

An Artefact, a Fracture or Neither? Anatomy!

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BACKGROUND

1. An artefact in computed tomography (CT) is 'any systematic discrepancy between CT numbers in reconstructed image and actual attenuation coefficients of the object'.¹
2. Clinicians viewing CT images must assess clinical patient related assessment data prior to deciding on definitive treatment.
3. Mandibular fractures are among the most common maxillofacial fractures observed in A&E departments, few of which are diagnosed without radiographic imaging.⁴

AIM

To present a case report of an *unusual* CT artefact mimicking mandibular fracture which had potential to result in misdiagnosis and mismanagement

OBJECTIVE

To explore possible misdiagnosis for maxillofacial fractures which could be caused by placing heavy reliance on viewing CT scans in 3D

CASE REPORT

PATIENT:
82 year old, fit and well female

PRESENTATION:
A&E 2 weeks post unwitnessed ground-level fall which resulted in a blunt head trauma.

COMPLAINT:
She presented 2 weeks later to A&E complaining of head and neck pain. No neurological deficits noted.

IMAGERY: *CT Neck with contrast*
This disclosed a comminuted fracture and dislocation of left mandibular condyle and what appeared to be a left mandibular fracture of the ramus (Fig.1).

ARTEFACT:
Upon close examination and review of CT the artefactual nature of the mandibular ramus fracture was exposed (Fig. 2 and 3) and compared with similarities on the right (Fig.4).

SUPPORTING IMAGES (Written explicit consent obtained for sharing of images for educational purposes)



Figure 1. CT, 3D view of left condyle fracture

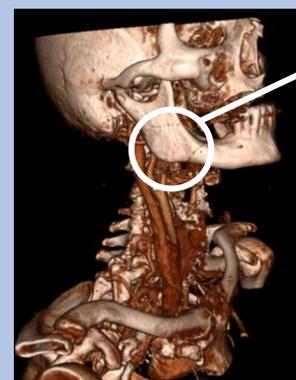


Figure 3. CT, 3D view of right artefact mimicking mandibular fracture.

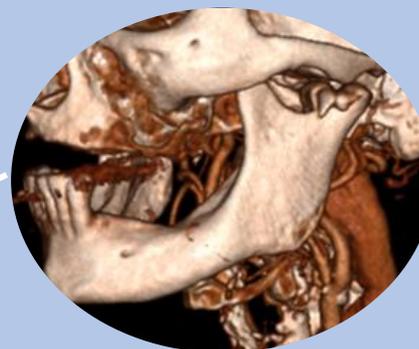


Figure 2. CT, 3D view of left artefact mimicking mandibular fracture.

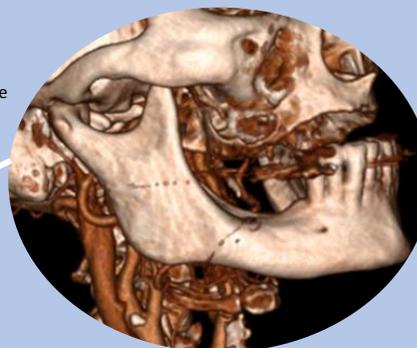


Figure 4. CT, 3D view of right artefact mimicking mandibular fracture.

DIAGNOSIS

A comminuted fracture and dislocation of left mandibular condyle.

DISCUSSION

Despite the reported diagnostic accuracy of CT, we must appreciate that they are more liable to artefacts, than plain film radiographs.¹

There are two common causes of CT artefact;

- Patient motion during imaging
- Beam hardening caused by passage of beam through dense matter.⁷

These artefacts can result in false-positive pathological findings as illustrated in this *rare case*. Assessment using plain-film radiographic techniques to supplement CT imaging can help identify motion artefacts but has the disadvantage of additional radiographic exposure.²

CT imaging is indicated when planning for surgical intervention of traumatic maxillofacial fractures, due to the enhanced detail provided in the images. This allows clinicians to assess if a fracture would be amenable to open reduction internal fixation (ORIF).³

In this case the CT allowed adequate imaging of the condylar fracture where PA radiographs were obscure. It allowed us to assess the spatial relationship of the true fracture.³

This is a rare example of CT artefact which could have resulted in misdiagnosis and mismanagement. Further research into these artefacts in Oral and Maxillofacial departments is needed to ensure adequate patient safety and care.

CONCLUSION

Diagnosis of traumatic mandibular fractures can be supported by various imaging modalities. Reviewing these images is vital for directing patients towards appropriate treatments.

Plain-film radiography is often ineffective in detailing condylar fractures, due to superimposition of anatomy. However, an OPG can suffice in an ambulant patient with a skilled radiographer.⁶

Meticulous clinical examination must always supplement mandibular fracture diagnosis and over-reliance on a single 3D CT scan should be avoided.³

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