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Research Article

To study different types of scapular glenoid fossa and their morphometric variations

Dr. Salah Eldeen Dafalla[1], Dr. Mohammed Shafat Ullah[2], Dr. Mohammed Noor Ullah[3*], Dr. Yousuf Begum[4], Dr. Saif Ullah[5]

[1]Assistant Professor, Department of Human Anatomy, Ibn Sina National College for Medical Sciences, University of Eastern Sudan for Medical Science and Technology, Jeddah, Saudi Arabia
[2]Assistant Professor, Department of Human Anatomy, Mahaveer Medical College, Vikarabad, Telangana, India
[3]Assistant Professor, Department of Human Anatomy, Government Medical College, Mahbubnagar, Telangana, India
[4]Assistant Professor, Department of Anatomy, College of Medicine, Imam Abdulrahman Bin Faisal University
[5]MDS, Prosthodontist and Implantologist, Sri Sai Dental College, Vikarabad, Telangana, India.

***Corresponding Author:** Dr. Mohammed Noor Ullah
*Assistant Professor, Department of Human Anatomy, Government Medical College, Mahbubnagar, Telangana, India

ABSTRACT:

Background and Objectives

There is a shallow angle on the side of the scapula that forms the pyriform articular surface of the glenoid hollow or fossa. The goal of this study is to look at how the scapula and glenoid space are built.

Material and Methods

This research was undertaken at the Department of Human Anatomy, Government Medical College, Mahbubnagar, Telangana, India.

This study was done from September 2023 to August 2024. This study examined a total of 100 dry human scapular glenoid fossae, comprising 60 from the right side and 40 from the left side. The vertical and transverse dimensions of the glenoid were measured, and the glenoid cavity index was computed. The morphology of the glenoid fossae was examined.

Results

The average distance from the front to the back and the average distance from the top to the bottom of the 100 scapulae that were studied in this study were 24.26 mm and 38.7 mm, respectively.

It was 61.8 mm for the Glenoid Cavity Index.Based on whether they had a glenoid notch or not, the glenoid fossae were categorized as either pear-shaped, oval-shaped, or inverted comma-shaped.

In this study, pears and inverted commas were the shapes that were seen the most often.

Conclusion

The findings of this study will improve surgery orthopedics by giving us more information about the glenoid fossa's anatomy.

It is important to look at all the different ways the glenoid fossa can be shaped and measured when evaluating shoulder problems, performing shoulder surgeries, and making and fitting shoulder prostheses.

Keywords: Morphometry, scapular glenoid fossa, prosthesis, shoulder arthroplasty

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INTRODUCTION:

The scapula is an important bone to study in anatomy, and it varies a lot between people of different races, ages, and developmental stages. In addition, looking at the size of the scapula can help you understand how different upper musculoskeletal problems happen [1-3]. The pyriform articular surface of the glenoid hollow or fossa is on the surface of the scapula's superficial lateral angle. This part of the upper limb is more likely to get hurt because it has a bigger vertical width [4-6].

Most of the time, people who have hurt their shoulders end up with glenoid cavity dislocation or fracture. Total shoulder replacement is the best way to reposition the anterior muscles, do overlapping healing, and strengthen the capsular ligaments during labrum reconstruction [7-9]. Different glenoid cavity shapes have been categorized by the appearance of a notch on the anterior glenoid rim. People have found that when the notch is clear, the glenoid labrum crosses the notch instead of being attached to its bony edge. Because of this, the shoulder joint may not be able to handle dislocation pressures as well [10-12].

There are big differences in the anatomy of the glenoid region depending on whether the notch on the front edge of the glenoid is present or absent. The shape of the glenoid hollow changes from person to person because of differences in anatomy. Because of this, the glenoid hollow can look like an ovoid, a pear, a teardrop, or an upside-down comma [11-13]. The glenoid notch, which marks the shoulder's joint surface where the scapula and coracoid meet, is more noticeable when the bones in the upper limb are first growing in. It has a unique center for ossification [12-14].

Full-thickness tears in the rotator cuff point to glenoid slope. The size of the glenoid hollow is important for predicting the outcome of glenohumeral osteoarthritis, rotator cuff problems, and shoulder dislocation. The sizes of the glenoid components are also necessary for planning shoulder arthroplasty. A glenoid osteochondral defect is often caused by sudden impact. This can lead to instability, labral tears, and intraarticular fragments [13-15].

Studies show that roentgenograms show the injury in 20% of people who have unstable shoulder mobility on one side. How the matching prosthesis is placed and shaped depends on the glenoid fossa's height, width, slope, and shape. There are big changes between people in these areas, which means that prosthesis designs, tools, and ways of implanting them during surgery are also very different [14-16].

MATERIAL AND METHODS:

This research was undertaken at the Department of Human Anatomy, Government Medical College, Mahbubnagar, Telangana, India. This study was done from September 2023 to August 2024. The current study examined 100 dry human scapular glenoid fossas, 60 of which were on the right side and 40 on the left. The glenoid cavity index was computed, along with measurements of the vertical and transverse glenoid diameters. The form of glenoid fossae was noted.

Inclusion Criteria:

- Patients with the scapular glenoid fossa
- Patients above the age group 18 years

Inclusion Criteria:

- Patients with the no scapular glenoid fossa
- Patients below the age group 18 years

RESULTS:

The study looked at 100 dry scapular glenoid fossas from people, with 60 from the right side and 40 from the left. The glenoid cavity index was found by measuring the diameters of the glenoid in both the vertical and horizontal directions. The shape of the glenoid fossae was looked at.

Table 1: Side wise different parameters distribution

Sr. No.	Side	Vertical glenoid diameter (mm)	Transverse glenoid diameter (mm)	Glenoid cavity index (%)
1	**Right**	34.2	21.3	65.1
2	**Left**	38.4	22.8	60.5
3	**Average**	36.2	22.2	61.4

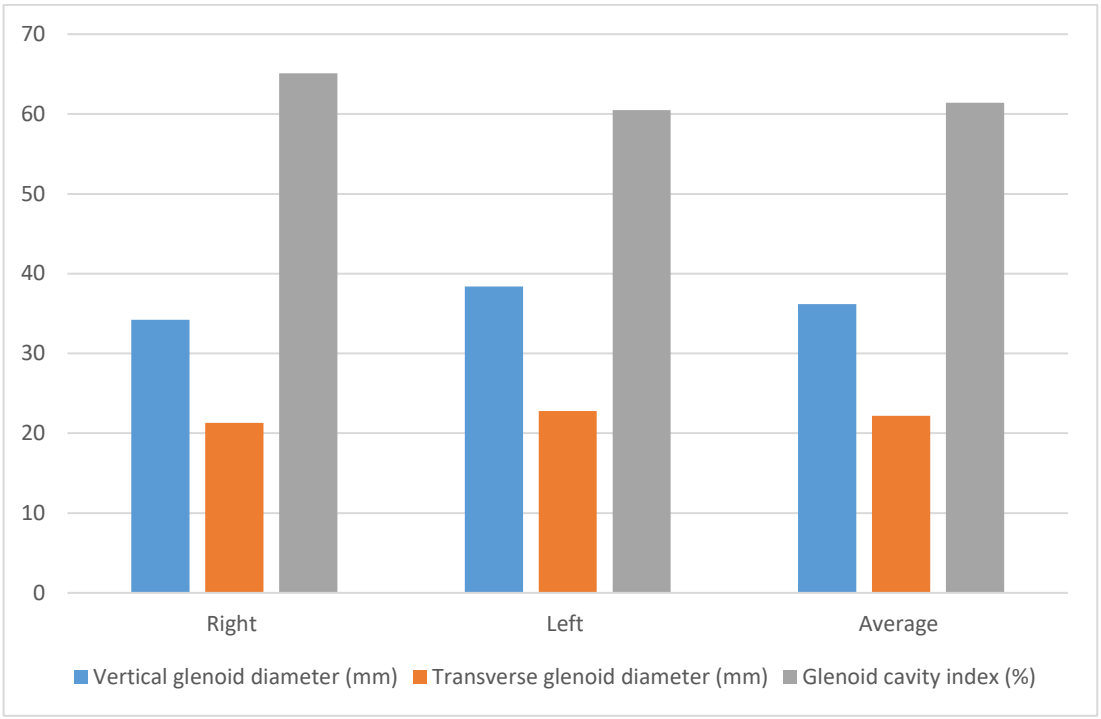

Figure 1: Side wise different parameters distribution

Table 1 presents the distribution of many characteristics, including the right side measurements: vertical glenoid diameter at (34.2, 38.4 and 36.2), transverse glenoid diameter at (21.3, 22.8 and 22.2), and glenoid cavity index at (65.1, 60.5 and 61.4), respectively.

Table 2: Shape wise patient distribution

Sr. No.	**Shape (%)**	**Left**	**Right**
1	Inverted comma	20	15
2	Pear	30	10
3	Oval	10	15
	Total	**60**	**40**

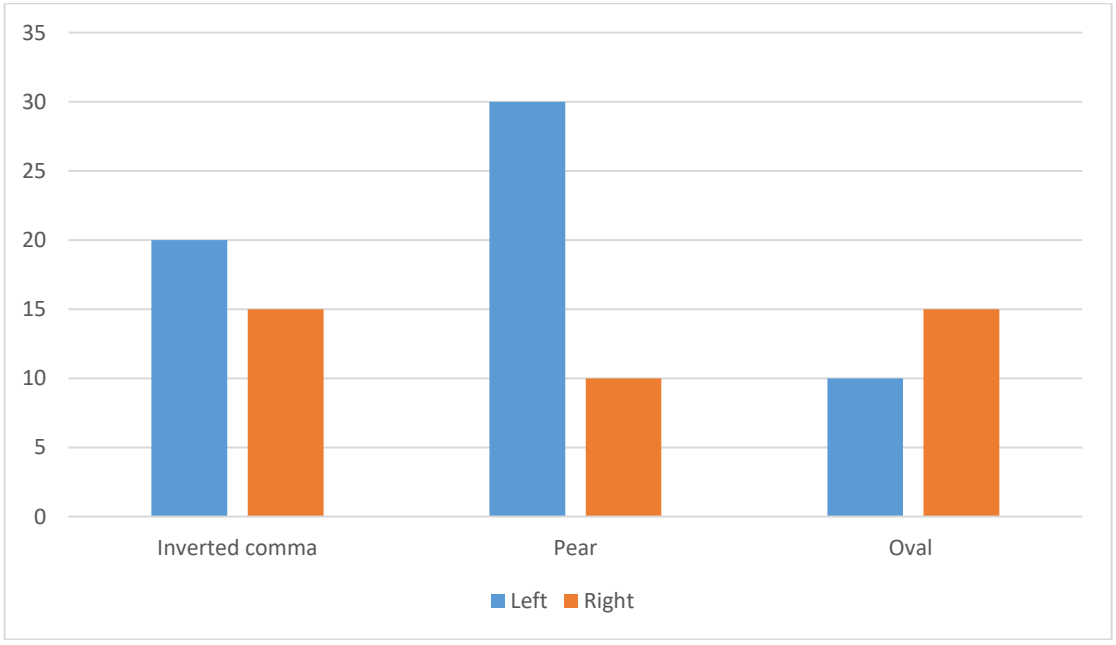

Figure 2: Shape wise patient distribution

Table 2 presents the distribution of patients by shape, including the left side with counts of 20, 30, and 10 for the shapes denoted as "Inverted comma," "pear," and "oval," respectively. The right side features 15, 10, and 15, accompanied by inverted commas, a pear, and an oval, respectively.

DISCUSSION:

Within the scope of this investigation, the right glenoid fossa displayed a mean vertical diameter of 35.3 millimeters. When measured vertically, the left glenoid fossa has an average diameter of 35.4 millimeters. the 100 scapulae that were studied in this study were 24.26 mm and 38.7 mm, respectively. It was 61.8 mm for the Glenoid Cavity Index. The standard deviation of the transverse glenoid diameter on the right side of the study was 22.9 millimeters, which was lower than the average of 24.0 millimeters on the left side of the study, which was greater than the lower value. Within the scope of this inquiry, the average percentage of the glenoid cavity index on the right side was found to be 64.9% respectively [17-19].

This notch is not an unusual anatomical difference; rather, it is a common deviation from the norm. When there is no notch present, the glenoid cavity is circular or elliptical in shape. However, when the notch is present, the glenoid cavity takes on a pear-shaped or inverted comma-shaped shape. The glenoid labrum is not attached to the bony edges of the glenoid cavity; rather, it extends over the notch that is present in the labrum [20-22]. There is a possibility that this particular labrum attachment affects the shoulder joint's ability to withstand stresses that cause dislocation. Earlier, Prescher conducted an investigation into this characteristic and decided to divide the form of the glenoid cavity into two distinct categories: round and pear, with or without a noticeable notch. There are two distinct morphologies that have been identified for the glenoid cavity: round and pear-shaped variations. There is a noticeable but not overpowering presence of the glenoid notch, which may be seen in 76% of instances on the left side and in 80% of cases on the right side [23-25].

According to the findings of the present investigation, glenoid cavities can be organized into three distinct shapes: round, pear, and inverted comma. When it comes to shoulder arthroplasty, the dimensions of the glenoid fossa provide essential information that is used in the design and fitting of the glenoid component [24-26]. In terms of the scapula, the average diameter of the superior-inferior region was 3.40±0.38 centimeters, with a mean of 3.49±0.432 centimeters on the right side and 3.30±0.33 centimeters on the left side. The superior and inferior diameters of the glenoid cavities present in males and females are distinct from one another. For the female glenoid, the mean and standard deviation were found to be 3.37±0.30 cm, while for the male glenoid, the mean and standard deviation were found to be 3.87±0.27 cm [25-27].

An evaluation was performed on the superior-inferior diameter. A range of 2.5 cm to 4.2 cm was shown in the findings that were displayed on the right side of the page. The average measurement was 3.36 cm, and the standard deviation was 0.28 cm [26-28]. An average of 3.39 centimeters and a standard variation of 0.28 centimeters were found for the superior-inferior diameter on the left side, which ranged from 2.6 to 4 centimeters. On the right side of the scapula, the average diameter of the anteroposterior glenoid was 2.19±0.29 centimeters, while on the left side, the average diameter was 2.06±0.295 centimeters [29-32].

CONCLUSION:

The glenoid cavity index on the left side was measured in this study, and the average percentage was 67.8%, which was higher than the lower value. The pear-shaped glenoid fossa is the major morphology of the glenoid fossa bilaterally in this study. This morphology is related with the inverted comma, which is the second most prevalent morphology, and it connects with the oval, which is the least frequent formation. Because of the broad humeral head and the shallow glenoid fossa, the shoulder joint comes with a natural tendency to be unstable. The notch that is located on the front margin of the glenoid rim is the cause of labral tears. This notch prevents the glenoidal labrum from being attached to the rim in a secure manner at all times. When it comes to diagnosing shoulder diseases, performing shoulder surgeries, and developing and fitting shoulder prostheses, it is vital to conduct a detailed examination of the variations in the shape and proportions of the glenoid fossa.

Conflict of Interest:

None

Funding:

None

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