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# Variations In Talar Articular Facets on Dry Adult Human Left Calcaneus

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***Abstract***

***Context:*** *Calcaneus, also called the "Heel Bone" is the largest and strongest tarsal bone in humans. It acts as the posterior pillar of the longitudinal arches of foot for the transmission of body weight. The calcaneus articulates with the talus bone superiorly by three articular facets, forming a subtalar joint. Morphological variations of superior articular facets of calcaneus may predispose people to joint instability, ligamentous laxity and development of arthritic changes in the subtalar joint. Knowledge of such variations is essential for treatment and diagnostic procedures in orthopaedic surgeries. The aim of this study is to find out the variations in types of talar articular facets of calcaneus.*

***Materials and Methods:*** *The present study was an observational study conducted on the department of Anatomy, Dhaka Medical College, Dhaka from January 2018 to December 2018. The study material consists of two hundred (200) calcaneus of unknown sex. The study samples were divided into male and female groups using 'discrimination function analysis technique' and the variations in talar articular facets on dry adult human left calcaneus were identified by simple observational method.*

***Results****: In the male, Pattern I was found in 73%, Pattern II was found in 24% and Pattern III was found in 3% cases. In the female, Pattern I was found in 64%, Pattern II was found in 34% and Pattern III was found in 2% cases.*

***Conclusion:*** *The findings of the present study revealed that Pattern I was common.*

***Keywords:*** *talar articular facet,; calcaneus*

## Introduction

Calcaneus is the longest, strongest and biggest of all the tarsal bones of the proximal row. It is also referred to as heel bone and forms a major component of the skeleton of the hindfoot and prominence of the heel. This bone is unique, since it is the first tarsal bone to ossify. The purpose of the calcaneus is to transmit the weight of the body to the ground and to act as a strong lever for the calf muscles. It is located posteroinferior to the talus, providing support to the ankle joint.[1]

The superior surface of calcaneus has the posterior talar facet in middle one-third and the middle and anterior talar facets in its anterior one-third. Morphologically, the variant types and incidence of facets on the superior articular surface have been well documented in both sexes and many races.[2] Calcaneus forms the subtalar joint (also known as 'talocalcaneal joint') with talus. Subtalar joint stability is influenced by the morphology of superior articular facets of the calcaneus.[3] Analysis of the articular surfaces of the subtalar joint provides vital information in understanding the dynamics of foot, especially following postoperative fixation and artificial joint production such as subtalar implants, the flaps and prosthesis for foot.[4]

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Calcaneus is the most frequently fractured tarsal bone and calcaneal fracture accounting for about 60% of all major tarsal injuries. The posterior talar facet is the largest of the three facets and the major weight-bearing surface of calcaneus. It involves almost 90% of all intra-articular calcaneal fractures.[5] The majority of bony coalition commonly involves the middle talar facet of the talocalcaneal joint, also a common cause of painful flatfoot.[6] In clinical treatments, incidence of morphological variation of talar articular facets has been considered to be essential information before surgical procedure or the internal and external fixation in various diseases of the foot such as talocalcaneal arthritis and coalition, flatfoot, intraarticular fractures, congenital or accidental dysmorphology, club foot, subtalar instability and valgus deformities.[7]

So the knowledge of the variant patterns of talar articular facets can be used in the field of anatomy, radiology, orthopedic surgery, plastic surgery, reconstructive surgery, medical rehabilitation and forensic science.

**Materials and Methods**

The present study was carried out in the Department of Anatomy, Dhaka Medical College, Dhaka from January 2018 to December 2018. A total of two hundred (200) dry adult human left calcaneus of unknown sex were collected from the Department of Anatomy and also from the MBBS students of Dhaka Medical College (DMC) Dhaka, Dhaka National Medical College (DNMC) Dhaka, Dr. Sirajul Islam Medical College (Dr. SIMC) Dhaka & Dhaka Community Medical College (DCMC) Dhaka. By discrimination function analysis technique[8] and also with the help of various morphological criteria used by different authors,[8,9] the sex was determined and the grouping was done.

**Table I**

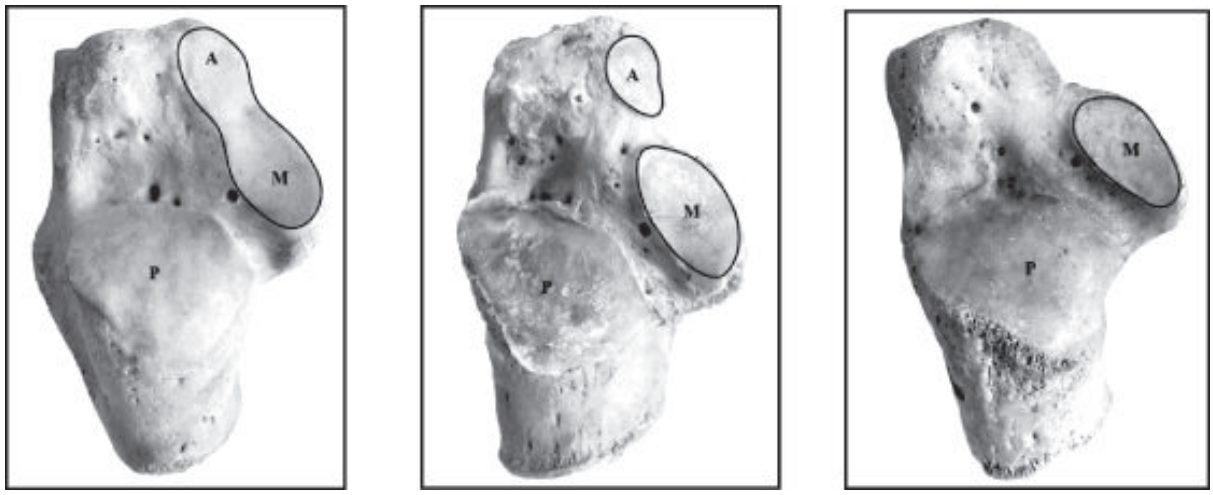
*Grouping of the sample*

| Sex | Number of study sample |
|---|---|
| Male | 103 |
| Female | 97 |

Then different patterns of talar articular facets were observed and recorded by morphological examination.[10]

The following patterns of talar articular facets were observed:

- Pattern I – fusion of middle and anterior facets
- Pattern II – separate middle and anterior facets
- Pattern III – absence of anterior facet




a. Pattern I b. Pattern II c. Pattern III

**Fig.-1 (a,b,c):** *Showing different patterns of talar articular facets. Here, A represents anterior articular facet, M represents middle articular facet and P represents posterior articular facet.*

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## Results

Of the total two hundred study samples, in the male, Pattern I was found in 73%, Pattern II was found in 24% and Pattern III was found in 3% cases.

In the female, Pattern I was found in 64%, Pattern II was found in 34% and Pattern III was found in 2% cases.

The finding of the present study revealed that Pattern I was common.

**Table - II**

*Patterns of talar articular facets in male and female*

| | Male | | Female | |
|---|---|---|---|---|
| Patterns | Frequency | Percentage (%) | Frequency | Percentage (%) |
| Pattern I | 75 | 73% | 62 | 64% |
| Pattern II | 25 | 24% | 33 | 34% |
| Pattern III | 3 | 3% | 2 | 2% |
| Total (n) | 103 | 100.0% | 97 | 100.0% |

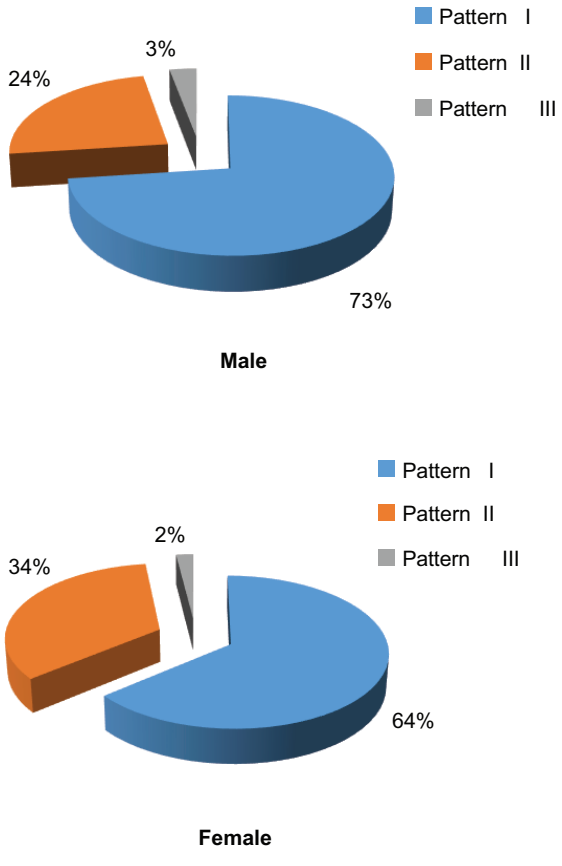


**Fig.-2:** *Pie chart showing percentage (%) of different patterns of talar articular facets on calcaneus in male and female*

## Discussion

The patterns of talar articular facets of the present study in male and female was almost similar with that of Tarunkumar et al[11], Kori et al[12] , Chowdhury et al[13], Madhavi et al[14] who all worked on Indian population. The similarities might be attributed to racial and geographical proximity. Indian people are a racial mixture of Caucasoid, Negroid, Mongoloid and Australoid resembling with that of Bangladeshi people.

The findings of the present study differ in both male and female than that of Ukoha et al[1] who carried out study on Nigerian people, Arun et al[6] on Nepali people, Iamsaard et al[7] on Thai people and Uygur et al[15] on Turkish people. This divergence might be due to variation in race and genetic composition.

## Conclusion

The present study exhibited that pattern I was the commonest in the Bangladeshi population followed by pattern II and pattern III. A thorough knowledge of variant patterns of talar articular facets is essential for providing the best treatment in various clinical conditions. Hence this study is accomplished to contribute to the subject of Anatomy enlightening the importance of variations in patterns of talar articular facets on dry adult human left calcaneus.

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