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Spectrum Of Fractures In Radiographs In Patients Referred To Radiology Department In A Teaching Medical College Hospital From South India - A Retrospective Study.

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I. Introduction

Fractures occur due to various reasons. Commonest is trauma, mainly due to road traffic accidents. Other causes include fall and domestic violence.

Due to recent advances in imaging, CT is used in case of polytrauma and head injury to make quick decision making.

This study aims to review the spectrum of fractures in radiographs in patients referred to Department of Radio-Diagnosis to rule out fractures in a teaching medical college hospital from south India.

II. Materials And Methods

Records from hospital were reviewed from January 2020 to March 2021.

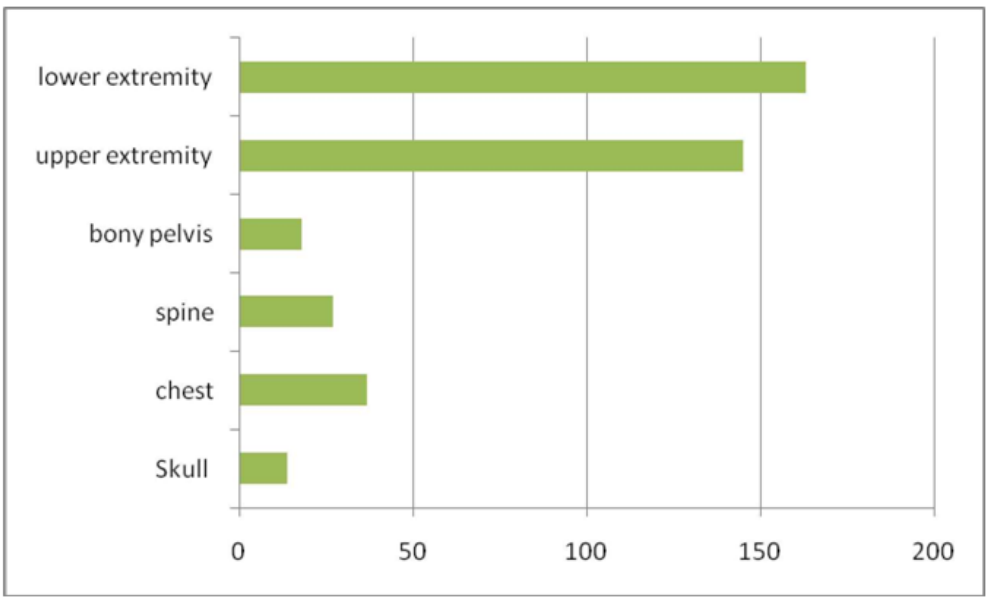
Inclusion criteria

Patients with suspected fracture.

Exclusion criteria

1. Patients presenting with fever / cough/ suspected lung infection.
2. Patients with pathological fractures / insufficiency fractures.

The total number of radiographs done - Skull - 14 Chest - 37 Spine - 27
Bony pelvis - 18
Upper extremity - 145
Lower extremity – 160



A. Bar diagram showing the number of fracture cases in the different parts of the body.

Discussion

Road traffic accidents are important cause of fracture.

Women with low bone density with trivial fall also sustain fracture. Domestic violence also contributes to fracture.

With increasing road facilities all over India, there is increasing number of road accidents. Government of India and Government of Andhra Pradesh are doing a great job to teach public and regulate the traffic rules.

Radiography remains the imaging standard for fracture detection after trauma. However, fractures continue to be the most common type of missed injuries.

Skull and spine

Skull radiographs were obtained always or often in cases of head trauma. CT was always employed in cases of severe head trauma, and skull radiography was frequently used in cases of minor injuries. (1)

Nowadays, patients are regularly referred to CT brain than skull radiographs since CT has higher sensitivity and specificity to detect fractures and intracranial complications

Spine (2)

Radiographs are to be taken in cases of polytrauma after stabilizing the spine

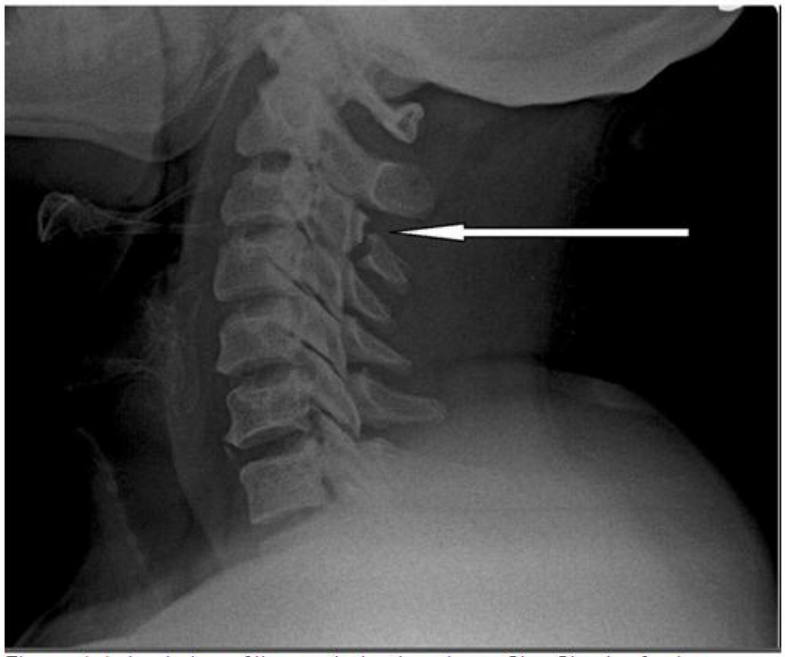


Figure. 1. Lateral view of the cervical spine shows Clay Shovler fracture

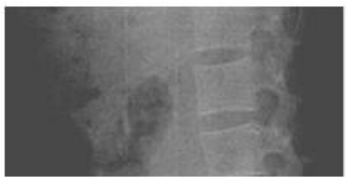


Figure 2. Lateral view of the lumbar spine radiograph shows L4 vertebral fracture with retro-pulsion of fragment into the spinal canal.

Chest- chest radiograph - anteroposterior view is used to look for fracture ribs. (3, 4)

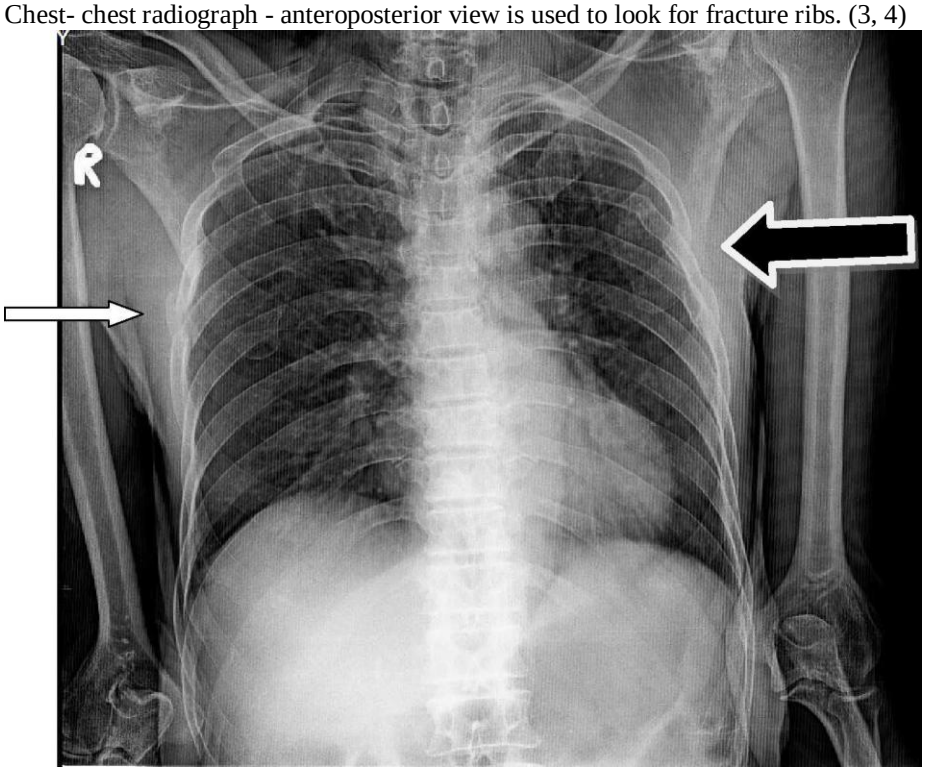


Figure 3. Rib fractures. Frontal radiograph of the chest shows acute fracture on the right side of the rib cage (white arrow mark) and old healed fractures on the left side (black arrow mark)

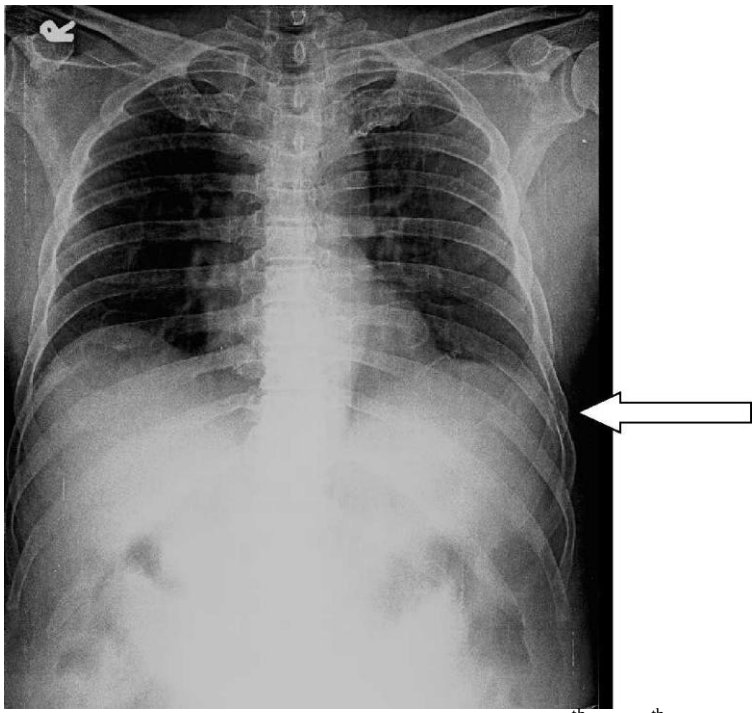


Figure 4. Frontal radiograph of the chest shows left 7^{th} and 8^{th} rib fractures

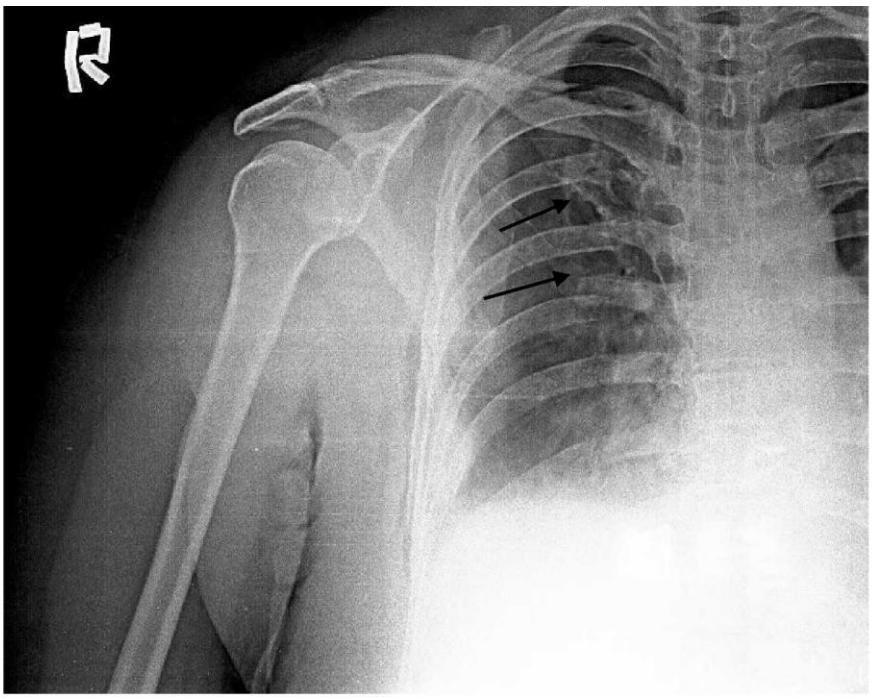


Figure 5. Frontal radiograph of the chest shows Rib fractures; fractures noted in the posterior 1/3rd of ribs

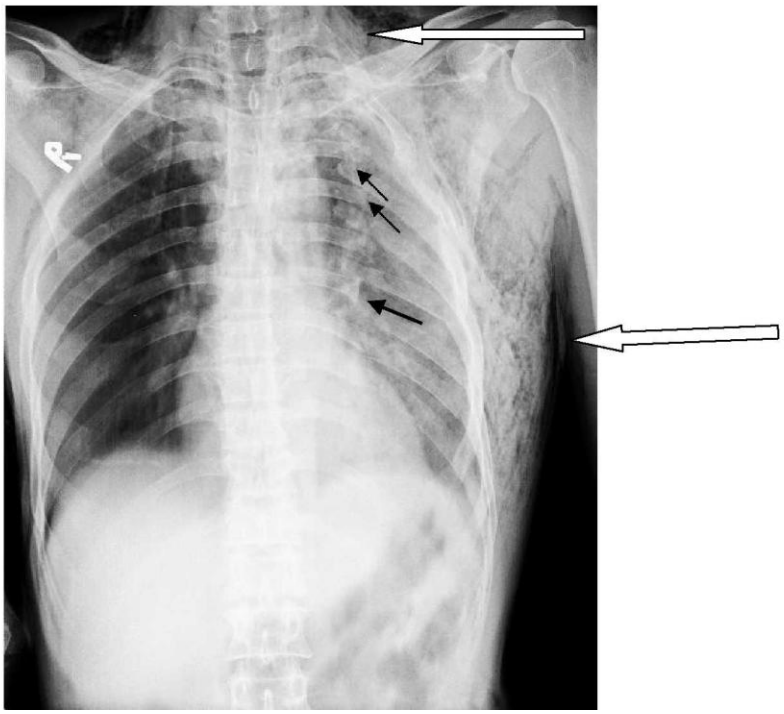


Figure 6. Frontal radiograph of the chest shows multiple rib fractures on the left side (black arrow marks). There is also extensive subcutaneous emphysema seen over left hemi-thorax and neck (white thick arrow marks).

Pelvis -

They most commonly result from trauma, such as motor vehicle accidents (60% of cases), falls from a height (30% of cases), and crush injuries (10% of cases). Thus, displaced pelvic ring injuries are a marker for high-energy trauma and are often associated with other life-threatening injuries.

Pelvic radiographs are utilized to identify fractures and dislocations. (5, 6)

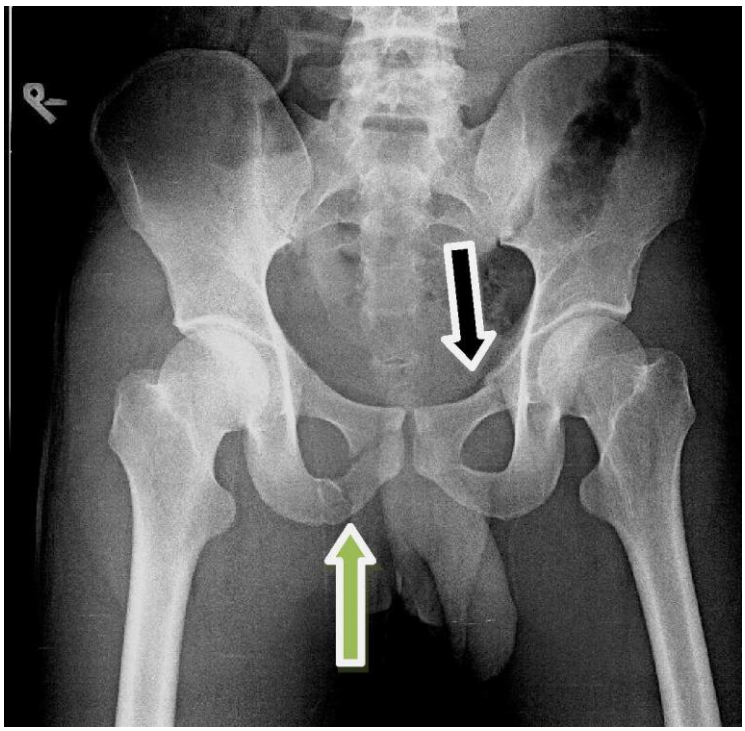


Figure 7. Antero-posterior view of pelvis shows following fractures,
Right inferior pubic ramus fracture (upward pointing arrow mark),
Left superior pubic ramus fracture (downward pointing arrow mark).

Upper extremity

Radiographs can be especially helpful for the patient who is a poor historian or is difficult to examine, providing information crucial to identifying the underlying pathologic abnormality and help direct management. (7)

There are various reasons for a "miss" or error when interpreting radiographs. The most obvious reason is when the radiologist overlooks the finding, which is present on the study, during the initial review. This miss could be secondary to a number of different causes, such as an error of speed, error in search technique, satisfaction of search, or error due to multitasking. Another reason may be that your eyes "played a trick on you," and frankly you did everything correctly except make the important finding. These types of errors can be frustrating because on second look, the diagnosis is rather obvious.

Figure 8. Antero-posterior and lateral views of the elbow shows fracture of medial epicondyle in a skeletally mature patient

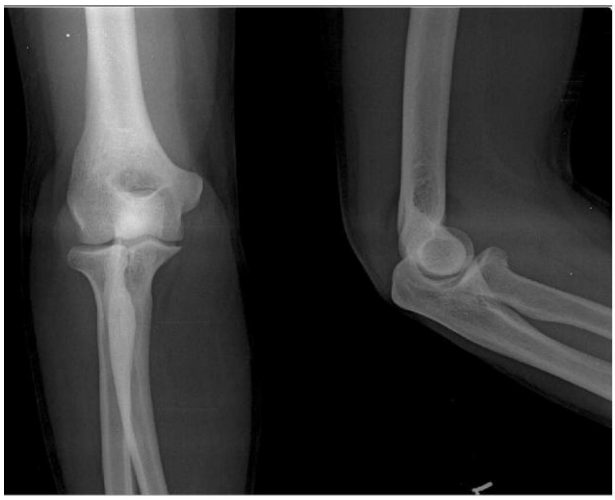


Figure 9. Antero-posterior and lateral views of the elbow shows fracture of the radial head

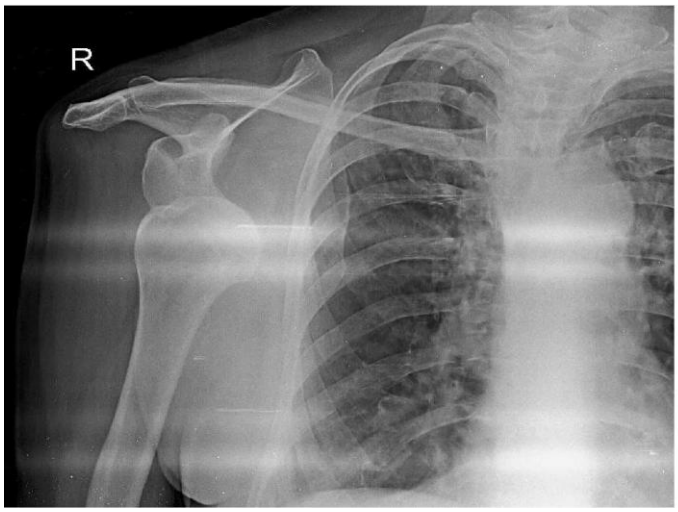


Figure 10. Antero-posterior view of the shoulder shows antero-inferior shoulder dislocation

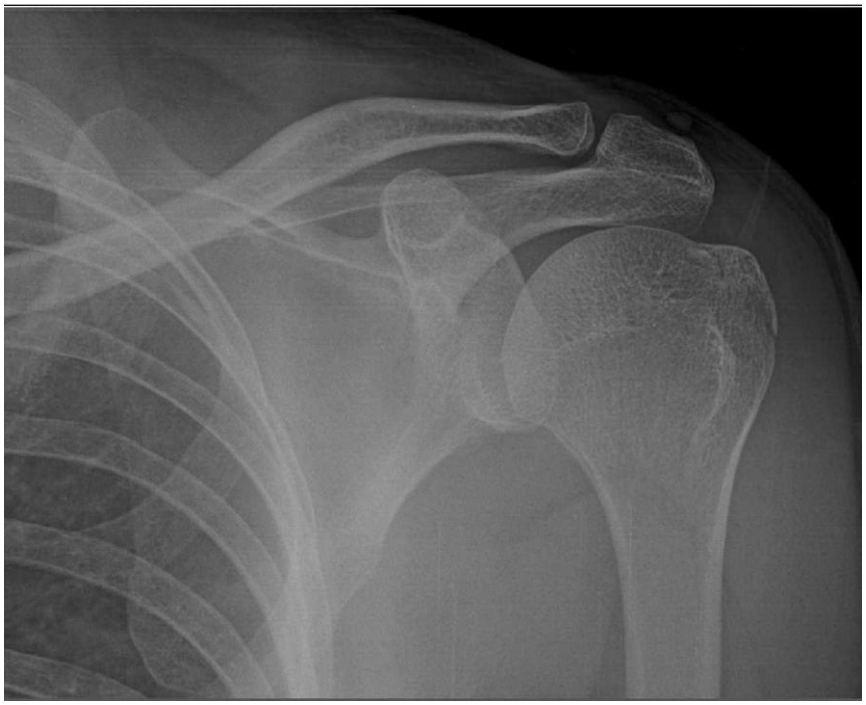


Figure 11. Antero-posterior view of the shoulder shows greater tuberosity fracture

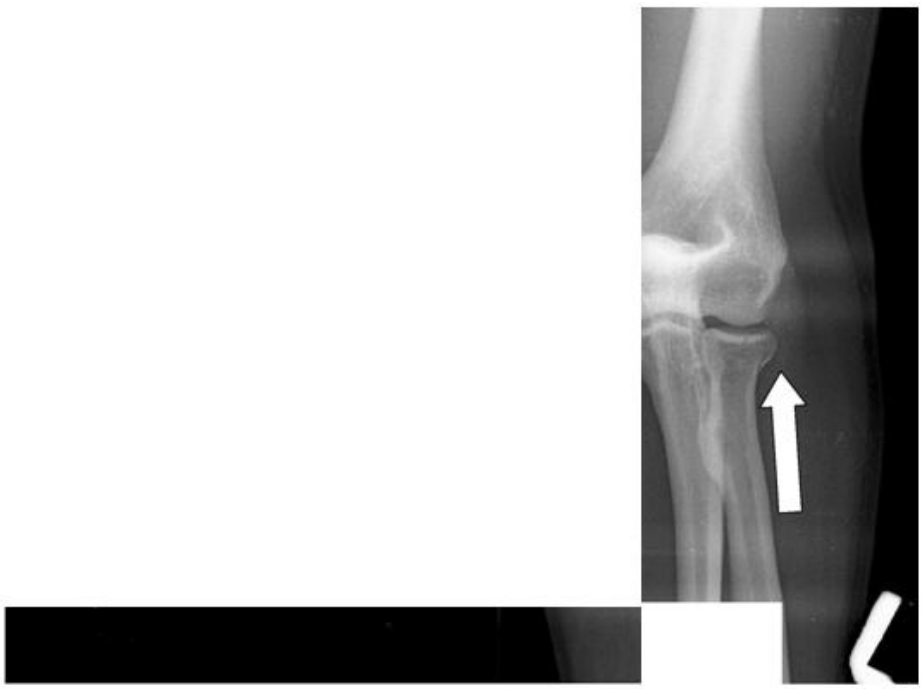


Figure 12. Antero-posterior and lateral views of the elbow shows fat pad sign (horizontal arrows) and radial head fracture (vertical arrow)

Figure 13. Antero-posterior and lateral views of the fore-arm shows Torus fracture of the distal radius

Figure 14. Antero-posterior and lateral views of the elbow shows supracondylar fracture

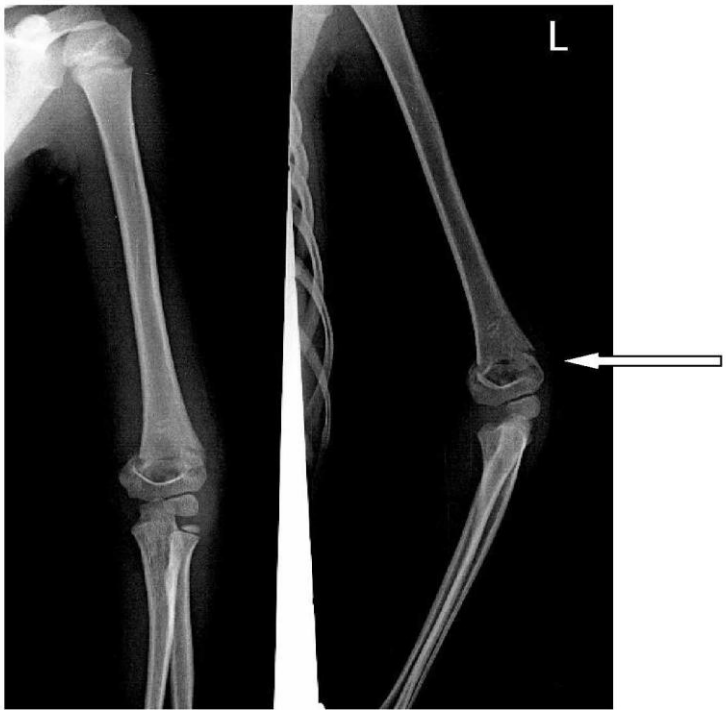


Figure 15. Antero-posterior and lateral views of the elbow shows supracondylar fracture

Figure 16. Antero-posterior and lateral views of the elbow shows supracondylar fracture

Figure 17. Antero-posterior and oblique views of the hand shows dislocation of proximal inter-phalangeal joint

Figure 18. Antero-posterior and lateral views of the fore-arm shows fracture of the mid-shafts of radius and ulna

Figure 19. Antero-posterior and lateral views of the fore-arm shows fracture of the mid-shafts of radius; note the fracture fragments are displaced

Figure 20. Antero-posterior and lateral views of the elbow shows a. segmental Fracture of ulna (horizontal arrow), b. dislocation of radial head (down arrow)

Figure 21. Antero-posterior and oblique views of the hand shows fracture of the base of the fifth metacarpal (arrow)

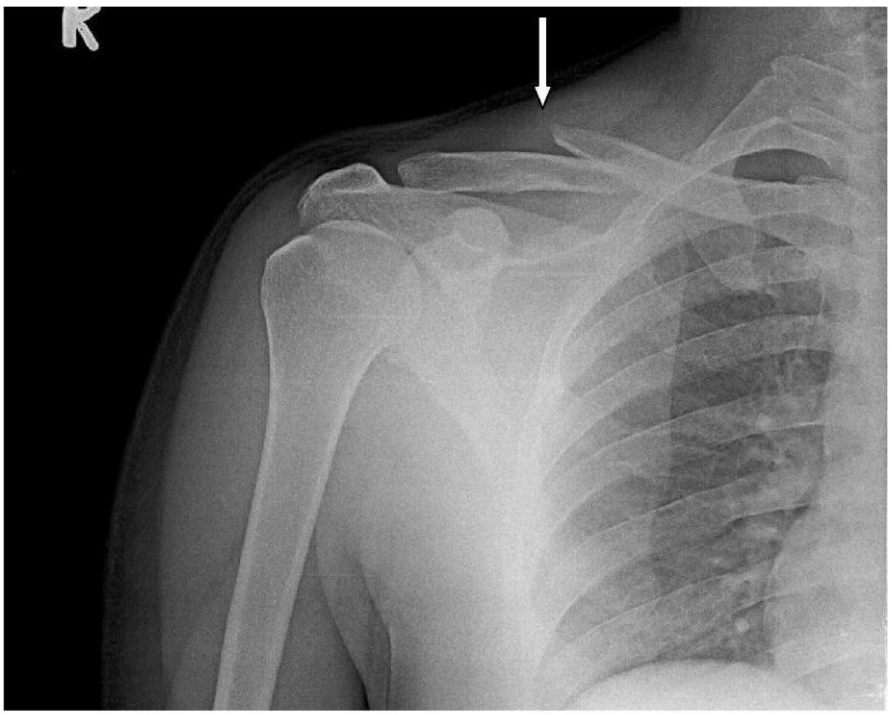


Figure 22. Antero-posterior view of the shoulder shows fracture of the clavicle

Figure 23. Antero-posterior and lateral views of the thumb shows fracture of the distal phalanx of thumb

Figure 24. Antero-posterior and lateral views of the fore-arm shows fracture of the green stick fracture of fore-arm bones

Lower extremity

Figure 25. Antero-posterior view of the pelvis shows dislocation of hip joint

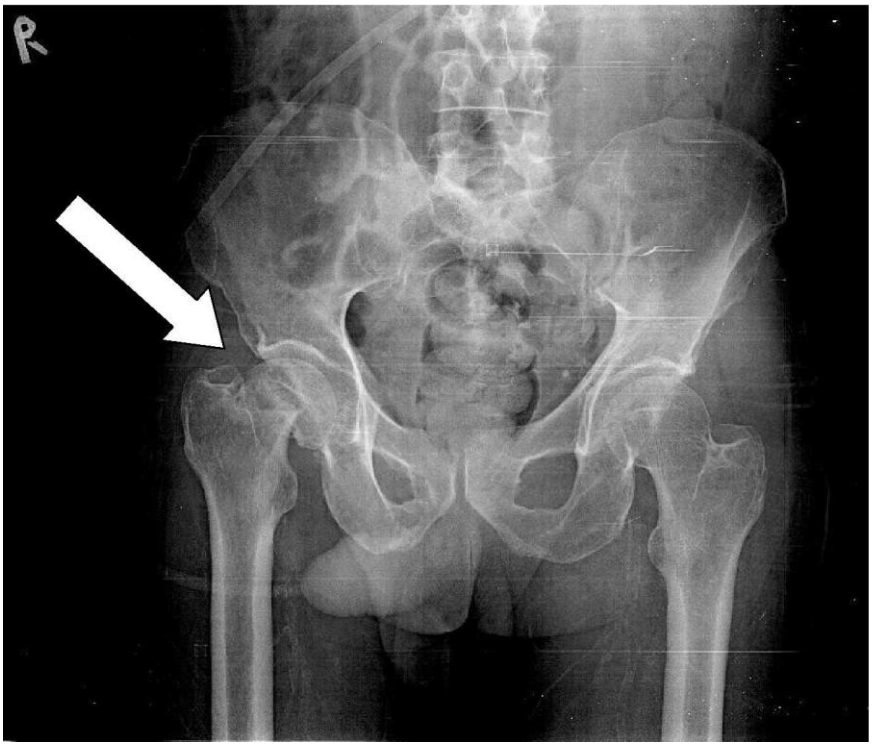


Figure 26. Antero-posterior view of the pelvis shows fracture neck of femur

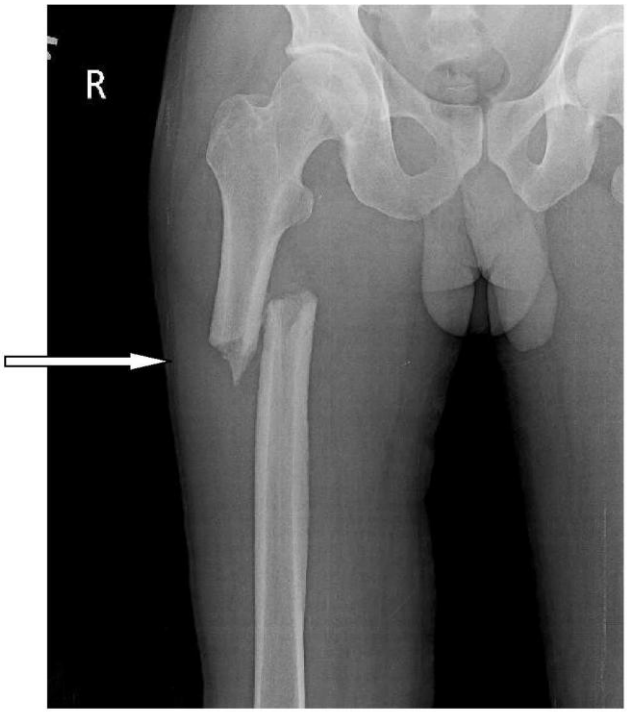


Figure 27. Antero-posterior view of the right hip and upper thigh shows fracture of the shaft of femur

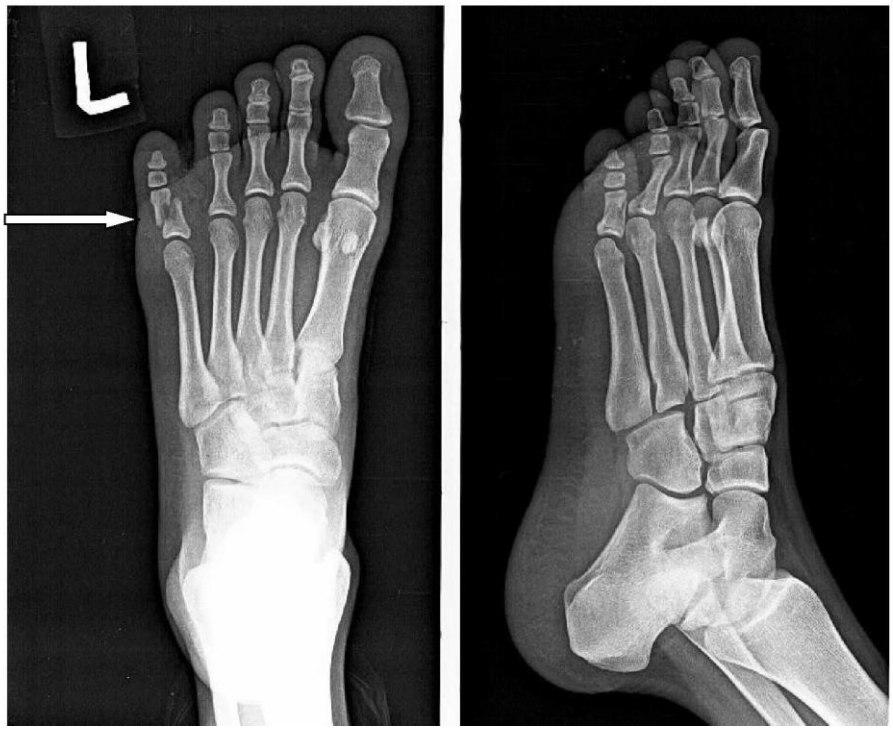


Figure 28. Antero-posterior and oblique views of the foot shows fracture of the proximal phalanx of little toe

Figure 29. Antero-posterior and lateral views of the leg shows fracture tibia and fibula. Note the segmental fracture of tibia

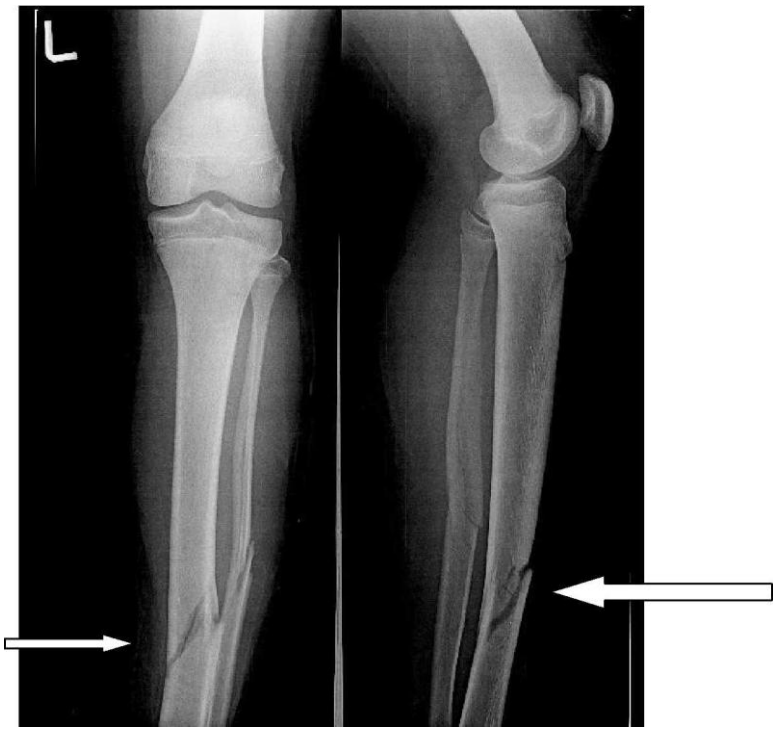


Figure 30. Antero-posterior and lateral views of the leg shows fracture tibia and fibula - fracture line is oblique

Figure 31. Antero-posterior and lateral views of the leg shows fracture tibia and fibula. Fracture line is transverse and there is mild displacement of fracture fragments

Figure 32. Antero-posterior views of the ankle shows fracture of lateral malleolus

Figure 33. Antero-posterior and oblique views of the foot shows fracture of the base of the fifth meta-tarsal

Figure 34. Antero-posterior and lateral views of the ankle shows fracture of Calcaneum

fracture

Figure 35. Antero-posterior and lateral views of the knee shows anterior cruciate ligament avulsion

Figure 36. Antero-posterior view of the pelvis shows posterior dislocation of right hip

Figure 37. Antero-posterior view of the right thigh shows fracture of the mid-shaft of femur in a skeletally immature patient

Figure 38. Antero-posterior and oblique views of the foot shows fracture base of fifth meta-tarsal

Figure 39. Antero-posterior and oblique views of the foot shows fracture base of fifth metatarsal

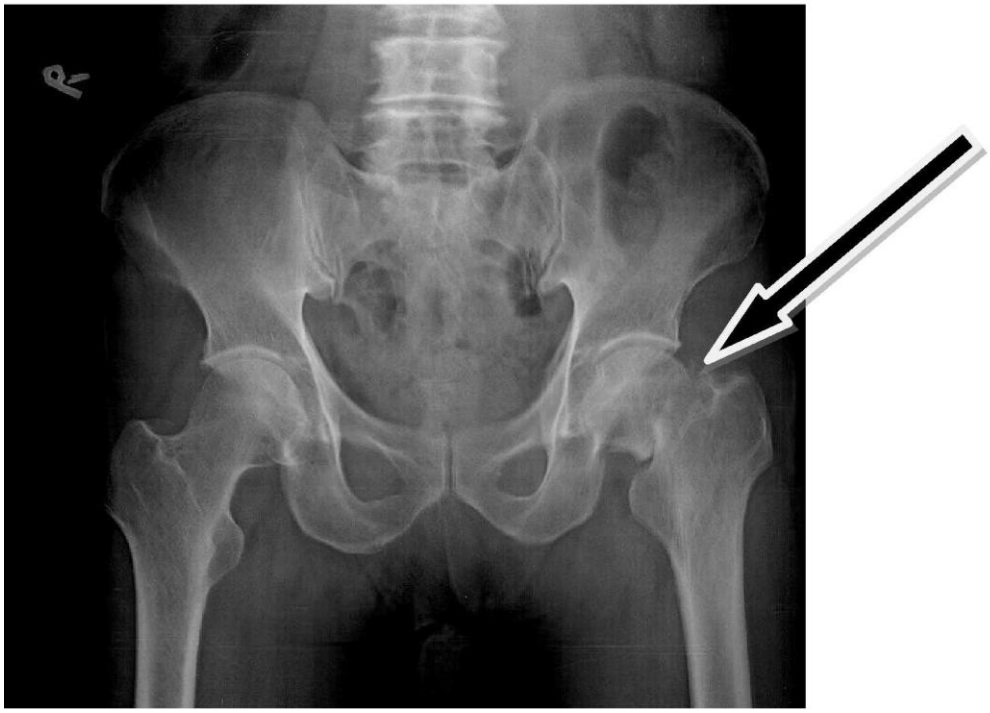


Figure 40. Antero-posterior view of the pelvis shows fracture of neck of left femur

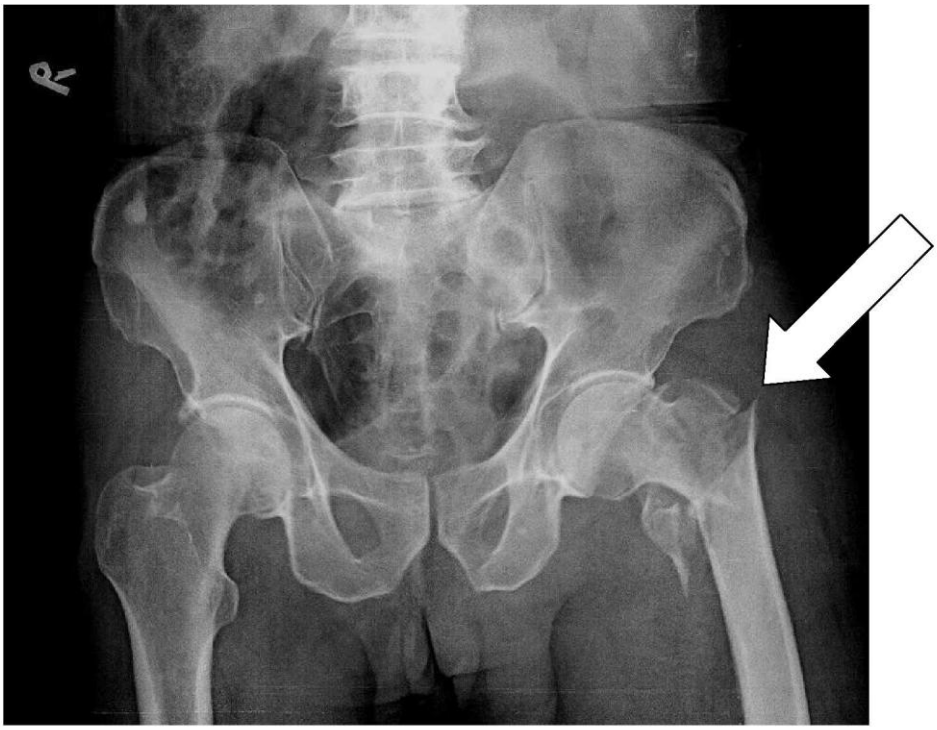


Figure 41. Antero-posterior view of the pelvis shows left Inter-trochanteric fracture

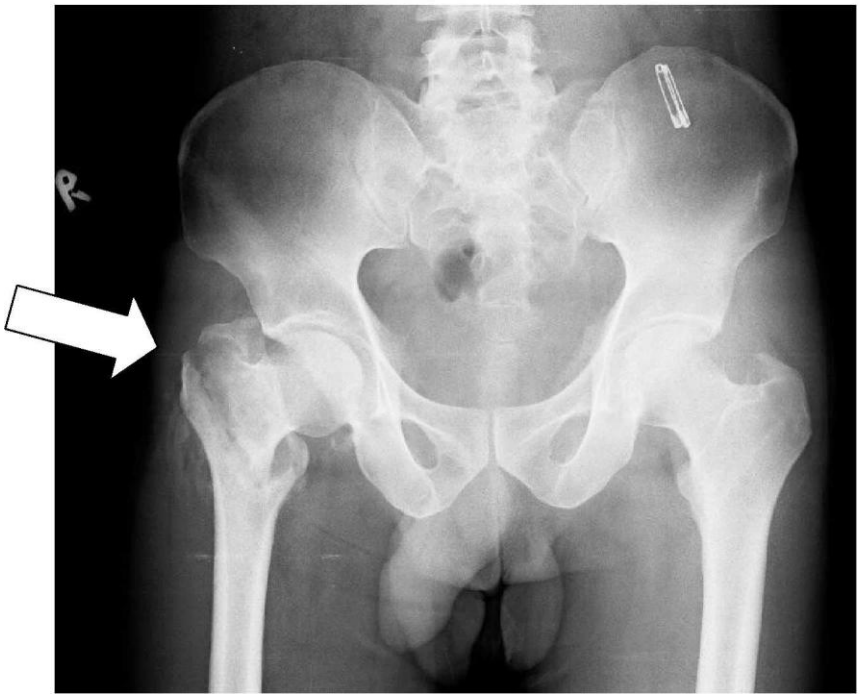


Figure 42. Antero-posterior view of the pelvis shows right Intertrochanteric fracture

Figure 43. Antero-posterior and oblique views of the foot shows fracture of meta-tarsals

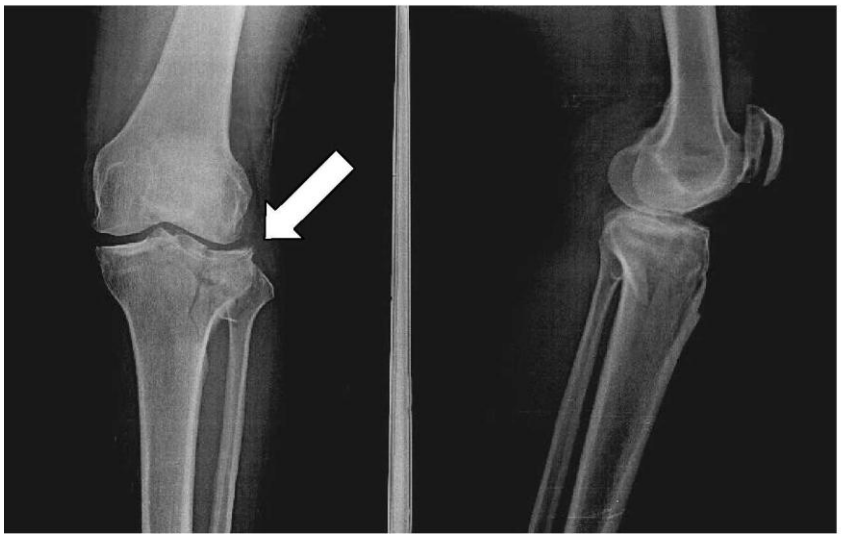


Figure 44. Antero-posterior and lateral views of the knee shows fracture of the lateral tibial plateau

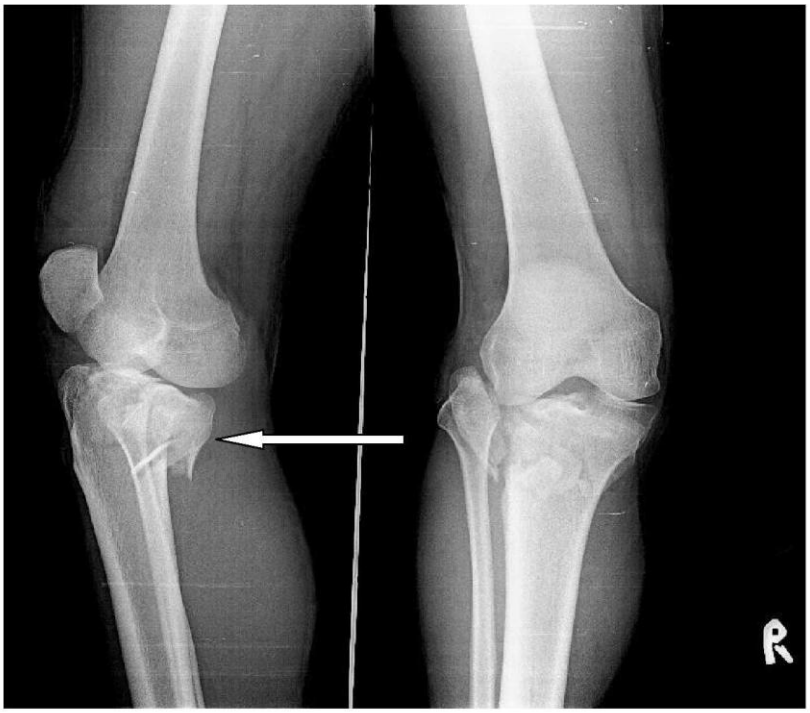


Figure 45. Antero-posterior and lateral views of the knee shows fracture of the lateral tibial plateau

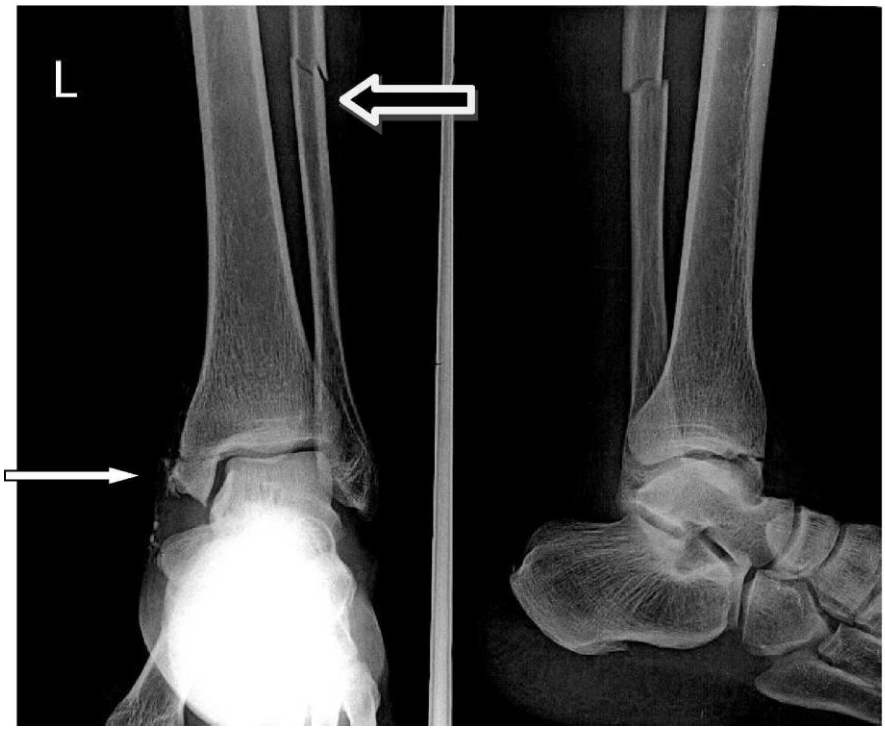


Figure 46. Antero-posterior and lateral views of the ankle including lower leg shows fracture medial malleolus (white arrow) and fracture of the mid-shaft of fibula (black arrow)

Figure 47. Antero-posterior and lateral views of the leg shows oblique fracture of the tibia

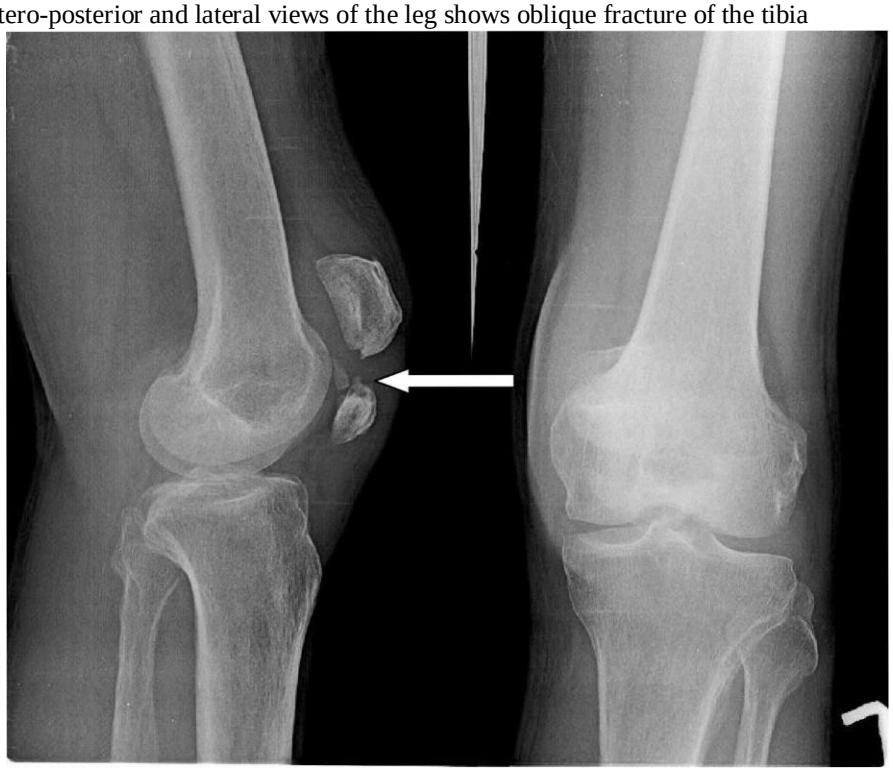


Figure 48. Antero-posterior and lateral views of the knee shows fracture of the patella

Figure 49. Antero-posterior and lateral views of the ankle including lower leg shows fracture medial malleolus and fracture of the mid-shaft of fibula

Figure 50. Antero-posterior and lateral views of the ankle shows calcaneal fracture

Pitfalls (8)

There are many pitfalls in picking up fractures.

They include insufficient views, improperly positioned or technically imperfect radiographs, non-displaced fractures, common locations of errors, little avulsion fractures, bipartite sesamoid versus fracture, satisfaction of search and faulty reasoning

III. *Conclusion*

Radiography plays a vital role in imaging patients with trauma. This article detailed the various fractures occurring in the human from skull to foot. Fractures most commonly seen in lower extremities followed by upper extremity and least in the skull in this series. Low number of skull fractures are due to increased use of Computed Tomography for head injury. We like to stress the public should use more protective devices to protect extremities.

This document will be also very useful to radiology and orthopedic junior and senior residents.

References

[1]. MELO, Jose Roberto Tude et al . Skull radiographs and computed tomography scans in children and adolescents with mild head trauma. **Arq. Neuro-Psiquiatr.,** Sao Paulo , v. 66, n. 3b, p. 708-710, 2008 .

[2]. Parizel PM, Van Der Zijden T, Gaudino S, et al. Trauma of the spine and spinal cord: imaging strategies. *Eur Spine J*. 2010;19 Suppl 1(Suppl 1):S8-17.

[3]. Talbot BS, Gange CP Jr., Chaturvedi A, Klionsky N, Hobbs SK. Traumatic rib injury: patterns, imaging pitfalls, complications, and treatment-erratum. Radiogr Rev Publ Radiol Soc N Am Inc. 2017; 37(3) :1004

[4]. Assi AA, Nazal Y. Rib fracture: Different radiographic projections. *Pol J Radiol.* 2012;77(4):13-6.

[5]. Anne K. Misiura,1 Autumn D. Nanassy,2 and Jacqueline Urbine Usefulness of Pelvic Radiographs in the Initial Trauma Evaluation with Concurrent CT: Is Additional Radiation Exposure Necessary.

[6]. Bharti Khurana , Scott E. Sheehan, Aaron D. Sodickson, Michael J. Weaver. Pelvic Ring Fractures: What the Orthopedic Surgeon Wants to Know https://doi.org/10.1148/rg.345135113

[7]. Soterios Gyftopoulos1, Munish Chitkara1 and Jenny T. Bencardino Misses and Errors in Upper Extremity Trauma Radiographs https://www.ajYonline.org/doi/full/10.2214/AJR.14.12589

[8]. Alice S. Ha1, Jack A. Porrino1 and Felix S. Radiographic Pitfalls in Lower Extremity Trauma. https://www.ajronline.org/doi/full/10.2214/AJR.14.12626

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