

Anatomico-radiological study of asymmetrical articular facets on occipital condyles and its clinical implications

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Abstract

The articular facets on the inferior aspect of the occipital condyles, articulate with the superior articular facets of the first cervical (atlas) vertebra, to form the atlanto-occipital joint. The present case, reports the asymmetrical dimensions of the facets on the occipital condyles of a human dried skull. The anatomico-radiological study of asymmetrical articular facets on the occipital condyles, may be helpful for academicians, neuro-surgeons, clinicians and radiologists in day to day clinical practice.

Key Words: Skull, Joint, Occipital Condyle, Articular Facets, Anatomy, Variations, Anomaly.

The inferior articular facets on the occipital condyles, articulate with the superior articular facets on the first cervical (atlas) vertebra, to form the atlanto-occipital joint. Many studies have described the facets on the occipital condyles in detail but there is paucity of literature on the anatomico-radiological studies on the anomalies pertaining to the facets on the occipital condyles¹. The present study describes a case of asymmetrical articular facets on the inferior aspect of the occipital condyles detected in human dried skull. Asymmetrical facets may be responsible for altered kinematics in the atlanto-occipital joint. Standard anatomy textbooks do not highlight in detail the anomalies related to asymmetrical articular facets and the only source of information may be the research reports. Anatomical knowledge of the facets on the occipital condyles may be important for radiologists and neuro-surgeons exploring the base of the skull.

Case report

We detected anomalous occipital condyles in a dried human skull. The base of the skull in the region of the occipital condyles was studied in detail and appropriate measurements were taken. The specimen was photographed (Fig 1) and a skiagram (Fig 2) was also obtained.

Maximum transverse dimensions of the inferior articular facets of the right and left sides were 1.5 cm and 1.3 cm, respectively. The maximum antero-posterior dimension of the inferior articular facets of the right and left sides were 1.9 cm and 2.1 cm, respectively. Both the facets were convex and directed medially. The facets were oval and triangular in shape, on the left and right sides respectively and the same could be well appreciated in the photograph as well as in the skiagram. No other abnormalities were observed.

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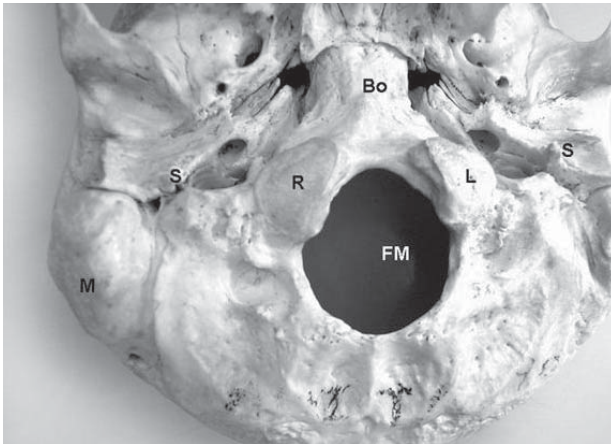


Fig.1: Photograph of base of skull (inferior view) showing:

- L:** Facet on Left occipital condyle
- R:** Facet on Right occipital condyle
- Bo:** Basiocciput
- FM:** Foramen Magnum
- E:** External occipital protuberance
- M:** Mastoid process
- S:** Styloid process

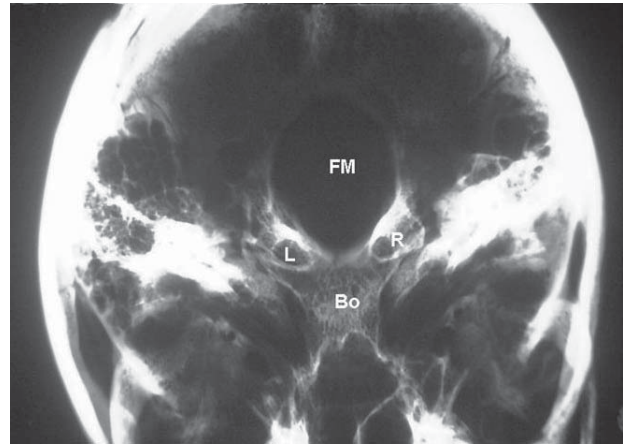


Fig 2: Photograph of skiagram of skull base (inferior view) showing:

- R:** Triangular Right occipital condyle
- L:** Oval Left occipital condyle
- Bo:** Basiocciput
- FM:** Foramen Magnum

Discussion

The inferior articular facets of occipital bone articulate with the superior articular facets on the atlas vertebra to form the atlanto-occipital joint, which is of synovial variety. The bones are covered by the articular capsule and the anterior and the posterior atlanto-occipital membranes². Standard textbook of anatomy, describes the fact that facets on each occipital condyle are usually oval in shape and oriented obliquely². In the present case, we observed the occipital condyles to be oval on the left side only, whereas on the right side, it was triangular in shape. The increase in antero-posterior, transverse dimensions and the triangular shape, clearly suggest a developmental anomaly of the occipital condyles.

A past research study had measured the dimensions of the occipital condyles of 101 skulls but it was not supplemented by radiological findings¹. Scientists have also accepted the fact that less attention had been given to craniovertebral articulations³. The atlanto-occipital joint is an important joint, which contributes to the movements of the head. We as anatomists opine, that the movements of flexion, extension and lateral bending, which normally occur at this joint, may be disturbed as a result of asymmetrical in shape of the articular surfaces. Admittedly, in the present case, we did not have the corresponding atlas to corroborate the fact. Considering the fact, that the entire weight of the

head falls on the atlanto-occipital joint, any variation in the shape and size of the joint may cause resultant symptoms.

For a clinician, it is very important that he should clearly differentiate between asymmetrical motion caused by vertebral fixation and that caused by asymmetrical joint anatomy⁴. Understanding the normal and abnormal anatomy may be essential for any occipito-cervical instrumentation. Degeneration of the atlanto-occipital joint may also occur. Degenerative changes may alter the shapes of the articular facets and as a result of such the joint biomechanics may be altered. Even hypertrophy of the occipital condyles has been reported to cause cervical myelopathy in a 10 year old girl⁵. Thus, in the presence of anomalies pertaining to the occipital condyles, associated symptoms may also arise.

We obtained a skiagram of the specimen to note the anomaly and this makes our study different from any past study. The anatomy of the atlanto-occipital region may be important for craniovertebral junction surgeries and a pre-operative skiagram may be helpful. Anatomico-radiological description of the present anomaly may be important for academicians, radiologists and surgeons, in day to day clinical practice.

Reference

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