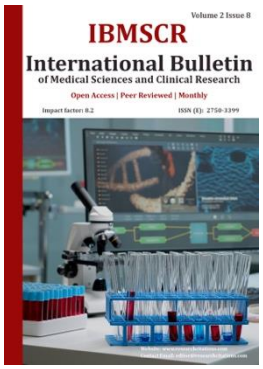

SHOULDER PLEXUS: FORMATION, TOPOGRAPHY, SHORT BRANCHES, AREAS OF INNERVATION.

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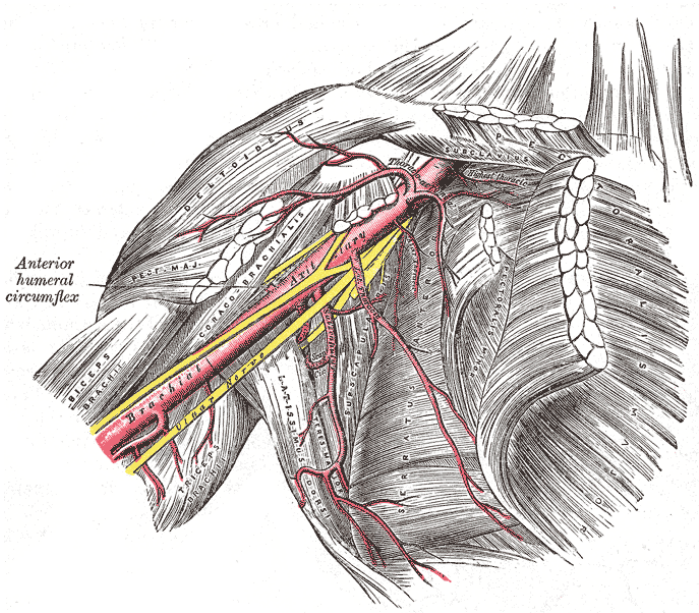
Abstract: This article is about shoulder plexus: formation, topography, short branches, areas of innervation. The shoulder plexus is a network of nerves formed by the anterior branch of the lower four cervical nerves and the first thoracic nerve. This plexus passes from the spinal cord, through the cervicoaxillary c. in the neck, through the first rib to the armpit. It supplies afferent and efferent nerve fibers to the chest, shoulder, wrist, and hand.

Key words: Shoulder, plexus, nerve, topography, anatomy.

The scapula is divided into five roots, three trunks, six divisions (three anterior and three posterior) and five branches. There are five "terminal" branches and many other "pre-terminal" or "lateral" branches, such as the scapular nerve, thoracic nerve, and long thoracic nerve[1], which leave the plexus at various points along its length[2].



Roots

The five roots are the anterior main branches of the spinal nerves, which supply segmental branches to the neck muscles. Shoulder ligaments occur at five different levels: C5, C6, C7, C8, and T1. C5 and C6 combine to form the upper trunk, C7 continuously forms the middle trunk, and C8 and T1 combine to form the lower trunk. And the anterior and posterior branches contain C4 or T2, respectively. The dorsal scapular nerve exits the upper trunk[2] and innervates the rhomboid muscles, which retract and rotate the humerus downward. The subscapular nerve originates from and innervates both C5 and C6, which includes elevation of the first ribs during respiration. The long thoracic nerve originates from C5, C6, and C7. This

nerve innervates the dentate anterior muscle, which pulls the humerus laterally and is the prime mover in all forward thrusting movements.

Stems

These roots join to form stems:

"superior" or "upper" (C5-C6)

"middle" (C7)

"inferior" or "lower" (C8, T1)

Departments

Each trunk is then split in two to create six partitions:

anterior divisions of upper, middle and lower trunks

posterior divisions of upper, middle and lower trunks

when viewing the body in anatomical position, the anterior compartments are superficial to the posterior compartments.

Networks

Most networks arise from cords, but a few networks arise directly from earlier structures. The five on the left are considered "terminal branches". These terminal branches are the musculocutaneous nerve, axillary nerve, radial nerve, medial nerve, and carpal nerve. Due to its exit from the lateral cord, the musculocutaneous nerve and the medial nerve are well connected. The musculocutaneous nerve has even been shown to send a branch to the medial nerve, which further connects them.

Function of the shoulder joint

The shoulder girdle innervates the skin and muscles of the arms, with two exceptions: the trapezius muscle (supplied by the spinal accessory nerve) and the area of skin near the axilla (supplied by the intercostobrachial nerve). The shoulder plexus is connected to the plexus roots through the sympathetic trunk through the gray network communicants.

The terminal branches of the shoulder plexus (musculocutaneous n., axillary n., radial n., median n. and ulnar n.) all have specific sensory, motor and proprioceptive functions[5][6].

Terminal Branch	**Sensory Innervation**	**Muscular Innervation**
musculocutaneous nerve	Skin of the anterolateral forearm	Brachialis, biceps brachii, coracobrachialis
axillary nerve	Skin of lateral portion of the shoulder and upper arm	Deltoid and teres minor
radial nerve	Posterior aspect of the lateral forearm and wrist; posterior arm	Triceps brachii, brachioradialis, anconeus, extensor muscles of the posterior arm and forearm
median nerve	Skin of lateral 2/3rd of hand and the tips of digits 1-4	Forearm flexors, thenar eminence, lumbricals of the hand 1-2
ulnar nerve	Skin of palm and medial side of	Hypothenar eminence, some

	hand and digits 3-5	forearm flexors, thumb adductor, lumbricals 3-4, interosseous muscles

Injury

It shows a simulated example of a motorcyclist hitting the floor at an angle that can damage the nerves in the shoulder. The photo shows the separation of the head and shoulder, which can stretch or tear the nerves between them. Protective gear can help prevent nerve damage by providing additional support to the opposite side of the head to prevent excessive neck extension.

Injuries to the shoulder joint can affect the sensation or movement of different parts of the arm. The injury can be caused by the shoulder being pushed down and the head pulled up, which stretches or tears the nerves. Malpositioning injuries usually affect the brachial nerves rather than other peripheral nerve groups[7][8]. Because the nerves in the shoulder plexus are so sensitive to position, there are very limited ways to prevent such injuries. The most common victims of shoulder impingement injuries are motor vehicle accident victims and newborns[9].

Injuries to the lateral neck region (posterior triangle) of the neck or achilles can be caused by strains, diseases, and ulcers. Depending on the location of the injury, signs and symptoms can range from complete paralysis to unconsciousness. Testing the patient's ability to perform movements and comparing it to the normal side is a way to assess the degree of paralysis. A common shoulder impingement injury is caused by a hard landing, where the shoulder is widely separated from the neck (such as a motorcycle accident or falling from a tree). These stretches can rupture the upper parts of the plexus or dislodge the roots of the spinal cord. In newborns, cervical spondylosis is common when the neck is overextended during delivery. Studies have shown a relationship between birth weight and injury, but the number of births needed to prevent injury is higher than most birth weights[10].

For injuries to the superior scapula, paralysis occurs in the muscles supplied by C5 and C6, such as the deltoid, biceps, shoulder, and shoulder-wrist. Loss of sensation on the lateral side of the upper limb is also common with such injuries. Injuries to the lower scapula are rare, but can occur during labor when a person falls and grabs something to break it, or when the baby's upper limb is pulled too far. In this case, the short muscles of the hand are affected and are unable to form a full fist position [11].

Clinical examination to distinguish between preganglionic and postganglionic lesions requires the physician to keep the following points in mind. Preganglionic lesions cause loss of sensation above the spinal level, otherwise insensible hand pain, ipsilateral Horner's syndrome, and loss of function of the muscles supplied by branches arising directly from the roots, i.e., a long thoracic nerve palsy leading to the scapular wing.

Acute plexus branchialis neuritis is a neurological disease characterized by severe pain in the shoulder area. In addition, cord compression may cause pain that radiates to the hand, numbness, paresthesia, erythema, and arm weakness.

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