



Fueling the Competitive Athlete: Best Practices

An athlete's fueling strategy impacts their

- ability to train at higher intensity, frequencies and durations
- adaptation to training
- injury risk (over training, muscle injury, bone mineral density, hydration ...)
- immune function and adaptation to training
- hormonal adaptations to training, competitive and life/psychological stress
- mental perspective and confidence

Fueling strategies need to reflect and correspond to each individual athletes

- training phase and goals
- performance schedule and individual performance events
- body composition and weight variables
- travel impacts
- living and financial consideration
- individual preferences, ethnicity, culture, tolerance , physical and psychological state
- training outcomes: times, distances, weight training results, frequency of illness, residual soreness

Primary Fueling Strategies:

1. Determine the base or year round foundation nutritional plan that includes

- Quality, types and quantity of proteins, carbohydrates and lipids
- Caloric needs based on base training and weight goals
- Micronutrient intake: antioxidants, phytochemicals, nutrient density
- Distribution of intake
- Hydration protocol and sweat rate assessments

2. Pre fueling for training

- Complex or whole grain carbohydrate foods low in fat with variable protein content depending on event or training within 1-4 hours prior to activity
- The closer to training, decrease quantity of solids and include more Kcals as liquids
- Front loading intake or distributing intake to preempt energy demanding training.
 - If afternoon workout, consuming 60% of intake prior to afternoon training session (can include pre-fueling and recovery needs)

3-4 hours prior to training= 400-500 calories, low in fat, moderate protein, liquids and predominantly complex carbohydrate

- Bean, rice and chicken burrito, whole wheat tortilla if available, mild salsa, limit cheese
- Turkey sandwich (mustard) on wheat, with veggies, yogurt, handful of pretzels
- PBJ on whole wheat, green tip banana, yogurt

If within 1-1.5 hours prior consider (~200 calories)

- Very individual, needs to be included in training and low-priority competitions first

If long warm-up or high stress

- Consider a small liquid based non fat, carb and protein combo (diary or dairy alternative) within 30 min prior to an event that is likely to last > 20 minutes.
- **Examples of food appropriate for 1-2 hours prior**
 - Plain low fat yogurt mixed with *Wheaties* or cheerios cereal
 - *Clif* bar (peanut butter), 1 cup *Gatorade* or water
 - Small bowl of oatmeal with raisins and honey or brown sugar
 - Bowl of low sugar cereal with non-fat milk

3. During Activity = Real Time Fueling

Workouts longer than 45 min .

- Likely will need and benefit from fueling to protect the quality of workout. Carry or bring fuel and fluids.
- Examples: Power bar, gels, raw honey, Gatorade or well designed sport drinks, raisins
- Start during activity fueling after 30 minutes unless breakthrough hunger occurs earlier

Workouts shorter than <45 min.

- If breakthrough hunger or if high intensity with repetitions apply minimum carbohydrate intake of 50 grams
- If lower intensity, shorter duration workout, no fueling is necessary, water might help, sports drinks WILL NOT hurt
- Examples: same as with longer duration, sports drinks, water or nothing.

During Competition

10K-1/2 marathon, sprint triathlon or multi-attempt events;

Consider carrying and consuming fuel and fluids

Depending on event ~45-60 grams mixed type carbohydrate per hour

Olympic distance triathlon, marathon and events lasting longer than 4 hours;

Delay first fueling for 45-60 minutes unless hunger or premature fatigue

Depending on event, 45-60+ grams carbohydrate per hour activity (greater intake possible with stop and go or biking or lower intensity)

4. Recovery Nutrition

- Carbohydrate, protein if high intensity or in a early build phase and fluids.
 - Research suggests that a combination of simple and complex carbohydrate restore glycogen to best levels
- Calculate specific need based on 1-1.2 grams per kg body weight.
- A minimum of 50 grams is needed to initiate recovery providing there is repeated intake within 2 hours of end of activity.
- Protein, if needed = between 7-15 grams total
- Fluids: glycogen restoration requires fluid

- Most important situations requiring recovery nutrition:
 - If well fueled prior and workout lasts longer than 90 minutes or high intensity, multiple reps over larger time (even with breaks)
 - If under fueled for training, working on losing body fat,
 - If increasing mileage more rapidly within shorter time frame
(Greater than 10% increase per week)

Weight ranges and associated recovery nutrition amounts.

Weight	1-1.2 gm/kg	Weight	1-1.2 gm/kg	Weight	1-1.2 gm/kg
105-115	47-63	145-155	66-84	175-185	79-101
115-125	52-68	155-165	70-90	185-195	84-106
125-145	57-79	165-175	75-95	195-205	89-112

Examples of high carbohydrate foods that best fit recovery needs and provide 50 grams of carbohydrate per serving.

3. 3cups well designed sport Drink	2 cups skim or 2% Chocolate milk*	¾ bagel	¾ cup low fat granola*	~ 8 oz low fat sweetened yogurt*
5 full graham crackers	1.5 8" bananas	2 cups mixed 100% fruit juice	1/3 cups dried fruit and nut trail mix+	PowerBar (45 grams CHO)*
Clif bar (45 grams CHO)*	1.75 cups grapes	12 ounces Boost or Ensure *	Gatorade Recovery Shake*	1.5 cups Go Lean Cereal*
1 cup whole grain pretzels	~ 12 whole grain saltines	1.5-2 trail mix bars*	10 oz. drinkable yogurt/dairy alternative*	3 oatmeal raisin cookies

* = at least 5 grams of protein per 50 grams carbohydrate

5. Supplements

- Best to have athletes spend their money on food=fuel.
 - Less risk of cross-contamination or unlabeled ingredient intake
 - Most micronutrient deficiencies in athletes can be resolved by consuming a caloric intake more closely matched to expenditure.
 - Adequate fueling diminishes need for supplementation of any kind
- Remember energy or sports bars, sports drinks, “functional foods” all are likely to be enriched, fortified or supplemented with many trace minerals and vitamins etc...
- Supplements or functional foods to consider:
 - Low does iron for females
 - 65 mg OTC iron with coating for tolerance
 - Iron free multivitamin for Males
 - Iron containing multivitamin for females
 - Omega-3 as fish oil or precursor (2-3 grams) males and females
 - Bone supplement with Calcium and Vitamin D
 - Foods with pro-and pre-biotics
 - Yogurts, milks, dairy foods
 - Supplements that have been and require refrigeration
 - If vegetarian and female (esp.) , gluten/wheat intolerant or no dairy;
 - B-12, zinc, iron, calcium, multivitamin