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ANALYSIS OF LISTER'S TUBERCLE OF RADIUS BONE AND ITS CLINICAL IMPLICATIONS - A MORPHOMETRIC STUDY

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ABSTRACT:
Lister's tubercle is a bony prominence and it is an anatomical landmark which is also called as dorsal tubercle located on the distal end of the dorsum of the radius bone and palpable on the dorsum of wrist which acts as a pulley for Extensor Pollicis Longus tendon .It's anatomical localization is important for clinical and surgical procedures. The study was carried out in 33 human bones obtained from the department of anatomy, saveetha dental college. The measurements (length, breath) of both left and right Lister's tubercle of radius bone were measured using a sliding verniercalliper. The observed data was analyzed statistically and represented graphically. All the observations were presented in graphs and images. Morphometric analysis of Lister's tubercle of radius bone was present in the graph and it indicated the lister' s tubercle on the right side had more diameter than the left Lister's tubercle. The study was conducted to know the morphometrical and morphological analysis of Lister's tubercle of the radius bone. This data will be useful in medico legal and arthroscopic surgeries.

INTRODUCTION

Lister's tubercle is an anatomical indicator for clinical surgeries, Wrist arthroscopy, Wrist joint injections which is present at the distal end of the

radius bone [1]. As Lister's tubercle is an anatomical landmark it can be used to identify anatomical variants [2]. Distal Intersection Syndrome is the uncommon disorder causing pain, swelling and tenderness of the Lister's tubercle in the area of wrist [3]Most of the time pathology of the Extensor Pollicis Longus can be found with the presence of Lister's tubercle [4]. Inappropriate inclination of screws during intra-auricular fractures and volar plate fixation may damage Extensor Pollicis Longus [5] Fracture in Lister's tubercle is not visible in normal radiographs; special radiographs are used to identify the fracture in Lister's tubercle [6]. Some trauma cases in or around the Lister's tubercle can be cured only by the proper surgeries [7] . Delayed rupture in Extensor Pollicis Longus causes island shaped fracture around the Lister's tubercle so it is also called as island shaped fractures [8]. During surgeries the presence of Lister's tubercle helps to obtain the natural length of the fingers and the joints [9] . The measurement of Lister's tubercle in relation to Extensor Pollicis Longus (EPL) is important for better surgical procedures [1011].

This study was done particularly among the South Indian population. The revised data is carved out by comparing the length, breadth and diameter of the Lister's tubercle of radius bone for both left and right hand. Other studies were mostly done in the unselected population and most of the studies were not based on the gender basis and most of them calculated the breadth, length and diameter in relation EPL rather than calculating length , breadth and diameter of Lister's tubercle alone.

The purpose of the study done by clement. H is to measure the size and shape of the Lister's Tubercle and the depth of the EPL groove. It is done to know the objective of lister's tubercle during surgeries and fractures. He concluded that it is significant to know the landmark of lister's tubercle for performing Volar plating fractures.

Sebastian. F. Baumbach performed the analysis of the lister's tubercle of radius bone in 3-D shape to models. The background of this study is to know diversification through 3-D shapes. They concluded that it can be used tocharacterise the cut - planes and to spot the sex of the obscured sample [12]

A. FerneresIn his study concluded that dorsal radius fracture is the most common fracture nowadays. It mostly occurs in young adults the condition of the fracture depends upon the force given by the ground when we fall. Wrist arthroscopy can be done for this kind of fracture. The landmark of Lister's tubercle is important for doing these surgeries [4].

W. Pichler in his study concentrates on the mechanics of distal radius to be used while doing Volar plating when there is a fracture in distal radius bone. He found variations in the length. He differentiated many aspects from the CT scan study and cadaver study. He mentioned the surgeon should be conscious when inserting a screw during surgeries. It is important to know the anatomical landmark to Lister's tubercle for safe surgeries [10].

Rashid et al In his study explained that Distal radius fracture near Lister's tubercle may cause unprompted rupture EPL tendon [13].

The aim of the study is to analyse the morphological and morphometrical variations of Lister's tubercle of radius bone and to correlate it with clinical anatomy.

MATERIALS AND METHODS

The study was conducted in the Department of anatomy, Saveetha Dental College, Chennai. A total of 33 human radial bones of unknown sex was analysed. Bones without any gross breakage and any abnormalities were selected and evaluated. The right and left side of the radius bone were segregated based on their anatomical features. At the distal end of radius bone the Lister's tubercle was identified and the length and breadth of the Lister's tubercle of radius bone were calculated for both right and left side by using a digital sliding vernier caliper. The observed data was analysed and the data was made into graphical representation to correlate the significance of the length and breath of the Lister's tubercle of the right and left side of the radius bone.

RESULTS AND DISCUSSIONS

All the observations were presented in graphs. The morphometric analysis showing the mean of Lister's tubercle of radius bone of right and left side was depicted in Figure 1. The mean length of Lister's tubercle of the left bone was 14.79 ± 0.12 mm and the mean breadth was 8.41 ± 0.274 mm. The mean length of Lister's tubercle of the right bone was 16.05 ± 0.48 mm and the mean breadth was 9.08 ± 0.462 mm. The mean diameter of Lister's tubercle of the left side bone was 11.6 ± 0.58 mm and the mean diameter of Lister's tubercle of the right side bone was 12.57 ± 0.234 mm.

It was inferred that the mean diameter of Lister's tubercle was comparatively greater than the left bone.

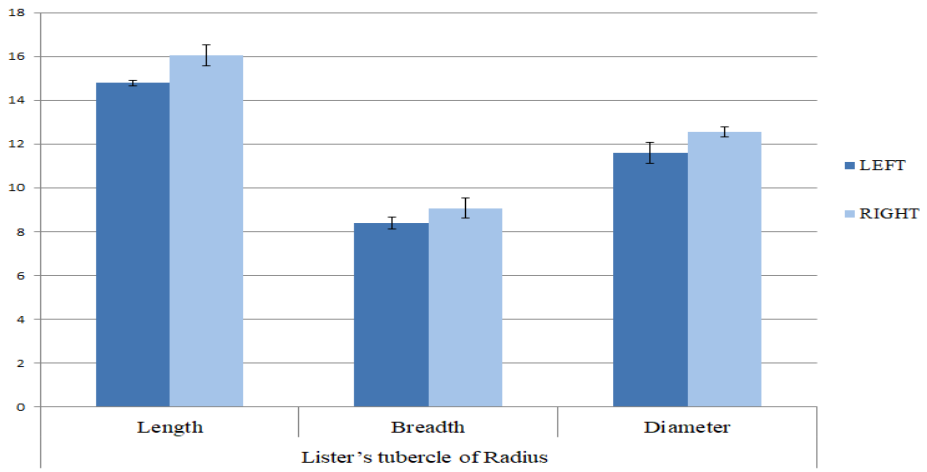

Figure 1: Bar graph showing the mean of Lister's tubercle of radius bone of right and left side. X-axis represents the parameters of bone and y-axis represents the measurements. Dark blue colour denotes left and light blue

colour denotes right side. Morphological analysis was found to be greater on the right side than left side. All the values are expressed as mean ± SD in mm.

From this study, it can be said that the diameter of Lister's tubercle of the right bone is larger when compared to the left side bone. The mean value of Lister's tubercle of the right side bone is greater. It is important to analyse the morphological and morphometrical features because of its surgical importance. Because lister's tubercle acts as an anatomical landmark during surgeries and Volar plating during fractures[1415].

In a previous Study, researchers mentioned that morphological analysis of lister's tubercle is important to have knowledge about Island fractures.Some of the previous studies have mentioned that during upper limb surgery an incision is made for bone grafting. So the morphometrical and Morphological analysis is important. Dislodgement of screw during surgeries in lister's tubercle causes rupture in Extensor Pollicis Longus Tendon [16].

Previous studies concentrated on the relations around Lister's tubercle. They have mentioned that , superficial branch of the radial nerve to the lister's tubercle is explained. The lateral branches of the nerve from the lister's tubercle is 2.51 cm and 3.90 cm. It is recommended to avoid traverse lesions in the snuff box region between 2.51 cm and 3.90 cm from the lister's tubercle. Height and depth of the lister's tubercle and extensor pollicis should be considered while doing surgeries of distal bone. Rupture in extensor pollicis longus causes the fracture pattern surrounding the lister's tubercle.

CONCLUSION

This study was conducted to know the morphological and morphometrical analyses of lister tubercle of radius bone. From the result we may come to the knowledge that length, breadth and diameter of the lister's tubercle of the right side of the radius bone is maximum when compared to the lister's tubercle of the radius bone of the left side. It is important to note during surgical procedure and it is mandatory to know the clinical relevance associated with it.

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CONFLICT OF INTEREST

The authors declare no conflict of interest.

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