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A Study on Morphometry of Articular Cartilage of Superior Articulating Surface of Talus

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Abstract: ***Talocrural joint is a major weight bearing joint of the body. The objective of the study is to find the mean measurements of the articular cartilage of the superior articulating surface of talus in south Indian population. Differences between the sides, variations within the same population and comparison of the study with that of the others will be done. The present study was done in the Department of Anatomy, K.S.Hegde Medical Academy Mangalore using 11 specimens. All the measurements were taken using Digital Calipers. There were no significant differences between the right and the left side. There were no significant differences within the population. Articular cartilage of the superior articulating surface of the talus was wider in front and narrows posteriorly. The cartilage was thick in the centre and thin at the periphery. The study will help in the reconstruction surgeries and in the manufacture of implants in south Indians.***

Keywords: Articular, Cartilage, Joint,Measurements,Talocrural.

1. Introduction

The entire weight of the human body is taken up equally by the talus. The superior articulating surface of the talus articulates with the tibiofibular mortise. The articulating surface of the talus that articulates with the tibiofibular mortise includes a superior surface and a large triangular shaped medial surface that articulates with the medial malleolus and a comma shaped lateral surface which articulates with the lateral malleolus.

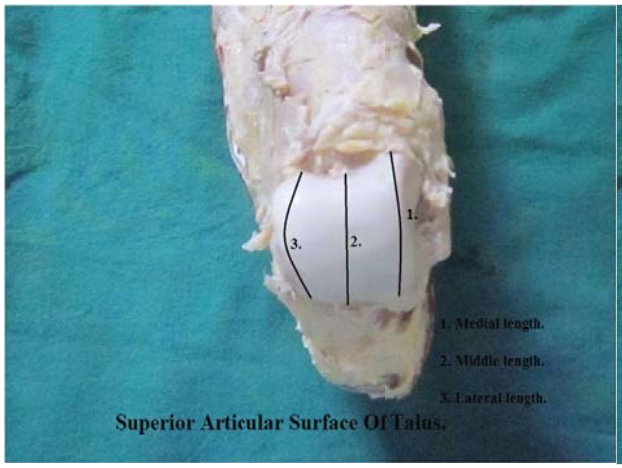
Five Sixth of the total weight of the body is taken up by the tibia and the rest of the weight is taken up by the fibula [1]. Since a lot of load is taken up by the talocrural joint, we can expect a lot of injuries to happen in the articular cartilages. The injuries of the talocrural joint are also quiet common [2]. The aim of the present study is to find the morphometry of the cartilage covering the superior articulating surface of talus.

The aim of the present study is to study and report the morphometry of articular cartilage of the superior articulating surface of the talus.

2. Materials and Methods

Altogether eleven formalin fixed ankles were dissected. Five specimen belonged to the right and six belonged to the left side.
Eleven formalin fixed human ankles were dissected which was available in the department of anatomy, K.S.Hegde medical academy, Mangalore.

The measurements that were taken on the superior articulating surface are, medial side length, lateral side length, central length, anterior width, central width, posterior width, lateral side: central radius, lateral side: posterior radius, medial side: anterior height.The squatting facets were noted.



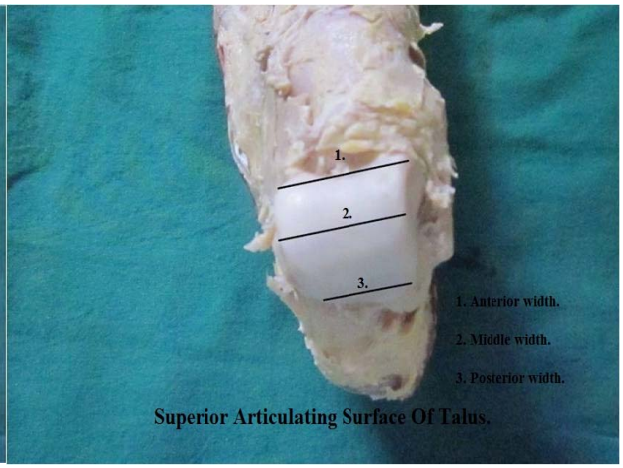


Image 14(left): Length measurements of superior articulating surface of talus taken at different levels.
Image 15(right): Width measurements of superior articulating surface of talus taken at different levels.

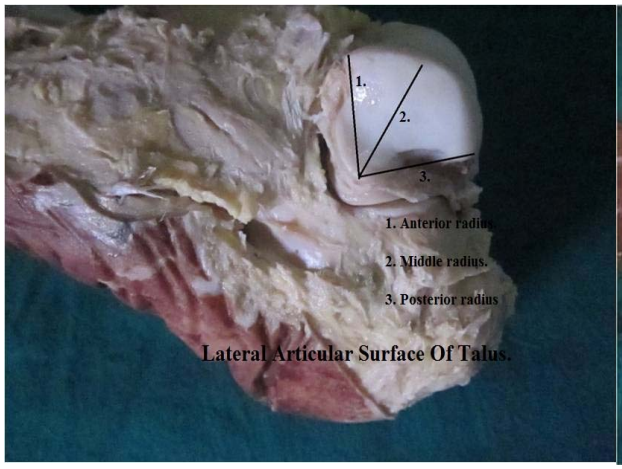


Image 16(left): Measurements of lateral articulating surface of talus taken at different levels.
Image 17(right): Measurements of medial articulating surface of talus.

3. Results

Irrespective of the side and sex to which the bone belongs, the mean values of the length of superior trochlear surface of talus on the medial, lateral and central part are 35.63 mm, 35.72 mm and 38.09 mm. The mean values of the width of superior trochlear surface of talus on the anterior, central and posterior part are 30.45 mm, 27 mm and 21.45 mm. The mean values of the anterior, middle and the posterior radius on the lateral articulating surface are 21.27 mm, 22.63 mm and 21.45 mm. The mean value of the anterior height on the medial side is 14mm.

On the right side, the mean length measurements are 34.6 mm, 36.2 mm and 38 mm. The mean width measurements are 30.2 mm, 26.8 mm and 21.2 mm. The mean radius measurements are 21.2 mm, 22 mm and 21.4 mm. The mean height measurement is 14 mm.

On the left side, the mean length measurements are 36.5 mm, 35.33 mm and 38.16 mm. The mean width measurements are 30.66 mm, 27.16 mm and 21.66 mm.The mean radius measurements are 21.33 mm, 23.16mm and 21.5 mm. The mean height measurement is 14 mm.

Table 1: Showing the measurements of the different criteria taken into consideration.

Measurements Of Superior Surface	Side	Mean	Std. Deviation	Sig.
Medial Length	R	34.6	1.14	0.149
	L	36.5	2.58	
Lateral Length	R	36.2	2.04	0.423
	L	35.33	1.36	
Central Length	R	38	1	0.741
	L	38.16	0.40	
Anterior Width	R	30.2	1.64	0.649
	L	30.66	1.63	
Central Width	R	26.8	0.83	0.527
	L	27.16	0.98	
Posterior Width	R	21.2	0.44	0.576
	L	21.66	1.86	
Measurements Of Medial Surface				
Anterior Radius	R	21.2	1.92	0.929
	L	21.33	2.73	
Middle Radius	R	22	1.73	0.378
	L	23.16	2.31	
Posterior Radius	R	21.4	1.67	0.933
	L	21.5	2.07	
Measurements Of Lateral Surface				
Medial Height	R	14	0.70	1
	L	14	1.54	

4. Discussion

The lateral side measurement is higher than the other length measurements. The articular surface is wider in front and narrows behind. The lateral articular surface forms an arc of a circle.

The measurements are similar on both sides.

According to Andrew R. Fauth et al [3]. on the study of anatomical based investigations on the total ankle arthroplasty,
The mean values of the length of superior trochlear surface of talus irrespective of the sex on the medial, lateral and central part are 34.30 mm, 33.16 mm and 33.89 mm. The mean values of the width of superior trochlear surface of talus on the anterior, posterior and central part are 29.89 mm, 22.48 mm and 28.86 mm. Irrespective of the sex, the mean values of the anterior, middle and the posterior radius on the lateral articulating surface are 22.4 mm, 23.43 mm and 23.16 mm.

Irrespective of the sex, the mean value of the anterior height on the medial side is 13.34 mm. The study is in agreement with the study of Adrew. R .Fauth et al [3]. The small difference found in our specimens, could be a characteristic of our population, but no previous studies exist to compare our findings.

5. Conclusion

There are slight differences when the data is compared to that of Andrew R Fauth [3].This may be because of the fact that, the study conducted in our studies is in “South Indian West Costal Population”.The difference found in our specimens could be a characteristic of our population, but no previous studies exist with which to compare our findings.

The findings form a base for further studies. The measurements are useful to develop ankle prosthesis that would be specific for south Indian population.

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