

## **Motor Innervation of the Short Muscles of the Thumb: Anatomic and Clinical Implications**

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### **Abstract**

**Background:** The motor innervation of the thumb muscles though important for the hand surgeon, yet it is still a subject of debate since median and ulnar nerves play variable roles.

**Objectives:** To describe the innervation of the short muscles of the thumb and the possible presence of a 1<sup>st</sup> palmar interosseous muscle. To correlate the variations of innervation to prognostic values in nerve diseases and injuries.

**Methods:** A dissection of 15 adult embalmed hands was performed. An EMG study on 42 hands of healthy volunteers was done in which the compound muscle action potential and the interference pattern were studied by sampling separate muscles.

**Results:** In (86.6%) of the dissections the muscular branch of the median nerve was the first branch in the palm. A median-ulnar anastomosis was found in (53.3%) of the dissected hands, demonstrated at different levels. In spite of special attention to reveal a first palmar interosseous muscle, it was not detected as a separate entity. In the EMG study, innervation showed considerable variations.

Adductor pollicis did not receive pure median innervation, it received the ulnar nerve in (90.5%) of the cases. Abductor pollicis brevis did not show a pure ulnar supply, it was mainly supplied by median nerve (66.7%). The highest percentage (66.7%) of a mixed innervation was shown in opponens pollicis.

**Conclusions:** The palmar median-ulnar anastomosis at different levels makes it vulnerable in surgical interventions. The absence of significant laterality in the mode of innervation of specific muscles may help the prognosis of the affected hand from an EMG study done on the contralateral side. The conventional EMG method does not specify the exact innervation of each muscle. From the prognostic point of view if the method used in this study is applied conventionally, the severity of the injury can be expressed in terms of muscles involved. Many muscles received mixed innervation and will retain their function on the long run.

**Key words:** thenar muscles, motor innervation, EMG

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### **Introduction**

The gripping mechanism of the palm is an important adjunct to manual dexterity. Of the hand digits, the thumb is as important as the rest of the digits. Functionally speaking, the most important movement of the thumb is opposition. Though many thumb muscles participate in this movement, the thenar muscles are chiefly responsible.

The intrinsic muscles of the thumb are quite ill-defined. The name of thenar

eminence is as vague as its content: while French and German speaking anatomists describe a superficial (external) thenar, comprising the abductor pollicis brevis, flexor pollicis brevis, opponens pollicis muscles and a deep (internal) one formed by the adductor pollicis, most English-speaking ones accept under the name of thenar only the first three muscles<sup>[1]</sup>.

The 1<sup>st</sup> palmar interosseous muscle in the thumb is still debatable. Some authorities have preferred to regard the 1<sup>st</sup> palmar interosseous muscle as a deep striation of flexor pollicis brevis<sup>[2]</sup>. This issue is to be further clarified herein.

In this study, the German speaking anatomists were followed so the short muscles of the thumb are counted as: opponens pollicis, flexor pollicis brevis,

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