

Clinical/Diagnostic Problem	Investigation	Recommendation (Grade)	Dose	Comment
<b>Head</b>				
<b>J01. Head injury</b>  (For children see Section L)	SXR	Not indicated [B]	☼	There is poor correlation between the presence of a skull fracture and a clinically significant head injury. The only indications for skull x-rays in the setting of trauma are suspected open or depressed skull fractures, if CT is not available and suspected child abuse.
	CT	Indicated [A]	☼☼	<p>CT is indicated in all patients with a severe head injury (GCS &lt;13).</p> <p>In patients with a minor head injury (GCS 13-15 and witnessed loss of consciousness or disorientation or definite amnesia) CT is indicated to rule out an injury requiring neurosurgical intervention if there is:</p> <ul style="list-style-type: none"> <li>• GCS &lt;15 2 hours after the injury</li> <li>• Suspected open or depressed skull fracture</li> <li>• Any sign of a basal skull fracture</li> <li>• Two or more episodes of vomiting</li> <li>• Age &gt; 65 years</li> </ul> <p>To rule out any other clinically significant intracranial injury, the following additional risk factors justify obtaining CT:</p> <ul style="list-style-type: none"> <li>• Amnesia for before the impact lasting &gt; 30 minutes</li> <li>• Dangerous mechanism of injury (motor vehicle accident or fall from &gt; 3 feet or 5 stairs or more).</li> </ul>
	CTA	Specialized Investigation [B]	☼☼	<p>CTA should be performed with presentation of high energy transfer mechanism or if associated with any of the following:</p> <ul style="list-style-type: none"> <li>• Displaced mid-face fracture</li> <li>• Basilar skull fracture with carotid canal involvement</li> <li>• Focal neurological deficit</li> <li>• Cervical vertebral body or transverse foramen fracture</li> <li>• Fracture at C1-C3</li> <li>• Clothesline type injury or seat belt abrasion with significant swelling/pain</li> <li>• Altered mental status</li> </ul>
<b>Face and orbits</b>				
<b>J02. Nasal trauma</b>	CT	Specialized Investigation [B]	☼☼	CT may be indicated if requested by a referral service to plan for management.
	XR nasal bones	Not Indicated	☼	XRs are unreliable in diagnosing/characterizing nasal bone fractures and do not alter management.

## Section J: Trauma

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<b>J03. Blunt orbital trauma</b>	CT	Indicated [A]	☼☼	CT is indicated when an orbital fracture or globe injury is suspected.
	XR Orbits	Indicated in special circumstances [A]	☼	May be used if CT is not available.
<b>J04. Orbital trauma: penetrating injury</b>	CT	Indicated [A]	☼☼	CT is indicated when an orbital fracture or globe injury is suspected.  CT is also indicated when XR does not show a foreign body but one, which may not be metallic, is strongly suspected, when multiple foreign bodies are present, or when it is not certain whether a foreign body is intraocular.
	XR orbits	Indicated [A]	☼	XR is the only imaging required to exclude a metallic foreign body.
	US	Indicated [C]	0	US can also be used for radiolucent foreign bodies or where XR is difficult.
<b>J05. Middle third facial injury</b>	CT Facial Bones	Indicated [A]	☼☼	Patient cooperation is essential to obtain views of diagnostic quality. Consider delay if patient is uncooperative. Should be considered in setting of abnormal XR, suspected fracture, foreign body, or hematoma, and acute diplopia.
	XR facial bones	Indicated [C]	☼	Discuss with maxillofacial surgeon, who may request low dose CT at an early stage in management of complex injuries.  Although plain x-rays have had a historical role, CT with reformats provides superior evaluation and should be the imaging modality of choice when available.
<b>J06. Mandibular trauma</b>	CT	Indicated [A]	☼☼	CT with reformats should be performed where available for superior fracture detection.
	XR mandible or OPG	Indicated [C]	☼	Panoramic XR is not appropriate in uncooperative or multiply injured patients. CT should be performed when available.



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<b>Cervical spine</b>				
<b>J07. Conscious patient with head and/or facial injury only</b>	XR cervical spine	Indicated only in specific circumstances [A]	⊕	<p>In an alert, stable patient XR is indicated only if there are the following risk factors:</p> <ul style="list-style-type: none"> <li>• Age &gt;65 years</li> <li>• Dangerous mechanism of injury</li> <li>• Parasthesias in the extremities or other neurological deficit</li> <li>• Midline tenderness</li> <li>• Inability to actively rotate the neck 45° to the right and the left</li> </ul> <p>If the XR is normal and there is persistent pain, flexion and extension views can be obtained to assess possible ligament damage.</p>
	CT Cervical Spine	Indicated [A]	⊕⊕	Although XR is indicated in the specific circumstances outlined above, due to superior visualization of both bony and soft-tissue injury CT should be obtained as a first line modality if available, and to further characterize injury should one be suspected on XR.
<b>J08. Unconscious patient with head injury</b>	CT Cervical Spine	Indicated [A]	⊕⊕	CT is indicated to characterize both bony and soft-tissue injury.
	XR cervical spine	Indicated in specific circumstances [B]	⊕	Indicated only if CT is not available.
<b>J09. Neck injury and pain with or without neurological deficit</b>	CT Cervical Spine	Indicated [A]	⊕⊕	CT is indicated to characterize both bony and soft-tissue injury.
	MRI	Specialized investigation [B]	0	May be valuable in specialized situations where CT is negative and a purely ligamentous injury is suspected, or to further characterize injury already seen on CT.
	XR cervical spine	Indicated [B]	⊕	Indicated only if CT is not readily available.
<b>J10. Neck injury with pain but XR initially normal; suspected ligamentous injury</b>	CT Cervical Spine	Indicated [A]	⊕⊕	CT should be performed to detect radiographically occult fracture.
	MRI	Specialized investigation [B]	0	MRI demonstrates ligamentous injuries better than CT.
	XR cervical spine	Specialized investigation [B]	⊕	Views taken in flexion and extension (consider fluoroscopy) as achieved by the patient with no assistance and under medical supervision.

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<b>Thoracic and Lumbar Spine</b>				
<b>J11. Trauma without neurological deficit, with or without pain</b>	XR	Indicated in specific circumstances [B]	⊕	Imaging is not usually indicated in a conscious asymptomatic patient, who can be reliably examined.  Imaging is indicated if there is a history of a significant mechanism such as a fall or a high-impact motor vehicle accident, if there is pain and/or tenderness or if the patient cannot be reliably evaluated.  XR may also be indicated in situations when CT is not readily available.
	CT Spine	Indicated [A]	⊕⊕	Threshold to CT should be low when there is pain / tenderness, a significant mechanism of injury, the presence of other spinal fractures, or when it is not possible to clinically evaluate a patient.
<b>J12. Trauma: with neurological deficit, with or without pain</b>	CT	Indicated [A]	⊕⊕	CT is indicated to further evaluate for injury with or without localizing signs.
	MRI	Indicated [B]	0	MRI is indicated if there is concern about a cord injury not seen on CT, if a purely ligamentous injury is suspected, or to further characterize injury already seen on CT.
	XR	Indicated [C]	⊕	Should be performed only when CT is unavailable. Regardless CT / MRI is essential.
<b>Pelvis and sacrum</b>				
<b>J13. Fall with pain</b>	XR Pelvis and Lateral XR Hip	Indicated [B]	⊕	XR is indicated as an initial imaging modality if a pelvic or femoral neck fracture is suspected.
	CT	Indicated [B]	⊕⊕	CT is indicated if XR shows no fracture but there is ongoing pain or inability to weight bear. CT may also be indicated to further characterize fractures seen on XR.
	NM	Indicated in specific circumstances [C]	⊕⊕	NM bone scan should be performed at least 48-72 hours post-injury to maximize sensitivity.
<b>Upper limb</b>				
<b>J14. Shoulder injury</b>	XR	Indicated [B]	⊕	XR is the appropriate initial imaging modality.
<b>J15. Elbow trauma</b>	XR	Indicated [B]	⊕	XR is the appropriate initial imaging modality.

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<b>J16. Wrist injury: suspected scaphoid fracture</b>	XR	Indicated [A]	⊕	XR is the appropriate initial imaging modality. If a scaphoid fracture is suspected a scaphoid view should be requested.  Delayed XR (at least ten days) is appropriate if there is a high suspicion of a scaphoid fracture but a normal initial XR.
	CT	Indicated in special circumstances [B]	⊕⊕	If a scaphoid fracture or other carpal fracture is suspected and the XR is normal CT is appropriate for further evaluation.
	MRI	Indicated in special circumstances [B]	0	If a scaphoid fracture is suspected and the XR is normal and early diagnosis is required, MRI is the preferred modality for further evaluation.
	NM	Indicated in special circumstances [C]	⊕⊕	If a scaphoid fracture is suspected and the XR is normal and early diagnosis is required NM can be used for further evaluation but NM bone scan should be performed at least 48-72 hours post-injury to maximize sensitivity.
<b>Lower limb</b>				
<b>J17. Knee trauma: fall / blunt trauma</b>	XR	Indicated in specific circumstances [A]	⊕	XR is the appropriate initial imaging modality. It is indicated if any of the following risk factors are present: <ul style="list-style-type: none"> <li>• Age &gt; 55 years</li> <li>• Tenderness over the head of the fibula</li> <li>• Isolated tenderness of the patella</li> <li>• Inability to flex to 90°</li> <li>• Inability to weight bear 4 steps immediately and in the ED</li> </ul>
	XR	Indicated in specific circumstances [A]	⊕	XR is the appropriate initial imaging modality. It is indicated if any of the following risk factors are present : <ul style="list-style-type: none"> <li>• inability to weight-bear four steps immediately and in the emergency room,</li> <li>• point tenderness over the medial malleolus, and/or</li> <li>• the posterior edge and distal tip of the lateral malleolus.</li> </ul>
MRI	Indicated in specific circumstances [B]	0	MRI is indicated if there is a suspected isolated soft-tissue injury, occult fracture not seen on CT, or to further characterize fractures seen on CT.	
<b>J19. Foot injury</b>	XR	Indicated only in specific circumstances [A]	⊕	XR is the appropriate initial imaging modality.

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<b>J20. Stress fracture</b>	XR	Indicated [B]	⊕	This is the preferred initial imaging modality.
	CT	Indicated [B]	⊕⊕	CT is indicated if there are ongoing symptoms and a negative XR.
	MRI	Indicated [B]	0	MRI is the superior modality for detecting early undisplaced stress fractures which may be occult on CT and XR.
	NM	Indicated [B]	⊕⊕	NM studies may be useful for further evaluation of a suspected stress fracture not visible on XR.
<b>J21. Suspected hip fracture</b>	XR	Indicated [A]	⊕	XR is the appropriate initial imaging modality.
	CT	Indicated [B]	⊕⊕	CT is indicated if there is ongoing inability to weight bear and/or a high suspicion for fracture despite a negative XR.
	MRI	Indicated [B]	0	MRI is indicated for ongoing suspicion of hip fracture in the setting of a normal XR or CT, especially if a stress fracture is suspected.
	NM	Indicated [B]	⊕⊕	NM bone scan can be performed where MRI is unavailable or contraindicated. NM bone scan should performed at least 48-72 hours post-injury to maximize sensitivity.
<b>Imaging of a Foreign Body</b>				
<b>J22. Soft tissue injury: radio-opaque foreign body suspected</b>	XR	Indicated [A]	⊕	XR is the appropriate initial imaging modality.
	US	Indicated in specific circumstances [B]	0	US may be indicated if glass or wood foreign body is suspected and XR is normal.
<b>J23. Soft tissue injury: radiolucent foreign body suspected.</b>	XR	Indicated in specific circumstances [B]	⊕	Indicated only if there is concern about associated bony abnormality.
	US	Indicated in specific circumstances [B]	0	US is the appropriate initial imaging modality if a radiolucent, soft-tissue foreign body is suspected.
<b>J24. Swallowed foreign body</b> <b>(For children see L58)</b>	XR	Indicated in specific circumstances [B]	⊕	XR should be performed in conjunction with direct examination of the upper pharynx where most foreign bodies lodge. XR is most useful if the swallowed foreign body is radio-opaque.

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<b>J24. Swallowed foreign body</b>  <b>(For children see L58)</b>  <i>(continued)</i>	XR chest and abdomen	Indicated in specific circumstances [C]	⊕	For a suspected sharp or potentially poisonous foreign body (e.g. battery), XR should cover the aerodigestive tract from the pharynx to the rectum.
	CT	Indicated in specific circumstances [C]	⊕⊕	CT is indicated if XR is negative or if there is clinical suspicion of obstruction or perforation of a hollow viscous.
<b>Chest</b>				
<b>J25. Chest trauma: Minor, suspected rib fracture</b>	CXR	Indicated in specific circumstances [C]	⊕	Undisplaced rib fractures are difficult to identify and their diagnosis does not alter management. However, identification of rib fractures may be useful in order to counsel patients on recovery.
<b>J26. Chest trauma: Moderate to severe</b>	CXR	Indicated [A]	⊕	CXR is indicated as an initial examination but should not delay CT if there are suspected severe injuries such as a pneumothorax.
	CT Chest	Indicated [A]	⊕⊕	CT with contrast is indicated in the setting of severe trauma or penetrating injury in a patient who is hemodynamically stable. Unstable patients may require immediate surgery.
	CTA Chest	Indicated in special circumstances [B]	⊕⊕	CTA is indicated in the setting of suspected traumatic aortic injury, or high energy transfer mechanism.
<b>J27. Suspected esophageal or airway injury</b>	CT	Indicated in special circumstances [B]	⊕⊕	Contrast enhanced CT with water soluble oral contrast can be indicated in the setting of suspected esophageal or airway injury in consultation prior to esophageal endoscopy or bronchoscopy.
<b>Abdomen (including kidney)</b>				
<b>J28. Blunt or stab injury</b>  <b>(For children see L59)</b>	CT	Indicated [A]	⊕⊕	CT with contrast is indicated in the setting of severe trauma or penetrating injury in a patient who is hemodynamically stable. Unstable patients may require immediate surgery.
	Abdominal XR supine and CXR erect	Indicated [B]	⊕	If CT is unavailable, supine abdominal XR and erect CXR are indicated to diagnose free intra peritoneal air. Pelvic x-rays are indicated to diagnose pelvic fractures which may denote internal injuries.
	CT Cystogram	Indicated only in specific circumstances [C]	⊕⊕⊕	A CT cystogram may be indicated in patients with severe pelvic trauma with suspected bladder or urethral injury.

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<b>J29. Renal trauma</b>	CT	Indicated [A]	⊕⊕	CT is the best imaging modality to investigate patients with suspected major renal injury. Adults with blunt renal trauma but only microscopic hematuria do not require imaging.
	US	Indicated only in specific circumstances [B]	0	US may be used if CT is unavailable but is not as sensitive as CT for evaluating traumatic injury.