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MED

First aid-drowning

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Learning objectives

- Student will learn the causes of drowning.
- Student will learn the approach of first aid for drowning (children and adults).
- Student will learn about the risks to rescuer during drowning.

Drowning

- Drowning is the process of experiencing respiratory impairment from submersion/immersion in liquid.
- Just 30 mm of liquid and you can drown.
- 360,000 people died from drowning in average every year.
- Drowning is the third leading cause of unintentional injury-related death (after drink-drive accident, fire-related injury)
- Drowning is the leading cause of injury death in children aged 1-4 years.
- Prevention is the key.

Risk factors

- Male: Nearly 80% of people who die
- The most risky age in years:
- **A 1-4.** Childrens can't swim, they don't have endurance.
- **B 18-24.** Loss of inhibitions. Hazardous behavior.
Alcohol intoxication.
- **C over 55.** Overestimation of swimming abilities.
Chronic limiting diseases.
- Where:
- 89% swimming pool.
- 10% sea, ocean, river..
- 1% other (transportation, toilete, bath bucket)



Risk factors

- Transportation (migration, cheap boats fishermen, inappropriate management in an accident)
- Tourists (by the sea do not know the local conditions, currents below the surface, the power of low tide, rip current)
- Most people drown at the beginning of the summer season and during the big holidays (4th July)

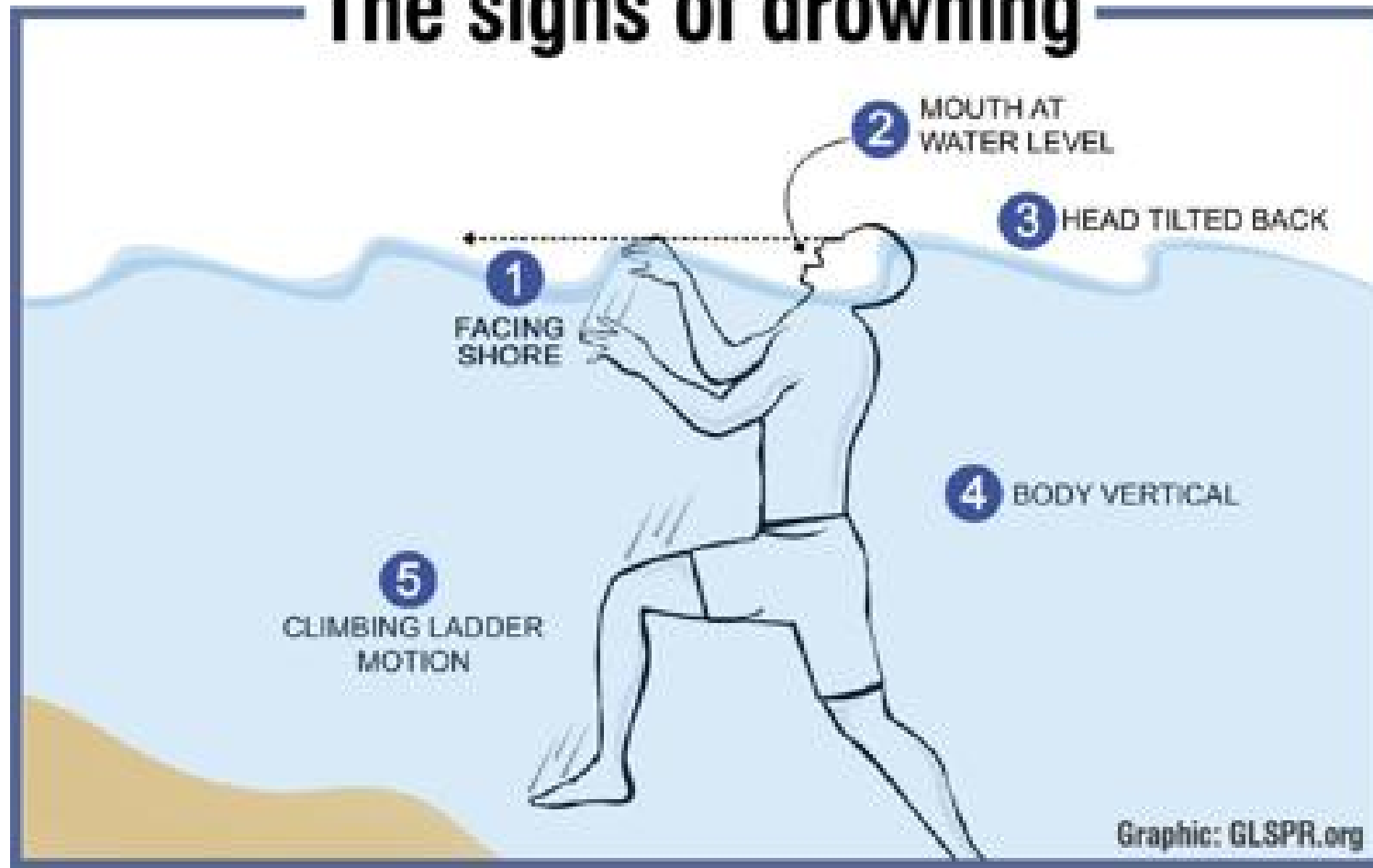
How to recognize drowning ?

– Lifeguard distinguishes 4 types of people in water.



1. **Swimmer** (horizontal position of the body, regular breathing, progression in water)
2. **Distress swimmer** (horizontal position, accelerated breathing, no or minimal progression in water. Within 60 seconds they become active drowning. Ideally rescue immediately at this point.
3. **Active drowning victim** (vertical position, ineffective movements of the limbs, tilt of the head back. CAVE: risk of drowning of the rescuer. They are strong. They're fighting for their lives. Rescue for professionals only.
4. **Passive drowning victim** (someone who is unconscious in the water)

The signs of drowning



Drowning chain of survival



- The safety of the rescuer is an **absolute priority**.
- If you find someone drowning. The first step is call for help bystanders and summon EMS.
- Then attempt to save the victim:
 - 1. Throwing rescue. Throw something to keep them afloat (rescue ring, floating..)
 - 2. Water rescue (No diving. Always feet first and watching closely the victim. Grasp the victim ideally behind the chest and pull the victim to the nearest exit point, 2 rescuers)
- The aim is to keep the airway above water level and transport the victim to the resuscitation position to the ground.

Basic skills on how to rescue a drowning victim

If a person falls through ice, and there is more than one person on solid ground, form a chain of bodies from a secure location out to the fallen person



ADAM

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Hypoxic cascade-drowning

- Apnoe. Voluntary stop breathing, but later CO₂ increases, panic, more oxygen need. Begins involuntary breathing of water.
- Aspiration and swallowing of water. An uncontrollable need to breathe. The victim inhales water into his lungs and swallows. This causes a later respiratory arrest reflexively.
- Respiratory arrest. Respiratory arrest leads to hypoxia. Hypoxia leads to cardiac arrest.
- Irreversible changes. Begins to irreversibly die off the brain tissue.
- CAVE: Cold water-brain protection. Start CPR even after 1 hour of immersion)

Drowning



- **Hypoxia**
- **Cold environment:**
better tolerancy of hypoxia
- **Decreased rate of metabolism**
- **Start resuscitation even after 20-60 min of submersion**





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Types of drowning



- DRY. Water not enter lungs. Death occurs by sustained laryngeal spasm. In 10% of cases.
- WET. = primary drowning. Water inhaled into lungs. In 90% of cases. This is due to hypoxic cascade and the phenomenon of terminal relaxation of the muscles of the larynx, pharynx (hypercapnia, hypoxia)
- SECONDARY AFTER 24-48 HOURS. Respiratory distress. Aspirated fluid interferes with the pulmonary surfactant. Causes swelling of the lungs, hypersecretion of mucus, bronchospasm. CAVE: We always think about the possibility of late complications!

Drowning- Basic life support

- We pulled the drowning man out of the water and he's safely on land.
- 1. Victim is conscious. Sitting position. Keep coughing. Can vomit.
CAVE: hypothermia and secondary drowning.
- 2. Victim is unconscious.
- Initial assessment is almost identical to the other conditions.
- Follow SSS ABC.
- Differences. CPR start with 5 breaths, then in ratio 30:2 or in children 15:2. Check availability of AED. Before AED operation-dry victims chest!

CPR for drowning - specifics



- First the respiratory arrest, then the cardiac arrest (hypoxic arrest)
- The restitution of spontaneous circulation is dependent on the supply of oxygen
- CPR start with 5 breaths (chest is rising)
- During CPR 90% of the victim vomits swallowed water (hypoxic cascade)
- If the victim vomits (we turn it to the side for better drainage, we can use a few strong back blows between the shoulder blades on the side, then immediately back to the back and continue in CPR)
- We always check if an AED is available. Before use dry victim.

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Summary

- The safety of the rescuer is an **absolute priority**.
- Prevention is the key.
- Rescue the victim from water with someone. Ideally 2 rescuers.
- The victim swallows water during drowning - vomits during rescue.
- Dry the victim. (AED use and prevention of hypothermia)
- CPR start with 5 breaths (chest is rising).
- We always think about the possibility of late complications!
(secondary drowning)
- Start CPR within 1 hour of immersion.



Learning outcomes

- Student is able to describe the rescue of the drowning victim.
- Student can explain the difference between dry and wet drowning.
- Student knows the specifics of Basic Life Support in drowning.

References

- <https://www.redcross.org/take-a-class/lifeguarding/lifeguard-preparation/lifeguard-manual>
- <https://www.resuscitace.cz/ke-stazeni>

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