

# Elongated muscle belly of the flexor digitorum superficialis causing carpal tunnel syndrome

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**The online version of this article (doi:10.1007/s11552-012-9435-z) contains a video, which is available to authorized users**

## Abstract

**Background** Carpal tunnel syndrome (CTS) is by far the most common entrapment neuropathy (Adams et al. *Am J Ind Med* 25:527–536, 1994; Cheadle et al. *Am J Public Health* 84:190–196, 1994; Stevens et al. *Neurology* 38:134–138, 1988). A combination of described symptoms, clinical findings and electrophysiological testing is used to confirm the diagnosis. Several studies have suggested that in patients with a clinical diagnosis of CTS, the accuracy of nerve sonography is similar to that for electromyography (Chen et al. *BMC Med Imaging* 11:22, 2011; Guan et al. *Neurol Res* 33:970–953, 2011; Kele et al. *Neurology* 61:389–391, 2003; Tai et al. *Ultrasound Med Biol* 38:1121–1128, 2012). In special cases though, the nerve sonography can reveal the cause of the median entrapment neuropathy (Fumière et al. *JBR-BTR* 85:1–3, 2002; Kele et al. *J Neurosurg* 97:471–473, 2002; Kele et al. *Neurology* 61:389–391, 2003; Zamora et al. *J Clin Ultrasound* 39:44–47, 2011).

**Methods** A 43-year-old farmer was admitted to our department with 1 year of intermittent pain in the left hand and numbness of the thumb, index and middle finger. The pain

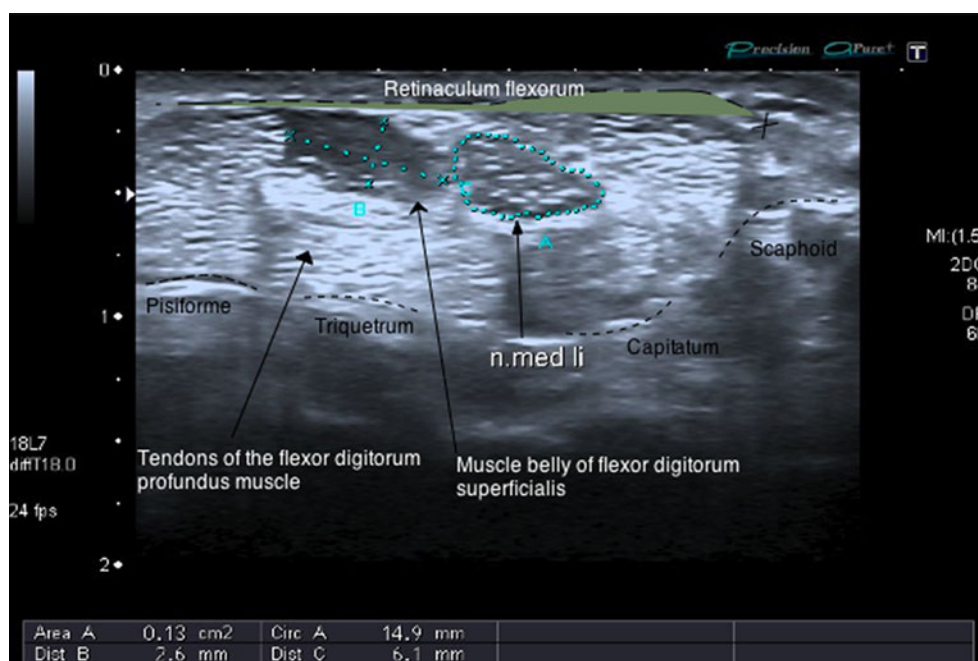
and the numbness could be reproduced by extension of the wrist and fingers. The electrophysiological testing revealed signs of an entrapment median neuropathy in carpal tunnel. **Results** The high-resolution sonography (18 MHz) revealed signs of entrapment neuropathy with increased cross-sectional area, disturbed echostructure of the nerve and pathological wrist-to-forearm ratio, confirming the results from a similar study (Kele et al. *Neurology* 61:389–391, 2003). In addition, an elongated muscle belly of the flexor digitorum superficialis in the carpal tunnel could be identified. During the extension of the wrist and fingers, a greater protrusion of the muscle belly could be demonstrated causing compression of the median nerve.

**Conclusions** We present a video case report of the sonographic findings of a patient diagnosed with carpal tunnel syndrome due to an elongated muscle belly of the flexor digitorum superficialis in the carpal tunnel. Our case highlights the importance of nerve sonography in the differential diagnosis of the cause of a carpal tunnel syndrome. With the aid of ultrasonography, it is possible to obtain very important information concerning different aspects of this case. First, in showing the presence of the elongated muscle belly of the flexor digitorum superficialis, the cause of the symptoms could be explained. Second, it was possible through the ultrasound study to explain the atypical clinical appearance in this case, demonstrating the compression neuropathy only after extension of the wrist and fingers. There have been no previous reports in which authors described an elongated muscle belly as cause of a CTS. Third, and perhaps most important, ultrasonography had a direct influence on our selection of therapeutical strategy and approach. As a result, we recommended in this patient a surgical therapy to completely solve the problem, but the patient declined this option and preferred a conservative therapy

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**Fig. 1** Still frame of the carpal tunnel, showing the different anatomic structures and the elongated muscle belly of flexor digitorum superficialis as the cause of the compression neuropathy of the median nerve



with a hand orthosis to prevent wrist extension. In conclusion we recommend ultrasonography as a very useful method in the diagnostic evaluation of carpal tunnel syndrome. We have clearly demonstrated that ultrasonography can be used to discover the cause of median nerve compression, especially in cases with an atypical clinical presentation.

**Keywords** Carpal tunnel syndrome · Median nerve neuropathy · Ultrasound

#### Video 1

- Cross-sectional scan with a 12-MHz probe of the median nerve in carpal tunnel
- A hypoechoic structure could be immediately be identified as an elongated muscle belly of the flexor digitorum superficialis in the carpal tunnel (Fig. 1).
- During the wrist and finger extension, a greater protrusion of the muscle belly of the flexor digitorum superficialis in the carpal tunnel could be demonstrated causing the entrapment neuropathy of the median nerve.

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