

Food for Thought

...And the Athlete

At least 70% of the athlete's diet should consist of carbohydrate-rich food

Dietary practices differ greatly among athletes and coaches. Myths and other sorts of misinformation often cloud the practice of sound nutrition, the thinking on the consumption of "high-energy" simple sugars before the game, during the game, and before the post-competition meal, and the role of fats, proteins, salt, and fluids.

Many well-intentioned coaches have engaged in some questionable practices such as depriving their athletes of fluids and recommending: (1) such foods as french fries as a high-carbohydrate pre-game meal, (2) the use of salt tablets, (3) the use of candy bars prior to competition, and (4) the use of a spaghetti dinner the night before a competition as a means of "carbohydrate loading."

Some of these practices are more questionable than others, probably because of the uncertainty of the resource and research on pre-competition dietary practices.



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Historically, carbohydrate loading is begun up to six days prior to competition. Recommendations include three days of increased exercise intensity and no carbohydrate ingestion, followed by a training taper and three days of high carbohydrate ingestion.

This practice of "carbohydrate supercompensation" had many disadvantages, including fatigue during the carbohydrate-restricted phase, increased weight gain, water retention, and muscle stiffness, and discomfort during the carbohydrate-loading phase.

A modified carbohydrate loading scheme is currently recommended. It should begin approximately three days prior to competition. Note: While muscle glycogen can be elevated after 24 hours of carbohydrate loading, it takes at least three days to maximally elevate muscle glycogen levels.

The diet should consist of at least 70% nutritious carbohydrate-rich foods, and should include such items as pasta, rice, breads, vegetables,

fruits, milk, and juice.

The pre-competition meal should also include nutritious high-carbohydrate foods that are enjoyable to the athlete and do not cause stomach distention. The amount of food consumed depends on the athlete's size and the nature of the competition. We generally recommend consuming approximately 500 to 1000 calories two to four hours prior to competition.

The goals of the pre-competition meal are:

1. A final attempt to increase carbohydrate fuel stores.
2. No undesirable shifts in energy expenditure during digestion.
3. Adequate hydration.
4. No gastrointestinal discomfort.

Fats and proteins should be avoided in the pre-competition meal. Fats delay the digestive process, may increase gastrointestinal discomfort, and do not increase glycogen stores. Proteins should be avoided because they help increase water excretion and compromise athlete hydration.

Adequate hydration can be insured by increasing fluid consumption up to 24 hours in advance of competition. Athletes should be ▶

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encouraged to drink up to 500 ml of fluid in the hours prior to competition and to consume fluid regularly during competition.

Water is the universally recommended fluid prior to competition. Since thirst is not a good indicator of athlete hydration status, the athletes should be encouraged to consume fluids habitually.

Finally, contrary to the theory that tepid fluids are best, we now know that cool fluids best enhance body-temperature control.

Dehydration strategies are often employed by athletes in sports with weight-classes, such as wrestling. These strategies include fluid restrictions, excessive sweating, and the use of diuretics and laxatives.

These practices reduce the volume of plasma, diminish blood supply to active muscles, and cause poor thermoregulation, fatigue, and

anxiety. For these reasons, we recommend the avoidance of excessive weight loss strategies prior to competition.

The practice of salt supplementation may lead to fluid diuresis and impair hydration as well. It is also believed that perspiration can lead to excessive salt loss and result in electrolyte loss. As a result, athletes do not need any more salt than normally consumed in the diet.

Some controversy exists over the practice of consuming high-carbohydrate foods-primarily simple sugars-in the hour prior to competition. This practice had been discouraged due to the concerns over insulin mediated rebound hypoglycemia, increased carbohydrate oxidation, and the decreased use of fatty acids as a fuel source, all of which impair performance.

Although recent research suggests these concerns have been overstated, the jury is still out on the question of

carbohydrate consumption in the hour before competition.

Some sports require intermittent matches, trials, and competitions over a number of hours. The failure to meet nutritional needs can result in dehydration, lowered glycogen levels, and hunger. The risk of gastrointestinal upset may be eliminated by avoiding food consumption.

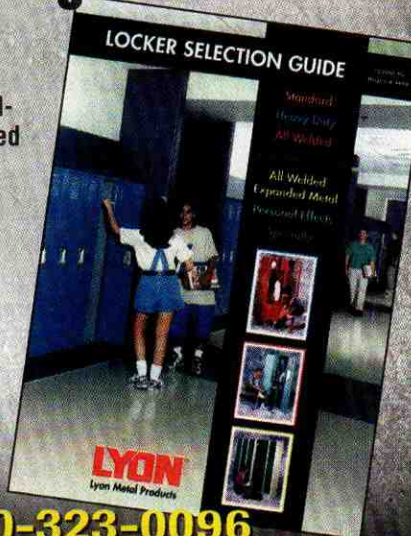
For competition with two-hour (or longer) breaks, we would recommend the consumption of carbohydrate-rich solids and liquids. Carbohydrate-based drinks may be best for competition having less than two-hour breaks.

Carbohydrate consumption is also important during the post-competitive phase. Fluid and carbohydrate replacement should be made within the first two hours after competition, while the capacity to synthesize is enhanced.

There is some evidence that simple and complex carbohydrates may perform equally well in this

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role. Food recommendations include bread, pasta, rice, cereal, muffins, potatoes, fruit, sports bars, milk, fruit juice, and sports drinks.

Coaches and athletes are often instructed to consume foods with limited nutritional value, due to limited time and minimal budgets, especially on road trips. Nonetheless, it is necessary to create a plan to meet athletes dietary needs before, during, and after competition.

Most athletes and former athletes know the feeling of playing with gastrointestinal distress, inadequate energy, lethargy, or "out of sync." And since many athlete contests are truly "games of inches," a logical nutritional plan may provide the necessary boost for the winning edge.

COMPETITION NUTRITION TIMELINE	
PRECOMPETITION	NUTRITION PRACTICE
72 hrs.	Begin carbohydrate loading
72 hrs.	Begin training taper
24 hrs.	Increase water consumption
2-4 hrs.	Eat pre-game meal
1 hr.	Consume 500 ml water
1 hr.	Possibly consume small nutritious "snack"
BETWEEN MULTIPLE EVENT COMPETITIONS	
<2 hrs.	Consume moderate amounts of carbohydrate rich foods and liquids
>2 hrs.	Consume carbohydrate rich liquids only
AFTER COMPETITIONS	
0-2 hrs.	Consume complex and simple carbohydrate rich foods

Recommendations:

1. Begin precompetition carbohydrate loading three days prior to competition.
2. Consume 70% carbohydrates during carbohydrate loading.
3. Eat precompetition meals 2-4 hours before completion.
4. Taper training 2-3 days prior to

competition to allow for increase glycogen storage (along with other physiological benefits).

5. Find nutritious food sources while on road trips or bring convenient nutritious foods along.
6. Allow athlete to experiment and assess the effectiveness of nutritious carbohydrate "snacks" within the hour prior to competition.
7. Increase fluid intake 24 hours prior to competition.

8. Consume about 500 ml water within an hour of competition.
9. Read nutrition labels on food packaging.
10. In weight-class sports, look for athletes who can make a weight class without excessive food restriction, sweating, or use of laxatives and diuretics. ■

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