

Case Report

Variation in origin of pectoralis minor muscle: a case report

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Received: 07 February 2025

Revised: 10 March 2025

Accepted: 12 March 2025

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ABSTRACT

Pectoralis minor is a slender, triangular muscle deep within the pectoralis major. It originates from the exterior surfaces of the third through fifth ribs, in the vicinity of their cartilages and fascia covering the adjacent external intercostal muscles. Under the pectoralis major's cover, its fibres climb laterally and converge into a flat tendon linked to the medial border and top surface of the scapula's coracoid process. A portion of the tendon may cross the coracoid process and enter the coracoacromial ligament. In regular dissection muscles of the pectoral region were observed and the pectoralis minor muscle variation was noted. Out of 10 cadavers, a male cadaver showed bilateral variation in the origin of the pectoralis minor muscle. In this case, we found the origin of the pectoralis minor muscle was from the outer surface of the second to fifth rib, near their cartilages. The present case is a rare anomaly and is being reported as this knowledge is of importance great importance to surgeons, orthopedics and sports medicine as it could lead to shoulder pain, rotator cuff pathologies, winging of scapula, impingement of neurovascular bundle known as pectoralis minor syndrome.

Keywords: Pectoralis minor, Variation, Muscle origin

INTRODUCTION

The pectoralis minor is a slender, triangular muscle deep within the pectoralis major. It originates from the exterior surfaces of the third through fifth ribs, in the vicinity of their cartilages and fascia covering the adjacent external intercostal muscles. Under the pectoralis major's cover, its fibers climb laterally and converge into a flat tendon linked to the medial border and top surface of the scapula's coracoid process. A portion of the tendon may cross the coracoid process and enter the coracoacromial ligament. A variation in the number of muscle slips can be seen occasionally or muscle may be absent.¹ The pectoralis minor anatomically acts as landmark point for deeper structures, such as the medial pectoral nerves, axillary arteries, and the cords of the brachial plexus. Some researchers have linked the rotator cuff syndrome to a variation in the insertion of the pectoralis minor during surgical procedures. The anatomical variations in the pectoralis minor muscle may have important implications

during surgical procedures, including modified radical mastectomy.²

CASE REPORT

A regular dissection procedure of the upper limb following guidelines of Cunningham's manual was performed in the Anatomy Dissection Hall of PGIMS Rohtak, Haryana, India, on a 55-year-old male cadaver of Indian origin. The pectoral region muscles were observed, while advancing through the routine steps of dissection it showed bilateral variation in origin of the pectoralis minor muscle.

Out of 10 cadavers only a male cadaver showed bilateral variation in the origin of the pectoralis minor muscle, we found the origin of the pectoralis minor muscle from the outer surface of the second to fifth rib, near their cartilages (Figures 1 and 2). No variation was found in the insertion, the blood supply or the nerve supply.



Figure 1: Pectoral region of right side.



Figure 2: Pectoral region of left side.

DISCUSSION

The present case is a rare variation and is being reported as knowledge of such anomalies is of great importance to surgeons, orthopedics and sports medicine personnel as the lateral rotation of the shoulder and hyperabduction can cause stretch or impinge the neurovascular structure underneath known as pectoralis minor syndrome, shoulder pain, rotator cuff pathologies, winging of scapula.

Another such variation reported bilateral variation in the origin of the pectoralis minor in a similar fashion as in our study where the origin of muscle was from the 2nd to 4th ribs and costochondral junction.³

In another case variation in the origin was noted on a 60-year female cadaver, from the costal cartilage of the second to fifth ribs close to their costochondral junction on both sides, pectoralis minor. In 6 limbs out of 19 variations were seen on insertion.⁴

In a case series on 131 cadavers in Japan, it was observed that origin of the pectoralis minor muscles was from 1st to 6th ribs and the attachment was near the cartilage of these ribs along with the aponeurosis covering the intercostal muscles, with most common being origin from 2nd to 5th rib in males and 2nd to 4th rib in females.⁵

A case report was made showing the variation in a 96-year-old female cadaver where both side of the pectoralis minor muscle showed different insertion. The insertion of right pectoralis minor was type 2 and left was type 1 varieties as described by Le Double in 1897.⁶

In the case of a female cadaver, bilateral additional thin long musculotendinous slip was observed from 5th and 6th rib on left and 5th rib on right. Fibres from slips blended with the lateral border of the pectoralis minor muscle.⁷

In another case of a Filipino male cadaver bilateral variation in the pectoralis minor was seen where on the right origin of muscle was from 2nd – 5th rib along with adjacent intercostal muscles and on the left no muscle was found and instead strong and thickened fascial sheath was present.⁸

In a 65-year female cadaver variation of the pectoralis minor muscle was seen both at the origin and the insertion on left side. The origin of the muscle was from 3rd and 4th rib along with the fascia over 2nd and 3rd interspace. The fibres attached to the middle portion of inferior surface of the clavicle after passing over the 2nd rib and some fibres attached to the costocoracoid ligament. On right the origin of the muscle was similar to that of left side with only variation in the insertion which was at the lateral border of the coracoid process.⁹

Another such variation was seen in a female cadaver, where multiple anomalous attachments were seen including those of the pectoralis minor which showed an additional blending of its tendon with the coracobrachialis and the short head of biceps brachii. An additional muscle was noted above and parallel to the pectoralis minor with its origin from first costochondral junction and insertion at the coracoid process. It was designated as the pectoralis minimus.¹⁰

There is also variation seen in insertion of pectoralis minor, which may cause clinical symptoms. It can attach to the coracoacromial ligament, the supraspinatus, the capsule of the glenohumeral joint, the tubercles of the humeral head and glenoid labrum. Another case of 20-year-old male showed ectopic insertion of pectoralis minor on magnetic resonance imaging (MRI) and ultrasound of shoulder which led to pain at shoulder. Tendon of the pectoralis crossed the coracoid process and attached on the supraspinatus muscle.¹¹

CONCLUSION

This case represents a rare variation and is being reported because understanding such anomalies is crucial for medicine professionals for awareness regarding their potential medical impact on diagnosing and treating shoulder conditions. This study emphasizes the importance of a deep understanding of pectoral muscle anatomy and awareness of its variations, which may be crucial in clinical practice. Recognizing these variants

during surgery or prior via magnetic resonance imaging (MRI), CT arthrography or ultrasonogram (USG) can help reduce complications and improve patient outcomes and decrease risk of iatrogenic tendon injury. The lateral rotation and hyperabduction of the shoulder can stretch or compress the neurovascular structures beneath, leading to conditions like pectoralis minor syndrome, shoulder pain, rotator cuff issues, and scapular winging. This variation of origin can be one of the etiologies for shoulder stiffness or discomfort.

Funding: No funding sources

Conflict of interest: None declared

Ethical approval: Not required

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Cite this article as: Agrawal S, Singroha R, Garsa V, Rathee SK, Sran S. Variation in origin of pectoralis minor muscle: a case report. Int J Res Med Sci 2025;13:1721-3.