



The Axillary Nerve

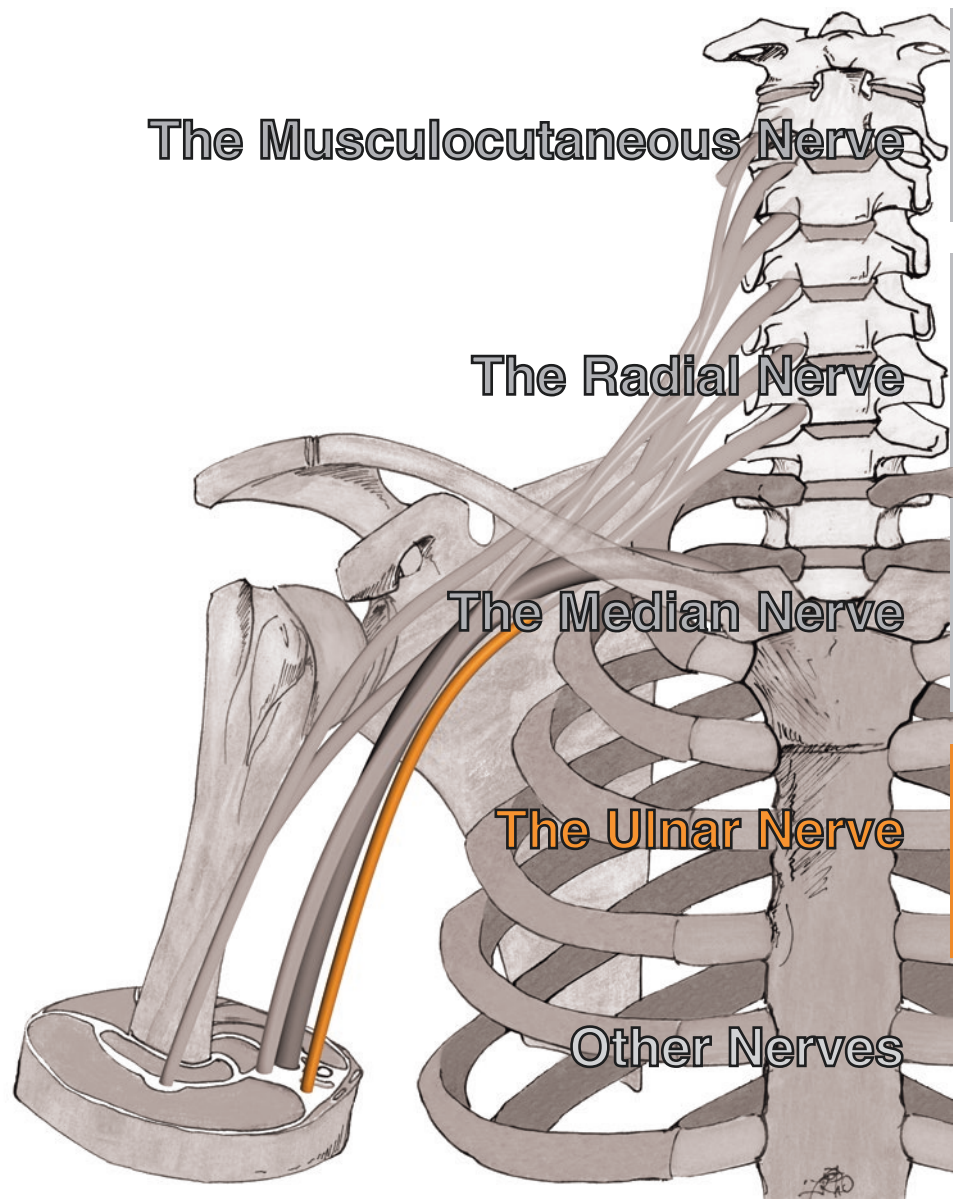
The Musculocutaneous Nerve

The Radial Nerve

The Median Nerve

The Ulnar Nerve

Other Nerves



U

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Morphological Data

The ulnar nerve is a mixed nerve coming from the lower trunk of the brachial plexus.

Origin

It is constituted of the C8, T1 and sometimes C7 roots (Figures U1 and U2). They unite in order to form the lower trunk of the brachial plexus. The medial cord comes from the anterior division of this trunk. The ulnar nerve is a terminal branch of the medial cord that also gives off the medial root of the median nerve and the medial cutaneous nerves of the arm and forearm. The medial cord of the brachial plexus splits medially to the axillary artery to give off the medial root of the median nerve and the ulnar nerve. The ulnar nerve then faces the median nerve laterally and above, the latter's roots join again a few centimetres below (Figure U3).

The axillary vein is situated medially beside the ulnar nerve, which is initially situated between the axillary artery and nerve.

Path

In the arm, the ulnar nerve is situated medially beside the axillary artery and then beside the brachial artery and initially faces the radial and median nerve laterally, the medial cutaneous nerve of the arm medially and the axillary vein. It then rests in behind on the long head of the triceps brachii and faces the coracobrachialis muscle laterally (Figure U3).

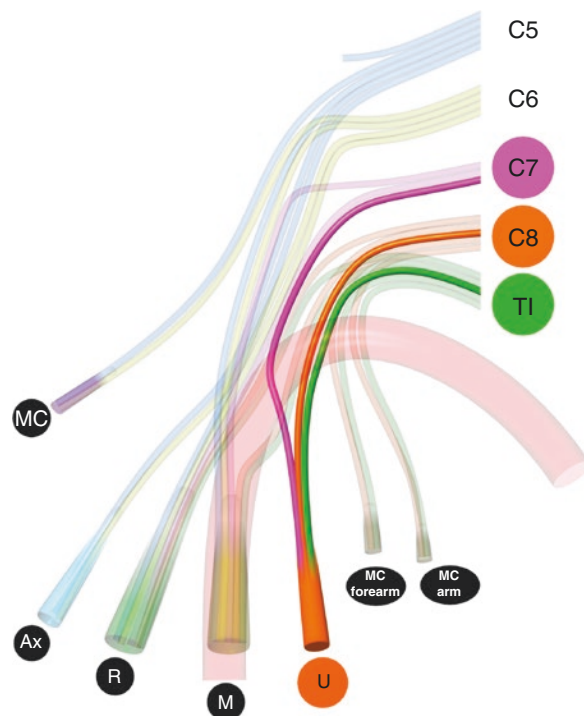
The ulnar nerve stays in contact with the brachial artery until the middle third of the arm in the medial brachial canal; it then separates from it by going through the medial intermuscular septum. It is then situated in the posterior compartment of the arm and lies against the medial head of the triceps brachii (Figure U4).

In the elbow, it goes towards the medial epicondyle, accompanied by the superior ulnar collateral artery, and then into the epitrochlear-olecranon groove. After this groove, it goes between the two heads of the flexor carpi ulnaris muscle, which is often the point where it gets compressed in the elbow (Figures U5, U6 and U16).

At the level of the superior half of the forearm, it is situated between the flexor carpi ulnaris and the flexor digitorum profundus. It then becomes more superficial and travels

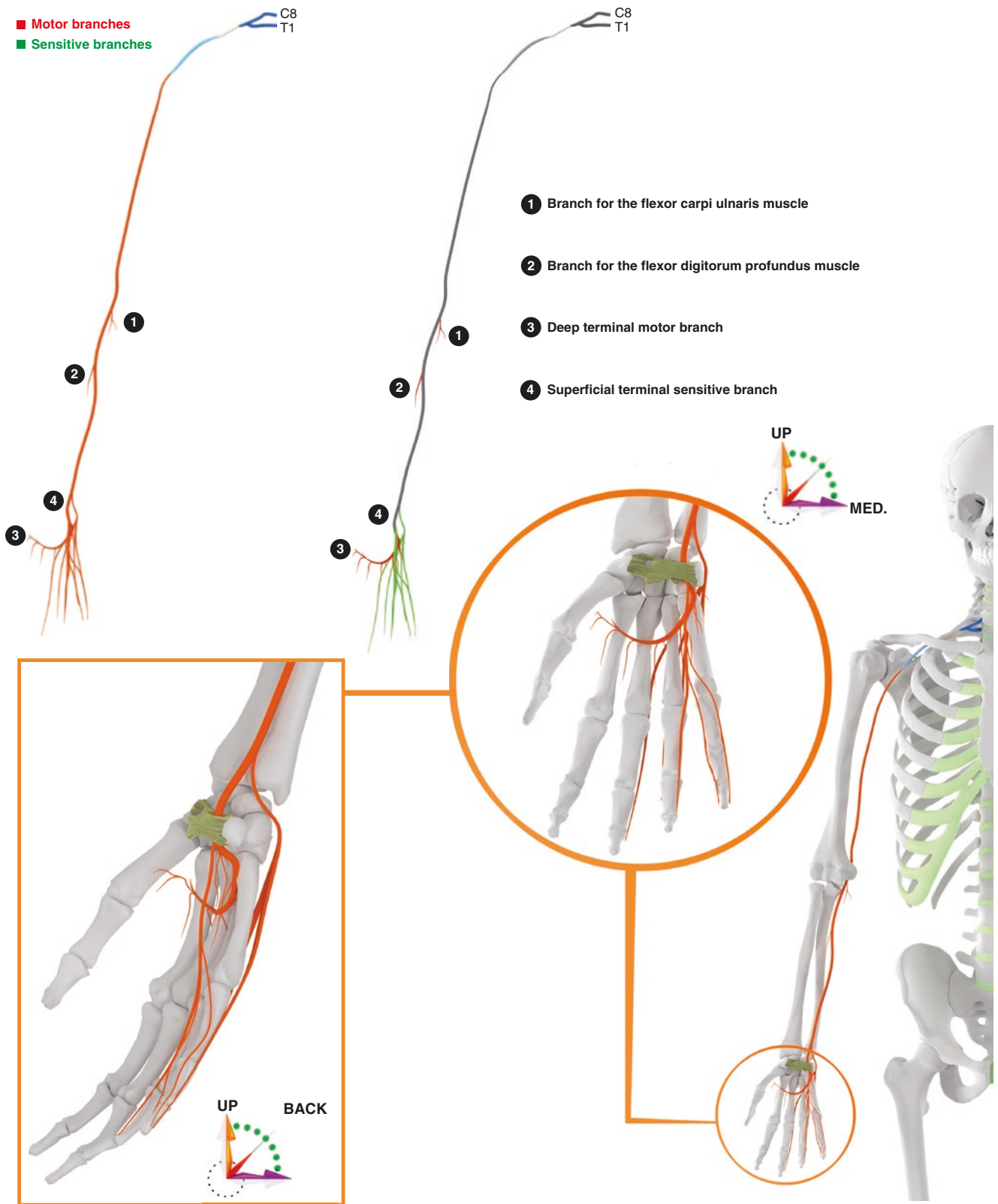
along the medial edge of the ulnar artery until the wrist (Figures U8, U18 and U19). It gives rise to the dorsal cutaneous branch in the hand, a few centimetres above the wrist, and then penetrates into the hand in front of the flexor retinaculum and outside of the pisiform bone (Figure U9).

This tunnel is referred to as Guyon's canal or ulnar canal in the *Nomina Anatomica*. The limits of the ulnar canal are mainly constituted by an expansion of the flexor retinaculum. The latter splits in two; on one hand, it fuses with the tendon of the flexor carpi ulnaris before joining onto the pisiform bone and then forms the canal's arch. On the other hand, it widens deeper and constitutes a deep expansion of the retinaculum which covers the carpus's bones and inserts itself on the pisiform, hamulus and hamate bones. This is a resistant quadrilateral plate made of transversal fibres, higher on the outside than on the inside; this part composes the base of the canal. Its medial limit is successively comprised of the insertion tendon of the flexor carpi ulnaris on the pisiform bone and then of the proximal part of the insertion tendon of the abductor digiti minimi (Figure U9).



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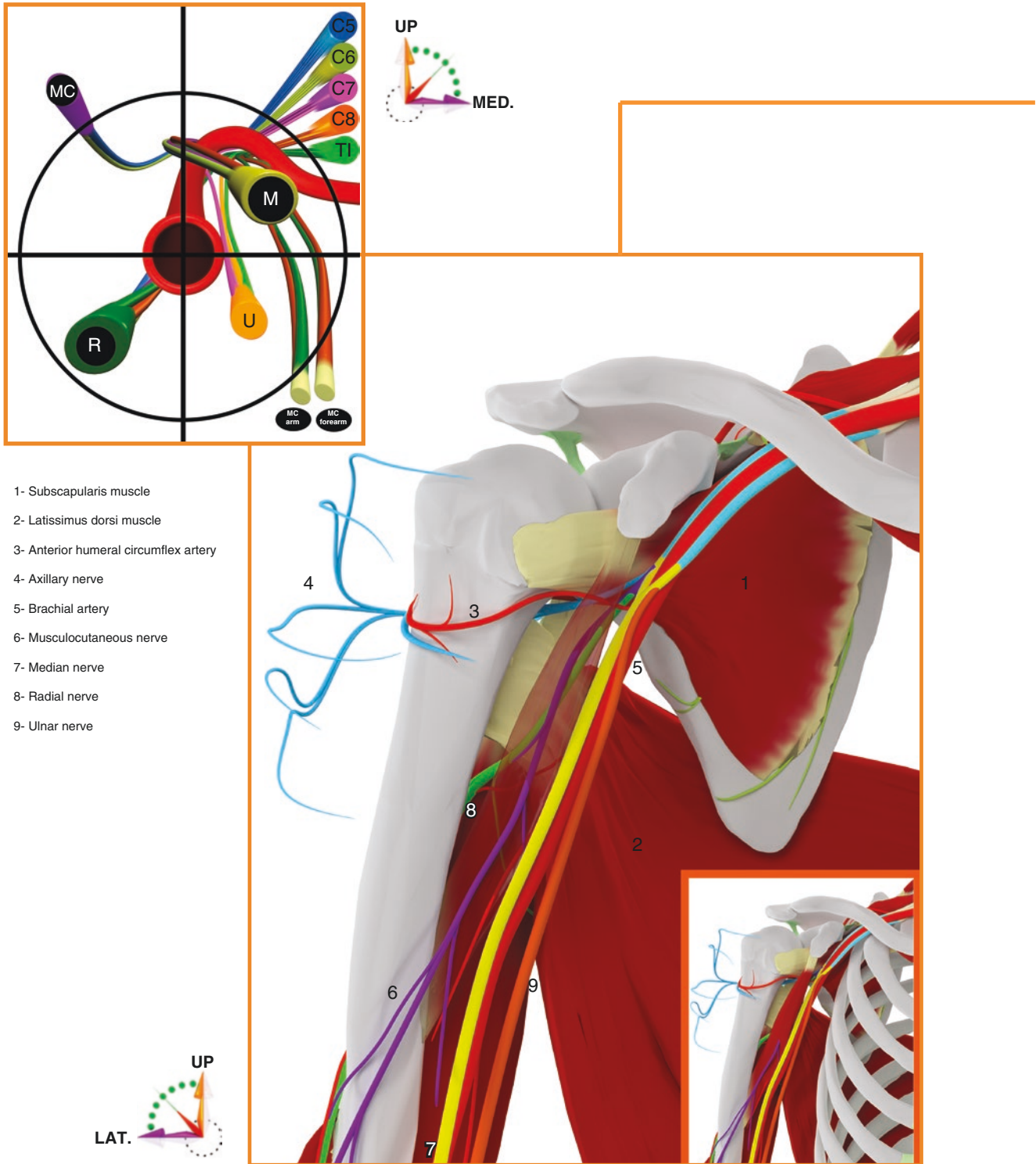
Figure U1. Origin of the ulnar nerve



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Figure U2. Distribution of the ulnar nerve and its relations with bones

The Ulnar Nerve



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Figure U3. Neurovascular relations of the ulnar nerve in the arm

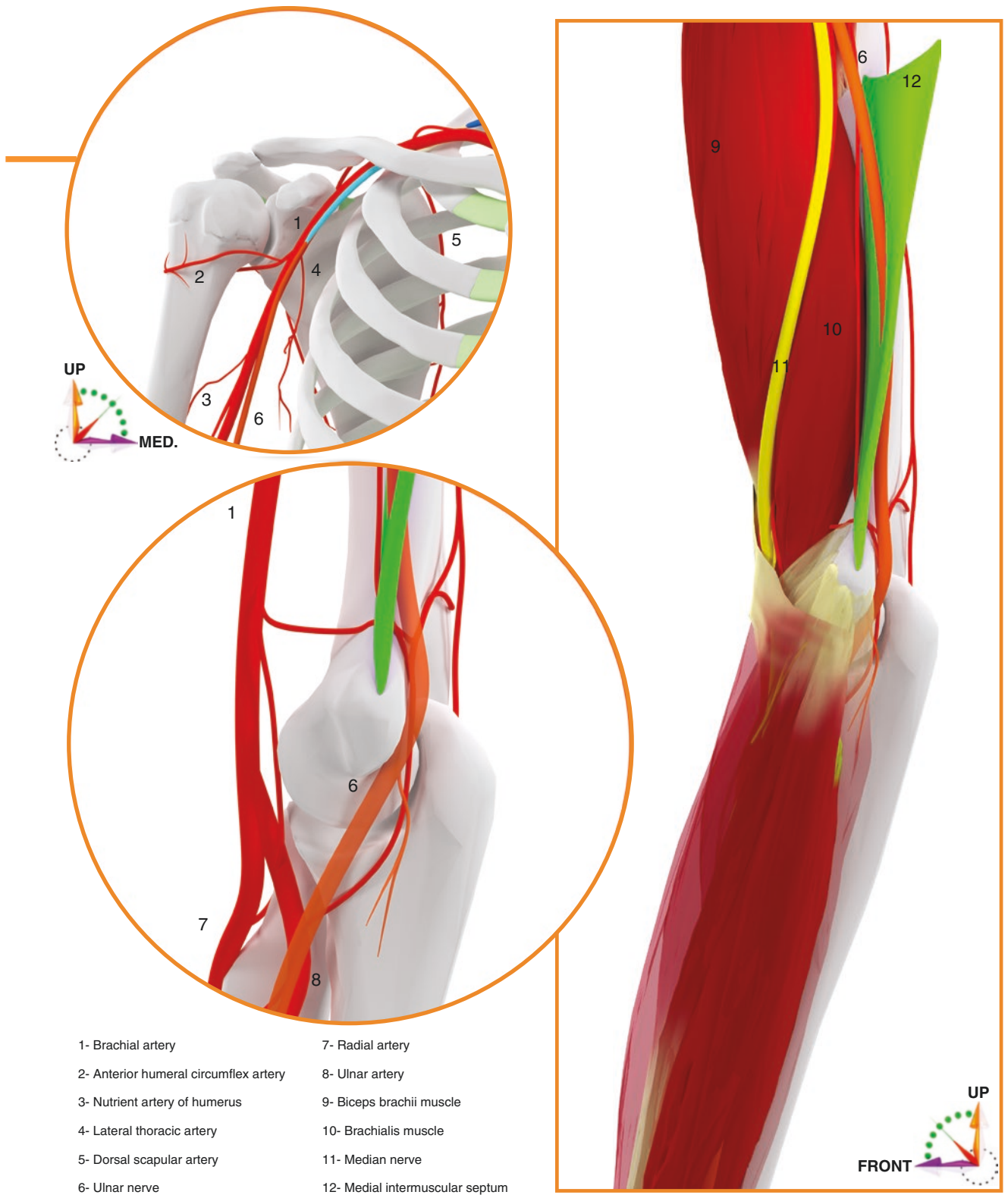
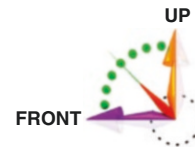
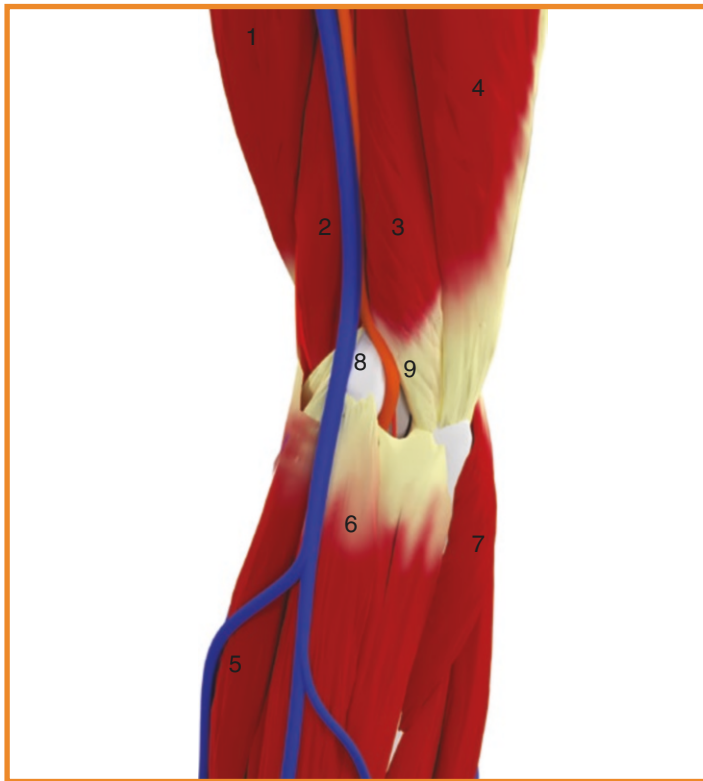


Figure U4. Neurovascular relations of the ulnar nerve in the elbow

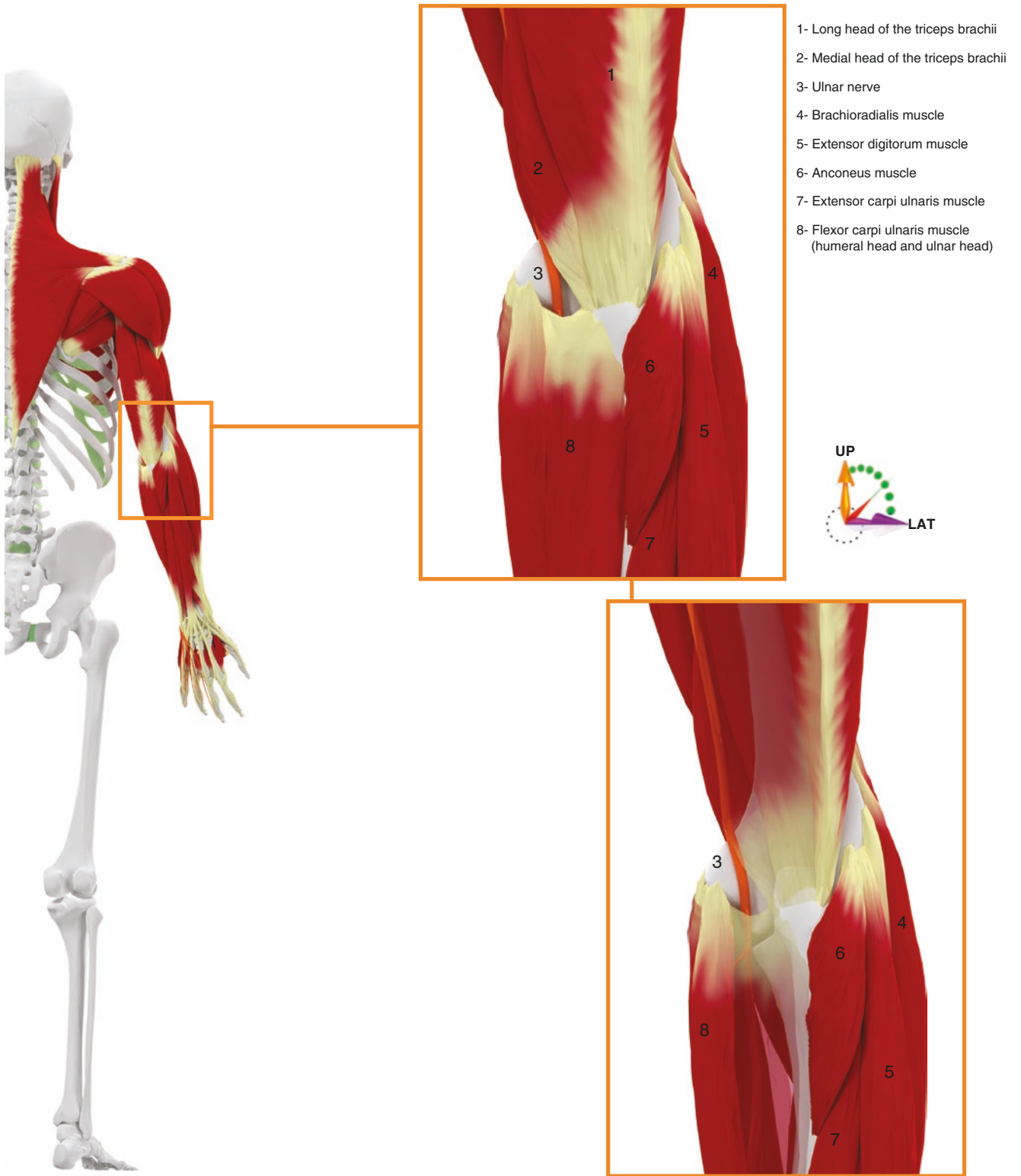
The Ulnar Nerve



- 1- Biceps brachii muscle
- 2- Brachialis muscle
- 3- Medial head of the triceps brachii
- 4- Long head of the triceps brachii
- 5- Palmaris longus muscle
- 6- Flexor carpi ulnaris muscle
- 7- Anconeus muscle
- 8- Basilic vein
- 9- Ulnar nerve

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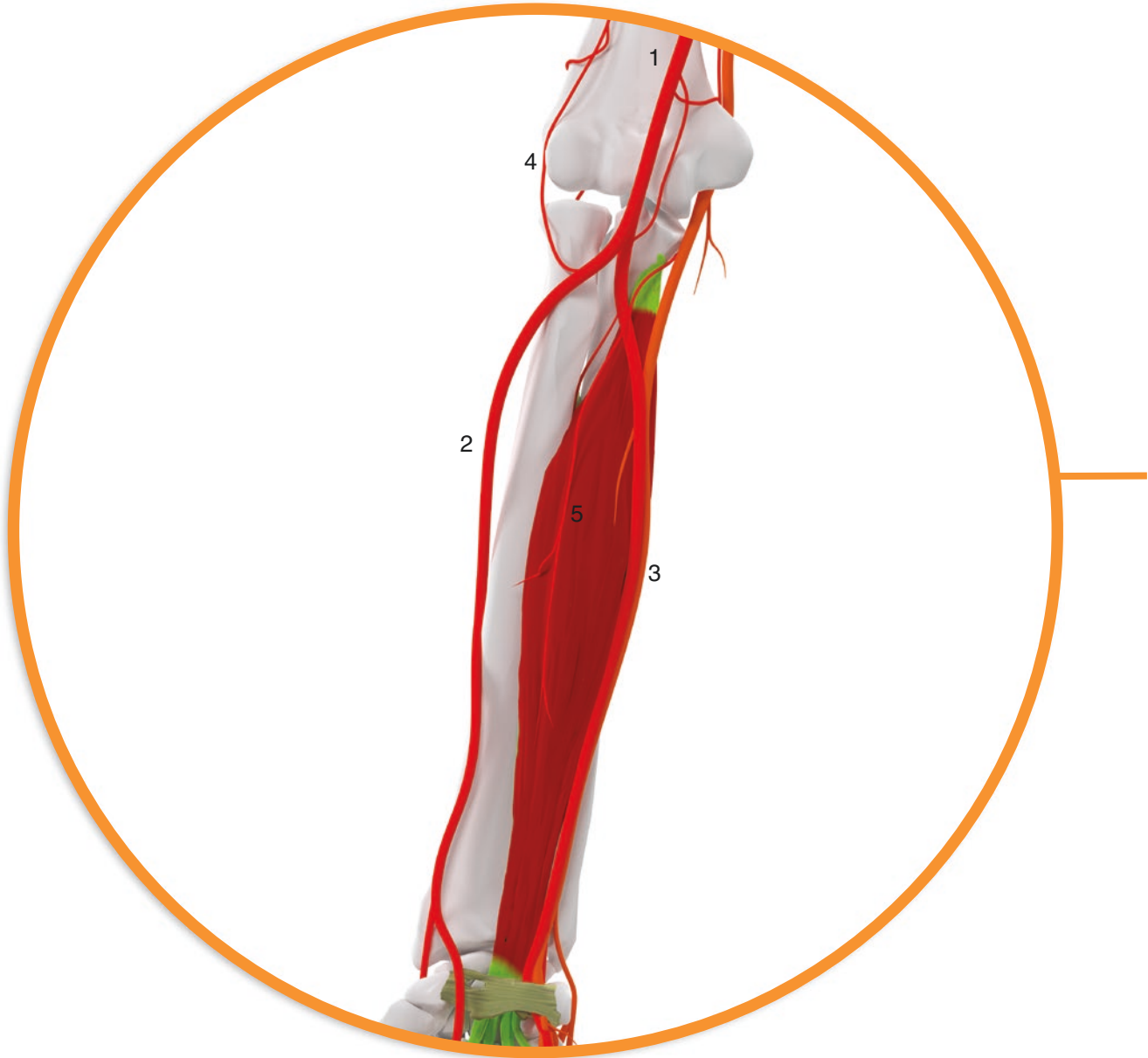
Figure U5. Muscular relations of the ulnar nerve in the elbow (medial view)



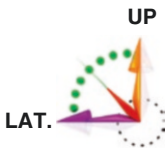
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Figure U6. Muscular relations of the ulnar nerve in the elbow (posterior view)

The Ulnar Nerve

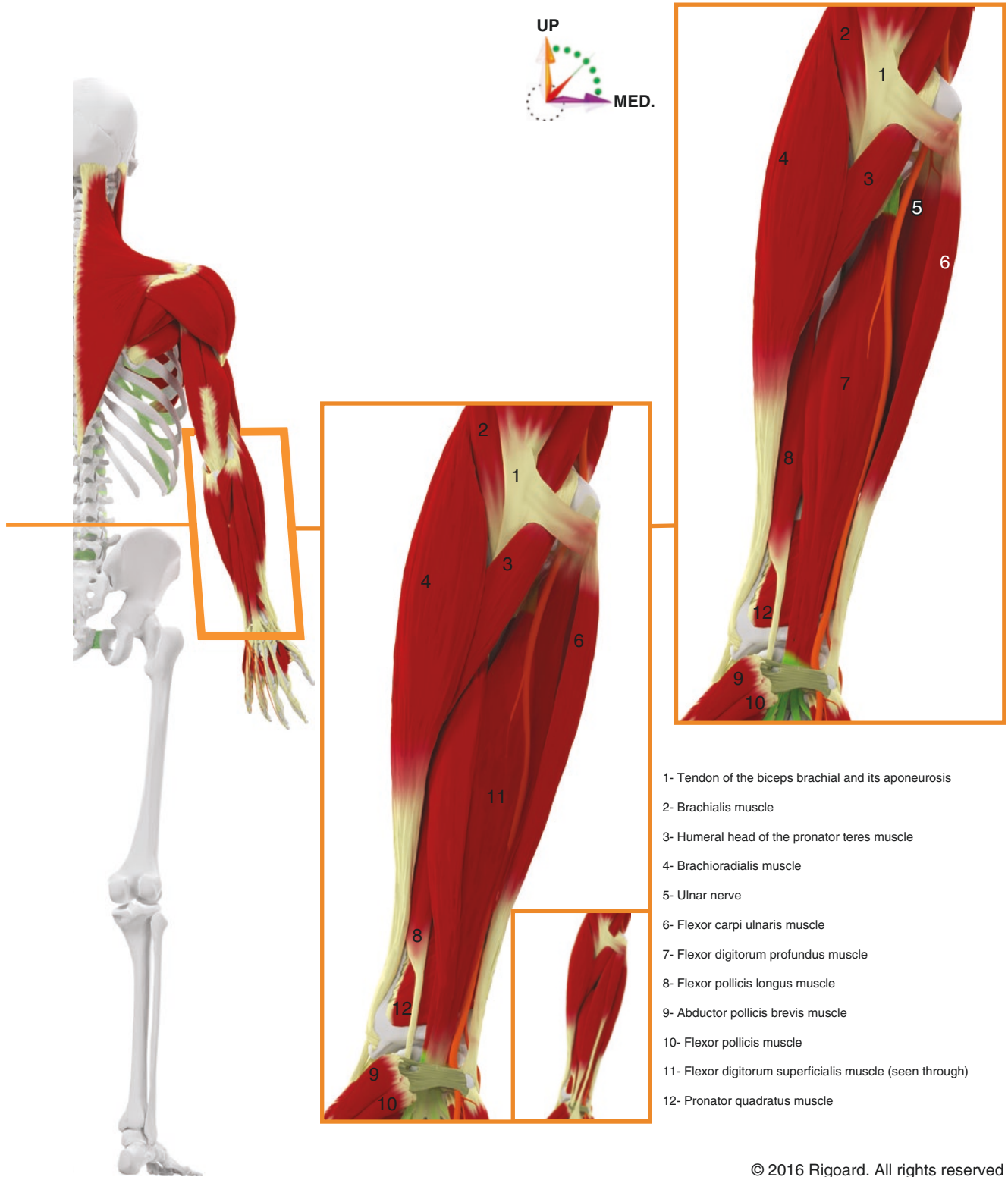


- 1- Brachial artery
- 2- Radial artery
- 3- Ulnar artery and nerve
- 4- Radial recurrent artery
- 5- Anterior interosseous artery



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Figure U7. Neurovascular relations of the ulnar nerve in the forearm

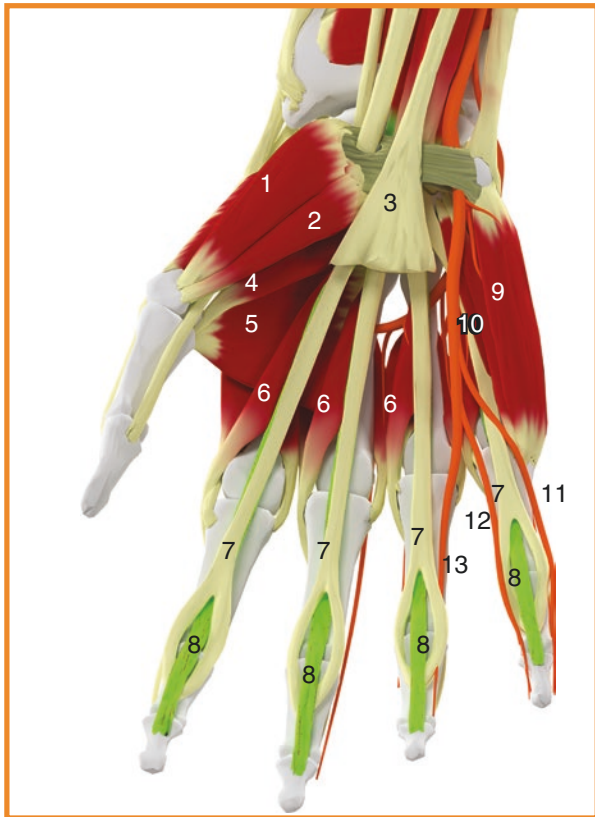


- 1- Tendon of the biceps brachial and its aponeurosis
- 2- Brachialis muscle
- 3- Humeral head of the pronator teres muscle
- 4- Brachioradialis muscle
- 5- Ulnar nerve
- 6- Flexor carpi ulnaris muscle
- 7- Flexor digitorum profundus muscle
- 8- Flexor pollicis longus muscle
- 9- Abductor pollicis brevis muscle
- 10- Flexor pollicis muscle
- 11- Flexor digitorum superficialis muscle (seen through)
- 12- Pronator quadratus muscle

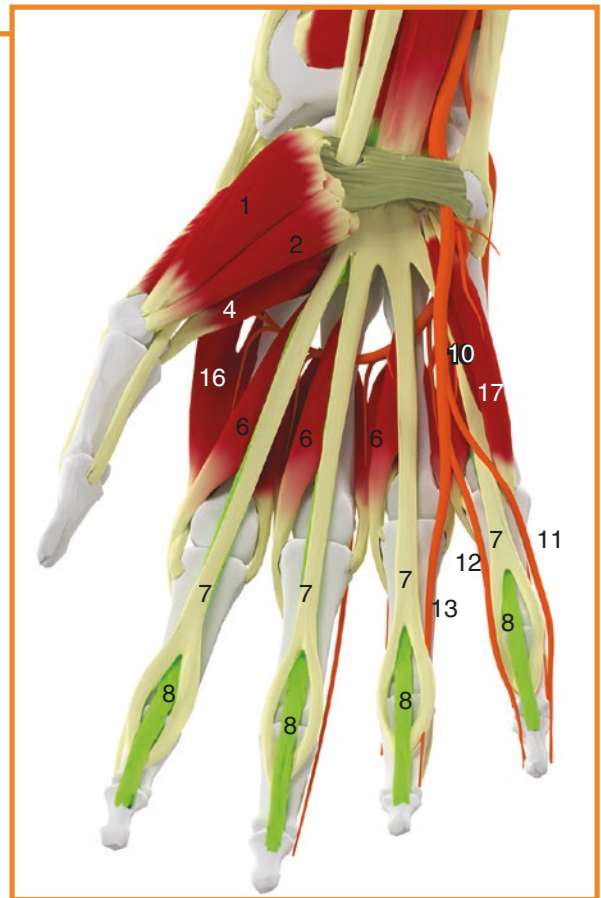
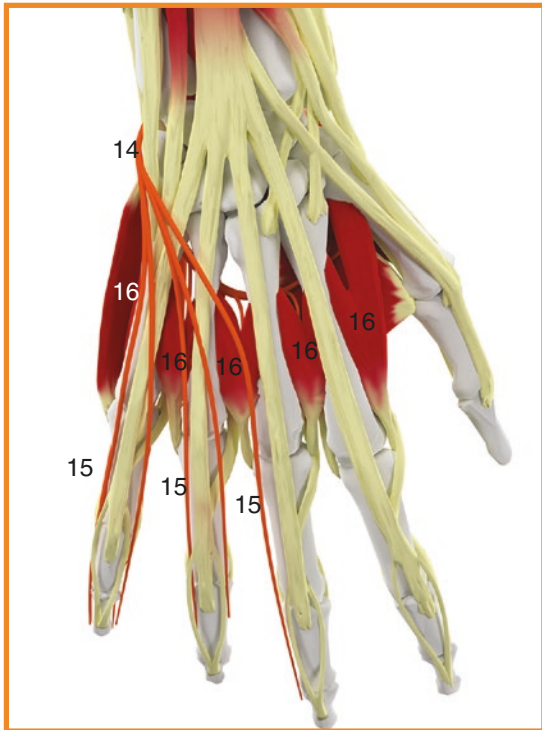
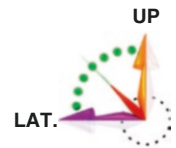
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Figure U8. Muscular relations of the ulnar nerve in the forearm (anterior view)

The Ulnar Nerve

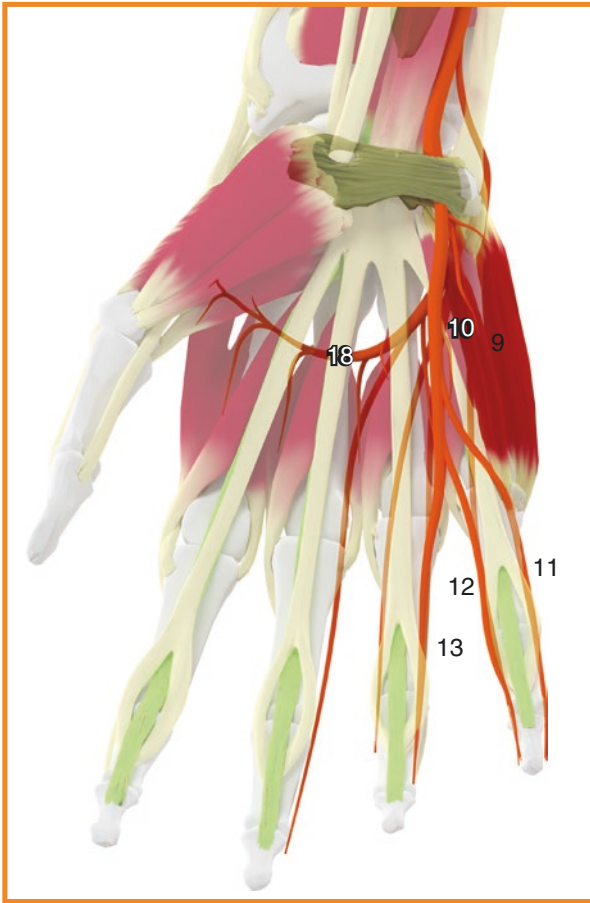


- 1- Abductor pollicis brevis muscle
- 2- Flexor pollicis brevis muscle
- 3- Palmaris longus muscle
- 4- Adductor pollicis muscle (oblique head)
- 5- Adductor pollicis muscle (transverse head)
- 6- Lumbricals
- 7- Tendons of the flexor digitorum superficialis muscle
- 8- Tendons of the flexor digitorum profundus muscle
- 9- Abductor digiti minimi muscle

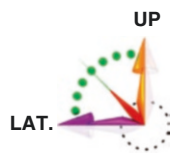


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Figure U9. Muscular relations and distribution of the ulnar nerve in the hand (sensitive branches) caption



- 10- Superficial branch of the ulnar nerve
- 11- Medial proper palmar digital nerve of the little finger
- 12- Lateral palmar digital nerve of the little finger
- 13- Medial proper palmar digital nerve of the ring finger
- 14- Dorsal branch of the ulnar nerve
- 15- Dorsal digital nerves
- 16- Dorsal interossei muscles
- 17- Opponens digiti minimi muscle
- 18- Deep branch of the ulnar nerve



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Figure U10. Muscular relations and distribution of the ulnar nerve in the hand (motor branches)

The Ulnar Nerve

Neurovascular Relations

At its origin, the ulnar nerve faces the axillary artery laterally and the axillary vein medially. At the level of the axillary fossa, the subscapular artery crosses in front of the ulnar nerve. The ulnar nerve is then placed medially related to the brachial artery in the arm (Figures U3, U12 and U14). In the inferior part of the arm, the ulnar nerve parts with the brachial artery and goes through the medial intermuscular septum before following the path of the superior ulnar collateral artery (Figure U4). At the level of the elbow, it goes away from this artery and places itself behind the basilic vein. In the forearm, the ulnar nerve is placed on the medial face of the ulnar artery until the ulnar canal (Figures U7, U13 and U15).

Collateral Branches

Of note, unlike the musculocutaneous, median and radial nerves, the ulnar nerve does not give off any collateral branch in the arm.

Its collateral branches start from the level of the elbow, with (Figure U2):

- Articular branches
- One branch for the ulnar artery
- Muscular branches in the forearm for the flexor carpi ulnaris and flexor digitorum profundus muscles for its medial part
- Sensitive branches for the dorsal face of the hand, from a main branch that splits off at the inferior third of the forearm, as well as a palmar branch for the hypothenar eminence

Terminal Branches

The ulnar nerve splits into two terminal branches, a superficial branch and a deep branch, at the level of the wrist.

The superficial branch is sensitive and gives off the medial and lateral palmar collateral cutaneous nerve of the fifth finger and medial palmar collateral cutaneous nerve of the fourth finger. The last two form the digital nerves of the fourth interdigital spaces.

The deep branch is a motor branch that heads towards the dorsal and palmar interossei muscles of the hand and for the third and fourth lumbricals. It also innervates the abductor, opponens and flexor digiti minimi brevis, the adductor pollicis and the deep head of the flexor pollicis brevis as well as the deep palmar arch. This branch sinks directly from its origin into the arch formed by the pisiform and hamulus bones. It goes between the abductor digiti minimi and opponens digiti minimi and then adopts a path transversal to the deep face of the tendons of the flexor digitorum muscles, under

the lumbricals, but on the dorsal face of the interossei muscles (Figures U9 and U10).

Motor Function

Its motor innervation includes the flexor carpi ulnaris and the ulnar half of the flexor digitorum profundus. It also innervates all of the intrinsic muscles of the hand except for the first and second lumbricals, the abductor pollicis brevis and the opponens pollicis. Finally, the flexor pollicis brevis is innervated in a mixed way by the median and the ulnar nerves in variable proportion.

Therefore, the ulnar nerve takes care of the function of adduction of the hand as well as the flexion of the fingers on the hand in a partial way. It also allows prehensibility and the spreading apart of the fingers (Figure U11).

Sensitive Function

The cutaneous sensitive area of the ulnar nerve corresponds to the ulnar part of the palm of the hand, except for the little finger's axis. This distribution of the innervations of the palmar face between the median and the ulnar nerves can vary according to the four main types described in 1988 by G.P. Ferrari. The dorsal face of the hand includes the whole little finger, the proximal phalanx, the medial halves of the intermediate and distal phalanx of the ring finger and the medial half of the proximal phalanx of the middle finger according to a line separating the dorsal face of the hand in two halves (Figure U11).

Anastomoses

The median nerve makes anastomoses with:

- The medial cutaneous nerve of the arm.
- The radial nerve on the dorsal face of the hand.
- And the median nerve several times: a superficial branch between the third and fourth common palmar digital nerves (going either above or below the superficial palmar arch) and a deep branch going through the flexor pollicis brevis called the Riche-Cannieu anastomosis. Another anastomotic branch with the median nerve is frequently described but only sometimes found: the Martin-Grüber anastomosis. It is generally identified in the forearm or shortly after the ulnar canal.

These anastomoses are important to know, especially for their subsequent implications in reconstruction surgeries of this nerve.



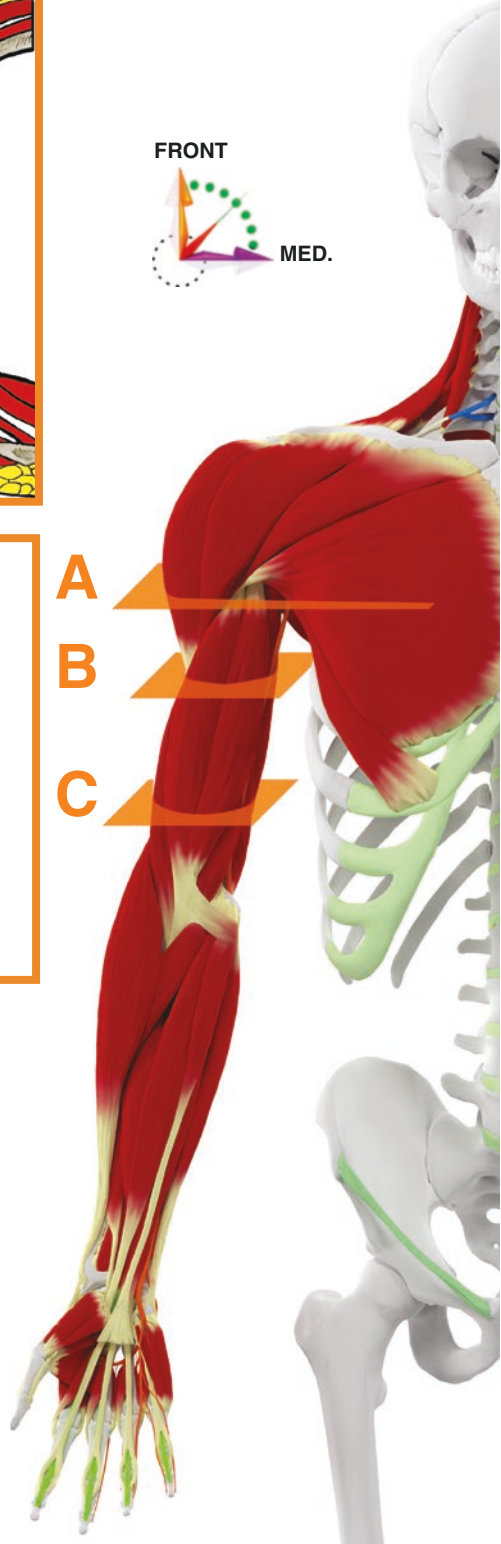
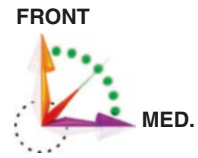
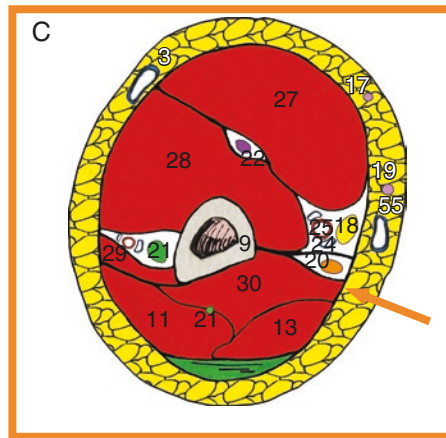
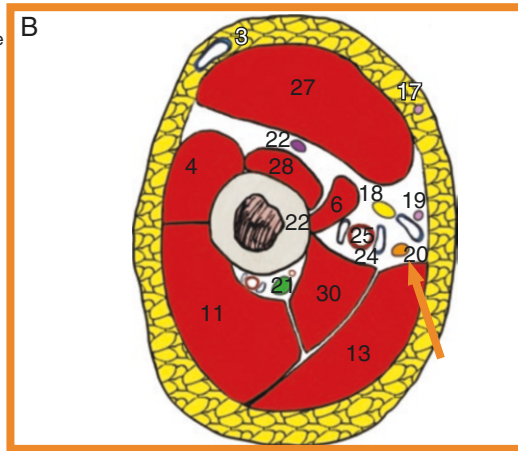
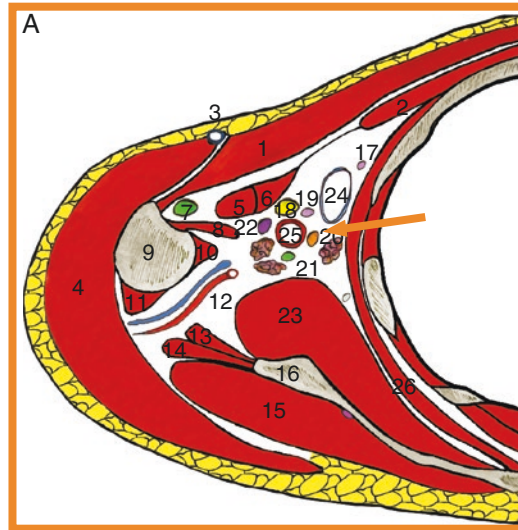
- 1- Flexor carpi ulnaris muscle
- 2- Flexor digitorum profundus muscle
- 3- Abductor digiti minimi muscle
- 4- Flexor pollicis brevis muscle
- 5- Adductor pollicis muscle
- 6- Lumbricals
- 7- Palmar interossei muscles

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Figure U11. Motor and sensitive innervation of the ulnar nerve

The Ulnar Nerve

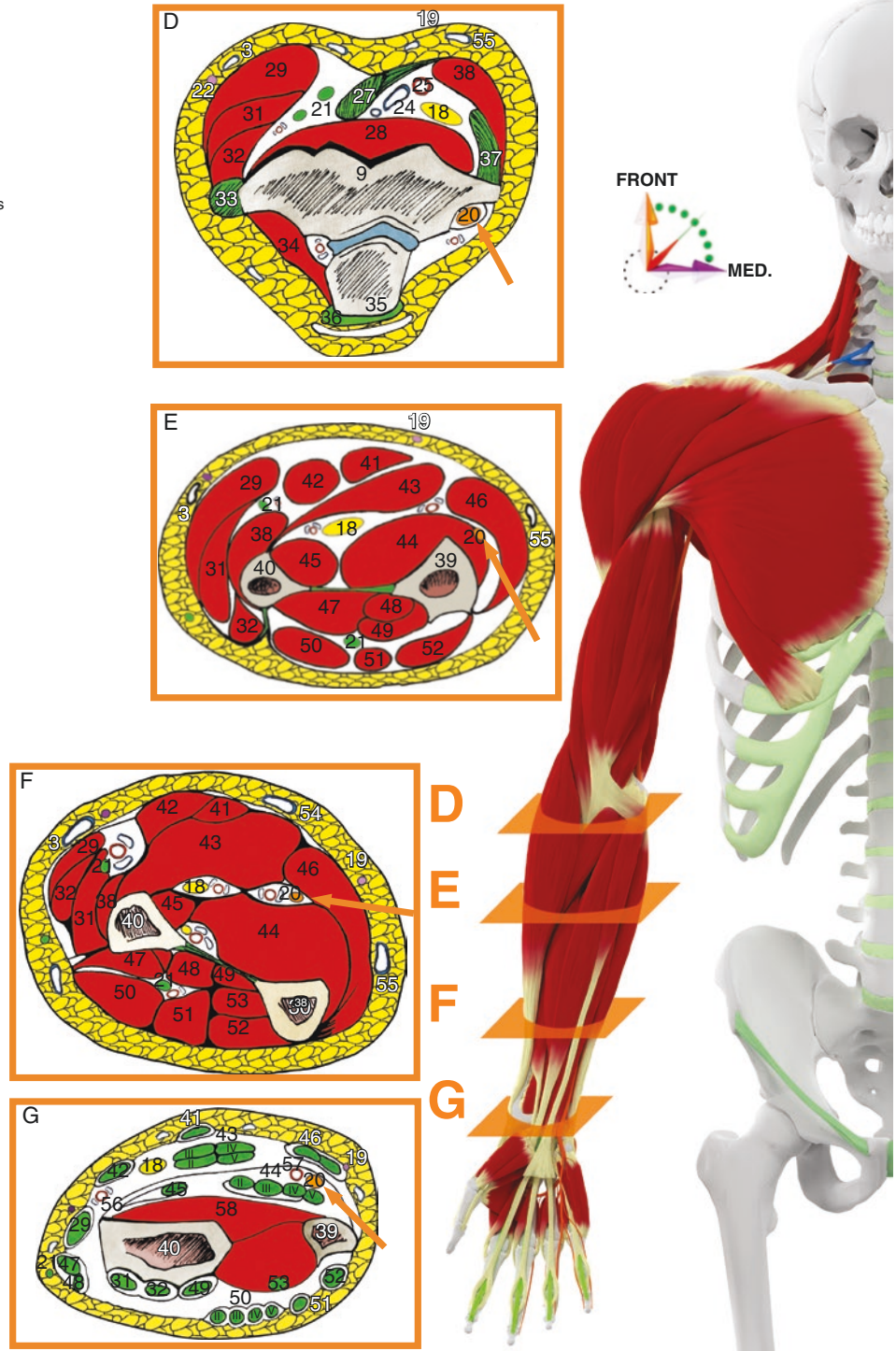
- 1- Pectoralis major muscle
- 2- Pectoralis minor muscle
- 3- Cephalic vein
- 4- Deltoid muscle
- 5- Short head of the biceps brachii muscle
- 6- Coracobrachialis muscle
- 7- Tendon of the long head of the biceps brachii muscle
- 8- Latissimus dorsi muscle
- 9- Humerus
- 10- Teres major muscle
- 11- Lateral head of the triceps brachii muscle
- 12- Circumflex artery and nerve
- 13- Long head of the triceps brachii muscle
- 14- Teres minor muscle
- 15- Infraspinatus muscle
- 16- Scapula
- 17- Medial cutaneous nerve of arm
- 18- Median nerve
- 19- Medial cutaneous nerve of forearm
- 20- Ulnar nerve
- 21- Radial nerve
- 22- Musculocutaneous nerve
- 23- Subscapularis muscle
- 24- Brachial vein
- 25- Brachial artery
- 26- Serratus anterior
- 27- Biceps brachii muscle
- 28- Brachialis muscle
- 29- Brachioradialis muscle



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Figure U12. Relations of the ulnar nerve in the arm, axial sections

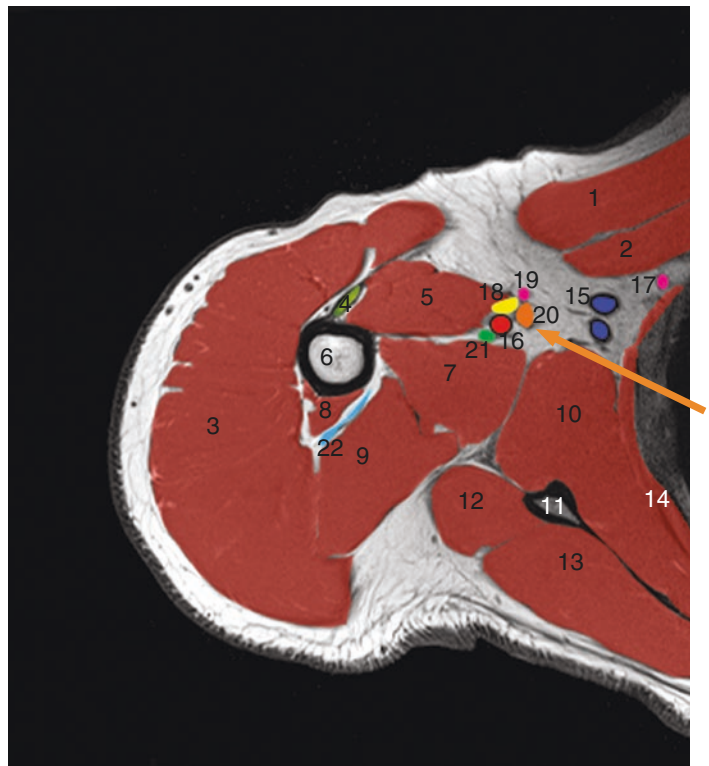
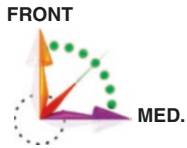
- 30- Medial head of the triceps brachii muscle
- 31- Extensor carpi radialis longus muscle
- 32- Extensor carpi radialis brevis muscle
- 33- Tendon of epicondyle muscles
- 34- Anconeus muscle
- 35- Olecranon
- 36- Tendon of the triceps brachii muscle
- 37- Tendon of the median epicondylar muscles
- 38- Pronator teres muscle
- 39- Ulna
- 40- Radius
- 41- Palmaris longus muscle
- 42- Flexor carpi radialis muscle
- 43- Flexor digitorum superficialis muscle
- 44- Flexor digitorum profundus muscle
- 45- Flexor pollicis longus muscle
- 46- Flexor carpi ulnaris muscle
- 47- Abductor pollicis longus muscle
- 48- Extensor pollicis brevis muscle
- 49- Extensor pollicis longus muscle
- 50- Extensor digitorum muscle
- 51- Extensor digiti minimi muscle
- 52- Extensor carpi ulnaris muscle
- 53- Extensor indicis muscle
- 54- Median vein of the forearm
- 55- Basilic vein
- 56- Radial artery and vein
- 57- Ulnar artery and vein
- 58- Pronator quadratus muscle



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Figure U13. Relations of the ulnar nerve in the elbow and forearm, axial sections

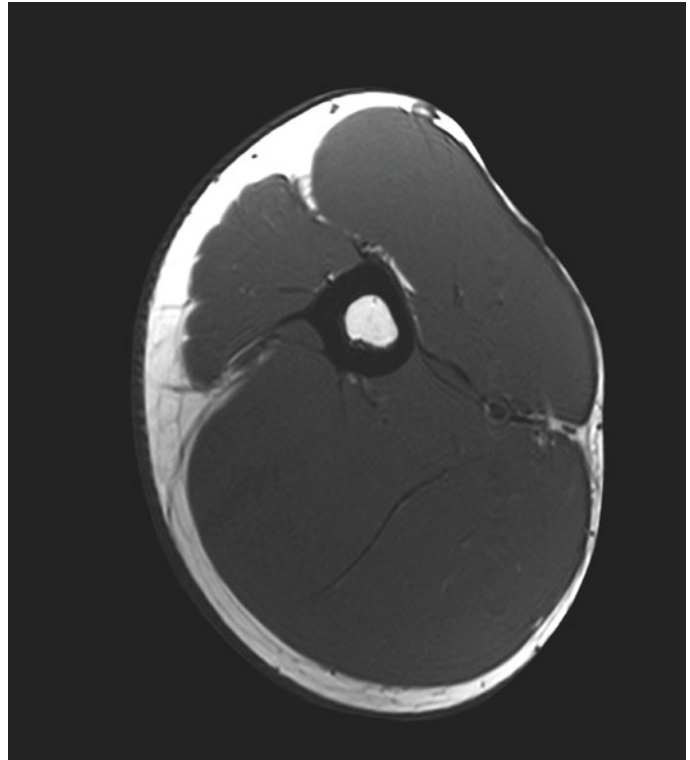
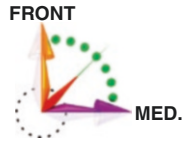
The Ulnar Nerve



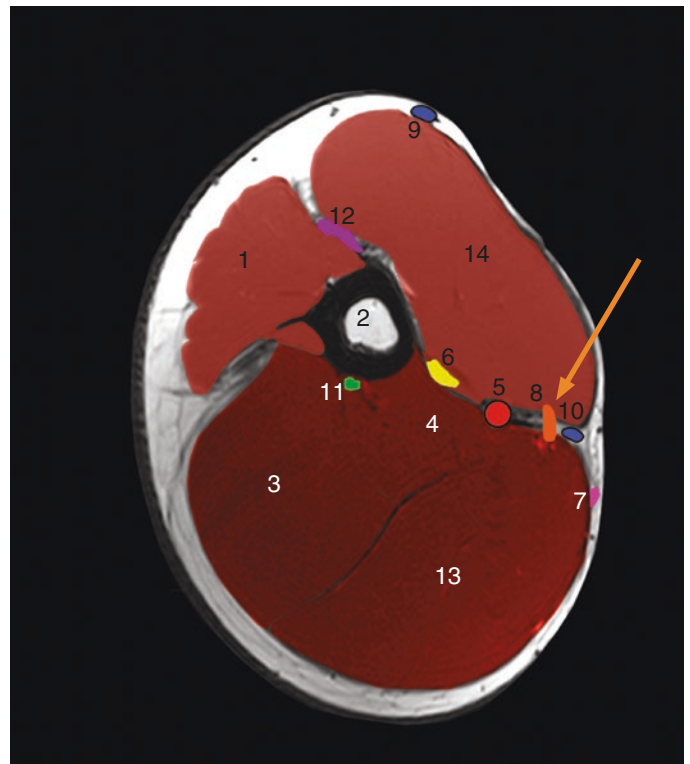
- 1- Pectoralis major muscle
- 2- Pectoralis minor muscle
- 3- Deltoid muscle
- 4- Long head of the Biceps brachii muscle
- 5- Latissimus dorsi muscle
- 6- Humerus
- 7- Teres major muscle
- 8- Lateral head of the triceps brachii muscle
- 9- Medial head of the triceps brachii muscle
- 10- Subscapularis muscle
- 11- Scapula
- 12- Teres minor muscle
- 13- Infraspinatus muscle
- 14- Serratus anterior
- 15- Brachial vein
- 16- Brachial artery
- 17- Medial cutaneous nerve of arm
- 18- Median nerve
- 19- Medial cutaneous nerve of forearm
- 20- Ulnar nerve
- 21- Radial nerve
- 22- Axillary nerve

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Figure U14. MRI scans in the shoulder through the ulnar nerve



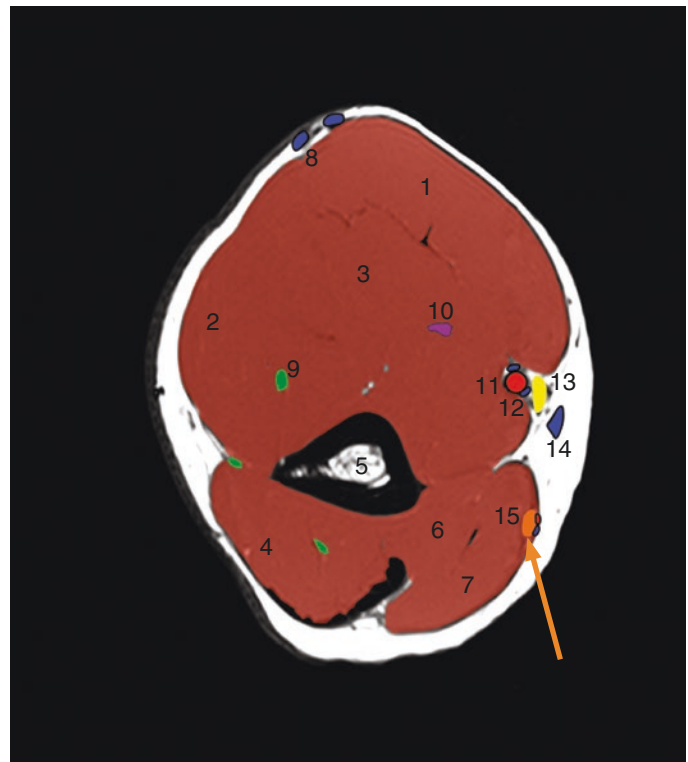
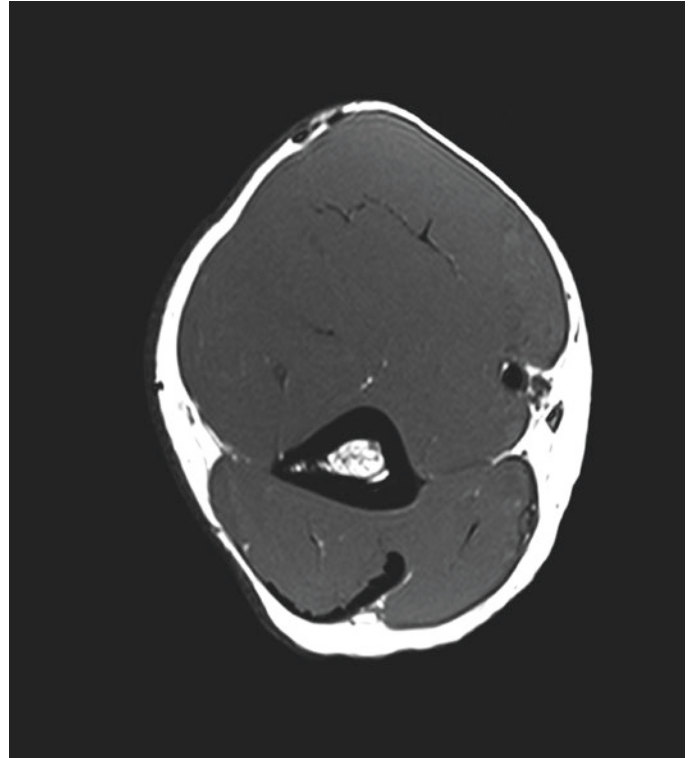
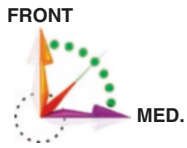
- 1- Deltoid muscle
- 2- Humerus
- 3- Lateral head of the triceps brachii muscle
- 4- Medial head of the triceps brachii muscle
- 5- Brachial artery
- 6- Median nerve
- 7- Medial cutaneous nerve of forearm
- 8- Ulnar nerve
- 9- Cephalic vein
- 10- Basilic vein
- 11- Radial nerve
- 12- Musculocutaneous nerve
- 13- Long head of the triceps brachii muscle
- 14- Biceps brachii muscle



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Figure U15. MRI scans at the proximal third of the arm through the ulnar nerve

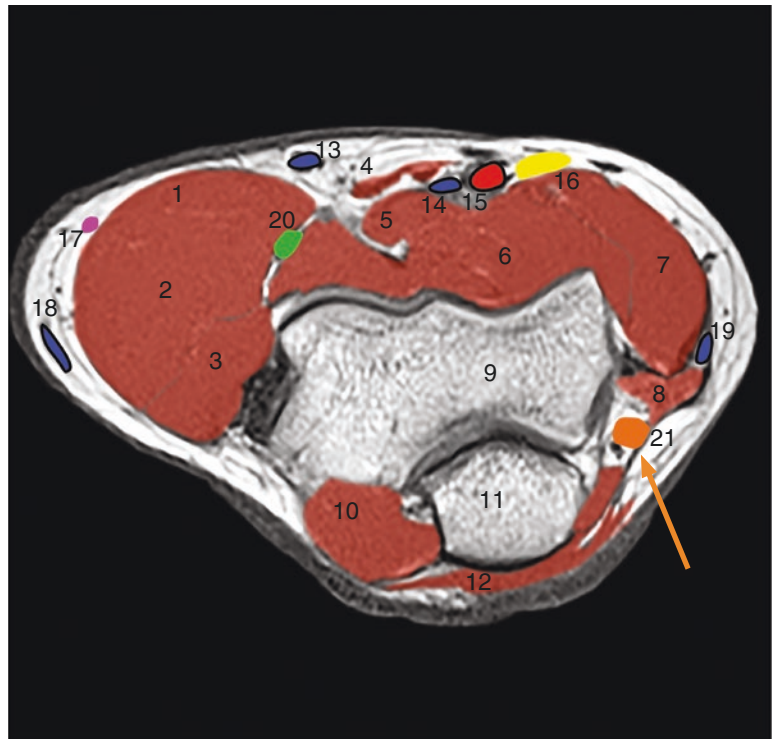
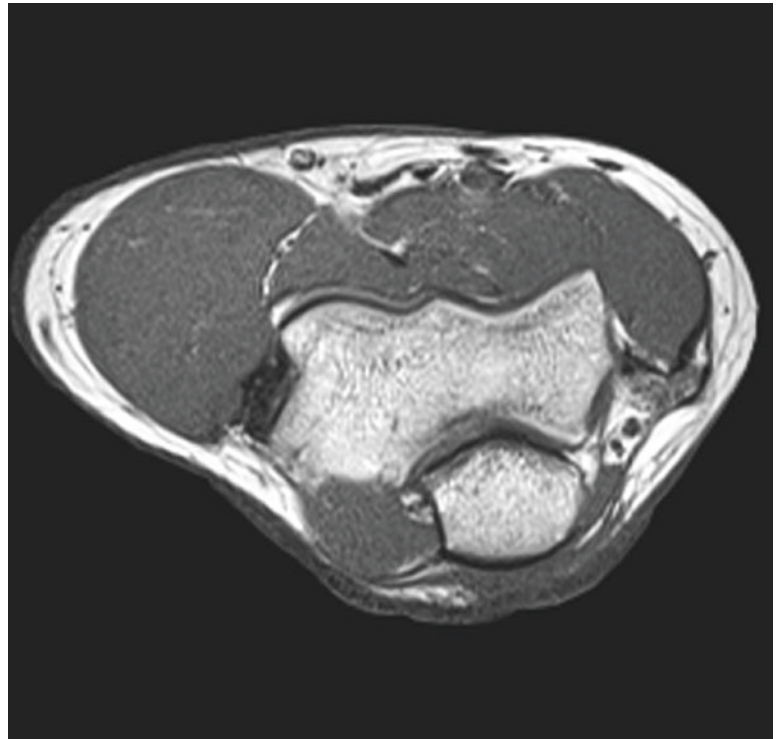
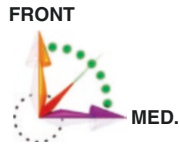
The Ulnar Nerve



- 1- Biceps brachii muscle
- 2- Brachioradialis muscle
- 3- Brachialis muscle
- 4- Lateral head of the triceps brachii muscle
- 5- Humerus
- 6- Long head of the triceps brachii muscle
- 7- Medial head of the triceps brachii muscle
- 8- Cephalic vein
- 9- Radial nerve
- 10- Musculocutaneous nerve
- 11- Brachial artery
- 12- Brachial vein
- 13- Median nerve
- 14- Basilic vein
- 15- Ulnar nerve

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Figure U16. MRI scans at the distal third of the arm through the ulnar nerve

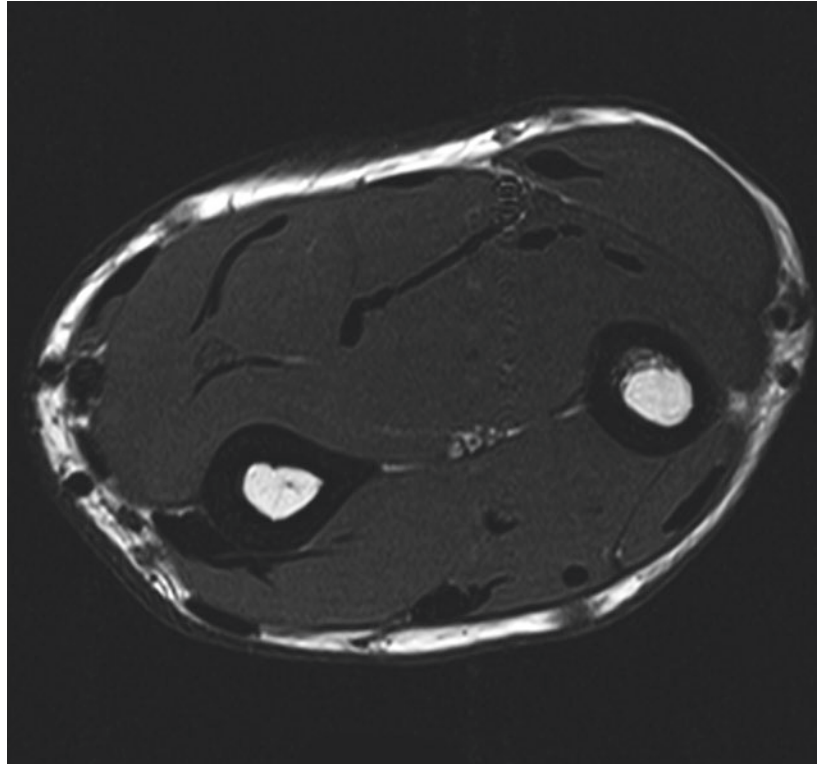
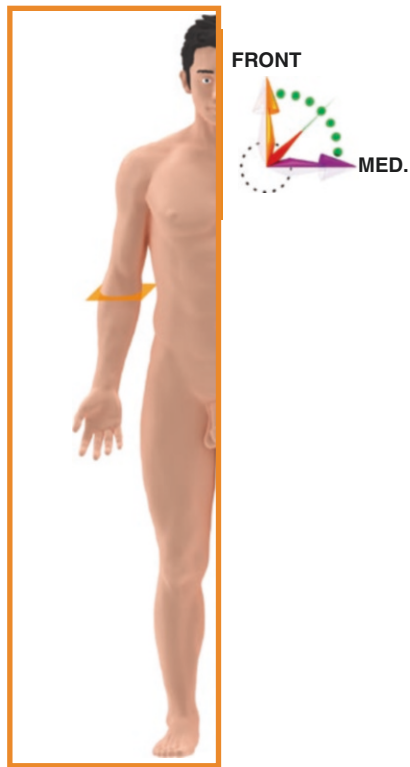


- 1- Brachioradialis muscle
- 2- Extensor carpi radialis longus muscle
- 3- Extensor carpi radialis brevis muscle
- 4- Biceps brachii muscle
- 5- Tendon of the long head of biceps
- 6- Brachialis muscle
- 7- Pronator teres muscle
- 8- Tendon of the medial epicondylar muscles
- 9- Humerus
- 10- Anconeus muscle
- 11- Ulna
- 12- Triceps brachii muscle
- 13- Medial vein at the elbow
- 14- Brachial vein
- 15- Brachial artery
- 16- Median nerve
- 17- Musculocutaneous nerve
- 18- Cephalic vein
- 19- Basilic vein
- 20- Radial nerve

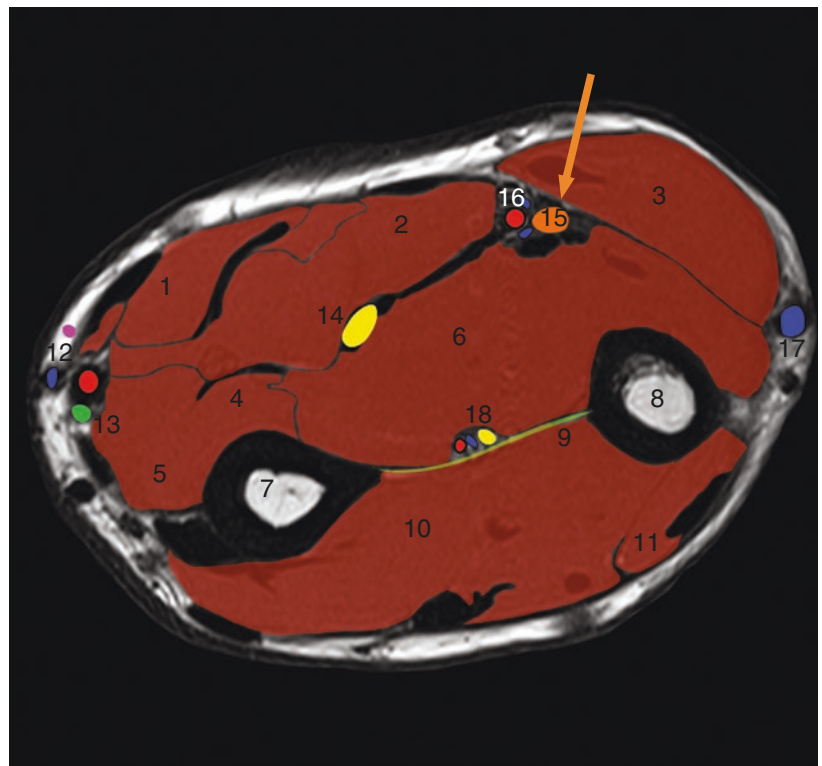
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Figure U17. MRI scans in the elbow through the ulnar nerve

The Ulnar Nerve

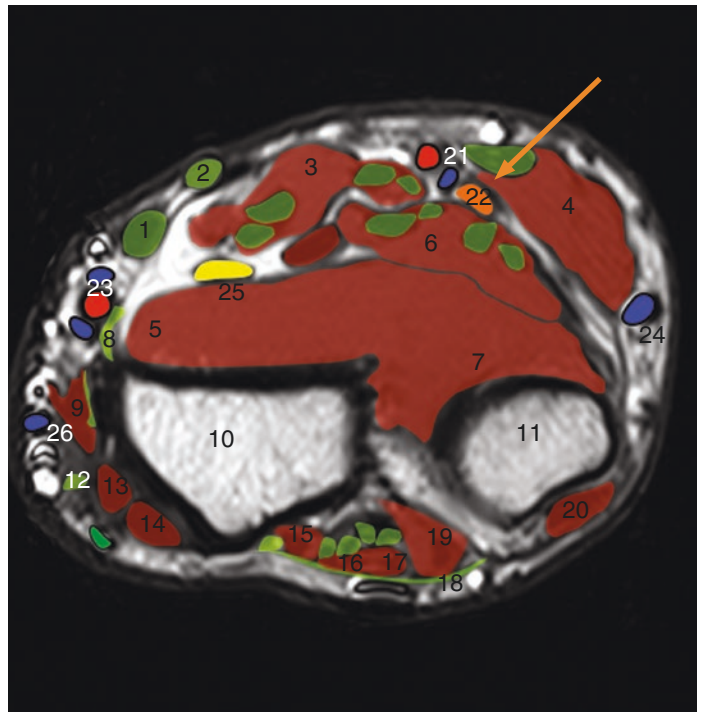
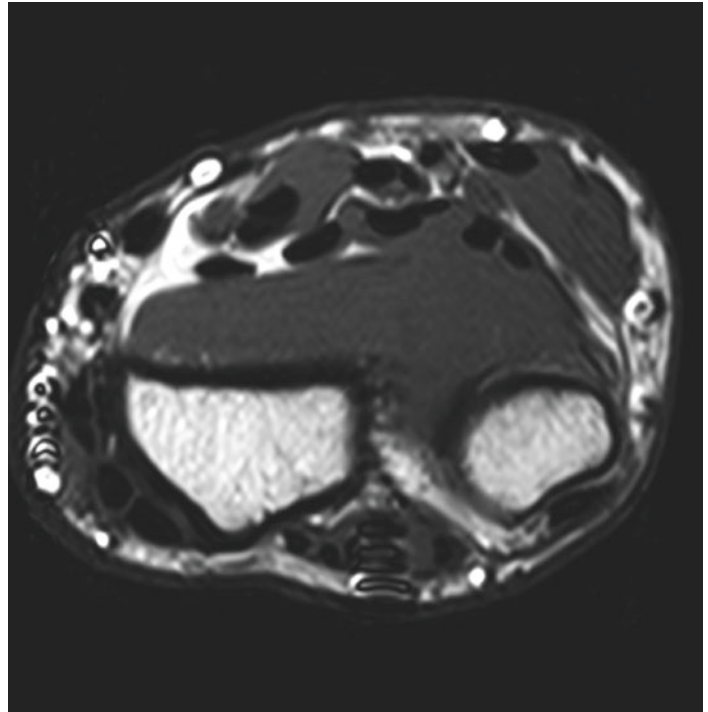
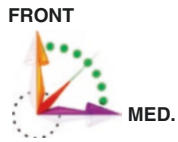


- 1- Flexor carpi radialis muscle
- 2- Flexor digitorum superficialis muscle
- 3- Flexor carpi ulnaris muscle
- 4- Flexor pollicis longus muscle
- 5- Extensor carpi radialis brevis muscle
- 6- Flexor digitorum profundus muscle
- 7- Radius
- 8- Ulna
- 9- Interosseous membrane of the forearm
- 10- Posterior compartment of the extensor digitorum muscles
- 11- Extensor carpi muscle
- 12- Radial artery and vein
- 13- Radial nerve
- 14- Median nerve
- 15- Ulnar nerve
- 16- Ulnar artery and vein
- 17- Basilic vein
- 18- Anterior interosseous artery, vein and nerve



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Figure U18. MRI scans in the forearm through the ulnar nerve



- 1- Flexor carpi radialis muscle
- 2- Palmaris longus muscle
- 3- Flexor digitorum superficialis muscle
- 4- Flexor carpi ulnaris muscle
- 5- Flexor pollicis longus muscle
- 6- Flexor digitorum profundus muscle
- 7- Pronator quadratus muscle
- 8- Brachioradialis muscle
- 9- Abductor pollicis longus muscle
- 10- Radius
- 11- Ulna
- 12- Extensor pollicis brevis muscle
- 13- Extensor carpi radialis longus muscle
- 14- Extensor carpi radialis brevis muscle
- 15- Extensor pollicis longus muscle
- 16- Extensor digitorum muscle
- 17- Extensor digiti minimi muscle
- 18- Extensor retinaculum
- 19- Extensor indicis muscle
- 20- Extensor carpi muscle
- 21- Ulnar artery and vein
- 22- Ulnar nerve
- 23- Radial artery and vein
- 24- Basilic vein
- 25- Median nerve
- 26- Cephalic vein

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Figure U19. MRI scans in the wrist through ulnar nerve

Pathology

Cubital Tunnel Syndrome

In the elbow, the ulnar nerve is situated behind the medial epicondyle of the humerus. It is accompanied by the superior collateral ulnar artery. It then goes in between the two heads of the flexor carpi ulnaris muscle. It can be compressed at this level (Figure U20).

Aetiology

- **Compression:** it is truly an entrapment neuropathy. The compression occurs at the level of the arch of the flexor carpi ulnaris muscle. This compression is more likely to happen after remodelling of bone, for post-injury reasons or not. Any cause of shrinking of this “ulnar tunnel” can be responsible for this syndrome. It is often due to a repeated, prolonged, or sometimes iatrogenic compression – surgery in genupectoral position and prolonged anaesthesia with the arm in a wrong position or use of crutches. Diabetes, smoking and arterial hypertension are risk factors, as well as hypothyroidism and intensive manual labour.
- **Traction:** the region described above is an important stretching area of the ulnar nerve during repeated flexion motions of the elbow. At this level, nerve injuries are more likely to happen in the case of “system” diseases such as diabetes, renal failure, hepatocellular failure and vitamin deficiency which can all weaken the nerve.

Clinical Significance

- **Sensitive signs:** the sensitive signs generally concern the last two fingers of the hand. It can be pain of neuropathic type or mere paraesthesiae. The paraesthesiae or pain can increase during the night, especially when the elbow is in a flexion position.

Paradoxically, the first sensibility mode affected is the proprioceptive function and secondarily the epicritic function.

- **Motor signs:** in the forearm, the ulnar nerve takes charge of the innervation of the flexor carpi ulnaris and partially

the flexor digitorum profundus muscle. In the hand, it innervates the major part of the intrinsic muscles except for the abductor pollicis brevis, opponens pollicis and the first and second lumbricals. Its motor impairment is therefore manifesting itself by an impossibility of adduction of the little finger and of flexion and extension for all the other fingers except for the thumb. Flexion deficit is higher for the metacarpophalangeal joints when the interphalangeal joints are maintained in an extension position.

Froment’s sign and an amyotrophy of the first interosseous space will be found belatedly, very noticeable on the dorsal face of the hand.

Clinical Forms

The revealing sign can be an amyotrophy of the interosseous muscles, which later extends towards the other muscles. It must compel one to seek for a distal compression of the nerve at the level of the hand.

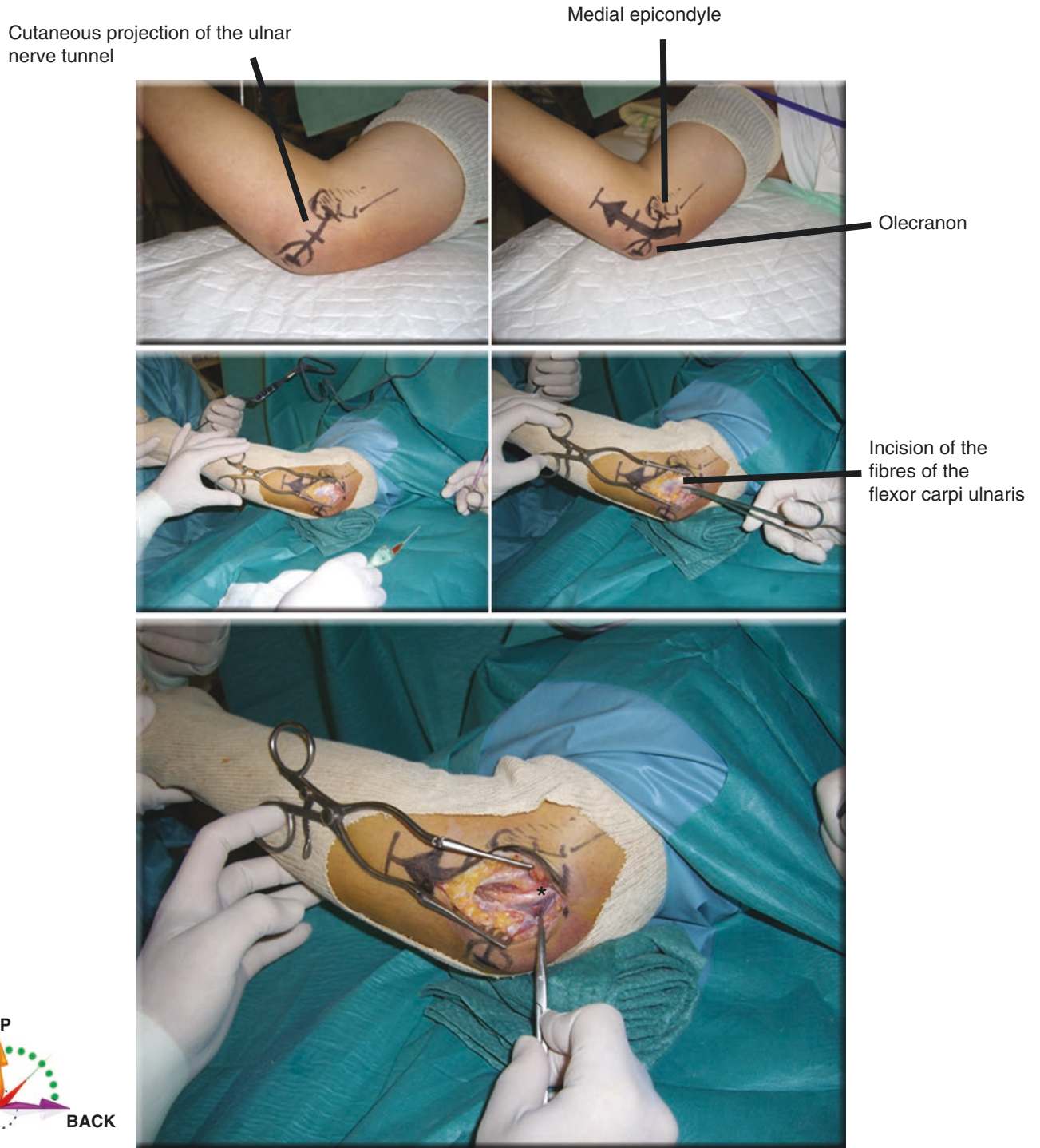
The sensitive signs may not appear for a long time, and the pain can stay localised in the elbow. An impairment of the flexor digitorum muscles remains minimal or non-existent in most cases, considering their double innervations.

Complementary Examinations

- Bilateral and comparative radiographies of both the elbows: the goal is to look for a radiopaque exostosis, proof of the possible existence of an arcade of Struthers.

The arcade of Struthers is a fibrous band stretched between an abnormal exostosis, called “supracondylar process”, situated 3–5 cm above the medial epicondyle and the junction of the medial epicondyle with the trochlea. It exists in 1% of subjects. This is the other nerve compression site that must systematically be sought for.

- An electroneuromyography objectifies the ulnar nerve injury and eliminates an associated impairment or a differential diagnosis.



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Figure U20. Pathology of the ulnar nerve: ulnar nerve entrapment at the elbow – decompression surgery in order to release the ulnar nerve (*) in its ulnar nerve tunnel

Treatment

A change in the patient's habits in position, which goes towards avoiding the position with an elbow in flexion which is likely to compress the nerve, is recommended as first intention. An elbow orthosis for night use can be suggested.

If the medical treatment fails, a surgical opening of the arcade of the flexor carpi ulnaris is generally sufficient.

The surgery's result is good or excellent in 90–95% of cases. The recovery period varies according to the severity of the disuse atrophy when surgery is operated and to whether the neuropathic character of pain is proven (Figure U21).

Ulnar Tunnel Syndrome (Guyon's Canal)

The ulnar canal is formed on the carpus by an expansion of the extensor retinaculum that inserts itself on the hamatum and pisiform bones (see above). The nerve can be compressed in this canal. At this position, the ulnar nerve splits into its two terminal branches (Figure U17).

Aetiology

- Compression: there was no reported case of a real entrapment neuropathy. There are two potential compression sites – either at the proximal level, at the level of the palmar carpal ligament or, more distally, under the arch formed by the pisiform and hamulus bones.

Clinical Signs

- Sensitive signs: the sensitive territory of the ulnar nerve includes the palmar face of the fifth finger and the medial half of the fourth finger. The symptoms associate pain, paraesthesiae, vasomotor disorders and epicritic and/or proprioceptive hypaesthesia of the ulnar region. They can be triggered by percussion of the nerve at this level (Tinel's sign). It is important to note that the ulnar nerve's territory has a variable size and that it can be spread out differently on the palmar face of the third, fourth and fifth fingers.
- Motor signs: the impairment is sensibly identical with the cubital tunnel syndrome. According to the level of compression, a disuse atrophy of the hypothenar and/or interossei muscles can appear. It is important to note that the flexor carpi ulnaris is spared by this motor impairment.

Clinical Forms

There are three possible clinical pictures depending on where the nerve injury is located:

- Type I injury, proximal, representing 30% of cases. It is mixed, sensitive and motor and is caused by synovial cyst or malunions in the wrist.
- Type II injury, representing 52% of cases. It affects the nerve after the latter gives off its sensitive branch. It is therefore a purely motor injury: the impairment is massive. It is referred to as type IIa injury if the compression affects the nerve before the origin of its hypothenar branches and therefore spares the hypothenar group. It is referred to as type IIb in cases of a more distal injury at the level of the hamulus. It is the most frequent form of injury. Type IIc injury is rarer, where the injury is outside and distally from the compartment, at the level of the arcade of the adductor digiti minimi, proximally related to the branches heading for the first dorsal interosseous muscle and the adductor pollicis.
- Type III injury, representing 18% of cases. It is purely sensitive because it affects this component at the end of the ulnar compartment in an isolated way. A motor impairment can also be seen when the palmaris brevis muscle is affected, causing a loss in the relief and of the palmar creases of the hypothenar eminence (Figure U22).

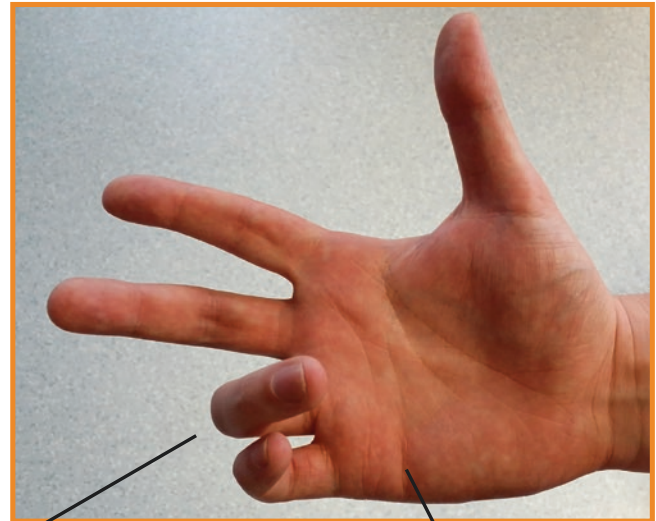
Complementary Examinations

- The level of compression can be identified using electrophysiological monitoring.
- The indication of an MRI must be discussed if there is any doubt of a synovial or fatty pathology or any other type of intrinsic/extrinsic compression of the nerve.
- Wrist radiographies are recommended. They allow investigation for the possibility of an abnormal osseous swelling.

Treatment

The treatment varies directly according to the cause. There is no general agreement. In the case of an acute or evolving extrinsic compression, a decompression surgery is often recommended.

Post-operative results are generally satisfying after a few months of follow-up.

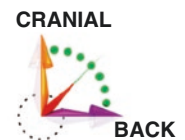
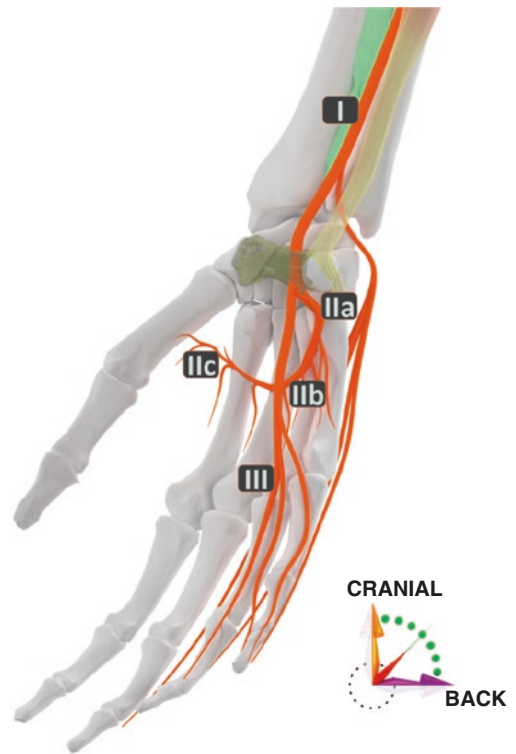
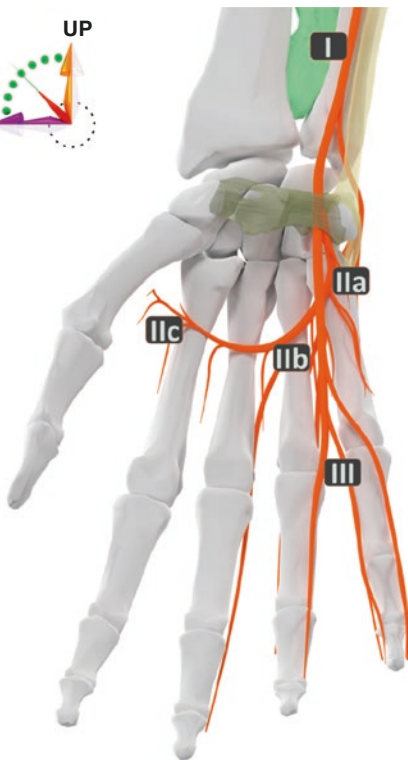
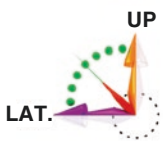


Ulnar claw

Disuse atrophy of the hypothenar compartment

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Figure U21. Ulnar nerve entrapment at the wrist – ulnar claw



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Figure U22. Anatomoclinical classification of ulnar nerve injuries. (1) Hamulus of hamate bone. (2) Deep motor branch of ulnar nerve. (3) Pisiform bone. (4) Superficial sensitive branch of the ulnar nerve