Original Article

ANATOMICAL VARIATIONS OF TROCHLEAR SURFACE OF TALUS

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ABSTRACT

Objective:

Anatomical variations of talar facets can be of help in pathologies of foot for reconstruction and rehabilitation procedures. So this study was designed to observe anatomical variations in tali.

Study design:

Observational analytical study.

Settings and duration of study:

The study was done at Islamic International Medical College, Rawalpindi and University Medical & Dental College, Faisalabad during Sept. 2010-March 2011.

Methods:

300 adult tali were collected from different medical colleges of Rawalpindi, Islamabad and Faisalabad. Each talus was selected to mark the outline of the articulating surface carefully with the pencil. All the 300 tali were numbered and photographed. The articular facets were outlined with a black marker. The number of tali with a particular type of facets was noted and their percentages were calculated. The data was analyzed using SPSS version 17. The number and percentages were calculated for each type.

Results:

A. Medial extension of trochlear surface was present in 100 of the adult tali.
B. Lateral extension of trochlear surface was present in 175 adult tali.
C. Both Medial and Lateral extensions of trochlear surface was noticed in 25 adult tali.

Conclusion:

Both Medial and lateral extensions are less common as compared to lateral and medial extensions independently.

Keywords:

INTRODUCTION

Studying anatomical variations from individual bones is a difficult task but several workers have attempted to do so using various morphological features. Morphological features of bones such as Mandible[1], Pelvis[2], Sternum[3], Clavicle[4], Scapula[5] have been studied. Talus is the key bone of the longitudinal arch of the foot. It is responsible for receiving the body weight and transmitting it to the plantar arch below. Talus is the only bone which has no muscular attachment and no tendinous attachment.[6] Talus has three articulating surfaces. They are; Large oval surface on its most posterior aspect articulating with sustenticulum tali of calcaneum; a flat surface on its anterolateral surface articulating with upper surface of calcaneum on its anteromedial surface and medial to the above two facets is the third facet articulating with spring ligament which is covered by articular cartilage.[7] Talus has also

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been studied by many researchers specially the presence of squatting facets.[8] Several distinct facets have been described but lack of an agreed terminology has resulted in considerable confusion. Further, some workers have studied only tali, and others only tibiae. That results thus obtained are not strictly comparable. Finally, though there are several reports on adult bones, only one series of foetal tali has been reported. Anatomical variations in the trochlear surface have also been studied. In the present study the anatomical variations of trochlear surfaces were determined.

Objective of the study:

Variations in talar anatomy can be of help for reconstruction and rehabilitation of foot. Therefore, this study was designed to observe anatomical variations in tali.

MATERIAL AND METHODS

Settings and duration of study:

The study was done at Islamic International Medical College, Rawalpindi and University Medical & Dental College, Faisalabad during Sept. 2010–March 2011.

Methods:

300 adult tali were collected from different medical colleges of Rawalpindi, Islamabad and Faisalabad. Each talus was selected to mark the outline of the articulating surface carefully with the pencil. All the 300 tali were numbered and photographed. The articular facets were outlined with a black marker. The number of tali with a particular type of facets was noted and their percentages were calculated. The data was analyzed using SPSS version 17. The number and percentages were calculated for each type.

Results:

1. Medial extension of trochlear surface was present in 100 of the adult tali.
2. Lateral extension of trochlear surface was present in 175 adult tali.
3. Both medial and lateral extensions of trochlear surface was noticed in 25 of tali.

Table 1. Incidence of various anatomical variations of Trochlear surface of Talus

Anatomical variations of trochlear surface of talus	No. of cases
Medial Extension	100
Lateral Extension	175
Both Lateral and Medial Extensions	25
Total number of cases	300

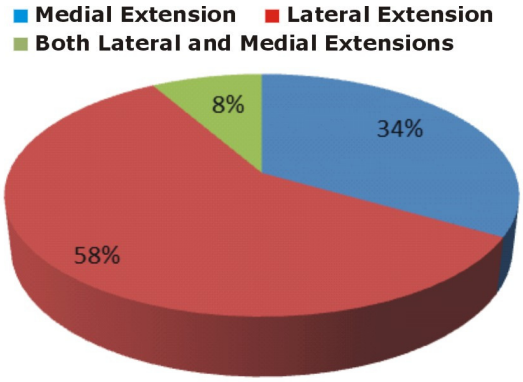

Fig. 1. Percentage Distribution of Anatomical Variations of Trochlear Surface of Talus (n=300)

RESULTS

Out of 300 adult tali 100 had medial extension of articular facets (Fig. 2A), 125 had lateral extensions (Fig. 2B) and only 25 cases (Fig. 2C) had both medial and lateral extensions.

DISCUSSION

The results of this study show that there are considerable changes in the orientation and shape of the talar facets. The presence of medial extension in 100 tali (Fig. 2A) shows that modeling of bone is feature of human development. This has been shown by studies done in past. Some of the authors have documented that the framework of plastic changes occurring in the talus in response to the biomechanical demands of increased weight bearing.[9] Unlike the weight bearing articular facets at the pelvis, femur and tibia; the talar articular surfaces are very small in relation to the loading environment and their ability to remain morphologically plastic during ontogeny represents an adaption that

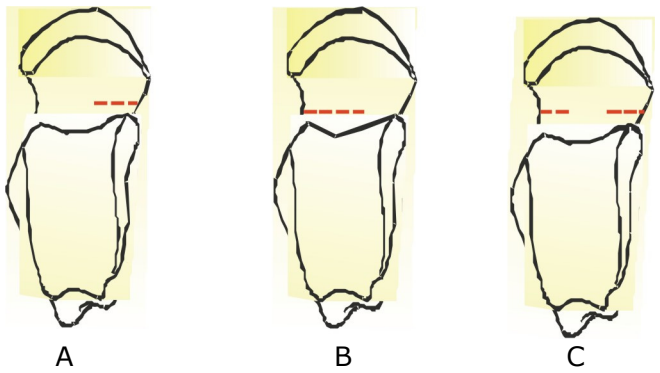

Fig. 2. Lateral extension of Talus (A), Medial extension of Talus (B), Both Medial and Lateral extensions of Talus (C).

is integral to our ability to cope with the substantial gains in body weight that occur during our developmental period.[10] In another study the shape of the talus in respect of the curvatures of the trochlear surface appears to be independent of sex and age.[11]

In this study the lateral extension was found in 175 tali (Fig. 2B) while in comparison in European tali the presence of medial articular facet has been reported.[12] Squatting facets have also been studied by many researchers. Forward prolongation of the medial articular surface and lateral articular surfaces of the talus upon the talar neck is not uncommon in the adult series.[13] This has been explained by the researchers in past. The medial squatting facet is known to be rare in both European and Australian tali; hence the failure to discover an example in the present series.[14] The presence of medial and lateral extension in 25 tali (Fig. 2C) is surprising since in Indian population only this type of extension was present.[15] In this study the presence of both medial and lateral extensions of talar facets was found to be less common in our country which has not been a feature in Indian and European population.

CONCLUSION

Both Medial and lateral extensions are less common as compared to lateral and medial extensions independently.

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