

# Frostbite and immersion injuries (trench foot)

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Frostbite occurs when a part of the body freezes. The cells are disrupted and the tissue dies. It is in effect a 'cold' burn and can be categorised according to the depth that it affects in the same way as a conventional burn. Other mechanisms at play include vasoconstriction caused by cold, capillary sludging and reperfusion injury with the release of free radicals, which occurs on rewarming the part. It commonly involves the fingers, toes, cheeks, the tip of the nose and the ears. When frozen the tissue feels hard and cannot be indented. Immersion injury is a cold injury that does not involve actual freezing of the tissue and is commonly caused by prolonged immersion in cold water (hence trench foot). The patient may also be hypothermic. Warming should be gentle as the heat used may actually cause a burn! Rehydration with warm fluids and use of non-steroidal anti-inflammatory drugs such as ibuprofen are beneficial. Richard von Volkmann, 1830-1889, Professor of Surgery, Halle, Germany. At this stage no surgery should be undertaken as there is often considerable deep recovery. The injured area should be kept clean and dry and efforts made to prevent further injury, as well as to prevent infection. Definitive surgery to excise dead tissue can be left for many months. Recent developments, such as the use of tissue plasminogen activator and nerve blocks, show promising results in reducing amputations, but have to be started within 24 hours and are seldom possible in the field. Summary box 33.12 Frostbite /uni25CF /uni25CF /uni25CF

Can be superficial or deep like a burn  
Rewarm gently Allow demarcation to occur naturally  
Protect against further trauma and infection

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