SQUATTING FACETS ON THE EUROPEAN TALUS

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It has been suggested that the so-called squatting facets found upon the neck of the talus and the lower end of the tibia in many Oriental races provide evidence for the inheritance of acquired characters, since they are present also in the Oriental foetus (Charles, 1894; Wood Jones, 1944). Sewell (1904) disputed this contention on the grounds that 'these facets occur in the foetus of the European, and probably in all other races, whether the facets are found to be present in the adult or not'. Unfortunately, as Inkster (1927) has pointed out, several distinct facets have been described in the literature, and the subject is further confused by the lack of an agreed terminology. Moreover, although many series of adult tali have been reported there has been no comparable study of foetal material. Most workers have examined dry tali; with these it is sometimes impossible to determine whether a smooth area on the neck of the talus is in fact an articular facet.

The present investigation is concerned with two aspects of the problem: first, to define the various facets that occur upon the neck of the human talus; secondly, to study their incidence in a series of adult and foetal European tali.

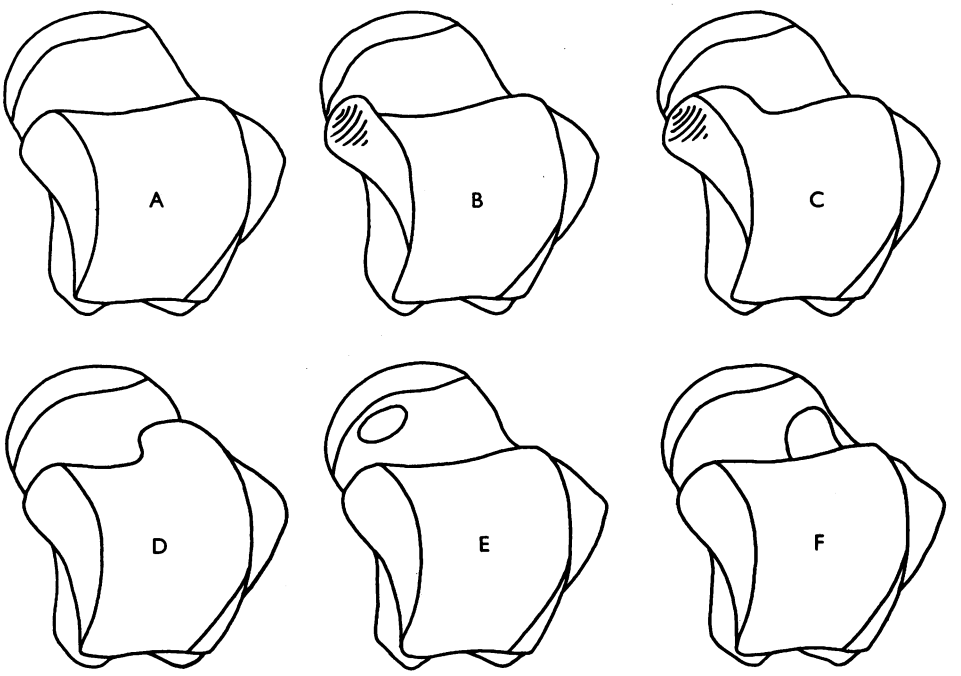
The main types of articular facet that have been described by previous workers are as follows:

(*a*) A forward prolongation of the comma-shaped medial articular surface of the talus beyond the anterior margin of the trochlea (Charles, 1893). When of large size, this surface is curved medially at its anterior end. The corresponding facet on the tibia is rounded, and cartilage is found covering part of the anterior as well as the lateral aspect of the medial malleolus (Text-fig. 1B).

(*b*) A rectangular area, covered with articular cartilage, upon the medial side of the upper surface of the neck of the talus has been incorrectly described as a squatting facet (Parker & Shattock, 1884). This area 'which is essentially a prolongation of the trochlea on its medial side, has a surface which continues the line of curvature of the trochlea and must therefore come into contact with the under surface of the lower end of the tibia during [dorsi-] flexion of the ankle and not with its anterior margin' (Inkster, 1927). Since there is no corresponding facet on the tibia, this prolongation is not a true squatting facet, and is better termed the 'medial extension of the trochlear surface'. It is invariably associated with a forward prolongation of the medial articular surface of the talus (Text-fig. 1C).

(*c*) Rarely, a facet is present on the upper medial surface of the neck which does not follow the line of curvature of the trochlear surface and is separated from this surface by a transverse ridge of bone not covered with articular cartilage. This facet does not articulate with the tibia in dorsiflexion; its exact causation is therefore obscure (Inkster, 1927). However, it appears to be associated with the habit of squatting and it may therefore legitimately be termed the 'medial squatting facet' (Text-fig. 1E).

(*d*) It is not uncommon for the anterior margin of the trochlear surface of the talus to present a sinuous form due to forward extension of the lateral one-third of this surface. This extension continues the line of curvature of the trochlea and thus makes contact with the undersurface of the tibia during dorsiflexion. It is not a true squatting facet and is therefore better termed the 'lateral extension of the trochlear surface' (Text-fig. 1D).



Text-fig. 1. The various types of talus described in the text. A, normal European talus; B, forward prolongation of the medial articular surface; C, medial extension of the trochlear surface; D, lateral extension of the trochlear surface; E, medial squatting facet (after Inkster); F, lateral squatting fact.

(*e*) Finally, the facet originally described by Thomson (1889) is a smooth, cartilage-covered area on the upper, lateral surface of the neck of the talus, articulating in full dorsiflexion with a well-marked facet on the anterior surface of the lower extremity of the tibia. It is often divided from the anterior margin of the trochlea by a distinct groove; in other tali it is continuous with the trochlear surface, though always making a sharp angle with the line of curvature of the latter. This may be called the 'lateral squatting facet' (Text-fig. 1F).

MATERIAL

One hundred cartilage-covered adult European tali have been studied. These specimens represent approximately seventy dissecting-room subjects, in about thirty of which both tali were examined and in the remainder only one, usually the right. In addition, one talus was examined from each of fifty-six stillborn European foetuses.

FINDINGS

Forward prolongation of the medial articular surface of the talus upon the talar neck is not uncommon in the adult series (Pl. 1, fig. 1). The prolongation can be expressed numerically by measuring the percentage of this medial surface that lies in front of the anterior margin of the trochlea (Table 1). In the series of foetal tali the medial surface was prolonged anteriorly to a greater extent than in the adult; correspondingly, the posterior end of the medial surface was usually situated well anterior to the posterior margin of the trochlea. It would appear that during growth there is a backward shift of the medial articular surface of the talus relative to the upper surface.

A medial extension of the trochlear surface was present in eleven of the adult tali (Pl. 1, fig. 2). In the foetal series the incidence was much higher—the medial extension of the trochlear surface was definite in forty-four out of fifty-six specimens (Pl. 1, fig. 6). Detailed findings are recorded in Table 2.

No medial squatting facets were present in either the adult or the foetal series. A lateral extension of the trochlear surface was present in seventeen adult tali (Pl. 1, fig. 3). It occurred commonly in the foetal series, but its exact incidence was not recorded. A lateral squatting facet was present in only two adult tali (Pl. 1, figs. 4, 5), but there were thirteen well-marked examples in the foetal series, each associated with a corresponding facet on the tibia (Pl. 1, figs. 6, 7). The incidence in the foetus is detailed in Table 2.

Table 1. *Forward prolongation of the medial articular surface of the talus*

Percentage of medial surface extending beyond front of trochlear surface	Incidence	
	Adult tali	Foetal tali
0–10	48	10
10–20	34	11
20–30	17	24
30–40	1	11

Table 2. *The incidence of two talar facets defined in the text*

Type of talus	Total number	Medial extension of trochlear surface present	Lateral squatting facet present
Foetal European			
5–10 cm., C.R.	11	7	1
10–15 cm., C.R.	28	22	5
15–20 cm., C.R.	11	9	5
20 cm., C.R. and above	6	6	2
Total	56	44	13
Adult European	100	11	2
Adult Panjabi (Charles)	53	Not recorded	34 (+6 doubtful)
Adult Australian (Inkster)	150	Not recorded	45 (+10 doubtful)

DISCUSSION

It is clear that, relative to the upper surface, the medial articular surface of the talus is situated more anteriorly in the foetus than in the adult. In this respect the European foetal talus resembles the adult talus of other races, such as the Panjabi

(Charles, 1894), the ancient Egyptian (Sewell, 1904) and the Australian (Inkster, 1927).

Medial extension of the trochlear surface is much more common in the European foetus than in the adult (Table 2). Lateral extension of the trochlear surface occurs frequently in the present series but no exact comparison with non-European tali is possible. The medial squatting facet is known to be rare in both European and Australian tali (Wood, 1920); hence the failure to discover an example in the present series.

Finally, the incidence of lateral squatting facets requires especial consideration, since it is this facet which most clearly distinguishes the adult European talus from that of many other races (Table 2). This squatting facet undoubtedly occurs in the Panjabi foetus and infant (Charles, 1894). Unfortunately its exact incidence is not known, but Charles implies that it is common. It is evident from the present findings that it occurs quite often in the European foetus also. Similar facets are not uncommon in animals in which the fully dorsiflexed talus is required to transmit the body weight, as, for example, the tree-kangaroo. Many men of European stock evidently possess these facets at birth, but the lack of subsequent pressure upon them (such as would occur during squatting) allows the attachment of the capsular ligament to encroach upon and obliterate them. Unless the incidence of lateral squatting facets in the Oriental foetus proves to be significantly higher than in the European foetus, it is unnecessary to invoke the hypothesis that acquired characters are inherited in order to explain this difference between the European and Oriental talus.

SUMMARY

1. The various types of articular facet that may occur on the neck of the human talus are defined.

2. A series of 100 adult and fifty-six foetal European tali have been examined with the object of determining the incidence of squatting facets.

3. The rarity of a lateral squatting facet as described by Thomson (1889) distinguishes the adult European talus from that of many other races. This facet is commonly found in European foetuses, however.

4. The racial differences found in human tali can be explained without necessarily invoking the theory that acquired characters are inherited.

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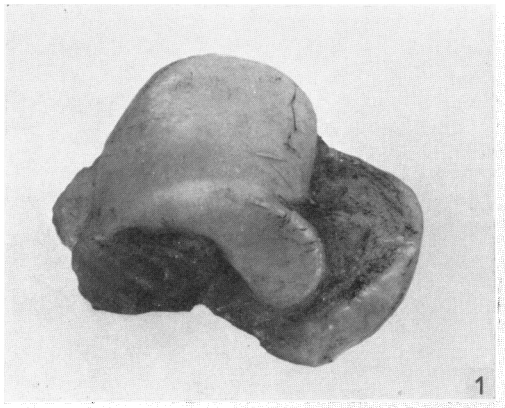
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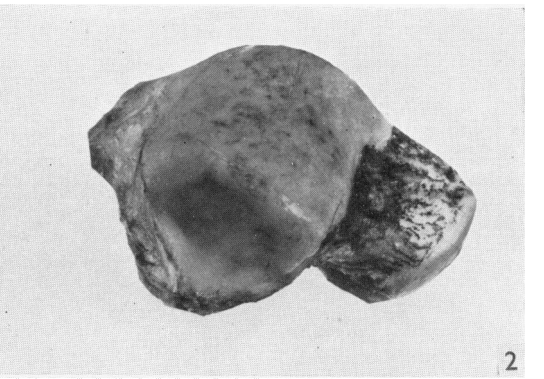
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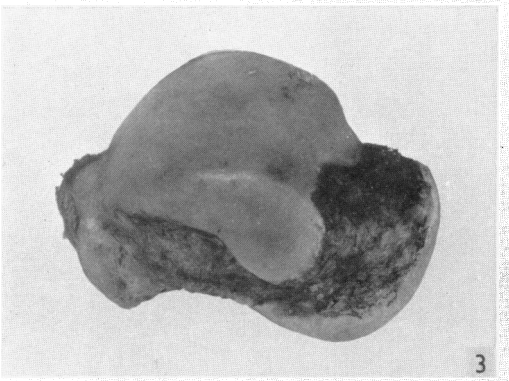
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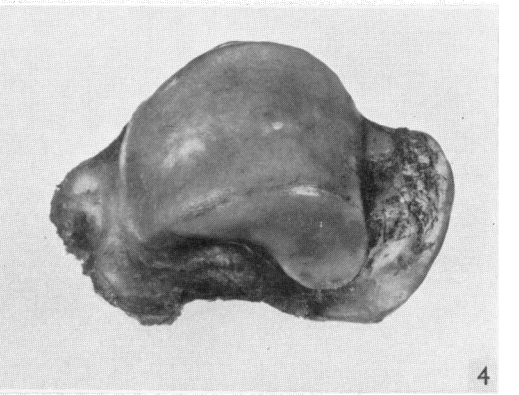
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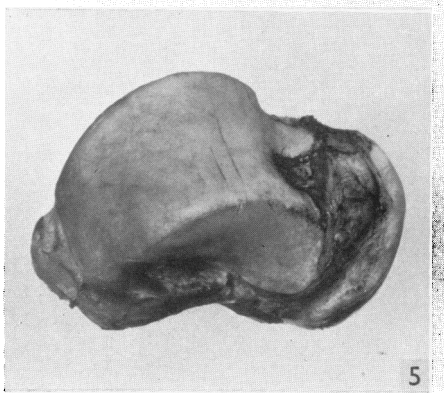
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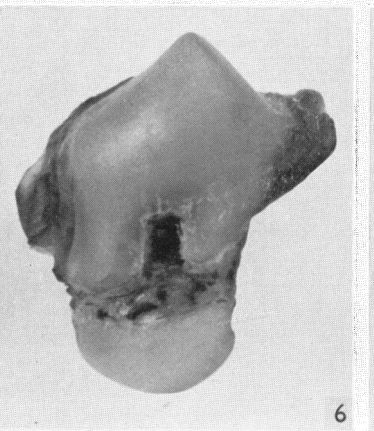
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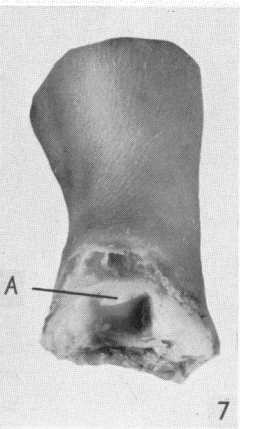
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EXPLANATION OF PLATE

Fig. 1. Forward prolongation of the medial articular surface.

Fig. 2. Medial extension of the trochlear surface.

Fig. 3. Lateral extension of the trochlear surface, associated with some forward prolongation of the medial articular surface.

Fig. 4. Lateral squatting facet.

Fig. 5. Lateral squatting facet associated with medial extension of the trochlear surface.

Fig. 6. Lateral squatting facet and medial extension of the trochlear surface (foetal talus: C.R. length 18 cm.).

Fig. 7. Left leg of foetus (C.R. length 16 cm.), showing facet on tibia (*A*).