



**GRADUATE
ENTRY
MEDICAL
SCHOOL**

Glasgow Coma Scale 40th Anniversary



UNIVERSITY of LIMERICK
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Easy Peasy Lemon Squeezy



Session Objective

- To revisit the Glasgow coma scale on its 40th anniversary

Components of consciousness

Components of consciousness

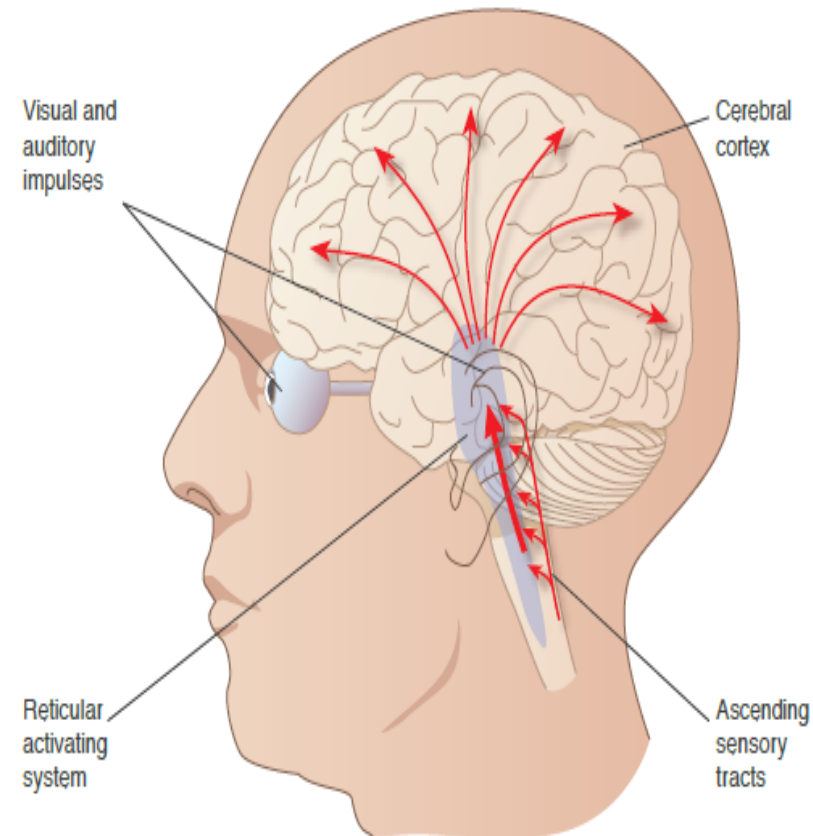
Consciousness is a state of general awareness of oneself and the environment. It has two components, arousal and awareness, and these correspond to two brain structures, the reticular activating system and the cerebral cortex respectively. Consciousness depends on the interaction between the neurones in the reticular activating system in the brainstem and the neurones in the cerebral cortex. The content of consciousness is determined by the neurones in the cerebral cortex while the neurones in the reticular activating system are responsible for the primitive state of arousal.

Arousal

Simply being awake is a primitive state managed by the reticular activating system.

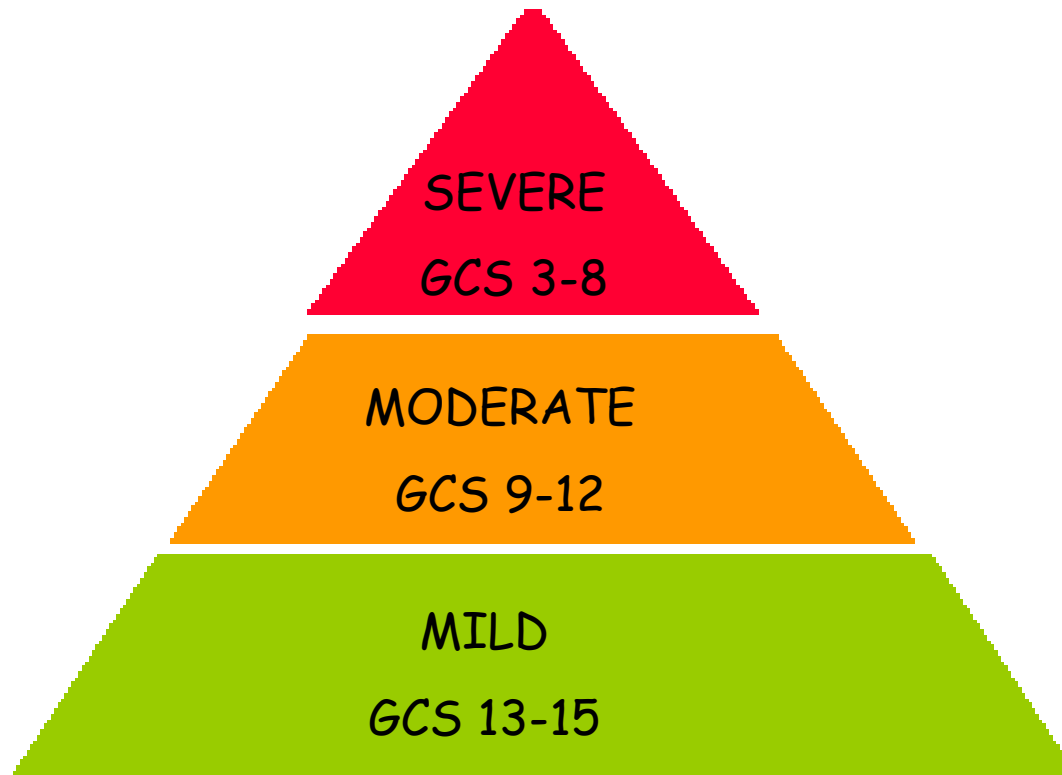
Awareness

Awareness is the more sophisticated part of consciousness, requiring an intact cerebral cortex to interpret the sensory input from the reticular activating system and respond accordingly.



Monday, 06 October 2014

Classification of Brain Injury According to Glasgow Coma Scale



Team Waiting



Radio Report for Emergency Dept.

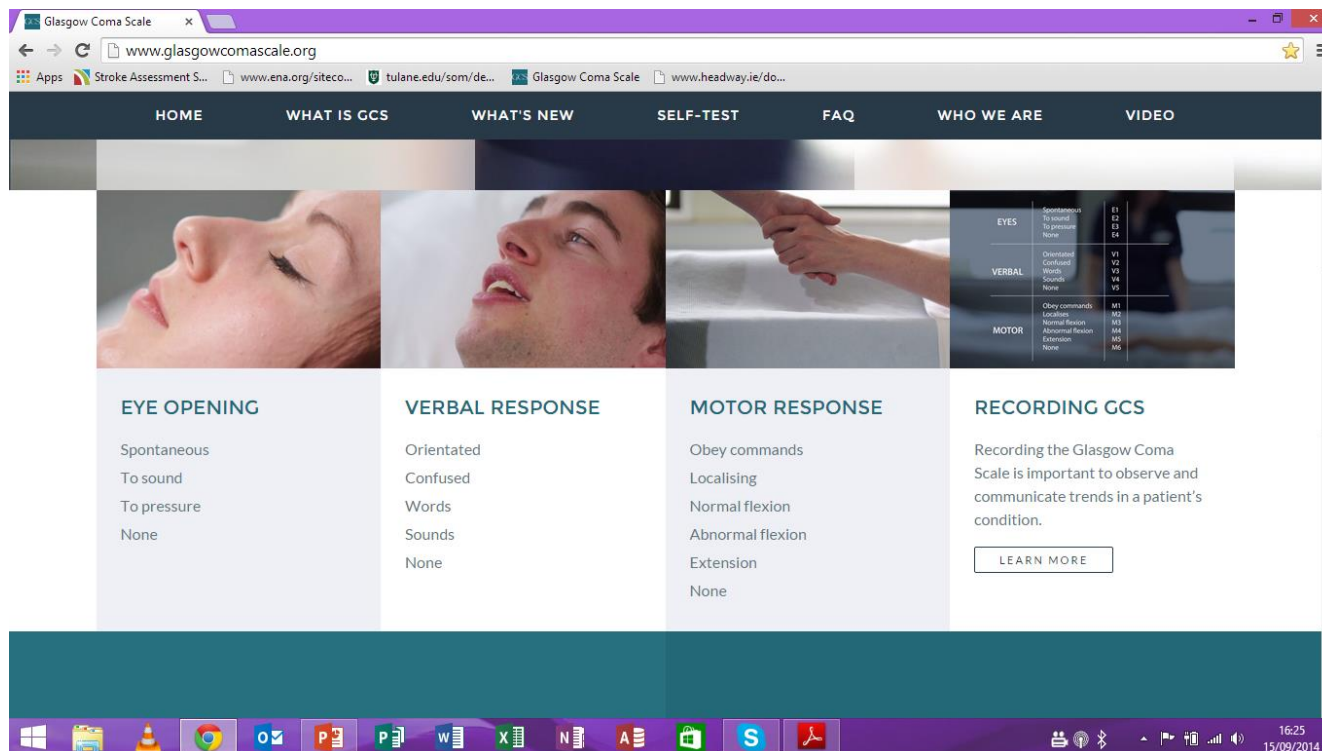
When patients require urgent medical attention on arrival at the ED it is essential that an appropriate patient report precedes their arrival.

The report needs to be clear and concise yet transfer all relevant information.

It is good practice to identify your clinical level when communicating with the ED.

The recommended format is ASHICE.

- A** — Age of patient
- S** — Sex of patient
- H** — History of event
- I** — Illness / injury
- C** — Condition (vital signs & reason for pre-alerting)
- E** — Estimated time of arrival



The screenshot shows the Glasgow Coma Scale (GCS) website. The browser address bar displays 'www.glasgowcomascale.org'. The website has a navigation menu with links: HOME, WHAT IS GCS, WHAT'S NEW, SELF-TEST, FAQ, WHO WE ARE, and VIDEO. Below the navigation menu, there are three large images: a woman's face, a man's face, and hands being held. To the right of these images is a table summarizing the GCS components.

Component	Response	Score
EYES	Spontaneous	E1
	To sound	E2
	To pressure	E3
	None	E4
VERBAL	Orientated	V1
	Confused	V2
	Words	V3
	Sounds	V4
MOTOR	Obey commands	M1
	Localising	M2
	Normal flexion	M3
	Abnormal flexion	M4
	Extension	M5
	None	M6

The main content area is divided into four columns:

- EYE OPENING**
 - Spontaneous
 - To sound
 - To pressure
 - None
- VERBAL RESPONSE**
 - Orientated
 - Confused
 - Words
 - Sounds
 - None
- MOTOR RESPONSE**
 - Obey commands
 - Localising
 - Normal flexion
 - Abnormal flexion
 - Extension
 - None
- RECORDING GCS**

Recording the Glasgow Coma Scale is important to observe and communicate trends in a patient's condition.

[LEARN MORE](#)

The Windows taskbar at the bottom shows the date and time as 16:25 on 15/09/2014.

GLASGOW COMA SCALE : Do it this way

GCS
at 40

EYES
VERBAL
MOTOR

Institute of Neurological Sciences NHS Greater Glasgow and Clyde



CHECK

For factors Interfering with communication, ability to respond and other injuries



OBSERVE

Eye opening , content of speech and movements of right and left sides



STIMULATE

Sound: spoken or shouted request
Physical: Pressure on finger tip, trapezius or supraorbital notch



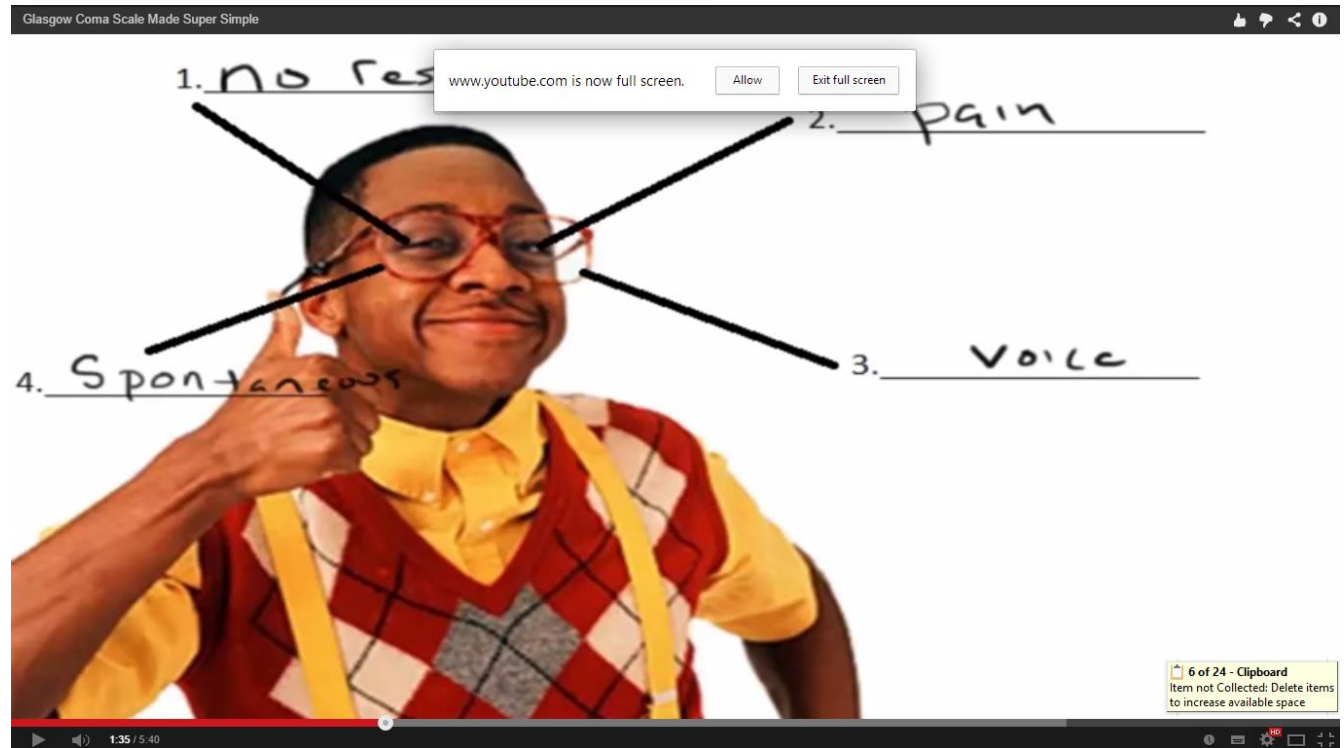
RATE

Assign according to highest response observed

Factors affecting eye opening

Periorbital oedema
Ocular trauma
Cranial nerve injury
pain

Eye



Eye opening

Spontaneous:

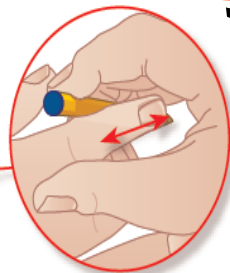
Observed before you approach the patient or speak to him

To speech:

Call the patient's name

To pain:

Apply pressure to side of finger (central stimulus to supraorbital nerve will cause grimacing and eye closure)



None:

Ensure painful stimulus is adequate

Eye Opening

NAME

RECORD No

None

No response

Orientated

Eyes open

Best verbal response

Spontaneously 4

To speech 3

To pain 2

None 1

Orientated 5

Confused 4

Inappropriate words 3

Incomprehensible sounds 2

None 1

Eye opening

Criterion	Observed	Rating	Score
Open before stimulus	✓	Spontaneous	4
After spoken or shouted request	✓	To sound	3
After finger tip stimulus	✓	To pressure	2
No opening at any time, no interfering factor	✓	None	1
Closed by local factor	✓	Non testable	NT

Factors affecting verbal response

- Endotracheal intubation
- Tracheostomy
- Laryngectomy
- Maxillary facial trauma
- Oedematous tongue
- Mutism
- Aphasia
- Hearing loss
- Inability to comprehend language spoken
- Dementia
- Psychiatric disorders
- Developmental delays
- Medications (sedation, neuromuscular blocking agents, anaesthetics)
- Alcohol and drug intoxication

Verbal

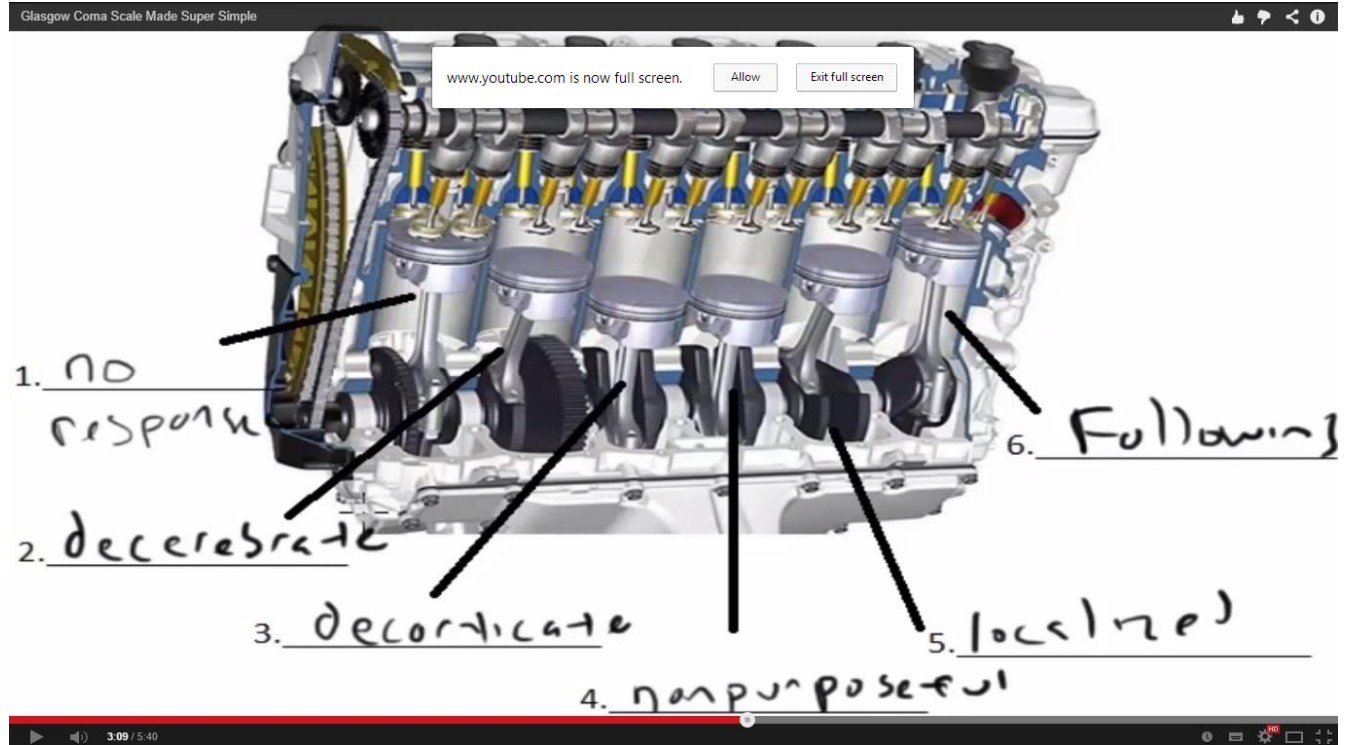


If the patient has an endotracheal tube or tracheostomy, T is recorded in this section.

[illegible]UNIVERSITY of LIMERICK
GALLAGHER CAMPUS

Factors affecting motor response

- Spinal cord injury
- Peripheral nerve injury
- Extremity injury with immobilisation
- Pain
- Inability to comprehend language spoken
- Dementia
- Psychiatric disorders
- Developmental delays
- Medications (sedation, neuromuscular blocking agents, anaesthetics)
- Alcohol and drug intoxication





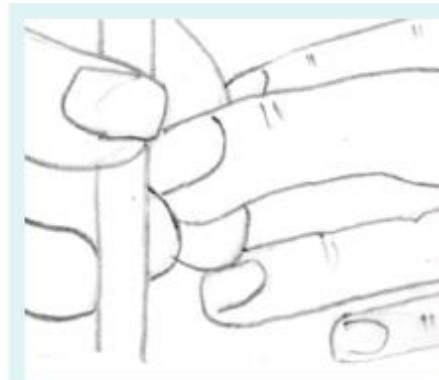
Motor Response

Best motor response

Criterion	Observed	Rating	Score
Obey 2-part request	✓	Obeys commands	6
Brings hand above clavicle to stimulus on head/neck	✓	Localising	5
Bends arm at elbow rapidly but features not predominantly abnormal	✓	Normal flexion	4
Bends arm at elbow, features clearly predominantly abnormal	✓	Abnormal flexion	3
Extends arm at elbow	✓	Extension	2
No movement in arms / legs, no interfering factor	✓	None	1
Paralysed or other limiting factor	✓	Non testable	NT

Sites For Physical Stimulation

Finger tip pressure



Trapezius Pinch



Supraorbital notch



Features of Flexion Responses

Modified with permission from Van Der Naalt 2004
Ned Tijdschr Geneeskd

Abnormal Flexion

Slow Sterotyped
Arm across chest
Forearm rotates
Thumb clenched
Leg extends



Normal flexion

Rapid
Variable
Arm away from body

www.glasgowcomascale.org

Patient arrives

IMIST-AMBO Handover Protocol

I	Identification of patient	
M	Mechanism of injury or medical complaint	
I	Injuries or information related to complaint	
S	Signs	Pulse: _____ BP: ____/____ mmHg Resps: _____ Sats: ____ % GCS: E ____ V ____ M ____ BM: _____ Mmols Temp: _____ °C
T	Treatment and trends	

Pause for Questions

A	Allergies	
M	Medication	
B	Background	
O	Other Information	



Case History



John Smith, a 35-year-old man, has been admitted to A&E following an accident at work in which he was hit on the front of the head by a large steel pipe. Work colleagues reported to the ambulance crew that he lost consciousness for a few seconds. On arrival in A&E, he is opening his eyes spontaneously, is orientated and is able to obey commands. He complains of headache and has two episodes of vomiting.

When his Glasgow Coma Scale score drops 3 (E1 V1 M1) he is taken to CT scan which shows a large left frontal extradural haematoma.

NAME: John Smith				Hospital no:				
			TIME	13	14	15	16	
Glasgow Coma Scale	Eyes	Spontaneously	4	+				
		To speech	3	+				
		To pain	3		+	+		
	Verbal	None	1				+	
		Orientated	5	+				
		Confused	4		+			
	Motor	Inappropriate words	3			+	+	
		Incomprehensible sounds	2					
		None	1					+
Eyes <td>Obey commands</td> <td>6</td> <td>+</td> <td>+</td> <td></td> <td></td> <td></td>	Obey commands	6	+	+				
	Localise pain	5			+			
	Flexion to pain	4				+		
Verbal	Abnormal flexion	3						
	Extension to pain	2					+	
	None	1						
Pupil scale (mm)	Blood pressure and Pulse rate		240					
			200					
			220					
			210					
			200					
			180	+				
			160					
			140					
			120					
			100					
			80					
			60					
			40					
			20					
			10					
PUPILS	Respiration		20	+	+	+	+	
			15					
			10					
			5					
Limb movement	Right	Normal power	4	+	+	+	+	
		Mild weakness	3	+	+	+	+	
		Severe weakness	2	+	+	+	+	
		No response	1	+	+	+	+	
Limb movement	Left	Normal power	4	+	+	+	+	
		Mild weakness	3	+	+	+	+	
		Severe weakness	2	+	+	+	+	
		No response	1	+	+	+	+	



Consider the following in relation to Mr Smith's acute management:

- Frequency of observations.
- Triggers for CT scan.
- Triggers for urgent medical review.
- Glasgow Coma Scale trigger for intubation and ventilation.
- Significance of drop in Glasgow Coma Scale score, pupillary changes and development of limb deficit (to check your answers, go to NICE, 2007).

Glasgow coma scale observation chart

NAME			NEUROLOGICAL OBSERVATION CHART																					
RECORD No.			Hospital no:										Date:					Time:						
NAME:																								
COMA SCALE	Eyes open	Spontaneously 4																					TIME	
		To speech 3																					Eyes closed by swelling = C	
	Best verbal response	To pain 2																					Endotracheal tube or tracheostomy = T	
		None 1																						
Best motor response	Orientated 5	Confused 4																					Temperature °C	
		Inappropriate words 3																						
	Best motor response	Incomprehensible sounds 2																						
		None 1																						
PUPILS	Right	Obey commands 6																					+ reacts - no reaction c eye closed	
		Localise pain 5																						
		Flexion to pain 4																						
		Abnormal flexion 3																						
		Extension to pain 2																						
		None 1																						
		Left	Size																					
			Reaction																					
	Size																							
	Reaction																							
	Normal power																							
	Mild weakness																							
	Severe weakness																							
	Spastic flexion																							
	Limb Movement	Arms	Extension																					Record right (R) and left (L) separately if there is a difference between the two sides
			No response																					
Normal power																								
Mild weakness																								
Legs		Severe weakness																						
		Extension																						
		No response																						

Observations

- **Observation of admitted patients**
- 1.8.5 In-hospital observation of patients with a head injury should only be conducted by professionals competent in the assessment of head injury. **[2003]**
- 1.8.6 For patients admitted for head injury observation the minimum acceptable documented neurological observations are: GCS; pupil size and reactivity; limb movements; respiratory rate; heart rate; blood pressure; temperature; blood oxygen saturation. **[2003]**
- 1.8.7 Perform and record observations on a half-hourly basis until GCS equal to 15 has been achieved. The minimum frequency of observations for patients with GCS equal to 15 should be as follows, starting after the initial assessment in the emergency department:
 - Half-hourly for 2 hours.
 - Then 1-hourly for 4 hours.
 - Then 2-hourly thereafter. **[2003]**
- 1.8.8 Should the patient with GCS equal to 15 deteriorate at any time after the initial 2-hour period, observations should revert to half-hourly and follow the original frequency schedule. **[2003]**
- 1.8.9 Any of the following examples of neurological deterioration should prompt urgent reappraisal by the supervising doctor.
 - Development of agitation or abnormal behaviour.
 - A sustained (that is, for at least 30 minutes) drop of 1 point in GCS score (greater weight should be given to a drop of 1 point in the motor response score of the GCS).
 - Any drop of 3 or more points in the eye-opening or verbal response scores of the GCS, or 2 or more points in the motor response score.
 - Development of severe or increasing headache or persisting vomiting.
 - New or evolving neurological symptoms or signs such as pupil inequality or asymmetry of limb or facial movement. **[2003, amended 2007]**
- 1.8.10 To reduce inter-observer variability and unnecessary referrals, a second member of staff competent to perform observation should confirm deterioration before involving the supervising doctor. This confirmation should be carried out immediately. Where a confirmation cannot be performed immediately (for example, no staff member available to perform the second observation) the supervising doctor should be contacted without the confirmation being performed. **[2003]**

Recap

- Check for factors that might interfere with your assessment
- Observe the patient for spontaneous eye opening speech and movement
- If necessary stimulate the patient first verbally then physically
- Findings should be documented clearly on²⁶ GCS chart

Dying man locked in cell for 25 hours because he looked drunk

By Paul Sims

A MAN suffering from a brain haemorrhage was locked in a cell for 25 hours because police wrongly assumed he was drunk.

Mark Camm, 43, was then dumped in an A&E casualty department where his condition was not properly assessed for nine hours. He died 12 days later.

At the end of an inquest yesterday, Mr Camm's devastated family hit out at the 'culture of cost cutting' which led to his death.

They said in a statement: 'Everybody failed Mark whether they were police officers, doctors at the police station or doctors and nurses at the accident and emergency department who first saw him.'

'Mark lost a chance of survival. But even if he was ultimately to die, we lost the chance to be with him while he was still conscious. to

reassure him, to remind him of how much his family loved him.'

The inquest heard that Mr Camm, a window cleaner, could barely talk and was unsteady on his feet because of the neurological condition when he was detained by police at an off-licence on June 17 four years ago.

But instead of taking him to a hospital officers arrested him for being drunk and disorderly.

He was assessed by a nurse who could not smell alcohol on his breath. Despite this he was slung in a cell at Wood Street police station in Wakefield, West Yorkshire, as officers made rude jokes about his mental well-being. For the next 25 hours he did not move or speak, the inquest was told.

Officers should have checked on him every half hour, but did not



Mark Camm: Was unsteady on his feet from the brain haemorrhage

enter his cell once to examine him or give him water, preferring to look through the grate of the door.

When police finally realised something was wrong they took him to Pinderfields Hospital in a police van. Later, officers falsified records of his incarceration.

At the hospital, 'confused' nursing staff placed him in a less urgent area of casualty because of a lack of space. He was finally treated, and then transferred to Leeds General Infirmary where he died on June 29. After a six-week hearing the jury returned a narrative verdict and criticised police and hospital staff.

The Crown Prosecution Service is expected to review the case, as is the General Medical Council after the coroner David Hinchliff called for an inquiry.

Mr Hinchliff also recommended that West Yorkshire Chief Constable Sir Norman Bettison review custody procedures across the force.

Mr Camm's sisters, Michelle Chadwick and Mel Carlton, vowed to fight for justice. The family said: 'As 25 hours ticked by, and Mark remained speechless in a cell, his chances of survival ebbed away.'

p.sims@dailymail.co.uk

Easy Peasy Lemon Squeezy



references

- [Clinical skills.net](http://Clinicalskills.net)
- Nice Guidelines 2014
- glasgowcomascale.org

Thank You





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CLOSED HEAD INJURIES:

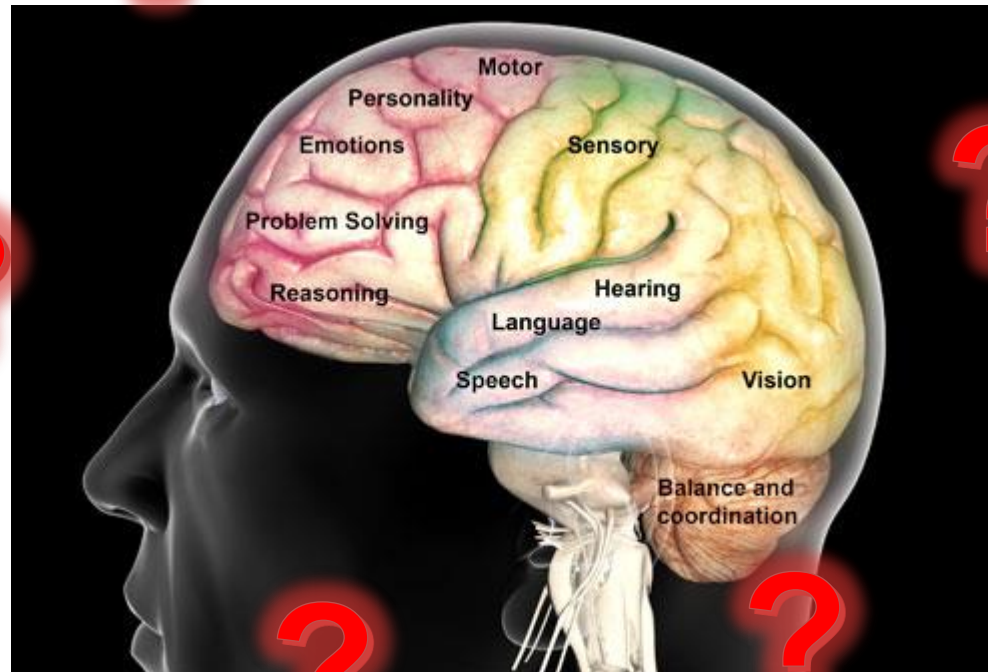
*Preventing Secondary
Injury Pre-hospital*

Carmel O'Sullivan



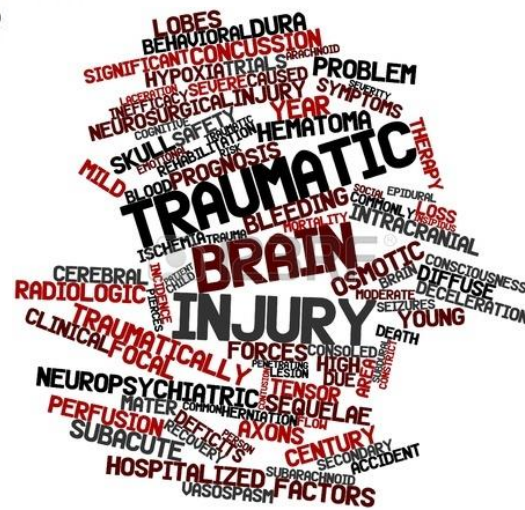
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Closed Head Injuries



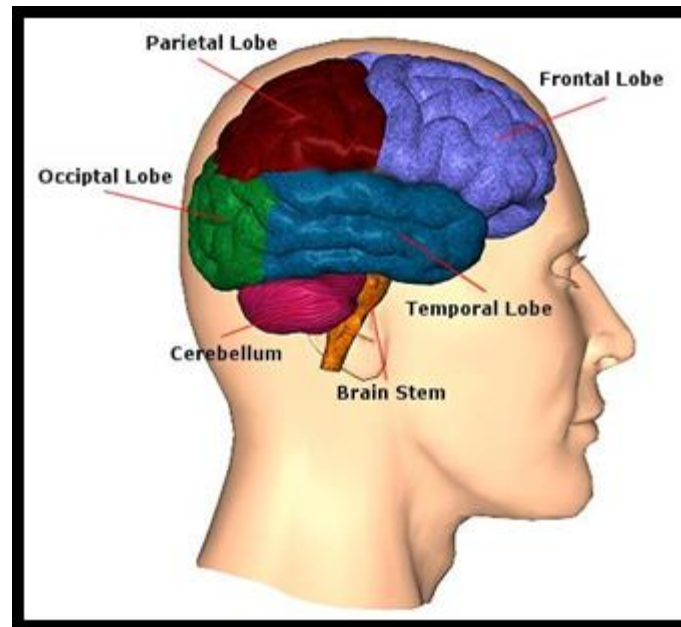
Objectives

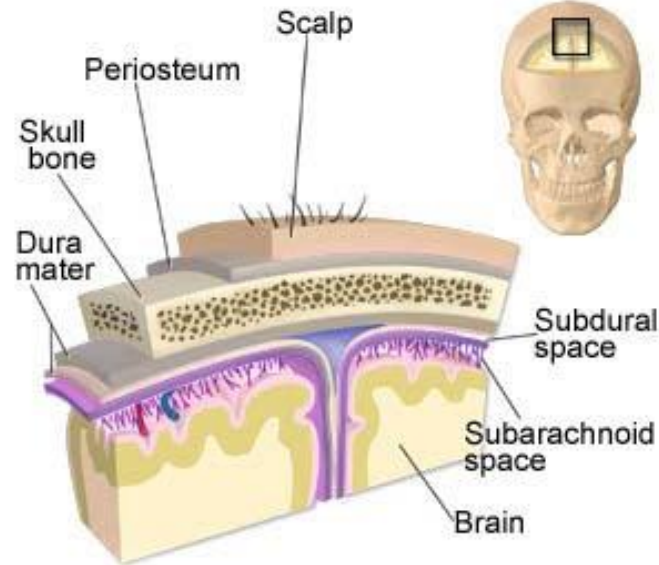
- Define Closed Head Injuries
- Types of Injuries
- Pathophysiology
- Management & Head Injury CPG



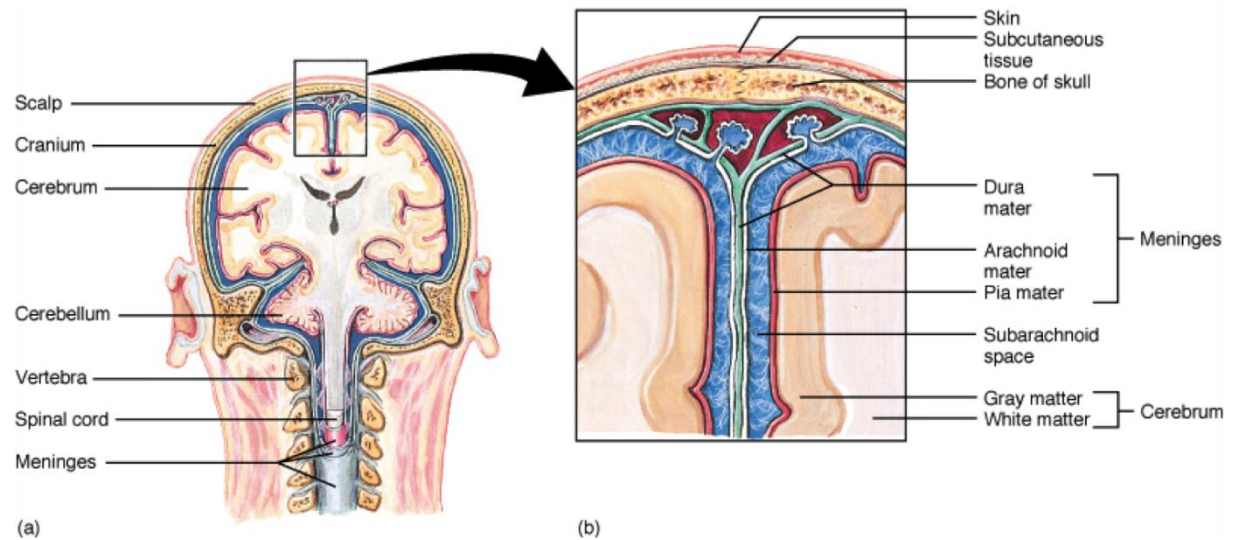
Closed Head Injury

- TBI – blunt trauma
- Dura mater intact
- Brain tissue is not exposed





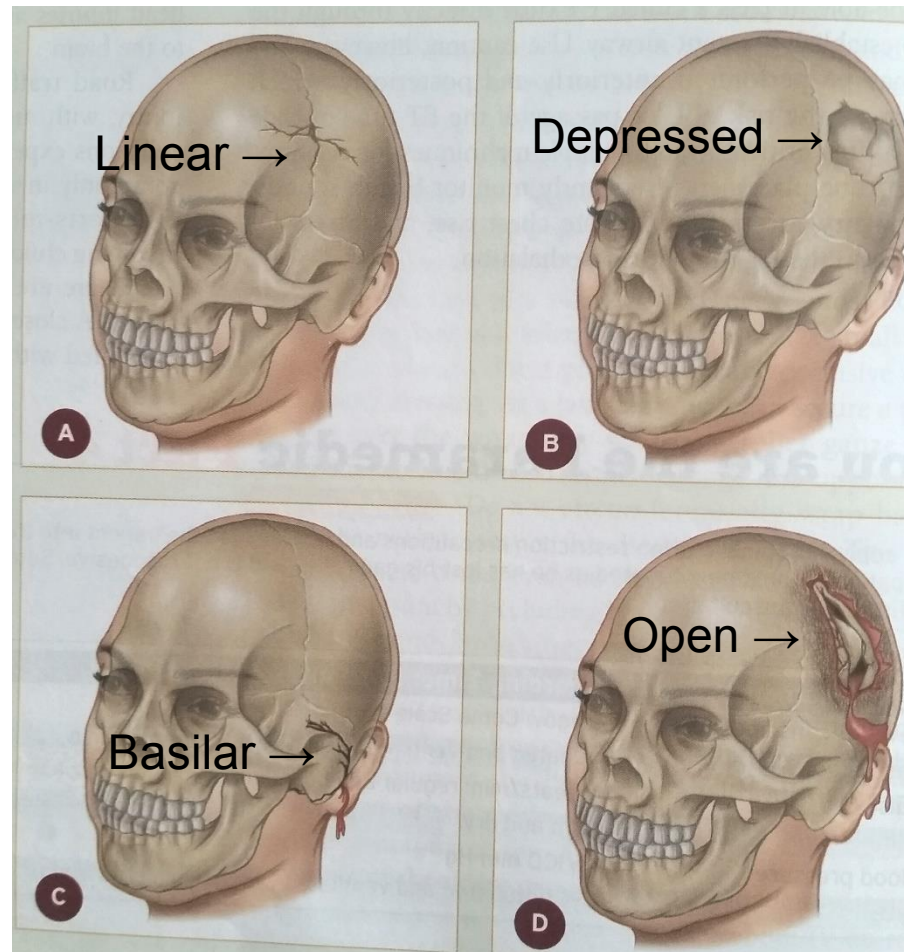
Layers covering the Brain



Injuries

- Skull Fractures
- Diffuse Brain Injuries
- Focal Brain Injuries

Skull Fractures



REF: Nancy Caroline, *Emergency Care in the Streets*

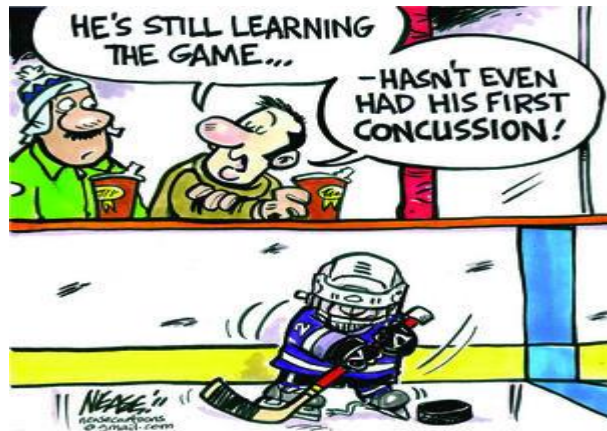
Diffuse Brain Injuries

- Cerebral Concussion
- Diffuse Axonal Injury

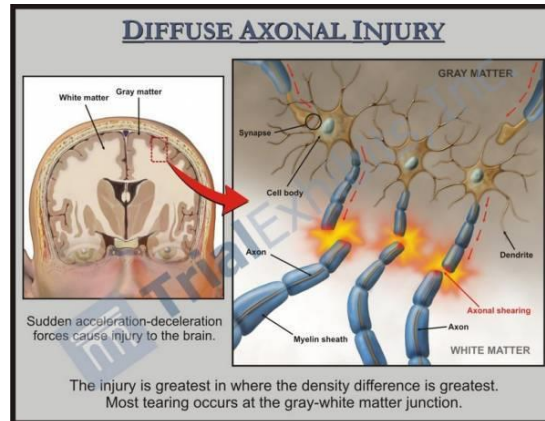
Cerebral Concussion



- Transient dysfunction of the cerebral cortex – ie brain-shaking!



Diffuse Axonal Injury



STRETCHING

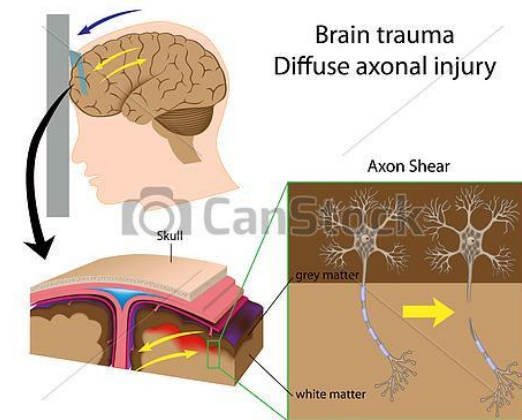
SHEARING

TEARING

MILD

MODERATE

SEVERE



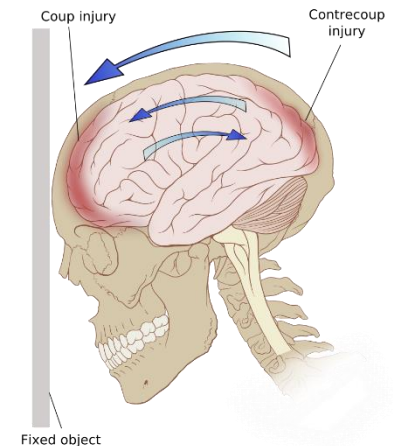
© Can Stock Photo - csp7951829

Focal Brain Injury

- Cerebral Contusion
- Intracranial Haemorrhage
 - Epidural or extradural haematoma
 - Subdural haematoma
 - Intracerebral haematoma
 - Subarachnoid haematoma

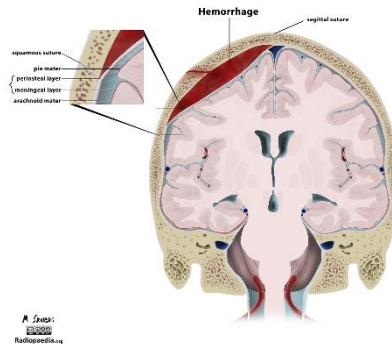
Cerebral Contusion

- Brain tissue bruised => brain physically damaged
- Swelling of tissue
- Can lead to \uparrow ICP



Intracranial Haemorrhage

Extradural Hemorrhage



Subdural hemorrhage

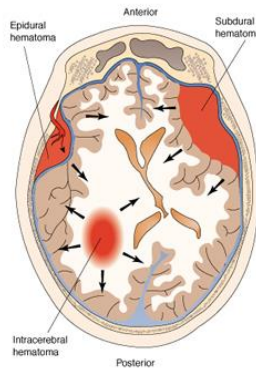
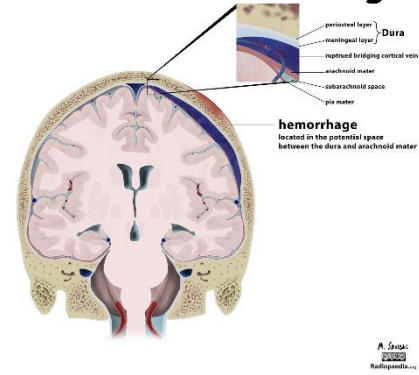
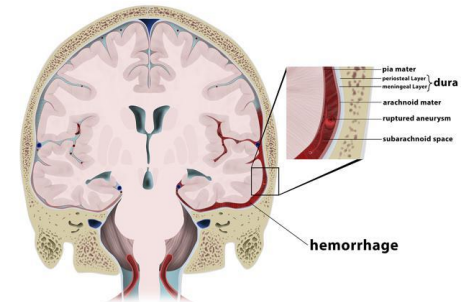


Figure 52-8 Location of epidural, subdural, and intracerebral hematomas.

Copyright © 2005 Lippincott Williams & Wilkins. Instructor's Resource CD-ROM to Accompany *Forth's Pathophysiology: Concepts of Altered Health States*, Seventh Edition.

Subarachnoid Hemorrhage



Pathophysiology

- Primary Injury
- Secondary Injury

“The ‘After effects’ of the primary injury”

- Nancy Caroline

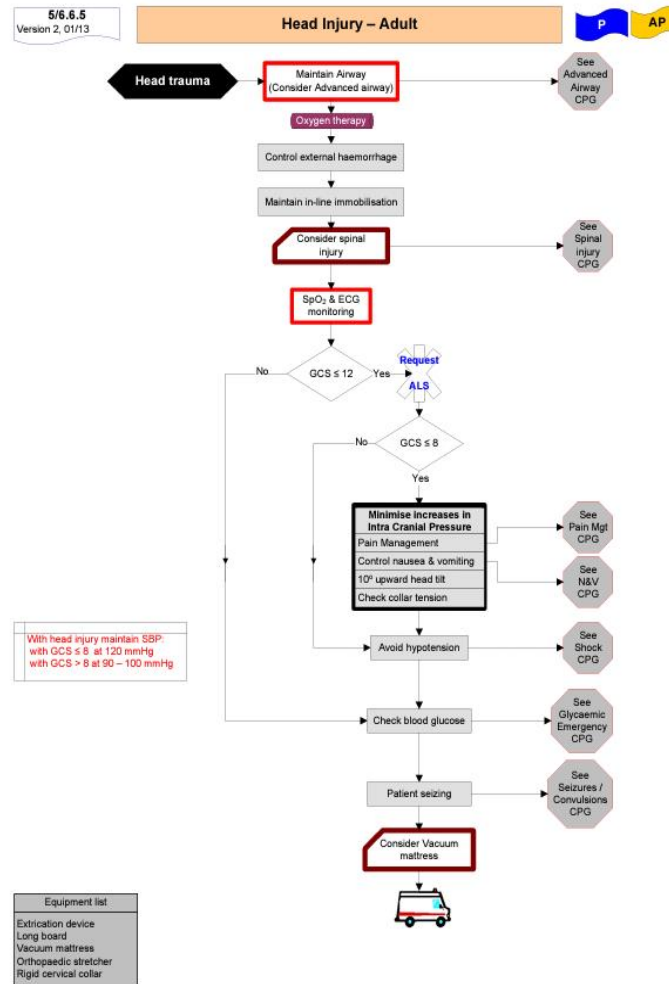
Secondary Injury

- Cerebral Oedema
- Intracranial haemorrhage
- Increased ICP
- Cerebral Ischaemia
- Hypoxia
- Infection

ICP

- Early signs
 - Mild -> Moderate -> Severe
 - BP
 - HR
 - Respirations
 - Pupils
 - Motor response
 - Outcome
- Pre-hospital
Observations

SECTION 6 TRAUMA



Management

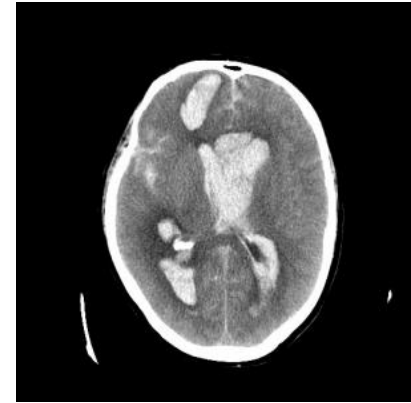
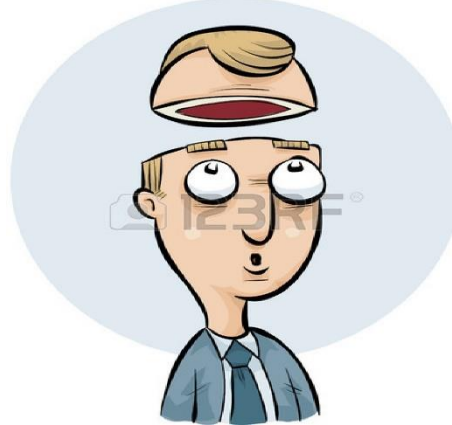
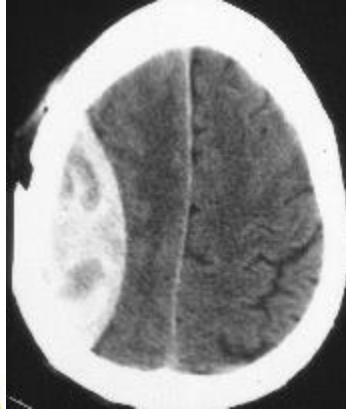
- Hx of incident
 - Airway – advanced?? & Oxygenation
 - External Haemorrhage
 - C-SPINE
 - SP02 & ECG
 - GCS
 - Pupils
 - Pain management
 - Nausea & Vomiting
 - Head tilt 10degrees
 - Collar tension
 - Hypotension
 - Seizures
 - Prompt & appropriate transport
- Perform asap
- ALS**
- Minimise Intracranial Pressure

HAVE YOU GUYS LEARNED ANYTHING???!!!!!



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Summary



- ❖ Described Closed head injuries,
 - ❖ The types of injuries and their pathophysiology
 - ❖ The importance pre-hospital of recognition and management to prevent secondary injury
- ❖ PHECC Education & Training Standard
- ❖ Paramedic CPG 5/6.6.5, Version 2, 01/13

References

1. Caroline N. Endocrine Emergencies. *Emergency Care in the Streets*. 6th ed. London. Jones and Bartlett Publishers Inc.; 2008.
2. Sanders MJ. Endocrinology. *Mosby's Paramedic Textbook*. 3rd ed. Canada: Elsevier Mosby; 2007.
3. Pre-hospital Emergency Care Council. *Clinical Practice Guidelines for Pre-hospital Emergency Care*. 2014. Dublin. Pre-hospital Emergency Care Council; 2014.

Links:

www.nice.org.uk

www.headway.ie

www.briireland.ie

www.traumaticbraininjury.com

www.lifeinthefastline.com

www.mayoclinic.org/

THE END!



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**GRADUATE
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**NON-ACCIDENTAL
HEAD INJURIES.
SHAKEN BABY
SYNDROME**

By Irene Culhane EMC-P

EME UL

24/August/2014



UNIVERSITY of LIMERICK
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OBJECTIVES

1. Define shaken baby syndrome.
2. Describe the mechanism of injury.
3. Recognize the clinical presentations of head injuries resulting from abuse.
4. List the consequences.
5. Examine the risk factors.
6. Identify Differential Diagnosis.
7. Discuss pre-hospital assessment and care.

Motivation

As professionals, it is our duty of care, both morally and professionally, to protect and preserve life, especially to those most vulnerable.

More than 40% of deaths from child abuse occur among children younger than 12 months of age, and abusive head injury is the most common cause of death in such cases.

Infants frequently present with nonspecific clinical features without a history of trauma. As a result, as many as 30% of children with abusive head injury may be misdiagnosed at the initial evaluation.
(Christian & Block, 2009).

INCIDENCE

In southwest England and south Wales the incidence of subdural haematoma was 21.0 per 100,000 children under one year of age and it was estimated that non-accidental injury accounted for 82 percent of these.

In the US, SBS deaths account for 13-50% of all non accidental paediatric deaths recorded. Severe neurological impairments and physical disabilities are recorded in 50-75% of the survival population.

DEFINITION

“A form of Abusive Head Injury (AHI) and Inflicted Traumatic Brain Injury (ITBI), is a preventable and severe form of physical child abuse”.

Centre for disease control and prevention
(CDC)

“A form of child abuse caused by violently shaking an infant or child”

University of Maryland Medical Centre and WHO.

Mechanism of Injury (1 of 3)



Abusive paediatric head trauma begins as intense frustration and anger. In its aftermath, lives, relationships, families and futures can be changed forever.

—Hymel & Deye, 2010

When a child is taken by the torso, leg, or arm and shaken repeatedly, (this can develop from just five seconds of vigorous shaking), this acceleration and deceleration motion causes the brain to rotate and bounce within the baby's skull.

(MacDonald & Helfrich, 2001; Tsao et al., 2002).

Mechanism of Injury (2 of 3)

Due to the weight of an infant's head, the weak neck muscles, the thick skull wall, the soft tissue of the brain, the lack of myelination, and its higher water content this violent shaking makes an infant's brain extremely vulnerable to damage, can be easily compressed, distorted within the skull and cause diffuse axonal injury. (Lewin, 2008.)

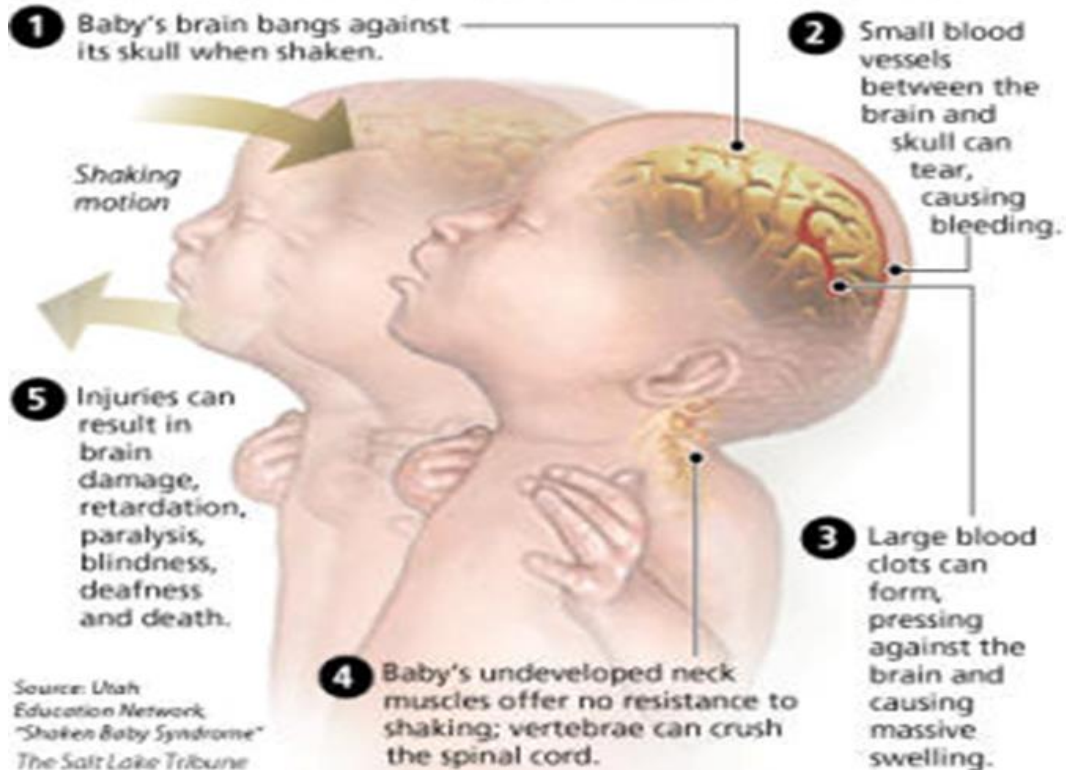
The force at which an infant is shaken causes blood vessels to be broken resulting in bleeding within the brain leading to further swelling and intercranial pressure.

(MacDonald & Helfrich, 2001; Carbaugh, 2004).

Mechanism of Injury (3 of 3)

Damage caused when a baby is shaken

Babies are especially susceptible to injury when they are shaken because their connecting tissues and bone structure have not sufficiently developed to offer any protection.



Hope

CLINICAL PRESENTATIONS

(1 of 7)

Physical Signs:

Black Eyes



CLINICAL PRESENTATIONS

(2 of 7)

Bruises in areas where normal childhood activities would not usually result in bruising



CLINICAL PRESENTATIONS

(3 of 7)

Bulging soft spot (fontanelle) or separations in an infant's skull



CLINICAL PRESENTATIONS

(4 of 7)

Torn Frenulum



CLINICAL PRESENTATIONS

(5 of 7)

Fractures



Two infants with a femur fracture. Child abuse was suspected because of the age of the child and an inconsistent history given by the parents.

CLINICAL PRESENTATIONS (6 of 7)

Other clinical signs include:

- irritability, seizures, impaired consciousness,
- inability to focus their eyes, breathing abnormalities,
- vomiting, lethargy,
- constipation, poor feeding,
- apnoea and muscle weakness.

(Lewin, 2008; Carbaugh, 2004; Duhaime et al., 1998).

The damage of SBS continues to impact the infant's life, long after the attack

CLINICAL PRESENTATIONS

(7 of 7)

Assessments such as:

CT scans have been shown to be superior when viewing the damage to the infant's brain. Intracranial haemorrhage, hairline fractures, and compressions in the skull are all visible on the CT scan (Coody et al., 1994).

In infants where CT findings are not definitive, an MRI has been shown to be useful in detecting extraaxial haemorrhages (Duhaime et al., 1998)

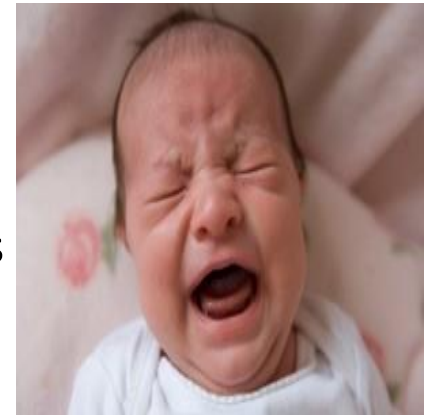
There is a direct relationship between the force at which the infant is shaken and the amount of haemorrhaging that has occurred within the brain.

A common finding in SBS, which has been reported in 65 to 95% of the population, is retinal haemorrhages (RH) (Duhaime et al., 1998).

RISK FACTORS (1 of 2)

INFANTS AT HIGH RISK:

1. Cry frequently, inconsolable, “colicky”
2. Have difficult temperaments
3. Are a product of a multiple pregnancy
4. Are premature
5. Have special needs
6. Are low birth weight
7. Have congenital defects or syndromes
8. Bond poorly with caregivers
(Carbaugh 2004: Lewin 2008.)



RISK FACTORS

RISK FACTORS FOR SBS PERPETRATORS:

1. Male gender
2. Mentally challenged
3. Illiterate
4. Impulsive behaviour
5. Single parenthood
6. Domestic violence
7. Drug/substance abuse
8. Mental illness – anxiety, depression

CONSEQUENCES

- Learning and physical disabilities
- Visual disabilities or blindness
- Hearing impairment
- Speech disabilities
- Cerebral palsy
- Seizures
- Behaviour disorders
- Cognitive impairment
- death in approximately 20 percent of infants
- paralysis
- SBS may result in a permanent vegetative state.
(Duhaime et al.,1998).

DIFFERENTIAL DIAGNOSIS

It is also important to rule out underlying conditions that may look like abuse. These include inquiring about the presence of any of the following conditions or practices:

- Congenital e.g Oestogenesis imperfecta.
- Metabolic e.g Scurvy (Vit C deficiency)
- Neoplastic e.g brain tumour.
- Connective tissue disease, which may lead to spontaneous fractures and bruising without traumatic injury e.g Ehlers-Danlos
- Acquired causes (e.g., meningitis, obstructive hydrocephalus)
- Undetected bleeding disorders that can lead to abnormal bleeding patterns (e.g., hemophilia, liver disease)
- Traditional or alternative healing practices, which may lead to unusual bruising and scarring patterns (e.g., coin rubbing, cupping, burning herbs on the skin over acupuncture points)

(Hymel & Deyes, 2011)

Non accidental or Differential Diagnosis

8. *Infantile cortical hyperostosis*. Note bilateral swellings over the temples.



Non accidental or Differential Diagnosis



Non accidental or Differential Diagnosis



PRE-HOSPITAL ASSESMENT (1 of 5)

- A - Airway
- C - C SPINE
- B - Breathing
- C - Circulation.
- Anticonvulsant therapy.

GLASGOW COMA SCALE.

The Glasgow Coma Scale continues to be one of the most widely used to evaluate injury severity of young children presenting with altered level of consciousness. Any combined score of less than 8 suggests severe brain injury and represents a significant risk of mortality.

GLASGOW COMA SCALE

Modified Glasgow Coma Scale for Infants and Children

	Child	Infant	Score
Eye opening	Spontaneous	Spontaneous	4
	To speech	To speech	3
	To pain only	To pain only	2
	No response	No response	1
Best verbal response	Oriented, appropriate	Coos and babbles	5
	Confused	Irritable cries	4
	Inappropriate words	Cries to pain	3
	Incomprehensible sounds	Moans to pain	2
	No response	No response	1
Best motor response*	Obeys commands	Moves spontaneously and purposefully	6
	Localizes painful stimulus		5
	Withdraws in response to pain	Withdraws to touch	4
	Flexion in response to pain	Withdraws to response in pain	3
	Extension in response to pain	Abnormal flexion posture to pain	2
		Abnormal extension posture to pain	1
	No response	No response	

*If patient is intubated, unconscious, or preverbal, the most important part of this scale is motor response. Motor response should be carefully evaluated.

PRE-HOSPITAL ASSESSMENT (2 of 5)

PHYSICAL EXAM – Secondary Survey.

Complete physical exam for any young child with suspected abusive head trauma should include:

- Inspection of all body parts, scalp, fontanelles, ears, and hair.
- Inspection of the mouth (lip, tongue, buccal) to look for dental injuries. Other possible oral injuries include unexplained bruising to the cheeks, ears, neck, or trunk in association with a torn frenum. A torn frenum may occur with force-feeding an infant
- Palpation of legs, arms, hands, feet, and ribs to feel for crepitus or deformities.

(Baz &
Wang, 2012).

Torn Frenum



PRE-HOSPITAL ASSESSMENT

(4 OF 5)



History contd.

In addition to the presenting history, the past medical and developmental history should be collected. This includes:

- Birth history
- Prior hospitalizations and emergency visits
- Tendency to bleed or bruise
- Prior injuries
- Seizure history
- Temperament and irritability
- Medications and immunizations
- Developmental history, including motor, language, and social skills
- Family medical history (especially of bleeding, bone disorders, and metabolic or genetic disorders)

(Jackson & Jackson, 2011)



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PRE-HOSPITAL ASSESMENT

Presenting History

Any reported history or statements made by the caregiver regarding the injury should be documented accurately and completely. There are three general portions of the presenting history that are important to document. The first is the history of the injury event, second is how the child responded or behaved after the injury and finally the paramedics documentation if there is a high suspicion index (policy NASCG015).

Questions to ask when taking a presenting history should include:

- What happened?
- Who was there when it happened?
- Where did it happen?
- When was the child noticed to be ill or injured?
- How did the child respond?

PRE-HOSPITAL ASSESMENT



(5 OF 5)

Observations and explanations that may be of concern to EMS providers include:

- Any infant or young child whose history is not plausible or consistent with the presenting signs and symptoms (i.e., explanation that is inconsistent with the pattern, age, or severity of the injury or injuries or is inconsistent with the child's physical and/or developmental capabilities)
- The presence of a new adult partner in the home
- A history of delay in seeking medical attention
- A previous history or suspicion of abuse.
- Physical evidence of multiple injuries at varying stages of healing
- Unexplained changes in neurologic status, unexplained shock, and/or cardiovascular collapse

CONCLUSION

Shaken Baby Syndrome is not just a crime, it's a public health issue.

You as health care professionals, are in an ideal position and play a key role in identifying those most at risk.

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