

Paul Lockwood &amp; Keith Piper

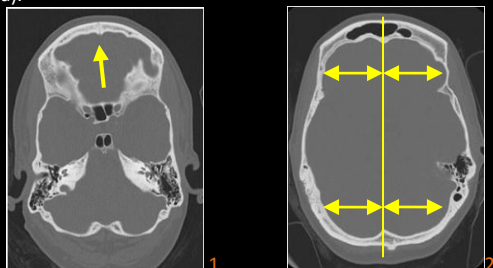
Allied Health Professions Department, Canterbury Christ Church University, UK

## Introduction

Essential teaching of CT Head Reporting to postgraduate radiography students must include the normal variant pitfalls in image interpretation. The identification of a normal anatomical variant results from experienced recognition and established strategic search patterns. Checking the cortex and trabecular pattern of bone, looking for periosteal reactions, determining the appearance as focalised or diffuse, solitary or multiple, with correlation to evidence based materials help to support and reference the variant.

### 1. Metopic Suture

A persistent metopic suture, often called a sutura frontalis persistens, is the normal frontal suture (which divides the two halves of the frontal bone) of the forehead in infants up to the age of 6 years. Occasionally this does not fuse causing the metopic suture (dividing the frontal bone from nasion to bregma).

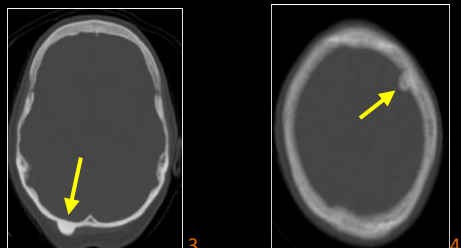


### 2. Asymmetry of Cranium

Asymmetry of the cranial bones has been found to be more common in patients that are right handed compared to the left handed, and it has been noted that right handed patients are more likely to have an occipital protrusion on the left and a frontal protrusion on the right, causing these sides to have slightly larger zones. The opposite is often found to occur in left handed patients although less markedly.

### 3. Exostosis

A benign abnormal growth of new bone on the outer surface bone surface of no significance.

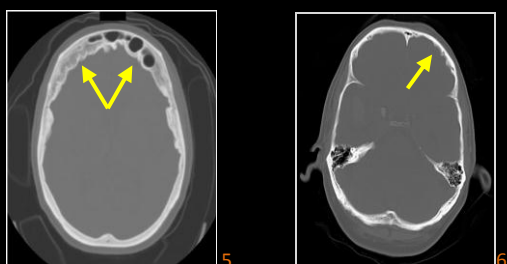


### 4. Enostosis

A common congenital or developmental benign bone island of incidental occurrence, usually a focus of compact bone.

### 5. Hyperostosis Frontalis Interna

Thickening and overgrowth of the inner table of the frontal bone of the skull. A benign condition more often seen in adult females, often bilateral and symmetrical with extension into the temporo-parietal zones (known as Hyperostosis Fronto-Parietalis).

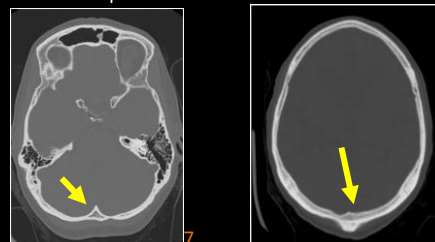


### 6. Internal Frontal Protuberance

Often called a calvarial osseus, seen in adult patients of a prominent frontal crest, of no significance. Formed at the internal surface of the squama frontalis, along the vertical groove of the sagittal sulcus, which forms the ridge of the frontal crest, the sulcus itself holds the superior sagittal sinus within it, whilst the outer margins align to the falx cerebri.

### 7. Internal Occipital Protuberance

A normal variant of the cranial bones, of no significance to the surrounding anatomy or pathology. Formed by the intersection of the four divisions of the cruciate eminence of the occipital bone, it is also named as the prominence of the occipital crest.

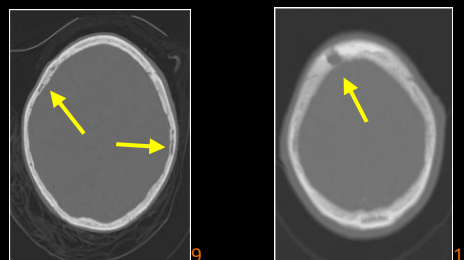


### 8. External Occipital Protuberances

A bony projection of overgrowth on the external surface of the occipital bone near the middle of the occipital squama. The highest part of the protuberance is the inion, which extends from underneath the nuchal line of the occipital bone with the superior nuchal line of the occipital shown on either side of the protuberance.

### 9. Prominent Diploic Venous Channels

Dilation of the venous channel and grooves (canals diploicae) within the marrow containing area held between the inner and outer tables of the skull vault.

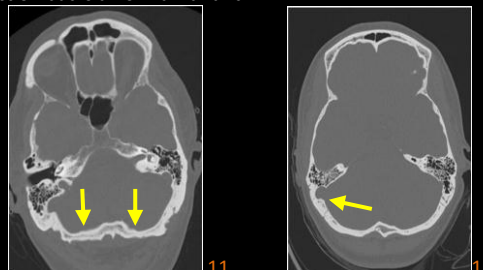


### 10. Pacchionian Impressions

A form of granulations, that appear as irregular smooth oval erosions of the inner table of the vertex, usually close to the midline. The erosions of endosteal scalloping of the parietal bone form over many years as thinning of the endosteal bone and blistering of the bone cortex, which allow diverticula like pouching of subarachnoid space to penetrate into the dura mater, inner table of bone into the diploic space.

### 11. Irregular External Surface of the Occipital Bone

Rough external surface of the occipital bone at the base of the skull along the inferior nuchal muscle attachment line simulates erosion and bony destruction but is a normal variant.



### 12. Prominent Sigmoid Sinus Groove

Prominent unilateral sigmoid sinus grooves have a strong rounded cortical margin which differentiates this appearance from tumour erosion. Often this is seen on the right due to prominent transverse and sigmoid sinus drainage channels from the superior sagittal sinus, draining lower down through to a dilated jugular fossa.

## Conclusion

The differentiation of a normal anatomical variant comes from experienced recognition of established patterns of variation from either empirical visual assessment or evidenced based research material that allow the reduction of false-positive findings and reduce unnecessary additional diagnostic imaging.

## References

- Keats, T. Anderson, M. (2013) Atlas of Normal Roentgen Variants That May simulate Disease. Elsevier  
Kuhns, L. Seegar, J. (1983) Atlas of compiled Tomography Variants. Year Book Medical Publishers