Maritime Health Trainings for Seafarers and Doctors

«Training 10-Fracture, Dislocation, Sprain and Muscle Injuries»

ERASMUS+ KA2 - Cooperation for Innovation and the Exchange of Good Practices
KA202 - Strategic Partnerships for vocational education and training

Fracture,Dislocation,Sprain and Muscle Injuries

✓ ***Learning Objective;***

This section is aimed to raise awareness of officers on fracture,dislocation, sprain and muscle injuries happen onboard. Upon completion of this section, trainers will be able to:

- First Aid for Muscle Injuries
- First Aid for Fractures
- First Aid for Dislocations
- First Aid for Sprains
- Fracture, Dislocation and Sprain Immobilization

First Aid For Injuries

Symptoms of muscle and joınt injury;

- Pain,
- Swelling,
- Bruising,
- Redness, and
- Limited motion

- The Basic Treatment of Muscle and Joint Injuries consist of;
- R Rest,
- I Ice (Cold Compression)
- C Compression,
- E Elevation, and
- P Pain Relief.

Treatment of Muscle and Joint Injuries

- Rest should continue until the pain of the injured area disappears,
- Compression is applied by wrapping the injured area with an elastic bandage.
- Elevation is to elevate the injured limb above the level of heart.

- Ice, a cold compression is applied with an ice bag or cold gel in the injured area for 15-20 minutes for 4-5 times a day without direct contact with the skin.
- To relieve the pain, give the patient 400 mg of ibuprofen orally every 6 hours.

First Aid for Fractures

What is Fracture?

Fracture is disruption of bone integrity.

Closed fracture

Bone integrity is disrupted.There is no puncture or open wound in the skin.

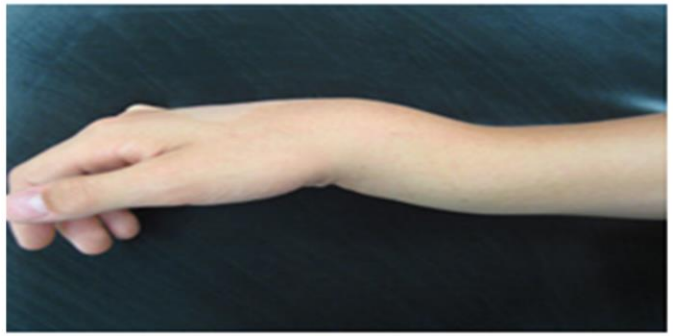
Open fracture

Skin integrity is disrupted. A fragment of bone can break through the skin and bring along risks of bleeding and infection

First Aid for Fractures

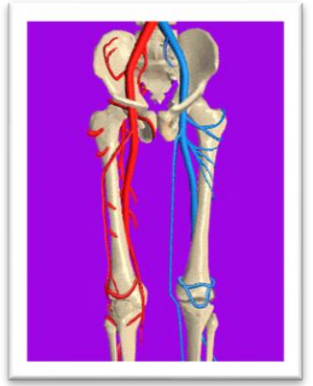
Symptoms of a Broken Bone:

- Pain in the injured area that gets worse when the area is moved,
- Deformity,
- Loss of function,
- Bruising due to swelling and bleeding.
- Crepitation (a crackling sound or sensation produced by the fractured ends of a bone moving against each other)



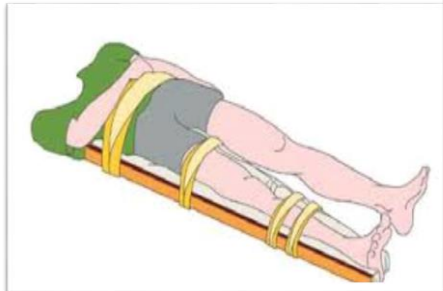
First Aid for Fractures

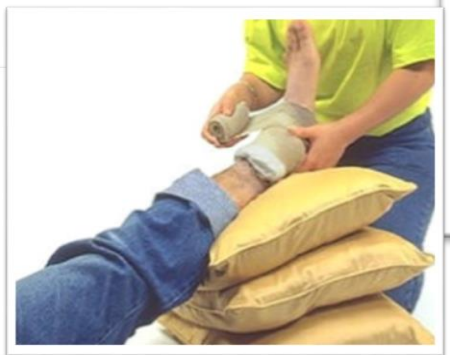
- Injury and compression in the vessels, nerves and muscles near the fracture (Acrotism in the broken area, paleness, coldness).
- Pulse, color and temperature of the skin should be checked frequently in the broken area.
- Do not move the injured person if it is unnecessary.
- Take off or cut the clothes in the injured area.
- If the fracture is in the arms or hands, take off the items such as rings and watches



First Aid for Fractures

- If there is bleeding due to open fracture, stop it by compressing.
- If the wound is open, cover it with a clean gauze patch before detection.
- Immobilize the area with suspected fracture, including the lower and upper joints, avoiding sudden movements.
- Leave the fingers visibly out while fixing and wrapping, so you can control the color, motion, and sensitivity in the fingers.
- Elevate arms and legs above the level of heart.
- **Call Tele Health Center if necessary**





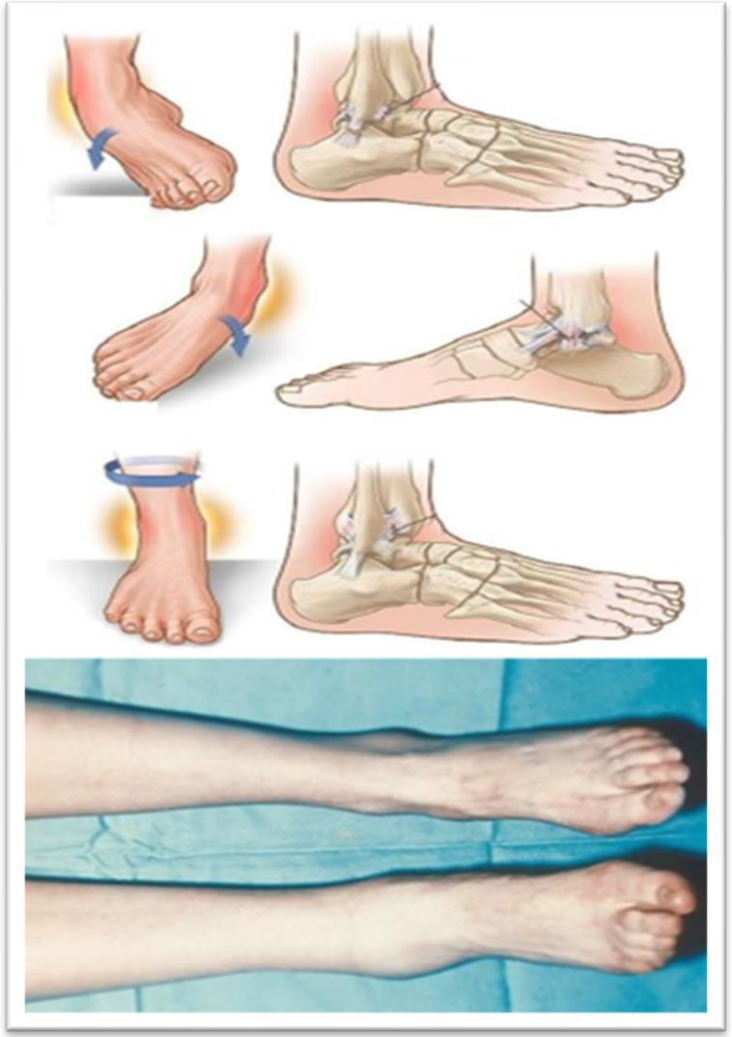
First Aid for Sprains

What is Sprain?

- Sprain is the instant stretch or tore of one or more ligaments.

What Are the Symptoms of Sprains?

- Pain in the affected area,
- Inflammation, swelling,
- Loss of function.



First Aid for Sprains

- Immobilize the sprained joint using elastic bandages,
- Elevate the area to reduce swelling,
- Do not move the joint,
- Check the pulse before and after bandage
- **Call Tele Health/Medicine Center.**

First Aid for Dislocations

What is Dislocation?

A dislocation occurs when a bone slips out of a joint.

What Are the Symptoms of Dislocation?

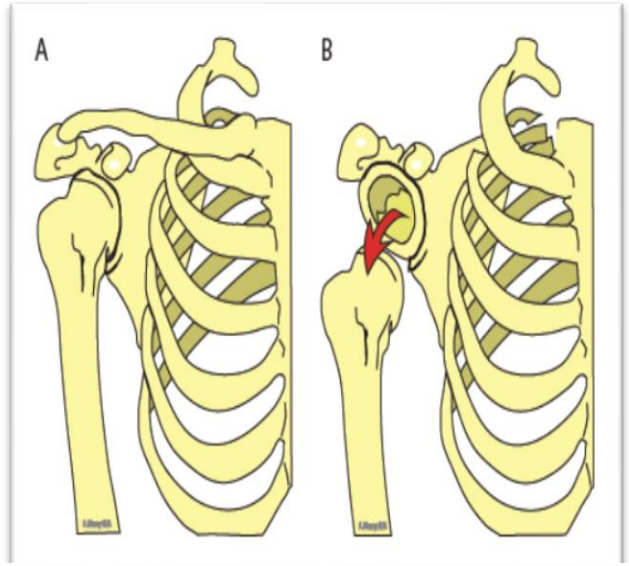
- Intense pain,
- Swelling and inflammation,
- Loss of function,
- Joint disorder.

- Immobilize the joint exactly as it is found,
- Do not try to reduce the dislocation,
- Do not give anyhing to the patient/injured person orally,
- Check the color and temperature of skin in the area,
- Call Tele Health/Medicine Center

First Aid For Dislocations

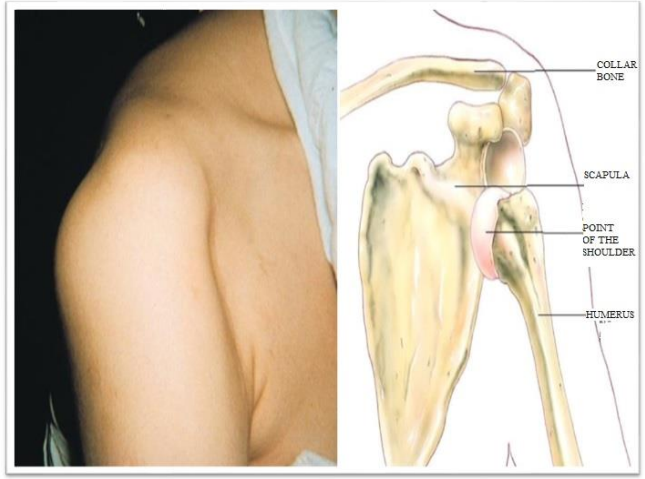
Shoulder Dislocation

- A dislocated shoulder occurs when your upper arm bone pops out of the cup-shaped socket that's part of your shoulder blade. It usually pops out forward.



Signs And Symptoms

- Shoulder pain, usually severe.
- Shoulder has an abnormal shape.



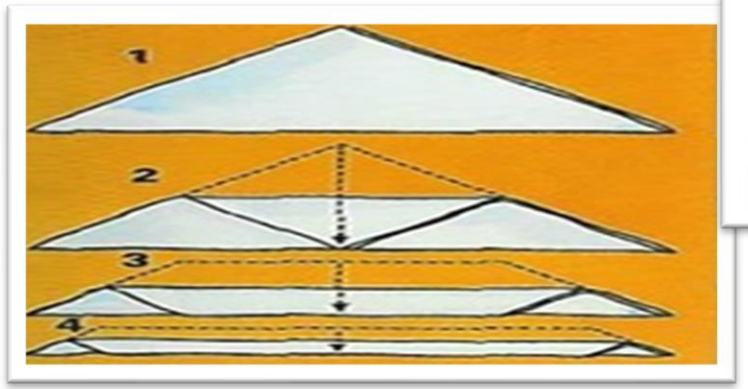
What Should We Do For a Dislocated Shoulder?V

- Usually gravity is used to reduce the dislocation.
- Give the patient 10 mg of morphine and wait for 30 minutes.
- Lay the patient face down on the table.
- Hang down the arm.
- Pad the armpit.
- Hand over 7-8 kilograms of weight.
- Usually in 30 minutes, the dislocation reduces when the shoulder muscles get tired.
- If not, call Tele Health Center.
- After the shoulder is in its place, make an arm sling and ask the patient to wear it for 3 weeks.

Fixing Materials for Fractures, Dislocations and Sprains

First-aider uses the materials available on board for immobilization.
These can be materials such as;

- Triangular bandage, bandage roll, air splint,
- Blanket,
- Cardigan, scarf, tie etc.
- Wood, stick, cardboard etc.



- Splint (forearm, hand, finger, leg and air),
- Aluminum finger splint,
- Wrist and ankle guard,
- Neck brace,

How to Wear an Air Splint?

1. By cutting clothes, evaluate the injured area in terms of fracture, sensitivity, swelling, scratch, bleeding, etc.

2. Check the pulse, feeling and color of the area to be treated

3. If there is open wound and bleeding, stop bleeding before wearing splint. Close the area with a sterile pad.

4. Select the appropriate splint for the arm and leg (length for covering upper and lower joint) and check if it is solid.

5. Turn the valve on the splint to the open position.

6. Immobilize the injured area by holding it.

How to Wear an Air Splint

7. With the help of another person, pass your hand through the non-zipper splint, keep it away from the injured area and place the splint along the area (if the splint is zippered; open the zipper and place the splint around the area and close the zipper).

8. Inflate the splint with the help of a pump or by mouth.

How to Wear an Air Splint

9. Check the pressure of the splint (the end of the inflated splint should not be too solid and its walls should not touch each other when squeezed with two fingers).

10. Close the valve on the splint and continue to support the splint manually.

11. If necessary, immobilize the splinted area to the body with a triangular bandage or a gauze.

12. After this treatment, check the pulse, sense and motor controls again.

Things to be Considered During Immobilization

1. Hold constant the injured area while immobilizing,
2. If there is a wound, cover it with a clean cloth,
3. Cover the area to be immobilized with a soft material first,
4. Detect the injured area as it is found, do not try to fix it,
5. Make the immobilization including the joints above and below fractures, dislocations or sprains.

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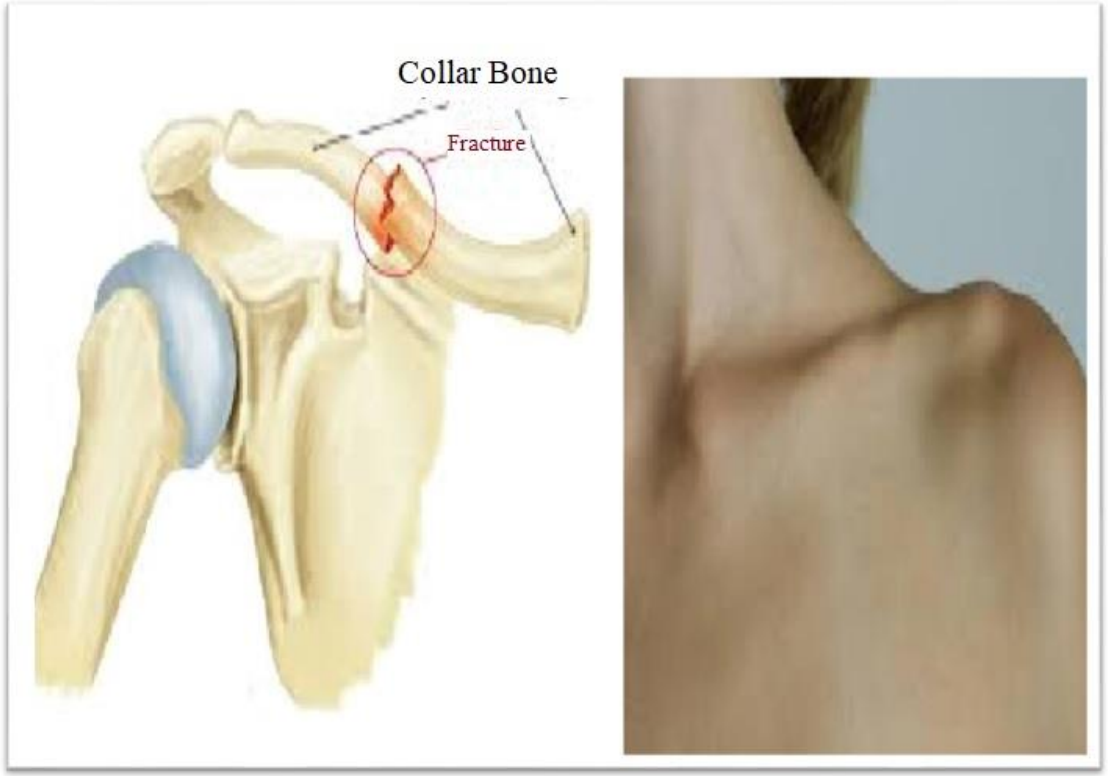
Arm And Collar Bone Fractures

Collar Bone Injuries

- The collarbone can break often as a result of falling when the arms are open.
- The immobilization is easy as this bone is very close to the skin.



Arm and Collarbone Immobilization

1. Place a soft material under the armpit
2. Place the arm sling.
3. Place the triangular bandage over the injured person’s body, the top of the triangle on the elbow side so its base is on a level with the body.
4. Place the hand bent at the level of the elbow at the bottom of the chest. Knot both ends of the triangular bandage on the patient's neck, make sure that the fingers of the detected hand are visible.
5. Place the arm sling over the chest cavity and the injured arm (you can also place a wide outer bandage) so that you can securely immobilize the injured arm and shoulder joint to the body.

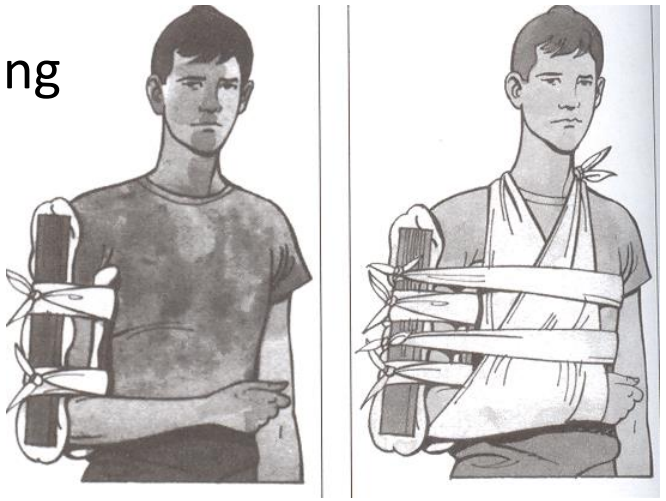
Arm and Collarbone Immobilization

Humerus Fracture

- Humeral fractures generally occur in the middle-third of the humerus.
- Symptoms include bruising and swelling after a sudden onset pain.
- Seek medical aid since hospital treatment is required.
- As the nerve of the arm can be injured by the fracture, carefully watch whether the patient can open the arm, and whether the thumb and the ring finger can do the grasping movement between them.
- You can immobilize it while waiting for the patient to be transferred from the vessel.

Humerus Immobilization

- Do it with a rigid fixing material,
- Place two strips under the arm (using the armpit cavity), before placing the materials that will detect the broken bone,
- Place the shorter material from the armpit including to the elbow,
- Place the longer one including the shoulder and elbow,
- Immobilize by connecting previously placed strips. You must not tie the strips too short.
- Wear an arm sling to immobilize the elbow,
- For vertebra immobilization, use a wide fabric strip or triangular bandage over the chest and injured arm.



Elbow Fracture and Dislocation Immobilization

- Generally, elbow fractures may occur with elbow dislocations.
- Symptoms include pain, significant deformity and loss of function.

- It is necessary to transfer the patient from the vessel.
- Meanwhile, arm sling can be worn and morphine sulfate can be given to reduce the pain.

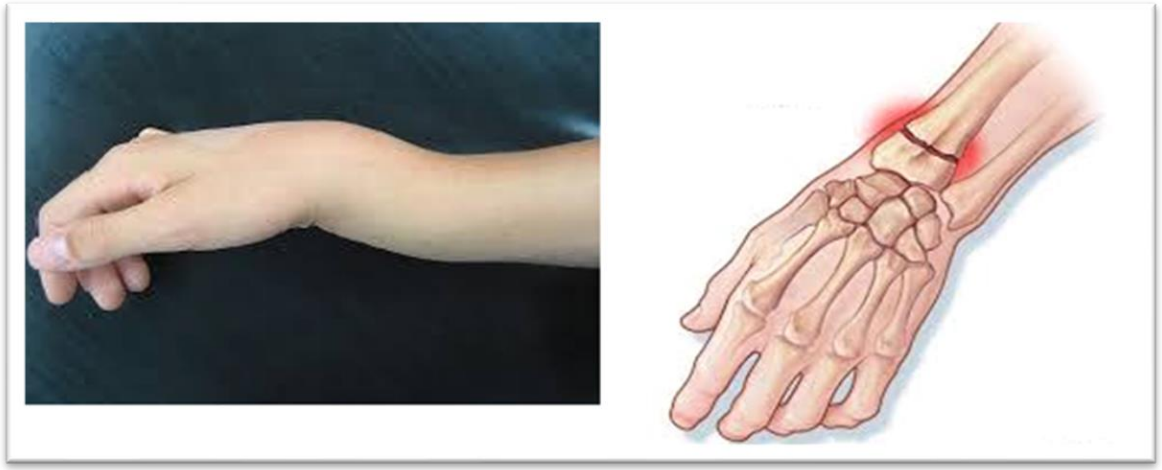
Elbow Fracture and Dislocation Immobilization

- If the arm is in a tense position, immobilize it with the help of fixing materials stretched across the patient's body and filled with soft materials between the skin,

- If it is bent, it is immobilized with the help of an arm sling.

First Aid For Wrist And Forearm Fractures

- Significant deformity occurs. There may be nerve and vascular injuries.

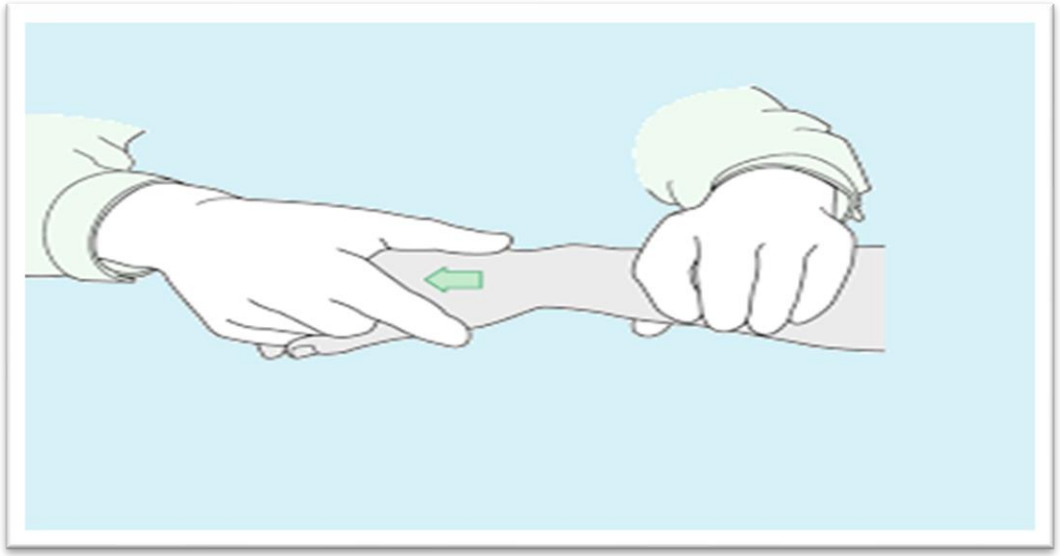


First Aid For Wrist And Forearm Fractures

- Check the sense in the fingers.
- Check the circulation. See if the color of the fingers is normal, and if it turns white when pressed on the fingertips and then turns red.
- If there are no signs of nerve or vascular injury, the patient has 24 hours to be transferred.
- If there are symptoms of nerve or vascular injury, early transfer is required.

First Aid For Wrist And Forearm Fractures

- While waiting for the patient's transfer, hang the arm and give analgesic ibuprofen 400 mg oral every 6 hours.
- If there is nerve or arterial injury and if the patient is not transferred immediately, the fracture may need to be reduced to depressurise of the artery.
- In this case, give the patient 15 mg of intramuscular morphine and wait for 30 minutes.

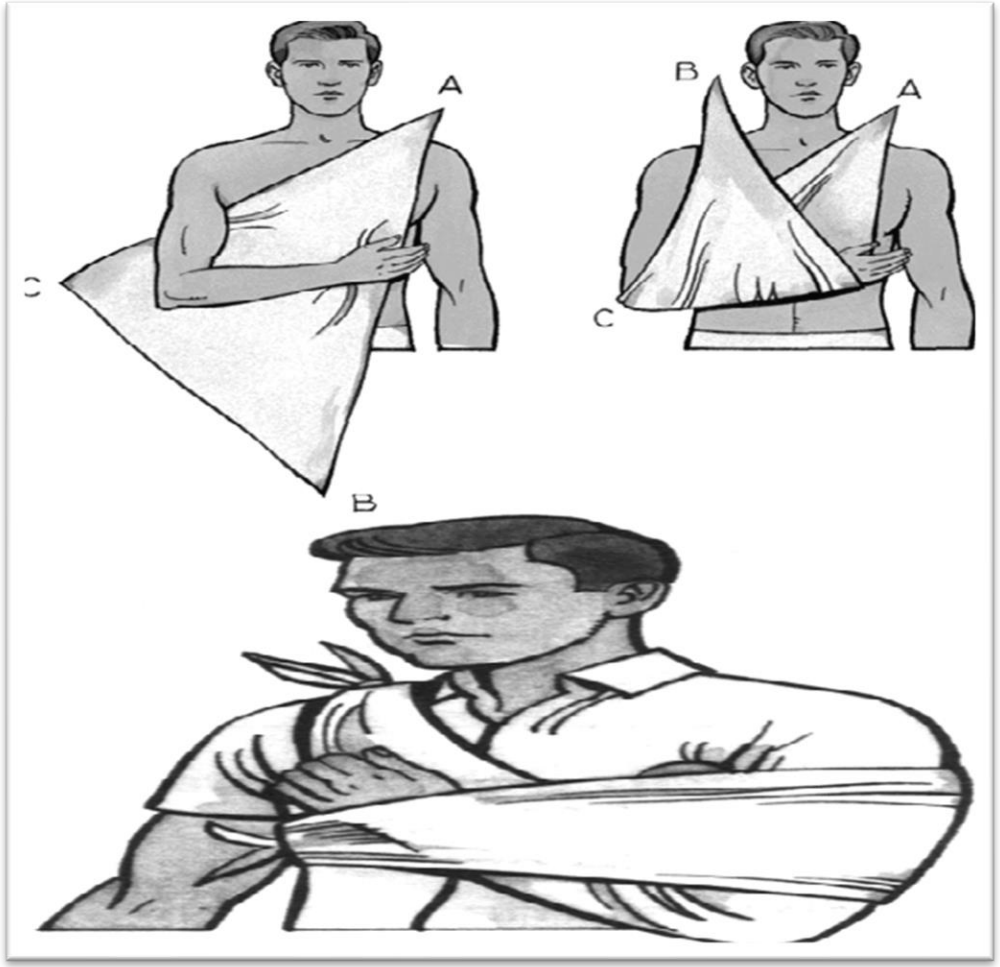


- Have someone else hold the upper arm and elbow.
- Hold the patient's hand in shaking position, then pull firmly until the wrist is flat.
- Wear a splint.

Forearm, Wrist and Hand Immobilization with an Arm Sling

- Place a triangular arm sling under the injured forearm to prevent motion of the broken elbow and wrist joint. Knot the two ends of the triangle behind the neck of the patient/injured person.

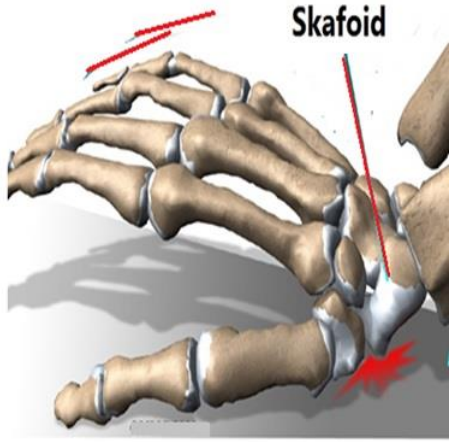
- To prevent excessive motion, immobilize it to the body with a wide bandage.



First Aid For Hand And Finger Injuries

Scaphoıd Fracture

- The scaphoid bone is a small bone which is situated between the hand and forearm on the thumb side of the wrist.
- It can break when falling on hand.



Signs and Symptoms

- Pain in the wrist.
- Pain in the base of the thumb.
- Pain while doing grasping movement.

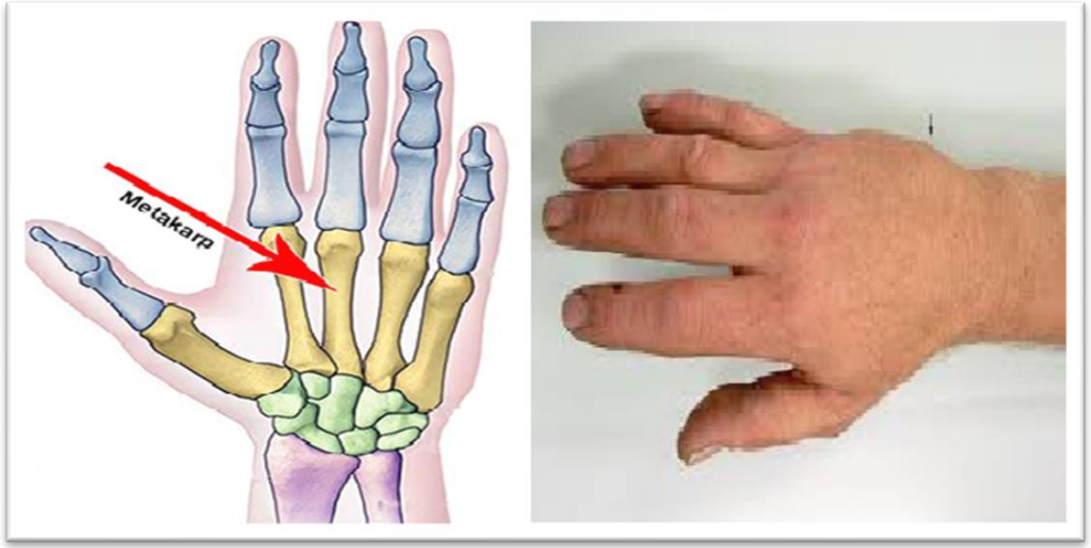
What Should We Do?

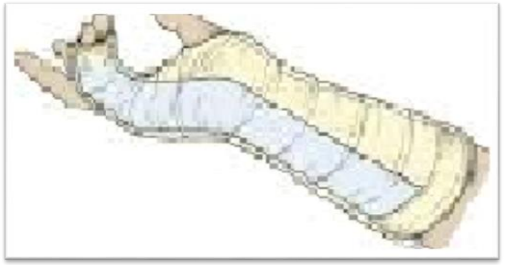
- If there is pain on the scaphoid after falling, medical aid is required.
- These injuries can create problems that require long-term treatment.

First Aid For Hand And Finger Injuries

Metacarpal Fractures:

- Metacarpal bones connect the fingers to the wrist and form the arch of the hand.
- Tell the patient to extend their fingers straight forward. Then bend the joint between the hand and fingers as much as possible. The fingers should be in a straight line
- If the fingers are unstable, the patient needs to be transferred to reduce the fracture. This should be done within 3-4 days.





What Should We Do?

- If the patient has been injured during a fight and there are symptoms of skin damage and bite, it may be an open fracture and the risk of inflammation is also very high. Early transfer of the patient is required.

- Meanwhile, you should give the patient amoxicillin/clavulanate orally twice a day as antibiotic.

- If you are in doubt about a closed fracture, you can wear a splint to the front of the hand and give painkiller.

First Aid For Hand And Finger Injuries

Thumb Fractures

Thumb breaks frequently in fights. Most fractures also include the joint. If it is not surgically reduced, it creates problems.

What Should We Do?

- You can wear spica or gutter splint.
- Give 400 mg ibuprofen orally every six hours.
- Transfer the patient within 2-3 days.

First Aid for Hand and Finger Injuries

Finger splint

Immobilize the broken finger with a healthy finger.

Pelvis, Hip Joint And Femur Fractures

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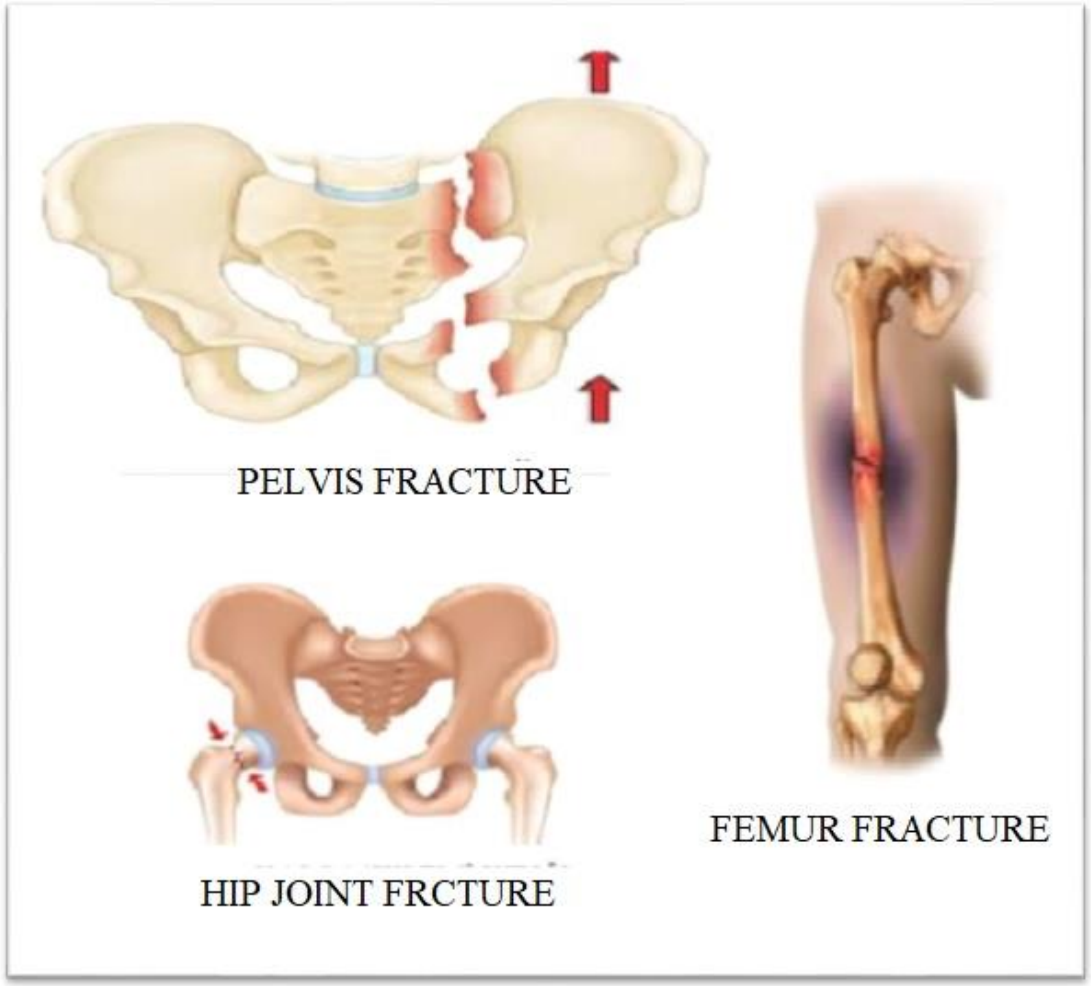
- In young people, pelvis (pelvic bone) fractures, fractures around the hip joint and femoral fractures are often occur in major traumas and accompanied by other injuries.

- In these fractures, blood loss is high and a shock status may occur. Fluid should be given until the patient is transferred.



Pelvis, Hip Joint And Femur Fractures

Signs and Symptoms:

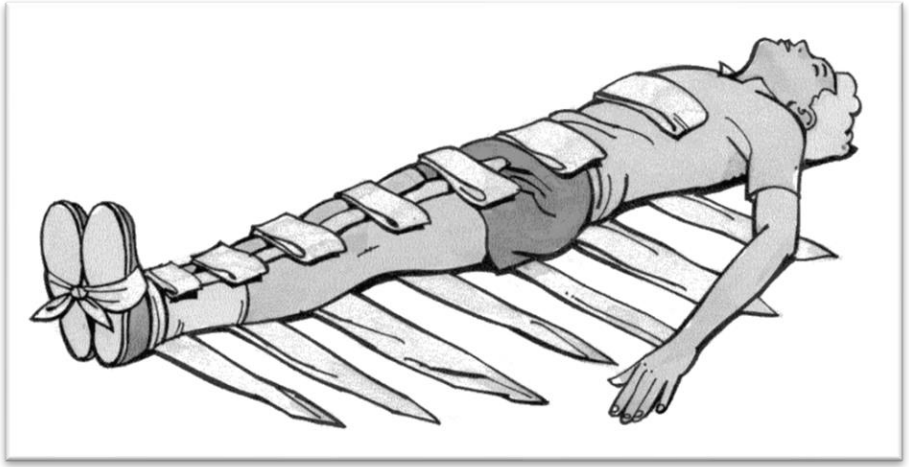
- There is pain in small fractures caused by minor falls, the patient generally cannot stand up and walk.
- The affected leg gets shorter after the fracture.
- The foot gets externally rotated.

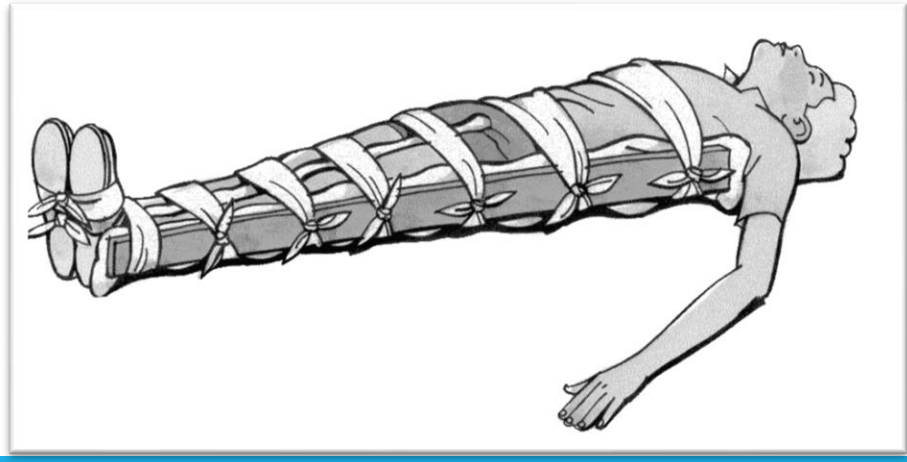
What Should We Do?

- Immobilize the broken area.
- Plan the transfer of the patient.
- Meanwhile, give morphine every 3-4 hours to relieve the pain.

Pelvic Fracture Immobilization

- Put a filling material between both legs,
- Immobilize the ankles with a Figure 8 bandage,
- Slide the bandages under the body cavities (knees and ankles), and immobilize them by knotting the two between the hips and knees, the other two between the knees and ankles.
- All knots must be on the same side.





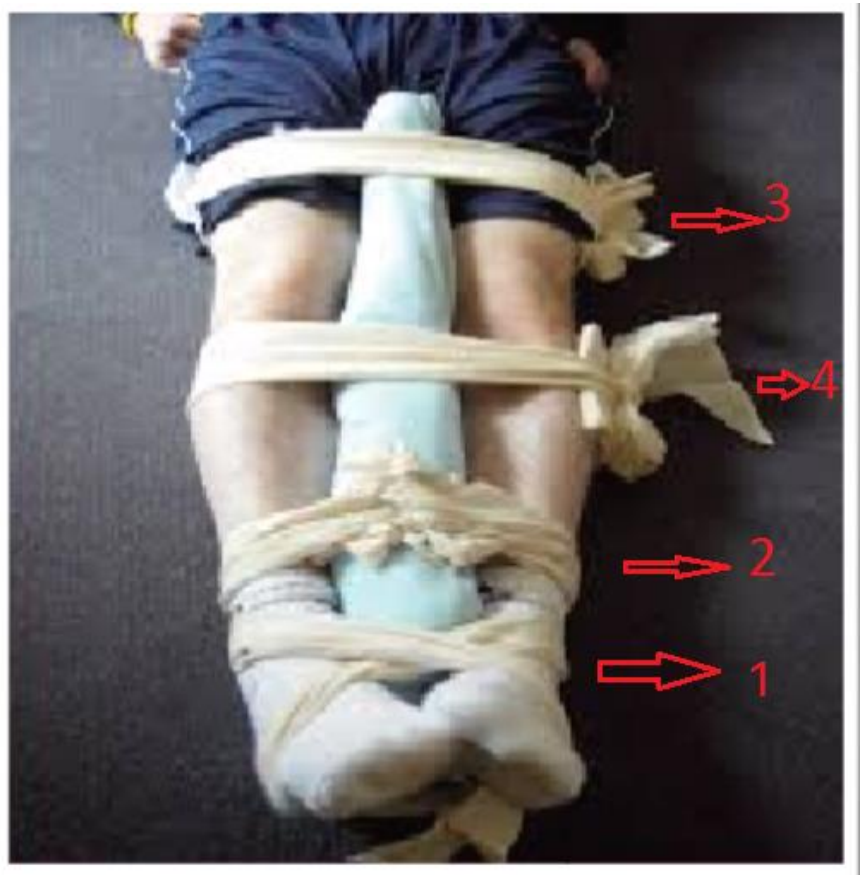
Femur Fracture Immobilization

- Hold the injured leg by putting one hand on the upper part of the foot, the other on the ankle and pull it gently to align it with the healthy leg. Also rotate the leg slightly,

- Put a filling material between both legs (knees and ankles)

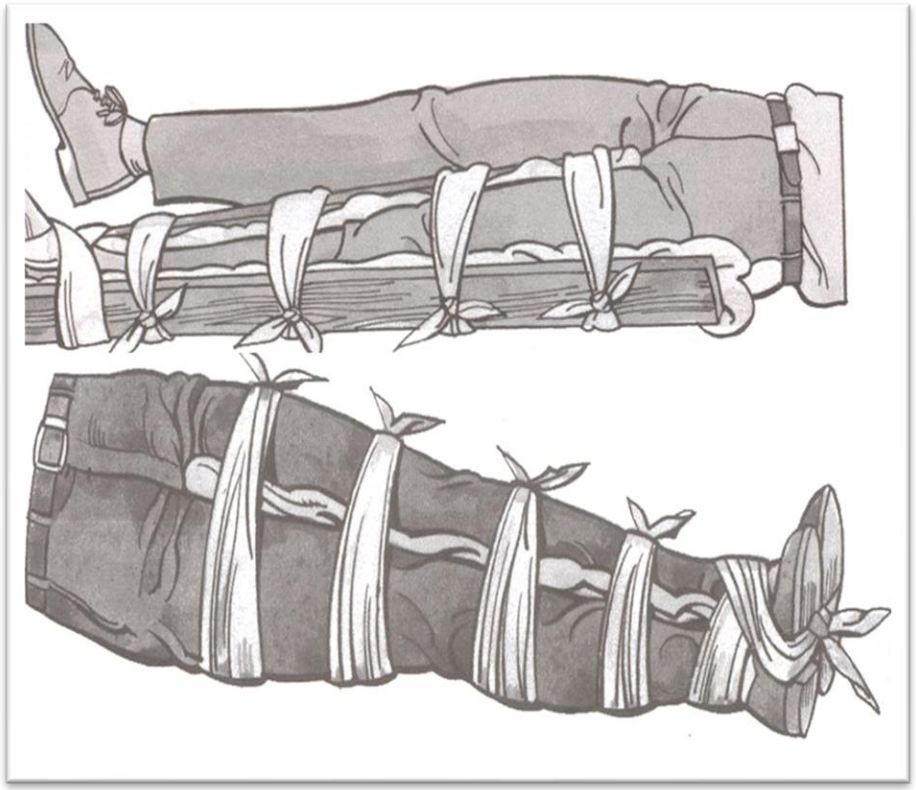
- Immobilize the ankles with a Figure 8 bandage.

- Put 7 fabric strips (or suchlike) under the patient's body, behind the waist, knees and ankles, using body cavities without moving,



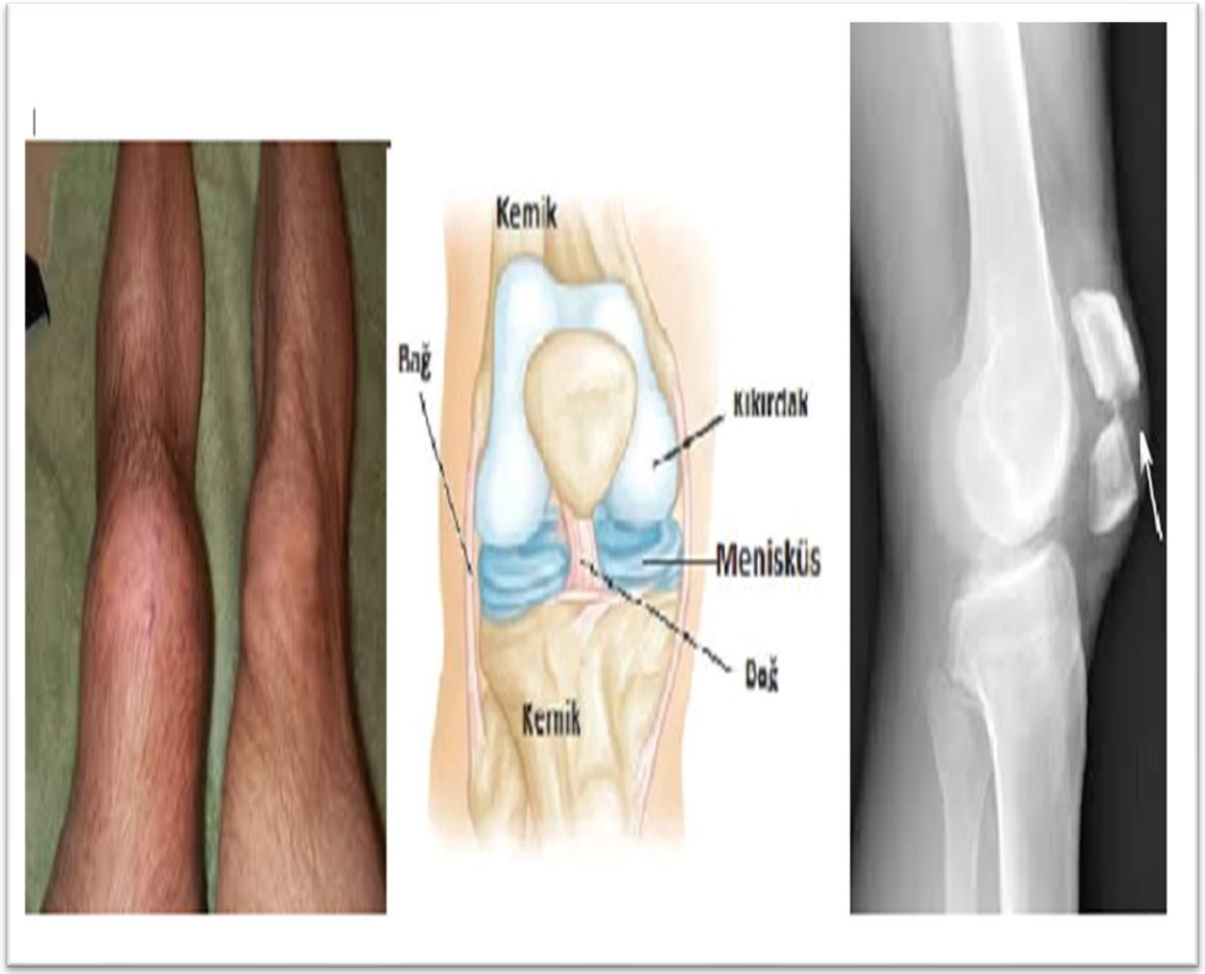
Femur Fracture Immobilization

- Place the rigid fixing material, supported with a soft material, from the armpit to the foot and tie it up from the feet,
- Tie the bandages by tying the knots on the fixing material
- Tie the bandage at the ankle level over the previous one in the form of figure eight,
- In the absence of rigid fixing material, immobilize the broken leg with wide bandages using the healthy leg as the sole support.



Knee Injuries

- The knee joint is the widest joint in the body. It has a complex functional mechanism.
- It is vulnerable to injuries and tears are often there.
- It has four main bonds and 2 meniscitis. Fractures around the joint are less frequent and ligament injuries are very common.



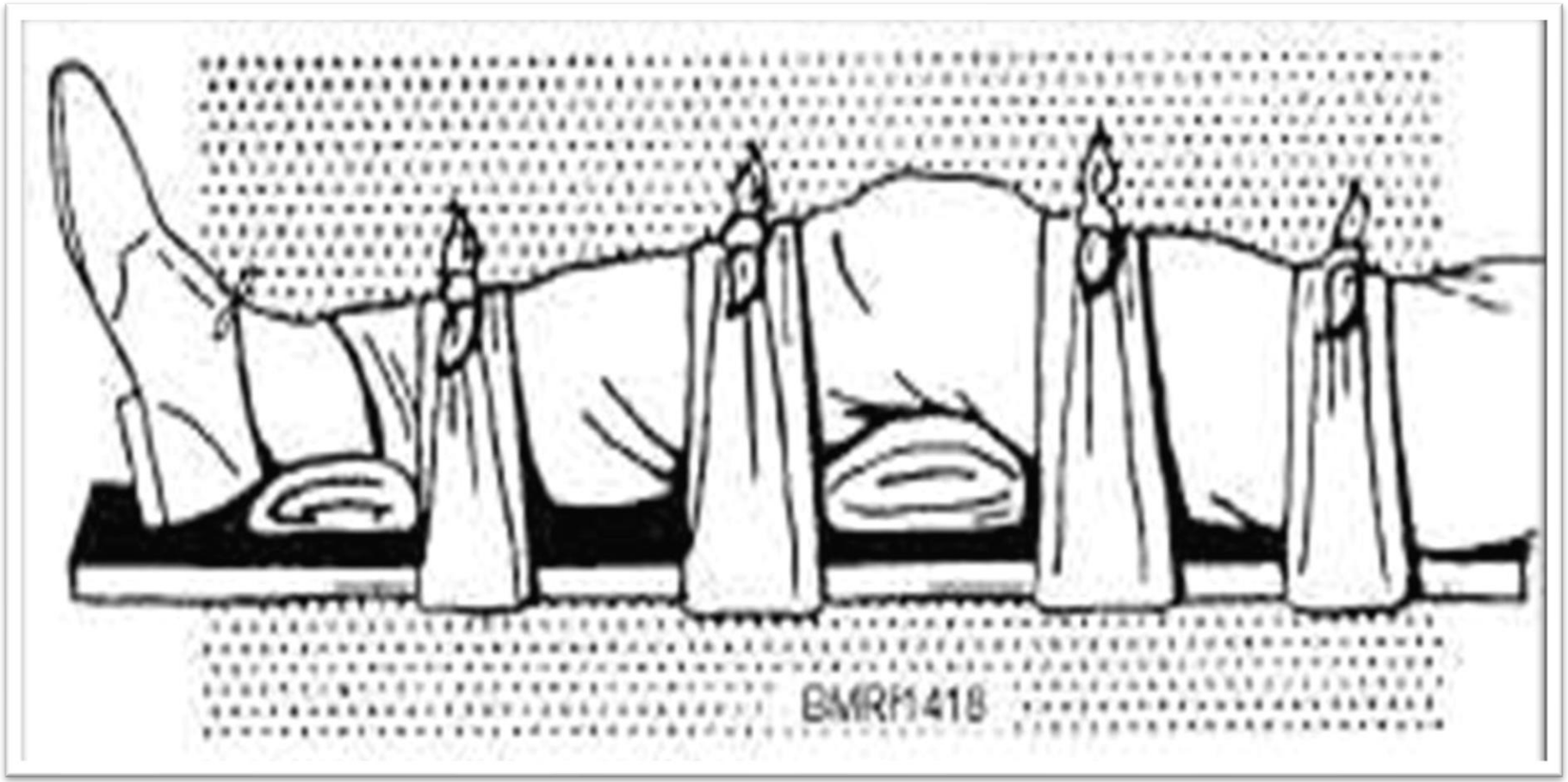
Patella Fracture Immobilization

If the leg is straight:

- Lay the patient or injured on their back.
- Provide a rigid fixing material to include the hip and foot heel covered with a soft material and five bandages of various lengths.
- Place the rigid fixing material under the injured leg from the hip to the foot.
- Place two of the bandages between the knee and the wrist, and two of them between the hips and knees, and tie the knots in the same direction on the outside.

- To prevent the movement of the ankle joint, pass the fifth bandage under the rigid fixing material, cross it over the foot and tie it to the sole of the foot.
- Have the patient transfer from the vessel.

Patella Fracture Immobilization



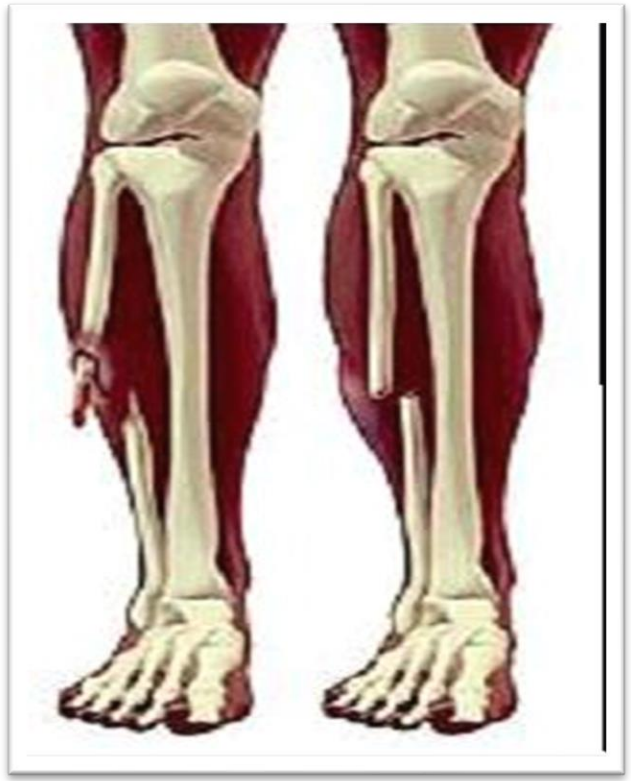
Patella Fracture Immobilization

If the leg is bent:

- Keep the patient or injured in its position.
- Provide two rigid fixing materials and two bandages covered with soft material.
- Place the rigid fixing material on both sides of the bent leg.
- Tie rigid fixing materials with bandages so that the bent position does not misshape.
- Transfer the patient from the vessel.

Tibia And Fibula Fractures

- Tibia is responsible for supporting most of the body weight. It forms the lower flat part of the leg.
- Fibula is a thinner bone located on the anterior surface of the leg.
- Generally, fractures occur by falling from height or crushing. Since tibia is exactly close the skin, open fractures are common.



Fibula Fracture

Tibia Fracture

Tibia And Fibula Fractures

Fracture-related swelling and increasing pressure on the leg stop blood flow. As a result;

- The skin becomes pale
- No pulse on the foot
- The patient have more pain
- Loss of strength and sensation occurs in the ankle and foot.

It is an emergency and pressure must be reduced immediately.

What Should We Do?

- Call Tele Health/Medicine Center for transfer of the patient.
- Administer 10-15 mg of morphine intramuscularly until you get help.
- Wear splint on the back of the leg.
- Do not cover the toes with splints, check the sense and color every 30 minutes.
- Give only water orally.

Tibia And Fibula Fracture Immobilization

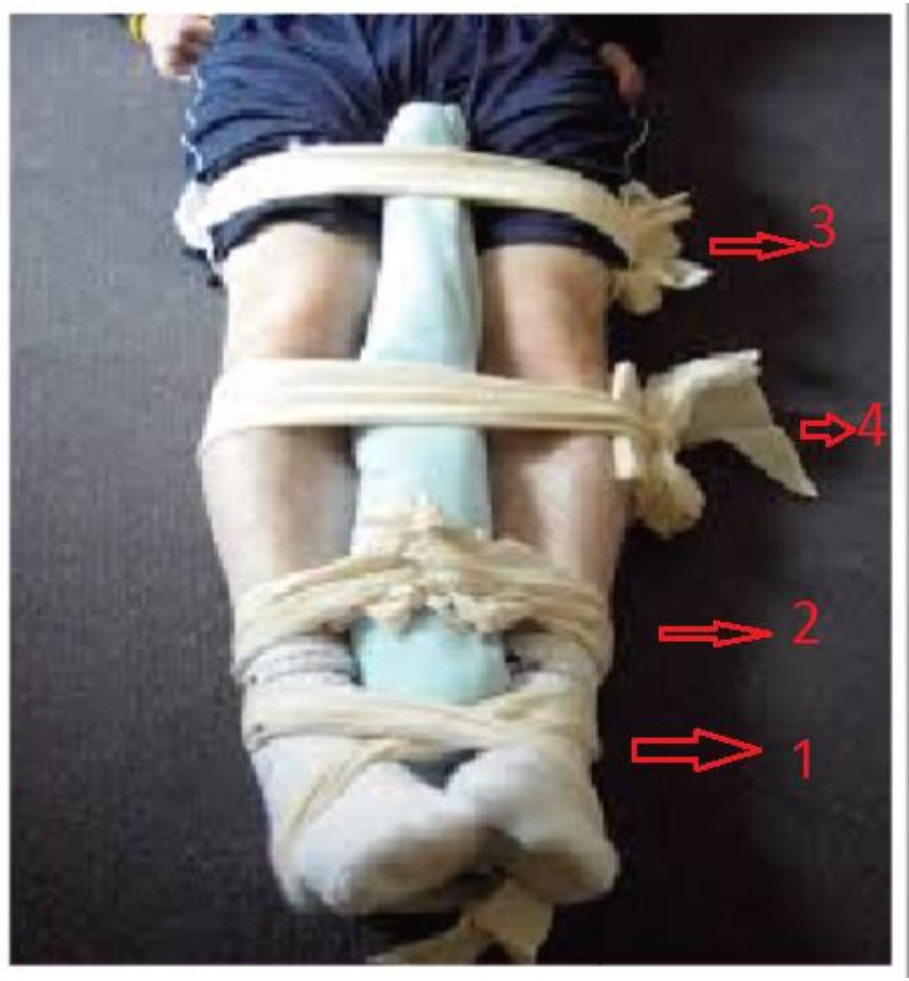
•It is as in the immobilization of a femur bone fracture.

•Hold the legs and pull gently.

•Using body cavities (below the knees, below the wrists), cross the fabric strips under the injured leg.

•Place one of the fixing materials, suitably supplemented with a soft material, from groin to foot on the inside, from hip to foot on the other side.

•Tie the strips by knotting on the outer fixing material, starting from the feet. Knot the bandage at the level of the ankle on the sole of the foot in the form of eight.

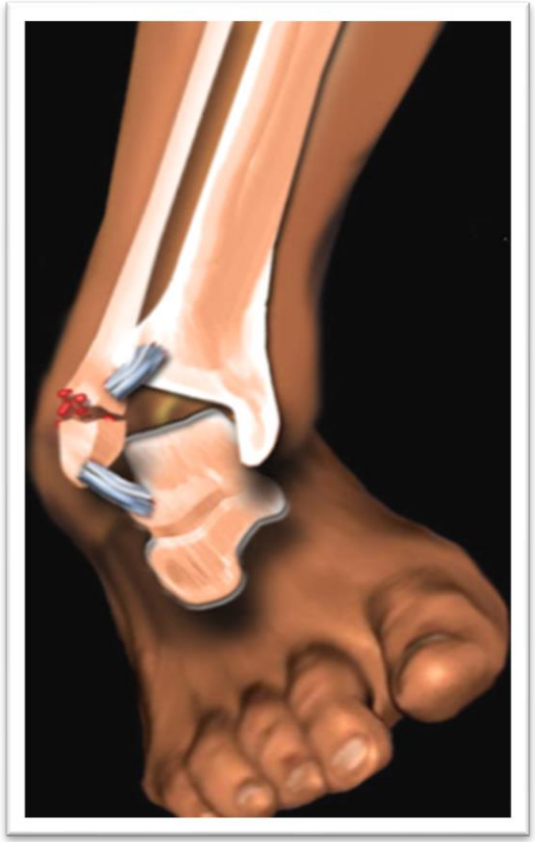


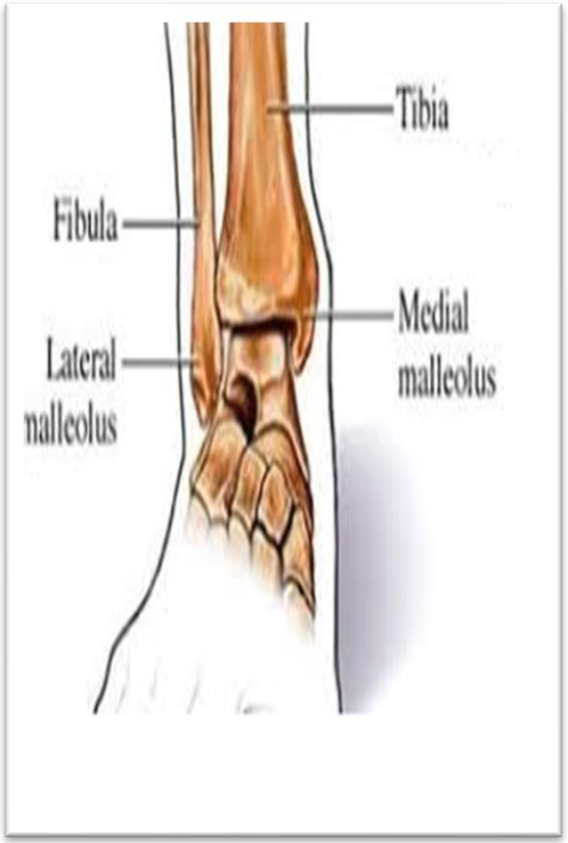
Tibia And Fibula Fracture Immobilization

Air Splint (available on board)

Ankle Injuries

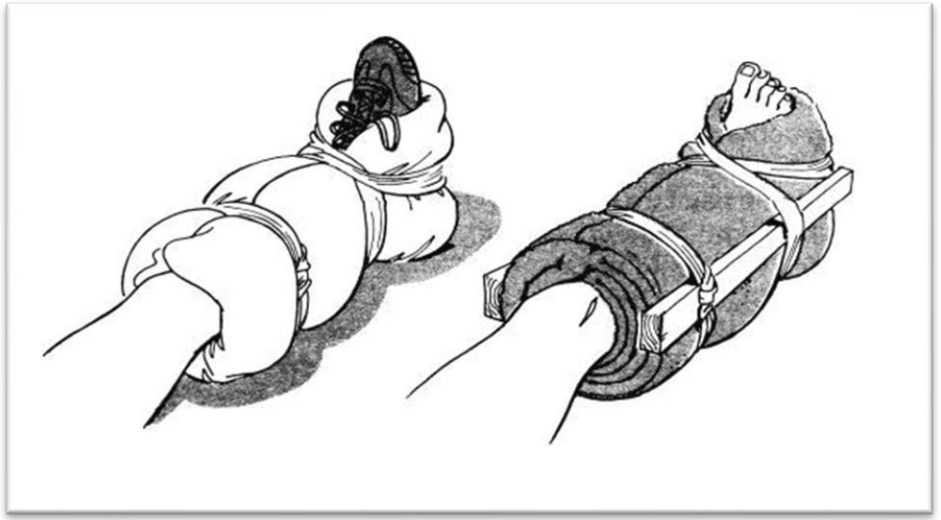
- The ankle is formed of the tibia, fibula, and a joint that joins the foot.
- The inner side of tibia and fibula is called medial malleolus (talus) and the outer side is called lateral malleolus. Malleoli are connected by ligaments to the foot bones.



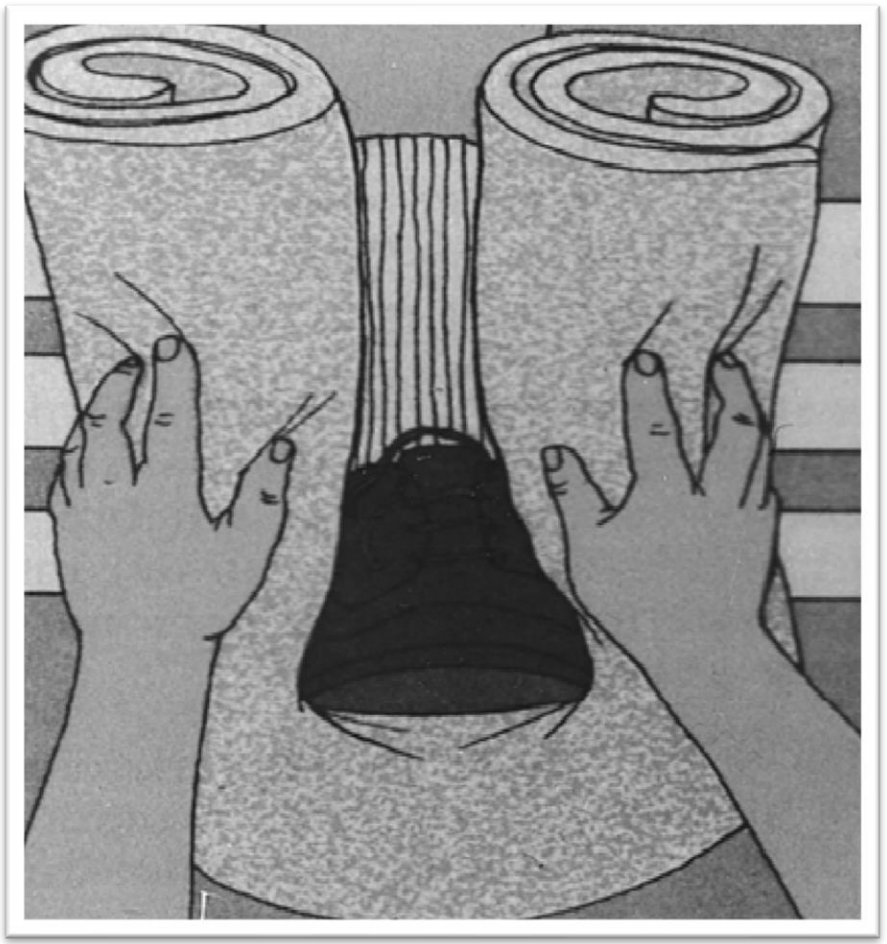


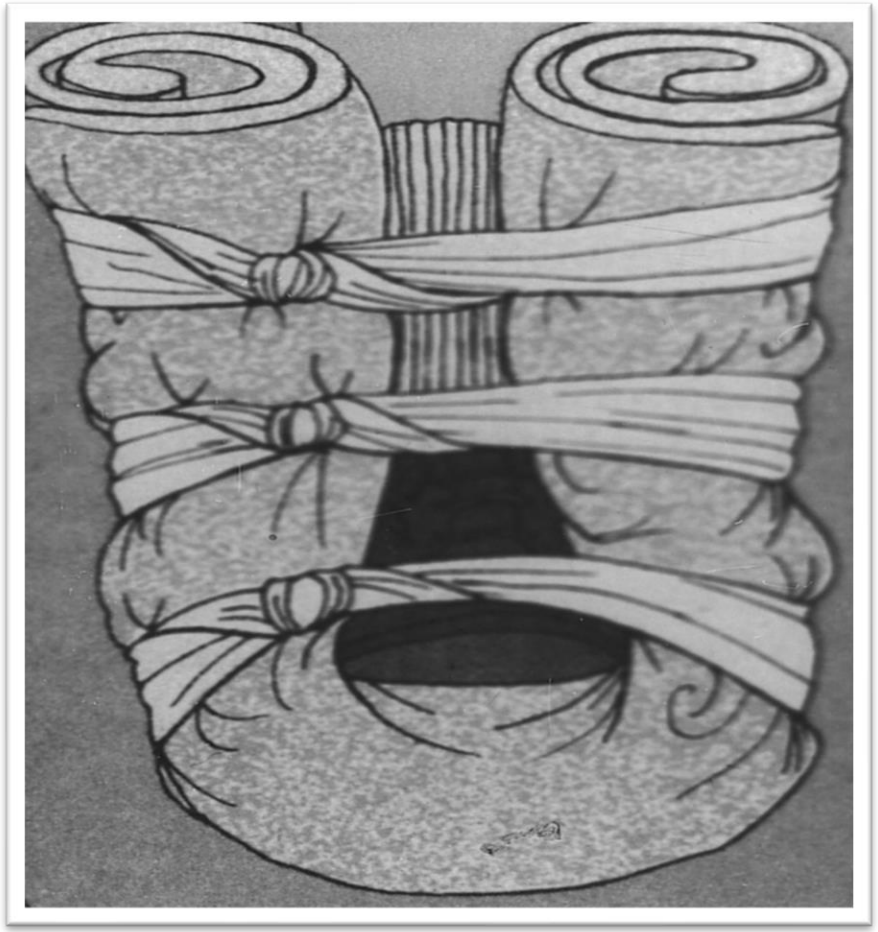
Foot and Ankle Immobilization

- Untie the shoelaces without taking off the patient's shoes,
- Immobilize both feet together with a Figure 8 bandage wrapped around the wrist level and elevate the legs by making them lean against a surface covered with soft materials (a rolled blanket).



Foot and Ankle Immobilization





Ankle Injuries Caused By A Trip Or Fall

- Ankle sprains generally affect the outside of the ankle.
- There may be tears in the ligaments or fractures in the malleolus.

Evaluatıon Of Injury Level

- If the outer side is the only affected part, there is probably no serious damage.
- If there is no swelling and bruising, the probability of fracture or ligament damage is poor; if there is, there may be fracture or ligament damage.
- Ankle should be moved in, out, up, down. If there is no pain, it is unlikely that there is an injury.
- If the patient has walked right after the injury and can take at least 4 steps, the injury is probably not serious.

Ankle Injuries Caused By A Trip Or Fall

What Should We Do?

- If the inner or both sides of the ankle are affected, medical aid is required.
- Otherwise, follow the above.
- Put on a bandage on the ankle.

Ankle Injuries Caused By A Fall

What Should We Do?

- Ask for medical aid to transfer the patient. These are usually severe and include both sides of the ankle and the heel.

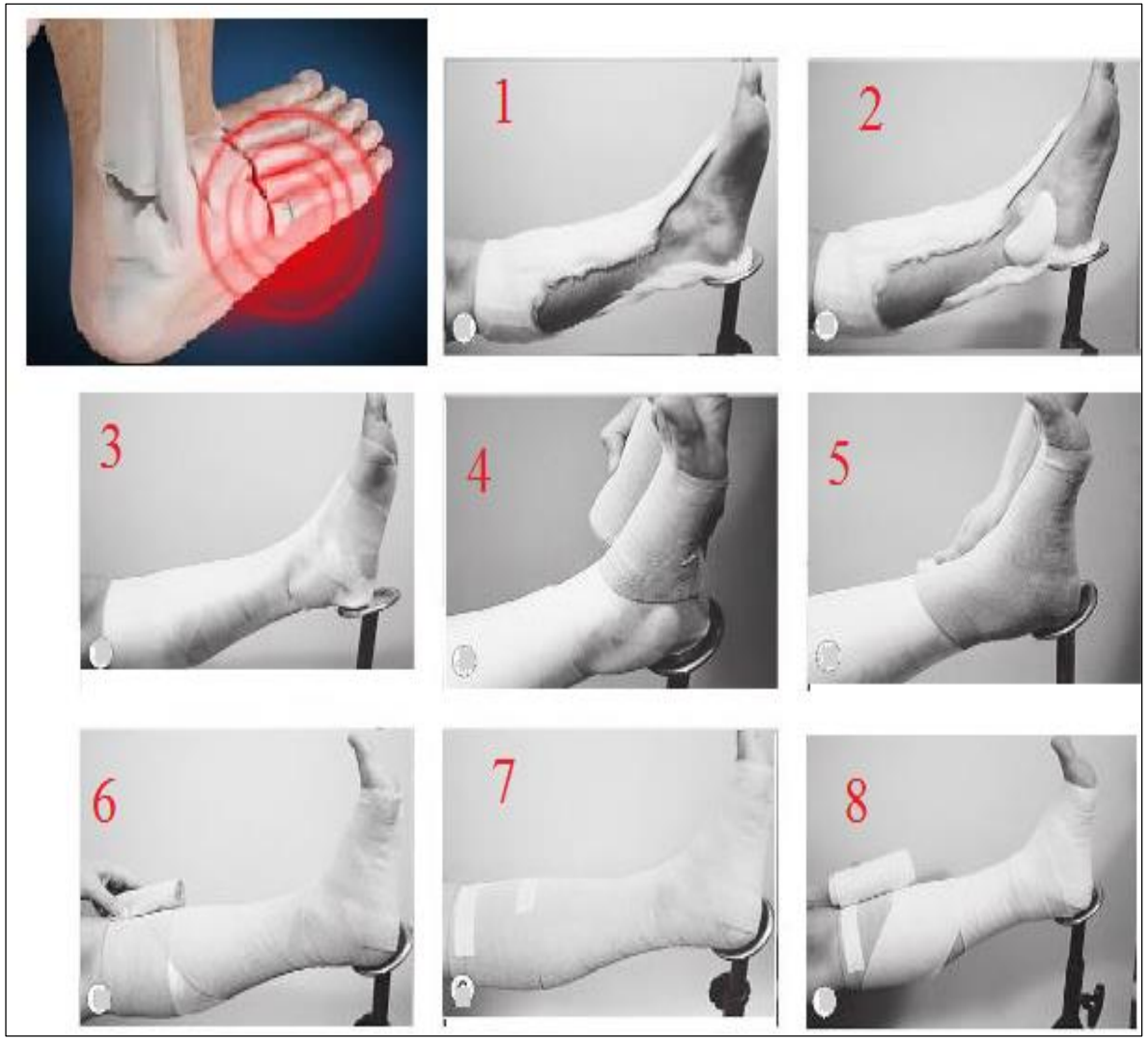
- In addition, femur and spinal fractures can occur.

What Should We Do?

• If the patient has just one metatarsal fracture, let them rest. You can give 400 mg of ibuprofen orally as a painkiller every 8 hours.

• Put on a bandage to the foot and ankle.

• Transfer the patient if there is severe soft tissue damage or open fracture. Meanwhile, give amoxicillin/clavulanate orally twice a day as antibiotics.



What Should We Do?

- For simple finger fractures, tape 2 fingers together and give painkiller.

- Forefoot fractures are important as forefoot functions in walking and balance. Surgery can be delayed if it is closed fracture and soft tissue injury is not severe.

- Meanwhile, give the patient painkiller, wear splint to the back of the leg and have a doctor see the patient as soon as possible.