

STEVEN CHUDIK MD

SHOULDER, KNEE & SPORTS MEDICINE

Frostbite

Frostbite is a cold-related injury to body parts that have been exposed to low temperatures for prolonged periods of time. The tissues freeze and lose oxygen supply because blood supply is lost or reduced. Frostbite is common in runners in cold climates, as well as participants in winter and climbing sports.

Frequent Signs and Symptoms

- First Stage
 - Numbness
 - Central white area with surrounding redness
 - Clumsiness
 - Swelling (edema)
- Second Stage
 - Blisters with clear or milky fluid developing after 24 hours
- Third Stage
 - Hemorrhagic blisters that slowly become a hard black scab (eschar) over 2 weeks
- Fourth Stage
 - Loss of tissue

Etiology (Causes)

Frostbite is caused by prolonged exposure to freezing temperatures. Risk increases with:

- Alcohol consumption
- Improper clothing
- Prior episode of frostbite
- Smoking
- Dehydration
- Poor conditioning
- Non-acclimatization (no previous attempt to prepare the body for cold weather)



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Prevention

- Wear proper protective clothing.
- Maintain general good health.
- Maintain adequate hydration.
- Face away from the wind.
- Cover your nose, ears, and hands.
- Keep your hands inside a jacket or under your armpits when possible.
- Eliminate alcohol and tobacco use.
- Wear clothing in layers.
- Use water repellent over mittens or gloves.
- Prevent clothes from becoming wet with waterproof covering.

Outcomes

The risks of a bad outcome from exposure to the cold are related to the amount of time exposed to the cold more than the temperature. Although skin freezes more quickly at colder temperatures, the amount of permanent damage is linked to the total time the tissue is frozen. The best results are seen when the initial examination demonstrates sensation to pinprick, skin that indents when pressure is applied, normal skin color, and blisters filled with clear fluid. Poorer results can be expected when blisters are filled with blood-tinged fluid and when the skin feels wooden to touch and does not indent.

Potential Complications

The most dreaded complication of frostbite is loss of tissue. In severe cases, loss of not only skin but also muscle and bone is common. In milder cases, there is usually a vulnerability to cold injury for months or years. Some patients experience numbness in the area for variable periods. The mildest cases (first stage) usually have no complications.

Treatment Considerations

- Rapidly rewarm the area in warm water with precisely controlled temperature (40°C to 42° C).
- Débride (clean) white blisters and apply aloe vera (no alcohol or perfume).
- Apply loose bulky protective dressing.
- Splint and elevate the extremity.
- Use ibuprofen, 800 mg 2 to 4 times per day for adults.
- Do not smoke.



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Possible Medications

- A tetanus shot may be needed if your last tetanus booster was given more than 10 years previously.
- For severe cases, intravenous penicillin is given for 3 days.
- Pain medications are used as needed.
- Many treatments for frostbite are experimental and cannot be recommended at present.

Activity

- Avoid re-cooling the injured area until the area is completely normal.
- Physical therapy to restore motion and strength is often started when swelling resolves.

Diet

- Adequate hydration is important in prevention.

Notify My Office If

- After a prolonged period of cold exposure, you experience numbness and white skin with any blister formation
- You have a history of frostbite and experience a new episode
- You have a severe episode of cold exposure with blood-filled blisters on the area



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