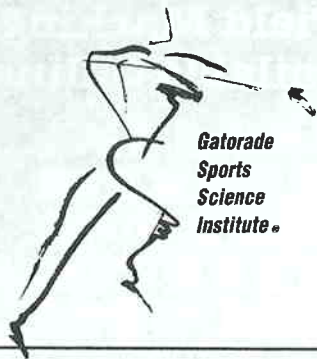




Coaches' Corner

Tips on Exercising in the Cold

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Exercising in cold weather is a fact of life for many athletes. For some, such as cross-country runners and baseball players, low temperatures are an unwelcome element in late-season competitions or off-season training. For other athletes, including Nordic skiers and ice skaters, cold weather is an essential element of the sport.

Regardless of its specific role in a sport, cold weather can profoundly affect the physiological responses to exercise. In some cases, it can present a significant health risk. Coaches and trainers must be prepared to help their athletes overcome the hazards associated with cold.

BODY RESPONSE TO COLD

Like all warm-blooded animals, humans must maintain an internal body temperature close to 98.6°F (37°C). During exposure to a cold environment, the normal body temperature is maintained by increasing heat production and/or reducing the rate of heat loss (heat conservation).

Heat production can be increased by voluntary exercise or by shivering, which is caused by involuntary muscle contractions.

Heat conservation is accomplished behaviorally by adding clothing or physiologically by constricting the vessels that carry blood to the skin and to regions of the body such as the ears, feet, and hand.

BODY RESPONSE TO EXERCISE IN COLD

The effect of cold on exercise performance depends largely on the severity of the cold and the nature of the exercise. With endurance exercise, exposure to extreme cold reduces both the athlete's core body temperature and maximal aerobic power (VO₂max), impairing the athlete's performance.

Moderate cold exposure, however, may actually produce a positive effect.

Research has shown that the performance of endurance exercise is enhanced by cooler environmental conditions and by treatments such as brief pre-exercise cold showers. Indeed, record performances during long-distance running and cycling are usually achieved in cool climatic conditions.

In contrast, both severe and moderate cold can adversely affect the performance of activities that depend on high levels of strength and anaerobic power (e.g., sprinting and jumping). These effects are most profound when the conditions are severe enough to reduce muscle temperature.

PRACTICAL TIPS

Exercise and sport participation can be pursued safely and successfully in cold conditions by observing the following precautions:

- **Proper warm-up.** In many athletic activities, particularly those relying on speed and power, optimal performance requires the elevation of the muscle temperature before competition. In cold conditions, this state is difficult to achieve and may require wearing heavier clothing, exercising more intensely and/or longer, and continuing the warm-up activity until immediately before the competition.

- **Appropriate clothing.** When dressing for exercise in the cold, the athlete should ensure adequate insulation while avoiding an accumulation of sweat in the garments. Clothing should be selected for comfort during the activity, after metabolic heat production has reached a steady-state. Athletes should resist the temptation to overdress, as this can lead to sweat accumulation in the clothing. Multiple layers of clothing provide good insulation. However, the innermost layers should carry moisture away from the body surface. Polypropylene or cotton fishnet materials are recommended.

Since much heat can be lost through the head, proper head covering is a must.

- **Gauge the wind.** Wind can greatly increase heat loss from the body. During training, runners, cross-country skiers, and other endurance athletes should "go out" facing the wind and "come in" with the wind. This will avoid exposure to high wind chill while wearing sweat-soaked clothing.

- **Prevent frostbite.** During cold exposure, the fingers, toes, ears, and facial tissues are susceptible to frostbite because of the reduction of blood flow to these tissues. These areas should be checked regularly during prolonged exposure to cold, windy conditions. Note: Victims of frostbite are often unaware of the condition because extreme cold blocks sensations of pain.

- **Prevention of postexercise hypothermia.** Hypothermia is a dangerous and potentially lethal condition in which body temperature falls markedly below the normal 98.6°F (37°C). Many cases of hypothermia can develop rapidly after exercise at low temperatures because the heat production has decreased while the rate of heat loss has remained high.

Postexercise hypothermia can be prevented by adding clothing and moving to a warm environment soon after finishing the competition and drinking fluids.

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