

Supracondylar process of humerus - a case series

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SUMMARY

The supracondylar process in the human race is a rare anatomical variant. It is a hook-like bony process on the anteromedial surface of the humerus. During routine osteology demonstration for students, we found two humeri of the left side with a bony projection from the anteromedial surface of its distal shaft. The bones were then examined and photographed, and their dimensions were measured with a sliding caliper. Knowledge of this variation may be of great importance to anatomists and anthropologists, because of its evolutionary changes. It may be also equally important for clinicians, as it may be misdiagnosed with pathological conditions like osteochondroma or myositis ossificans.

Key words: Supracondylar process – Struther's ligament – Humerus – Evolution – Medial epicondyle – Median nerve – Brachial artery

INTRODUCTION

Morphological variations are the tools being used to find the missing links between the different stages of evolution. Supracondylar process is one such variation. Supracondylar process of the humerus is an occasional hook-shaped process, 2-20 cm in length, which projects from the anteromedial surface of the shaft, approximately 5 cm proximal to the medial epicondyle. It is curved downwards and forwards and its pointed apex is connected to the medial border, just above the medial epicondyle by a fibrous band to which part of the pronator teres is attached (Standing, 2008).

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Supracondylar process of the humerus is commonly seen in climbing mammals, and it contributes to the formation of osseo-fibrous tunnel in the lower third of the humerus. This osseofibrous tunnel is formed by the anteromedial surface of the humerus, the supracondylar process and the Struthers' ligament. This tunnel serves to protect the nerves and vessels going to the forearm (Mittal and Gupta, 1978). The Struthers ligament lies between the tendon of the latissimusdorsi and the coracobrachialis muscle, and corresponds to the lower part of the tendon of the vestigial latissimcondyloideus. The latissimcondyloides is a muscle found in climbing mammals which extends from the tendon of insertion of the latissimusdorsi muscle to the medial epicondyle (Kessel and Ring, 1976). In the process of evolution from lower mammals to humans it has subsequently disappeared. When present, it has a potential for fracture or entrapment of important structures like brachial artery and median nerve (Subasi et al., 2002).

CASE SERIES

Out of 70 humeri, we found two male humeri of the left side with a bony projection from the anteromedial surface of its distal shaft. Incidence is $2/70 \times 100 = 2.8\%$. Supracondylar process was noted in 2 left humeri (Fig. 1) of unknown age during routine osteology classes for students. The dimensions of the supracondylar process were measured using sliding calipers and photographed. The length of spur, the breadth at its base (Fig. 2), the distance from the process to nutrient foramen (Fig. 3), the distance from the process to the medial epicondyle (Fig. 4), the distance from the highest point on the head of the humerus, and the distance from the trochlea were measured with a sliding caliper. The measurements were recorded and tabulated below in Table 1.

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Fig. 1. Two humeri with a supracondylar process.



Fig. 2. Measurement of the base of the supracondylar process.



Fig. 3. Measurement from spine to nutrient foramen.

Case 1

The supracondylar process was directed forwards and medially in the anteromedial surface of the distal humerus. It was 6 cm proximal to the medial epicondyle, was 0.6 cm long and 1.2 cm broad at its base. Distance from the process to the nutrient foramen was recorded as 6.7 cm.



Fig. 4. Measurement from spine to medial epicondyle.

Case 2

The supracondylar process was directed forwards and medially in the anteromedial surface of the distal humerus. It was 5.4 cm proximal to the medial epicondyle, was 0.7 cm long and 1.3 cm broad at its base. Distance from the process to the nutrient foramen was recorded as 7.4 cm.

DISCUSSION

Sir John Struthers in 1854 observed a bony projection on the anteromedial aspect of the humerus, about 5 cm above the medial epicondyle, and de-

Table 1. Dimensions of supracondylar process in different studies.

Author	Length (cm)	Breadth at the base (cm)	Distance from nutrient foramen (cm)	Distance from medial epicondyle (cm)
Guptha and Mehta, 2008	0.3	1.1	-	6.5
Oluyemikayode et al., 2007	1.6	-	5.5	5.3
Prabahita et al., 2012	1.1	1.5	6.5	4.4
Jeyanthi et al., 2013	1.3	1	-	4.5
Case 1	0.6	1.2	6.7	6.0
Case 2	0.7	1.3	7.4	5.4

scribed it as a supracondylar process or supracondylar spur. He also described a fibrous band extending from the supracondylar process to the medial epicondyle as the ligament of Struthers (Al-Qattan and Husband, 1991). Supracondylar process is usually silent clinically. It may become symptomatic when there is median nerve compression and claudication of the brachial artery (Ivins and Fulton, 1996). Entrapment of the brachial artery and the median nerve by Struthers' ligament at the level of supracondylar process is known as the supracondylar process syndrome (Pecina et al., 2002).

A supracondylar process is sometimes misdiagnosed as osteochondroma. Supracondylar process is oriented distally, towards the elbow joint and there is no discontinuity with the cortex of the humerus, whereas osteochondroma points away from the joint (Ivins and Fulton, 1996). Heterotopic bone such as myositis ossificans may also mimic a supracondylar process (Fragiadakis and Lamb., 1970). Treatment consists of excision of the supracondylar process along with the overlying periosteum and the associated ligament of Struthers (Ivins and Fulton, 1996; Spinner et al., 1994).

The incidence of supracondylar process ranges from 0.4% to 2.7%. The percentage of incidence as given by different authors varies. Guptha found the incidence of supracondylar process as 0.26%, Danforth as 0.5%, Adachi as 0.8%, Hrdlicka as 1%, Dellon as 1.15% and Natsis as 1.3%, Gruber as 2.7 %, in different races (Prabahita et al., 2012). In the present study incidence is little higher that is 2.8%.

The length of supracondylar process in Indians also ranges from 0.3 to 1.3 cm. In Africans it is little bigger. The dimensions of supracondylar process in different studies are depicted in Table 1.

Conclusion

The supracondylar process is a very rare vestigial structure in humans. This anatomical variation is important not only for anatomists and anthropologists; it is also equally important for clinicians, as it may be misdiagnosed with pathological conditions

like osteochondroma or myositis ossificans. These case reports may help the clinicians in the diagnosis of bony lesions in the lower end of the humerus.

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