

VARIATIONS OF THE ULNAR NERVE IN SUDANESE SUBJECTS

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Abstract:

The ulnar nerve is the continuation of the medial cord of the brachial plexus. Identification of variable sites of ulnar nerve variations has an important clinical significance such as recognition of injury and repair of their traumatic injury. Researches concerning ulnar nerve variations while are lacking, the other peripheral nerves have been discussed before by many researchers. So the aim of this study is to complete the picture by studying the ulnar nerve variations among Sudanese.

Fifty formalin-fixed cadaveric upper limb specimens were evaluated. The specimens prosected or none dissected were obtained from cadavers used for anatomy courses were included in this study irrespective of sex and age. All the specimens were dissected; the ulnar nerve was exposed throughout its course from origin up to its termination, and the variations in root values and site of termination were recorded and photographed.

Three specimens showed variations in the root values; all of them were unilateral; the variation was the values C7, 8 and T1 for each. This variations followed by cords origin variations; since the C7 contributes to the lateral cord the ulnar nerve in this cases was received fibers from it by two ways directly one specimen and indirect through the lateral root of the median nerve two specimens. The termination of the ulnar nerve by dividing into two terminal branches was found proximal to the wrist in 3 specimens.

Keywords: Ulnar nerve, Variations, Sudanese

1. Introduction:

The ulnar nerve is the continuation of the medial cord of the brachial plexus (Drake et al, 2007). It arises from the C8, T1 and often receives fibers from the ventral ramus of C7 (Moore and Dalley, 1999; Ellis, 2006; Sinnatamby, 2006) as a branch from the lateral cord, if these has not already passed to the medial cord from the anterior ramus of C7 (Sinnatamby, 2006; Bergman et al, 1988). It may be derived from the C8 only or from both the C7, 8 (Bergman et al, 1988). It often receives a communicating branch from the lateral root of the median nerve, originating from the lateral cord and carrying fibers from C7 (Drake et al, 2007).

It is the largest terminal branch of medial cord (Drake et al, 2007; Moore and Dalley, 1999; Tank, 2009). It has no branches in the upper arm (Drake et al, 2007; Moore and Dalley, 1999; Moore and Dalley, 1999; Ellis, 2006; Sinnatamby, 2006; Gray, 2005). It enters the posterior compartment of the upper arm midway down its length, by piercing the medial intermuscular septum and passes behind the medial epicondyle of the humerus to enter the forearm (Moore and Agur, 2007; Ali and Ali, 1998; Snell, 2004; Marieb and Hoehn, 2007; Hartwig, 2008). It passes to the wrist deep to flexor carpi ulnaris, giving branches to this muscle and to the ulnar half of flexor digitorum profundus (Drake et al, 2007; Moore and Dalley, 1999; Ellis, 2006; Sinnatamby, 2006). Just proximal to the wrist, it gives off a dorsal cutaneous branch that supplies the skin over the dorsal aspect of the little finger and the ulnar half of the ring finger (Drake et al, 2007; Moore and Dalley, 1999; Ellis, 2006; Sinnatamby, 2006). The ulnar nerve crosses into the palm superficial to the flexor retinaculum in Guyon's canal (Drake et al, 2007; Moore and Dalley, 1999; Ellis, 2006; Sinnatamby, 2006). It divides into a motor branch, which supplies the hypothenar muscles, the intrinsic (apart from the radial two lumbricals), and adductor pollicis, and cutaneous branches, which supply the skin of the palmar aspect of the little finger, and ulnar half of the ring finger (Drake et al, 2007; Moore and Dalley, 1999; Ellis, 2006; Sinnatamby, 2006). The ulnar nerve was divided into its terminal branches in the lower part of the forearm. The distribution of the terminal branches the ulnar nerve was normal according to Ramana, *et al* (Ramana et al, 2008).

Identification of variable sites of ulnar nerve variations has an important clinical significance, such as recognition of injury and repair of their traumatic injury (Guardia, 2010).

2. Material and methods:

Fifty formalin-fixed cadaveric upper limb specimens were evaluated. The specimens prosected or none dissected were obtained from cadavers used for anatomy courses were included in this study irrespective of sex and age. The specimens are dissected in the dissection room cadavers from department of anatomy at the universities and medical colleges in Khartoum state, Sudan. All cadavers were adult, and were preserved in 10-30 % formalin. All specimens looked normal, and free of any congenital developmental defects.

The cadavers were inspected to search and determine the variations of the ulnar. All the specimens were dissected; the ulnar nerve was exposed throughout its course from origin up to its termination, and the variations in root values and site of termination were recorded.

3. Results:

A total of 3 (6%) of the specimens were showed variations in the root values; all of them were unilateral 2 (4%) of the specimens were on the left side while one specimen equaling (2%) was on the right side, (fig. 1); the variations were about the values C7, 8 and T1 for each. These variations followed by cords origin variations; since the C7 contributes to the lateral cord the ulnar nerve in this cases were received

fibers from it by two ways directly one specimen "left side" (fig. 2) and indirect through the lateral root of the median nerve two specimens one of them right and the other was in the left side (fig. 3).

The termination of the ulnar nerve by dividing into two terminal branches was found proximal to the wrist in 3 (6%) of specimens (fig. 4); Two of specimens were in the left side while the right side was reported in one case.

4. Discussion:

4.1. Variations of the ulnar nerve according to root values and cords origin:

In the present study 3 of 50 equaling 6% showed variations in the root values all of them were unilateral, the root values were C7, 8 and T1 (Moore and Dalley, 1999; Sinnatamby, 2006; Gray, 2005). No cases found derived from C8 only or from both the C7, 8 (Bergman et al, 1988) in the current study.

In the present study 3 of 50 equaling 6% showed variations in the cord origin (Drake et al, 2007), all of them were unilateral; these variations followed the root values variations. Since the C7 contributes to the lateral cord the ulnar nerve, in this cases were received fibers from it by two ways directly one specimen (left side), and indirect through the lateral root of the median nerve, two specimens one of them right and the other was the left side.

4.2. Variations according to site of termination:

The ulnar nerve was divided into its terminal branches in the lower part of the forearm according to Ramana, *et al* (Ramana et al, 2008). In the present study the division of terminal branches was found proximal to the wrist in 3 (6%) of specimens unilaterally, which resemble to Ramana, *et al* (Ramana et al, 2008).

Conclusion:

There are number of variations in the formation, and termination of this nerve. Variations in cord origin accompany root values variations.

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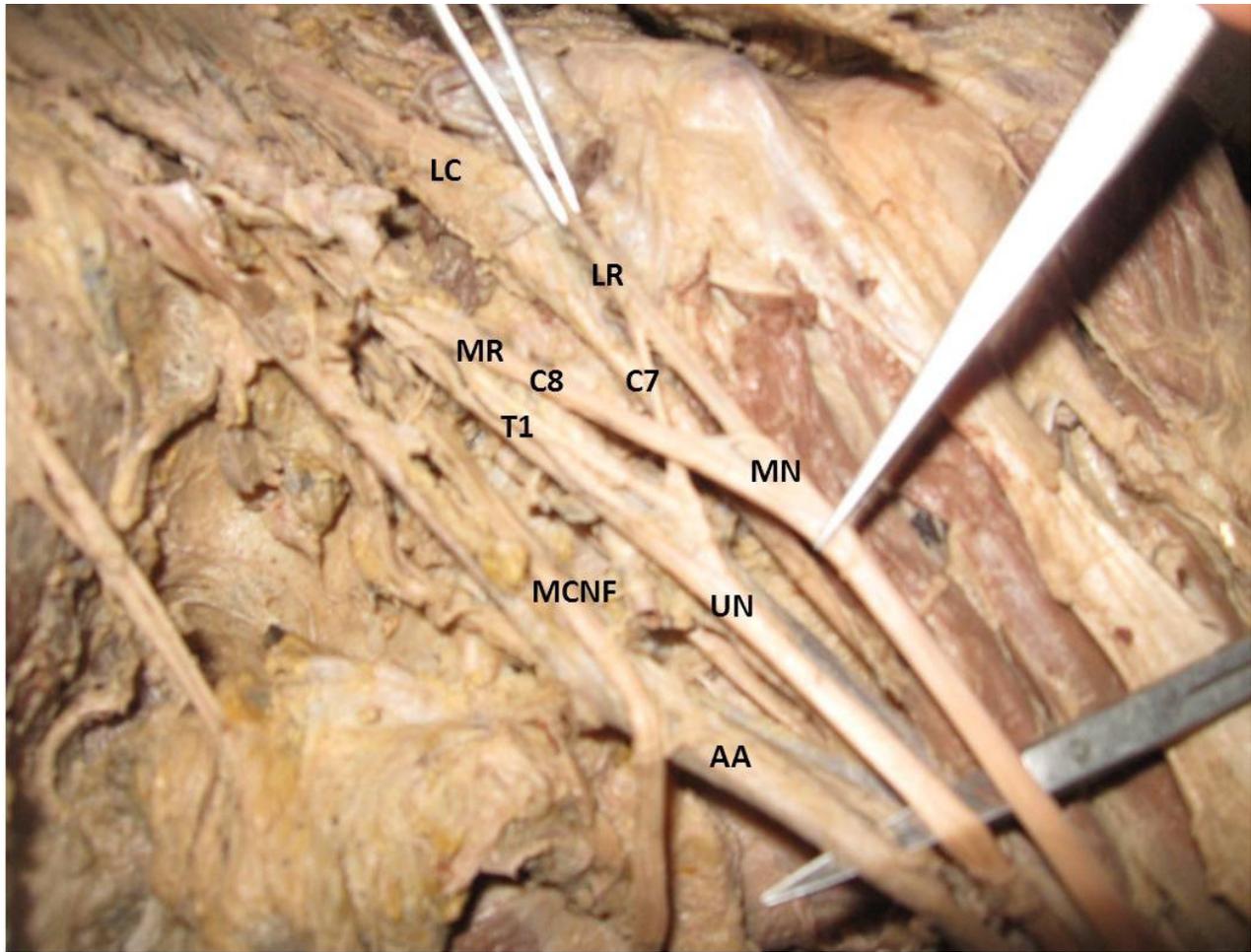


Fig.(1) Variations of the ulnar nerve according to root values. UN; ulnar nerve, MN; median nerve, MC; medial cord, LC; lateral cord, MR; medial root of median nerve, LR; lateral root of median nerve, AA; axillary artery, MCNF; medial cutaneous nerve of the forearm.

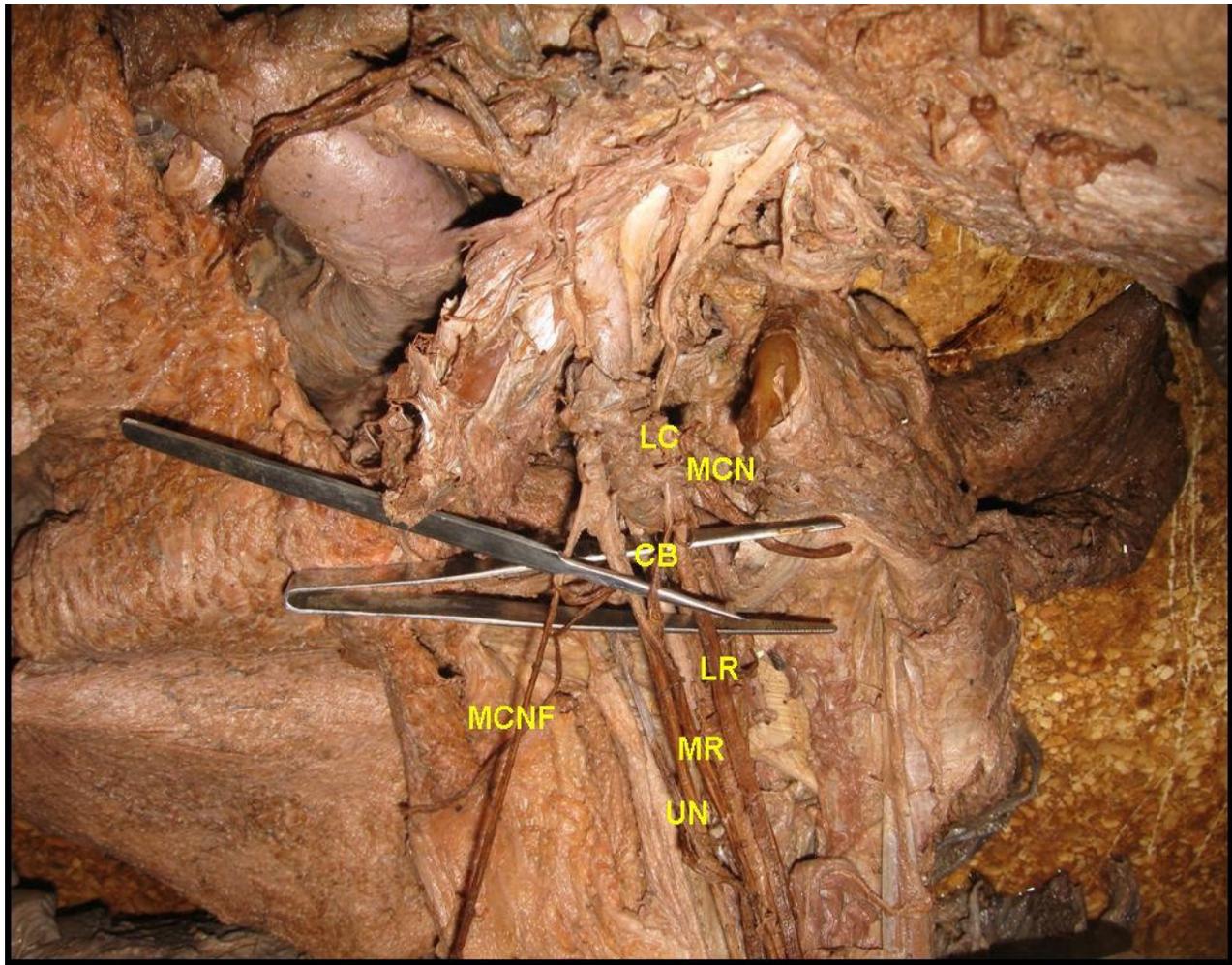


Fig. (2): Communication between the ulnar nerve and the lateral cord of the brachial plexus. UN; ulnar nerve, MR; medial root of median nerve, LR; lateral root of median nerve, MCN; musculocutaneous nerve, LC; lateral cord, MCNF; medial cutaneous nerve of the forearm, CB; communicating branch between UN and the LC of median nerve.

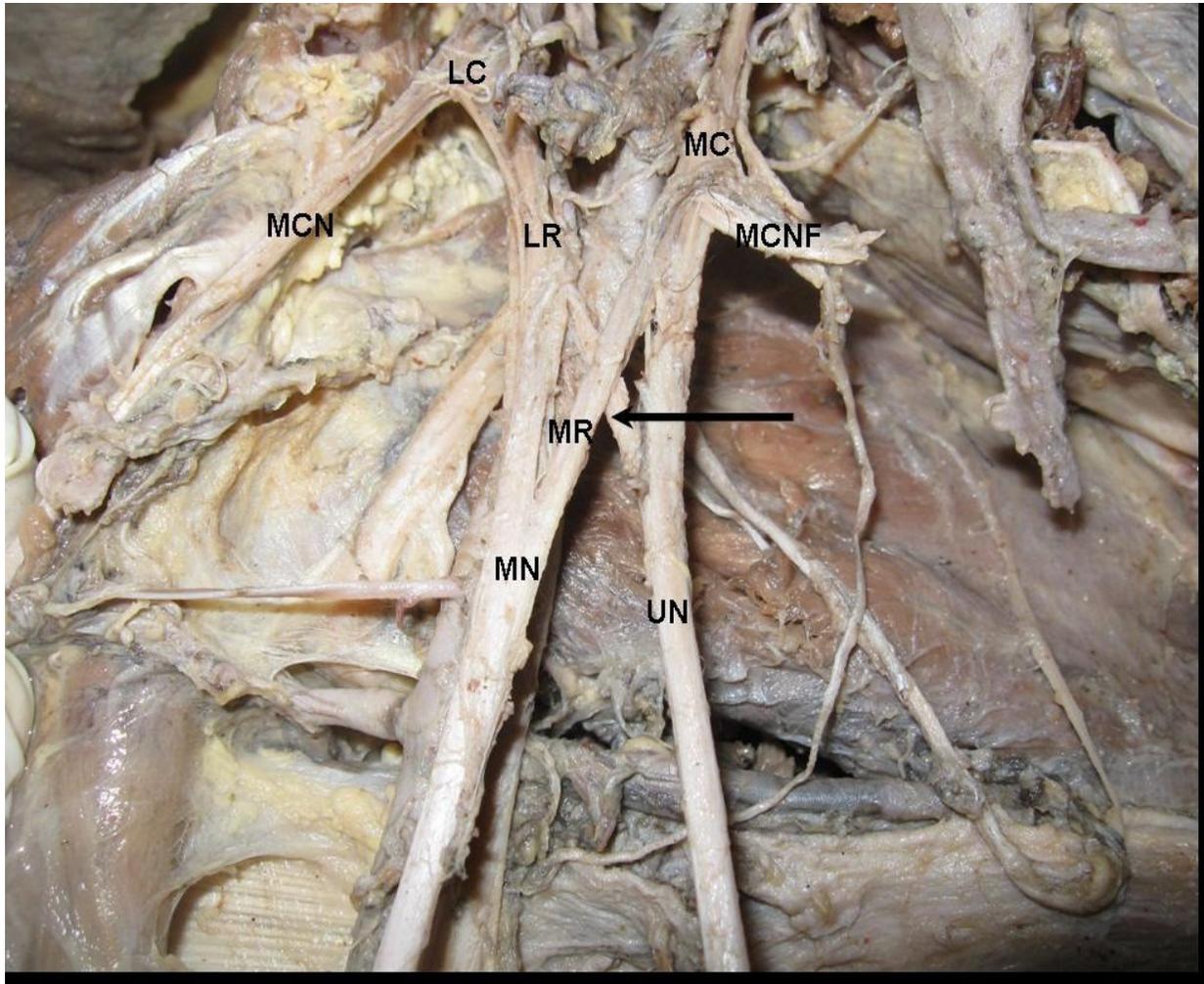


Fig. (3): Communication between the ulnar nerve and the lateral root of the median nerve. UN;ulnar nerve, MN; median nerve, MC; medial cord, LC; lateral cord, MR; medial root of median nerve, LR; lateral root of median nerve, MCN; musculocutaneous nerve, MCNF; medial cutaneous nerve of the forearm, Arrow; communicating branch between the UN and the LR of median nerve.

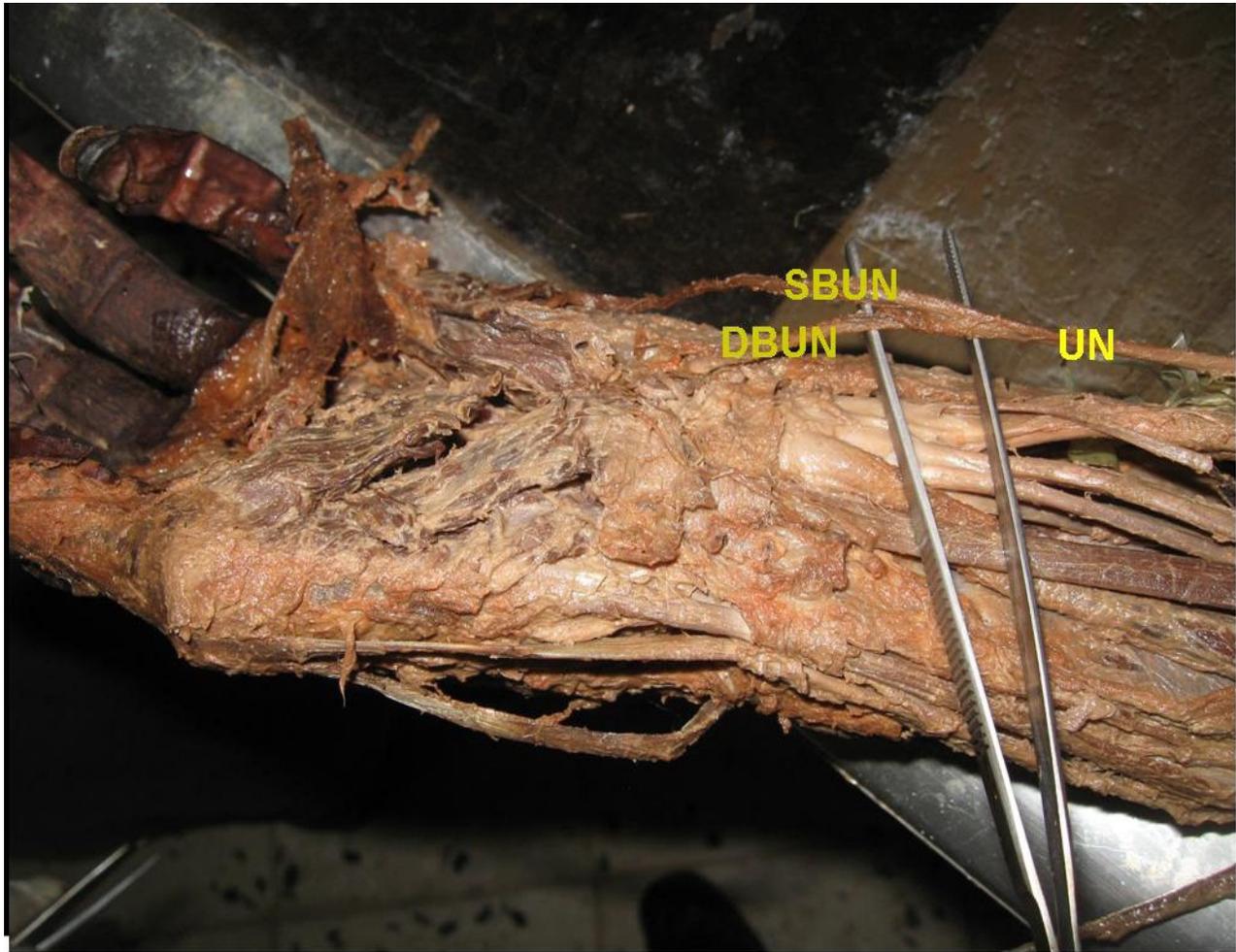


Fig. (4): Variations of the ulnar nerve according to the site of termination. UN; ulnar nerve, SBUN; superficial of the ulnar nerve, DBUN; deep branch of the ulnar nerve.