

Traumatic Injuries in Rugby

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Conflict of Interest Disclosure

In compliance with continuing education requirements, all presenters must disclose any financial or other associations with companies to which they have a direct link and/or financial relationship that is related to the topic/content of their presentation.

- Nothing relevant to disclose



Learning Objectives

1. Identify and evaluate traumatic injuries: concussion, musculoskeletal trauma, and spinal damage.
2. Comprehend current on-field treatment and transfer techniques.
3. Describe rehabilitation therapies to regain strength, flexibility, and endurance.



- Head Injuries and Concussion
- Musculoskeletal Trauma
- Spinal Injuries





Head Injuries including Concussion

- Definitions - Minor, mild, moderate and severe head injury
- Primary and secondary brain injury
- Management of the head injured patient
- Concussion - principles of management

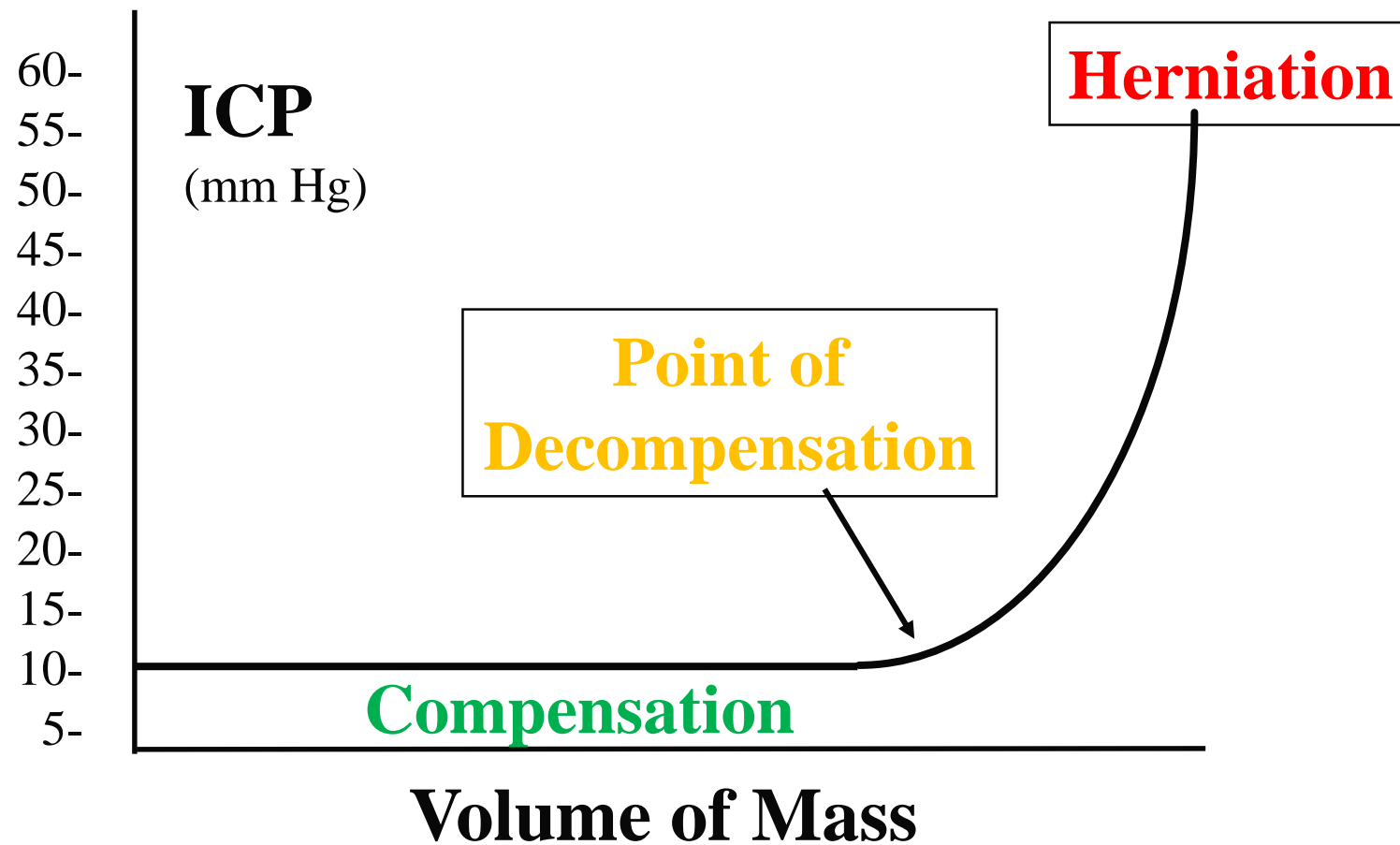
Categories of head injuries

- Minor, moderate and severe head (traumatic brain) injuries
- AVPU – Awake, Verbal, Painful, Unresponsive - V or below:
 - Extrication from the field of play with c-spine immobilized
- Head impact with potential to result in concussion
 - Mild and mild end of minor/AVPU – A
 - On field management: determine concussion suspected and player removed from the field of play for more detailed assessment and follow-up.
- Players can deteriorate as well as improve

Primary Brain Injury

- Energy transmitted to brain -> brain tissue injury
- Cannot be modified by medical treatment
- Minor head injury: GCS 13-15
 - Short initial period of ↓ GCS, amnesia is short
 - If vomiting or severe headache → ED
 - The majority recover fully
- Moderate head injury: GCS 9 – 13
 - Require hospital assessment & observation
- Major head Injury: Diffuse axonal injury GCS 3-8
 - Coma lasting > 24 hours,
 - Post traumatic amnesia > 24 hours
 - ABCDE – Airway, Breathing, Circulation, Dysfunction, Expose/Environment
 - ED ASAP

Relationship of Volume - Pressure



Assessment & Management (SABCDE)

- Safe approach: Scrupulous Cervical immobilization
- Airway: Obstruction/Aspiration
 - ↓ conscious level → loss of gag reflex
- Breathing: ↓ conscious level
 - Adequate ventilation/Consider chest injuries
 - High flow oxygen
 - Hypoxia → brain swelling → ↑ ICP
 - Hypercapnia → cerebral vasodilatation → ↑ ICP
- Circulation: Signs of haemorrhage
- Dysfunction: AVPU/GCS
- Expose/Environment: move carefully

Management: SABCDE

- Circulation with haemorrhage control
 - Hypotensive: look for other injury
- Scalp Injury
 - Extremely good blood supply
 - Haemorrhage may be considerable
 - ? Underlying fracture
 - Apply pressure dressing
 - Suture, staples or glue
 - ED if concerns



Dysfunction

- AVPU (on the field of play)
 - A = Alert
 - V = responds to Verbal stimulus
 - P = responds to Painful stimulus
 - U = Unresponsive
- Pupils (Medical room)
 - Dilated
 - Un-reactive
 - Unilateral or bilateral

Glasgow Coma Scale

In the medical room (use a wall or observation chart)

- **Eye Opening:**

Spontaneously	4
To Verbal Command	3
To Pain	2
No response	1

- **Verbal Response:**

Orientated	5
Confused	4
Inappropriate words	3
Incomprehensible sounds	2
None	1

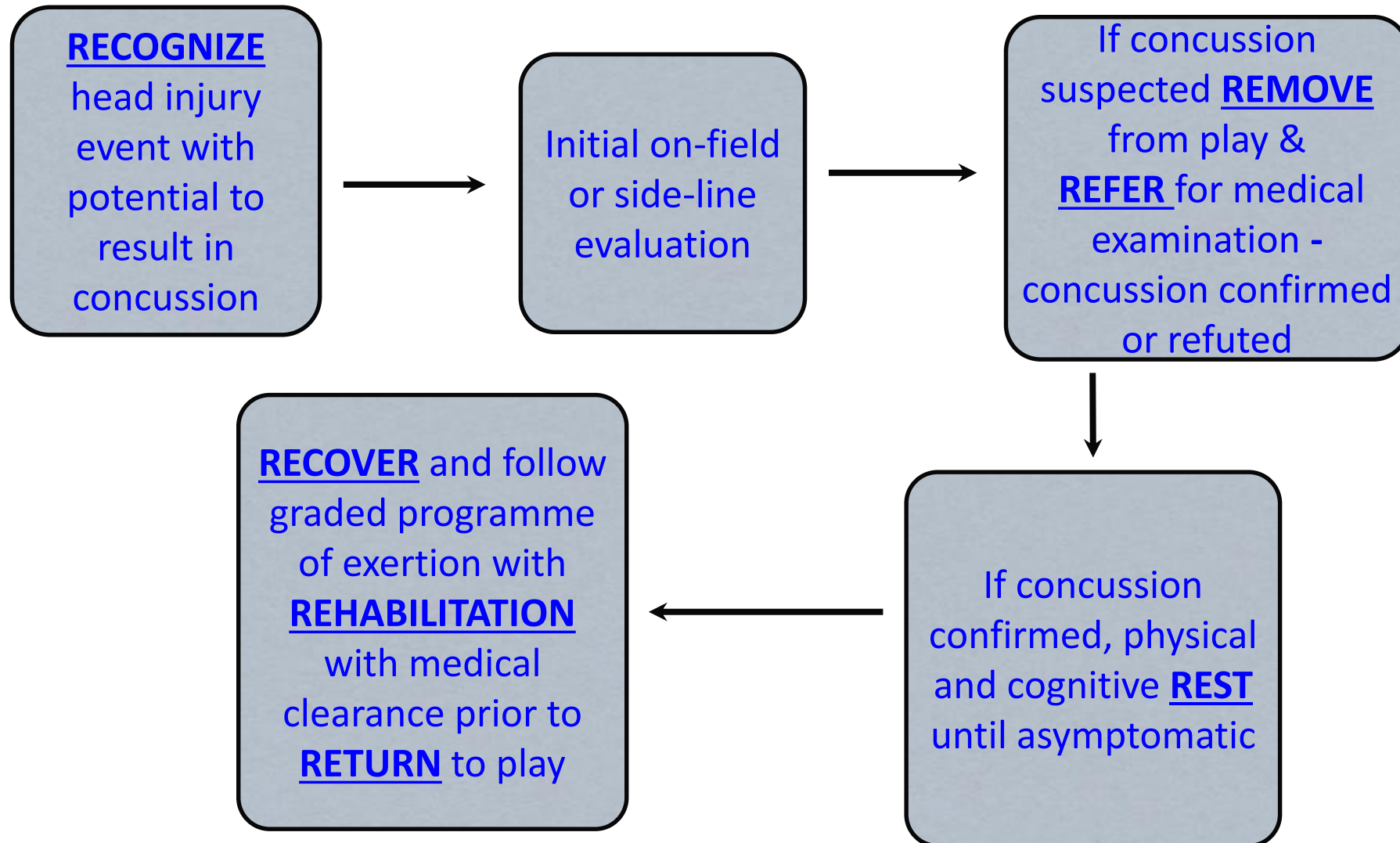
- **Motor response:**

Obeys verbal command	6
Localises pain	5
Withdrawal from pain	4
Decorticate flexion	3
Decerebrate extension	2
None	1

What is Concussion?

- A brain injury
 - direct blow to head or body resulting in impulsive force to the brain.
- The initial brain injury → release of brain chemicals (neurotransmitters) changes the way the brain normally works
- Results in a wide range of symptoms or signs which can effect
 - thinking and remembering
 - mood and behaviour
 - level of consciousness
 - produce a range of physical symptoms .
- LOC occurs in less than 10% of concussions
- May take days or weeks for brain nerve cells to return to pre-injury condition.
- Recent research some concussions also associated with damage to the deep connections within the brain (white matter).

Principles of concussion management – the 7R's



Why is it important to stop playing after sustaining a concussion?

- Exposure to further head impacts can (rarely) result in the development of **second impact syndrome** and death
- Increased risk of developing **Post Concussion Syndrome**
- Increased risk (<3X) of **further concussion or other injury** due to impaired cognition/ thinking, reaction time and balance
- **Impaired personal and team performance.**
- Potentially increased risk of developing **long term neurodegenerative problems including Chronic Traumatic Encephalopathy (CTE).**



On Pitch assessment of the player following a head impact event

- AVPU – V or below → extrication with spinal immobilisation
- A and GCS 15 (in absence of any other injuries) → assessment to determine whether concussion suspected with player removed from the field of play for more detailed assessment and follow-up
- Any symptom or sign of concussion present → concussion suspected and player removed from field of play
- **“Recognize and Remove”**

Signs & Symptoms of a Concussed Athlete

- **Signs**
 - Loss of consciousness/impaired conscious state
 - Gait unsteadiness/loss of balance
 - Vacant expression
 - Vomiting
 - Impaired playing behavior
 - Inappropriate emotions
- **Symptoms**
 - Headache/dizziness/"feeling in a fog"
- **Cognitive impairment**
 - Slowed reaction times, confusion/disorientation, poor attention and concentration
 - Loss of memory for events up to and after concussive event
 - Inability to answer Maddock's questions correctly



Pocket Concussion Recognition tool

On Pitch triage options if access to Head Injury Assessment (HIA)

- **On field indications for permanent removal from the field of play**
 - Confirmed or suspected loss of consciousness
 - Balance disturbance/ataxia
 - Clearly dazed or dinged
 - Not orientated in time place or person
 - Definite behavioural changes
 - Convulsions
 - Tonic Posturing
 - Oculomotor signs
 - Definite concussion
 - On field identification of signs and symptoms of concussion
 - Spontaneous Nystagmus
- **Indications for temporary replacement and side line neurological assessment (using HIA tool)**
 - Head injury where the diagnosis is not apparent
 - Possible behaviour change and possible confusion
 - Injury event witnessed with potential to result in concussive injury
- Potential for player to return after temporary replacement if concussion not confirmed on HIA tool
 - Symptoms
 - Cognition
 - Balance
- Abbreviated “On the field and on the run” evaluations are strongly discouraged

Evaluation in the medical room

- **Clinical assessment by a medical practitioner if temporarily replaced using HIA tool**
 - Review of video where available
 - Potential for player to return
- **Clinical assessment by medical practitioner if permanently replaced**
 - Standard secondary survey
 - Further detailed clinical assessment of the athlete by a medical practitioner supported by the SCAT3 tool
 - If concussion is confirmed then athlete should not be left alone
- Regular monitoring for deteriorating physical or mental status is essential
- Appropriate discharge to
 - Home
 - remain onsite until the end of the game,
 - transfer to an emergency facility
 - Needs to be agreed

Referral to ED:

- Fractured skull or penetrating skull trauma
- Deterioration in conscious state following injury
- Focal neurological signs
- Confusion or impairment of consciousness > 30 minutes
- Loss of consciousness > 5 minutes
- Persistent vomiting or increasing headache post injury
- Any convulsive movements
- All children with head injuries
- Inadequate post injury supervision

If in doubt seek ED assistance

Graduated Return to Play Protocol Principle

Rehabilitation stage	Functional exercise at each stage of rehabilitation	Objective of each stage	Stepwise progression Stage 1 is physical and cognitive rest Proceed to next level if asymptomatic at present level Minimum of 24hrs at each level Principle of medical clearance before full contact practice If PCS occur drop back to previous asymptomatic level and rest for 24hrs RTP may be sport specific and dependent on age and access to medical care
1. No activity	Symptom limited physical and cognitive rest.	Recovery	
2. Light aerobic exercise	Walking, swimming or stationary cycling keeping intensity < 70% MPPHR No resistance training.	Increase HR	
3. Sport-specific exercise	Skating drills in ice hockey, running drills in soccer. No head impact activities.	Add movement	
4. Non-contact training drills	Progression to more complex training drills e.g. passing drills in football and ice hockey. May start progressive resistance training	Exercise, coordination, and cognitive load	
5. Full contact practice	Following medical clearance participate in normal training activities	Restore confidence and assess functional skills by coaching staff	
6. Return to play	Normal game play		



**WORLD
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Musculoskeletal Trauma



Contents

- Identification of life threatening injuries
- Identification of limb threatening injuries
- Principles of initial management
- Dislocation management

Musculoskeletal Trauma

- Common, rarely life-threatening
- Major musculoskeletal injuries may indicate other injuries
- Life threatening problems:
 - Haemorrhage
 - Compartment syndrome
 - Crush syndrome (rare)
 - Fat embolism (rare)

Limb threatening Injuries

- Open fracture & joint injuries
- Vascular injuries (shock)
- Compartment syndrome
- Neurological injury



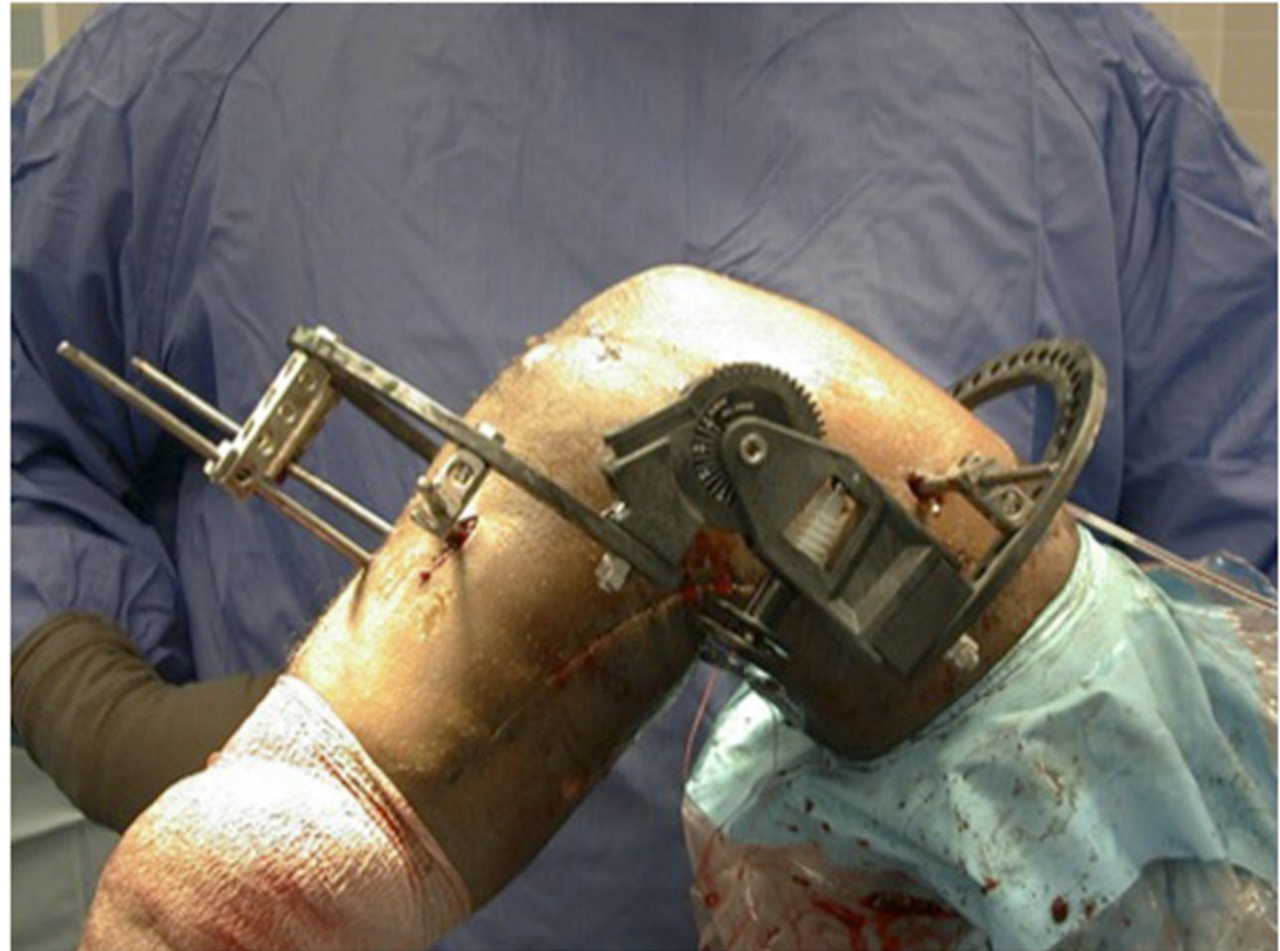
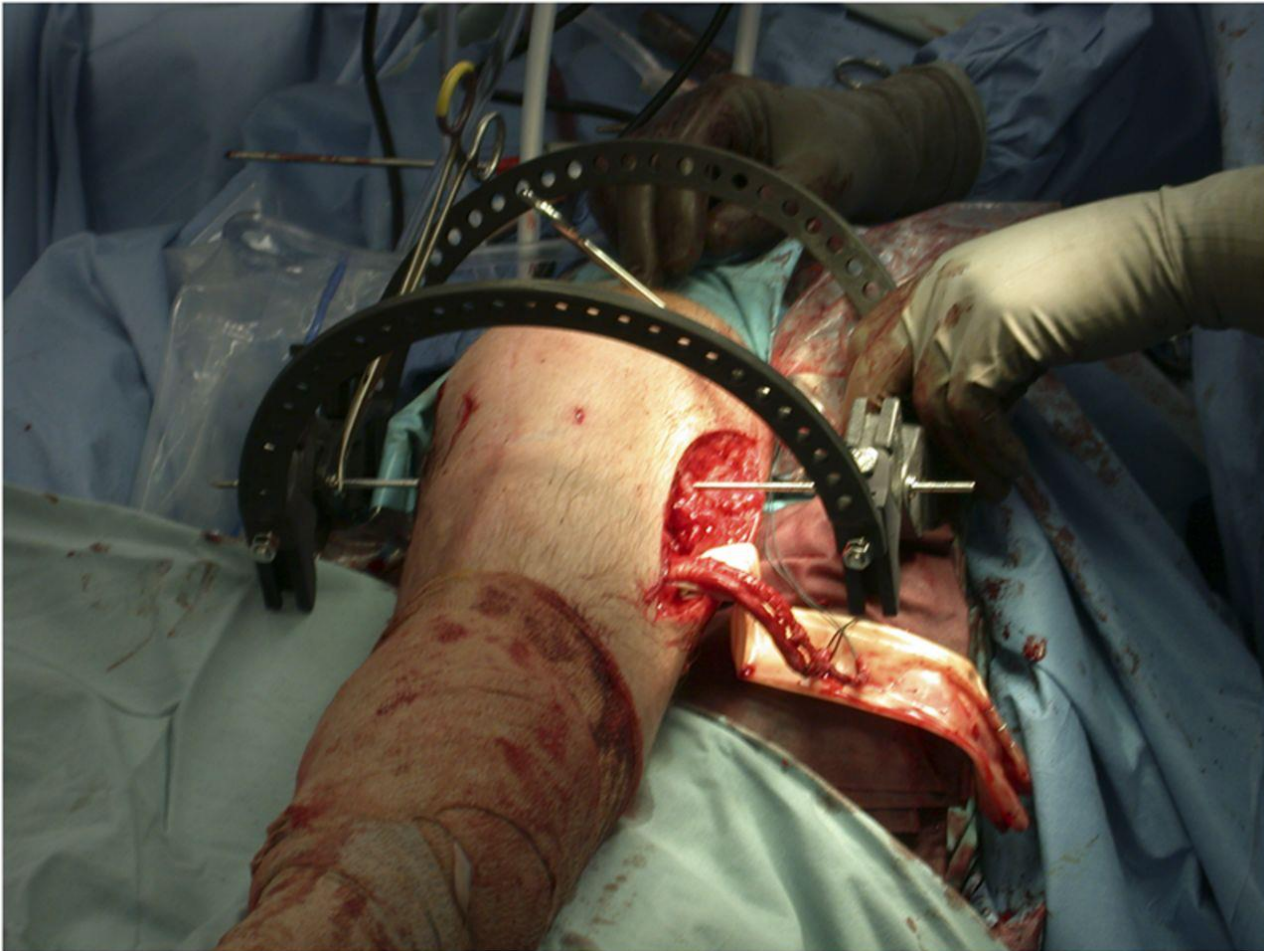
Signs & Symptoms of Fracture / Dislocation

- Recognise life or limb threatening injury
 - Mechanism of injury
 - Gross anatomical deformity
 - Pain & swelling
 - Crepitus & tenderness
 - Neurovascular compromise

Bilateral knee dislocations



Surgical emergency requiring hinged external fixator



Primary on Pitch Management

- SABCDE (Manage shock)
- Immediate on field fracture/dislocation management
- Analgesia
- Relocation if possible
- Immobilization
- Cover open wounds
- ED ASAP

Open fractures, joint injuries

- Treatment
 - Sterile dressings & splints
 - Adequate analgesia
 - Antibiotics
- ED ASAP

Open III-B distal tibia fracture



Vascular Injury

- Variable presentation
- Assess pulses
- Associated with fractures/dislocations
- Re-align
- Check for pulses after splinting
- Adequate analgesia
- ED ASAP

Neurological injury

- Due to fracture/dislocation
 - Shoulder: Axillary nerve
 - Elbow: Median, Radial & Ulna nerve
 - Knee: Peroneal nerve
- Resuscitate & analgesia
- Reduce & immobilize
- ED ASAP

Fracture immobilization

Aims to achieve:

- Haemorrhage control
- Pain relief
- Prevent further soft tissue injury
- ↓ chance of fat embolism

Fracture immobilization

- Joint above & below
- Padding to bony prominences
- Box splint
- Vacuum splint
- Traction splint (Kendrick)
- Poly slings

Dislocations

- Careful assessment
- Check neurovascular status
- Immediate reduction if possible
- No prolonged attempts
- Recheck & document neurovascular status
- All need further assessment including radiology



Summary

- Identify life & limb threatening injuries
- Resuscitate & analgesia
- Early reduction & immobilization
- ED ASAP



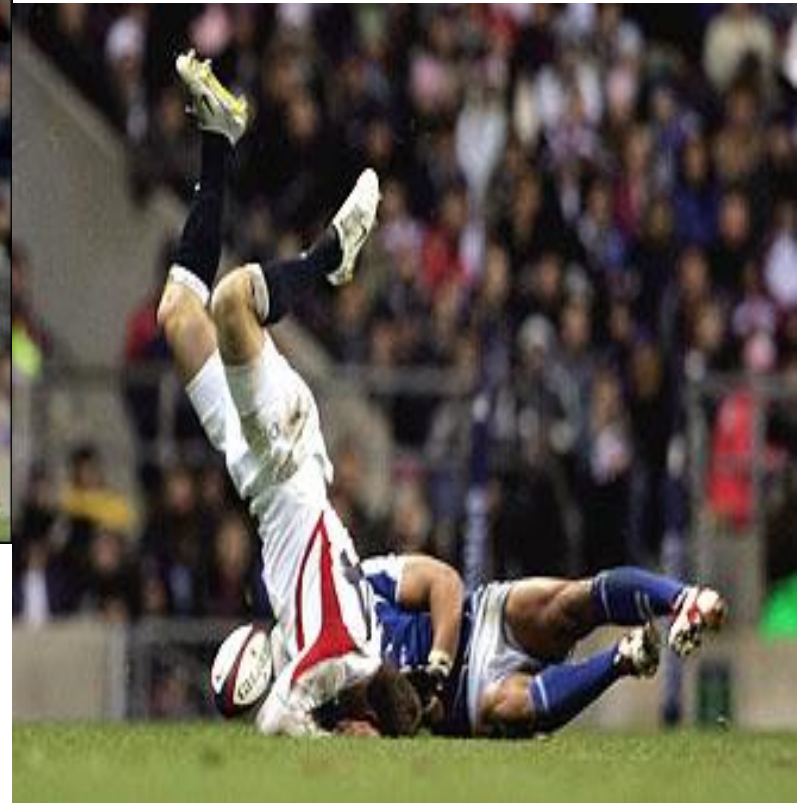
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Spinal Trauma

Contents

- When to suspect spinal injury
- Assessment of spinally injured patient
- Initial management spinally injured patient

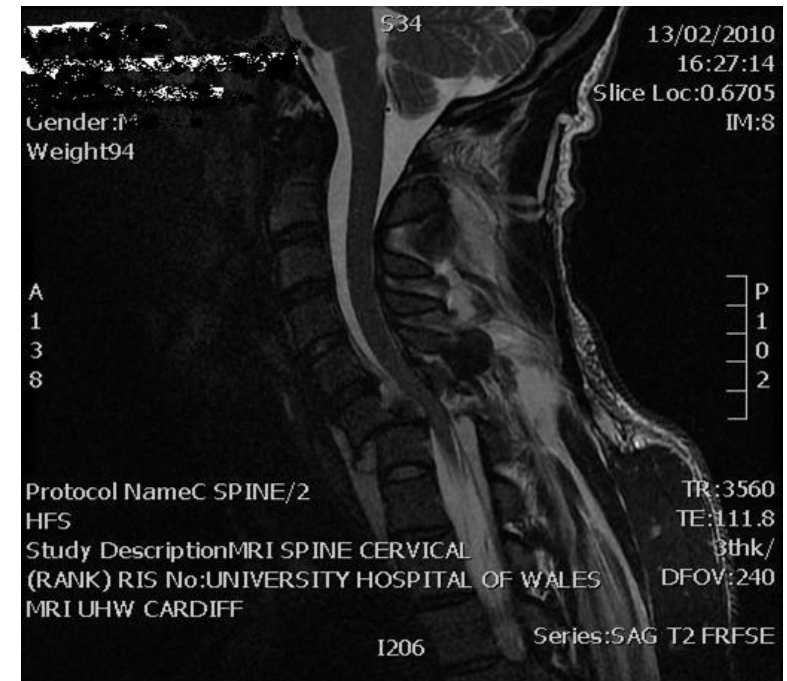
WR Immediate Care in Rugby



Neck injury



WR Immediate Care in Rugby



Who to suspect a C-Spine injury in:

- CCS/NEXUS/ATLS C-Spine Rules*:
 - Mechanism of injury
 - Reduced conscious level
 - Neurological signs or symptoms
 - Distracting injury
 - Midline tenderness
 - Unable to voluntarily rotate $> 45^{\circ}$ R & L
 - Flexion and extension

*CCS = Canadian C-Spine Rules

*NEXUS = National Emergency X-Radiography Utilisation Study

*ATLS = Advanced Trauma Life Support

*NICE = National Institute of Clinical Excellence



Management

- SABCDE (“Think spinal do airway”)
- Resuscitate as required (re-evaluate)
- Immobilization
 - In line cervical stabilization
 - Semi-rigid collar, blocks & tapes
 - Long (spinal) board/split long board/mattress
 - Transfer to Emergency Department
 - Maintain immobilization until injury excluded

Associated Problems

- Neurogenic Shock
 - Hypotension with C/High T injury
 - Bradycardia (use of atropine)
- Effects on other organs
 - Inadequate ventilation
 - Abdominal examination compromised
 - Occult compartment syndrome

Must consider and exclude haemorrhagic shock in a shocked patient

Semi-rigid collars

- Requires 2 people
- In line manual immobilization
- Size collar (infra mental line to trapezius)
- Carefully apply collar

Semi-rigid collars



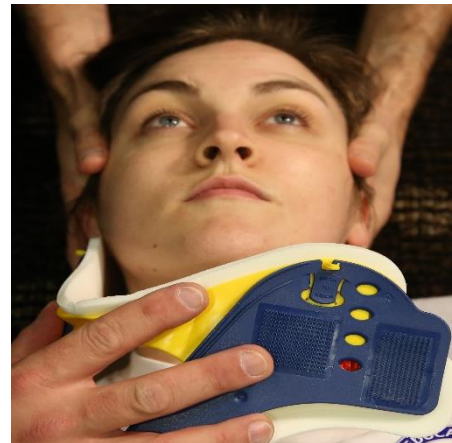
In line Immobilization



Measuring for collar



Checking collar size



Fitting collar



Collar in place

Log Roll

- Requires a minimum of 5 people
- Patients arms by the side or folded
- Team leader at head: in line immobilization
- Tallest holding outer shoulder & elbow
- Next tallest holding pelvis with one hand & other hand scooped under the outer thigh
- Smallest with both hands scooped, one under the outer knee & the other hand under the lower leg
- The role is in unison controlled by the team leader
- Back inspection can be performed by a fifth person

Log Roll



Patient on Long (Spinal) Board



Split Long Board Stretchers

- Designed to lift patient up from the ground with minimal movement
- Traditional metal Scoop not designed to carry patients, to scoop onto only
- New EXL can carry up to 159Kg
- Lay the stretcher beside the patient
- Size and split the stretcher
- 15° Roll the patient and slide in each side
- Bring two halves together and lock in place
- Apply body straps, then head blocks and tapes

Split Long Board Stretchers

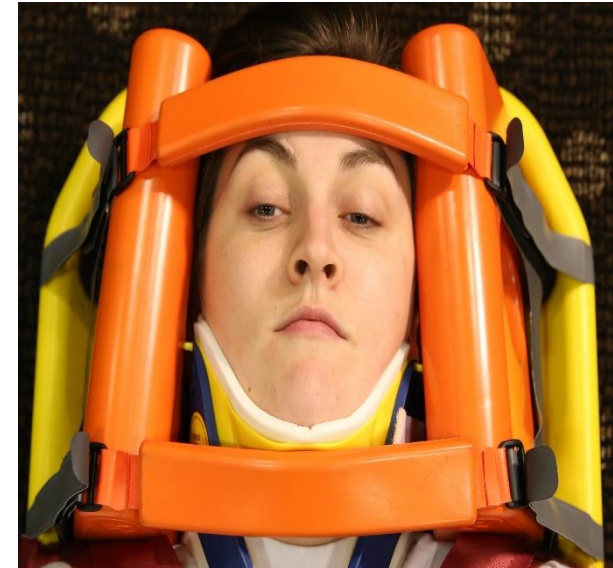
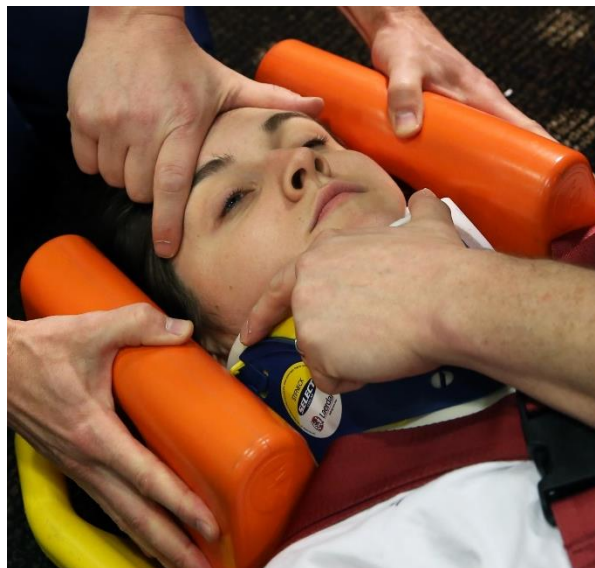
Advantages:

- Suitability for heavy players up to 159kg
- X-ray lucency
- Reduced patient

Disadvantages:

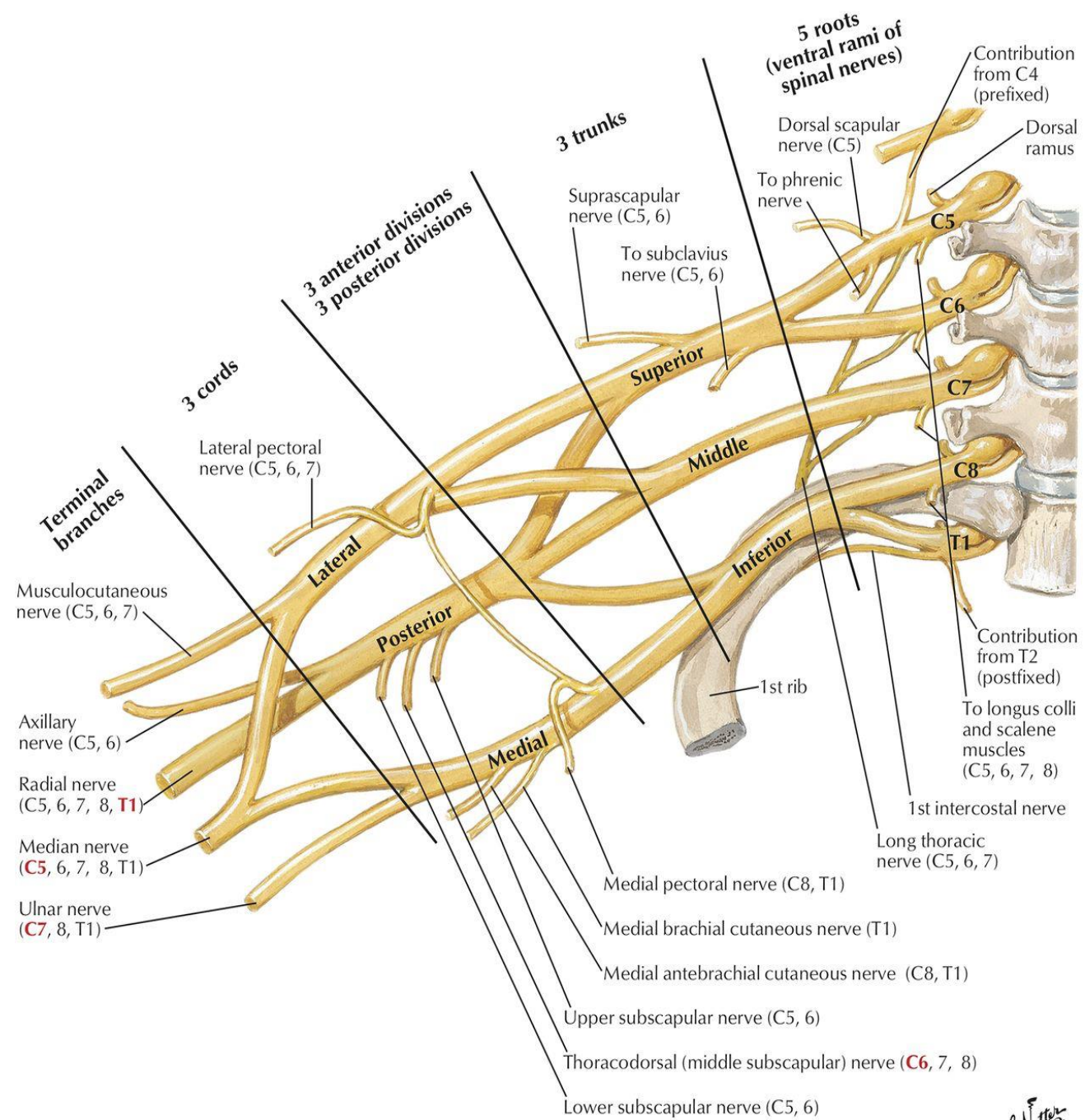
- Narrow ~47cm wide (front row up to 70 cm)
- Use of a spreader
- Recess handles make gripping difficult.
- Tall players: weight centred on aluminium extensions.

Patient Placed on Scoop



Stingers (Burners)

- Acute pain (burning, pinching, electric shock)
- Numbness and weakness in the arm
- Usually with a hit with the shoulder or head
 - Traction or compression to the upper trunk of the brachial plexus
- Unilateral neurological deficit
- Usually short duration
- Can be recurrent
- Symptom resolution before return to play
- Complicate spinal cord injury assessment



F. Netter M.D.

Stingers (burners)

- Squad surveillance: Who gets stingers
 - Not new presentation
 - Common to recover
- Compression loading e.g. prop
 - Next play a scrum
 - Stick to CCS/NEXUS/ATLS C-spine rules
 - Symptom resolution before return to play
- Younger players
 - Cord stenosis
 - Disc pathology

Stingers Treatment

- Stage 1 – Control pain and inflammation (ice and nsaids)
- Stage 2 – Rehabilitation, (posture, correct muscle imbalances, equipment modification)

Stingers Return to Competition

- Neurologic deficits, persistent pain, ROM deficits, strength
- Number of previous stingers
- Bilateral
- Full recovery within 15 minutes- Return to same game competition
- Full recovery within 1 week after initial stinger - Return next week
- Recurrent stingers – No competition for number of weeks that corresponds to the number of stingers in a given season
- More than 3 stingers/season or bilaterality – Consider ending season (persistent weakness, EMG, MRI herniated disc)

Summary

- Treat life threatening injuries first
 - With in line C – Spine immobilization
- Immobilize
 - Collar, blocks, tapes
 - Split long board/vacuum mattress
- Prevent secondary injury
- Transfer to ED carefully if necessary

Thank You

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