

Patterns of Talar Articular Facets on Fully Ossified Dry Human Left Calcaneus – An Observational Study

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Abstract

Context: The calcaneus is a weight bearing tarsal bone. It belongs to proximal row and forms the posterior pillar of two longitudinal arches of foot. In the upper surface calcaneus forms talocalcaneal joint with talus which maintains eversion and inversion of foot and named as subtalar joint. There are three facets over upper side of talocalcaneal joint: anterior talar facet, middle and posterior. The aim of this study is to find out the variations in types of talar facets of calcanei.

Materials and methods: One hundred and fifty five(155) fully ossified dry human left calcaneus of unknown sex were observed for patterns of talar articular facets at the department of Anatomy, Sir Salimullah Medical College, Dhaka from January 2014 to June 2015.

Results: Of the total one hundred and fifty five study samples type I was found in 108 cases (69.68%), type II was found in 44 cases (28.39%) and type III was found in 3 cases (1.93%).

Conclusion: The findings of the present study revealed that type I articular facet was common.

Key words: talar articular facet; calcaneus.

Introduction:

The calcaneus, the heel bone, is the largest of the tarsal bones. It articulates with the talus above and cuboid in front¹. Since calcaneus bone is located at the rear portion of foot, it is most vital in bearing weight of the body². There are three facets over upper side of talocalcaneal joint: anterior talar facet, middle and posterior. The middle third of superior surface of calcaneus carries posterior talar facet for articulation with the body of talus. In the anterior third of calcaneus, distal and medial to sulcus calcanei, an articular area covers the sustentaculum tali. This facet articulates with the head of talus and may be divided in about half the cases by a non-articular zone creating middle and

anterior talar facets the incidence of which varies with race and sex³.

These facets configuration are probably genetically determined and do not develop due to responses to walking habits, physique of a person, occupation, duration of weight bearing in post natal life. A comparison of the adult African, Indian and European calcaneal bones have revealed distinct racial difference in adult bones. Racial and individual morphological variation of articular facets of calcaneus may predispose people to joint instability, ligamentous laxity and development of arthritic changes in the subtalar joint⁴. Problems associated with subtalar joint are arthritis, flat foot, cavus foot, tarsal coalition. Foot and ankle surgeons have observed subtalar instability as a major paediatric problem because it can lead to severe flat foot with growing pain and quick fatigue while walking and running. Abnormalities in facet pattern can lead to many orthopedic problems affecting ankle, knee, hip joint and lower back and results in clinical presentations like anterior or posterior tibial tendonitis, plantar fasciitis and forefoot pain⁵.

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Europeans who predominantly have calcanei with pattern II facets for the sustentaculum tali are more stable and have less chance of developing arthritis^{6,8,9}. Pattern I calcanei are found to be dominant in Indians are unstable joint and are more likely to suffer trauma, accidents or other biochemical stress as a results of uneven weight distribution⁶. Knowledge of talar facets of calcaneum is essential for orthopaedic surgeons who perform 'Lengthening-distraction wedge calcaneal osteotomy and interposition bone graft' to correct deformities in pes planus⁷.

Therefore information regarding different types of talar articular facets provide baseline data for anatomy, planning treatment and diagnostic procedures of orthopaedic surgery, kinesiology and also in physical medicine and rehabilitation.⁷

Materials and methods:

Talar articular facets were observed on one hundred and fifty five (155) fully ossified dry human left calcaneus. The calcaneus were collected from the medical students of Sir Salimullah Medical College (SSMC), Dhaka and Dhaka National Medical College (DNMC).

Depending on the degree of separation, fusion and shape, four patterns of articular facets have been described by (Muthukumarravel et al, 2011, pp. 791-794)

- Type 1 pattern presents continuous middle and anterior facet
- Type 2 pattern shows separate middle and anterior facets.
- Type 3 pattern shows absence of anterior facet.
- Type 4 has a single articular facet formed by the confluence of posterior, middle and anterior facets.

Ethical Clearance:

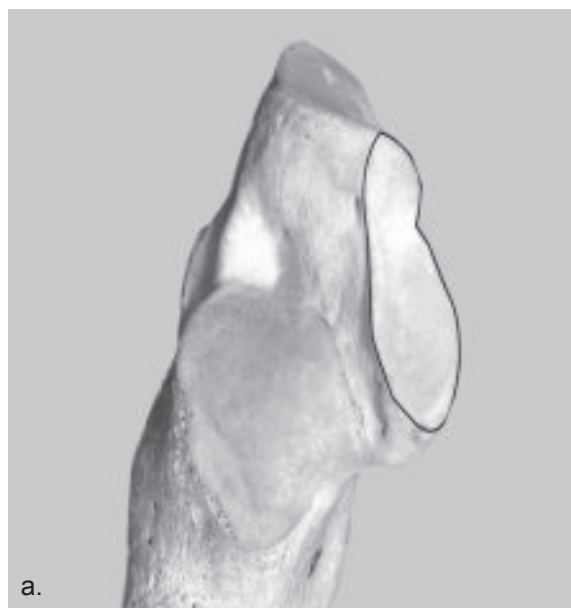
This study was approved by Ethical Review committee of Sir Salimullah Medical College, Dhaka.

Results:

The dry human left calcaneus were observed to find out different types of talar articular facets on

calcaneus. Of the total one hundred and fifty five study samples type I was found in 108 cases (69.68%), type II was found in 44 cases (28.39%) and type III was found in 3 cases (1.93%). Type IV talar articular facet was not found in the study. (Photograph1, Fig.-1).

Different types of talar articular facets on calcaneus



a. Middle and anterior facets are continuous (Type I)



b. Middle and anterior facets are separate (Type II)



c. Anterior facet is absent. (Type III)

Photograph1 (a,b,c): Showing different types of talar articular facets on calcaneus

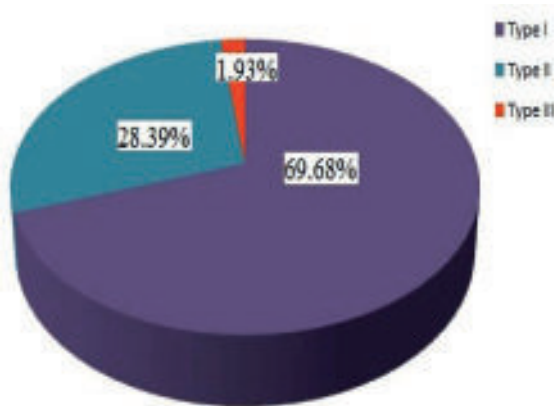


Fig 1 : Pie chart showing percentage (%) of different types of talar articular facets on calcaneus

Discussion

Types of talar articular facets on calcaneus was compared with that of SK, N et al² (2012) who carried out their study on Ahmedabad population, Saadeh et al⁸ (2000) on Egyptian, Barki, W.H.⁹ (2010) on Pakistani, Garg, R.et al⁷ (2013) on

Rajasthan people, Muthukumaravel, N.⁶ (2011) on Tamil, Anjaneyulu, K.¹⁰ (2014) and Patel¹¹ on Indian population. Findings of the present study matched with the findings of the above mentioned researchers where type I articular facet was the commonest and followed by type II, type III, and type IV.

Barki, W. H. and Khalid, S.⁹ also found type I articular facet commonest followed by type II and type IV. Type III facet was absent in their study. Similar findings was also observed in different medical colleges of Tamil Nadu, India where type III was absent.

Conclusion:

Type I articular facet was the commonest in the Bangladeshi population followed by II & III.

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