

# Polytrauma

**Polytrauma** is the involvement of at least two organ systems, at least one of which **threatens the patient's life** .

**A combined injury** is an impairment of at least two organ systems that **do not threaten** the patient's life.

## Epidemiology

Polytraumas are the most common cause of death under the age of 40, the incidence of trauma-related deaths in developed countries is 60-80/100,000 population, it is the fifth most common cause of death, the most common cause is traffic accidents.

### Distribution of deaths

- Immediate - 50% during the first 30 min. – serious injuries to the brain , spine, heart or large vessels.
- Early - 30% in the first 4 hours - DC obstruction, insufficient ventilation, hemo - pneumothorax .
- Late - 20% ARDS, MOF, sepsis, pulmonary embolism .

## Mechanism of injury

- High speed vehicle collisions.
- Fall from more than 4 meters.
- Explosion.
- Backfilling.

### Typical injury mechanisms cause typical injuries:

- **frontal impact** – direct injury to the head, cervical spine, lower limbs, pelvis and chest;
- **fall from a height** – lower limb fractures, skull base fractures, trauma to the spine, pelvis, injuries to internal organs;
- **blast** – chest, limb, abdominal trauma, blast syndrome – pressure wave injury;
- **crushing** – crush syndrome, damage to internal organs.

## Polytrauma surgical scoring

- **Abbreviated Injury Scale = AIS**

Individual injuries are evaluated according to the degree of severity from 1 to 6 - from the lightest 1 to the most severe (inoperable) 6.

- **Injury Severity Score = ISS**

Individual injuries are graded according to the AIS scale - and divided into six areas (head, face, chest, abdomen, limbs including pelvis, external injuries) - only the highest AIS value in the given region is counted. The ISS takes on values from 0 to 75. If a region in the AIS is rated as grade 6 (inoperable), the ISS automatically takes on the value of 75.

Example

Region	Description of injury	AIS	Values of the three most difficult <sup>2</sup>
Head and neck	Brain contusion	3	9
Face	No injuries	0	
Thorax	Flail chest	4	16
Belly	Mild liver contusion	2	25
	Rupture of the spleen	5	
Extremities	Femur fracture	3	
External injuries	No injuries	0	
	ISS		50

# Management of care for the polytraumatized patient

Caring for a polytraumatized patient usually begins with the treatment and transport of a polytraumatized patient by an RLP doctor (Rapid Medical Aid – a type of medical emergency service crew whose member is a doctor). It is important to set priorities and maintain calm and balance.

## EMS doctors (medical emergency service)

Upon arrival at the scene - determination of the number of injuries, evaluation of the severity of injuries, stopping life-threatening bleeding, ensuring airways, securing venous access, pharmacotherapy, volume therapy, transport to a trauma center or an appropriate medical facility.

### Algorithm

- **A - Airway** - ensuring patency of airways (!Watch out for spinal trauma).
- **B - Breathing** - assessment of breathing, frequency, sight, palpation, listening (chest injury, tracheal deviation, pneumothorax) and the resulting measures - mask breathing, chest puncture, etc.
- **C - Circulation** - Palpation of the pulse - if it is not palpable, we start immediate resuscitation, if the pulse is palpable, we measure the pulse, pressure - procedures - stop the bleeding, ensure venous access, replenish the volume, take blood for KO, HTK.
- **D - Disability** - indicative neurological examination - head trauma, pupil size, state of consciousness GCS .
- **E - Examination** - Orientation examination of other body systems - chest, abdomen, limbs.
- **T** - thermal management, transport and documentation. <sup>[2]</sup>

## Hospital phase

### Structure of the ATLS (Advanced Trauma Live Support) trauma protocol

#### Short overall evaluation

rough orientation, medical history.

#### Primary evaluation

A, B, C, D, E - possible resuscitation, then:

Disarmament, venous access 2 cannulas at least 14G, BP, TF, saturation.

#### Secondary evaluation follows stabilization of vital functions.

Clinical examination, X-ray, chest drainage, CVK, urinary catheter, ultrasound of the abdomen, CT of the spine and skull, arterial access , CT of the head.

#### Definitive treatment.

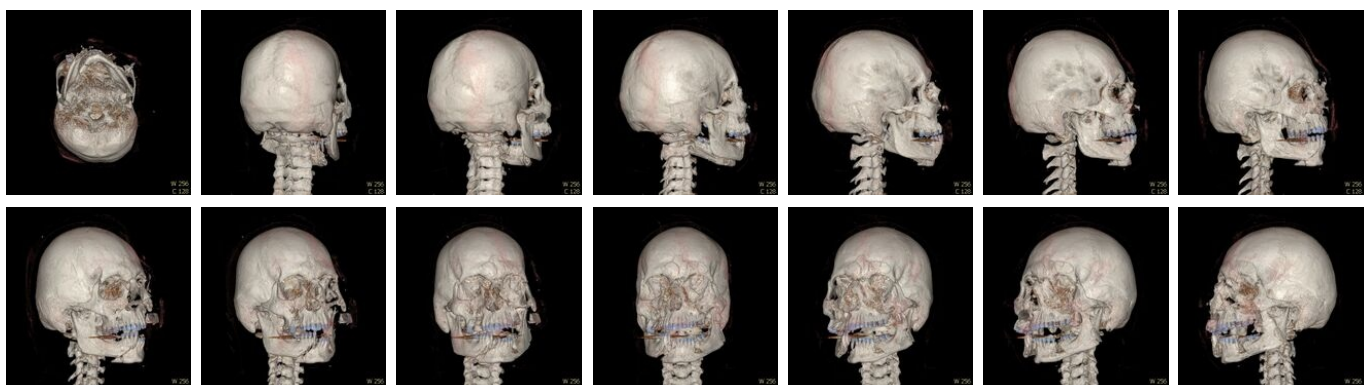
### Treatment of serious injuries

1. Urgent income + life-saving services.
2. The first diagnostic phase within 30 minutes.
3. Injury stabilization and stabilizing surgery 2-3 hours (necessary to stabilize the patient).
4. Second diagnostic phase + definitive stabilization 7.-10. day.
5. Delayed performance and recovery

### Composition of the trauma team

- Traumatologist
- Anesthesiologist, intensivist
- Surgeon
- Radiographer
- Neurosurgeon, neurologist, orthopedist, ENT, urologist, oral and maxillofacial surgeon...

## Reconstruction from CT skull polytrauma





## Links

### Related Articles

- Injury
- Damage control surgery

### External links

- Polytrauma-MUNI Brno ([http://med.muni.cz/Traumatologie/ark\\_sv\\_Anna/Trauma.htm](http://med.muni.cz/Traumatologie/ark_sv_Anna/Trauma.htm))
- Doporučené postupy pro ošetření pacienta se závažným traumatem v přednemocniční péči ([https://www.urgmed.cz:443/postupy/2009\\_trauma.pdf](https://www.urgmed.cz:443/postupy/2009_trauma.pdf))

### References

1. KARIM, Brohi. *Trauma.org* [online]. ©10.03.2007. [cit. 9.11.2009]. <[1] (<http://www.trauma.org/index.php/main/article/383/>)>.
2. ŠKORŇÁK, Oldřich. *Záchranáři RZP a polytrauma* [online]. ©2009. [cit. 9.11.2009]. <[2] ([http://www.komorazachranaru.cz/download/09.\\_Zachranari\\_RZP\\_a\\_polytrauma\\_\(O.Skornak\).ppt](http://www.komorazachranaru.cz/download/09._Zachranari_RZP_a_polytrauma_(O.Skornak).ppt))>.