

Case Report

BILATERAL PECTORALIS MINOR MUSCLE VARIANT

David R Terfera ^{*1}, Anton Alder ², Kevin R Kelliher ³.

^{*1} Assistant Professor, College of Naturopathic Medicine, University of Bridgeport, Bridgeport, CT 06604.

² College of Naturopathic Medicine, University of Bridgeport, Bridgeport, CT 06604.

³ Assistant Professor, College of Chiropractic, University of Bridgeport, Bridgeport, CT 06604.

ABSTRACT

During a routine anatomical dissection we discovered an aberrant muscle slip associated with the pectoralis minor muscle that occurred bilaterally. The muscle slips originated from ribs five or six and inserted into the tendon of the coracobrachialis in close proximity the coracoid process of the scapula. Fibers of the muscle slip also blended with the pectoralis minor muscle on its lateral border. The muscle slips were innervated by the medial pectoral nerve. Reports and documentation of anatomical variants such as this provide an important resource for both researchers and clinicians.

KEY WORDS: Pectoralis Minor, Variant, Axilla, Coracobrachialis.

Address for Correspondence: David Terfera, Ph.D., University of Bridgeport, College of Naturopathic Medicine, 60 Lafayette Street, Bridgeport, CT 06604.

E-Mail: dterfera@bridgeport.edu

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INTRODUCTION

The pectoralis minor is a thin triangular muscle located deep to the pectoralis major muscle. It attaches to ribs three, four and five near the costochondral junction and courses superolaterally to insert on the coracoid process of the scapula [1]. It forms part of the anterior wall of the axilla and is an important anatomical landmark that defines the parts of the axillary artery and levels of pectoral axillary lymph nodes.

Variants of the pectoralis minor muscle that are recorded in the literature are generally associated with unique insertions of the muscle onto structures other than the coracoid process of the scapula. These ectopic insertions included the supraspinatus tendon, coracoacromial ligament, humeral tubercles, and clavicle [2-7].

In addition to the variants of the pectoralis minor muscle, supernumerary or accessory muscles that originate on the anterior thorax and insert on the bones, ligaments, and tendons that comprise the shoulder are also frequently reported in the literature. [2-4, 8-10]. In this report, we describe the occurrence of a unique musculotendinous slip muscle that arose as supernumerary muscle fibers from ribs five and six and coursed superolaterally to blend with the lateral border of the pectoralis minor muscle and also inserted via a tendon to the fascia of the coracobrachialis muscle.

Many of the muscular variants reported in the literature are discovered during routine cadaveric dissection and are of great interest to anatomists and developmental biologists. However, recognizing and understanding both

normal and variant anatomy of the anterior thorax and axilla is of critical importance to health care professionals when diagnosing, imaging, or surgically treating these areas.

CASE REPORT

During the thoracic dissection of a female cadaver, bilateral musculotendinous slips associated with the pectoralis minor muscles were observed. Both the left and right pectoralis minor muscles originated from ribs two through four and inserted on a slightly raised tubercle on the coracoid process (Figure 1A). Lateral to both the right and left pectoralis minor muscles, a thin long musculotendinous slip attached to the ribs (Figure 1A). The left musculotendinous slip originated from the ribs five and six and measured 21 cm. The musculotendinous slip on the right side originated from rib five and measured 18 cm. Due to the lack of preservation during the dissection process, it is unclear if the right musculotendinous slip also extended to rib six. The insertion of the right and left tendinous portion of the musculotendinous slips was to the fascia of the coracobrachialis near its attachment to the coracoid process (Figure 1B). Fibers from each musculotendinous slip blended with the adjacent belly of the pectoralis minor muscles along its lateral border (Figure 1 A and

B). The pectoralis minor muscles were innervated by the medial pectoral nerve. Branches of the medial pectoral nerve extended beyond the pectoralis minor muscles and innervated the musculotendinous slips (Figure 1 C).

DISCUSSION

In this case, we describe the occurrence of bilateral variants of the pectoralis minor muscle discovered during a routine dissection of a female cadaver. These variants consisted of a musculotendinous slips that originated on the ribs and blended with the lateral border of the pectoralis minor muscles. Interestingly, these musculotendinous slips also possessed tendons that inserted onto the fascia of the coracobrachialis muscles. The innervation of the musculotendinous slips was provided by branches of the medial pectoral nerve suggesting that these musculotendinous slips may be derived from the pectoralis minor muscle. Pectoralis major and minor muscles both develop from the pectoral premuscle mass derived from the 5th through 7th cervical myotomes [11]. The premuscle mass forms a single mass that attaches to the humerus, coracoid process and the developing clavicle. The proximal portion of the muscle splits into major and minor portions with the

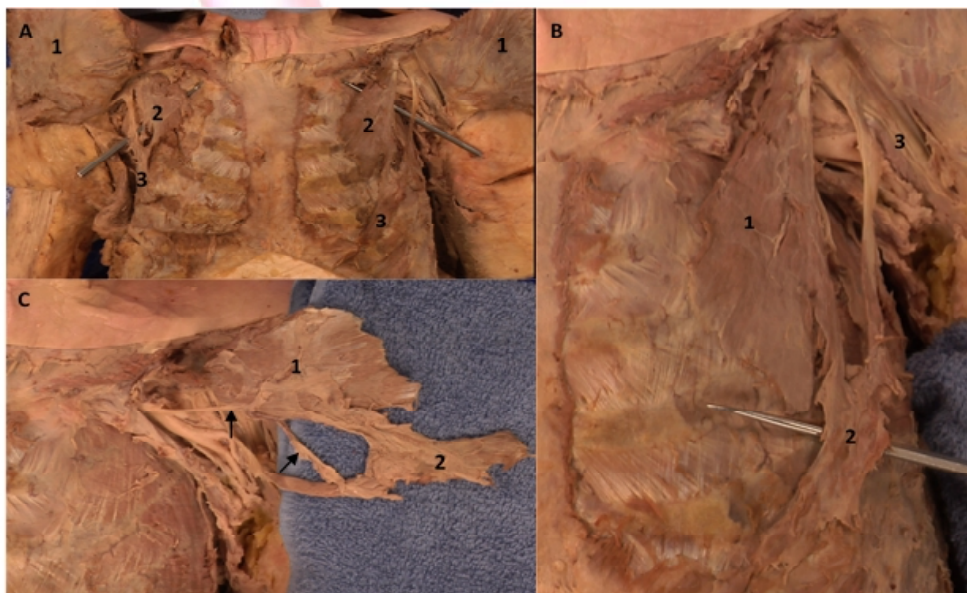


Fig. 1 A: Anterior view of the pectoral region with pectoralis major muscle (1) reflected. Pectoralis minor muscle (2), anomalous muscular slips (3). **B:** Anterior view of left pectoralis minor muscle (1) and ligamentous blending of anomalous muscular slip (2) with coracobrachialis muscle (3) prior to coracoid insertion. **C:** Reflection of the pectoralis minor (1) and the anomalous muscular slip (2) innervated by branches of the medial pectoral nerve (arrows).

major attached by a tendon to the humerus and the minor to the coracoid process [11]. The musculotendinous slip in our case is may be due to an incomplete separation of the major and minor muscles.

Many accessory muscles in the pectoral region have been reported in the literature. Bannur BM et al. recently reported an accessory muscle of the pectoral region that originated at the costochondral junction of ribs five and six, fused laterally with pectoralis minor muscle, and inserted onto the coracoid process [8]. This muscle variant was only discovered on the right side and did not attach to the coracobrachialis muscle. Hardy MA and Fabrizio PA described an accessory muscle of the thoracic wall with an origin on the aponeurosis of the external oblique abdominal muscle that inserted on the coracobrachialis fascia [9]. This accessory muscle did not blend with the pectoralis minor. The pectoralis minimis is a rare muscle variant that extends from the first rib to the coracoid process [12, 13]. Also rare are reports of the pectoralis tertius muscle [4, 10]. Del Sol M and Vasquez B recently described two occurrences the pectoralis tertius muscle [10]. One pectoralis tertius muscle arose near the costochondral junction of the fifth and sixth rib and inserted onto the coracoid process, greater tubercle of the humerus, and fascia of the pectoralis minor. The second pectoralis tertius muscle arose from the costochondral junction of the fifth through seventh ribs and the external oblique abdominal muscle and inserted on greater tubercle of the humerus. Due to its attachment to the humerus, this accessory muscle is described as a costobrachialis muscle [10]. The chondro-coracoid muscle is muscle rarely described in the literature. Wood J described this variant as arising from the sixth ribs and aponeurosis of the external oblique abdominal muscle and inserting as a tendon into the fascia covering the origin of the coracobrachialis [2]. This muscle was described as being completely independent of the pectoralis minor muscle. What was unique about the musculotendinous slips described in our report is that they blended with the pectoralis minor muscle and yet retained an independent insertion on the fascia of the coracobrachialis

muscle.

Many pectoral muscle variants are discovered during routine dissection and are recognized by surgeons but their impact on shoulder function is considered negligible. However, ectopic insertions of the pectoralis minor muscle and supernumerary muscles in the anterior thorax and axilla have clinical implications. Insertion of the pectoralis minor muscle to the supraspinatus muscle has been shown to be responsible for shoulder pain and stiffness [14]. Tenotomy of this pectoralis minor muscle relieved symptoms and increased the range of motions during external rotation of the shoulder. Anomalous insertions of the pectoralis minor muscle have also been reported to cause impingement syndrome [15], superior labrum anterior to posterior (SLAP) lesions [16], and shoulder pain and clicking [17]. Even the normal attachment of the pectoralis minor muscle to the coracoid process has the potential to compress the axillary artery and branches of the brachial plexus thus mimicking the symptoms of thoracic outlet syndrome (TOS) [18-20]. The pectoralis minor muscle is also used as a muscle flap during the reconstruction of the breast and axilla [21, 22]. Knowledge of pectoralis muscle variants allows surgeons to be better prepared to adapt procedures and properly incorporate or utilize the variant to the benefit the patient during surgery.

CONCLUSION

In the present case, it is undetermined if the presence of the musculotendinous slips had any clinical implications. However, it is important to document such variants to increase the awareness among clinicians of their potential impact in the diagnosis and treatment of the shoulder. Recognizing the potential to encounter variants in the pectoral region during surgery would also reduce complications resulting in better patient outcomes.

Conflicts of Interests: None

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