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# Image- Guided Navigation And Its Use In An Unusual Case Of Intranasal Sinus Osteoma Invading The Orbit

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## Abstract

### Background:

Osteomas are benign slow growing tumours which occur in various areas of the body including the paranasal sinuses. Complications and symptoms occur due compression and invasion into surrounding structures, and treatment by excision can be challenging because of the proximity of important structures.

### History:

A 79 year old man presented with diplopia, particularly on looking to the right, and headaches.

### Investigations:

MRI scan - showed a large right anterior ethmoid mucocoele

However a CT scan revealed a calcified mass arising from the anterior and posterior ethmoid sinuses, which was displacing the orbital contents laterally.

Navigational imaging was acquired and cross sectional reconstructions made.

### Surgery:

Image guided navigation system used. The bony lesion was identified excised endoscopically.

### Outcome:

The patient had an excellent outcome, and his symptoms were resolved.

## INTRODUCTION

Osteomas are histologically benign slow growing tumours occurring in various areas of the body including the paranasal sinuses. They are the commonest benign neoplasms of the nose and paranasal sinuses. They are commonly asymptomatic <sup>1</sup> but complications and symptoms occur due to compression and invasion into surrounding structures, and include mucocoele formation <sup>2</sup>. Interestingly, intraorbital extension is uncommon <sup>3</sup>. Treatment by excision can be challenging because of the proximity of vulnerable structures, and traditionally an open craniofacial approach has been necessary <sup>4</sup>. New advances with endonasal approaches and stereotactic image guidance have allowed new treatment options with minimally invasive techniques <sup>5</sup>.

## MR EP

Mr EP, a 79 year old man presented to the Ophthalmology department at Chelsea & Westminster Hospital in December 2004. He complained of several years history of diplopia particularly on right gaze. He also complained of mild to moderate headaches. He denied any rhinological symptoms, and had no history of nasal problems.

On examination, Snellen visual acuity on the right was 6/12 and on the left 6/9. It was noted that he had 2mm of right axial proptosis, but no non-axial proptosis. He had left hypertropia – upward deviation of the visual axis of the eye, and right exophoria – tendency of the eye to deviate outwards. He was also noted to have mild cortical lens opacities, but ophthalmological examination was otherwise normal.

An MRI scan was performed, which showed evidence of a large right anterior ethmoid mass, reported as a mucocoele with associated paranasal sinus disease and ischaemic small vessel disease. The orbital structures were displaced by, but not invaded by the lesion.

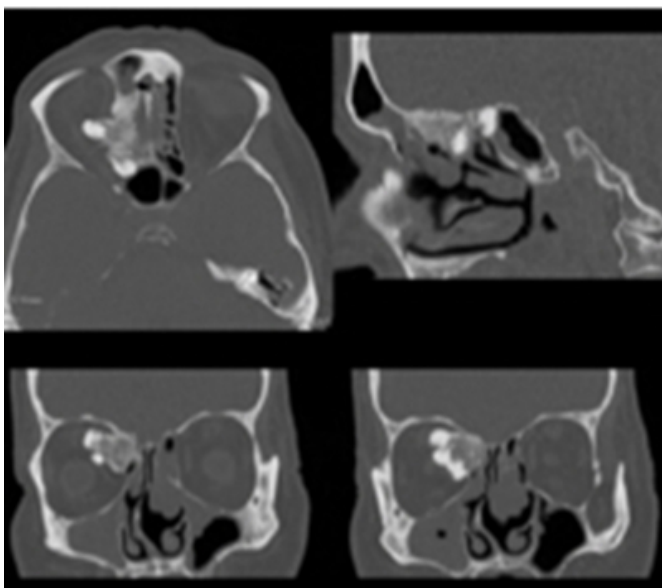
The patient was referred to ENT at Charing Cross Hospital with a working diagnosis of mucocoele.

Again, the patient denied any rhinological symptoms, and he had no history of ENT problems. Nasal endoscopy revealed a deviated nasal septum to the right, a large anterior ethmoid polyp arising from the left middle meatus, and a small polyp in the middle meatus on the right. There was no palpable mucocoele in the medial canthal region.

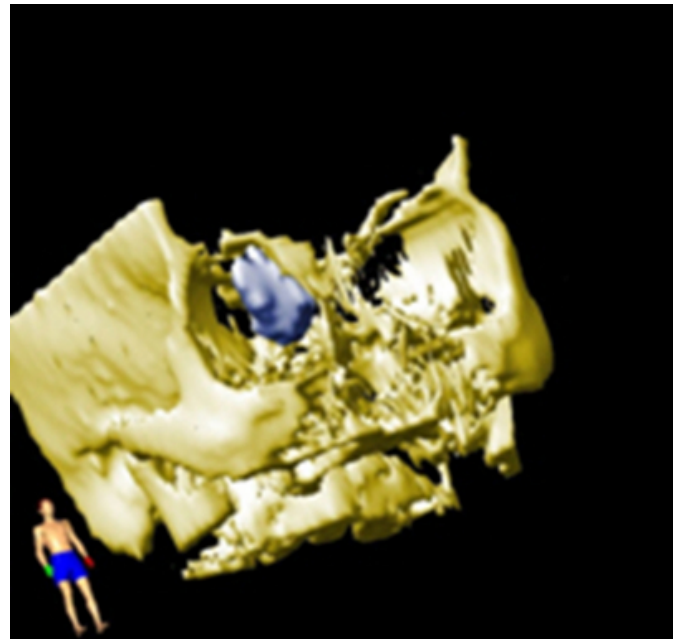
A CT scan was carried out which interestingly revealed a lobulated mass arising from the right anterior and posterior ethmoid sinuses and the cribriform plate, extending into the orbit posteromedially, displacing both the medial rectus and optic nerve laterally. There was no evidence of compression in the optic canal region. Complete opacification of right maxillary antrum, with a defect in the medial wall was also noted, and a deviated nasal septum, left middle meatal polyps and evidence of pansinusitis.

Navigational imaging was acquired and cross sectional reconstructions made.

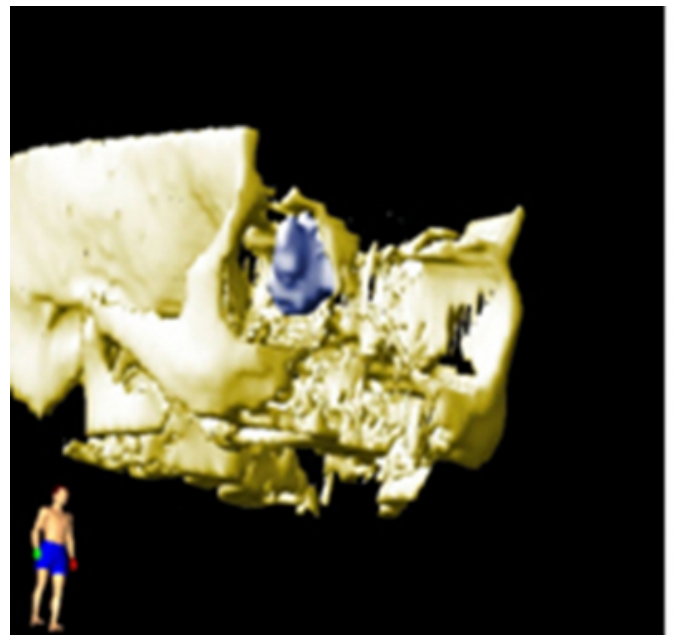
**Figure 1**



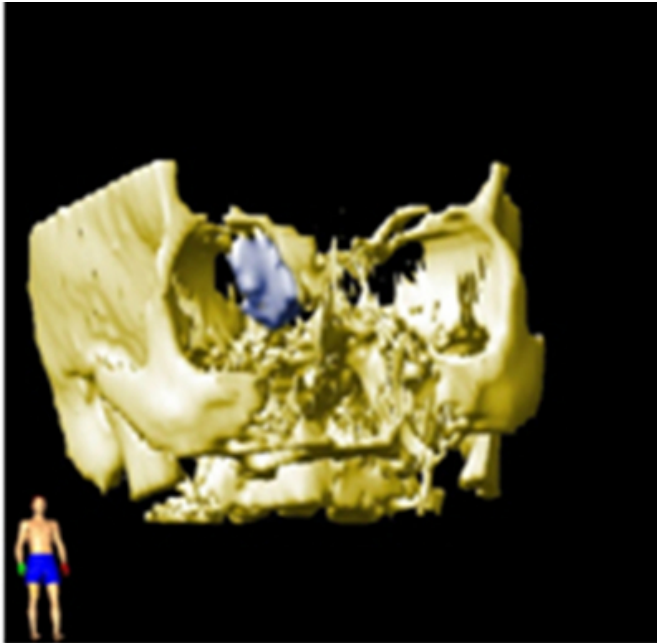
**Figure 2**



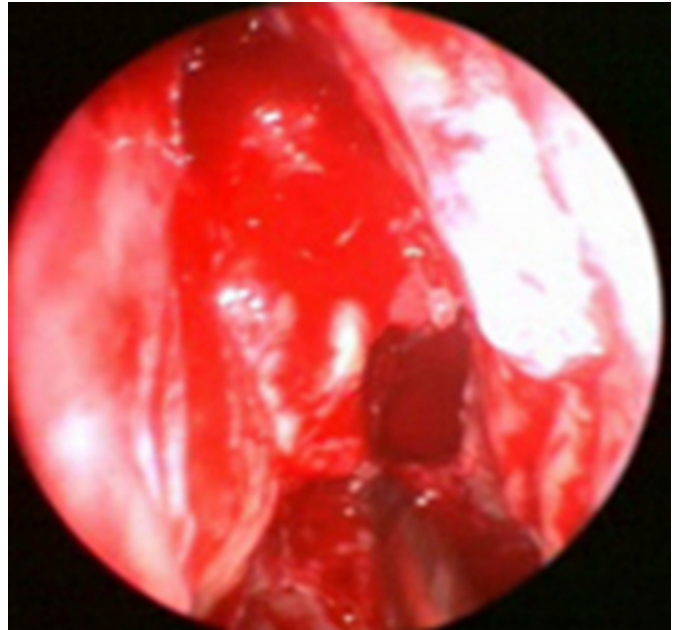
**Figure 3**



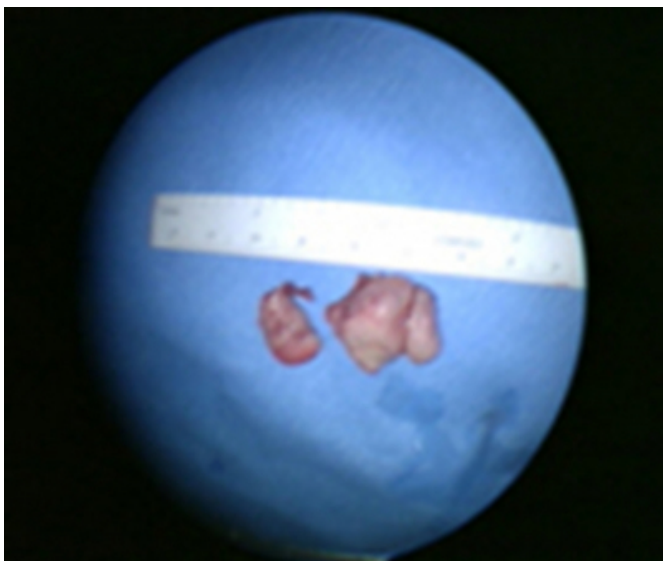
**Figure 4**



**Figure 6**



**Figure 5**



## **RESULTS**

An image guided navigation system was used and initially a septoplasty and partial resection of the middle turbinate performed for access. The bony lesion was identified arising from the anterior and posterior ethmoids and the cribriform plate. A middle meatal antrostomy, ethmoidectomy and sphenoidotomy carried out and access obtained to the medial orbit. The lesion was excised using a combination of drilling, out fracture and shelling out with image control. The skull base was intact at the end of the procedure and no complications occurred.

## **DISCUSSION**

The headaches resolved almost immediately and the diplopia and proptosis resolved in the weeks following surgery.

Histological examination showed sclerotic cortical bone overlying thick trabeculae of lamellar bone, and paucicellular fibrovascular marrow. The histology was very unusual, and was reviewed by the histopathologists at the Robert Jones and Agnes Hunt Orthopaedic Hospital, Oswestry for a second opinion.

These appearances were in keeping with an evolving ivory osteoma.

## **CONCLUSION**

The patient had an excellent outcome, and his symptoms were resolved. The image guided navigation system proved a valuable tool in excising this lesion particularly within the

orbit.

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