An anomalous muscle in the hand that can cause carpal tunnel syndrome: A case report

P Shetty, SB Nayak*, MR D'Souza, R Thangarajan, GS Prabhu

Abstract
Introduction
Intrinsic and extrinsic muscles of the hand show frequent variations. Knowledge of these muscle variations is important during diagnosis and treatment of carpal tunnel syndrome, hand surgery and some plastic surgery procedures. We report here the presence of an anomalous muscle in the hand between the first and second lumbricals.

Case report
The flexor digitorum superficialis had five tendons and the two lateral-most tendons among them gave origin to this abnormal muscle of the hand. The fleshy belly of the muscle was supplied by a branch of the median nerve. Distally the tendon of the anomalous muscle and most of the lateral tendon of the flexor digitorum superficialis muscle merged with the second tendon of the flexor digitorum superficialis muscle. The common tendon was inserted to the base of the middle phalanx of the index finger. Further, the first lumbrical had two heads: a lateral head and a medial head. The lateral head took its origin from the lateral-most tendon of the flexor digitorum profundus muscle and the medial head took origin from the lateral part of the fleshy belly of the abnormal muscle. Its insertion and nerve supply were normal.

Conclusion
The abnormal muscle can produce a bulge in the palm and it might compress the median nerve in the carpal tunnel, resulting in carpal tunnel syndrome.

Introduction
Wide ranges of accessory muscles of the forearm have been described in anatomical, surgical and radiological literature. In most of the cases, these additional muscles are asymptomatic but in some cases, they produce clinical symptoms. They may occur as a palpable soft swelling near or in the carpal tunnel with or without symptoms of neurovascular compression. In symptomatic cases, recognition and careful evaluation of the accessory muscle with electromyographic examination may help in diagnosis and proper planning of the treatment. Anomalies of the flexor digitorum superficialis muscle are extremely rare and were first reported by MacAlister in 1868 and subsequently by Graper in 1917 and Mainland in 1927. The anomalous bellies arising from flexor digitorum superficialis might show a tender mass in the palm. Magnetic Resonance Imaging (MRI) may be of great use in knowing the extent and exact nature of the muscle. Partial or complete surgical resection of such muscles can reduce the symptoms. We report an anomalous muscle belly arising from the flexor digitorum superficialis that could be a potential source of carpal tunnel syndrome.

Case report
During routine dissection classes for medical undergraduates, we found an anomalous muscle between the first and second lumbricals of the right hand of an adult male cadaver, aged approximately 60 years (Figure 1). The flexor digitorum superficialis muscle had five tendons and the two most lateral tendons gave origin to this abnormal muscle of the hand (Figure 2). The fleshy belly of the muscle was supplied by a branch of the median nerve. Distally the tendon of the abnormal muscle and the lateral-most tendon of the flexor digitorum superficialis muscle merged with the second tendon (tendon going to index finger) of the flexor digitorum superficialis muscle. The common tendon was inserted to the base of the middle phalanx of the index finger. Further, the first lumbrical had two heads: a lateral head and a medial head. The lateral head took its origin from the lateral-most tendon of the flexor digitorum profundus muscle and the medial head took origin from the lateral part of the fleshy belly of the abnormal muscle (Figure 3). Its insertion and nerve supply were normal.

Discussion
It is very important for clinicians to be aware of the anomalous muscles in the forearm and hand. These muscles may simulate a ganglion or a soft tissue tumour. When they are closely related to the nerves, they may result in carpal tunnel syndrome or pressure neuritis. Many such anomalous symptomatic muscles have been reported. Stephens et al. have reported the presence of a symptomatic anomalous flexor digitorum superficialis. The symptoms were relieved by surgically debulking the muscle. An unusual muscle belly originating as a continuation of flexor digitorum superficialis tendon in the carpal tunnel and inserting normally into the middle phalanx has been reported by D’Costa et al. The
an anomalous muscle in the current case is totally different from this because, in the current case, the flexor digitorum superficialis had an additional tendon and two lateral-most tendons gave origin to the anomalous muscle. Its origin was in the forearm and it traversed the carpal tunnel. Since the muscle belly was in close proximity with the median nerve, there are chances for it to compress the median nerve in the carpal tunnel and produce the symptoms of carpal tunnel syndrome.

Lumbricals of the hand are peculiar muscles in the sense that they connect the flexor tendons with the extensor tendons. Variations in the attachment of lumbricals are common. In a study conducted by Mehta and Gardner, the lumbricals had an occasional origin in the forearm, from a metacarpal or from the flexor digitorum superficialis, instead of the deep flexor tendons and that the third and fourth lumbricals originated from a single tendon instead of two. Roy et al. have reported a bipennate first lumbrical in which the accessory head arose from the tendon of flexor digitorum superficialis of the index finger and the other main belly took origin, as usual, from flexor digitorum profundus. Nayak et al. also have reported a similar case. The bipennate first lumbrical observed in the current case is quite different from the previous reports because its accessory head arose from the anomalous muscle in the palm.

Figure 1: Dissection of the palm showing the abnormal muscle. (1, 2, 3, 4 – lumbricals; AM – anomalous muscle; MN – digital branches of the median nerve; TM – thenar muscles; UA – ulnar artery).

Figure 2: Dissection of the palm showing the origin of the abnormal muscle. (1, 2, 3, 4 – lumbricals; AM – anomalous muscle; MN – median nerve; A, B, C, D, E – 5 tendons of the flexor digitorum superficialis muscle).

Figure 3: Dissection of the palm showing the bipennate first lumbrical muscle. (LH – lateral head of the first lumbrical; MH – medial head of the first lumbrical; AM – anomalous muscle; MN – median nerve; TM – thenar muscles).
Conclusion
The current case is a combination of two variant muscles in the hand. The anomalous muscle that took origin from the additional tendon of the flexor digitorum superficialis might compress the median nerve in the carpal tunnel. The bipennate origin of the first lumbrical may not cause any clinical symptoms but what makes the case interesting is that the accessory head of the first lumbrical took origin from the anomalous muscle. Knowledge of these variations is important for plastic surgeons, hand surgeons and clinicians, in general.

References