Heat acclimatisation and rehydration strategy

The 1996 Olympic games were held in Atlanta, Georgia, from 19 July to 4 August 1996. Atlanta is located at latitude 33° N, longitude 84° W (five hour time difference from the United Kingdom), and is at an altitude of about 1050 feet (320 m) above sea level. When the Games were awarded to Atlanta, it was immediately obvious that the climatic conditions in Atlanta would cause problems for some of the competitors. Expected average maximum day time temperatures in Atlanta at the time of the Games, based on long term average figures, were 31°C (87°F), with the daily minimum temperature likely to be 21°C (70°F). Average relative humidity was expected to be about 69%, with a range of between 50 and 90%. There was the possibility that it might be much worse than this: a temperature as high as 39°C (103°F) and humidity of 100% are possible. These were the conditions for which the athletes were prepared.

Living, training, and competing in hot humid conditions cause problems related to dehydration, with an impairment of performance likely, and with the possibility of potentially serious heat illness. These dangers can be reduced, but not entirely eliminated, by prior acclimatisation and by proper attention to rehydration, and these two aspects were the focus of the British Olympic Association (BOA) acclimatisation strategy. In addition, lifestyle issues related to living and training in the heat were addressed.

Although performance is impaired in the heat, repeated exposure to exercise in hot, humid conditions will result in physiological adaptations that reduce this negative effect. There have been many studies of the requirements for an effective acclimatisation programme, though these studies have not been carried out on Olympic athletes, but, rather, on soldiers, mineworkers, and student volunteers. Coupled with the wide individual variability in responses, this makes for some difficulty in making definitive recommendations for the individual athlete. None the less, the basic requirements seem clear, and all athletes were advised to consider a period of acclimatisation before the Games. One option was to stay at home and continue with morning training as normal, with an exercise session lasting 60–90 minutes in a hot room later in the day: 10–12 sessions, either daily or at intervals of no more than three days were recommended. This has the advantage of minimising time away from home and of allowing training to continue during the acclimatisation process. The second option was to travel to a hot environment for a period before the Games. The BOA made this option available to all teams by establishing the holding camp in Tallahassee. The advantage of this is that it allows athletes to train and live in the heat, to become adjusted to the time change, and to minimise the travelling time to the Games village. Other sports used holding camps elsewhere to take advantage of better facilities.

During exercise in the heat, large amounts of water and electrolytes are lost in the sweat: daily water requirements may increase from 2–4 litres to as much as 10–20 litres in extreme conditions. A rehydration strategy is therefore essential: acclimatisation increases, rather than decreases, the water requirement, and dehydration nullifies the advantages conferred by acclimatisation. There are real practical difficulties in adjusting the fluid intake to meet the increased requirements, and athletes were encouraged to experiment in training at home and during any hot weather trips in the two years preceding the Games. Variety and palatability are important issues when such large volumes have to be consumed. Electrolyte replacement also becomes important, but a combination of sports drinks and oral rehydration solutions, together with the electrolytes from the normal diet, were felt to be sufficient; electrolyte supplementation was not recommended except in specific situations.

The preparation of athletes—and of team management—was divided into three phases. The first was based on a BOA strategy that covered the general principles of living, training, and competing in the heat. The aim of this was primarily to raise the level of awareness about the potential problems of competing in the heat, especially among those who might have felt that they would be less affected: this included athletes in indoor sports, those in short duration events, and the coaching and management staff. The focus was on the need for an acclimatisation programme and a rehydration strategy, as well as on the lifestyle issues involved. Lectures were given and written material distributed at BOA coaching meetings, at squad weekends, and at the Tallahassee training camps held in the summers of 1994 and 1995.

The information was then refined in the second phase to form a strategy for specific sports, dealing with the factors that were relevant to the different sports, and setting a time frame that was determined by the competition schedule at the Games. Responsibility for this was devolved upon the individual sports, with assistance from a physiologist, a dietician, a sports medicine professional, and other experts as required. The final phase was the development of an individual strategy to suit the needs of each individual athlete.

During the Tallahassee camps in 1994 and 1995 athletes were encouraged to monitor their own responses to the heat and to use markers such as body weight, urine output, and urine colour to assess their hydration status daily. Coaches and managers were asked to try to identify any athlete having particular difficulty in adapting to the conditions. The experience of living in the heat was invaluable: athletes realised the need to carry drinking bottles to ensure adequate fluid intake. This was also time to experiment with modifications to the warm up and to experience an environment in which many sports were taking place.

Although each sport and each individual athlete was encouraged to be self sufficient as far as possible, some resources were provided centrally. A variety of different sports drinks were available in addition to those provided by the organisers, and 2000 personal drinks bottles were supplied. Dieticians, physiologists, and medical personnel were on hand throughout the games period at the holding camp in Tallahassee as well as in Atlanta, and were available for any last minute advice or encouragement.

The success of the preparations is difficult to judge: medal performance is not a suitable index, but there were no serious cases of heat illness during the Games, nor was there any indication that any individual British athlete suffered through lack of adequate preparation for the climatic conditions.

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