Endurance Nutrition

Training for an endurance sport, no matter what the distance, requires a lot of planning, training, and time. Over time, these things become like clockwork, and athletes come up with their own individual training plan that works for them. However, many athletes, from beginner to advanced are still confused about how to eat properly for these types of events. As professionals, it is important to have a basic knowledge of nutrition for triathlons or other endurance events, and understand how it differs from other types of physical activities.

General Nutrition Recommendations

The general nutrition recommendations for endurance sports are:

- 50-70% carbohydrates
- 10-20% protein
- 20-35% fat

The large range in carbohydrates depends on the distance of the endurance event. For athletes training for Ironman distance triathlons, 70% of calories from carbohydrates are the appropriate amount to adequately replenish stored carbohydrates. However, these general percentages for nutrients only work if the athlete is eating the appropriate amount of calories. To be adequately fueled for extreme amounts of exercise, the calorie recommendations are:

- 44-51 calories/kg for females
- 50-58 calories/kg for males

** To get pounds converted to kg, divide the athlete's weight by 2.2

For example, a female athlete who weighs 130 pounds or 59 kilograms (kg) would need approximately 2350-3000 calories per day to fuel her activity levels and normal daily activities.

Of course these are generalizations and some athletes may need more; a simple way to monitor calorie and fuel needs is to measure body weight, recovery (are the athletes eating enough to recover), and performance.

Specific Nutrition Recommendations

Carbohydrates

To ensure the athlete has adequate stored carbohydrate and protein for endurance exercise, it is more accurate to make carbohydrate, protein, and fat recommendations based on the athlete's weight in kg.

The current recommendation for athletes in endurance training events is approximately 8-10 grams (gm) carbohydrates per kg.

Sample Carbohydrate Recommendations for 59 kg female in training:

- 59 kg * 8-10 gm carbohydrates/kg = 470-590 gm carbohydrates/day

Protein

Fuel Tips

- ⇨ Calorie recommendation for females: 44-51 calories/kg
- ⇨ For males, recommendation is 50-58 calories/kg
- ⇨ Carbohydrate recommendation: 8-10 grams carbohydrate/kg bodyweight
- ⇨ Protein recommendation: 1.2-1.4 g protein/kg body weight
- ⇨ Fat recommendation 1-2 g/kg body weight

Protein recommendations for endurance athletes are 1.2-1.4 gm of protein/kg, which can easily be reached if the athlete is consuming enough calories. It is important that these protein goals be met in order for the athlete to maintain their lean muscle mass. Protein is also extra important for endurance athletes because prolonged exercise increases the chance that the body uses some of the athlete's protein stores for energy.

Protein Recommendations for 59 kg female in training:

- 59 kg * 1.2-1.4 gm/kg = 70-83 gm protein/day

Fat

Fat recommendations for endurance athletes are just as important as carbohydrates and protein. To ensure that stored fat in muscle used in extreme endurance events are replenished, professionals need to emphasize that a low fat or a virtually fat free diet could be detrimental to performance.

Fat Recommendations

Depending on the amount of calories being consumed, the recommendation for daily fat intake is 1 gm-2 gm/kg. If the athlete is trying to lose weight, the amount of fat consumed will be the nutrient that is decreased, not carbohydrates or protein. The minimum level of fat for an endurance athlete in their peak training time is 1 gm/kg.

Sample Pre Race/Workout Fueling Plan for 59 kg female:

2 hours before (~117 gm carbs):
1 plain bagel, 4 " diameter (60 gm)
1 tbsp. regular jelly (17 gm)
1 large banana (27 gm)
2 tbsp. peanut butter (15 gm)
12 oz. water

4 hours before (~232 gm carbs):
2 slices thick bread (45 gm)
2 tbsp. peanut butter (15 gm)
2 tbsp. regular jelly (34 g)
1 large apple (30 gm)
1 6-8 oz. yogurt (35 gm)
1 oz pretzel sticks (50 gm)
12 oz. sports beverage (21 gm)

Race Day/Workout Nutrition Strategies

There are specific recommendations for the amount and type of food, fluids, and electrolytes during the race/training based on year of research.

General Recommendations (remember, each athlete is unique, so these are generalizations from research, but numbers may vary).

- **Consume 30-60 gm carbohydrates per hour.** Taking in any more carbohydrates than the recommended amounts can be too much for the body to digest at one time, leading to stomach cramps.
- **Beverages consumed during a race must be a 6-8% carbohydrate concentration**. If the concentration of carbohydrates per 8 oz is higher than that, the stomach is not able to absorb the sugar fast enough, which can lead to stomach cramping.
    - To calculate % carbohydrate solution: Find the grams of carbohydrates in the beverage and divide that number by 237 ml (amount in 8 oz.). For example, Gatorade has 14 gm carbohydrates per 1 cup, so 14/237 = 6%. On the other hand, orange juice has 28 gm carbohydrates per 1 cup, which is a 12% carbohydrate solution.
- **Fluid recommendations** should really be customized based on the athlete's sweat rate, but a **general recommendation is 6-12 oz per 15-20 min**.
- Sodium is the main electrolyte lost in sweat and must be replaced during heavy endurance activities. **Depending on how heavy the athlete sweats, approximately 500-1000 mg sodium/hour should be consumed each hour.** (NOTE: If the athlete always has a white film on their clothes after exercise, they would be considered "heavy sweaters," and should consume the higher range of sodium per hour.

Sample During Race/Workout Fueling Plans for 59 kg female:

Goals Per Hour: 30-60 gm carbohydrates, 20-30 oz. fluids, 700 mg sodium

1. PowerGel – 25 gm carbohydrates, 200 mg sodium
   8 oz. Gatorade Endurance – 14 gm carbohydrates, 200 mg sodium

Water – 12 oz.
Salt tablets – 300 mg

2. Clif Bar – 45 gm carbohydrates, 130 mg sodium
   Water – 25 oz.
   Salt tablets – 600 mg
3. Banana – 30 gm carbohydrates, 0 mg sodium
   8 oz. Gatorade Endurance – 14 gm carbohydrates, 200 mg sodium
   Water - 12 oz.
   Salt tablets – 500 mg

Optimal Foods for Recovery

See nutrient timing sheet for specific recovery recommendations.

Sample Fueling Plans for Recovery

Goals for 59 kg female assuming a two pound weight loss:

- 90 gm carbohydrates in the first hour
- 45-90 gm carbohydrates each hour after up to 3 more hours
- 50 oz. or 6 oz. fluids
- 6 gm protein

1. Cornflakes (2 cups) = 50 gm carbohydrates
   Milk (1 cup) = 12 gm carbohydrates, 8 gm protein
   Banana = 30 gm carbohydrates
   6 oz. water

Salty, high carbohydrate foods in the next 1-3 hours.

- Other great recovery foods are chocolate milk, yogurt, smoothies, pretzels and dried fruit.

These tips should help you assist athletes on adequate fueling to get them through though workouts day after day and still have the energy on race day, when it really counts!