Multiple variations of the tendons of the anatomical snuffbox

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INTRODUCTION

Multiple tendons of the abductor pollicis longus (APL) in the anatomical snuffbox of the wrist can lead to the development of de Quervain’s syndrome, which is caused by stenosing tenosynovitis. A cadaveric study was performed to establish the variations present in the tendons of the anatomical snuffbox in a Malaysian population, in the hope that this knowledge would aid clinical investigation and surgical treatment of de Quervain’s tenosynovitis.

METHODS

Routine dissection of ten upper limbs was performed to determine the variations in the tendons of the anatomical snuffbox of the wrist.

RESULTS

In all the dissected upper limbs, the APL tendon of the first extensor compartment was found to have several (3–14) tendon slips. The insertion of the APL tendon slips in all upper limbs were at the base of the first metacarpal bone, trapezius and fascia of the opponens pollicis muscle; however, in seven specimens, they were also found to be attached to the fleshy belly of the abductor pollicis brevis muscle. In two specimens, double tendons of the extensor pollicis longus located in the third extensor compartment were inserted into the capsule of the proximal interphalangeal joints before being joined to the extensor expansion. In two other specimens, the first extensor compartment had two osseofibrous tunnels divided by a septum that separated the APL tendon from the extensor pollicis brevis tendon.

CONCLUSION

Multiple variations were found in the anatomical snuffbox region of the dissected upper limbs. Knowledge of these variations would be useful in interventional radiology and orthopaedic surgery.

Keywords: abductor pollicis longus, extensor pollicis brevis, extensor pollicis longus, tendon

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specimens (specimens 1–4 and 7–9), the APL tendon slips were also found to be inserted into the fleshy belly of the abductor pollicis brevis (APB) muscle (Fig. 3).

In specimens 9 and 10, the tendon of the EPL, which is usually single, was found to be double and located in the third extensor compartment. The tendons were inserted into the capsule of the proximal interphalangeal joints before being joined to the extensor expansion (Fig. 4). No variation was found in the EPB muscle. In specimens 4 and 5, the first extensor compartment was found to have two osseofibrous tunnels divided by a septum that separated the tendon of the APL from that of the EPB (Fig. 5).

**DISCUSSION**

In this study that focused on multiple variations of the anatomical snuffbox of the wrist, we found supernumerary tendon slips of the APL, ranging from 3 to 14 slips, in the ten upper limb specimens dissected. Multiple variations of the APL are common; five, six, and nine APL tendon slips have previously been reported. Mansur et al have suggested that these supernumerary tendons are clinically important in reconstructive surgery. Mehta et al proposed that when supernumerary tendons were present, injury to a single tendon would not disturb the normal function of the thumb, as the additional tendons would supplement the functional capacity...
of APL tendons. According to Mansur et al, the presence of multiple APL tendons may have functional significance in the development of de Quervain’s stenosing tenosynovitis. They also suggested that multiple tendons of the APL might modify the force component, thus altering the mechanics of the thumb.

In this current study, the insertion of the APL tendon slips in all the upper limbs was at the base of the first metacarpal bone, trapezium and fascia of the opponens pollicis muscle. Apart from the aforementioned insertions, the tendon slips in seven specimens were found to be also attached to the fleshy belly of the APB. Similar findings have been reported by Kocabiyik et al. Likewise, Mansur et al had also reported APL tendon insertions at the lateral and anterolateral sides of the base of the first metacarpal bone, trapezium, opponens pollicis, APB and thenar fascia.

During the early developmental period, the APL tendon is divided into three strips, with the middle strip inserted into the trapezium and the dorsal strip attached to the first metacarpal bone. The palmar strip, which is connected to the opponens pollicis, is disconnected when new connections with the APB are established. It is possible that such persistent tendinous patterns can lead to multiple tendons being observed later in life.

We found double tendons of the EPL in the third extensor compartment of two specimens. Nishijo et al had also reported duplicated EPL tendons that passed medial to the APL and were inserted into the interphalangeal joint. Although a normal tendon is usually strong, the EPL may rupture due to added friction imposed on it, for example in Colles fracture, which is normally treated by tendon transfer surgery. However, it is possible that in individuals who have an additional tendon, a ruptured tendon may actually be compensated by the second tendon, thus maintaining proper functioning of the thumb.

The first extensor compartment usually contains the tendons of the EPB and APL in a single compartment. In two of the specimens in our study, the first extensor compartment was divided by a septum into two separate tunnels instead of a single compartment. Similarly, a study by Nayak et al found that in 34.6% of the upper limbs (n = 54), the tendons of the EPB were separated from the APL tendons by an osseofibrous septum in the first extensor compartment. Kulthanan and Chareonwat have suggested that the presence of multiple compartments in the first extensor compartment may be clinically significant, as it may predispose one to de Quervain’s syndrome. The authors reported that the presence of sub-compartments was more commonly seen in patients with de Quervain’s syndrome than in the normal population (58% vs. 37%). Septation in the first extensor compartment may also affect nonoperative treatment of the wrist, as the septum may limit the delivery of any injected steroid into these compartments.

To conclude, multiple variations, including supernumerary tendon slips of the APL, insertion of the APL to the APB, double EPL tendons and the presence of fibrous septum in the first extensor compartment, were seen in the anatomical snuffbox region of the upper limbs dissected in our study. The existence of multiple tendons and the presence of septation in the compartment might be clinically significant for the treatment of de Quervain’s syndrome. Detailed knowledge of these variations will not only aid interventional radiology (e.g. help radiologists in diagnosing tendon rupture), but also orthopaedic surgery (e.g. during tendon reconstructive surgery).

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