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# Absence of the head of the humerus in an adult Nigerian- a case report

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**Abstract**
The spherical head of the humerus forms the ball of the ball-and-socket of the shoulder joint, with the glenoid cavity of the scapular acting as the socket. The rounded shape of the head of the humerus allows the humerus to move in a complete circle (circumduction) and rotate around its axis at the shoulder joint. In absence of the head of the humerus, the above functions of the shoulder joint will be lost resulting in rotator cuff injury, frequent dislocation of the shoulder which is extremely painful and may require surgical repair or even cause permanent damage. The humerus described in this case report showed absence of the head with normal greater tubercle, lesser tubercle and intertubercular sulcus, intact shaft and distal extremity. Absence of the head of the humerus has been generally considered to be a rare condition and has not been previously described in a Nigerian. This defect recorded may be recognized as a group of deformities (Congenital or fractured) of the shoulder joint.

**Keywords:** *Absence, head, humerus,circumduction*

**Résumé**
La tête sphérique de l'humérus forme la boule de l'articulation de l'épaule, avec la cavité glénoïde du scapulaire agissant comme la douille. La forme arrondie de la tête de l'humérus permet à l'humérus de se déplacer dans un cercle complet (circumduction) et de tourner autour de son axe au niveau de l'articulation de l'épaule. En l'absence de la tête de l'humérus, les fonctions ci-dessus de l'articulation de l'épaule seront perdues résultant dans la blessure de la coiffe du rotateur, luxation fréquente de l'épaule qui est extrêmement douloureux et peut nécessiter une réparation chirurgicale ou même causer des dommages permanents. L'humérus décrit dans le présent rapport de cas a montré l'absence de la tête avecnormalplus grand tubercule, tubercule inférieur et sulcus inter-tuberculaire, fût intact et l'extrémité distale.

L'absence de la tête de l'humérus a été généralement considérée comme une maladie rare et n'a pas été précédemment décrit chez un Nigérian. Ce défaut enregistré peut être reconnu comme un groupe de déformations (congénitales ou fracturées) de l'articulation de l'épaule.

**Mots clés:** *Absence, tête, humérus, circumduction*

## Introduction
Previous literature search indicated that this rare condition has been described in less than ten cases and none of these cases has been described in a Nigerian. This congenital absence of the head of the humerus and some anatomical variations in the proximal part of the humerus may be a contributory factor in congenital malformations involving the shoulder joint [1]. Congenital absence of the head of the humerus has also been described clinically by [2-4] in which they reported that in all three cases, in addition to absence of the head of humerus, the patients had other congenital bone and joint malformations. Congenital absence of the head of the humerus has not been previously described in a Nigerian, hence the description of this case report.

## Case Report
In the course of distribution of bones from our bone library (Department of Anatomy, College of Medicine, University of Ibadan, Ibadan, Nigeria) to the second year Medical and Dental students, we observed a left humerus of an unknown age, sex and ethnicity without a head, but had normal greater and lesser tuberosities, as well as the intertubercular sulcus or bicipital groove (Figures 1-3).

The humerus had a length of 28.0 cm (from the tip of the greater tubercle to the trochlea, using a calibrated ruler) (Fig 4), thickness of 15.9 mm (middle of the shaft, using a digital vernier caliper) (Fig 5) and a total dry weight of 81.6 g, using an electronic weighing balance [5, 6].

## Discussion
Andreasen (1948) [1] described two rare cases of absence of the humeral head and concluded that

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Fig 1: Posterior view of the proximal part of the left humerus with absence of the head of the humerus


Fig 2: Lateral view of the proximal part of the left humerus with absence of the head of the humerus


Fig 3: Anterior view of the proximal part of the left humerus with absence of the head of the humerus, but with normal greater and lesser tuberosities, and intertubercular sulcus (white arrows).


Fig 4: Measurement of the length (cm) of the humerus from the tip of the proximal humerus to the tip of the trochlea in the distal part, using a calibrated ruler

the condition is probably congenital, and represented varying degrees of a typical but hitherto unrecognized deformity of the shoulder joint. Congenital absence of the head of the humerus occurs at a very early stage of embryonic life. This may be due to failure of development of the tissue

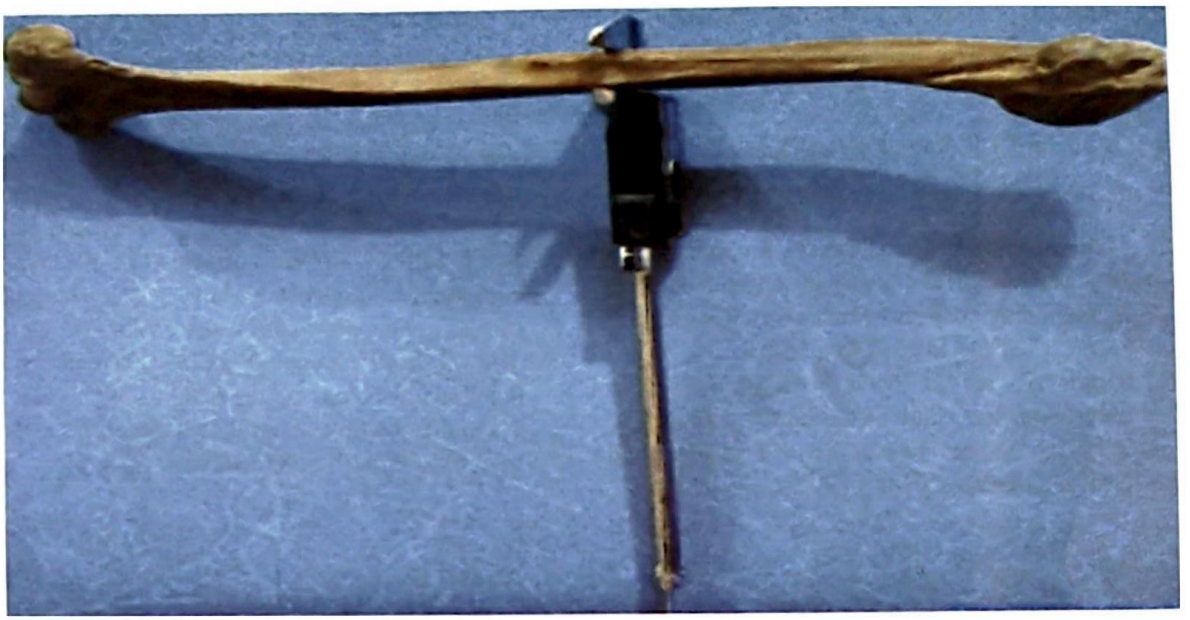

**Fig 5:** Measurement of the thickness (mm) of the humerus, midway in the shaft between the proximal and distal ends of the humerus, using a digital vernier caliper

in which the capital epiphysis should form [1] and may be completed by the non-appearance of the ossification centre for the head of humerus in the fourth and sixth months of development [7]. At a very early stage of development when the primitive joint begins to form, an accident may occur which may alter the process of separation in the mesenchyme to form the articular ends of joints [1]. In this case report, it was likely the brunt of force of the accident (caused either by genetic or environmental factor) fell upon the head of the humerus.

Absence of the head of the humerus may also occur in complex fracture with multiple fragments where interruption to the blood supply is more likely and in fracture of the surgical neck resulting in avascular necrosis of the humeral head. This leads to flattening of the head of the humerus with the resultant pain and stiffness in the shoulder, malunion of the shoulder joint, associated glenohumeral dislocation and associated rotator cuff injury [8].

The shoulder joint is vulnerable to dislocations from sudden jerks of the arm especially in children before strong muscles have developed. The spherical head of the humerus forms the ball of the ball-and-socket shoulder joint, with the glenoid cavity of the scapular acting as the socket. The rounded shape of the head of the humerus allows the humerus to move in a complete circle (circumduction) and rotate around its axis at the shoulder joint. These functions will be lost in absence of the head of the humerus and may result in frequent dislocation of the shoulder which is extremely painful and may require surgical repair or even cause permanent damage. Deformities of the shoulder resulting from congenital absence of the head of the humerus may be prominent in lesions of the rotator cuff muscles [9]. The rotator cuff muscles are four short (supraspinatus, infraspinatus, teres minor and subscapularis muscles) which help prevent nipping of the synovial fluid and stabilizes the head of the humerus at the level of the shoulder joint [10].

In spite of the loss of some movements (circumduction and rotation) of the shoulder joint as a result of absence of the head of humerus, this study was not able to ascertain if the absence of the head of the humerus was congenital or as a result of fracture because of lack of proper records of documentation.

The case report described above has not only added to the existing literature of absence of the head of the humerus, but can also occur in a Nigeria, sub-Saharan African. However, the frequency of occurrence and sex distribution of the absence of the head of the humerus should be further determined.

## References

1. Andreasen A T. Congenital absence of humeral head. A report of two cases. The journal of bone and joint surgery. 1948; 30b : 2.

2. Lewin H. Seitese MiBildungen des Schultergeienks. Roentgenpraxis. 1931; 3: 556-560.
3. Muller W. Zeitschrift f# (252) Orthopadie, 1939; 69, 257.
4. Brailsford J F. Radiology of Bones and Joints. 3rd edition. London: J. & A. Churchill, Ltd. 1944; 64.
5. Niraj P, Dangol PM and Ranjit N. Measurement of length and weight of non-articulated adult humerus in Nepalese corpses. Journal of Kathmandu Medical College, 2013; 2 (1): 25-27
6. Singh A, Nagar M and Kumar A. An anthropometric study of the humerus in adults. Research and reviews: Journal of Medical and Health Sciences, 2014; 3 (3): 77-82.
7. Williams P L and Warwick R. Gray's Anatomy (eds). Phildelphia. WB Saunders. 1980.
8. Xu J, Zhang C and Wang T. Avascular necrosis in proximal humeral fractures in patients treated with operative fixation: a meta-analysis. J Orthop Surg Res. 2014; 9: 31.
9. Zbojnewicz A.M, Maeder M.E, Emery K.H. and Salisbury S.R. Rotator cuff tears in children and adolescents: experience at a large pediatric hospital Pediatric Radiology. 2004; 44(b): 729-737.
10. Kido T, Itoi E, Konno N, *et al.* The depressor functions of biceps on the head of the humerus in shoulders with tears of the rotator cuff. J Bone Joint Surg Br. 2000; 82 (3): 416 - 419.