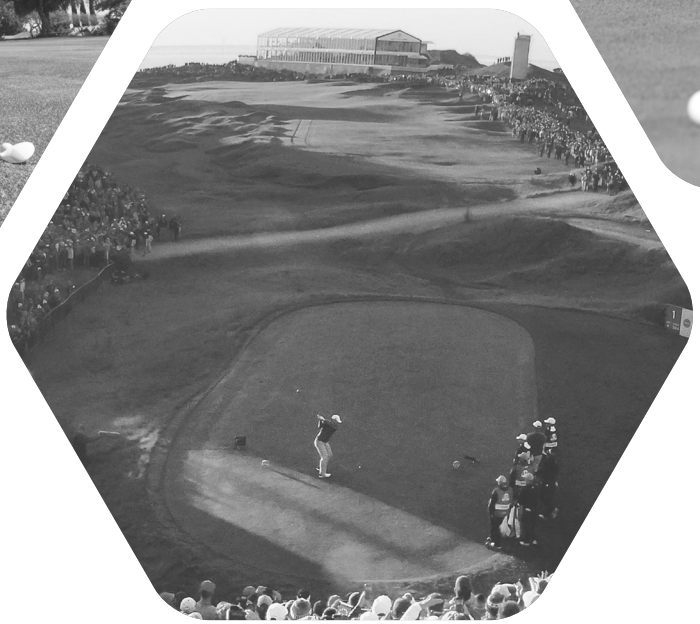
GATORADE SPORTS SCIENCE INSTITUTE®

FOODS & FLUIDS FOR GOLF







FOODS & FLUIDS FOR GOLF

In the sport of golf, where precision and focus are important for success, it's important to consider the role proper nutrition and hydration play. Get the most out of your game with the right foods and fluids at the right time. The following recommendations are for golfers who are looking to optimize their physical and mental performance. The energy expended, and the subsequent fueling and hydration strategies to support that energy expenditure, is dependent on the duration of training/competition, whether they are walking the course or riding in a golf cart, and how hot and humid of an environment that would impact their sweat rates. Following a personalized fueling and hydration strategy can support the demands of the sport and ensure the golfer can perform to their potential.

PRE-COMPETITION FOODS & FLUIDS

It is not uncommon for golfers to arrive at the course already dehydrated before they even start sweating,[2] which has been linked to higher scores! To avoid starting at a deficit, about 4 hours before a workout drink 0.07 to 0.10 oz of fluid per pound of body weight (13-18 oz for a 180 lb person).[3] The best way to determine hydration status is to monitor urine color. Prior to beginning exercise, urine should be light yellow, like lemonade (not clear). If it is dark in color, consider drinking more fluid prior to beginning exercise. Carbohydrate is the body's powerhouse fuel and without it golfers lack energy, experience muscle fatigue and are unable to produce the energy required for the rapid muscular contractions necessary for a golf swing. In the 3-4 hours before competition, individuals should aim to eat a balanced meal including about 0.45-1.8 g of carbohydrate per pound of body weight, or about 81-324 g for a 180 lb person,[4] and 0.18-0.25 g of protein per pound of body weight, or about 30-45 g for a 180 lb person. However, the exact amount and composition of the meal consumed at a given time will depend upon how the stomach reacts – athletes should use trial and error and keep a journal to find a time, type and amount of carbohydrate and protein that works for them and provides the energy needed.

PRE-TRAINING OR COMPETITION KEY MESSAGES

- Golfers often start a workout already dehydrated. Prepare to begin your round in a hydrated state so you don't start at a deficit!
- Eat a carbohydrate and protein-rich meal before competition for the energy to support your day.



~50 G CARBOHYDRATE SNACKS

(200 calories from carbohydrate)

- 6-inch turkey sub with toppings and 12 oz of Gatorade Zero
- 4 1/2 oz of fruit-flavored low-fat yogurt and 15 mini-pretzels
- Large banana and graham crackers (2 "sheets")

DURING-COMPETITION FOODS & FLUIDS

Enough fluid should be consumed during a round to minimize changes in body weight. Dehydration diminishes a golfer's performance by significantly reducing both distance and shot accuracy.[5] Prioritizing proper hydration is essential for golfers to enhance their game. Remember, changes in body weight over the course of one round are related to fluid losses, not loss of fat or gain in muscle! To determine an individual's sweat rate, measure body weight before and after a round. Also, keep track of all the fluid you consumed. A rough estimate of your sweat rate can be obtained by using the following equation: sweat rate (L/h) = (weight loss (lbs) – fluid intake (L))/exercise time (hours). Reference the Sweat Rate Calculator on page 8. Playing in hot, humid conditions in the summer months calls for special attention to fluid intake. Dehydration in the heat can increase body temperature to dangerous levels, leading to heat illness. To feel good, stay healthy and stay primed to perform in the heat, make sure to get adequate fluids before and during exercise. Remember that sweat contains more than just water, and sodium is the key electrolyte lost in sweat. Consuming fluid with sodium is important because sodium helps maintain the physiological desire to drink and helps retain the fluid consumed.[6] Consuming a low-calorie beverage with sodium, such as G2, Gatorade G Zero, GFit or Propel, can help replace the fluids and electrolytes lost in sweat.

During competition or practice lasting over an hour, consuming 30-60 g of carbohydrate per hour provides fuel for the working muscles, delays the onset of fatigue,[7] and is conducive to maintaining golf specific skills. The ingestion of carbohydrates may also counter negative feelings of energy and improve concentration to help maintain acuity needed for strategic execution of golf shots. There are plenty of opportunities to consume carbohydrates throughout the course of the competitive round and practice/training and a variety of dietary choices and sports specific products from drinks to foods may be useful. It's important for each player to find the right fueling strategy to fit their individual performance needs that match their hydration strategy.

Consuming protein during practice or competition is not as important as consuming proper fluids and carbohydrates, however, given the duration and intensity



of golf, and the general need for consuming adequate protein across the day to support muscle function and repair, consuming some protein on the course can support your total protein dietary needs. High-protein consumption can cause gastric distress so aiming to consume 10-20 g of protein every 2-3 hours on the course can support total dietary needs.

CARBOHYDRATE AND SODIUM CONTENT OF GATORADE PRODUCTS

Product	Carbohydrate (g/fl oz)	Sodium (g/fl oz)
Gatorade Zero	<1	160
Gatorade Lower Sugar	5	160
Gatorade Thirst Quencher	22	160

DURING COMPETITION KEY MESSAGES

- Drinking fluid with sodium will help you to stay hydrated during your workout. Developing a personalized hydration strategy that limits body weight lost will help support performance.
- Consume 30-60 g of carbohydrate per hour of practice or competition to provide fuel to your muscles and help delay fatigue. Find the right fueling strategy to support your individual fuel and hydration needs.

POST-COMPETITION FOODS & FLUIDS

Rapid restoration of performance capabilities between competitive events requires appropriate fluid, carbohydrate, sodium, and protein intake to promote rehydration and restore muscle glycogen and repair working muscles. Replacing lost fluids helps prepare the body for the next day's round. Remember, weight lost during exercise represents fluid loss through sweat and not fat loss. Rehydrating after a workout can help you feel better for the next day's round, so drink ~20-24 oz of fluid with sodium for every pound of weight lost during exercise.[3] When two rounds of competitive golf are played on the same day, ensuring continuous and adequate carbohydrates are consumed during and between rounds, including 30-60 g carbohydrates can help support muscle glycogen restoration and carbohydrate availability. A small amount of high-quality protein, particularly whey and milk protein,[8] can help repair and build lean muscle mass. Individuals focused on muscle recovery should consume ~20 g of protein shortly following exercise to enhance synthesis of new muscle proteins.[8] For individuals looking to gain muscle as a result of their training, they can get more specific with their protein intake at 0.11-0.14 g/lb (~20-25 g for a 180 lb person).[9] Consuming between 0.6-0.9 g protein per lb body weight (~110-165 g protein for a 180 lb person) broken into equal servings every 3-5 hours supports muscle adaptations, repair and remodeling of the working skeletal muscle. Research is emerging on the use of plant-based proteins for recovery and muscle gain. Athletes consuming plant-based proteins should ensure they are eating a variety of foods to meet their essential amino acid needs to support recovery and training adaptations.[10]



POST-COMPETITION KEY MESSAGES

- Rehydrate after your round with ~20-24 oz of fluid for every pound of body weight lost (if weight loss occurs during exercise, it's from fluid loss!)
- Eating ~20-25g, or 0.25-0.30 g/kg of high-quality protein following training or competition will help improve recovery.

RECOVERY OPTIONS

Product	Calories	Carbohydrate (g)	Fiber (g)	Protein (g)	Fat (g)	Sodium (mg)
Muscle Milk Pro Protein Shake 14 fluid ounces	240-250	14-15	<1-2	42	2-2.5	310-350
Muscle Milk Pro Protein Shake 11 fluid ounces	190-200	11-12	<1-2	33	1.5-2	250-280
Muscle Milk Protein Shake 14 fluid ounces	170	13	1-2	26	1-1.5	290-330
Muscle Milk Protein Shake 11 fluid ounces	160	10-11	<1-2	26	1-1.5	240-270
Gatorade Recover Protein Bar	330-360	39-43	0-2	20	10-13	160-310





AN EXAMPLE: PUTTING THE SCIENCE-BASED RECOMMENDATIONS INTO PRACTICE



ATHLETE PROFILE

Name: Thomas

Age: 27

Weight: 190 lbs (86.4 kg)

Purpose of Consultation: Thomas is preparing for the Ryder Cup. He wants to ensure that he will be able to mentally focus and maintain his skill level throughout the competition, he has struggled with mental and physical fatigue in the past. Thomas will have several days of practice rounds/ practice sessions and then 3 days of 18-36 holes of competition in a pressure filled environment. He could play up to 54 holes of golf and walk upwards of 35 miles throughout the competition.

BEFORE TEE TIME

During the competition, Thomas could be teeing off as early as 7:35 am. He plans to wake up around 5:00 to have time for breakfast and commuting to the course with time for a warm-up and range session. We suggested 2.5 g carbohydrate/kg body weight due to the longer duration of the day. As a result, his pre-match meal should contain 216 g of carbohydrate (864 calories). To promote satiety and because of the low-intensity level of his competition, Thomas's meal should contain 22-26 g protein (0.25-0.3 g/kg) and a small amount of fat. His plan is to eat a consistent breakfast that he is familiar with the week of the competition to avoid any GI issues.

Incorporating familiar foods, Thomas eats 2 cups of breakfast potatoes (peeled diced potatoes, onion and bell pepper), 2 tbs shredded cheese with 2 over easy eggs, a breakfast pastry, 1 cup of sliced strawberries, and 10 oz coffee with 2 tbs milk. He also sips on a Propel between breakfast and teeing off to begin the day hydrated.

DURING COMPETITION (AM SESSION)

Thomas previously tested his sweat rate in environmental conditions similar to those experienced at the Ryder Cup in mid-September and found his sweat rate was 1 L/h and sweat sodium losses to be 1100 mg/L. He knows that he needs a plan for both the morning and afternoon sessions as his fluid and sodium losses will add up over time. He plans to drink between 0.8-1L of fluid each hour he is on the course to prevent losing >2% of his body weight. He chooses to alternate between drinking G Zero and Gatorlyte to replace fluid and electrolytes throughout the morning and limit flavor fatigue.

Fueling is also an important component to Thomas's plan. He will pack portable snacks to make sure he can take in 30-60 g of carbohydrate per hour. His goal is to eat small amounts of food every 3 holes, ensuring a consistent energy supply which can also help lower the risk of any GI issues. Given the lower intensity of the sport but long duration, he can take in some protein throughout the morning to support satiety and overall protein needs. Thomas chooses ready to eat PBJ sandwiches, granola bars and a banana to meet his fueling needs. In choosing these foods and eating every 3 holes, he consumes between 30-40 g/h.

LUNCH

Depending on the duration of the AM session, Thomas may not have much time between the morning and afternoon tee off. He chooses to take in a 20 oz fruit smoothie made with Greek yogurt or protein powder during this break in play. This will provide fluid, carbohydrate and protein during this break in play and also contribute to his fueling strategy.

DURING COMPETITION (PM SESSION)

Similar to the morning session, Thomas chooses to alternate between G Zero and Gatorlyte to meet his fluid and electrolyte needs. To provide variety, he packs snacks of pretzels, jerky, grapes and turkey sandwiches (kept in a cooler on ice) to meet his energy needs and continue with his strategy of eating every 3 holes.

AFTER COMPETITION

Due to the multi-day nature of the tournament, Thomas wants to prioritize recovery each evening. We helped him understand what he needs to replenish his energy stores and prepare for the next day. Shortly after signing his scorecard, Thomas eats a Gatorade Recovery bar to support his carbohydrate, protein, and electrolytes recovery needs. Following his round, he weighs himself in the locker room to determine how much weight he lost on the course. For every pound of weight he lost on the course, he needs to drink 20-24 oz of fluid with sodium (or drink water with sodium-containing food). Thomas chooses G Zero for this occasion. The amount of weight he loses each day will depend on a number of factors, so tracking weight changes is the best habit he can adopt to make sure he replaces fluid appropriately across the competition.

Then, after he showers and rests for a little bit, he can have a meal. The meal should be high in carbohydrate, moderate in protein, and low in fiber and fat, helping to meet the daily recommendation of 6-10 g/ kg/day (for Thomas, 518 - 864 g, or 3108 - 3456 calories from carbohydrate per day). He should also ensure that this meal, and a snack before bed, contain 0.25-0.3 g/kg of protein (for Thomas, 22-26 g or 88-104 calories from protein per meal/snack).

Thomas plans to take advantage of the cuisine in Italy and opts to eat a meal that includes an antipasti plate of meat, cheese and crostini, a primi piatti of cacio e pepe (pasta dish), a secondi piatti of pollo alla romana (chicken), insalata (salad), and a small cup of gelato. The variety of pastas, meats, vegetables and sweets will support his overall recovery needs and allow him to enjoy the cuisine!

Any opinions or scientific interpretations expressed in this document are those of the author and do not necessarily reflect the position or policy of PepsiCo, Inc.

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CALCULATIONS/YOUR WORKSHEET

1. BEFORE-EXERCISE CARBOHYDRATE NEEDS

A. Pre-exercise carbohydrate intake = _____ body weight (lbs) * 0.45 g = [ ] g carbohydrate

2. BEFORE-EXERCISE FLUID NEEDS

A. 4 hours prior to exercise:

_____ Body weight (lbs) * 0.07 oz/lb = [ ] oz

TO

_____ Body weight (lbs) * 0.10 oz/lb = [ ] oz

3. DURING-EXERCISE FLUID NEEDS

A. Pre-exercise weight = _____ lbs

B. Fluid consumed during exercise = _____ L

*(_____ fluid oz / 33.8 = _____ L)

C. Post-exercise weight = _____ lbs

D. Weight change = Pre-exercise weight _____ lbs - Post-exercise weight _____ lbs = [ ] lbs

E. Exercise time = _____ hours

F. Sweat rate = (Weight change _____ + Fluid intake _____ L) / _____ hours = [ ] L/h

4. POST-EXERCISE FLUID NEEDS

Weight change = Pre-exercise weight _____ lbs - Post-exercise weight _____ lbs = [ ] lbs

Fluid needs:

_____ Body weight lost * 20 oz = [ ] oz

TO

_____ Body weight lost * 24 oz = [ ] oz

5. POST EXERCISE PROTEIN NEEDS

About 20 g is appropriate for most athletes; however, to calculate your individual needs use this equation:

body weight _____ (kg) * 0.25 g = [ ] g protein

TO

body weight _____ (kg) * 0.3 g = [ ] g protein


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