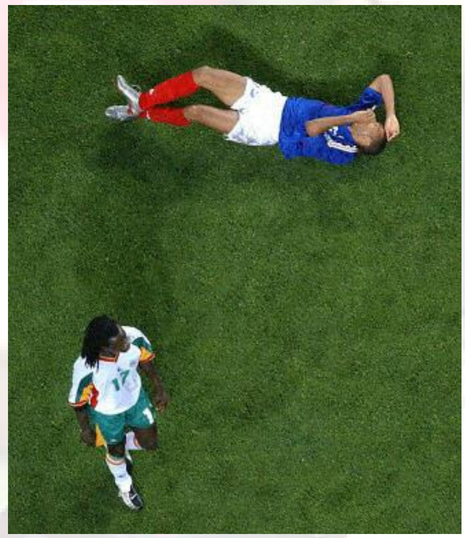
RECOVERY BETWEEN MATCHES

Most of the body's organs and systems are stressed during a soccer game. These include energy systems (liver and muscle glycogen, muscle tryglycerides), the musculoskeletal system, the endocrine and nervous systems.
There three main areas in which we can work on are: warm-down, restoring fluid levels and restoration of energy levels.

Warm-down



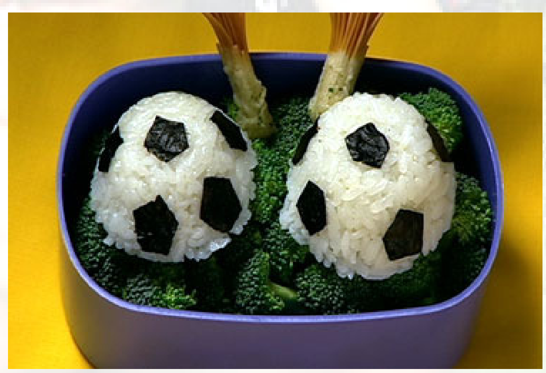
Active recovery removes lactate from the blood more quickly than does passive recovery. The clearance of lactate from the circulation is related directly to the exercise intensity (1) up to about 50% of maximal oxygen uptake (VO2max). It also facilitates a smoother decline in body temperature and blood flow than when activity is terminated abruptly, as core temperature continues to rise for a few minutes once the participant stops exercising (2). A warm-down also helps to damp activity in the nervous system, which promotes sleep afterwards: sleep could be adversely affected after a match due to a maintained elevation in the level of arousal of the central nervous system (3).

The active warm-down may consist of three phases (7):

a- 5-7 min of jogging,
b- 5 min of stretching and
c- a further 2 min lying prone with legs rose and ''shaken down'' by another player.

The trends in the data indicated that players warming down after a match recovered faster than an inactive group and may have some effects on reducing muscle soreness (4).

Restoration of energy levels



Body fat and carbohydrate stores provide the major sources of exercise fuel; whereas fat sources (plasma free fatty acids derived from adipose tissue and intramuscular triglycerides) are relatively plentiful, carbohydrate sources (plasma glucose derived from the liver or dietary carbohydrate intake, and muscle glycogen stores) are limited. In fact, the availability of carbohydrate as a substrate for the muscle and central nervous system becomes a limiting factor in the performance of prolonged intermittent high-intensity exercise training or soccer games.

By the time a game or a prolonged training session ends, those players who had played for the entire duration are likely to have almost depleted their glycogen stores in active muscles and liver. Unless glycogen concentrations are restored to normal, players may be ill-prepared for continuing their training programmes or to be prepared for the next competitive encounter.

There is clear evidence that adequate carbohydrate intake is important for the restoration of muscle glycogen stores, and that other dietary strategies related to the timing of intake, type of carbohydrate source or addition of other nutrients may either directly enhance the rate of glycogen recovery or improve the practical achievement of carbohydrate intake targets.

Timing of intake

The optimal time for beginning the replacement of energy is in the first 1 h after cessation of exercise, as the enzymes associated with glycogen synthesis are most active during this period (5). Recent investigations of feeding during the first 4 h of recovery (6) have achieved the highest glycogen rates when comparing with later feeding periods.

Although early feeding may be important when there is only 4–8 h between exercise sessions (5), it may have less impact over a longer recovery period.

The process of restoring energy must be continued next day to become effective. The protocol may entail ingesting 8 – 10 g kg-1 or more of carbohydrate over the day, representing a carbohydrate intake that represents 60% of the daily energy intake.

Quantity

There is a direct and positive relationship between the quantity of dietary carbohydrate and post-exercise glycogen storage at least until the muscle storage capacity or threshold has been reached.
Features of recent studies include carbohydrate intakes of 1.0– 1.8 g per kg of body mass every hour and repeated small feedings (e.g. intake every 15–60 min) rather than single or several large meals (6).

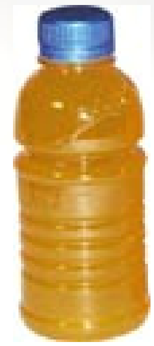
Effect of energy intake and co-ingestion of other nutrients

The co-ingestion of protein with carbohydrate meals has received most attention in terms of glycogen recovery and has provided a source of some debate, with some studies reporting both an increase in glycogen storage when protein is added to a carbohydrate feeding (6) and others finding no effect. (6).

Thus it is prudent to conclude at this time that the presence of other macronutrients with carbohydrate feedings does not substantially alter muscle glycogen synthesis when total carbohydrate intake is at the level for the glycogen storage threshold. However, when the athlete's energy intake or food availability does not allow them to consume such amounts of carbohydrate, the presence of protein in post-exercise meals and snacks may enhance overall glycogen recovery. In fact, intake of protein in recovery meals is recommended to enhance net protein balance, tissue repair and adaptations involving synthesis of new proteins (6)

The consumption of excessively large amounts of protein and fat in an athlete's diet, however, is discouraged because it may displace carbohydrate foods within the athlete's energy requirements and gastric comfort, thereby indirectly interfering with glycogen storage by preventing adequate carbohydrate intake.

Restoring fluid levels



Water loss during exercise (dehydration), although not so easy to observe, rapidly reduces performance in training and match-play. Since the satiation of thirst is a poor indicator of the restoration of body water, players should be encouraged to drink more than they feel is needed.

When

Ingestion of fluid during competition cannot keep pace with the amount of fluid lost and so a deficit in body water is incurred. Since physical performance capability is impaired when water losses exceed 1% of body mass, it is important that the player starts the game already euhydrated and that the fluid deficit is minimized. To do so requires periodic drinking in the natural breaks that occur during the game and more substantial fluid intake at the half-time intermission. Gastric discomfort constitutes a practical limitation when trying to restore fluid balance by drinking in the half-time interval. A rough guideline is contained in the schedule employed by Clarke, Drust, MacLaren and Reilly (2004). A total volume of 1065+76 ml administered at 0, 15, 30 min, half-time, 60 and 75 min) given in six equal small volumes eliminated feelings of gut fullness that were evident when the same total amount of fluid was given in two drinks, before the game and at half-time.

Type of content

Ingestion of pure water in the period after finishing the game lowers plasma osmolality and plasma sodium; the effects are a reduction in thirst and an increase in urine production, both of which tend to delay effective rehydration. The inclusion of electrolytes, notably sodium, in the drink facilitates absorption of water through the intestinal wall. The major electrolytes lost in sweat are sodium and chloride. If these electrolyte losses are not restored, part of the fluid ingested is lost again in the urine.

Addition of an energy source is not necessary for rehydration, but a small amount of carbohydrate may improve the rate of intestinal uptake of sodium and water and will improve palatability. When sweat losses are high, rehydration with carbohydrate solutions has implications for energy balance. For example, 10 L of soft drink will provide approximately 1000 g of carbohydrate, equivalent to about 4000 calories. The volume of beverage consumed should be greater than the volume of sweat lost to compensate for the ongoing obligatory urine losses, and palatability of the beverage is a major issue when large volumes of fluid must be consumed.

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