Chapter 9

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In this thesis the communicating branch between the ulnar and median nerves in the palm of hand is viewed from different angles. In Chapter 1 a general introduction is given about this anatomical structure, which has already been known for almost 400 years and the renewed surgical interest with the introduction of endoscopic carpal tunnel release.

In Chapter 2 an anatomic study in 53 hands is described. The incidence, branching pattern and location of the communicating branch in the Dutch population were studied. A danger zone based on surface landmarks using morphometric data was established in which the communicating branch is at risk during surgery. A communicating branch was found in 50 out of 53 hands. It originated proximally from the fourth common digital nerve to join the third common digital nerve distally in 44 hands. In two hands the communicating branch left the third common digital nerve proximally to join the fourth common digital nerve distally and in the four remaining hands it traversed perpendicularly between the third and fourth common digital nerves.

In 90% of the hands the communicating branch crossed over in the middle third of the palm of the hand. As a cautious measure, hand surgeons should take into account that this structure could cross over anywhere in the middle three fifths of the palm.

We studied the microanatomy of the communicating branch in 26 adult cadaveric hands. The results are described in Chapter 3. Variations found were subdivided into three types and several subtypes according the classification of Meals and Shaner. Two new variations of the ramus communicans were observed. In the first, the ramus communicans originated proximally from the third common digital nerve to join the ring finger ulnar digital nerve and the little finger radial digital nerve distally. In the second variation, the ramus communicans traversed perpendicularly between the third and fourth common digital nerves with a crossover of nerve fibers.

After these anatomic studies we wondered if the communicating branch could also be demonstrated in vivo using the Semmes-Weinstein test. The palmar sensibility pattern of the digits assessed by Semmes Weinstein testing after a complete median or ulnar nerve transection was retrospectively investigated in 43 patients. The results are described in Chapter 4. Eight out of nine observed sensibility patterns could be explained by known anatomic types and subtypes of the communicating branch. The type of communicating branch but no definite subtype could be established in the one remaining pattern.
Chapter 5 is an elaborate comment on an original article by Laroy et al., which states that a mononeural innervation of the ring finger is highly unlikely.

Another way of mapping the communicating branch is by neurography. In Chapter 6 we describe an electrophysiological technique. In eight patients with carpal tunnel syndrome (CTS) and in four volunteers the hands were electrophysiologically tested. An orthodromical ring finger test was performed using a four-channel EMG device. In four CTS patients a type 1 communicating branch was found. A type 2 communicating branch was found in three healthy volunteers. In 48% of the investigated cases the communicating branch could be found with electrophysiological testing.

In Chapter 7 we describe the life of Pietro Berrettini di Cortona, a famous Baroquean painter, whose name is connected to this communicating branch. Until recent authors mentioned Berrettini’s anatomic plates of 1741 as the oldest illustrations of the communicating branch. In this chapter we conclude that the illustrations are probably much older and can be dated back to 1618. Also the eponym Berrettini-branch is questioned as we found a much earlier print from Charles Estienne dated 1545.

In the discussion, in Chapter 8, the results from the different studies are summarized and placed in a broader context.