International Journal of Advanced Research in Medicine

E-ISSN: 2706-9575
P-ISSN: 2706-9567
IJARM 2021; 3(1): 17-19
Received: 01-01-2021
Accepted: 02-02-2021

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A study of incidence of squatting facets

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DOI: https://doi.org/10.22271/27069567.2021.v3.i1a.95

Abstract
Habitual squatting has long been recognized to alter the skeletal morphology of the lower limb. Squatting is a resting postural complex that involves hyperflexion at the hip and knee and hyperdorsiflexion at the ankle and subtalar joints. During locomotion, the foot is rarely dorsiflexed sufficiently to bring the anterior border of the inferior extremity of the tibia into contact with the dorsum of the neck of the talus. Thus modifications of the neck of the talus and the distal tibia indicating their habitual contact have been taken as evidence of the extreme dorsiflexion of the ankle that occurs in squatting.

Keywords: morphometry, squatting facets, Indian population

Introduction
The distal end of the tibia is expanded slightly and has anterior, medial, posterior, lateral and distal surfaces [1,2,3]. It also has inferomedial projection called as the medial malleolus. The smooth anterior surface bulges beyond the distal surface and is separated by a narrow groove. The capsule of the ankle joint is attached to an anterior groove near the articular surface [4,5]. The medial surface is smooth, continuous above with the medial surfaces of the shaft and below with the medial malleolus and is subcutaneous. The posterior surface is smooth and extends to the posterior surface of the medial malleolus. It also is continuous with the posterior surface of the shaft. The lateral surface has a triangular fibular notch; its anterior and posterior borders converge proximally to the interosseous border. The anterior and posterior tibiofibular ligaments are attached to the edges of the notch. The distal surface, articulating with the talus, is wider in front, concave sagittally and transversely slightly convex, somewhat like a saddle-shape. Medially it continues as the malleolar articular surface. This articular surface may extend sometimes into a groove that separates it from the anterior surface of the shaft. Such groove like extensions, are squatting facets, and they articulate with reciprocal talar facets in extreme dorsiflexion. These features have been used in the evaluation of the racial origins of skeletal material. The talus is the link between the foot and leg, through the ankle joint and it has the following parts:
Head is directed distally and somewhat inferomedially, the head has a distal surface; its long axis is also inclined inferomedially and articulates with the proximal navicular surface. The plantar surface has three articular areas, separated by smooth ridges. The posterior is the largest, is oval and slightly convex and rests on a shelf-like medial projection of calcaneus, the sustentaculum tali. Anterolateral to this articular surface and usually continuous with it, is a flat articular facet which rests on the anteromedial part of the dorsal calcaneal surface; distally it continues into the navicular surface. Between the two calcaneal facets, articular cartilage covered talar head is in contact with the plantar calcaneonavicular ligament.
The neck is a narrow, medially inclined region present between the head and body of talus. Its rough surface provides attachment to the ligaments. The capsule of the ankle joint is attached distally to its dorsal surface. A part of trochlear surface and medial articular facet of the talar body may extend onto the neck. The anterior talofibular ligament is attached on the lateral aspect of the neck, and spreads around the adjacent anterior border of the lateral surface. 'Squatting facet' is commonly seen on the talar neck in those individuals who habitually adopt the squatting position and it articulates with the anterior tibial margin in extreme dorsiflexion and may be double.

The body is cuboidal, the trochlear surface articulates with the distal end of the tibia. It is convex anteroposteriorly, gently concave transversely, wide anteriorly and narrows posteriorly. The triangle shaped lateral surface is smooth and vertically concave for articulation with the lateral malleolus and is continuous with the trochlear surface. Proximally, the medial surface is covered by a comma-shaped facet, which is deeper in front and articulates with the medial malleolus. The plantar surface articulates with the dorsal calcaneal surface by an oval concave facet, its long axis is directed distolaterally at an angle of approximately 45° with the median plane. The medial border of the trochlear surface is straight. Its lateral border inclines medially in its posterior part and is often broadened into a small elongated triangular area which is in contact with the posterior tibiofibular ligament in dorsiflexion.

This study puts in an effort to find the morphometry of squatting facets.

Aims and Objectives

This study puts in an effort to find the morphometry of squatting facets in Indian Population.

Materials and Methods

Sixty specimen were dissected in the Department of Anatomy, JNUIMSRC, Jaipur. Thirty were from males and thirty were from females. Right and left were equally distributed.

The incidence of squatting facets were noted and reported based on sides and sexes.

The study was done from Nov 2019 to Nov 2020

The Squatting facets in the tibia were noted.

Results

Squatting Facets on the Superior Articular Surface of Talus

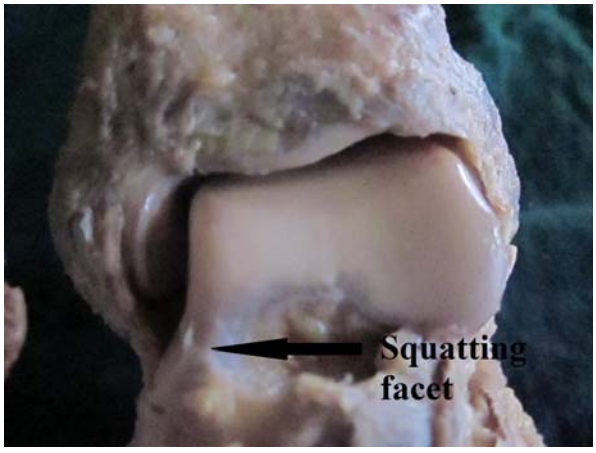

Image 1: Squatting facet in wet talus

Irrespective of the side which the bone belongs, the squatting facets is present in 18.18 percent.
On the right side it is present in 20 percent.
On the left side it is present in 17 percent.
In males, it is present in 20 percent.
In females, it is present in 17 percent.

Squatting facets are found more on the right side. This might be because of dominance. It is also found slightly more in males.

Squatting facet superior articular surface of tibia:

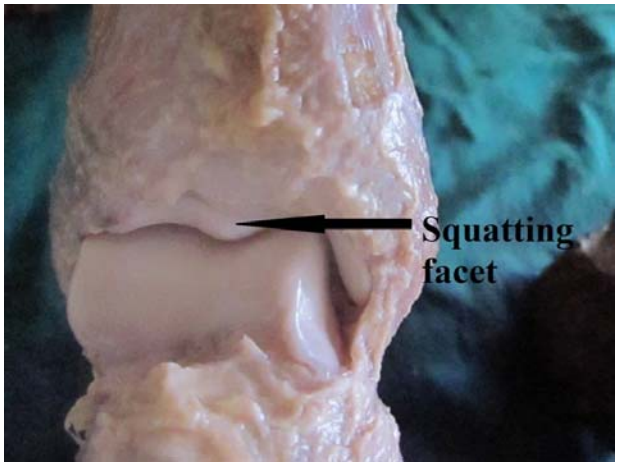

Image 2: Squatting facet in wet tibia

Irrespective of the side to which the bone belongs, the squatting facets on the tibia is in 45.46 percent.
On the right side, it is present in 40 percent.
On the left side, it is present in 50 percent.
In males, it is present in 40 percent.
In females, it is present in 50 percent.
The squatting facets are more on the right side.
The squatting facets are more in the females than that of females.

Discussion

Inderbir Singh[9] in 1959 conducted a study of Squatting facets on the talus and tibia in Indians. Using 200 tibia and 200 tali (dry bones), 92 tibia and 100 talus (wet cartilage covered bones). The author mentioned that, out of 292 tibia which were studied, 231 tibia had squatting facets indicating an incidence of 79.1%. Of the 300 talus which were studied, 86 talus had squatting indicating an incidence of 28.6%.

According to Charles RH[47] on the study of influence of function as exemplified on the morphology of the lower extremity of Punjabi, 34 out of 53 talus was found to have squatting facets showing an incidence of 63 percent.

The observation in my studies is not in agreement with the other studies. It may be because of the difference in population chosen for the study. The study was conducted on south west coast Indians and the other study was based on north Indians.

Conclusion

The sides and the sexes in which the squatting facets are present predominantly are reported.

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