

## Pattern of talar articular facets in Indian calcanei

S. C. GUPTA, C. D. GUPTA AND A. K. ARORA

*Department of Anatomy, S.N. Medical College, Agra, India*

(Accepted 18 October 1976)

### INTRODUCTION

In most textbooks of Anatomy descriptions of the posterior talar facet on the middle third of the dorsal surface of the calcaneus are similar. However, descriptions of the facet for the head of the talus are at variance (Breathnach, 1965; Last, 1970; Warwick & Williams, 1973). The common variations in the talar facets on the calcaneus have been described in detail by Bunning & Barnett (1965) in British, Nigerian and Indian subjects and by El-Eishi (1974) in Egyptians. In Bunning & Barnett's (1965) series, the number of Indian calcanei studied (78) was too small for detailed documentation of variations. The present study of the variations in the talar facets on Indian calcanei has utilized 401 normal adult specimens.

### OBSERVATIONS

The posterior talar facet which is situated on the middle third of the dorsal surface of the calcaneus, and which articulates with the body of the talus, was large and convex in all cases, but its shape varied, being circular, rectangular, triangular or irregular. The facet(s) for the head of the talus were of four types:

Type 1: One continuous facet was situated on the sustentaculum tali extending on to the antero-medial corner of the distal part of the calcaneus (268 calcanei - 67%, Figs. 1, 2). The facet was either constricted (28%, Fig. 1) or not constricted (39%, Fig. 2).

Type 2: Two articular facets were present, one on the sustentaculum tali and the other on the distal part of the calcaneus (104 calcanei - 26%, Figs 3-6). However, the degree of separation between the 2 facets was variable: less than 2 mm (narrow interval - 9%, Fig. 3); between 2 and 5 mm (moderate interval - 4%, Fig. 4); or more than 5 mm (wide interval - 13%, Figs. 5, 6). There was variation in the size of the facet at the antero-medial corner of the distal part of the calcaneus. In the majority of cases (20%) this facet was large (Figs. 3-5), but in a few cases (6%) it was quite small (Fig. 6).

Type 3: A single well defined facet confined to the sustentaculum tali was present (21 calcanei - 5%, Fig. 7).

Type 4: A single facet was situated on the sustentaculum tali extending on to the antero-medial corner of the distal part of the body of the calcaneus. This facet was continuous with the posterior talar facet of the calcaneus (8 calcanei - 2%, Fig. 8).

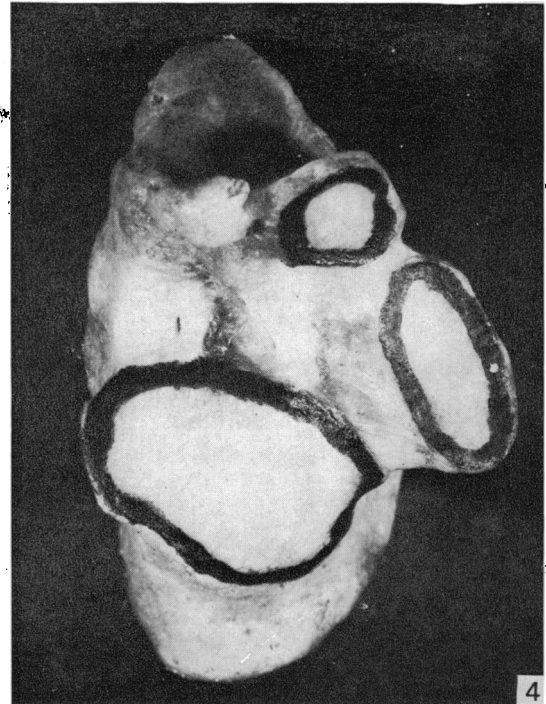
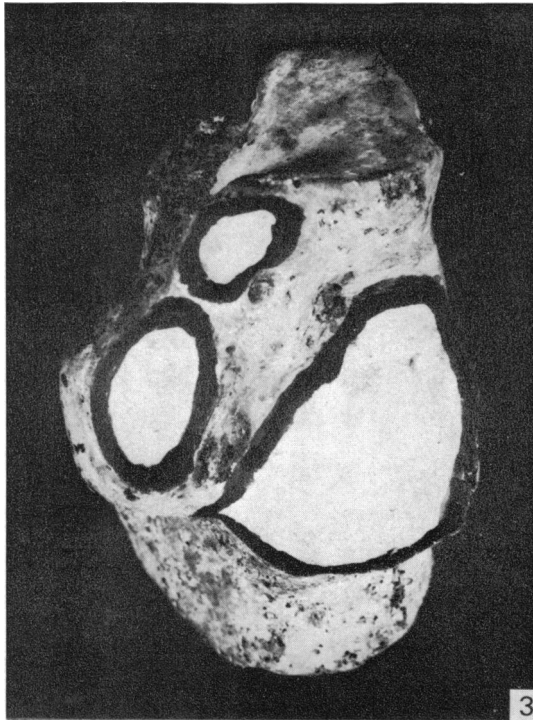
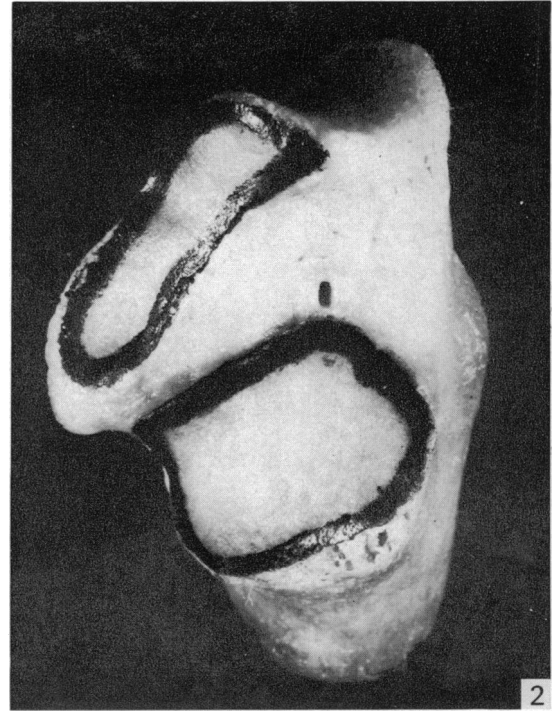
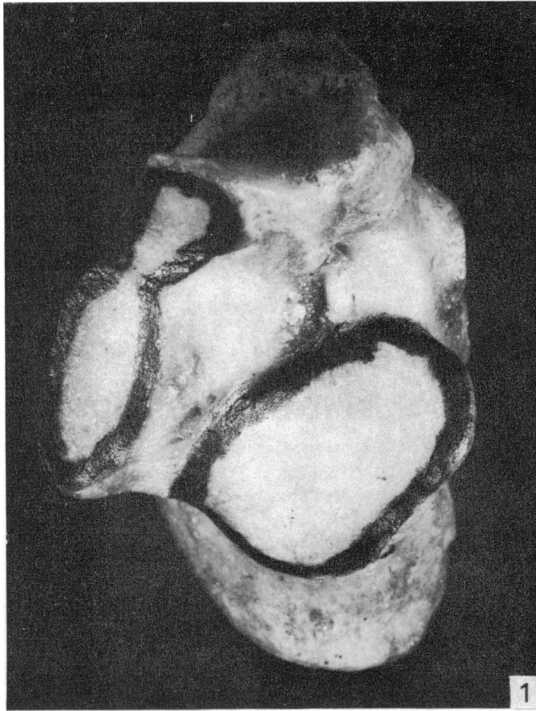


Fig. 1. Type 1 calcaneus: The talar articular facet is constricted.

Fig. 2. Type 1 calcaneus: The talar articular facet is not constricted

Fig. 3. Type 2 calcaneus: The degree of separation between two facets is less marked. The facet present at the antero-medial corner of the distal part of the calcaneus is large.

Fig. 4. Type 2 calcaneus: The degree of separation between two facets is moderately marked. The facet present at the antero-medial corner of the distal part of the calcaneus is large.

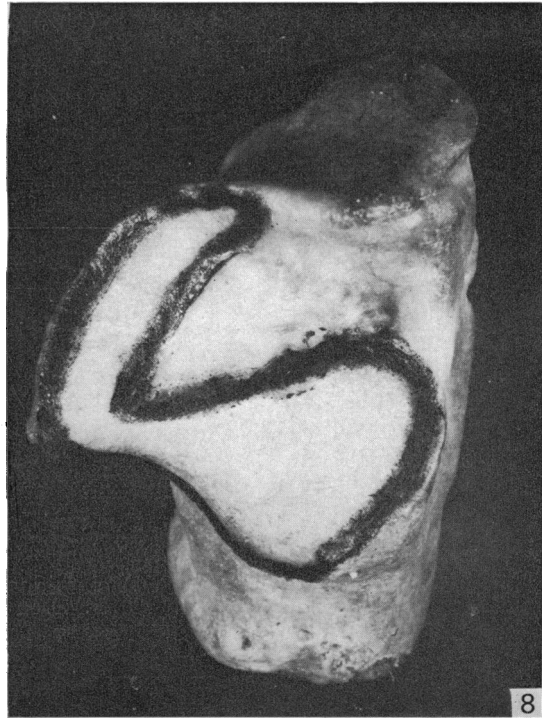
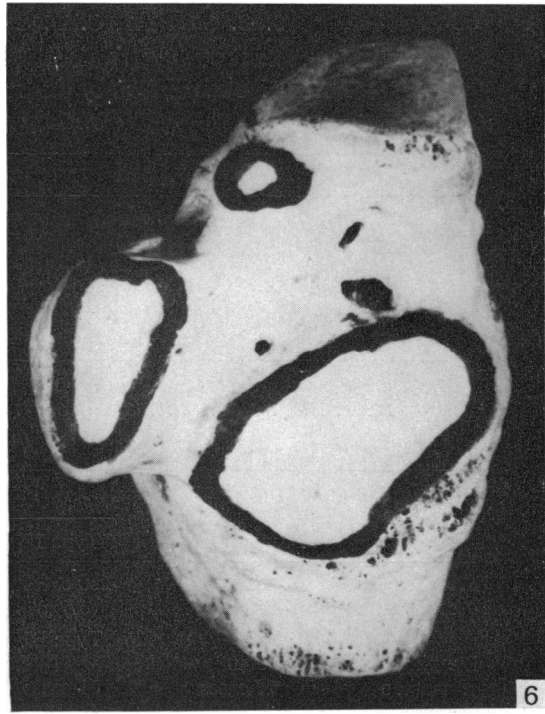
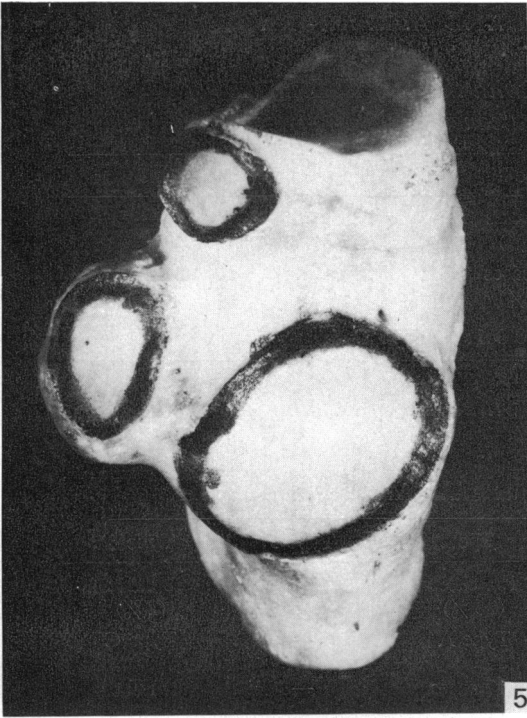


Fig. 5. Type 2 calcaneus: The degree of separation between two facets is more marked. The facet present at the antero-medial corner of the distal part of the calcaneus is large in size.

Fig. 6. Type 2 calcaneus: The degree of separation between two facets is more marked. The facet present at the antero-medial corner of the distal part of the calcaneus is small in size.

Fig. 7. Type 3 calcaneus.

Fig. 8. Type 4 calcaneus.

Table 1. *Comparison of our results with those of El-Eishi (1974) on Egyptian calcanei*

|                | Type 1              | Type 2              | Type 3             | Type 4           |
|----------------|---------------------|---------------------|--------------------|------------------|
| El-Eishi       | 98 cases<br>(49 %)  | 80 cases<br>(40 %)  | 22 cases<br>(11 %) | —                |
| Present series | 268 cases<br>(67 %) | 104 cases<br>(26 %) | 21 cases<br>(5 %)  | 8 cases<br>(2 %) |

$\chi^2 - 17.82$ , d.f. = 2,  $P < 0.001$ : significant.

Table 2. *The comparison of our results with those of Bunning & Barnett (1965)*

|                            |             | Pattern of talar articular facets in the calcanei |                     |                     |                  |
|----------------------------|-------------|---|---------------------|---------------------|------------------|
| Population                 |             | Type 1  | Type 2              | Type 3              | Type 4           |
| Present series             | Indian      | 268 cases<br>(67 %)                               | 104 cases<br>(26 %) | 21 cases<br>(5 %)   | 8 cases<br>(2 %) |
|                            | 401 cases   | Type B  | Type A              | —                   | Type C           |
| Bunning & Barnett's series | Indian*     | 61 cases<br>(78 %)                                | 17 cases<br>(22 %)  | —                   | Nil              |
|                            | 78 cases    | 64 cases<br>(33 %)                                | 130 cases<br>(67 %) | —                   | Nil              |
|                            | British**   | 194 cases   | 312 cases<br>(63 %) | 176 cases<br>(36 %) | 4 cases<br>(1 %) |
|                            | Nigerian*** | 492 cases   |                     |                     |                  |

$\chi^2$  test between the present series and different populations of Bunning & Barnett's series.  
\*  $\chi^2 - 3.98$ , d.f. = 1,  $P > 0.05$ : not significant  
\*\*  $\chi^2 - 60.71$ , d.f. = 1,  $P < 0.001$ : significant  
\*\*\*  $\chi^2 - 31.84$ , d.f. = 2,  $P < 0.001$ : significant.

## DISCUSSION

In the present series of 401 calcanei the facet(s) for the head of the talus were of four types: Type 1: 268 calcanei (67%); Type 2: 104 calcanei (26%); Type 3: 21 calcanei (5%); Type 4: 8 calcanei (2%).

Our results as compared with those of El-Eishi (1974) on Egyptian calcanei are shown in Table 1.

From this Table it is clear that there is a marked difference in the talar facets on the calcanei between Egyptians and Indians. In Egyptians, Type 4 facets were not observed by El-Eishi (1974).

Bunning & Barnett (1963) classified calcanei into three types according to the number of talar articular facets present on them. Type A calcanei bear three facets, Type B two, and Type C only a single facet. Types A, B and C of Bunning & Barnett's (1965) series corresponded to Type 2, 1 and 4 respectively of the present series. Type 3 of our series was not observed by them. Our results compared with those of Bunning & Barnett (1965) are given in Table 2.

The above Tables depict the marked differences in the talar facets on the calcanei between the various populations. There is no significant difference between Bunning & Barnett's (1965) results and ours with respect to the Indian series, except that

Types 3 and 4 were not present in the former. This may have been because many more calcanei were examined in the present series, or possibly because Bunning & Barnett's material came from Calcutta, whereas ours came from Uttar Pradesh.

#### SUMMARY

The variations in the talar articular facets on 401 normal Indian calcanei have been observed and classified. Type 1 calcanei have one continuous facet on the sustentaculum tali extending on the antero-medial corner of the distal part of the calcaneus (268 cases – 67%). Type 2 calcanei have two articular facets, one on the sustentaculum tali, and another on the distal part of the calcaneus (104 cases – 26%). Type 3 calcanei have a single well defined facet on the sustentaculum tali (21 cases – 5%). Type 4 calcanei have a single facet on the sustentaculum tali extending on to the antero-medial corner of the distal part of the calcaneus, but this facet is continuous with the posterior talar facet of the calcaneus (8 cases – 2%).

We are grateful to Mr B. B. Maheshwari for the statistical analysis in the manuscript.

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