

Trauma patients who should have C-spine immobilised

- **Dangerous mechanism:**
 - Fall from elevation >3 feet or 5 stairs
 - Axial load to head e.g. diving
 - MVC high speed (>100km/h), rollover, ejection
 - Motorised recreational vehicle
 - Bicycle collision
- **Worrying symptoms:** unconscious, neck pain/tenderness/↓ROM, neurological deficit, significant head/facial injuries

Although generally don't immobilise if all of: GCS 15 (and not intoxicated) + no neck pain/tenderness + normal motor/sensory exam + no distracting injury



How to apply triple immobilisation

- **W**ash hands, **I**ntroduce self, **P**atients name, **E**xplain procedure and reassure patient
- Gather equipment
 - Spinal backboard/scoop or firm, flat trolley
 - Rigid neck collar
 - Supportive blocks
 - Tape
- If neck is not in neutral position, ask patient to actively (or do it passively if not possible), place neck into neutral position – stop if any pain, worsening neurological symptoms or resistance and splint in current position
- Instruct assistant to maintain manual C-spine stabilisation until patient is completely immobilised (done from cranial end of patient looking caudally... *either* by placing hands securely around either side of patient's head *or*, holding the superomedial portion of the patient's trapezius either side with thumbs anteriorly and fingers posteriorly, and clamping their head in between forearms parallel to their neck)

Backboard/firm trolley

- Apply backboard/scoop (if pre-hospital) or ensure patient is on a firm, flat trolley (if in hospital)

Cervical collar

- Determine collar size
 - Using finger widths, measure the vertical distance from the top of the shoulder (where the collar will sit) to an imaginary horizontal line from the bottom of the chin
 - Then find an appropriate collar size and adjust so that the distance between the marker/stud to the bottom of the collar's plastic (not foam) is equal to the finger widths measured on the patient
- Insert the strap end of the collar under the patient's neck
- Secure the collar using Velcro strap

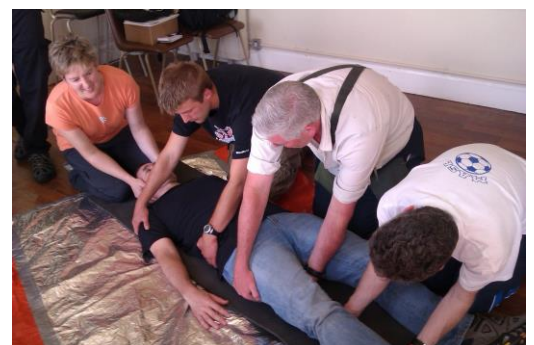
Supportive blocks

- Apply supportive blocks either side of their head
- Apply two tapes to secure:
 1. Right side of bed/backboard → over inferior part of the right block → across chin part of cervical collar → over inferior part of the left block → left side of bed/backboard
 2. Right side of bed/backboard → over superior part of the right block → across patient's forehead → over superior part of the left block → left side of bed/backboard

How to do spinal log roll ('3 under 3 over')

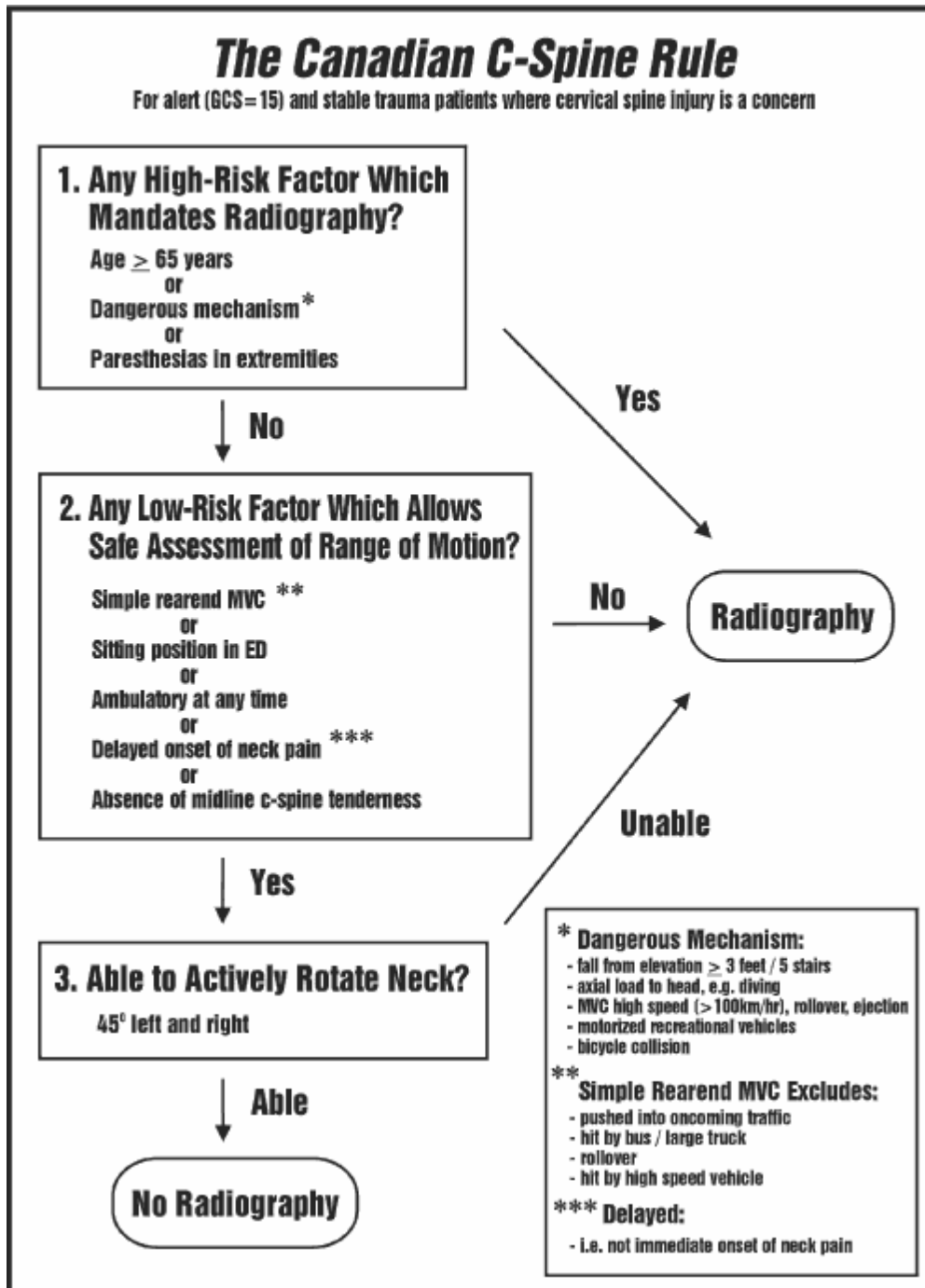
- Place patient's arms over their abdomen
- Position 4 people – 1 at cranial end (co-ordinates roll), other 3 on the side that the roll will be towards
 1. Hands firmly either side of patient's head
 2. Upper hand over opposite shoulder, lower hand over opposite hip (tallest person)
 3. Upper hand over opposite hip, lower hand under opposite thigh
 4. Upper hand under opposite calf, lower hand under opposite calf

i.e. upper 3 hands over, lower 3 hands under
- When everyone is ready, co-ordinator says "Roll right 90° on 3, 1... 2... 3"
- Separate person does what is required to the patient e.g. feels spinous processes
- Co-ordinator says "Roll back to bed on 3, 1... 2... 3"



Clearing the C-spine

The Canadian C-spine rule



Interpreting C-spine X-rays (ABC'S)

Lateral view

A

- **Adequacy**
 - Need to see the skulls base
 - Need to see C7/T1 disc space (if not, get *swimmer's view*)
- **Alignment** (look for smooth curves)
 1. Anterior vertebral body line
 2. Posterior vertebral body line
 3. Spinolaminar line (anterior edges of spinous processes)
 4. Posterior spinous process line (posterior edges of spinous processes)

Bones

- **Peg** of C2 sticking up
 - Should be smooth and flat
 - Atlanto-axial space should be <5mm in adults or <3mm in children (the space in front of the peg, before the posterior part of C1 tubercle)
- **Harris ring** of C2 integrity (formed by: body of C2 anteriorly and posteriorly, and borders of the pedicles superiorly and inferiorly)
- **Trace** around each vertebral body to look for fractures

Cartilage

- Equal **gaps** between vertebral bodies

Soft tissues

- Anterior **para-spinal soft tissue** width (line in front of vertebral bodies)
 - C1-4 = < a third vertebral body width
 - C5-7 = < whole vertebral body width

AP view

- **Spinous processes**
 - Alignment in straight line (may need to go down middle of bifid processes)
 - Distance apart

PEG view

- **Outline bones** and check **gaps** equal
 - Peg
 - C2 attached
 - C1 sides and their alignment

Note, up to 10% of fractures may not be visible on C-spine X-rays. If you are still clinically very suspicious of a fracture, consider CT scan to confirm/rule it out.