

INTRODUCTION

All trauma patients should be assessed and managed in a systematic way, using the primary survey to identify patients with actual or potentially life threatening injuries.

If any abnormality is detected during the assessment, the need for **senior clinical support** should be considered.

This guideline uses **mechanism of injury** and **primary survey** as the basis of care for all trauma patients.

All these guidelines reflect the principles of the Pre-Hospital Trauma Life Support (PHTLS RCS Ed)¹, and Advanced Trauma Life Support (ATLS) training courses.

BASIC TRAUMA INCIDENT PROCEDURE

Safety:

1. **SELF** – personal protective equipment is mandatory
2. **SCENE**
3. **CASUALTY**.

Remember, safety is **dynamic** and needs to be continually re-assessed throughout.

Scene Assessment:

- consider resources required
- consider possibility of major incident/chemical, biological, radiological or nuclear (CBRN) (*refer to CBRN guideline*)
- early situation report:
 - operational
 - clinical.

Deliver situation report using **'METHANE'** format²

M	Major incident standby or declared
E	Exact location of incident
T	Type of incident
H	Hazards (present and potential)
A	Access and egress routes
N	Number, severity and type of casualties
E	Emergency services present on scene and further resources required

Remember to check the scene for other casualties e.g. the ejected casualty from an RTC.

Always consider the **mechanism of injury** and the possible injury patterns that may result, but mechanism of injury alone cannot exclude injury.

PATIENT ASSESSMENT

The primary survey should be used to assess and detect any **TIME CRITICAL/POTENTIALLY TIME CRITICAL** problems

Primary Survey – (60 – 90 seconds for assessment)

- **AIRWAY** with spine control
- **BREATHING**
- **CIRCULATION**
- **DISABILITY** (mini neurological examination)
- **EXPOSURE** and **ENVIRONMENT**

Stepwise Patient Assessment and Management

In **ABCDE** management, problems should be dealt with as they are encountered, i.e. do not move onto breathing and circulation until airway is secured. Every time an intervention has been carried out, re-assess the patient.

At each stage consider:

- need for rapid evacuation to hospital
- need for early senior clinical support.

Airway Assessment

Look	for obvious obstructions e.g. teeth, foreign bodies, vomit, blood or soot/burns/oedema in burn victims
Listen	for noisy airflow e.g. snoring, gurgling or no airflow
Feel	for air movement

AT ALL TIMES immobilise the whole spine until it has been cleared, this will usually be with manual immobilisation initially (*see neck and back injury guideline*).

Stepwise Airway Management

Correct any airway problems immediately by:

- positioning
- suction (if available and appropriate)
- jaw thrust (no neck extension)
- oropharyngeal airway
- nasopharyngeal airway
- laryngeal mask airway (if appropriate)
- endotracheal intubation
- surgical airway (needle cricothyroidotomy).

All steps should be considered but may be omitted if not considered appropriate.

Remember: **ALL** trauma patients need high concentration oxygen.

Breathing Assessment

Expose the chest:

Look	for cyanosis, respiratory rate, depth and equality of breathing and assess effort. Look for obvious chest injury e.g. open wounds, flail segment. Remember to look in the axillae
Listen	for altered breathing patterns, auscultate to assess air entry and compare sides, percuss for hyporesonance or hyperresonance
Feel	for depth and equality of chest movement, crepitus of rib fractures or abnormal movement flail segments
Note	remember sides and back

Assess adequacy of breathing

- respiratory rate and depth (<10 or >30 breaths per minute (bpm))
- equality of air entry
- pulse oximetry should be undertaken
- oxygen saturation (SpO₂) <95% except in patients with COPD (*refer to COPD guideline*).

If the assessment elicits any suggestion of abnormal breathing then immediately assess for signs of life-threatening injury utilising 'TWELVe'

Examine the neck and chest for the signs of:

- T** Tracheal deviation
- W** Wounds, bruising, swelling
- E** Emphysema (surgical)
- L** Laryngeal crepitus
- V** Venous engorgement (jugular)

To **exclude** life-threatening injuries:

- tension pneumothorax
- open pneumothorax
- massive haemothorax
- flail chest.

Stepwise Breathing Management

Correct any breathing problems immediately:

- administer high concentration oxygen (O₂) via a non-rebreathing mask, using the stoma in laryngectomees and other neck breathing patients, to ensure an oxygen saturation (SpO₂) of >95%, except for patients with chronic obstructive pulmonary disease (COPD) (*refer to COPD guideline*)
- For sucking chest wounds (*refer to thoracic trauma guideline*)
- decompress tension pneumothorax if present, trained and authorised to do so (*refer to thoracic trauma guideline*)
- flail segment may be splinted with a hand.

Consider assisted ventilation at a rate of 12–20 respirations per minute if any of the following are present:

- oxygen saturation (SpO₂) <90% on high concentration oxygen
- respiratory rate <10 or >30bpm
- inadequate chest expansion.

Restraint (POSITIONAL) Asphyxia

If the patient's condition requires that they are physically restrained (e.g. by Police Officers) in order to prevent them injuring themselves or others or for the purpose of being detained under the Mental Health Act, then it is paramount that the method of restraint allows both for a patent airway and adequate respiratory volume. **Under these circumstances it is essential to ensure that the patient's airway and breathing are adequate at all times.**

Circulatory Assessment

Look for and control external haemorrhage.

Remain alert to the possibility of internal bleeding which requires immediate evacuation to hospital:

- assess skin colour and temperature
- palpate for a radial pulse – if present, implies a systolic BP of 80-90mmHg and adequate perfusion of vital organs, but this is highly variable.³ If absent, feel for a carotid pulse which, if present, implies a systolic BP of about 60mmHg
- assess pulse rate and volume
- check capillary refill time **centrally** i.e. forehead or sternum.

Consider hypovolaemic shock and beware of its early signs:

- pallor
- cool peripheries
- anxiety, abnormal behaviour
- increased respiratory rate
- tachycardia.

Look for signs of blood loss in five places (**see below**):

1. external	
2. chest	during B assessment
3. abdomen	by palpation (limited value) and observation of external marks and bruises
4. pelvis	gently spring once only
5. long bones	open or closed fractures

Recognition of Shock

Shock is difficult to diagnose. Certain groups of patients hide the signs of shock, notably, children, pregnant women, those on medication such as beta blockers, and the physically fit; for these groups of patients the signs of shock appear late:

- in adults, blood loss of 750-1000ml will produce little evidence of shock; blood loss of 1000-1500ml is required before more classical signs of shock appear
- **REMEMBER** this loss is from the circulation **NOT** necessarily from the body.

Stepwise Circulatory Management

Correct any circulatory problems immediately by:

1. Arresting external haemorrhage with the use of:

- direct pressure
- pressure on proximal artery
- tourniquet if exsanguinating.

2. Consider splinting:

- major long bone fractures with various devices
- pelvic fractures e.g. triangular bandages, inverted Kendrick Extrication Device or pelvic straps.

NOTE: Internal or uncontrolled haemorrhage requires rapid evacuation to hospital with alert message.

Fluid Therapy

Obtain IV access. (large bore cannula)

Current research shows little evidence to support the routine use of IV fluids in adult trauma patients. In circumstances such as penetrating chest and abdominal trauma, survival worsens with the routine use of IV fluids.⁴

Fluids may raise the blood pressure, cool the blood and dilute clotting factors, worsening haemorrhage. Therefore, current thinking is that fluids should only be given when major organ perfusion is impaired.

If there is visible external blood loss greater than 500mls, fluid replacement should be commenced with a 250ml bolus of crystalloid.

Central pulse **ABSENT**, radial pulse **ABSENT** – is an absolute indication for urgent fluid. If the patient has a carotid pulse but no radial pulse then other clinical factors should also be considered before decision on fluid administration.

Central pulse **PRESENT**, radial pulse **ABSENT** – is a relative indication for urgent fluid depending on other indications including tissue perfusion and visible/expected blood loss.

Central pulse **PRESENT**, radial pulse **PRESENT** – **DO NOT** commence fluid replacement,⁵ unless there are other signs of poor central tissue perfusion (e.g. altered mental state, cardiac rhythm disturbance).

Re-assess vital signs prior to further fluid administration.

DO NOT delay at scene for fluid replacement; wherever possible cannulate and give fluid **EN-ROUTE TO HOSPITAL**.

Disability Assessment:

Note initial level of responsiveness on AVPU scale, and time of assessment (*see below*).

- A** Alert
- V** Responds to voice
- P** Responds to painful stimulus
- U** Unresponsive

Assess and note pupil size, equality and response to light.

Any patient with altered mental status should have their blood glucose checked to rule out hypo or hyperglycaemia as the cause.

Exposure/Evaluation

At this stage further monitoring may be applied.

Care must be taken to ensure patient does not suffer from exposure to cold/wet conditions.

Evaluate whether the patient is time critical or non-time critical on the basis of the primary survey.

Non-trapped time critical patients need to be appropriately packaged and transported **IMMEDIATELY** to the nearest appropriate hospital.

If the patient remains absolutely trapped, consider early senior clinical support.

En-route, provide a **HOSPITAL ALERT MESSAGE** and continue **PATIENT RE-ASSESSMENT/MANAGEMENT**.

Consider the need for analgesia (refer to pain management guidelines).

Secondary survey will usually be undertaken during transit to hospital. In critical trauma it may not be possible to undertake the secondary survey before arrival at hospital.

Head

- re-assess airway
- check skin colour and temperature
- palpate for bruising / fractures
- check pupil size and activity
- examine for loss of cerebrospinal fluid
- check Glasgow Coma Scale^{6,7} (*see Appendix 1*)
- assess for signs of basal skull fracture.

Neck

- the collar will need to be loosened for proper examination of the neck
- re-assess for signs of life-threatening injury:

- T** Tracheal deviation
- W** Wounds, bruising, swelling
- E** Emphysema (surgical)
- L** Laryngeal crepitus
- V** Venous engorgement (jugular)

- assess and palpate for spinal tenderness, particularly note any bony tenderness.

Chest

- re-assess rate and depth of breathing
- re-assess for contusions, seatbelt marks and flail segments
- feel for rib fractures, instability and surgical emphysema
- auscultate for breath sounds in all lung fields and assess/re-assess the chest for signs of:
 - pneumothorax
 - haemothorax
 - pulmonary contusion
 - flail segment
 - cardiac tamponade.

For further information *refer to the thoracic trauma guideline*.

Abdomen

- examine for open wounds, contusions, seatbelt marks
- feel for tenderness and guarding, examining the whole abdomen
- remember to examine the back and the front.

Pelvis

- only 'spring' the pelvis once; this avoids the risk of starting catastrophic bleeding
- assume a pelvic injury based on the mechanism
- blood may be visible from urethra / vagina.

Lower and Upper Limbs

- examine lower limbs then upper limbs
- look for wounds and evidence of fractures
- check for MSC in **ALL** four limbs:

M	MOTOR	Test for movement
S	SENSATION	Apply light touch to evaluate sensation
C	CIRCULATION	Assess pulse and skin temperature

- assess pulse and skin temperature.

SPECIAL CIRCUMSTANCES IN TRAUMA

The Trapped Patient

Entrapment can be:

- **Relative:** trapped by difficulty in access/egress from the wreckage, including the physical injury stopping normal exit
- **Absolute:** firmly trapped by the vehicle and its deformity necessitating specialised cutting techniques to free the patient⁸

All absolutely trapped patients are at high risk of having suffered significant transfer of energy and therefore are at increased risk of severe injury. Senior Clinical help should be mobilised at the earliest opportunity.

Actions:

- perform assessment as per trauma guideline
- liaise / mobilise other services as necessary
- give situation report to control
- form a rescue plan
- provide analgesia (**refer to pain management guidelines**).

Key Points – Trauma Emergencies

- Overall assessment of safety: self, scene, casualties is of prime importance.
- The primary survey forms the basis of patient assessment, with due consideration for cervical spine control.
- Early application of oxygen and arrest of external haemorrhage can be life saving.
- Consider mobilising senior clinical support at the earliest opportunity.

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METHODOLOGY

Refer to methodology section.

Appendix 1 – Glasgow Coma Scale

GLASGOW COMA SCALE	
Item	Score
Eyes Opening:	
Spontaneously	4
To speech	3
To pain	2
None	1
Motor Response:	
Obeys commands	6
Localises pain	5
Withdraws from pain	4
Abnormal Flexion	3
Extensor response	2
No response to pain	1
Verbal Response:	
Orientated	5
Confused	4
Inappropriate words	3
Incomprehensible sounds	2
NO verbal response	1