi (seaweed and rice wrapped around raw seafood), sashimi (bite-size pieces of fresh, raw fish), ramen (noodles in broth, served with toppings like meat, vegetables, seaweed and scallions), scallion pancakes and miso soup.

China

Hotpot (dipping raw ingredients into boiling broths), dumplings, soups, congee (rice porridge), dim sum (large variety of small dishes) and Peking roasted duck.

South Korea

Pickled, salted foods, kimchi (spiced, salted veggies), bibimbap (loaded rice bowls) and bulgogi (grilled, marinated beef).

Southeast Asia

This large region encompasses many cultures. Common foods include curries, stir-fries, noodles, soups, sticky rice, coconut and more. Meals are often served family-style. Turmeric is a common spice used in this region. (Read more in the Recovery Superfoods section!)

Pacific Islands

Seafood, fresh fruits, coconut and more are native to this region.

Hawaii

Spam musubi (canned pork product on white rice with seaweed), kalua pig (slow-cooked whole pig), loco moco (white rice, hamburger patty, gravy, and over-easy egg), poi (taro root), poke (marinated ahi tuna cubes over rice with vegetables) and acai bowl (antioxidant-rich smoothie bowl made with acai and other fruits and toppings).

Australia

Australians are lucky to have their food shaped by many cultures, including English, Mediterranean and Asian. Common foods: Coconut bread, kangaroo and vegemite (salty yeast spread typically served on bread).

AFRICA

Northern Africa

Sardines, shakshuka (eggs poached in cumin-spiced tomato sauce), tagine (spiced lamb/chicken/fish stew with potatoes and carrots), b'ssara (fava bean soup) and couscous.

Western Africa

Jollof rice and yassa (baked fish/chicken in a lemon mustard sauce).

Southern Africa

Piri piri chicken (spicy chicken) and boerewors (beef sausage).

FUELING AROUND THE HOLIDAYS

Just like travel and climate changes can impact performance, various holiday seasons can also disrupt your normal rhythm. There are a wide variety of holidays celebrated around the world and many involve food! Some holidays are food-centric with feasts and treats (like Thanksgiving and Halloween), whereas others may involve restricting certain foods or fasting for prolonged periods of time (like Lent, Yom Kippur or Ramadan). Knowing how to approach holidays as an athlete can give you the competitive edge you need to succeed.

Food-Centric Holidays

Maintain your typical fueling timeline with all meals and snacks leading up to a holiday event.

Pro Tips to Prevent Overindulgence

1. Plan Ahead

Fueling adequately can help prevent you from being over-hungry and overeating when you build your plate at a holiday feast. Avoid restricting leading up to a holiday meal, as this can leave you with less available energy to fuel training—potentially leading to less effective workouts and reduced recovery. Have your performance goals in mind and know your boundaries as you build your holiday plate so you can make the best choices for you.

2. Follow Your Performance Plate

Use your Performance Plate guide (remember these from the Youth Sports Nutrition Guide Volume 1!) for building your plate at holiday gatherings. Prioritize color (fruits and vegetables), lean proteins and whole grains. Choose water, sparkling water, 100% fruit juice or unsweetened tea for hydration. It's okay to add a treat (food for the soul) to your plate for some psychological satisfaction. This way you get the nutrients you need from a balanced meal and keep your nutrition plan sustainable by allowing a little wiggle room for less nutritious options.

3. Make Treats Work for You

You can make a treat work for you by knowing the best time to eat it. Candy, for example, especially those higher in quick-digesting simple carbs (sugar), but low in fat and fiber (i.e., gummies, hard candies, jellybeans, marshmallows and candied fruit) can be used as pre-training or intra-training fuel. 30 to 60 grams of quick digesting carbs before training provides the body with fuel and energy to support performance. Re-up with more carbs if needed during longer or more intense training sessions.

• Leave baked treats for after training, as these are often higher in fat and digest more slowly, leaving you more prone to digestive discomfort if eaten before a workout.

• If you want to enjoy a holiday treat outside of a meal, turn it into a balanced snack and make it more satisfying by adding a source of protein and fiber. For example, add Greek yogurt (protein) and berries (fiber) to a bowl with your favorite holiday cookie crumbled on top.

4. Practice Mindful Eating

Choose your favorite holiday meal portions carefully, thinking about whether each choice fulfills either a Performance Plate component or brings you satisfaction. This helps you maintain reasonable portions.

Mindful eating involves being completely present during a meal, slowing down and chewing each bite thoroughly, and enjoying your food in the company of friends and family to get the full psychological benefit. Slow down to enjoy your meal and wait before grabbing a second serving to better assess your hunger/fullness levels. This way you can eat until full without feeling overstuffed.

5. Listen to Your Body

Pay attention to how you feel before, during and after a meal. In the hours after a holiday meal, you may notice that certain foods or dishes leave you feeling uncomfortable, bloated or sluggish. You can choose to reduce portion sizes or to avoid a certain food altogether in the future. Take note of which items cause issues for you and know to avoid these prior to training or before a game.

Many people over-stuff themselves during a holiday meal, which can lead to reduced performance the following day. If you find yourself in this situation, take it as a learning lesson for the next event. Never overcompensate for overeating by restricting or overtraining, instead simply resume following your normal activity plan and Performance Plate method.

Fasting Holidays

How to Make Fasting Work as an Athlete

Fasting is the act of abstaining from food and/or beverages, and this practice is often followed as part of a religion or during a religious holiday, like:

- Lent of Christianity
- Yom Kippur of Judaism
- Ramadan of Islam

Often, fasting is limited to certain times of the day, with eating permitted either one time per day (as with Ash Wednesday or Good Friday during Lent), or only during the timeframe between sunset and sunrise (as with Ramadan). It's important to know that fasting periods centered around sunrise and sunset can vary in duration based on an athlete's geographical location.

Fasting during the day presents unique complications for athletes accustomed to fueling regularly to support activity. Waiting until the sun sets to eat can affect sleep schedules, impact sleep quality and duration, and ultimately reduce recovery.

Careful planning can allow athletes to avoid taking any hits to their performance and keeping them feeling their best during their fasting window.

Pro Tips

1. Rehydrate with water, sports drinks containing sodium, oral rehydration solutions, sweetened drinks or 100% juice; aim for 500 ml (~16.9 fl oz) or more of fluids and electrolytes to break your fast. Be sure to rehydrate regularly throughout your feeding window.

- Don't overdo it—excessive fluid intake can negatively impact sleep due to more trips to the bathroom and can increase fluid losses through urine during the day.
- Monitor your USG (Urine Specific Gravity, aka hydration testing) status to ensure you stay hydrated throughout your fast and keep optimal urine color.

2. Follow your Performance Plate for your fast-breaking meal, ensuring you refuel with all components: carbs, protein, and colorful fruits and vegetables. Choose energy-dense, high-carb options and a lower overall volume of food in order to prevent bloating or acid reflux.

3. To obtain enough energy during your eating period, try adding in more liquids that are higher in calories with easy-to-digest carbohydrates, like protein smoothies or gels.

4. Try napping during the day to support recovery. Napping reduces energy expenditure during your fasting period and can allow you more time during your eating period to obtain adequate nutrition that meets your typical day's calories and macronutrient distribution.

- Utilize sleep nutrition strategies to help support you in getting your needed 8–10 hours of sleep per day.

5. Listen to your body throughout your fasting period and notice when you have the most and the least energy, as well as how you feel before, during and after training or matches.

- Prolonged fasting periods (as in Ramadan) often begin with decreases in peak power performance for the first week. But as the days pass, the body adapts, and performance can be maintained (and can even improve) with proper nutrition and sleep planning to prevent fatigue.
- Overuse and non-contact injuries are also more likely during prolonged fasting periods than they are during normal feeding schedules.

6. Communicate with your coaches and teammates so they understand any obstacles you're facing while fasting. Some coaches may modify training schedules with different start times or altered structures.

- Maybe opt for a lighter session in the afternoon and/or a more intense session in the morning or after your fast-breaking meal.

RECOVERING AND REFUELING

Now that you have mastered how to fuel yourself before and during training regardless of the climate, location or time of year, now let's chat about how to properly recover.

As sports and performance nutrition grows in popularity, there is a major emphasis on the pre-workout or fueling stage. Athletes are and should be highly motivated to find the best foods to enhance their immediate performance.

What about the Recovery Stage?

For many athletes, there is not as much priority on the post-workout or post-game period. Maybe that's because they don't understand the effects of sufficient and insufficient refueling. Did you know that proper recovery is really a form of fueling?

Six Facts You Need to Know

Fact #1:

Refueling Is Technically Fueling for Your Next Competition/Practice

If you work out and train often, failing to take advantage of your post-workout window can leave you feeling drained. This leads to a poor performance next time.

Fact #2:

The Four Rs of Recovery

If you're not sure what to prioritize in your post-workout window, just remember: replenish, repair, reinforce, and rehydrate.

- **Replenish** muscle glycogen with 30 to 60 grams of carbs. If your workout was mid to high intensity (you couldn't have a conversation while doing it), you probably utilized stored carbs. Make sure you refuel after your workout by eating a meal rich in starchy carbs.
- **Repair** and rebuild skeletal muscle with 15 to 30 grams of high-quality protein. Of course, this is more crucial to help with gains after strength and conditioning training, but all training has an opportunity for rebuilding post-workout.
- **Reinforce** muscle cells, immune function, and nervous system with colorful, anti-inflammatory fruits, veggies, whole grains, nuts, fish, and olive oil.
- **Rehydrate** by restoring fluids and replacing electrolytes lost through sweat, like sodium, potassium, and magnesium. Electrolytes are crucial for maintaining optimal fluid balance and muscle function. When we sweat, we lose a lot of sodium and need to replace it through foods and beverages.

Finally, a 5th R is Rest: this is the easiest one to do, and the easiest one to forget! It's important to give your body time to heal and repair before you get back out there again.

Fact #3:
Rehydration Requires More than Just Water

- Fluid is the most important thing you need when rehydrating, after all, it is the main ingredient lost in our sweat and breathing. A great way to ensure you are consuming enough fluid is to achieve a pale-yellow color urine.

- Electrolytes are also important to replace because they promote rehydration and fluid balance. For less intense exercise that doesn't produce much sweat, you don't need to worry as much. But if you lose a lot of sweat, you'll definitely need to add electrolytes to your post-workout meals and/or beverages.

- For optimal hydration, try adding a little sugar to your beverage to help your body retain and absorb more of the fluid. We're not talking about a lot, like the amounts found in many commercial sports drinks. Instead, aim for 10–20 grams of sugar per 20 ounces (591 ml) of fluid.

Fact #4:
If You Train Every Day, Carbohydrate Timing Is Important

- A carb-based snack (cereal, granola bar or sandwich) or beverage (sports drink or juice) can provide enough fuel to replenish your energy stores.

- Consuming protein within 20 minutes of ending strength training is not as critical as once thought. However, timing your intake of carbs is very important. For optimal refueling, you have about 45–60 minutes to get a carb-based snack or beverage in after your workout.

Remember, this only matters if you train once or multiple times a day. Otherwise, you have plenty of time to eat enough carbs to refuel before your next practice or competition.

Fact #5:
Rebuild with Protein

- Carbs fuel athletic performance, but protein rebuilds muscle. It's the only way to repair muscle tissue that breaks down and becomes damaged during intense exercise.

- A serving of 20–40 grams of protein consumed within two hours before and after practice is best for optimal recovery. Good sources include: meat, fish, dairy or a whey protein supplement. Many athletes focus on their anabolic window (right after practice), but you should actually aim to include protein regularly throughout the day.

Try consuming protein before and after training.

Fact #6:
Focus on Antioxidant-Rich Food

- Antioxidants are substances found in fruits and vegetables that help to neutralize harmful and reactive molecules that cause inflammation. These can damage our tissues, cause muscle soreness and negatively impact performance.

- The best way to control inflammation after training is to include nutrient-rich whole foods like dark-colored, leafy greens, fruits and veggies in your daily diet.

Protein: aim for 30 grams within 2 hours before and after practice.

- Lean proteins like chicken, fish, lean beef, low-fat dairy or a protein shake/bar are optimal.

TRY adding a protein shake to your lunch or dinner.

Carbohydrates: aim for 50–75 grams within 1 hour after practice/ competition.

Snacks: granola bars, sports drinks, flavored yogurt, skim chocolate milk, bowl of cereal and peanut butter and jelly sandwiches.

Meals: burritos, sandwiches, wraps, smoothies, shakes, rice bowls and pasta dishes.

Fluid: drink at least half your body weight (lb) in ounces.

- For every hour of sweat-heavy exercise you complete each day add 20–30 ounces.
- Consume 300–500 mg of sodium, and 100–300 mg of potassium in your post-workout beverage.
- Consume 10–20 grams of sugar in this post-workout beverage.
- Avoid chugging, focus on sipping, and try to achieve a pale-yellow urine color.

Fruits and veggies: aim for a variety of dark-colored fruits and vegetables throughout the day.

- The antioxidants help regulate inflammation levels.
- They also provide essential vitamins and minerals to restore energy and support immune function.

Remember, recovering from your workout is as important as fueling for it! One way to stay motivated is to look at recovery as fueling for your next workout. It will lead to a better performance and better results.

OFFSEASON NUTRITION STRATEGIES

During the season, your ultimate focus is on performance. You know, putting the ball in the basket, hitting the baseball as far as possible, scoring goals, getting the takedown or whatever the home run is for your sport. **But as a competitive athlete, it's important to stay focused on your overall health, and set goals, even in your offseason.**

Offseason Goals

This is the time when performance goals take a backseat, and you can achieve:

Fat loss

Muscle gain

Speed improvements

Endurance

Increased strength and power

Skill enhancement

All of these goals require time, effort, and nutritional adjustments, so the offseason is perfect for that. Now let's talk about how to prioritize your offseason nutrition.

Priority #1:
Adjusting Your Energy Needs

Consider how much your training schedule will change in the offseason. Ask yourself:

- Will I be training more? Less?
- Will I be training at a lower intensity? Higher intensity?
- Will I be playing competitive games? Friendly, pickup?

When your energy needs change, your energy intake should too. Next, identify your body composition goal. Is it mass gain, loss or maintenance?

- If you have a goal of gaining weight, you'll need to increase your energy intake. Adding some calorie-dense snacks or an extra meal throughout the day can help with this. Alongside this energy increase, you want to add resistance training (which we'll cover later), sufficient protein (0.6–0.8 g/lb per day) and plenty of sleep. This is the perfect recipe for muscle gain.

Priority #2:
Adjusting Your Macros

Without competitive game schedules, most athletes will see a downshift in the intensity and duration of exercise and training.

- Therefore, if you have a goal of reducing or maintaining body mass and body fat, this is the perfect time to pursue those goals.
    - o Build muscle
    - o Maintain
    - o Lean out

    Reducing overall caloric intake is the priority, but how can we do this? One helpful strategy is to swap out a portion of your carbohydrate intake each day for protein. This will help you remain under your calorie goals, and also help protect and build your lean muscle mass.
- Remember, we don't recommend a low-carb diet, but rather a lower-carb intake in your offseason.

Priority #3:
Adjusting Training and Post-Workout Nutrition

- Whether you want to build muscle or lose body fat, you need effective resistance training. Work with your strength and conditioning coach to optimize your strength training program.
- Most athletic teams reduce or stop resistance training programs around playoffs or in the home stretch.
- In the offseason, your strength training should ramp back up to max intensity. Don't worry about any impact it has on the court, field, etc. Just aim to push harder in the gym.
- Your training should be focused on building muscle and progressing to increase strength and power.
    - o **Phase 1:** high volume, moderate intensity (weight)
    - o **Phase 2:** moderate volume, high intensity
    - o **Phase 3:** low volume, max intensity
- Of course, your diet should also be structured to support this program. Here's what that looks like:

- **Phase 1:** lower calories, moderate carb and fat, high protein
- **Phase 2:** moderate calories, moderate carb and fat, high protein
- **Phase 3:** higher calories, higher carb and protein, moderate fat

- Alongside this, you should also ensure:
  - Plenty of sleep (7–9 hours)
  - Sufficient fluid and electrolytes (especially in warm weather)
  - Dark-colored fruits and veggies (antioxidants fight inflammation)
  - Nuts, seeds, legumes, whole grains and veggies (fiber aids digestion and gut health)

Priority #4:
Recover and Rehab any Injuries

For some athletes, the offseason is a time for healing. Whether you have small issues or a significant injury that requires bed rest, your diet can help with recovery.

Nutrition for Healing

- **Sufficient protein (0.6–0.8 g/lb):** rebuilds damaged muscle tissue. It also helps maintain the muscle that surrounds a broken bone.
- **Hydration (50% of your lb of body weight in fl oz):** transports waste products and inflammatory compounds away from the injured tissue.
- **Dark-colored fruits and veggies:** regulate inflammation levels, especially around the injury.
- **Fish Oil:** from oily fish (1–2 servings a week) or a well-dosed supplement helps reduce inflammation.
- **Vitamin D:** 15–20 minutes of daily sun exposure (safely) or a well-dosed vitamin D supplement fuels our immune system, which is crucial in the injury recovery process.
- **Collagen:** a protein that helps with ligament and tendon repair. Consume 10–20 g of collagen + 50 mg of vitamin C, mixed with water before and/or after a resistance training session during the offseason to help with recovery.
- **Creatine:** this power supplement aids muscle tissue recovery. Simply 5 grams a day taken any time provides benefits.

Note: please speak with a sports dietitian or sports physician before taking any supplements. This helps you only take what is needed (and in the correct dosage), saving you time and money.

Priority #5:
Rest and Enjoy Good Food (in Moderation!)

For competitive athletes, the offseason is an important opportunity to chillax. You know, decompress and loosen some of those strict guidelines you follow in season.

- Some of these guidelines are dietary, which means it's your chance to enjoy the delicious foods you don't indulge in during the season.
- It is important to do this without altering your body composition or nutrition goals too much.

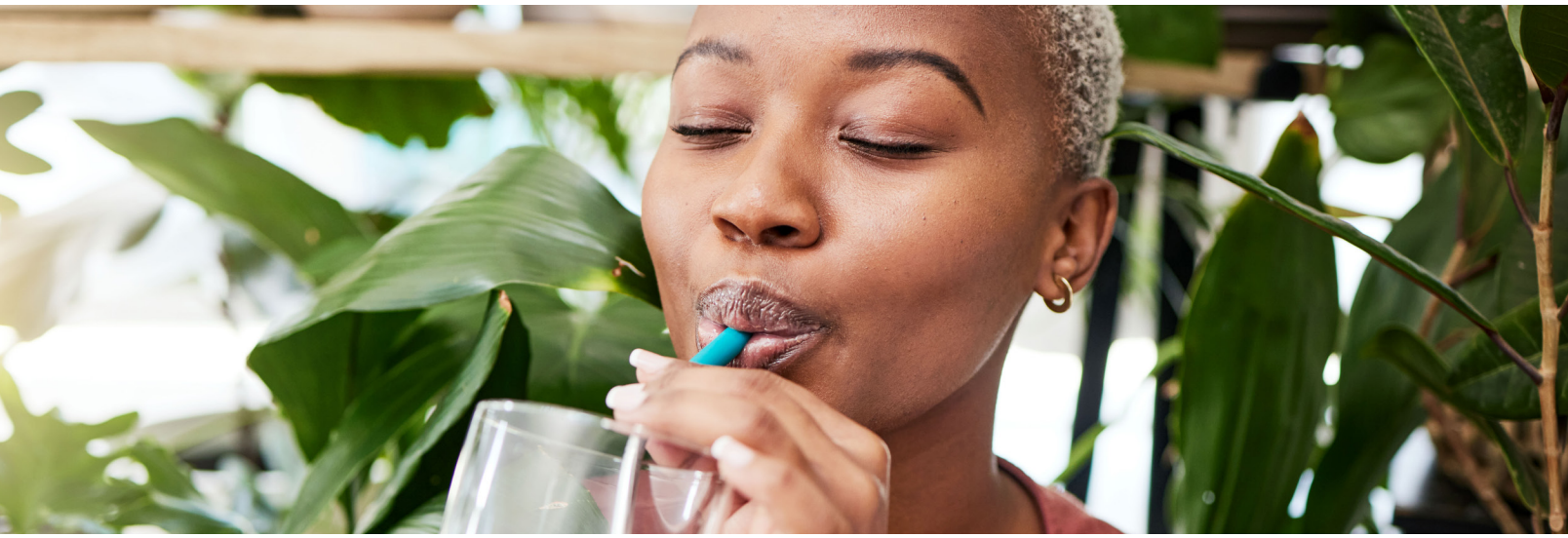
Pro Tips

Indulge in a special treat on a regular, but not everyday basis.

Have a rough estimate of your calorie goals, so you can adjust other meals around your takeout/indulgence food to accommodate.

Don't starve yourself or fast during the day to enjoy takeout food.

Don't view takeout/fast food as morally good or bad, it's perfectly fine to eat this once in a while. Being overly restrictive can cause unhealthy behavior patterns later in life.



NUTRITION MYTHS

Things you might see online!

Last but not least, you've learned how to control your nutrition regardless of the situation, but it's also important to control where you find your nutrition information! There are endless tips for building muscle, losing fat or gaining speed all over the internet and media... and the offseason may seem like the perfect time to try new things, but it's important to be very careful.

Much of what is online can have an element of truth, but it might not make sense for athletes and sometimes can even be harmful. So, let's squash some of the main sports nutrition myths out there, shall we? Here are the top 10.

Myth #1

Carbs = Fat Gain
This is probably one of the most commonly believed. Millions of people who struggle with their weight tend to vilify carbohydrates as the main culprit.

The Truth

When carbs break down in the body, they form sugar or glucose. This is absorbed and used to build up energy stores. Research shows that people who start a game, race or another athletic event with more glycogen, perform better.

If we consume too much energy on a daily basis, this store will likely be full. Any excess carbohydrates will then be converted to fat.

Here's the thing, studies show that in athletes, these stores are rarely full and are often times depleted when training starts.

Myth #2

You Should Train Fasted to Lose Fat
This one came from people who wanted to maximize "fat burning" during training sessions. Many athletes don't eat before a 1 to 2-hour practice.

The Truth

You do increase fat burn when you exercise without eating first. However, what many people don't tell you is the following:

After you wake up, glycogen stores (aka carbohydrates) in your liver are depleted. When energy stores are depleted, your body resorts to burning fats.

When you're burning fat, it's likely your intensity will drop and you won't perform very well.

It's important to differentiate between "burning fat" and "losing fat" as they are not the same. In fact, fasted training studies show there is no difference between weight and/or fat loss between those who train after eating and those who don't.

By eating a balanced breakfast with a good dose of carbohydrates (cereal, bread, fruit and granola), you'll infuse energy into the bloodstream for your muscles to use first. This will help you perform better overall!

Myth #3

Caffeine Is Bad for Athletes
Yep, this is a common one you've probably heard, but it's really not true!

The Truth

Caffeine is a stimulant shown to improve performance in endurance exercise. It can also improve reaction times and cognitive (mental) performance.

Of course, because it is a stimulant, there can be negative side effects, and you can definitely consume too much.

People respond very differently to the effects of caffeine, so it is important to reflect on how it makes you feel and perform. If it's not for you, it's not for you.

Myth #4

Protein Damages Your Kidneys
This one has been around for a long time. Because athletes generally require more protein to support performance needs, there's concern that their kidneys could be in danger.

The Truth

If you're healthy, and have healthy kidneys, without any underlying conditions, you don't need to worry about this one. Plenty of studies have shown that higher-protein diets do not negatively impact healthy kidneys.

Myth #5

Creatine Is like Steroids, You Shouldn't Take It
You've probably heard this one too, since it comes in supplement form, but don't worry. Here's the scoop.

The Truth

Creatine is a compound, an amino acid, found in red meat and seafood, and is also naturally produced in the body.

It is completely safe and well-proven to support performance and recovery. Creatine is nothing like a steroid.

Some people worry about creatine's impact on the kidneys, because when we break creatine down, it forms creatinine. Higher levels of creatinine are sometimes used as a marker for kidney issues. However, just because you have higher creatinine doesn't mean it is a result of kidney damage.

Myth #6

Vegan Athletes Are Better Athletes

Not sure where this one came from, but it's out there.

The Truth

Vegan athletes can be better athletes, but if they are, it has nothing to do with their diet. In fact, these diets can actually harm performance, if not structured correctly.

If you abstain from animal foods, there are certain considerations you need to make to ensure you get enough protein, iron and vitamin B12. These nutrients are critical for high-level performance and are a main concern in vegetarian and/or vegan diets.

Protein is important for muscle repair and recovery. Iron is a mineral needed for oxygen delivery. Vitamin B12 is crucial for healthy nerve function. If we don't get enough of these, health and performance suffer.

Pro Tip

For vegan athletes:

Add a plant-based protein supplement.

Eat a wide variety of protein-containing plants to obtain all of the essential amino acids.

Consider both an iron and vitamin B12 supplement.

Add plenty of dark leafy greens (source of iron!).

Consume citrus fruits before or soon after eating greens (vitamin C aids in iron absorption).

Consider a creatine supplement.

Work with a sports dietitian to ensure you are meeting your nutrition goals.

Myth #7

Fasted Training Is Better for Endurance Athletes

This is a popular narrative that training in a fasted state improves your endurance performance.

The Truth

The endurance claim comes from the fact that endurance athletes need to perform better later in the event/competition when their carbohydrate stores have been depleted.

While this seems plausible, we definitely don't recommend it for athletes who play in a high-intensity sport.

For most athletes, we recommend eating before training. This helps mental and physical performance, stamina and endurance.

Myth #8

You Shouldn't Eat Carbs after 8 p.m.

The idea behind this myth is that we can't eat carbs after 8 p.m. because they're more likely to be converted to fat.

The Truth

Because many practices and games are held at night, this myth couldn't be further from the truth.

In most cases, the carbohydrates you eat after a practice or a game help replenish your depleted energy stores.

Carbs can actually help you sleep better.

Your level of body fat just depends on how much total energy you eat, not your carbohydrate intake.

Myth #9

Sugar Is Always Terrible
With the rise of sugar-sweetened foods and beverages on the market, it is becoming more and more difficult to avoid.

The Truth

As an athlete, you don't need to avoid sugar at all times. It can really help right before training.

In fact, both before and right after a game or competition, one of the best things you can do is consume a food or drink that provides 20–30 grams of sugar. Think fruit, a moderately sweetened sports drink, an energy bar, or a bowl of cereal.

80% of the time (i.e., not around training/matches), you should aim for less-sweetened options that provide slow-burning and longer-lasting energy.

Myth #10

You Should Try to Get to the Lowest Body Fat (BF)% Possible
You know you've heard it, but it's absolutely not true.

The Truth

The ideal BF% is highly individual. Body composition depends on genetics, sport, habits, etc. Some people are at their best at 15% while others peak at 20%.

Your ideal BF% for performance depends on your sport (Fleck et al., 1983). For example, an endurance runner would have an ideal BF% that is much lower than what is considered ideal for a rugby player or football linebacker.

Males and females differ significantly in their ideal BF% range. Females will have a higher BF% at their peak, so using the same number for both sexes doesn't work very well.

If you need to improve your body composition, work with a sports dietitian to set a BF% goal. Make sure to reflect and check in on your way to that goal, to ensure it's realistic and doesn't detract from your athletic performance.

To maximize performance, athletes need a team. Our doctors, experts, dietitians and scientists have created this guide to fuel your best. Whether it's before, during or after a workout, each phase of training can be improved with the right nutrition. Be safe, stay hydrated and take your environment into consideration as you ramp up your routine.

We hope you continue your sports nutrition education and are proud to be a part of your team.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ISSUE 2

NUTRITION FOR PERFORMANCE