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Gender Variation in Squatting Facet of Talus Bone

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Abstract:

Context*: Talus is the most important key bone of the tarsals as it carries the weight in static and kinetic position during movement. Squatting facet is present on the superior surface of the neck of the talus. Appearance of squatting facet occur due to postural adaptation like squatting position during extreme dorsiflexion in climbing, prolonged standing, harvesting, performing prayers and high arched foot. Squatting facet can determine the race of an individual, can be utilized by forensic experts and anthropologists while dealing with unidentified bones.*

Material and Method*: This cross sectional observational study was conducted on 150 fully ossified dry adult human left tali (of which 83 were male and 67 were female). Types of squatting facets were observed in the Department of Anatomy of Dhaka Medical College, Dhaka from January, 2018 to December,2018.*

Results*: In male, out of 83 left tali, lateral squatting facet were observed in 24 cases (28.9%), medial squatting facet in 4 cases (4.8%), combined (medial and lateral) squatting facet in 9 cases (10.8%), no squatting facet in 46 cases (55.4%). In female, out of 67 left tali, lateral facet were found in 15 cases (22.4%), medial facet in 2 cases (3.0%), combined facet in 5 cases (7.5%) and no squatting facet in 45 cases (67.2%).*

Conclusion*: In the present study, lateral squatting facets were the commonest in both male and female.*

Key words*: Lateral squatting facet, medial squatting facet, combined (lateral and medial) squatting facet, no squatting facet.*

Introduction

Talus is a short, compact bone. Approximately 60% of its surface is covered by articular cartilage and there are no muscular or tendinous attachments to this bone.[1] It acts as a connecting link between the foot and the leg, through the ankle joint.[2] The talus has a body, neck and head. The body is cuboidal. The superior surface or the trochlea of the talus is gripped by two malleoli of the tibia and receives the weight of the body from the tibia and form the ankle joint or the talocrural joint. The grip of the malleoli on the trochlea is strongest during dorsiflexion of the foot.[3] The neck is narrow, medially inclined region between the head and the body. Its upper surface is roughened and gives attachment to the ligaments. The long axis of the neck inclined downwards, distally and medially, makes an angle of approximately 150° with that of the body.[4]

The bones that form ankle joint show different types of modifications when exposed to different types of stress.[5] During locomotion the foot is rarely dorsiflexed sufficiently enough to bring the anterior border of the distal end of the tibia in contact with the dorsum of the neck of the talus.[6] Squatting is a resting postural complex that involves hyperflexion at the hip and knee and hyperdorsiflexion at the ankle and the subtalar joints.[7] Squatting facet develops on the upper surface of the neck of the talus and the corresponding part of the anterior margin of the inferior aspect of the tibia.[8] They may be lateral or medial or combined in position and usually the lateral one is often continuous with the trochlear articular surface.[6]

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Morphological differences in bones are not only because of racial variations but also due to postural habits adopted by population. The racial and individual differences of the anatomic construction of the tali plays a key role on the static and kinetic dynamic on the foot.[9] Therefore, prior knowledge of anatomical variations in articulation holds significance not only in delineating underlying pathologies but also in its treatment. Adequate knowledge of the occurrence and variations in the squatting facets may be useful for the reconstructive surgery.Thus, the present study was carried out to determine the incidence of various types of squatting facets in human tali and correlate these findings with the existing literature.

Materials and methods

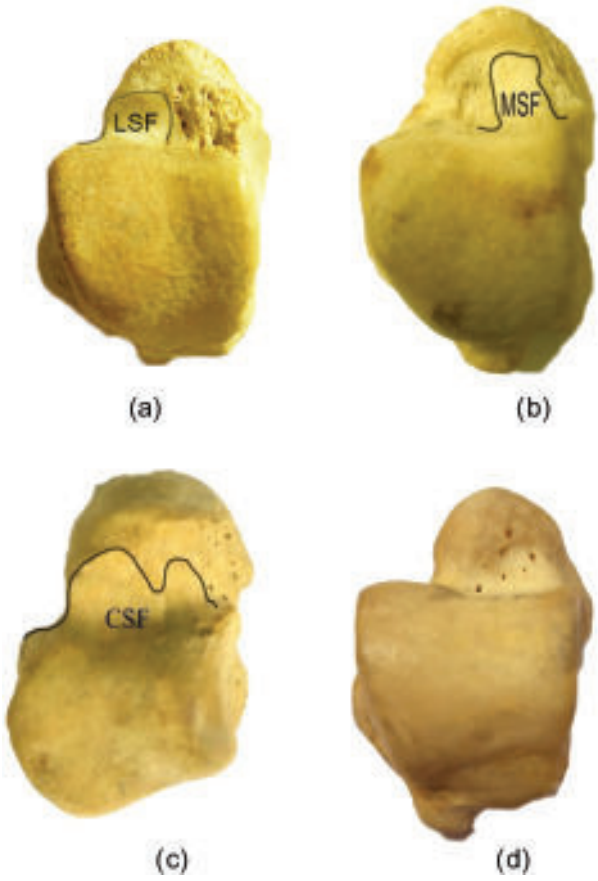
One hundred and fifty (150) dry fully ossified human left tali were collected from the medical students of Dhaka Medical College (DMC), Dhaka and Northern International Medical College and Hospital (NIMC), Dhaka. Broken or incomplete bones, congenitally deformed bones were excluded from the study. Types of squatting facets were classified according to Javia et al [10] and each talus was carefully observed over the dorsal aspect of the neck of the talus. The facets are:

a) Lateral squatting facet -present on the lateral side of the dorsal aspect of the neck

b) Medial squatting facet- present on the medial side of the dorsal aspect of the neck

c) Combined squatting facet (lateral and medial)- present on the both medial and lateral side over the dorsal aspect of the neck

d) No squatting facet-facet absent over the dorsal aspect of the neck



Photograph: showing different types of squatting facets on talus. LSF (a) lateral squatting facet, MSF(b) medial squatting facet, CSF(c) combined squatting facet

Ethical clearance

The study was approved by the Ethical Review Committee of Dhaka Medical College, Dhaka.

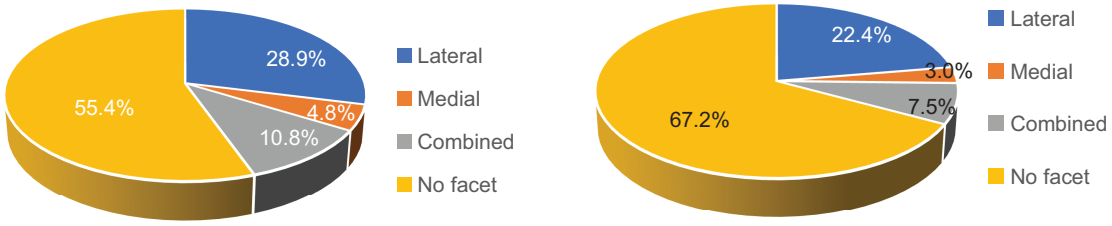
Results

Total one hundred and fifty left tali were observed and expressed in frequency and percentage (%) in male and female.

Table I

Types of squatting facets in male and female

Types of squatting facet	Male (n=83)		Female (n=67)	
	Frequency	Percentage(%)	Frequency	Percentage(%)
Lateral	24	28.9	15	22.4
Medial	4	4.8	2	3.0
Combined(lateral+medial)	9	10.8	5	7.5
No facet	46	55.4	45	67.2
Total	83	100.0	67	100.0



(a) Male (b) Female

Fig.-2: *Pie chart showing the comparison of percentage (%) of different types of squatting facets in male (a) and female (b)*

Discussion

The talus is a good example of plasticity exhibited by bones in response to mechanical requirements of new functions which are imposed on it as the talus encounter a lot of differential forces during locomotion. The stress patterns across the talus influences its overall dimensions, articular surface areas and angles.[11]

Reasons for squatting facet include physical stress, genetic factors and mechanical effects.[5] The high arched deformity can be caused by prolonged standing and walking on a hard surface and results in outward deviation of the foot at the talocalcaneal joint bringing the lateral surface of the neck of the talus into contact with the anterolateral margin of the inferior extremity of the tibia.[12] Clinically it was found that prolong squatting posture was a strong risk factor for the tibiofemoral knee osteoarthritis in elderly people.[13]

Much higher incidence of lateral squatting facets in samples can be attributed to the unequal distribution of body weight mainly towards the lateral side of the foot due to different life conditions, habitual activities and postures, production economies and generally hard working conditions.

In the present study, out of 150 left tali lateral squatting facet was observed more in male (28.9%) than in female (22.4%). This study finding was compared with that of Javia et al[10], Pandey and Singh[14] and Baykara et al[5] who carried out study on Jamnagar, Varanasi of India and on Turkish population respectively. All of them observed that lateral squatting facet was higher in male than in female which was similar to the present study.

Similar type of research works were performed by Azra et al[9], Garg et al[16] and Kavya et al [7] on people of Karnataka, Rajasthan and Mangalore of India respectively. Study was also conducted by Dixit et al[15] and Akpan et al[12] on north Indian people, and on people of Nigeria respectively. They did not differentiate sex. In those research works, lateral squatting facet was found to be the commonest which was similar to the findings of the present study. These similarities might be attributed to the racial and geographical proximity. Indian people are racial mixture of Caucasoid, Negroid, Mongoloid and Australoid resembling with that of Bangladeshi people.

Conclusion

Lateral squatting facets were the commonest in both sex. Left tali lateral squatting facet was observed more in male than female.

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