Duration of disorders

- Acute spine disorder (<4 weeks duration)
- Subacute spine disorder (4-12 weeks duration)
- Chronic spine disorder (>12 weeks duration)

Radicular pain

- Neurologic symptoms and signs
  - Pain radiating below the knee or beyond the elbow, as intense as the low back or neck pain, often radiating into the foot or hand with numbness or paresthesia in a dermatomal distribution with positive nerve root tension signs, abnormal motor power, sensation or deep tendon reflexes (MSR)
Indications of imaging

- T - Trauma
- R – Range of motion
- A – Alcohol/smoking
- U – Unresponsive to care/unusual natural history/symptoms
- M – Motor/sensory/reflexes
- A - Age

Case 1

- Father of a 2nd year CMCC student experienced acute neck pain after a tree fell on the back on his head in the forest while he was surveying the land.
- X-rayed at the hospital and was told he was fine.
- The student looked at the films and thought otherwise!

April 18, 2007
Radiographic findings

- A triangular bony fragment off the anterior aspect of C3 vertebral body
- Acute teardrop fracture of C3
Indications of imaging

- T - Trauma
- R – Range of motion
- A – Alcohol/smoking
- U – Unresponsive to care/unusual natural history/symptoms
- M – Motor/sensory/reflexes
- A - Age

Case 2

- 43 year-old inebriated male drove into lake at his cottage and acute neck pain and inability to move his head.

Courtesy of Dr. Jennifer DeGraauw
June 24, 2016

Indications of imaging

- T - Trauma
- R – Range of motion
- A – Alcohol/smoker
- U – Unresponsive to care/unusual natural history/symptoms
- M – Motor/sensory/reflexes
- A - Age
Findings
- Focal swelling of retropharyngeal soft tissue anterior to C2.
- Subtle depression of one of C2 superior facets; extra cortical line inferior to the right C2 superior facet on APOM view.
- Comminuted fracture with depression of the right C2 superior facet with anterior displacement of bony fragment.
- Extension of fracture into right C2 foramen transversarii.

Diagnosis
- Acute comminuted impaction fracture of right C2 superior facet with extension into foramen transversarii.
- Recommendation:
  - Angiogram to check for vertebral artery injury.

Case 3
- 73 year old female with 20+ year history of osteoporosis (treated only with calcium suppl & not well monitored).
- Subsequent to drinking, fell and hit her head on June 4. Was taken to ER.
- Radiographs taken 1:40am June 5 and released later that day with no treatment.
- Couldn’t get appointment to MD for 9 days so tried DC.
- Pain and tightness in C/S & H/A since fall. ROM pain limited (little to no mvt).
- Upper limb Neuro & CN testing were unremarkable.

Courtesy of Dr. Dwayne Hooper
June 19, 2007
Indications of imaging

- T - Trauma
- R – Range of motion
- A – Alcohol/smoking
- U – Unresponsive to care/unusual natural history/symptoms
- M – Motor/sensory/reflexes
- A - Age

Digital radiographs taken on June 5 and brought to DC on June 14
Anterior displacement of C1 spinolaminar line.
Disruption of the continuity of the cortex from dens to vertebral body at the posterior aspect.
Anterior angulated dens.
Rotational malposition and left lateral offset of atlas.
Disruption of one of the C2 superior articular facet.

Radiographic findings
**Diagnosis**

- Type III odontoid fracture with rotational dislocation of atlas (atlantoaxial rotatory fixation).

**Management**

- Chiropractor arranged an ambulance to transfer the patient to the hospital.
- CT scan was obtained.
CT findings

- Acute fracture through the base of the odontoid process and into the vertebral body with extension
  - C2 superior articular processes.
  - Anterior and inferior translation of atlas + narrowing of the spinal canal.
FOLLOW-UP ON 73 Y.O. FEMALE WITH C1 ROTARY DISLOCATION AND TYPE 3 DENS FX
73 year-old female with 20+ year history of osteoporosis. Subsequent to drinking, fell and hit her head on June 4. Was taken to ER. Pain and tightness in C/S & H/A since fall. ROM pain limited (little to no mvt).

Indications for imaging
- T - Trauma
- R – Range of motion
- A – Alcohol/smoking
- U – Unresponsive to care/unusual natural history/symptoms
- M – Motor/sensory/reflexes
- A - Age
**Case 4**

- 46 year old man with 5 months of left shoulder pain.
- Left shoulder x-ray 3 months ago by MD
  - Diagnosed with impingement syndrome.
  - Received physiotherapy 2 months with no relief.
- Seek chiropractic care
  - Diagnosed with cervicogenic referral pain to left shoulder.
  - 2 weeks of chiropractic care to neck with no improvement.
- Chronic smoker

*Courtesy of Dr. Dinna Icatar
April 13, 2004*

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**Indication of imaging**

- Chronic pain
  - 5 months of left shoulder pain and neck pain
- Resistant to conservative therapy
  - physiotherapy 2 months with no relief to left shoulder pain.
  - 2 weeks of chiropractic care to neck with no improvement.
- Radiculopathy
- Smoker

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**Indications of imaging**

- T - Trauma
- R – Range of motion
- A – Alcohol/smoking
- U – Unresponsive to care/unusual natural history/symptoms
- M – Motor/sensory/reflexes
- A - Age
Radiographic findings

- Large left apical mass
- Ddx – Pancoast tumor
  Tuberculosis

Previous shoulder study 3 months ago
CT findings

- Apical fibrosis in both lung apices secondary to radiation therapy.
- Left apical mass with destruction of the 2nd rib
  - Recurrent tumor with rib destruction.

Diagnosis

- Pancoast tumor with lytic destruction of left 2nd rib.

Post note – Patient died of his tumor 7 months later.
Case 5

- 53 year old woman with 6 months of left upper thoracic and shoulder pain after falling on outstretched hand.
- Progressive since 1 month ago
  - Difficult sleeping on left shoulder
  - 10/10
  - Numbness in medial three digits
  - Hurts with deep breath, sneezing, driving and rotating head to the right.

January 8 & 10, 2007

Past History

- MVA
  - In late 20’s
    - Fractured left ribs with pneumothorax, "broken" knees
- Smoke
  - 20’s to 47 yo – ½ to 1 pk/day
- Surgeries
  - Tonsils
  - Vaginal cyst
- LBP
  - 3 year ago, responded to chiropractic care
- Others
  - Bruise easily
  - Recurrent sinus infections

Physical Examination

- ROM
  - Reduced 75% right lateral flexion with pain in left trapezius.
- Ortho
  - Kemps +ve with pain into interscapular region.
  - Jackson +ve with pain in left trapezius
- Palpation
  - Pain at left ribs – 4th, 5th, and 6th
  - PA T/S compression – pain @ T3 – T5.
  - Maignes challenge – pain @ T1 – T4
Physical Exam

- Neuro
  - Reflex
    - 2+ R=L for biceps, triceps and BR
  - Sensory
    - Light touch and sharp-dull normal bilaterally
  - Motor
    - Not done

Tentative diagnosis

- Left costovertebral joint dysfunction with myofascial pain

Indication of imaging

- Chronic pain
  - 6 months of left upper thoracic and shoulder pain after falling on outstretched hand.
- Progression of symptoms
- Severity of pain
  - 10/10
- Poor activity of daily living
  - Unable to sleep on left shoulder
- Radiculopathy
  - Numbness in medial three digits
Indications of imaging

- T - Trauma
- R – Range of motion
- A – Alcohol/smoking
- U – Unresponsive to treatment/unusual natural history/symptoms
- M – Motor/sensory/reflexes
- A - Age

X-ray

- Cervical films were ordered on second visit.
Radiological Findings

- Lytic destruction of left 1st rib with soft tissue swelling and extrapleural soft tissue extension.
- Ill-defined left TVP and pedicle at T1.

DDx
- Lytic metastasis
- Multiple myeloma

Follow-up

- Lordotic view
- Chest - PA
Patient was referred to her family GP.
CT scan
Bronchoscopy
Final diagnosis - Broncogenic carcinoma with metastasis

Further studies
59 year-old male seeks chiropractic care for neck pain and stiffness in June, 2014.

Onset
- Flipping over the handle bar of his bicycle and landed on the right side of his head, neck and shoulder one year ago (August 2013).
- Left for 3 weeks holiday.
- Saw 1st chiropractor ordered x-ray of his neck at a medical lab and no fracture was reported.
- 1 week of activator treatment with some help.

Similar pain in January 2014
- MD referral to 6 weeks of physio – traction, heat, massage.

Case 6

Indications of imaging
- T - Trauma
- R – Range of motion
- A – Alcohol/smoking
- U – Unresponsive to care/unusual natural history/symptoms
- M – Motor/sensory/reflexes
- A - Age

Courtesy of Dr. Rebecca Scott, June 25, 2014
Study 3 weeks after the fall (Sept. 2013)

- Focal bony defect with a tiny bony fragment at C2 vertebral body.
- A faint vertical lucency through C2 posterior arch with suggestion of disruption of Harris ring.
- No fat C2 vertebral body.
- Anterolisthesis at C2-3.
- DDD + DJD

**Findings**
Recent teardrop fracture of C2 with suggestion of Hangman’s fracture and traumatic anterolisthesis.

DDD + DJD

Diagnosis

Recent study

June 25, 2014
Findings
- Anterior vertebral body fusion at C2-3.
- Anterolisthesis at C2-3.
- DDD + DJD
Diagnosis
- Post-traumatic fusion of C2-3 vertebral bodies secondary to previous teardrop fracture
- Traumatic anterolisthesis.
- DDD + DJD

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Indication of imaging
- Dangerous mechanism of injury
52 year-old female with severe neck pain and limited neck range of motion after waking up.
Difficulty swallowing.
Went to emergency hospital.
X-rayed and reported normal.
Given Demerol shot and prescription for NSAID.

Indications of imaging
- T - Trauma
- R – Range of motion
- A – Alcohol/smoking
- U – Unresponsive to care/unusual natural history/symptoms
- M – Motor/sensory/reflexes
- A - Age
Retropharyngeal soft tissue swelling is seen from C1 to C3 with an associated tear-drop shaped calcific density inferior to the anterior tubercle of C1.

Mild disc narrowing from C4 to C7.

Minimal uncinate hypertrophy at C5, 6 and 7 with no obvious foraminal encroachment.

Mild facet sclerosis with hypertrophy from C2 to T1, worse from C3 to C5 on the right with foraminal encroachment at right C3-4.
Calcific tendinosis of longus colli with retropharyngeal soft tissue swelling. This condition causes acute onset of neck pain with severe limited range of motion. Treatment of choice is anti-inflammatory medication.

Mild degenerative disc disease and minimal uncovertebral arthrosis from C4 to C7.

Mild facet arthrosis from C2 to T1, worse from C3 to C5 on the right with foraminal stenosis at right C3-4.

62-year-old male with acute neck pain after waking up in the morning and sat up from bed.

Heard a “crunch” in his neck – immediate pain, sweating and dizziness which subsided after 5 minutes.

Took some Tylenol 3 and NSAID to reduce pain

7/10 VAS, constant dull ache.

Slight weakness of right upper and lower limbs.

Has been ill with flu for 10 days; neck ache the same time which was relieved with heat packs.
Findings
- Complete loss of C4 vertebral body height with ill-defined endplates.
- Slight posterior displacement.
- Normal discs
- Slight anterior displacement of soft tissue.

Diagnosis
- Acute pathological fracture of C4
- DDx
  - Lytic metastasis, multiple myeloma and lymphoma.
- Final diagnosis
  - Multiple myeloma.
Follow-up

- In early part of 2016, a resident finalized the case report for this patient.
- Figuring that 12 years has passed, the patient is no longer with us, the resident called the family in attempt to get a permission to release medical record.
- Guess what!
- The patient answered the phone and was more than happy to drop by the college to sign the release form!

Case 9

- 50 year old male that was involved in an MVA in November 2015.
- Dizziness and headaches for many weeks after MVA.
- Neck pain, low back pain
- Constant numbness in both arms for 12+ years.
- Erectile dysfunction for 2 years
- Constipation, bloating and gas.

Courtesy of Dr. Greenwood
May 13, 2016
Physical exam findings
- 4/5 weakness C5 Bilaterally.
- Decreased sensation left C5-T1.
- C/S ROM (flexion 30 degrees, extension 5 degrees, LLF 5 degrees, RLF 10 degrees, Rotation 30 degrees bilaterally)

Indications of imaging
- T - Trauma
- R – Range of motion
- A – Alcohol/smoking
- U – Unresponsive to care/unusual natural history/symptoms
- M – Motor/sensory/reflexes
- A - Age
Findings

- Mild disc narrowing with bone spurring and intercalary bone from C4 to C7.
- A thick ossific density posterior to odontoid process and vertebral bodies and discs from C2 to C4 and partially from C4 to C6.
- This has resulted in 25% narrowing of the central canal from C2 to C4.

Diagnosis

- Marked central stenosis from C2 to C4 secondary to ossification of posterior longitudinal ligament (OPLL).
- RECOMMENDATION:
  - Compression of the cervical spinal cord is likely the cause of the patient’s bilateral arm numbness and erectile dysfunction and likely sensory deficient in the lower limbs. Neurological examination of the lower limbs is recommended checking for vibration and proprioception. A cervical MRI study is recommended to check for spinal cord compression.

Case 10

- 44 year-old male with full spine pain after being “T-bone” in a MVA.

Courtesy of Dr. McDiarmid
December 7, 2015
Indications of imaging

- T - Trauma
- R – Range of motion
- A – Alcohol/smoking
- U – Unresponsive to care/unusual natural history/symptoms
- M – Motor/sensory/reflexes
- A - Age
A non-united odontoid process with a slightly hypertrophied and round anterior tubercle of C1, triangular in shape and located in proximity to the basion. The round anterior tubercle of C1 sits in the anterior half of the C2 vertebral body. The base of the skull with atlas and odontoid ossicle translate as a unit. However, significant sagittal translation is observed with respect to C2 body. The basion translates posterior to the posterior cortical margin of the axis by 5mm in extension and translates anterior by 11mm (maximum allowable total sagittal translation is 12mm.) Our patient measures 16mm. Similarly the anterior tubercle of atlas to the posterior cortical margin of the axis is 2mm in extension and 12mm in flexion with a total translation of 10mm - an equivalent of 10mm atlantodental space.

**Findings**
Diagnosis

- Orthotopic os odontoideum with sagittal atlantoaxial and occipitoaxial instability.

Previous medial lab report (3 years ago)

Previous study
A non-united odontoid process is visualized with a slightly hypertrophied and round anterior tubercle of C1. The odontoid ossicle is triangular in shape and located in proximity to the basion. Minimal disc narrowing is detected at C6-7. Moderate facet hypertrophy is seen at right C3-4 with mild foraminal encroachment.
**Diagnosis**
- Orthotopic os odontoideum.
- Minimal degenerative disc disease at C6-7.
- Moderate facet arthrosis with foraminal stenosis at right C3-4.

**Indications of imaging**
- T - Trauma
- R – Range of motion
- A – Alcohol/smoking
- U – Unresponsive to care/unusual natural history/symptoms
- M – Motor/sensory/reflexes
- A - Age

**Adults with complicated neck pain**
- No response to care after 4 wk.
- Significant activity restriction > 4wk.
- Non-mechanical pain (unrelenting pain at rest, constant or progressive S&S)
- Neck rigidity in the sagittal plain in the absence of trauma (discitis, infection, tumor, meningitis, etc)
- Dysphasia
- Sudden onset of acute and unusual neck pain and/or headache
- Hx of severe trauma.