

Compression of the Radial Branch of the Median Nerve Due to an Anomalous Muscle Belly of the First Lumbrical in a Child

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Abstract

Compression of the radial branch of the median nerve due to an anomalous muscle belly of the first lumbrical is a new diagnostic entity. We found this in the case of a 12-year-old girl with intermittent pain, weakness and paresthesias in the right hand. Provocative signs and symptoms in the distribution of only the radial branch of the median nerve are the most important signs distinguishing this case from carpal tunnel syndrome.

Key Words: Compression, median, nerve, lumbrical, pediatric.

Case Report

A 12-YEAR-OLD, RIGHT-DOMINANT female patient complained of 1½ years of intermittent pain, weakness and paresthesias in the right hand within two minutes of beginning to write, play the cello, or play the piano. Specifically, the paresthesias, weakness and pain were in the radial side of the index finger and thumb. Fifteen months before, she had had a “lesion” removed from the dorsum of the first metacarpophalangeal joint, a procedure that was meant to alleviate the above-mentioned symptoms. Before the operation, she and her parents saw no mass, but her sensitivity to range of motion of the thumb was temporarily diminished after the surgery and during four weeks of immobilization. Otherwise, her symptoms persisted.

On physical examination, she had a painless 1 cm transverse scar over the dorsum of the first metacarpophalangeal joint. Wrist compression sign was positive to the radial 1½ digits. In this test the examiner’s digit compresses the median nerve at the distal flexion crease of the palm for less than 30 seconds. A positive response includes reproduction of the patient’s symptoms in the sensory distribution of the median nerve, which normally includes the radial 3½ digits. Pressure over the radial branch of the median nerve at the distal-lateral edge of the transverse carpal ligament reproduced her symptoms, as did writing for less than a minute, holding a

bottle, or grasping the bow of her cello and playing, as she demonstrated.

X-rays of the hand and wrist showed no bony or soft tissue abnormalities. Magnetic resonance imaging (MRI) of the hand and wrist depicted thickening of the flexor tenosynovium within the carpal tunnel. At the time of surgery, the carpal tunnel was entered and the transverse carpal ligament incised, more radially than usual, due to the location of the patient’s Tinel’s sign. With the index finger extended, an elongated, anomalous hypertrophied first lumbrical was found (Fig. 1). Originating, as it normally does, from the index profundus tendon, its tendinous origin was found to extend from the distal forearm rather than from the area of the distal transverse carpal ligament. Its insertion into the lateral band at the proximal phalanx was not visualized, but was demonstrated by its passive action. The lumbrical’s greatest diameter lay dorsal to the radial branch of the median nerve at the distal radial edge of the transverse carpal ligament. To approximate the adjacent lumbrical in size, the portion of this elongated muscle that lay within the carpal tunnel and distal forearm was excised (Fig. 2).

Postoperatively, the patient’s preoperative symptoms disappeared. Six months postoperatively, she still had some symptoms of pillar pain. At 1½ years, the pain was gone.

Discussion

Children have been found to have carpal tunnel syndrome due to idiopathic thickening of the flexor tenosynovium; congenital anomalies of the lumbricals, carpal tunnel, and sublimi;

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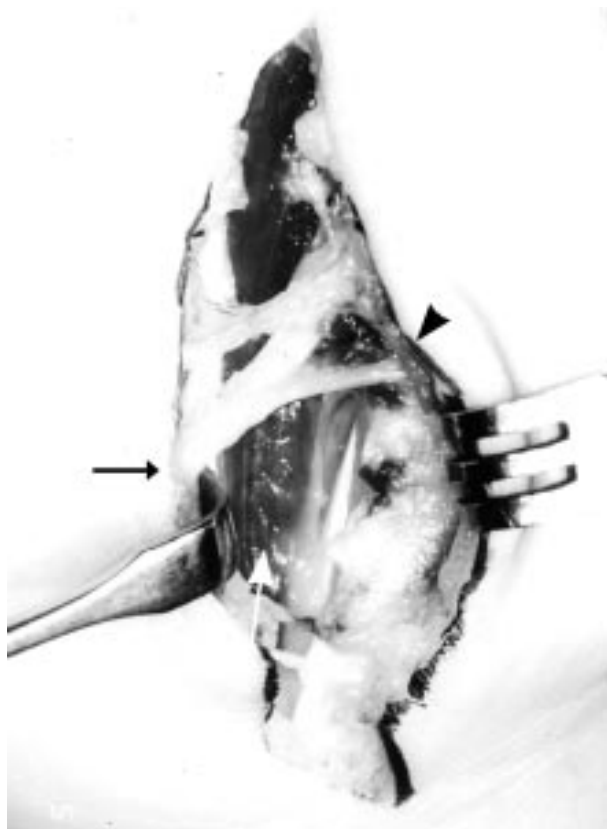


Fig. 1. The transverse carpal ligament has been sectioned and retracted with the skin. The first lumbrical muscle was seen on the floor of the carpal tunnel, dorsal to the radial branch of the median nerve. Thumb is to the right. Fingers are to the top. Wrist crease is at the bottom. White arrow points to the lumbrical. Black arrow points to radial branch of the median nerve, whose upper branch supplies the radial half of the index finger and thumb. The arrowhead points to the motor division of the radial nerve branch. Traversing the incision at its upper third is a cutaneous branch to the first web space.

mucopolysaccharidoses; hamartomas of the median nerve; and trauma (1–4). Among its three branches the median nerve has, as its radial-most division, a branch which includes the proper palmar digital nerve to the index finger, as well as the sensory and motor branches to the thumb and thenar muscles. Generally, the origin of the first lumbrical muscle from the profundus tendon of the index finger minimally encroaches on the outlet of the carpal tunnel. Due to its abnormal length in this case, its thickest portion came in contact with the radial branch of the median nerve at the distal edge of the transverse carpal ligament.

The positive Tinel's sign at the distal, radial transverse carpal ligament and the wrist compression sign limited to only the radial 1½ digits distinguish this neuropathological entity. In carpal tunnel syndrome, the first sign would have been negative and the second usually felt in the radial four digits.



Fig. 2. With the index finger in extension, the forceps exerts distally directed traction to the first lumbrical, pulling its proximal, tendinous origin from the level of the distal forearm to the level of the flexion crease of the wrist. Fingers are to the top. Thumb is to the right. Black arrow indicates proximal level of lumbrical at wrist crease. White arrow points to the lumbrical.

The importance of having the patient perform provocative maneuvers and activities during the physical examination is evident. Writing, playing the piano, and holding the bow when playing the cello, activated her anomalous first lumbrical, which lay on the dorsal surface of the radial branch of the median nerve, and compressed it against the distal margin of the transverse carpal ligament on the nerve's volar surface.

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