2. Eating Well Before, During, and After Activity

2.1 Priorities for a Competition Day

On a competition day, the aim is to ensure proper hydration and sufficient energy to allow the athlete to meet the demands of the activity. As a result, the focus should be on ensuring:

- the amount of food consumed is appropriate given the type of effort to be performed
- the majority of food ingested is carbohydrate
- the fat content of the food ingested is low
- enough water is drunk

2.2 Recommended Foods

General Characteristics

Rich in carbohydrate — The pre-event meal must be high in carbohydrate (65-70% of total calories consumed). Fat and protein, which take longer to digest, should be consumed in smaller amounts. For instance, pasta, rice, cereals, potatoes, bread, low-fat granola bars, and dry cookies are all appropriate, as they are easy to digest and absorb.

Familiar — Since pre-competition "nerves" can upset the stomach, athletes should be familiar and comfortable with the food. In other words, they should have tried it before, preferably in pre-exercise or training conditions.

The Best Choices when Breakfast is the Pre-Event Meal

The following are examples of foods that are appropriate for breakfast the day of a competition or during training:

- Cereal — with low-fat milk
- Yogurt — low-fat, plain or fruit
- Fruit
- French toast and/or pancakes – with no added butter or margarine
- Egg dishes — not fried
- Ham or steak — if lean/not fried (small amounts)
- Potato — not fried
- Rice — not fried
- Noodles, pasta
- Toast — with limited amounts of butter/margarine
- Muffins — try jam or jelly, not butter

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- Beverages — Athletes should drink plenty of fluid!
- Bottled water
- Fruit juice — fresh, canned, cartons
- Skim milk, Ovaltine

The Best Choices when Lunch or Dinner is the Pre-Event-Meal

The following are examples of foods that are appropriate for lunch or dinner before competition or training:

- Fruit and vegetables, fruit and vegetable juices — fresh, canned, cartons
- Soups — broth-based
- Meat, fish, poultry — broiled, roasted, baked, barbecued, poached (reasonable portions; trimmed fat; skin from chicken removed)
- Cold cuts — turkey, chicken, lean beef, lean ham (reasonable portions)
- Meat alternatives — beans, peas, and lentil dishes **if these are familiar foods**; gas produced when these foods are not part of the usual diet can cause discomfort.
- Vegetables — steamed, boiled, baked
- Potatoes — baked, boiled, mashed (without butter/margarine)
- Rice — steamed, plain
- Noodles — plain
- Pasta — plain or tomato or vegetable sauce
- Bread — rolls, crackers, all breads
- Salads — bean, peeled fresh vegetables, fruit salad, low-fat cottage cheese (small amount of dressing)
- Desserts — fruit, yogurt (low fat), custards, puddings
- Cheese — in moderation

2.3 Foods to Avoid

Characteristics

The following should be limited **before competition or training**:

- ❑ Fatty foods, because they are slow to digest
- ❑ Protein-rich food, because they are slow to digest and are not needed as fuel during exercise
- ❑ Alcoholic beverages such as wine and beer, because they can have a dehydrating effect

Before competition or training, avoid the following foods — breakfast

The following foods are high in fat, difficult to digest, or nutrient poor:

- Whole milk, cream
- Fried eggs
- Side bacon, sausage
- French fries, hash browns
- Fried rice
- Cream or butter sauces
- Doughnuts, Danishes, pastries
- Croissants
- Butter, margarine

Before competition or training, avoid the following foods — snack, lunch, or dinner

The following foods are high in fat or nutrient poor:

- Cookies, crackers, chips, granola bars
- Cream soups
- Fried fish, meat, poultry
- Buttered, sautéed, creamed vegetables, or soufflés
- Fried potatoes
- Butter or cream sauces
- Pâté, sausages, processed meats, liverwurst
- Potato and macaroni salad, creamy coleslaw
- Salad dressing
- Pies, ice cream, pastries

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2.4 Foods to be Wary Of

The following foods are not well tolerated before competition or practice and should therefore be treated with caution:

- Spicy foods may be difficult to digest before exertion. (When travelling in other countries, athletes can bring a few favourite spices if they are already used to them.)
- Fibre-rich foods like whole-grain bread, cookies, whole-wheat cereals, and dried fruits (prunes, etc.) stimulate digestion and induce elimination. These foods should be avoided before exercise, especially if the athlete has diarrhea.
- Gas-producing foods like cabbage, broccoli, onions, and carbonated drinks make some athletes feel bloated.
- Coffee, tea, cola, and chocolate may cause diarrhea, which can have a dehydrating effect.
- Alcoholic beverages can impair performance and have a dehydrating effect. In some sports, alcohol is a banned substance.

2.5 Digestion Period

The meal size and food choices will vary depending on the time between eating and performing. Athletes must allow sufficient time for digestion. High kcal meals, especially those high in fat content, take longer to digest than lighter snacks.

The guidelines below should be used when planning meal times relative to a training session, a competition, or a series of competitions held on the same day. Coaches should be aware of individual tolerance levels for food. Experiment with these guidelines in practice to establish an appropriate protocol for each athlete.

1. Allow 3-4 hours for a large meal (approximately 500-800 kcal or more) to digest
2. Allow 2-3 hours for a smaller meal (approximately 300-500 kcal) to digest
3. Allow 1-2 hours for a small snack or blender/liquid meal to digest, or whatever the athlete's own tolerance indicates

If the athlete will be competing within the next 2 hours, small quantities of carbohydrate are the best choice: fruit, beverages, low-fat crackers, bread, yogurt, and/or well-cooked pasta. The athlete should also drink plenty of water. (When the athlete is travelling, bottled water should be used.)

2.6 General Food Safety Advice

The following suggestions apply to food served in cafeterias and restaurants or prepared for bag lunches taken to sport venues:

- Hot dishes (e.g. meat, casseroles, rice) should be served hot (not warm).
- Cold foods (e.g. cold cuts, salads, milk, dessert, sandwiches) should be served cold (not warm).
- If the meals at the venue have NOT been refrigerated, do NOT eat salads prepared with mayonnaise (e.g. macaroni, potato, or creamy coleslaw) or egg-based dishes (including custards).
- Foods should be served either hot or cold, and should be consumed within one hour of preparation.

Best choice . . .

"Bring your own food!"

- Healthy
- Prepared safely

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3. HYDRATION

3.1 Importance of Fluids

Proper hydration is important for all athletes to:

1. Replace water lost as a result of sweating
2. Avoid marked decreases in performance that result from dehydration
3. Help maintain core body temperature within acceptable limits during exercise

3.2 Effects of Dehydration on Performance

Dehydration negatively affects performance and is associated with premature fatigue. This is particularly the case for prolonged aerobic exercises such as distance running or cycling, but athletes competing in team sports or events of short duration can also be affected by dehydration.

Ironically, dehydration reduces the capacity of the digestive system to absorb water. Athletes should not wait until they are dehydrated before they drink, as this slows rehydration and causes gastric cramping.

3.3 Feeling Thirsty and Dehydration Level

It is well established that the sensation of thirst is not a good indicator of an individual's level of dehydration. When thirst manifests itself, approximately 2% of body mass has already been lost. Consequently, one cannot gauge dehydration by referring to the sensation of thirst. Therefore during exercise, it is important to drink on a schedule rather than according to thirst.

If thirst were the only point of reference used for determining fluid needs following profuse sweating, re-establishing optimum hydration could take 24 to 48 hours.

3.4 Drinking Fluids before Activity

Athletes should drink plenty of fluid every day, particularly before a practice session or competition. Athletes who are well hydrated have the following characteristics:

1. Sweating that starts sooner and is more abundant
2. An enhanced rate of absorption of the fluids consumed during exercise

In practical terms, this means drinking 1.5–2.5 cups (400–600 mL) of fluid 2 to 3 hours before exercise. This allows time for excess fluid to be excreted as urine before the exercise starts.

To ensure complete hydration, consuming 0.5–1.5 cups (150–350 mL) of fluid about 15 minutes before exercise is recommended.

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3.5 Drinking Fluids during Activity

Amount of Fluids to Drink

Athletes should drink enough fluid to maintain fluid balance throughout the exercise. The amount of fluid an individual can tolerate during exercise varies from one person to another, but usually ranges between 10 and 15 mL per kg of body weight per hour. In other words, as the following table suggests, a 60 kg person can absorb between 600 and 900 mL of fluid in an hour, a 70 kg person between 700 and 1050 mL, etc.

Body weight (kg)	Approximate quantity of fluid absorbed by the body in one hour (mL)	
	from ...	to ...
30	300	450
40	400	600
50	500	750
60	600	900
70	700	1050
80	800	1200
90	900	1350

Rather than drinking large amounts of fluid at one go, it is better to drink 0.5–1.5 cups (150–350 mL) of fluid every 15 to 20 minutes, or as much as one can tolerate without feeling any discomfort.

Athletes rarely consume enough fluid to maximize the absorption capacity of the digestive system or to balance fluid losses. Increased fluid intake during exercise will improve fluid balance for most athletes.

Precautions

To encourage athletes to drink plenty of fluids, have them bring several bottles or containers of water or sport drinks. For reasons of good hygiene, do not allow them to share bottles or containers with other people.

Sport Drinks

Sport drinks containing carbohydrate are recommended for activities lasting more than 60 minutes without interruption. Several studies suggest an improvement in performance as a result of drinking sport drinks, which promote optimal performance by providing both fluids and carbohydrates.

When exercise lasts less than one hour, consuming a sport drink will probably not improve performance significantly. In this circumstance, drinking water should be adequate unless it is hot and humid, in which case a sport drink is recommended.

Strategy for Encouraging Hydration in Children

Recent studies show that children's consumption of fluids is increased when drinks contain carbohydrates (40–80 grams per litre) and a little sodium. It is suggested that the coach encourage this type of drink rather than plain water to ensure that children take in enough fluids when they exercise in hot weather.

3.6 Rehydration after Activity

After an exercise where sweating has been profuse, it is extremely important to replace fluid. This sensation of thirst is not a good gauge. Consequently, forced hydration is often necessary.

It is possible to estimate how much fluid an individual has lost during exercise by weighing before and after the activity. The difference in kg represents the amount of fluid lost, in litres, since one litre of water weighs one kg. For each kg of body weight lost, at least 1.0 litre of fluid plus an extra 0.5 litre should be consumed. It is important to drink more than one litre per kg of body weight lost to account for urinary losses.

The colour and amount of urine are an easy way for athletes to monitor their dehydration level. Scanty, dark urine signals a need for more fluid, in which case athletes should force themselves to drink more fluids. Plenty of clear-coloured urine usually indicates adequate hydration.

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4. STRATEGIES FOR PROMOTING RECOVERY

4.1 Nutrition between Competitions

When there are two or more competitions on the same day, it is primarily the time available between periods of activity that will determine the quantity and type of food consumed. The principles described in this section, and also those contained in Section 2, should be respected.

In general terms, it is better to consume snacks high in carbohydrates between each competition and wait until the end of the day to consume a more substantial meal. It is also important to ensure that athletes consume enough fluid between each event.

4.2 Recommendations for Replenishing Reserves after Activity

For rapid recovery, it is important that athletes refuel immediately after a practice session or competition, especially if another physically demanding event or training session is scheduled the following day. Athletes should:

1. **Drink plenty of fluids:** At least 1.0 litre (4 cups) of fluid per kg of body weight lost during exercise, plus 500 mL is recommended. Refer to Section 3.6, "Rehydration after Activity", for rehydration strategies. To rehydrate between competitions on the same day, follow the guidelines for hydration during activity.
2. **Consume carbohydrates soon after activity:** As soon as possible after exercise, preferably within 30 minutes, athletes should consume carbohydrate; this procedure should be repeated every 2 hours until the next meal. This allows muscle energy stores to be replenished at a faster rate than if the athlete waits until mealtime to consume carbohydrate-rich foods. Athletes usually find it easier to consume liquid carbohydrate (fruit juices, sweet drinks, etc.) rather than solid foods, since exercise dulls the appetite.

The following table shows the amount of carbohydrate to consume relative to body weight. Also provided are examples of foods providing approximately 50 grams of carbohydrate.

Body weight (kg)	Approximate quantity of carbohydrate to consume up to 30 minutes after activity and every two hours until the next meal-time
30	45 grams
40	60 grams
50	75 grams
60	90 grams
70	105 grams
80	120 grams
90	135 grams

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Examples of foods containing approximately 50 grams of carbohydrate:

- 700 mL of sport drink
- 500 mL of fruit juice or soft drink
- 3 average size pieces of fruit
- a large Mars bar
- 3 muesli bars
- 2 pancakes with maple syrup
- 60-gram packet of jelly beans or jujubes

Examples of foods containing approximately 50 grams of carbohydrate and 10 grams of protein:

- 300 mL of milkshake
- 400 g of fruit yogourt
- bowl of cereal with milk
- 300 mL of liquid meal supplement
- 2 English muffins with peanut butter

3. **The meal after exercise should be high in carbohydrate, adequate in protein, and relatively low in fat**. Carbohydrate-rich foods should constitute the meals and snacks that follow an intense effort; to ensure carbohydrate stores in the muscles can be replenished quickly.

4. **Moderate amounts of salt and a few portions of salty foods should be consumed**, for example, tomato or vegetable juice, pretzels, canned soup or bouillon, pickles, ketchup, soy sauce, salsa, cheese, salted nuts.

5. **At least three portions of potassium-rich foods (vegetables and fruit) are recommended**, for example, vegetables, potatoes, fruit juices and fresh fruit, dried fruit.

6. **Think ahead**: Non-perishable foods can be brought to the competition or training site if food choices are limited there.