

Educational material for the First Aid class prepared by the Medical Education Center JFMED

The most common traumatic life-threatening conditions

Bleeding

Bleeding – blood escaping from the circulatory system (extravasation) based on the rupture of the vessel wall – when it comes to trauma, there can be e.g. damage to the vessel wall caused by an invasive or destructive process in the body (bleeding from uterus/placenta in pregnancy pathologies, bleeding from the gastric ulcer etc.) – these are not discussed, as the trauma is the main focus of this chapter.

Bleeding can be classified according to various criteria:

- extent - minor bleeding that does not need surgical treatment vs major bleeding that needs surgical treatment
- site of bleeding – external (blood loss is visible – including blood loss from the body orifices) vs internal (bleeding to the abdomen, chest, skull or third space)
- source of bleeding (capillary, venous, arterial, mixed)
- mechanism - normal bleeding - extent of bleeding is proportional to the extent of injury vs abnormal (pathological) – extent of bleeding is larger than expected relative to the injury, commonly seen with patients on anticoagulants (warfarin etc.) or in some inherited diseases such as haemophilia. A doctor must always treat this bleeding.

Treatment of minor bleeding

Minor bleeds are usually self-limiting. Before treatment, wash and dry your own hands and use disposable gloves. Standard treatment consists of cleaning the wound or cut, if dirty, under running water, and drying with a sterile dressing or clean, lint-free material. If possible, raise the affected area above the heart. Cover the cut temporarily while you clean the surrounding skin with soap and water and disinfect the surrounding skin. Cover the cut completely with a sterile dressing or plaster. Instruct the patient about possible risks.

Treatment of major external bleeding

Make treatment of the bleeding wound a priority. Time is of the essence when a deep wound is bleeding profusely. Prevent prolonged and excessive blood loss, which can cause shock. Start developing a plan to reach medical personnel after you treat the wound. Expose the entire wound to see the full extent of the injury. Cut, tear, push, and/or lift any clothing away from the wound.

If clothing is stuck to the wound, leave that portion in place and work around it. Do not try to wash the wound. Resist the impulse to remove any objects from the wound. You need to use every method at your disposal to help the wound coagulate. Ripping off the portion of clothing stuck to the wound may disturb blood clots and cause more bleeding.

Do not remove objects because they may have a tamponade or compression effect within the wound. Injured blood vessels, arteries, or veins can clot faster when any type of pressure is applied. Removing an object from the wound may lead to more rapid hemorrhage or blood loss. Apply a regular dressing over the wound first. Find the cleanest cloth available if you do not have a first-aid kit. Stabilize any impaled objects sticking out of the wound with some of the bandage/cloth before you cover the wound. Secure the dressing in place. Do not manipulate the wound more than necessary. It is okay to protect the wound from further contamination if the area around the victim is dirty.

Extremity

Put the victim into the supine position. Compress the bleeding site and elevate the bleeding extremity above the level of the injured person's heart. Do not elevate the limb before you splint any broken bones. In an emergency, you can use your bare hands or any clean soft, non-fibrous material to improvise a pressure bandage – conversely, if you have on hand, use the bandages found in first aid kits

Pressure (compression) bandages consist of a cover layer, bandage, and compression piece. The compression piece is usually created by employing an unrolled bandage from the first aid kit. Apply a sterile cover dressing, fix it with several turns of a roller bandage, and then place the unrolled bandage over the wound. Hold this tight while you wind out the remainder of the roller bandage firmly around the extremity and wound. If there is profuse bleeding, and the first bandage becomes saturated, DO NOT REMOVE IT but simply add more layers to the first dressing. After treatment, maintain the thermal homeostasis and comfort of the victim.

The next possibility to stop bleeding is the compression of pressure points. These are points where the artery can be compressed manually directly against bone, and bleeding distally from the compression point stops because of diminished blood flow to the area. The use of pressure point in practice is sometimes difficult, because the victim is usually not naked, and also, not in such a convenient state as to allow compression of an artery, the rescuer would then be unable to perform further first aid, because pressure cannot be released. They are usually used in cases of bleeding from the neck and from the subclavian artery, where no other methods are possible.

Use of a tourniquet is advised only when no other technique (elevation, manual pressure, or a pressure dressing) has worked. Some years ago, the use of tourniquets was discouraged, but recent experiences by military and mass casualty management (terrorist attacks) have resulted in their renaissance. A tourniquet compresses arteries and veins very firmly. There is very little blood flowing past the point of the tourniquet, thus preventing haemorrhage through the wound. A tourniquet can be fashioned from anything: a belt or a long piece of cloth, but specialised instruments are becoming more and more frequent in advanced first aid kits. It is used for limbs only. The best location to wrap the tourniquet is on the thigh or the upper arm; this has to be changed to 10 – 15 cm above the wound if the wound is located on the thigh or the upper arm. This can be hard to accomplish precisely, especially in a catastrophe, so it is prudent to apply the logic that the tourniquet must be closer to the heart than the wound is. It is good practice to put something such as a piece of cloth or the person's clothing under the tourniquet to protect the skin, because, unlike a pressure dressing, a tourniquet is very, very tightly tied around a limb.

You can use a rubber Esmarch's tourniquet from a first aid kit or improvise it from a firm strip of cloth approximately 5 cm wide, or you could wrap the limb with a rope/belt/bra. Do not apply a tourniquet over a joint – blood passageways are protected in joints, and you'll never put pressure on the arteries. To apply the tourniquet, you must secure it in place by using one knot. Within this knot, slide a torsion device (firm stick, solid pen, etc..) and then tie another knot around the stick to keep it from undoing.

Apply pressure to the limb by turning the stick in one direction until it is extremely tight, and then use another piece of cloth or the loose ends of your first knots to anchor it in its tensed position. Tie another knot, then another to secure the torsion device onto the tourniquet. Do not remove the tourniquet once it is placed. Twist the torsion device in one direction until bleeding stops and secure it in place. Remember: it is the screwing and not the knots which make compression.

Bleeding from the head injury

Bleeding from the face can be treated usually by compression, for anything larger than a minor bleed medical treatment is necessary. Bleeding near the eye or from the eyelid can be remedied by the folded triangle bandage, and in case of bleeding from the bulb, both eyes must be covered so that you limit movement of the damaged eye (as eyes physiologically move in unison). Because you disorientate the patient and increase his anxiety, you must pay keen attention to reassuring him.

Bleeding from the scalp is usually alarmingly extensive for the size of the incision. Do not apply any pressure to a head wound unless you are quite sure there is no possibility of the broken. Look for sunken areas, visible bone fragments, or exposed brain tissue. Do not apply pressure to a wound that involves the eye or when an object in the wound pierces the skull. Cover the wound GENTLY with bandages, have the person lie down, and get him medical attention as soon as possible. Keep adding more bandages on top if the dressing gets soaked. Hair makes tape hard to use, and even long pieces of cloth wrapped around the head have a tendency to slip, so do not waste time trying to secure a regular dressing – focus on the quantity of dressing rather than the quality. Never wrap anything around the neck.

Internal bleeding

Internal bleeding cannot be directly observed, one can only look for signs of haemorrhagic shock in case of massive bleeding. The exemption is intracranial bleeding. It does not cause haemorrhagic shock despite being life-threatening, due to the rise of the pressure in the skull and compression of the brain/and brain vasculature.

Internal bleeding must be expected in some types of injury, even if signs of haemorrhagic shock are not present, like long bone fractures, chest, or abdominal injury. Even a suspicion of internal bleeding demands medical examination and treatment.

Bleeding from the body orifices

Nosebleed (Epistaxis)

A nosebleed is common in babies and children. The majority of nosebleeds arise from small blood vessels located in the front of the nasal passages that are fragile. Let the person sit down and bend forward. Sitting is preferable to lying down, since keeping the head above the level of the heart will help reduce the bleeding. Bending forward is also important. It lets the blood drain out through the nose rather than down the throat and swallowing, which can increase the risk of vomiting and/or

aspiration. Ask the patient (or hold yourself) to pinch the nose just below the ossa nasalis on the soft portion of the nose until the bleeding stops. Pinching sends pressure to the bleeding point on the nasal septum and often stops the flow of blood. Always pinch the soft part of the nose, not the hard bridge. This might take five to ten minutes. After bleeding stops, advise the person not to clean his nose or sneeze for 30 minutes. If a nosebleed goes on for more than 15 minutes, occurs following a serious injury, or is accompanied by severe blood loss, you should call a doctor or visit the emergency room.

Bleeding from the mouth

Have the person sit up and tilt his or her head forward with the chin down. This will help any blood drain out of the mouth, not down the back of the throat. Swallowing blood can cause vomiting. In case of an injured lip, press firmly on the wound with a clean cloth or the cleanest material available. If there is an object in the wound, apply pressure around the object, not directly over it. Apply steady pressure for a full 15 minutes.

To quell inner lip and inner cheek bleeding, place rolled gauze or a piece of clean cloth between the wound and the teeth, and apply pressure for 10 – 15 minutes. For a tongue bleed, squeeze or press the bleeding site with gauze or a piece of clean cloth. Gum bleeding – try biting down on a piece of gauze for 10 to 15 minutes. Avoid spitting, using any form of tobacco, and using straws, which can make bleeding worse. If moderate to severe bleeding has not slowed or stopped, continue direct pressure while getting help.

Tooth injury

It's sometimes possible to successfully implant permanent teeth that have been knocked out, but only if it does not dry out. If reimplantation does not occur within two hours after the tooth is knocked out, the likelihood of success becomes poor, so it's vital to get emergency dental care. Handle the tooth by the top or crown only — do not touch the roots, and try to put it back in the socket. If you can't put the tooth back in the socket, immediately place it between the cheek and gum. In case of difficult cooperation and/or risk, the tooth can be swallowed, put it in some milk, the victim's saliva, or a warm, mild saltwater solution (1/4 teaspoon salt to 1 litre of water). Get emergency dental care. It is not necessary to reimplant baby teeth (primary teeth) if they're knocked out. If only a part of the tooth is broken and if it is larger than 1/3 of the visible crown, bring it to the dentist.

Shock

Definition: Shock is the failure of the circulatory system to provide the organ perfusion and tissue oxygenation required to meet cellular metabolic demands. The most common signs are hypotension and tachycardia. The circulatory system consists of three main parts:

1. The heart muscle a pump.
2. The blood vessel's capacity and volumetric component.
3. Circulating blood – making up the content of the system and being the functional unit of oxygenation.

Disturbance may appear in any part and this system, and as such, it gives us a basis to define different

types of shock by how they modulate these parameters.

- Hypovolemic shock, secondary to haemorrhage, loss of fluid caused by burns, dehydration, etc.
- Obstructive shock (obstacle to blood flow caused by massive pulmonary embolism, tension pneumothorax, heart tamponade etc.)
- Cardiogenic shock (loss of capacity to pump blood – e.g. acute heart attack, cardiomyopathy).
- Distributive shock, including Neurogenic shock and Anaphylactic shock (dilatation of blood vessels caused by loss of sympathetic nerve system supply after high spinal cord injury, or anaphylaxis)
- Mixed form (eg. Septic shock – combination of hypovolemic, cardiogenic and distributive shock)

Hypovolemic shock

Hypovolemic shock is the most common type of shock – if caused by blood loss, it will be considered haemorrhagic.

Causes: The main causes of hypovolemia are bleeding, major burn injury, and dehydration (ileus, diarrhoea, hyperthermia). The most vulnerable organs are the kidneys, liver, lungs, and gut, but always keep in mind that the ultimate mechanism of death is brain hypoxia. The initial physiological response to shock includes the release of adrenaline and noradrenaline to promote tachycardia and vasoconstriction of non-essential, ischaemia-tolerant vascular beds (skin, muscles, kidneys, gastrointestinal tract). This effectively centralises the oxygenated blood in the body, meaning the most important regions of the body, such as the brain and heart, are bathed in oxygen-rich blood for as long as possible. This phase is described as compensated shock, or centralised circulation. Decompensated shock occurs when the physiological response fails to maintain normotension. In cases where there is severe loss of blood, for instance, meaning that compensation is inadequate to maintain perfusion and the adaptive response fails, the body begins to decompensate. This decompensated phase of shock is irreversible and occurs when prolonged hypotension, severe acidosis, and coagulopathy become unresponsive to fluid and drug therapies, ultimately leading to death. Note that this is not a manual of pathophysiology, but suffice to say that the acidosis incurred in peripheral ischemia forces the dilation of peripheral blood vessels, and then leads to a dramatic drop in central blood pressure, rendering both the brain and heart hypoxic.

Signs and symptoms of hypovolemic shock

- A rapid, weak, thready pulse due to decreased blood flow combined with tachycardia
- Cool, clammy skin due to stimulation of vasoconstriction
- Rapid and shallow breathing due to sympathetic nervous system stimulation and acidosis
- Hypothermia due to decreased perfusion, metabolism rate and evaporation of sweat
- Thirst and dry mouth, due to fluid depletion
- Decreased urine production, urine concentration
- Cold sweat because of circulating adrenaline
- Fatigue
- Disturbances of consciousness as a late sign

Note that in the hospital setting, only heart rate and urine output can be quantifiably measured at the bedside.

Table: An estimation of blood loss according to signs.

American College of Surgeons Classes of Acute Hemorrhage				
Factors	I	II	III	IV
Blood loss	<15% (<750ml)	15-30% (750-1500ml)	30-40% (1500-2000ml)	>40% (>2000ml)
Pulse	>100	>100	>120	>140
B.P.	Normal	Normal	↓	↓↓
Pulse pressure	N or ↓	↓	↓↓	↓↓
Capillary refill	<2s	2-3s	3-4s	>5s
Resp. rate	14-20	20-30	30-40	>40
Urine output ml/hr	30 or more	20-30	5-10	Negligible
Mental status	Slightly anxious	Mildly anxious	Anxious & confused	Confused Lethargic

First aid interventions in Hypovolemic shock:

Definitive treatment is possible only in a hospital. Treatment must be aggressive and rapid. Sometimes the terms 'golden hour' or 'platinum 30 minutes' are used to underline the time factor decisive for the successful treatment of a shock patient. The single aim is to restore oxygenation of organs, but note that this is not achieved by giving blood, as is the common misconception. To keep oxygenation, you must maintain the ability of blood to circulate, thus maintaining the integrity of the whole system. This is achieved by restoring circulating volume. To rephrase: Blood pressure is the keystone of cardiac output and oxygenation.

Because of the centralisation of circulation, all fluids and drugs must be administered intravenously. No food or drink must be given per os. There is an increased risk of hypothermia, bed sores, etc., because of hypoperfusion of the periphery, but in an acute patient, these are not of key concern.

Outside of the hospital setting, essential components of first aid treatment are:

- Prevent further blood loss
- Call EMS
- Immobilisation of fractures (provides analgesia and decreases bleeding)
- Treatment of further injuries to improve comfort
- Anti-shock position (supine position with elevated extremities)
- Prevention of hypothermia (e.g. by aluminium foil from the first aid kit)
- Prevention of pressure sores by padding all vulnerable parts
- observation until EMS arrives

Definitive therapy: In case of haemorrhage shock, the first step is to stop bleeding by acute surgery and by administering intravenous fluids for volume replacement (crystalloids or colloids). In blood loss exceeding 1500 ml in adults, a blood transfusion is necessary.

Fractures

Definition: A fracture is a broken bone. An open fracture means that there is the skin is also broken to some extent: from minor bruising to penetration of bone through the surface. Fractures also result in bleeding, which could range from minor to severe (in case of a fractured femur, one can often note 2 litres of blood loss). There is also probable damage to the nerve and soft tissue injury.

Causes: Excessive pressure, pulling, or rotation exceeding the limits of bone flexibility. Additional factors may be pathological conditions like osteoporosis or a tumour. Special cases are fatigue fractures from cyclic overloading, like marching, running, ballet, gymnastics

History: Injury or excessive strain in the injured part of the body

Signs and symptoms: Pain that increases with movement, loss of function, loss of shape (shortening, distortion), pathological movement, oedema, hematoma. Crepitation could be heard on movement, but this type of examination is not recommended. Skin wound in the case of an open fracture, it is quite rare that the bone can be seen through the skin.

Risks:

- bleeding (in case of closed fracture of femur, blood loss can be up to 2 l, in case of fractured pelvis a victim can bleed to death)
- nerve injury (typically radial nerve in case of fractured humerus)
- fat embolism
- infection

First aid:

In first aid, the most important consideration is the safety of the rescuer. Don't treat anyone if you're in harm's way. You should consider: did your patient break their leg from a fall? If so, are you in a position to fall? If you're at risk, address your safety first, and then care for the patient.

Expose the injury. In major trauma, do NOT focus only on the visible injuries — there could be other injuries you're not seeing because they're masked by clothing. Manually stabilise the fracture before splinting if possible. If you aren't alone with the patient, have someone hold the broken limb in place. Apply a splint. Closed fractures of long bones require a splint "over two joints". In open fractures, clean and disinfect the margins of the wound, cover with a sterile dressing, and immobilise. Never apply pressure or remove pieces of bone. In case of major bleeding, use a tourniquet. Do not give anything to eat or drink. Use your transport in case of minor bone fractures or call EMS.

Broken fingers

- Treat patients when they are in a seated position.
- Let a patient hold some soft tissue in the palm
- Fix the whole hand with a bandage or use uninjured fingers as a splint
- Use your transport to the accident and emergency clinic

Broken hand, wrist, and forearm

- Treat in a sitting position.
- Put some soft padding on the palm
- Use a splint from the elbow to the fingers
- Fix the forearm with a triangular bandage around the neck. In case of oedema, elevate the hand. Use an ice pack or wrap the ice in a clean cloth. Do not place ice directly against the skin.
- You may use your transport to the surgery

Broken humerus (arm)

- Check below the fracture for pulse, motor, and sensory capacity (signs of radial nerve and/or brachial artery injury)
- Treat in a sitting position.
- Use a splint and triangle bandage as in a broken forearm
- Fix the arm with another bandage to the trunk
- Call EMS. Seeing as this is a more severe break, transport to the hospital by your means is not recommended.

Broken clavicle

Mechanism: usually an indirect force during a fall on the extended upper extremity

- Treat in a sitting position.
- Use a splint and triangle bandage as in a broken forearm, with the hand elevated (the hand on the injured side touches the opposite shoulder).
- You may use your transport to the hospital

Broken foot and ankle

- Check below the fracture for pulse, motor control, and sensory capacity
- Treat in a sitting position or supine position with an elevated calf
- Use an ice pack or wrap the ice in a clean cloth. Do not place ice directly against the skin.
- Compress by wrapping the ankle lightly (not tightly) with a "U" bandage or elastic ankle brace. Do not try to align the bones.
- Elevate the ankle above the level of the heart to minimise blood loss or stagnation in the immobilised extremity.
- Call an ambulance.

Broken Shin (Tibia and/or Fibula)

- Treat in a supine position
- Use an uninjured lower extremity as a splint and fix both extremities together in the ankles, knees and thighs with padding between joints. This will be disconcerting for the patient, so if he is still conscious, make best efforts to reassure him.
- Apply anti-shock preventive measures
- Call EMS

Broken femur

Mechanism, history and signs:

For the most part, you can again apply the information above, but in case of a fracture to the neck of the femur, the mechanism and external signs may be less obvious. These fractures are mainly observed in old people with osteoporosis. These kinds of fractures can result even after a minor injury. The main signs and symptoms are pain on movement and difficulty bearing weight on the injured extremity.

First aid:

- As in a fracture of the shin
- Note that this (along with a broken pelvis) is a common injury incurred in motorcycle accidents, and the tell-tale sign of this is whether or not the rider has a boot missing. The only way for a motorcycle boot to be pulled off during a collision is the outward rotation of the foot incurred by a broken femur. In this case, pay extreme care not to let the patient stand under any circumstances. It is a common reaction for bikers to want to 'walk it off' while still under the influence of the stress response, and a mistake seen all too often at racing events.

Broken pelvis

Mechanism, history, and signs: Significant force to the pelvic area (falls, car accidents), frequently with other injuries, signs and symptoms of haemorrhagic shock because of massive internal bleeding, which is typical for this type of injury.

- Because an injury to the pelvis can also involve injury to the lower spine, it is best not to move the person. If possible, try to keep the person lying flat. Avoid excessive manipulation – you may worsen internal bleeding
- Using a triangular bandage or alternative (tape, cord, belt, etc) tie the casualty's ankles together; this is most comfortably and stably achieved by applying a 'figure of eight' around the back of the casualty's ankles, across their shoe laces, and tied off underneath their feet.
- Tying the ankles together bring in the feet which prevents outwards rotational forces on the pelvis.
- Completely unfold a space blanket and while grasping the top edge with hands wide apart, gather up the entire blanket into pleats into your hands.
- Pass the gathered space blanket under the natural hollows behind the casualty's knees to minimise movement. Pull the blanket through until it is central.
- Have an assistant stand astride of the casualty, above their waist and lift the casualty's bottom off the ground (only an inch or so) by grabbing them by their belt or waist band. If they are wearing tracksuit trousers or something stretchy without a stable belt, have them reach under their bottom and lift them up by pulling the seat of their trousers taut.
- Quickly, slide the blanket under their bottom and unfurl the pleats so that the blanket is spread out from their waist down to the crease between their buttocks and the top of their thighs.
- Gently lower the casualty, only the blanket.
- Bring either side of the blanket around the casualty's hips, bring the ends together and start twisting to 'wind in' the blanket. This will bring the hips in and stabilise the pelvis without applying direct pressure to the pelvis itself.

- Twist the ends until it feels snug; it must be tight enough to feel as though it is doing something but not so tight that you are 'crushing' the pelvis. Remember, you want to stabilise, not compress!
- Call EMS

Amputation of the peripheral part of the extremity

Usually, amputation of a finger or hand, most commonly as a result of home improvement and amateur automotive repair activities

First aid:

- Stop bleeding from the stump (use pressure and elevation; the tourniquet is less convenient)
- Save any severed body parts and make sure they stay with the person. Remove any dirty material that can contaminate the wound, if possible. Gently rinse the body part if the cut end is dirty.
- Wrap the severed part in a clean, damp cloth, place it in a sealed plastic bag, and place this bag in a second bag with an ice water bath (2 parts water to 1 part ice).
- Do not directly put the body part in water without using a plastic bag, or put the severed part directly on ice or use dry ice, as this will cause frostbite and injury to the part. The body part must not get frozen!
- Do not apply disinfection with peroxide directly on the stump
- Do not disrupt any pieces of skin connecting the stump and the amputated part
- If cold water is not available, keep the part away from heat as much as possible. Save it for the medical team, or take it to the hospital. Cooling the severed part will keep it safe for reattachment for about 18 hours. Without cooling, it will only remain safe for about 4 to 6 hours.
- Call EMS.
- Keep the person warm
- Once the bleeding is under control, check the person for other signs of injury that require emergency treatment. Treat fractures, additional cuts, and other injuries appropriately.
- Stay with the person until medical help arrives.

Burns

Definition: a traumatic injury to the skin or other organic tissue primarily caused by thermal exposure. Eventually, exposure to corrosive compounds or electrical current. Bearable contact temperature is 43.5 °C. Skin injury starts at 55 °C, denaturation of proteins at 60 °C. Next important factor is a time of exposure: (temperature 53 °C causes skin damage in 60 s, temperature 55 °C in 30 s).

Classification:

- First degree: Includes only the outer layer of skin, the epidermis. Skin is usually red and very painful, equivalent to superficial sunburn without blisters. Burn is dry in appearance, healing occurs in 3-5 days, injured epithelium peels away from the healthy skin
- Second degree involves 2 grades - partial-thickness burns involve epidermis and superficial portion of the dermis. Blisters are frequent, wound is pink, red in colour, painful and wet appearing, blanches with pressure, painful. Heals without grafting, deep partial-thickness burns (former 2nd B degree burn) involve the epidermis and most of the dermis, appears white or poorly vascularized, blanching is sluggish or absent; may not blister, less pain, frequently excision of the wound and skin grafting is necessary

- Third degree: Involves epidermis and all layers of dermis, extending down to subcutaneous tissue. Appears dry, leathery, and insensate, often without blisters, and can be difficult to differentiate from deep partial-thickness burns and needs skin grafting to heal.
- Fourth-degree burns involve thermal injury extending to muscles and bones.

Extent:

There are various methods to calculate the extent of the surface of the injury. In adults, the rule of 9 is used frequently, but cannot be used on children for a different body scale (surface area of 1 y 1-year-old baby is 17 %, in an adult 9 %).

Rule of 9:

Head 9 %, upper extremities 2 x 9 %, lower extremities 2 x 18 %, trunk 2 x 18 %, genitals 1 %. In infants up to 2 years the surface area of a patient's hand represents 1 % of body surface.

Critical burns

5 % and more in children up to 2 years

10 % and more in children up to 10 years

15 % and more in children up to 15 years

20 % and more in children older than years .

Added risk factors:

- Age (too young or too old)
- Complicating diseases
- Burns of face, hand, foot, genitals, buttocks
- Inhalation trauma, circular wound risk of oedema and compartment syndrome (compression of blood vessels because of oedema in a limited space among firm membranes. Every severe burn trauma should be treated in a specialised centre. Burn shock is a combination of distributive and hypovolemic shock (fluid and protein loss from the vascular space, loss of vessel wall integrity, impaired myocardial contractility)

First aid:

Stop the burning process (clothes caught on fire), cover, roll the person, and cover the face to protect the airway. Prevent any strain. Remove any clothes soaked with hot fluid. Do not remove parts that firmly adhere to the skin. Cool with clean running water at 8 °C for about 20 min or until pleasant, but only in small areas. Prolonged cooling of large surfaces results in hypothermia, decreased skin perfusion, and worsening of the wound. Remove rings, piercings, and all accessories that could not be removed in case of swelling.

Always cool: a) face, b) neck, c) hands, d) feet, e) minor burns

Cover: use a clean dressing or plastic cling foil to cover the burn, keep the patient warm, do not give anything to eat or drink

The most common mistakes:

4. Cooling of the whole body, the patient develops hypothermia
5. Cooling with ice
6. Use of ointments and other similar remedies
7. Underestimation of the injury

8. Oral intake of food, drink, drugs, etc. Treatment is usually done under general anaesthesia, and oral intake increases the risk of aspiration of gastric content into the lungs