

Winter sports and cold-related injuries

Participating in snow sports is a popular choice of recreation and can add exhilaration to the appreciation of alpine environments. The different conditions in these environments should be seriously considered and prepared for, to minimise the risk of personal injury.

Most injuries common to winter and snow sports can be prevented with planning, adequate preparation and proper equipment.

The alpine environment

Cold conditions can be expected in alpine environments. Furthermore, open exposed areas, such as mountain peaks, mean that windy conditions are also commonplace in these environments and can contribute significantly to cold temperatures (also known as the 'wind chill factor'). The collective effect of these conditions is heat loss which places extra demands on the body. For example, a drop in core body temperature of just 1°C causes the muscles to shiver, which in turn can lead to low blood sugar levels (hypoglycaemia) and reduced sporting performance.

Cold-related injuries

Injuries common to winter and snow sports that relate to cold and wet conditions include the following:

- **Blisters** – the friction of wet socks and badly fitting footwear can cause blisters on the toes, feet and heels.
- **Sprains and strains** – cold muscles and connective tissue have less elasticity and are therefore more prone to injury. Falls are also more likely when sporting performance is reduced in cold conditions, and this increases the likelihood of these soft tissue injuries. Ligaments and muscles spanning the knees, shoulders, wrists and spinal joints are the most commonly injured from falls while skiing or snowboarding.
- **Hypothermia** – the core temperature of the average human body is around 37°C. Hypothermia occurs when the body's temperature falls below 35°C. Symptoms include shivering, drowsiness and lack of coordination. The person may lie down to rest, lapse into unconsciousness and die if not treated quickly.
- **Frostbite** – this occurs when the tissues of the skin freeze. Ice crystals in and around skin cells block the movement of blood through the fine blood vessels (capillaries), which means the skin is deprived of oxygen and nutrients and dies.
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- Participants must also be aware of injuries resulting from the sun when exercising in alpine environments. This can include the following:
- **Sunburn** – ultraviolet radiation is present, even in cold and cloudy conditions. This, and the reflections off the snow, can cause sunburn to exposed skin. What many people may think is 'windburn' is actually sunburn.
- **Snow blindness** – this is sunburn of the cornea of the eye, caused by ultraviolet radiation. Symptoms include painful, watery eyes and temporary blurring of vision.

Most cold-related injuries can be prevented with planning, adequate preparation and proper equipment.

Requirements of winter and snow sports

There is nearly infinite scope for participants in winter and snow sports to place increasingly challenging physical demands on themselves as they improve their skills. Tasks will require various levels of strength, flexibility, coordination and balance.

Proper planning, adequate preparation and suitable equipment and clothing can prevent most winter and snow sport injuries.

Planning:

- Listen regularly to weather reports and avoid weather extremes, such as a predicted snowstorm.

Preparation:

- The best way to avoid many sports-related injuries in winter is to maintain an adequate fitness level all year round.
- Condition the muscles particular to your chosen winter sport for at least a few weeks or months beforehand. For example, downhill skiing places great demands on the quadriceps (the muscles located on the front of the thigh), so condition these muscles with regular pre-season training sessions of step aerobics or stair climbing.
- Acclimatise yourself to exercising in colder weather. For example, before you hit the ski slopes, try training outdoors for a few weeks instead of inside a warm gymnasium.
- Treat any ailments you may have before taking part in winter sports. Feet are particularly vulnerable to cold, so if you have a pre-existing medical condition that can affect your feet, such as bunions or diabetes, see your doctor for information and advice before engaging in winter sports. This applies to snow sports enthusiasts at all levels from beginners through to elites.

Equipment and clothing:

- Wear insulating, lightweight, multiple layers of clothing as this traps more body heat than one bulky layer. This also allows you to add or subtract layers according to your comfort.
- Wear adequate headgear since a lot of body heat is lost through the scalp.
- Avoid getting wet. Wear outer layers that are waterproof and 'breathable' (allows moisture produced by sweating to escape).
- 'Pit zips' on jackets and zips on pants are useful to release heat when you're exerting excessively and in danger of overheating.
- 'Powder skirts' are a useful feature in jackets, particularly if you fall in loose snow. The snow can find its way inside your jacket and your body heat can melt it, leaving you cold and wet.
- Take spare gloves, socks and hat in case the ones you are wearing get wet.
- Wear appropriate footwear (such as insulated and waterproof shoes) and wear a blend sock that 'wicks' sweat away from the skin.
- Make sure all footwear fits you properly, especially if you are skiing or skating. Footwear that is too tight or too loose will cause a wide range of avoidable injuries, including impaired blood circulation (which could contribute to frostbite) and blisters. Footwear that is too loose may also cause injuries. For example, if skiing in loose boots, your skis may not respond quickly enough to movements of your feet, causing you to fall.
- Make sure that any other equipment is suitable for the task. For example, skis should be the right length and shape, and bindings set to release at the appropriate level of force depending on your body dimensions and ability.
- Additional equipment such as helmets, wrist and knee guards or 'body armour' padding may be useful to prevent serious injuries from falls. 'Lids on kids' is a program that has been developed to promote the use of helmets in winter sports to decrease the risk of head injuries – for more information, see the **Where to get help** section of this fact sheet.
- Wear close-fitting sunglasses or goggles that meet the Australian Standard AS1067.

General safety suggestions

Take note of the following general safety suggestions:

- Never participate in winter sports alone. With a partner (or two), you can use the 'buddy system', for example to check each other for signs of hypothermia.
- Be aware that you are exposed to UV radiation even on cold and cloudy days. Apply broad spectrum 30+ sunscreen to all areas of exposed skin. Reapply regularly.
- Drink plenty of water before, during and after sport.

- Don't drink alcohol. While an alcoholic drink seems to warm you up, it actually narrows your blood vessels, particularly those of the hands, which can increase your risk of hypothermia.
- Carry some snacks or energy bars as fatigue increases the risk of injury.
- Don't push yourself until you are exhausted. Rest at regular intervals to avoid fatigue-related injuries.
- Cold muscles, tendons and ligaments are vulnerable to injury. Warm up thoroughly before playing your chosen winter sport. Remember to take cold temperatures into account and spend more time warming up than usual.
- Make sure you cool down thoroughly afterwards. Include plenty of slow, sustained stretching. This may assist in limiting the development of delayed onset muscle soreness after activity.
- In downhill snow sports obey the alpine responsibility code and any rules of the mountain.
- Know your ability and always stay in control and be able to stop and avoid other people or objects. It is your responsibility to stay in control on the ground and in the air.
- Take lessons from qualified professional instructors to learn and progress.
- As you proceed downhill or overtake another person, you must avoid the people below and beside you.
- Do not stop where you obstruct a trail or run or are not visible from above.
- When entering a trail or run or starting off downhill, look uphill and give way to others.
- When riding chairlifts always use the restraining devices. Always use suitable restraints to avoid runaway ski or snowboard equipment. Ensure your equipment is in good condition.
- Observe and obey all signs and warnings. Keep off closed trails or runs and out of closed areas.
- Before using any lift, you must have the knowledge and ability to load, ride and unload safely.
- Do not ski, snowboard, ride a lift or undertake any other alpine activity if your ability is impaired by drugs or alcohol.
- If you are involved in, or witness an accident, alert Ski Patrol, remain at the scene and identify yourself to Ski Patrol.
- When using terrain parks demonstrate appropriate etiquette. 'Smart Style' is a set of guidelines designed in America by Burton Snowboards and the National Ski Areas Association. The simple messages are:
 - Look before you leap – obey signs, scope around jumps first, use a spotter when necessary
 - Easy style it – know your limits and stay in control
 - Respect gets respect – wait your turn and call your start, only one person at a time on each feature, clear the landing quickly.
- In the event of a fall do not attempt to get up too soon while you are still falling or sliding – wait until you stop.

Avoid hypothermia and frostbite

- If your feet get wet, seek shelter as soon as you can. The skin tissues of wet, cold feet are in danger of freezing (frostbite).
- Be alert for signs of hypothermia and frostbite.
- Seek shelter and medical attention immediately if you, or anyone with you, experiences any of the following symptoms:
 - Grey or blue facial skin
 - Cold, hard and white skin
 - Numb patches on the skin
 - Swollen and blistering skin
 - Uncontrollable shivering, followed by lack of shivering
 - Loss of physical coordination
 - Speaking difficulties, such as slurring
 - Loss of control over the small muscles – for example, the muscles of the fingers
 - A strong yearning for sleep.

Where to get help

- A physiotherapist
- Australian Physiotherapy Association Tel. (03) 9092 0888 or **Find a Physio** at www.physiotherapy.asn.au
- Mountain rescue services.
- 'Lids on Kids' helmet safety program

Things to remember

- Exercising in cold weather places extra demands on the body.
- Protect against hypothermia and frostbite by wearing warm and waterproof clothing and footwear appropriate to your sport.
- Remember that you can still get sunburnt in cold and cloudy weather, so cover up with clothing, apply sunscreen to exposed skin and wear close-fitting sunglasses.
- Thoroughly warm up and cool down to reduce the risk of muscle sprains and strains.
- Seek out local experts and follow their advice.

This page has been produced in consultation with, and approved by:

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