AUSTRALIAN VOLLEYBALL SCHOOLS CUP

2017 HOT WEATHER POLICY

MELBOURNE

3-8th DECEMBER

HOT WEATHER POLICY FOR THE GENERAL POPULATION

DISCUSSION

The risk of heat illness from vigorous exercise or high intensity sport is significant. It can range from cramps, through heat exhaustion to heat stroke, coma, and death (Mitchell 1994).

During competition, competitors may produce 15 - 20 times the heat they produce at rest. Dissipation of this excess heat is primarily achieved through sweating. If the body's ability to dissipate heat is compromised, core temperature in an average size individual may rise by one degree Celsius for every five minutes of exercise if no temperature regulating mechanisms are activated (Nadel 1977). If an individual's core temperature is above 40 degrees Celsius (normal 37 degrees) the risk of heat injury is significant.
Rectal temperature higher than 41 degrees Celsius is dangerous.

Factors which impair the body's ability to dissipate heat are:

1. high ambient temperature;
2. solar radiation;
3. humidity (which compromises the efficacy of sweating); and
4. dehydration.

These factors significantly increase the risk of heat illness occurring.

Sports heat illness can occur with high intensity exercise in cool conditions and with well-hydrated participants.

Because sports heat stress is complex, and because individual responses to heat stress vary, it is not possible to provide overall recommendations about limiting conditions to cover all sports. Since heat stress varies with exercise intensity, potential for heat illness may be categorised according to the exercise characteristics of the sport. The following sports involve reducing levels of exercise intensity and therefore reducing levels of risk.

1. endurance running in competition or training (higher intensity/higher risk);
1. football codes and hockey;
2. tennis; and
3. cricket (lower intensity/lower risk).

TEMPERATURE

The tables below provide approximate guides to weather conditions and appropriate individual and organisational responses. Although temperature ranges are given, there are not clear demarcations in risk between ranges.

Ambient Temperature

Easily understood, most useful on hot, dry days

Ambient temperature	Relative humidity	Risk of Heat Illness	Recommended management for sports activities
15 - 20		Low	Heat illness can occur in distance running. Caution over-motivation.
21 - 25	Exceeds 70%	Low - moderate	Increase vigilance. Caution over-motivation.
26 – 30	Exceeds 60%	Moderate	Moderate early pre-season training intensity. Reduce intensity and duration of play/training; take more breaks.
31 – 35	Exceeds 50%	High – very high	Uncomfortable for most people. Limit intensity. Limit duration to less than 60 minutes per session.
36 and above	Exceeds 30%	Extreme	Very stressful for most people. Consider postponement to a cooler part of the day or cancellation.

WBGT

Further guidance might be gained from the Wet Bulb Globe Temperature (WBGT) index.
The WBGT is particularly useful for hot, humid days.

WBGT	Risk of Heat Illness	Recommended management for sports activities
Less than 20	Low	Heat illness can occur in distance running. Caution over-motivation.
21 - 25	Moderate to high	Increase vigilance. Caution over-motivation. Moderate early pre-season training intensity and duration. Take more breaks.
26 - 29	High - Very high	Limit intensity. Limit duration to less than 60 minutes per session.
30 and above	Extreme	Consider postponement to a cooler part of the day or cancellation (allow swimming).

STRATEGIES FOR REDUCING THE RISK OF HEAT ILLNESS (General Population)

The following strategies are intended for the general population that does not fall into any of the listed 'At Risk' categories. 'At Risk' participants should consult the recommendations for their particular population sector.

1.Timing of games

Games and sporting activities involving moderate to high intensity exercise should be scheduled to avoid conditions where ambient temperature exceeds or is likely to exceed 36 degrees Celsius or where WBGT exceeds 30 degrees Celsius.

In most parts of Australia players are likely to be exposed to their highest risk of heat injury in the months of December, January and February, although in some regions this level of risk extends into March and April. This is in part due to high ambient temperatures that are prevalent during this period, and lack of match fitness of players participating in traditional winter sports such as Australian Rules Football.

Where possible, especially in January and February, games should be scheduled to start before 9 am. or after 6 pm. Early morning or night games minimise the risk of encountering unacceptable conditions at these times of year. This is especially so where these games are to be played in a locations with a history of relatively high WBGT.

2. Acclimatisation

If games or activities are to be conducted after long periods of cooler conditions, participants should strive to be fully acclimatised prior to participation.

Physiological adaptations to exercising in the heat are rapid and can occur after 3-5 days in a hot environment. Full acclimatisation can take 10-14 days or longer. The initial response is an expansion of the plasma volume; then, over several days, this returns to normal and the sweat rate increases with sweating starting earlier and a more dilute sweat being produced.

There is evidence that exercising in sweat clothing to the point where heat strain is induced can give some degree of acclimatisation (Dawson et al). The training must induce heat strain over several days, and care must be taken that adequate hydration occurs during these training sessions.

Doing some form of submaximal exercise in a heat chamber will also give some degree of acclimatisation; but its practicality in a team sport, except possibly in individual cases, is limited.

Some level of acclimatisation will occur in players coming out of summer. This, however, is usually countered by the lack of match fitness in athletes at this time of year.

What can be done easily is to educate athletes to train themselves to play and train with copious fluids already on-board. Further it must be emphasised to the players that they MUST consume fluids containing 6%-8% carbohydrate - in warm/hot conditions, muscle glycogen utilisation is much higher. (Febbraio 1992). The consumption of carbohydrate containing fluids has been proven to improve performance in the heat and, more importantly, delay the onset of exercise-induced heat exhaustion (Febbraio 1992, Davies et al 1988) and, hence, probably help prevent heat stroke.

3. Hydration

The more athletes sweat, the more fluid they must consume to avoid dehydration. High levels of dehydration may increase the risk of heat stress. To diminish the risk of heat stress fluid should be consumed before, during and after activity.

It is recommended participants drink at least 7-8 ml of fluid per kg of body mass (average is about 2 cups) no more than 2 hours before exercising to promote adequate hydration and allow time for excretion of excess water.

During exercise it is recommended that participants should drink fluid at regular intervals to replace water lost through sweating. Participants should aim to drink at least 3 ml per kg of body mass (about 250 ml for the average athlete of around 70 kilograms every 15 to 20 minutes or 2–3 cups every hour). However, this may vary dependent on the rate of sweating. Fluid taken should be cooler than the ambient temperature.

Water is considered an adequate fluid option for activities lasting up to one hour. Participants in events or activities exceeding one hour are recommended to use carbohydrate-based sports drinks as a means of replacing fluids, carbohydrates and electrolytes lost during prolonged activity.

In high risk conditions players should be encouraged to drink fluids at scheduled drinks breaks and should be provided convenient access to fluids during activity without unnecessary interruption to the game or event.

Officials and event organisers should also consider including additional drinks breaks for players in conditions of high risk.

In regard to post-event rehydration, it needs to be remembered that this can take 24 hours or more.

4. Player rest and rotation

In conditions of high risk participants should be provided opportunities to rest through the use of player interchange or substitution. The period of rest should be determined by the ambient temperature and WBGT at the time of the event or activity. For ambient temperatures greater than 26 and less than 30 degrees Celsius and for WBGT temperatures greater than 21 degrees Celsius and less than 25 degrees Celsius, all players should be rested for at least 10% of the period they would normally participate.
For example, if the activity normally runs for 60 minutes, the rest period for the player should comprise at least 6 minutes during the period.

For situations where the ambient termperature is greater than 31 degrees and less than 35 degrees Celsius and the WBGT is greater than 26 degrees Celsius and less than 29 degrees Celsius, all players should be rested for at least 25% of the period in which they would normally participate.

This may be achieved by rotation of players through an interchange bench or via the reduction in the regular playing time for all players.

For events played in high risk conditions that do not have a specified playing time, players should be permitted to take rest breaks from activity equivalent to 3 minutes for every 30 minutes of activity.

The positive effects of rest breaks should also be maximised by employing the following strategies:

- allowing players to rest in naturally shaded areas or providing portable structures that create shade where and when required;
- providing fans and ice packs; and
- providing additional fluids to allow participants to spray or douse themselves to assist cooling.

5. Pre-cooling

Pre-cooling by cool water immersion or the wearing of ice vests has been demonstrated to increase athletic performance in endurance sports. This practice could be of benefit to many athletes. However, it must be noted that the effects of a pre-cooling manoeuvre are reduced rapidly by a warm up. Therefore, any pre-cooling strategy must be undertaken in concert with a vastly reduced warm-up if it is to be effective.

6. Clothing

Light coloured, loose fitting clothes, of natural fibres or composite fabrics, with high wicking (absorption) properties that provide for adequate ventilation are recommended as the most appropriate clothing in the heat. This clothing should further complement the existing practices in Australia that protect the skin against permanent damage from the sun.

CHILDREN AND HEAT

The physiological and structural difference between children and adults places children at a greater risk of suffering from heat illness. These differences impact on a child's ability to respond to environmental heat and acclimatise to heat. These differences include:

- a larger surface area/body mass ratio which affects their ability to dissipate heat when environmental temperature is greater than skin temperature (Falk 1998). This can be an advantage when heat loss is necessary, but is a disadvantage when radiant or convective heat gain occurs;
- immature sweating mechanisms which require a greater increase in body temperature before the onset of sweating (Araki et al 1979); and
- fewer and smaller sweat glands which limit the production of sweat (Araki et al 1979, Falk 1998, Wagner et al 1974).

HOT WEATHER POLICY FOR CHILDREN

At ambient temperature greater than or equal to 30 degrees Celsius, children have greater difficulty getting rid of heat than adults.

STRATEGIES FOR REDUCING THE RISK OF HEAT ILLNESS (Children)

The following strategies should be considered for sport and physical activities involving children. The strategies should be considered in conjunction with strategies for reducing the risk of heat illness for the general population and the hot weather policy for children.

1. Shade and drinks

Organisers of activities that are conducted in hot conditions must provide sufficient shade and regular drinking opportunities. This is particularly critical where the fitness and state of acclimatisation of the young participants are uncertain.

It is recommended that water or fluids be provided whenever children are being active.
More fluid, however, appears to be consumed by young people when the drinks offered are perceived as palatable to them. Therefore, for children and adolescents having trouble drinking adequate tap water, flavoured drinks may need to be considered.
Conversely, the high energy content of some flavoured drinks may be unnecessary during exercise in athletes who have a genuine rather than an aesthetic need to lower body fat levels.

It is recommended that young athletes begin regular drinking routines using water or fluids during training and competition. Regular and effective drinking practices should become habitual to young athletes before, during and after activity. Individuals should monitor weight changes before and after workouts and know the amount of fluid that they are likely to require.

2. Acclimatisation and overweight children

In addition to the risks associated with activity in the heat for unfit and unacclimatised young people, coaches/supervisors of overweight children and adolescents should take extra precautions to lessen the potential for heat gain. It is recommended that, whenever activity in hot conditions is unavoidable with these children, coaches/supervisors decrease the volume and duration of physical activity and increase opportunities for drinking, rest and shade as a matter of priority.

At the onset of hot weather, the young athlete may take longer to acclimatise. It is therefore recommended that training volumes (duration and intensity) decrease during the first few weeks of hot weather. Increased times for rest, using access to shade more frequently and increasing the number of mandatory drinking breaks are recommended for the young athlete when the weather becomes noticeably hotter.

3. Clothing

In addition to the clothing recommendations made for the general population, it is recommended that summer-based sporting organisations select uniforms that minimise heat gain and that coaches, teachers and parents encourage children and adolescents to wear appropriate clothing in layers that can be easily removed during activity.

4. Heat illness register

To improve the understanding of activity in the heat by children and adolescents, it is recommended that a register of heat-related illness be established. This may comprise a system within which all aspects of heat-related illness incidents are recorded. Items of note may include the individuals afflicted and their symptoms, the time of the incident, the environmental conditions, the physical activity undertaken, the immediate treatment and subsequent action taken.

The system is recommended to help identify individuals who have previously experienced some form of heat illness and therefore may require additional attention to ensure that they adopt prevention strategies.

RECOMMENDATIONS FOR THE DEVELOPMENT AND RECOMMENDATIONS FOR WAYS IN WHICH THE SPORTS INDUSTRY CAN REDUCE THE RISK OF HEAT ILLNESS

The following recommendations are provided to help identify long and short-term objectives for the sports industry so as to reduce significantly the risk of dangerous and sometimes catastrophic incidents occurring as a result of activity in hot weather.

Adoption of policy for children

All junior sporting clubs and associations or clubs and associations involving junior participants should immediately familiarise themselves with SMA's Hot Weather Guidelines and Beat the Heat brochure. These are available as a web download from www.sma.org.au .

All junior sporting clubs or clubs involving junior participants are encouraged to purchase a dry bulb thermometer to measure ambient air temperature on-site to ensure local conditions are accurately measured.

Adoption of strategies

All sporting clubs and associations should develop or add to their existing policies or rules, the 'Strategies for Reducing the Risk of Heat Injury' detailed in SMA's Hot Weather Guidelines.

Central measurement

To overcome the current barriers for sporting clubs and associations measuring WBGT, it is recommended that clubs and associations avail themselves of the local weather service provided by the Bureau of Meteorology through SMA websites. .

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