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Treatment of Dislocations and Fractures

Herbert Forster, Ken Zafren

Intended for all rescue first responders according to national regulations

Most mountain rescue operations are due to joint injuries and fractures. Treatment of these injuries must follow some basic principles.

The injury affects not only the bone or the joint, but also a complex functional unit that consists of skin, muscles, nerves, blood vessels, ligaments, tendons and bones. Each part of this unit has an important function. In most cases treatment is determined not so much by the injury to the bone itself, but by the injury to another part of this functional unit. Therefore, treatment is directed at the entire functional complex.

Because mountain rescue operations are often time-consuming, failure to reduce dislocations of joints or displaced fractures may result in serious skin, circulatory or neurological injury.

There is often no way in distinguishing fractures in the field. In doubtful cases, injuries should be treated as fractures to prevent further harm to the patient.

The main complication of open fractures is the danger of infection. A bandage should be applied to prevent further bacterial entry into the wound and should be not removed until hospital treatment. It is very important to report the possibility of an open fracture under the bandage when handing over the patient to another care giver.

In most cases it is better to bandage before splinting a limb. Foreign objects in the wound should not be removed. Improper removal can lead to major bleedings or to injuries to surrounding soft structures (e.g. nerves). Protruding foreign objects may to be shortened or bent very carefully, taking caution not to lose the remaining part in the wound.

Step-by-Step Fracture Treatment

1. Careful and complete examination of the patient
2. Promptly administer analgesia, as needed
3. Prepare splinting materials
4. Bandage open fractures
5. Reposite the limb by applying traction
6. Splint
7. Transport in a controlled fashion
8. Complete required documentation

In most cases, obvious or even spectacular injuries make a strong impression when approaching a injured patient. Nevertheless, the first step has to be a complete and systematic examination. It is crucial to recognize all life-threatening injuries well as to obtain an over view of all injuries. Once this has been done and life-threatening injuries addressed, then treatment of the injured extremities can be begun. If analgesics are given, there will be a delay before the onset of pain relief. The plan of treatment should be logical and be explained to the patient in order to gain his or her confidence and cooperation.

Repositioning of the upper extremity is generally unnecessary and often impossible, except for shoulder dislocations. The upper extremity should be splinted in the position in which it is found, if not easily and without causing more pain an appropriate anatomic position can be achieved for splinting. The same applies to the lower extremity except for injuries of the ankle and lower leg.

Fractures of the femur are almost always unstable. By applying traction, they can be reduced to anatomical position while placed on the vacuum mattress. If vacuum immobilization is unavailable, a traction device should be used. Injuries of the knee or hip should be splinted in position, which is most comfortable and least painful for the patient. For suspected hip dislocation, reduction should not be attempted at the scene of accident, unless arrival at hospital will be delayed for several hours or more.

Fractures of the lower leg are unstable in most cases, so that by applying traction along the axis of the lower leg during splinting, the limb can be restored to the normal position. This is especially important as the mantle of soft structure around the bone in this area is very thin, and an abnormal position of the tibia and fibula could cause harm to the skin, nerves and vessels very quickly.

Serious problems are caused by dislocations and displaced fractures of the ankle joint. The abnormal position damages the skin, nerves, ligaments and blood vessels. The goal is to restore the joint to anatomical position as rapidly as possible and to splint in this position. Inform the patient about the planned course of action and prepare to splint. Vacuum splints and vacuum mattresses are preferred to blowup splints. When analgesics are given, wait until pain relief starts. In order to secure co-operation during the process of repositioning and splinting, it is important to maintain contact with the patient and to explain each step of the procedure.

Reduction:

One rescuer holds the lower leg at the knee. The second rescuer holds the heel with one hand and the back of the foot with the other hand. The second rescuer tries to correct the abnormal position by applying strong traction along the axis of the lower leg. If the first attempt is unsuccessful, the limb should be splinted in the position in which it is found. Open fractures should be reduced as well. The reduction of a penetrating bony fragment is no longer regarded as unfavorable. Secondary damage by pressure on surrounding soft tissue is much worse than possible introduction of foreign matter into the wound. After reduction, apply traction at the heel until the prepared splint has been secured. Prior to transport, neurovascular status should be stabilized. Further stabilization of the splint, protection of neurovascular status and documentation of the injury may be required during transport.