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## Snow sports and cold-related injuries

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### Summary

- 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 and headgear, apply sunscreen to exposed skin, and wear close-fitting sunglasses with a high UV protection rating.
  - Thoroughly warm up and cool down to reduce the risk of injury to your body.
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### About snow 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.

### Alpine environments

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:

- **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 any soft tissue injuries can be more severe. Ligaments and muscles acting on the joints of the knees, shoulders, wrists and spine 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 core temperature falls below 35°C. Symptoms include shivering, drowsiness and lack of coordination. The person may lie down to rest, lapse into unconsciousness or die if they don't get urgent medical attention
- **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
- **head injury** – due to the high-speed nature of snow sports, impact injuries to the head can have serious health consequences. If you or a companion sustain a head injury while participating in snow sports, stop and seek urgent medical attention. Don't return to your snow sport until you have received medical clearance.

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

Be aware of the dangers of sun-related injuries when exercising in alpine environments. These can include:

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- **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. Snow blindness can be prevented by wearing snow goggles or wrap-around sunglasses with 95 to 100% UV protection.

Make sure to **protect yourself from the sun when you are at the snow.**

### **Requirements of winter and snow sports**

There are many opportunities for participants in winter and snow sports to increase the physical demands on themselves as their skills improve. Tasks 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 for winter and snow sports**

You can plan ahead by listening regularly to weather reports and avoiding weather extremes, such as a predicted snowstorm.

**Off-snow preparation** includes:

- improve cardio endurance to last longer on the snow.
- seek advice from your physiotherapist on a specific ski or snowboard training program as early as possible before you ski. If possible, complete a 6 to 12 week specific neuromuscular conditioning program to better prepare your body for the demands of skiing and snowboarding, and reduce the risk of injury.
- incorporate drills that improve foot speed and coordination to improve reaction time.
- use appropriately fitted gear.
- plan ahead – know your run levels! Don't get caught on a run that doesn't suit your ability.

**On snow preparation** includes:

- take lessons.
- use the proper equipment -- wear a helmet, check bindings before skiing and use any other required protective equipment.
- avoid 'taking air' (becoming airborne).
- assess your risk of injury. Using terrain parks to do jumps and other tricks adds a level of risk.
- learn how to fall – fall with the ski, wait until you stop sliding.

To recover after the day on the slopes, stretch or seek a massage to enhance your recovery.

### **Proper equipment and clothing for winter and snow sports**

Make sure that you have the proper equipment and clothing for winter and snow sports, including:

- wear insulating, lightweight, multiple layers of clothing as this traps more body heat than one bulky layer. This also allows you to add or remove 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' (allow moisture produced by sweating to escape). Change wet clothing at your next available opportunity.
- '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 helps keep sweat away from your 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.
- wear close-fitting sunglasses or goggles that meet the Australian Standard AS1067.

### General safety suggestions for snow sports

General safety suggestions for snow sports include:

- never participate in winter sports alone. With a partner (or two), you can use the 'buddy system' to look out for each other – 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. Eat these during your rest breaks in the day.
- 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 doing 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 help to limit the development of delayed onset muscle soreness after activity.
- take lessons from qualified professional instructors to learn and progress.
- in the event of a fall, don't attempt to get up too soon while you're still falling or sliding – wait until you stop.

In downhill snow sports, obey the **alpine responsibility code** and any rules of the mountain. The code advises:

- know your ability and always stay in control, and be able to stop and avoid other people or objects. It's your responsibility to stay in control on the ground and in the air.
- use appropriate protective equipment, such as helmets, to reduce your risk of injury.
- before using any lift, be sure that you know how and can load, ride and unload safely. When riding chairlifts, always use the restraining devices.
- observe and obey all signs and warnings. Keep off closed trails or runs, and out of closed areas.
- as you proceed downhill or overtake another person, avoid the people below and beside you.
- don't 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.
- always use suitable restraints to avoid runaway ski or snowboard equipment. Make sure your equipment is in good condition.
- if you are involved in, or witness, an accident alert Ski Patrol, remain at the scene and identify yourself to Ski Patrol.
- don't ski, snowboard, ride a lift or undertake any other alpine activity if your ability is impaired by drugs or alcohol.

When using terrain parks, make sure you observe the appropriate etiquette. **Smart Style** is a set of guidelines designed in America by Burton Snowboards and the National Ski Areas Association. The basic Smart Style messages are:

- start small – work your way up, build your skills
- make a plan – every feature, every time

- always look before you drop
- respect the features and other users
- take it easy – know your limits, land on your feet.

### **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, experience any of the following:

- 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**

- in an emergency, always call triple zero (000)
- local ski patrol
- **Snowsafe**
- **physiotherapist**
- **Australian Physiotherapy Association** Tel. **(03) 9092 0888**

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Australian Physiotherapy Association

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