Imaging of maxillofacial, orbital and skull base trauma

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Dr. Steven Connor

Dr. Steven Connor was appointed as a consultant neuroradiologist at King's College Hospital, London in 2002. He also holds an honorary post as a Consultant head and neck radiologist at Guy's and St Thomas' Hospital. He is actively involved in radiology and ENT/maxillofacial training programmes and organises the annual London petrous temporal bone radiology course. He has led a number of national radiology meetings and is a member of the Royal College of Radiologists (RCR) professional learning and development committee. He has authored over 130 peer reviewed articles (h index 25), has written five book chapters and has acted as deputy or associate editor for three journals. He is leading a five-year prospective study on head and neck cancer treatment response and is currently actively involved in 15 further clinical studies. He is the past president of the British Society of Head and Neck Imaging (BSHNI) and the current visiting professor for the RCR/BSHNI. His main research interests are in head and neck cancer, skull base and otology imaging.

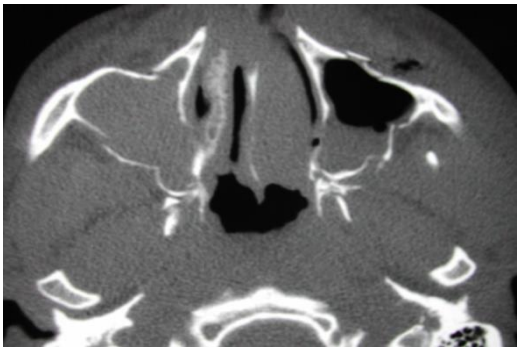
Abstract

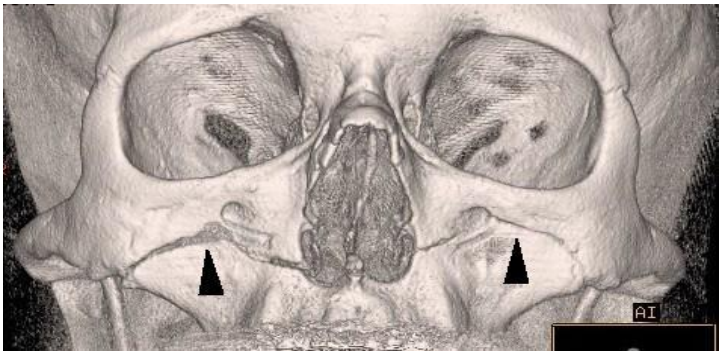
This presentation will review the techniques and protocols used in the imaging of orbital, maxillo-facial and skull base trauma together with the imaging appearances of fractures and their soft tissue complications. Accurate identification and characterization of orbital and maxillo-facial fractures is achieved using a combination of clinical examination, targeted plain film radiography and computed tomography (CT), whereas imaging modalities such as ultrasound, magnetic resonance imaging (MRI) provide additional information in selected cases to demonstrate soft tissue and fracture complications. Fracture appearances will be discussed with some fracture mimics illustrated. A systematic anatomical classification of facial and skull base fractures will be formulated (central midface, lateral midface, orbital, transfacial, craniofacial, central skull base and posterior skull base) in order to aid understanding and communication of fracture patterns. Specific aspects of fracture patterns and their associated soft tissue complications may impact on treatment planning and prognosis so these will be emphasized. The imaging of specific clinical scenarios related to orbital trauma (such as penetrating injury, intraorbital haematoma and post traumatic visual loss) and skull base trauma (CSF leak, facial palsy, hearing loss, vascular injury) will also be highlighted.

Learning Objectives

1. To describe the imaging techniques to be used in maxillofacial, orbital and skull base trauma
2. To provide a systematic approach to the most commonly used fracture classification systems
3. To learn how to recognize characteristic fracture patterns and complications
4. To understand the implications of imaging findings on patient management

Teaser





With regards to this fracture complex?
Only a single correct answer

a. This is a LeFort 1 fracture complex
b. This is a LeFort 3 fracture complex
c. This fracture subtype is that which is most frequently associated with orbital and cranial complications
d. The fracture of the pterygoid plates is an atypical feature
e. These are commonly seen in isolation in the context of high impact trauma

Test Your Knowledge

Only one answer is correct.

1. The following is NOT a potential complication of a naso-ethmoid complex fracture
    a. Telecanthus
    b. Dacryocystitis
    c. CSF rhinorrhea
    d. Carotico-cavernous fistula

2. The following is true of orbital "blow out" fractures
    a. Orbital floor blow out fractures may result in delayed exophthalmos

b. Ophthalmoplegia may only occur if there is herniation of the inferior rectus through an orbital floor fracture site
c. "Trapdoor type" fractures typically occur in adults
d. Enophthalmos may result if the fracture involves the "bulge" of the posterior medial wall of orbit

3. Regarding skull base fracture complication
    a. Sudden onset sensori-neural hearing loss is more typical of longitudinal otic capsule sparing temporal bone fractures
    b. Fractures of the optic nerve canal may result in sudden visual loss
    c. Sudden onset facial nerve paralysis usually results from neural contusion in the temporal bone
    d. Fractures of the anterior wall of the frontal sinus may result in a sudden CSF rhinorrhea

4. The following is true of maxillo-facial trauma
    a. Zygomatico-maxillary fractures are a type of medial midface fracture
    b. Smash type transfacial fractures are now more commonly seen than classical Le-Fort fractures in the context of high energy trauma
    c. Zygomatic fractures always need assessment with CT imaging
    d. Frontal sinus fractures involving the frontal sinus outflows predispose to meningoceles