

The morphometric measurements of talus and its articular facets**David Kumar Anand Pagolu¹, Anuradha Mamidi^{2*}, Rajesh Paluru³**¹*Assistant Professor, Department of Anatomy, Mediciti Institute of Medical sciences, Ghanpur, Medchal, Telangana State, India*²*Associate Professor, Department of Anatomy, Mediciti Institute of Medical sciences, Ghanpur, Medchal, Telangana State, India*³*Associate Professor, Department of Physiology, Mediciti Institute of Medical Sciences, Ghanpur, Medchal, Telangana State, India***Received: 29-05-2021 / Revised: 26-06-2021 / Accepted: 02-08-2021****Abstract**

Background: Talus is a distinctive bone among the tarsal bones. It is situated in proximal row consisting of head, neck and body. Calcaneus articulate inferiorly with anterior, middle and posterior articular surfaces of talus. Attachment involve mostly ligaments with lack of muscles. As talus bears whole body weight and conveys to arches of foot. It is considered as a vital bone. **Materials and methods:** The main aim of study include to know different articular surfaces and dimensions of talus. Ninety-eight dry talus were procured from department of Anatomy, Mediciti Institute Medical College, Hyderabad. All the bones were normal and study was done without any sex demarcation. **Result:** Type-B articular surface was more predominate and morphometric measurements of talus were similar to that of other studies. **Conclusion:** plays key role in reconstruction surgeries and foot rehabilitation procedures.

Keywords: talus, morphometry, articular surfaces, bones, calcaneus.

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Introduction

As talus bears whole body weight and conveys to arches of foot. It is considered as a vital bone. The Posterior projection of talus consists of medial and lateral tubercles. Unique feature of talus, attachment involve mostly ligaments with lack of muscles[1]. Tarsal bones are short bones, arranged in rows were talus and calcaneus are in proximal row. Talus lies midway between foot and leg. Consists of head, neck and body. Head articulates with navicular bone in front and sustentaculum tali below, neck is non-articular presents a groove sulcus tali, body bears pulley called trochlea tali[2]. Trochlea articulates with lower end of tibia. Talar movements are restricted by medial and lateral malleoli of tibia and fibula which primarily contributes to the plantar flexion and dorsiflexion motion of the foot. Dorsiflexion movement is more stable as talus is wider anteriorly[3]. Among the anterior, middle and posterior articular surfaces, sulcus tali separates middle and posterior. Studies reported variations in calcaneal articular surface of talus[4]. Present study followed the classification given by earlier studies, which was based on distance between the facets, complete and incomplete separation. Accordingly, three types-A, B and C. Type- A involved anterior and middle facets. Based on extent of separation in type-A, four subtypes were noticed: A₁. the distance between articular facets is less than 2 mm, A₂-distance between facets 2-5mm, A₃- distance between facets more than 5 mm. A₄-only one articular facet is seen. Based on separation divided into two types. B₁-separation incomplete, B₂-no separation between facets. In type -C only one facet[5-8]. Present study gives detailed knowledge about different articular surfaces with morphometric measurements of talus

Material and methods

Ninety-eight dry talus were procured from department of Anatomy, Mediciti Medical College, Hyderabad. All the bones were normal and study was done without any sex demarcation. Classification given by earlier studies, which was based on distance between the facets, complete and incomplete separation was followed in present study [5]. To know the dimensions of talus vernier callipers was used and parameters recorded are anteroposterior length, transverse diameter, length and width of sulcus tali: Antero-posterior length was recorded between head (anteriorly) and body (posteriorly). Transverse width was taken on body between medial and lateral ends of talus. Length of sulcus tali measured between medial and lateral border of sulcus. Width between anterior and posterior margin of sulcus.

Statistical analysis

The data was analysed in M.S office and measured as mean and standard deviation.

Results

Types of articular facets observed: type-A which included four subtypes - A₁ 1.02 %, A₂ 1.02 %, A₃ - 2.04%; A₄ -1.02 %. Type-B consisted B₁-55.10 %, B₂- 44.89 %. Type-C included 1.02 % respectively (Table I). Among these type-B was predominate (Fig-1). The anteroposterior length and transverse width of tali were: 54.01 +/- 3.34 mm and 44.06 +/- 2.55 mm respectively. The width and length sulcus tali were: 7.03 +/- 2.01 mm, and 22.01 +/- 2.88 mm respectively (Table II, fig-2).

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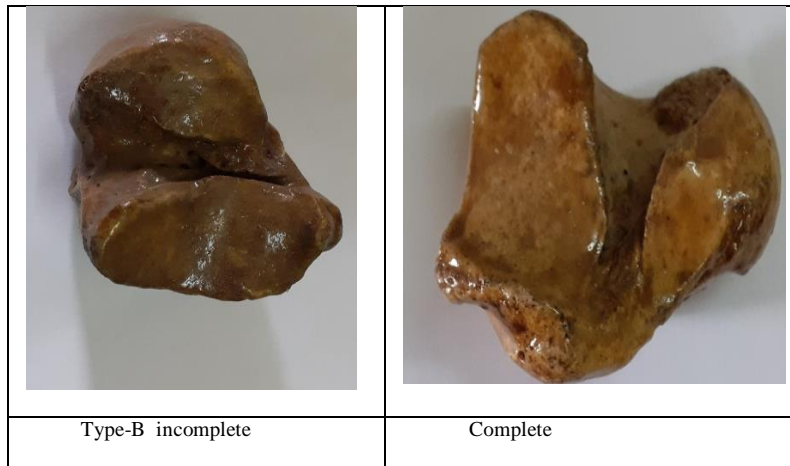


Fig 1: Articular facets

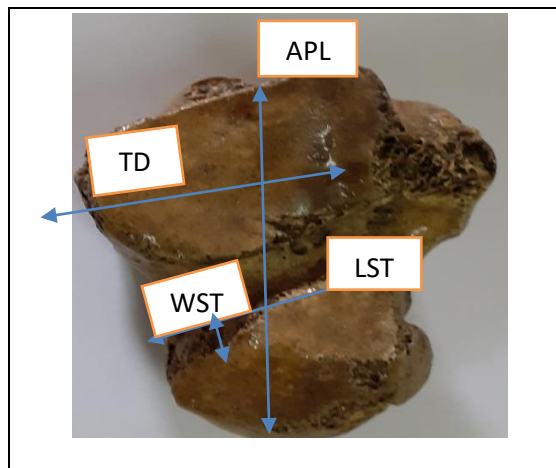


Fig 2: Morphometric measurements of talus

Table 1: Number and % of articular facets of talus

Types of articular facets	Number of bones	%
Type –A1 (less than 2mm)	1	1.02
A2 (2-5mm)	1	1.02
A3 (> 5mm)	2	2.04
A4 (only one facet)	1	1.02
B1(incomplete separation)	54	55.10
B2(no separation)	44	44.89
C (single facet)	1	1.02

Table 2:Mean and Standard deviation of distance measured on talus

Parameters (mm)	Mean+/-std
Anteroposterior length	54.01 +/- 3.34
Transverse diameter	44.06 +/-2.55
Sulcus tali length	22.01+/-2.88
Sulcus tali width	7.03+/- 2.01

Discussion

By recognising and observing the differences in articular facet and morphometric measures, act as a guide for diagnosis and treatment. As detailed knowledge is still deficient. The strength and movements of subtalar joint depends on number of articular facets[9].In the

current study type-B1 and B2 (55.10%, 44.89%) are most commonly observed which is in line with earlier studies were type-B 60.5% and 89% respectively[10,11].Anteroposterior length and transverse width of tali are: 54.01 +/- 3.34mm and 44.06 +/- 2.55 mm respectively in the present study. These findings were inline with earlier studies.

Unlike morphometric measures of width and length of sulcus tali (7.03+/- 2.01; 22.01+/-2.88) varied. These differences may be due to racial and different ends taken for measurements[12]. Morphology of articular facets in human may vary due to stress imposed on it[13,14]. The size and occurrence of facets of talus were studied on habitual squatting, and observed variations due to sociophysiological lifestyle and remodelling of bone which occurs in response to physical stress. The gradual evolution of talus may be also responsible for different types of facets which help in balance of foot[15]. This study would be helpful in surgical, diagnostic procedures and treatment in orthopaedic surgery like subtalar instability, congenital clubfoot, valgus deformities. It also provides knowledge in development of subtalar implants[16].

Conclusion

Morphometric parameters help in reconstruction surgeries and foot rehabilitation procedures and type –B articular facets were commonly seen in the study.

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