DOWNLOAD PDF THE BRACHIAL PLEXUS AND ITS BRANCHES

Chapter 1 : Brachial plexus | Radiology Reference Article | blog.quintoapp.com

The brachial plexus is a network of nerves formed by the ventral rami of the lower four cervical nerves and first thoracic nerve (C5, C6, C7, C8, and T1).This plexus extends from the spinal cord, through the cervicoaxillary canal in the neck, over the first rib, and into the armpit.

Although several mechanisms account for brachial plexus injuries, the most common is nerve compression or stretch. Infants, in particular, may suffer brachial plexus injuries during delivery and these present with typical patterns of weakness, depending on which portion of the brachial plexus is involved. The most severe form of injury is nerve root avulsion, which usually accompanies high-velocity impacts that commonly occur during motor-vehicle collisions or bicycle accidents. For example, musculocutaneous nerve damage weakens elbow flexors , median nerve damage causes proximal forearm pain, and paralysis of the ulnar nerve causes weak grip and finger numbness. In less severe cases, these injuries limit use of these limbs and cause pain. The arm cannot be raised from the side; all power of flexion of the elbow is lost, as is also supination of the forearm". The epineurium of the nerve is contiguous with the dura mater , providing extra support to the nerve. Brachial plexus lesions typically result from excessive stretching; from rupture injury where the nerve is torn but not at the spinal cord; or from avulsion injuries , where the nerve is torn from its attachment at the spinal cord. A bony fragment, pseudoaneurysm, hematoma , or callus formation of fractured clavcile can also put pressure on the injured nerve, disrupting innervation of the muscles. A trauma directly on the shoulder and neck region can crush the brachial plexus between the clavicle and the first rib. These injuries can be located in front of or behind the clavicle , nerve disruptions, or root avulsions from the spinal cord. These injuries are diagnosed based on clinical exams, axon reflex testing, and electrophysiological testing. These types of injuries are most common in young adult males. Injury from a direct blow to the lateral side of the scapula is also possible. The severity of nerve injuries may vary from a mild stretch to the nerve root tearing away from the spinal cord avulsion. An upper brachial plexus lesion, which occurs from excessive lateral neck flexion away from the shoulder. The subsequent paralysis affects, principally, the intrinsic muscles of the hand and the flexors of the wrist and fingers". Mechanism[edit] Injury to the brachial plexus can happen in numerous environments. These may include contact sports, motor vehicle accidents, and birth. The two mechanisms that can occur are traction and heavy impact. The nerves of the brachial plexus are damaged due to the forced pull by the widening of the shoulder and neck. This is a closer look at the traction mechanism at the cervical spine. The arrowed red line represents the stretch of the nerves. Depending on the force, lesions may occur. This image shows the anterior view of the 5 brachial plexus nerves on the human arm. The brachial plexus is made up of spinal nerves that are part of the peripheral nervous system. It includes sensory and motor nerves that innervate the upper limbs. The brachial plexus includes the last 4 cervical nerves C5-C8 and the 1st thoracic nerve T1. Each of those nerves splits into smaller trunks, divisions, and cords. The lateral cord includes the musculocutaneous nerve and lateral branch of the median nerve. The medial cord includes the medial branch of the median nerve and the ulnar nerve. The posterior cord includes the axillary nerve and radial nerve. There are two types of traction: In downward traction there is tension of the arm which forces the angle of the neck and shoulder to become broader. This tension is forced and can cause lesions of the upper roots and trunk of the nerves of the brachial plexus. Humeral fractures and shoulder dislocations can also cause this type of injury with high energy injuries. In peripheral mechanism, traction is transmitted to the rootlet, however dura mater will be torn with the rootlet intact because the dura is less elastic when compared to the rootlet. Pseudomeningocele can be shown on cervical myelography. On the other hand, through central mechanism, the head and neck is pushed along with the spinal roots of the brachial plexus to the opposite site of the body, leading to direct nerve root injury but the dura sheath remains intact. In this case, anterior roots are more prone than posterior roots for avulsion, thus the C8 and T1 nerve roots are more prone to injury. Root avulsion injury can be further divided based on the location of the lesion: In a preganglionic lesion, the sensory fibre remain attached to the cell body of the sensory ganglion, thus there is no wallerian degeneration of the sensory fibre, thus sensory action potential can still be detected at the distal end of the spinal nerve. However, those who get

this type of lesion has sensory loss over the affected nerve roots. In this case, surgical repair of the lesion is not possible because the proximal nerve tissue is too short for stitching to be possible. For postganglionic lesions, the cell body of the sensory ganglion is detached from the spinal nerve, leading to wallerian degeneration of the sensory fibre. Thus, no action potential detected at the distal end of spinal nerve. However, surgical repair is possible because proximal nerve tissue has enough length for stitching. Depending on the severity of the impact, lesions can occur at all nerves in the brachial plexus. The location of impact also affects the severity of the injury and depending on the location the nerves of the brachial plexus may be ruptured or avulsed. When passing through between the clavicle and first rib, the brachial plexus maybe crushed in the costoclavicular space. This is usually due to direct trauma to the shoulder or neck region as a result of motorvehicular accidents, occupational injuries or sports injuries. The brachial plexus may also be compressed by surrounding damaged structures such as bone fragments or callus from the clavicular fracture, and haematoma or pseudoaneurysm from vascular injury. Cervical rib, prominent transverse process, and congenital fibrous bands can also compress the brachial plexus and causes thoracic outlet syndrome. During this process, the brachial plexus can receive damage resulting in injury. The incidence of this happening at birth is 1 in The evidence of denervation will be evident. If there is no nerve conduction 72 hours after the injury, then avulsion is most likely. MR helps aid in the assessment of the injuries in specific context of site, extent and the nerve roots involved. In addition, assessment of the cervical cord and post traumatic changes in soft tissues may also be visualised. Classification[edit] The severity of brachial plexus injury is determined by the type of nerve damage. Most systems attempt to correlate the degree of injury with symptoms, pathology and prognosis. The mildest form of nerve injury. It involves an interruption of the nerve conduction without loss of continuity of the axon. Recovery takes place without wallerian degeneration. Involves axonal degeneration, with loss of the relative continuity of the axon and its covering of myelin, but preservation of the connective tissue framework of the nerve the encapsulating tissue, the epineurium and perineurium , are preserved. The most severe form of nerve injury, in which the nerve is completely disrupted by contusion, traction or laceration. Not only the axon, but the encapsulating connective tissue lose their continuity. The most extreme degree of neurotmesis is transsection, although most neurotmetic injuries do not produce gross loss of continuity of the nerve but rather, internal disruption of the nerve architecture sufficient to involve perineurium and endoneurium as well as axons and their covering. It requires surgery, with unpredictable recovery. With fifth degree injuries, the nerve is completely divided. Some brachial plexus injuries may heal without treatment. Many infants improve or recover within 6 months, but those that do not, have a very poor outlook and will need further surgery to try to compensate for the nerve deficits. Gentle range of motion exercises performed by parents, accompanied by repeated examinations by a physician, may be all that is necessary for patients with strong indicators of recovery. However, in more serious brachial plexus injuries surgical interventions can be used. Function can be restored by nerve repairs, nerve replacements, and surgery to remove tumors causing the injury. On top of promoting a lifetime process of physical healing, it is important to not overlook the psychological well-being of a patient. This is due to the possibility of depression or complications with head injuries. Improvements occur slowly and the rehabilitation process can take up to many years. Many factors should be considered when estimating recovery time, such as initial diagnosis of the injury, severity of the injury, and type of treatments used. One of the main goals of rehabilitation is to prevent muscle atrophy until the nerves regain function. Electrical stimulation is an effective treatment to help patients reach this fundamental goal. Exercises that involve shoulder extension, flexion, elevation, depression, abduction and adduction facilitate healing by engaging the nerves in the damaged sites as well as improve muscle function. Stretching is done on a daily basis to improve or maintain range of motion. Stretching is important in order to rehabilitate since it increases the blood flow to the injury as well as facilitates nerves in functioning properly. Examined patients had a lower score in the Berg balance scale , a greater difficulty in maintaining in the unipodal stance during one minute and leaned the body weight distribution to the side affected by the lesion. Patients also exhibited a greater variability in the postural oscillation, evaluated by the directional stability index. The results alert the clinical community about the necessity to prevent and treat secondary effects of this condition. Type of delivery also affects the risk of BPI. Avulsion and rupture injuries require timely surgical intervention for any

chance of recovery.

Chapter 2 : Easy Notes On â€•Brachial Plexusâ€˜Learn in Just 4 Minutes!

In this article, we shall look at the anatomy of the brachial plexus - its formation and anatomical course through the body. The brachial plexus is divided into five parts; roots, trunks, divisions, cords and branches (a good mnemonic for this is R ead T hat D amn C adaver B ook).

This article has been corrected. See J Neurosci Rural Pract. This article has been cited by other articles in PMC. Abstract The medial antebrachial cutaneous nerve MACN is a branch of the brachial plexus with a great variation within its branches. Knowledge of these variations is critical to neurologists, hand surgeons, plastic surgeons, and vascular surgeons. The aim of this study was to search for variations of the MACN and to discuss their clinical significance. For this study, six arm cadavers from three fresh cadavers were dissected and examined to find and study possible anatomical variations of the MACN. The authors report a rare case of a variation of the MACN, in which there are four brachial cutaneous branches, before the separation to anterior volar and posterior ulnar branch, that provide sensory innervation to the medial, inferior half of the arm, in the area that is commonly innervated from the medial brachial cutaneous nerve. To our knowledge, this is the first documented case of this nerve variation. This variation should be taken into serious consideration for the differential diagnosis of patients with complaints of hypoesthesia, pain, and paresthesia and for the surgical operations in the medial part of the arm. Anatomical variations, clinical anatomy, medial antebrachial cutaneous nerve, medial cutaneous nerve of the forearm Introduction The medial antebrachial cutaneous nerve MACN arises from the medial cord of the brachial plexus and is derived from segments C8 and T1. The authors report a variation in which the MACN provides four branches to the medial, inferior half of the arm. Although the cases in the literature describing variations of the branches of the brachial plexus are abundant, there is not any similar case describing brachial branches of the MACN in this specific area. All the three cadavers were in the anatomical position with the forearms supinated. After removing the skin and revealing the subcutaneous tissue, the MACN was isolated from the adipose tissue and examined. In addition, the brachial fascia was removed to study the brachial course of the nerve from its origin, the brachial plexus, to its emersion from the brachial fascia. Five of six nerves had no significant variations. One of them, the one of the female cadaver was providing branches to the skin of the medial, inferior half of the arm, in the area that is commonly innervated by the medial brachial cutaneous nerve MBCN. The authors isolated the nerve from the basilic vein and examined the number, the thickness, the length, and the allocation of the brachial cutaneous branches. There were four branches, about 1. The most superior branch was separated from the MACN Measurements were made by using a meter.

Chapter 3 : Brachial Plexus -

The brachial plexus is a conjugation of nervous tissue that is comprised of fibers formed by the ventral rami of the four lower cervical and the first thoracic nerve roots (C5-C8 and T1). Its branches radiate as large nerves that cutaneously and motorically innervate the entire upper limb.

The shoulder and axilla Muscles of pectoral region The upper limb is connected to the trunk ventrally by the pectoralis major, pectoralis minor, subclavius, and serratus anterior. The pectoralis major is inserted into the humerus, the others into the shoulder girdle. They are all supplied by branches of the brachial plexus. The origin, insertion, innervation, and action of each muscle are listed in table In this and subsequent tables of muscles, only the chief attachments and principal actions are given. The fascia extending between the pectoralis major and the latissimus dorsi forms the floor of the axilla. This axillary fascia is suspended from the fascia around the pectoralis minor, and traction on it produces the hollow of the armpit. It is attached above to the clavicle as the clavipectoral fascia, which is also anchored to the first rib and to the coracoid process fig. The supraclavicular nerves lateral, intermediate, and medial arise from the cervical plexus and cross the clavicle where they may be rolled against the bone. They supply the skin over the shoulder and, because they arise from the same roots C3, 4 as the phrenic nerve, diaphragmatic inflammation is one cause of pain referred to the shoulder. The pectoralis major is a large, fan-shaped muscle, the rounded, lower border of which forms the anterior axillary fold fig. It functions mainly as an adductor of the arm and aids in throwing, pushing, and shoveling. When the arms are fixed in climbing, it draws the body upward. The pectoralis major covers the pectoralis minor, which, in turn, covers the second part of the axillary artery. The serratus anterior see fig. Its digitations of origin which interdigitate with those of the external oblique muscle of the abdomen can be seen in a muscular person. The serratus rotates the scapula so that the inferior angle moves laterally; it is thereby important in abduction of the arm above the horizontal plane. It pulls the scapula anteriorward in throwing and pushing. Paralysis of the serratus anterior e. Superficial muscles of back see fig. The latissimus is inserted into the humerus, the others into the shoulder girdle. Although the muscles are located on the back, they are supplied from the ventral rami of cervical nerves. The trapezius receives its major supply from the accessory nerve CN XI. The muscles of the two sides together form a trapezoid. The region around C7 is more aponeurotic than muscular, resulting in a slightly depressed area frequently visible. The most superior part of the trapezius, together with the levator scapulae, elevates the shoulder. The muscles of the two sides together brace the shoulders by pulling the scapulae posteriorward, and their weakness results in drooping shoulders. The latissimus dorsi is a large, mostly superficial, triangular muscle. The posterior aspect of its most superior fibers is covered by the trapezius, and its lateral part, together with the teres major, forms the posterior axillary fold. The trapezius and latissimus dorsi intersect near the medial border of the scapula, at a small area termed the triangle of auscultation figs. The latissimus is a powerful adductor and extensor of the arm and is important in the downstroke in swimming as well as in rowing, climbing, and hammering, and in supporting the weight of the body on the hands. Muscles of shoulder table The deltoid, supraspinatus, infraspinatus, teres minor, teres major, and subscapularis arise from the scapula and are inserted into the humerus. They are supplied by cervical nerves 5 and 6 by way of branches of the brachial plexus. The deltoid is responsible for the roundness of the shoulder see fig. It originates from the inferolateral clavicle and spine of the scapula as well as the acromion process. It is a powerful abductor of the arm in the plane of the scapula. The anterior and posterior parts of the muscle are involved, respectively, in flexion and medial rotation and in extension and lateral rotation. The posterior and middle parts together abduct the arm in a coronal plane. The deltoid acts also as a stabilizer in horizontal movements, e. The supraspinatus initiates abduction and aids the deltoid in that motion, which is usually incomplete in paralysis of either of these muscles fig. The interval between the teres minor, teres major, and the surgical neck of the humerus is divided longitudinally by the long head of the triceps into a triangular space medially and a quadrangular space containing the axillary nerve laterally see fig. The tendons of the supraspinatus, infraspinatus, teres minor, and subscapularis blend with the capsule of the shoulder joint and form a musculotendinous or rotator cuff, which is incomplete in its inferior aspect fig. The

tendons of the cuff are prone to degenerative changes. Moreover, nipping of a tender structure e. Axilla The pyramidal interval between the arm and the chest wall is termed the axilla. The pectoralis major and latissimus dorsi form prominent anterior and posterior axillary folds, respectively. A vertical line midway between the anterior and posterior axillary folds is referred to as the midaxillary line. The fascial base extends between these folds. The apex of the axilla is the interval between the posterior border of the clavicle, the superior border of the scapula, and the external border of the first rib. Through the apex, the axillary vessels and their accompanying nerves pass from the neck to the arm. The axilla is bounded medially by the upper ribs and their intercostal muscles and by the serratus anterior; it is limited laterally by the intertubercular groove of the humerus. The chief contents of the axilla are the axillary artery and vein, a part of the brachial plexus and its branches, and the axillary lymph nodes. Nerves of the upper limb Brachial plexus figs. It is formed by the union of the ventral rami of the lower four cervical and first thoracic nerves C5,6,7,8; T1. Frequently it receives a contribution from one nerve higher or one nerve lower. The brachial plexus descends in the posterior triangle of the neck. Here it lies superior to the clavicle and posterior to the sternomastoid muscle, where it can be palpated. In surface anatomy, the brachial plexus in the neck lies inferior to a line from the posterior margin of the sternomastoid at the level of the cricoid cartilage to the midpoint of the clavicle. Here the plexus can be injected with a local anesthetic brachial block , the pulsations of the third part of the subclavian artery situated inferior and anterior to the plexus being used as a guide fig. The brachial plexus descends in the concavity of the medial two thirds of the clavicle see fig. The plexus is enclosed with the axillary vessels in the axillary sheath, which is a prolongation of the cervical fascia posterioinferior to the clavicle and into the axilla. The brachial plexus may be blocked in the axilla by injecting a local anesthetic into the axillary sheath. A common arrangement of the brachial plexus is shown in figures and The first two ventral rami C5,6 unite to form the upper trunk, the next C7 constitutes the middle trunk, and the last two C8; T1 join to form the lower trunk. Each trunk divides into an anterior and posterior division. The anterior divisions of the upper and middle trunks unite to form the lateral cord, that of the lower trunk constitutes the medial cord, and the three posterior divisions join to form the posterior cord. The cords are named from the positions that they occupy in relation to the second part of the axillary artery. In general, the lateral and medial cords supply the ventral aspect of the limb, whereas the posterior cord supplies the dorsal aspect. At the lateral border of the pectoralis minor, the cords divide into terminal branches, each of which contains fibers derived from several spinal nerves. In summary, the brachial plexus is composed successively of ventral rami and trunks in the neck, divisions that are usually posterior to the clavicle, and cords and branches in the axilla. The nerve bundles that descend from the neck come to meet, and then to accompany, the more superficially and medially placed artery that has ascended from the thorax. The lower trunk lies on the first rib behind the subclavian artery. When a cervical rib is present, the lower trunk may be stretched as it crosses the rib. Injuries to the brachial plexus are very important. Such injuries may occur during birth. The short muscles of the hand are affected and "claw hand" results see fig. Involvement of the brachial plexus may also be a part of the neurovascular compression syndrome. Branches of the brachial plexus Several branches arise superior to the clavicle fig. The ventral rami give rise to 1 the dorsal scapular nerve chiefly C5 to the rhomboids and 2 the long thoracic nerve C to the serratus anterior. The upper trunk gives off 1 the nerve to the subclavius chiefly C5 , which frequently contributes to the phrenic nerve, and 2 the suprascapular nerve C5,6 to the supraspinatus and infraspinatus. The terminal branches of the cords arise inferior to the clavicle. Several of them send articular twigs e. The lateral cord gives origin to 1 lateral pectoral nerves C to the pectoralis major and minor, 2 the musculocutaneous nerve, 3 the lateral head of the median, and 4 possibly a contribution to the ulnar fig. The medial cord fig. The posterior cord gives off 1 the upper subscapular nerve s C5 to the subscapularis, 2 the thoracodorsal nerve C7,8 to the latissimus dorsi, 3 the lower subscapular nerve s C5,6 to the subscapularis and teres major, 4 the axillary, and 5 the radial. A simple scheme fig. Table shows the segmental innervation of the muscles of the upper limb. The five most important branches of the brachial plexus are the musculocutaneous, median, ulnar, axillary, and radial nerves. The musculocutaneous nerve C fig. It may carry a part or all of the lateral head of the median nerve and send these fibers to the medial head in the arm. The musculocutaneous nerve supplies the flexor muscles on the anterior aspect of the arm and the skin on the

lateral side of the forearm. The median nerve C[5,] ; T1 fig. The median nerve supplies most of the flexor muscles on the front of the forearm, most of the short muscles of the thumb, and the skin on the lateral part of the front of the hand. In injury to the median nerve see fig. In section superior to the elbow, pronation is lost, flexion and abduction of the hand are impaired, interphalangeal flexion is lost in the lateral two fingers, and thumb movements, especially opposition, are severely impaired. In section at the wrist, a serious condition, anesthesia and impaired thumb movements result. Median nerve lesions are commonly followed by painful disorders e. The ulnar nerve C7, 8; T1 fig. The ulnar nerve supplies some of the flexor muscles of the anterior forearm, many of the short muscles of the hand, and the skin on the medial part of the palmar and dorsal aspect of the hand.

Chapter 4 : Brachial plexus - Physiopedia

The brachial plexus is a network of nerve confluences and ramifications, which combine to form the large terminal branches that supply motor and sensory branches to the upper extremities.

The C4 to C8 spinal nerves are the anterior ventral rami of the lower four cervicals and T1 is the first thoracic nerve. The Brachial plexus supplies afferent and efferent nerve fibers to the chest, shoulder, arm and hand. The roots and trunks arc located in the neck, divisions behind the clavicle and the cords in the axilla. Close to their origin, the roots receive gray rami communicates from the sympathetic trunk. These carry postganglionic sympathetic fibres onto the roots for distribution to the periphery. The roots and trunks enter the posterior triangle of the neck by passing between the anterior scalene and middle scalene muscles and lie superior and posterior to the subclavian artery. Brachial Plexus Trunks of The Brachial Plexus The three trunks of the brachial plexus originate from the roots, pass laterally over rib I, and enter the axilla: The superior trunk is formed by the union of C5 and C6 roots. The middle trunk is a continuation of the C7 root. The inferior trunk is formed by the union of the C8 and T1 roots. The inferior trunk lies on rib I posterior to the subclavian artery; the middle and superior trunks are more superior in position. Divisions of The Brachial Plexus Each of the three trunks of the brachial plexus divides into an anterior and a posterior division: The three anterior divisions form parts of the brachial plexus that ultimately give rise to peripheral nerves associated with the anterior compartments of the arm and forearm. The three posterior divisions combine to form parts of the brachial plexus that give rise to nerves associated with the posterior compartments. No peripheral nerves originate directly from the divisions of the brachial plexus. Cords of The Brachial Plexus The three cords of the brachial plexus originate from the divisions and are related to the second part of the axillary artery: The lateral cord results from the union of the anterior divisions of the upper and middle trunks and therefore has contributions from C5 to C7â€”it is positioned laterally to the second part of the axillary artery. The medial cord is medial to the second part of the axillary artery and is the continuation of the anterior division of the inferior trunkâ€”it contains contributions from C8 and Tl. The posterior cord occurs posterior to the second part of the axillary artery and originates as the union of all three posterior divisionsâ€”it contains contributions from all roots of the brachial plexus C5 to T1. Most of the major peripheral nerves of the upper limb originate from the cords of the brachial plexus. Generally, nerves associated with the anterior compartments of the upper limb arise from the medial and lateral cords and nerves associated with the posterior compartments originate from the posterior cord. Branches Branches of the Roots In addition to small segmental branches from C5 to C8 to muscles of the neck and a contribution of C5 to the phrenic nerve , the roots of the brachial plexus give rise to the dorsal scapular and long thoracic nerves. Passes posteriorly, often piercing the middle scalene muscle in the neck. Passes vertically down the neck, through the axillary inlet, and down the medial wall of the axilla to supply the serratus anterior muscle, and lies on the superficial aspect of the serratus anterior muscle. Branches of the Trunks The only branches from the trunks of the brachial plexus are two nerves that originate from the superior trunk upper trunk: The suprascapular nerve C5 and C6: The nerve to the subclavius muscle C5 and C6 is a small nerve that: Originates from the superior trunk of the brachial plexus. Passes anteroinferiorly over the subclavian artery and vein. Innervates the subclavius muscle. Branches of the Lateral Cord Brachial Plexus: Branches of Lateral Cord Three nerves originate entirely or partly from the lateral cord of the brachial plexus. The lateral pectoral nerve is the most proximal of the branches from the lateral cord. It passes anteriorly, together with the thoracoacromial artery, to penetrate the clavipectoral fascia that spans the gap between the subclavius and pectoralis minor muscles, and innervates the pectoralis major muscle. The musculocutaneous nerve is a large terminal branch of the lateral cord. It passes laterally to penetrate the coracobrachialis muscle and pass between the biceps brachii and brachialis muscles in the arm, and innervates all three flexor muscles in the anterior compartment of the arm, terminating as the lateral cutaneous nerve of the forearm. The lateral root of the median nerve is the largest terminal branch of the lateral cord and passes medially to join a similar branch from the medial cord to form the median nerve. Branches of the Medial Cord Brachial Plexus: Branches of Medial Cord The medial cord of the brachial

plexus has five branches. The medial pectoral nerve is the most proximal branch. It receives a communicating branch from the lateral pectoral nerve and then passes anteriorly between the axillary artery and axillary vein. Branches of the nerve penetrate and supply the pectoralis minor muscle. Some of these branches pass through the muscle to reach and supply the pectoralis major muscle. Other branches occasionally pass around the inferior or lateral margin of the pectoralis minor muscle to reach the pectoralis major muscle. The medial cutaneous nerve of the arm medial brachial cutaneous nerve passes through the axilla and into the arm where it penetrates deep fascia and supplies skin over the medial side of the distal third of the arm. In the axilla, the nerve communicates with the intercostobrachial nerve of T2. Fibers of the medial cutaneous nerve of the arm innervate the upper part of the medial surface of the arm and floor of the axilla. The medial cutaneous nerve of the forearm medial antebrachial cutaneous nerve originates just distal to the origin of the medial cutaneous nerve of the arm. It passes out of the axilla and into the arm where it gives off a branch to the skin over the biceps brachii muscle , and then continues down the arm to penetrate the deep fascia with the basilic vein, continuing interiorly to supply the skin over the anterior surface of the forearm. It innervates skin over the medial surface of the forearm down to the wrist. The medial root of the median nerve passes laterally to join with a similar root from the lateral cord to form the median nerve anterior to the third part of the axillary artery. The ulnar nerve is a large terminal branch of the medial cord. However, near its origin, it often receives a communicating branch from the lateral root of the median nerve originating from the lateral cord and carrying fibers from C7. The ulnar nerve passes through the arm and forearm into the hand where it innervates all intrinsic muscles of the hand except for the three thenar muscles and the two lateral lumbrical muscles. On passing through the forearm, branches of the ulnar nerve innervate the flexor carpi ulnaris muscle and the medial half of the flexor digitorum profundus muscle. The ulnar nerve innervates skin over the palmar surface of the little finger, medial half of the ring finger, and associated palm and wrist, and the skin over the dorsal surface of the medial part of the hand. Median nerve The median nerve is formed anterior to the third part of the axillary artery by the union of lateral and medial roots originating from the lateral and medial cords of the brachial plexus. It passes into the arm, anterior to the brachial artery and through the arm, into the forearm, where its branches innervate most of the muscles in the anterior compartment of the forearm. However, it does not innervate the flexor carpi ulnaris muscle and the medial half of the flexor digitorum profundus muscle, which are innervated by the ulnar nerve. The median nerve continues into the hand to innervate: The musculocutaneous nerve, the lateral root of the median nerve, the median nerve, the medial root of the median nerve, and the ulnar nerve form an M over the third part of the axillary artery. This feature, together with penetration of the coracobrachialis muscle by the musculocutaneous nerve, can be used to identify components of the brachial plexus in the axilla. Branches of the Posterior Cord Five nerves originate from the posterior cord of the brachial plexus: The superior subscapular nerve.

Chapter 5 : Brachial Plexus | Clinical Gate

Posterior cord of brachial plexus is formed by union of posterior division of upper, middle, and lower trunk of brachial plexus. It lies posterior to, second part of axillary artery. The posterior cord of brachial plexus after giving upper subscapular, thoracodorsal, lower subscapular, and axillary nerve in the axilla continues distally as the.

Brachial plexus injury Brachial plexus injury affects cutaneous sensations and movements in the upper limb. They can be caused by stretching, diseases, and wounds to the lateral cervical region posterior triangle of the neck or the axilla. Depending on the location of the injury, the signs and symptoms can range from complete paralysis to anesthesia. A common brachial plexus injury is from a hard landing where the shoulder widely separates from the neck such as in the case of motorcycle accidents or falling from a tree. These stretches can cause ruptures to the superior portions of the brachial plexus or avulse the roots from the spinal cord. Upper brachial plexus injuries are frequent in newborns when excessive stretching of the neck occurs during delivery. Studies have shown a relationship between birth weight and brachial plexus injuries; however, the number of cesarean deliveries necessary to prevent a single injury is high at most birth weights. A loss of sensation in the lateral aspect of the upper limb is also common with such injuries. In this case, the short muscles of the hand would be affected and cause the inability to form a full fist position. Acute brachial plexus neuritis is a neurological disorder that is characterized by the onset of severe pain in the shoulder region. Additionally, the compression of cords can cause pain radiating down the arm, numbness, paresthesia, erythema, and weakness of the hands. This kind of injury is common for people who have prolonged hyperabduction of the arm when they are performing tasks above their head. Definition[edit] Brachial plexus injuries are injuries that affect the nerves that carry signals from the spine to the shoulder. Injuries associated with malpositioning commonly affect the brachial plexus nerves, rather than other peripheral nerve groups. The most common victims of brachial plexus injuries consist of victims of motor vehicle accidents and newborns. Motorcycle accidents[edit] Motorcyclists who are involved in accidents are very susceptible to brachial plexus injuries due to the nature of the collision. During physical therapy, the position of the brachial plexus became very important to avoid further damage. In this photo, the subject performs an example of a motorcyclist colliding with the floor at an angle, which may damage the brachial plexus nerves. The photo shows how head and shoulder are extremely separated, which may stretch or even tear the nerves in the between area. Protective gear can help prevent nerve damage by providing extra support on the opposite side of the head to prevent over-stretching the neck. Sports injuries[edit] One sports injury that is becoming prevalent in contact sports, particularly in the sport of American football, is called a "stinger. Although this injury causes only a temporary sensation, in some cases it can cause chronic symptoms. Penetrating wounds[edit] Most penetration wounds require immediate treatment and are not as easy to repair. Injuries during birth[edit] Brachial Plexus injuries can occur during the delivery of newborns when after the delivery of the head, the anterior shoulder of the infant cannot pass below the pubic symphysis without manipulation. Shoulder dystocia can cause obstetric brachial plexus palsy OBPP , which is the actual injury to the brachial plexus. Nerve damage has been connected to birth weight with larger newborns being more susceptible to the injury but it also has to do with the delivery methods. Although very hard to prevent during live birth , doctors must be able to deliver a newborn with precise and gentle movements to decrease chances of injuring the child.

Chapter 6 : Medial cord - Wikipedia

Branches of the Roots. In addition to small segmental branches from C5 to C8 to muscles of the neck and a contribution of C5 to the phrenic nerve, the roots of the brachial plexus give rise to the dorsal scapular and long thoracic nerves.

Resources, including psychology, vocational rehabilitation, ergonomics, and driver training, can be included as necessary. However, nerve grafts performed at earlier time points may result in unnecessary surgery in individuals who would otherwise demonstrate some degree of spontaneous recovery. Further research is needed to assist in determining prognosis before 2 months and establishing the most effective timing for surgical intervention. Shapiro, Electromyography and Neuromuscular Disorders. Clin Sports Med, Nishizawa, [Diagnosis and management of paraneoplastic neurological syndromes]. Boome, Brachial plexus lesions associated with dislocated shoulders. J Bone Joint Surg Br, Rucksack Palsy and Digitalgia Paresthetica. J Spec Oper Med, Etiz, Early transient radiation-induced brachial plexopathy in locally advanced head and neck cancer. Contemp Oncol Pozn , Pritchard, Diffuse brachial plexopathy after interscalene blockade in a patient receiving cisplatin chemotherapy: Curr Neurol Neurosci Rep, J Clin Oncol, Van Alfen, Neuralgic amyotrophy: An update on diagnosis, pathophysiology, and treatment. Nat Rev Neurol, Norell, Microvasculitis and ischemia in diabetic lumbosacral radiculoplexus neuropathy. Kawabata, The prognostic value of concurrent phrenic nerve palsy in newborn babies with neonatal brachial plexus palsy. J Hand Surg Am, J Bone Joint Surg Am, Boden, Low Back and Neck Pain: Comprehensive Diagnosis and Management. Nadler, Musculoskeletal Physical Examination: Joint Bone Spine, Fredericson, Thoracic outlet syndrome. Chaudhry, Role of magnetic resonance neurography in brachial plexus lesions. J Neurosurg Pediatr, Wolfe, Imaging and electrodiagnostic work-up of acute adult brachial plexus injuries. J Hand Surg Eur Vol, Shin, Adult brachial plexus injuries: Chung, Psychosocial outcomes and coping after complete avulsion traumatic brachial plexus injury. Bone Joint J, Acta Neurochir Wien , J Plast Reconstr Aesthet Surg, Ghizoni, Results and current approach for Brachial Plexus reconstruction. Surgical strategies and approaches. Neurosurg Clin N Am, Eur J Cancer Care Engl , A long-term follow-up study. J Rehabil Med, Dev Med Child Neurol, Childs Nerv Syst, Clin Neurol Neurosurg,

Chapter 7 : Ultrasound of the Brachial Plexus | Clinical Gate

Quiz 11 - Brachial Plexus and its Terminal Branches study guide by TracyABar includes 61 questions covering vocabulary, terms and more. Quizlet flashcards, activities and games help you improve your grades.

Incision is marked a finger breath supraclavicular and is approximately 8cm in length. The supraclavicular notch and lateral border of the sternocleidomastoid are marked. The entire arm, chest, neck, and the lower aspect of the ear are prepped and draped. The supraclavicular notch and lateral border of the sternocleidomastoid are marked and the lobule of the ear is noted. An incision is made a finger breath above the clavicle and approximately 8cm in length. The dissection is carried down through the platysma muscle to identify the supraclavicular nerves that are encountered beneath it. Once identified, these nerves are carefully protected and two vessel loops are placed around the nerves. These loops are used as retractors for the nerves to prevent injury. Additionally, there are several supraclavicular nerves that can be encountered and are protected. The fat above the brachial plexus is elevated superiorly. The omohyiod is identified and divided through a plane lateral to the sternocleidomastoid. This small muscle is not repaired. The fat is elevated above the scalene muscles and the brachial plexus to be able to visualize these structures. Transverse cervical vessels, that are identified, are divided and ligated. The phrenic nerve is identified on the anterior surface of the anterior scalene and courses in a unique direction from lateral to medial. It is frequently found on the very most medial aspect of the anterior scalene. No vessel loop is used to protect it due to the sensitivity and critical function of this nerve. Once visually identified and stimulated to confirm its function, the phrenic nerve is visually protected throughout the procedure. The brachial plexus is separated from the anterior scalene, from which the anterior scalene is slowly and carefully divided using micro-bipolar cautery, and taking into account the subclavian artery inferiorly. The phrenic nerve is carefully protected throughout the division. The brachial plexus is mobilized medially to identify the middle scalene muscle laterally. A nerve stimulator is used to identify the long thoracic nerve, which will appear to have a course through the middle scalene or posterior to it. Due to its C5, C6, and C7 contributions, occasionally a couple of branches are visualized to originate from the root level and course together distally to compose the long thoracic nerve. The long thoracic nerve is protected with a vessel loop. Micro-bipolar cautery is used to remove the middle scalene from its attachment to the first rib. The middle scalene has a long distance to its attachment to the first rib. Its long attachment is elevated over this distance. The brachial plexus is then neurolyzed to the point where the Bands of Fontana can be visualized on the surface of the plexus trunks. The Bands of Fontana represent redundancy in the nerve fibers. Micro-instrumentation and straight micro-spring scissors are used for this neurolysis. This minimal neurolysis is described by just opening the epineurium to ensure that there is no compression due to thickened epineurium on the brachial plexus. In situations, where thoracic outlet syndrome is the result of trauma, neurolysis is recommended and useful. In other situations, neurolysis will not be necessary as it depends on the thickness of the epineurium and visualization of the Bands of Fontana. The visualization of the Bands of Fontana will help determine the necessity of neurolysis. In patients that exhibit scapular winging due to weakness of the serratus anterior, the entire length of the long thoracic nerve is examined to verify that there are no vascular structures compressing the nerve. If compression of the long thoracic nerve is identified, these structures are divided to decompress the nerve. Marcaine is then placed in the incision, which is usually drained and closed with subcuticular monocryl. Within two or three days post-operatively, patients are allowed gentle range of movements. Orthop Clin North Arm. Supraclavicular first rib resection. Semin Thorac Cardiovasc Surg. Evaluation of the patient with thoracic outlet syndrome. Outcome following conservative management of thoracic outlet syndrome. J Hand Surg Am.

Chapter 8 : Brachial plexus - blog.quintoapp.com

The brachial plexus is divided into Roots, Trunks, Divisions, Cords, and Branches. There are five "terminal" branches and numerous other "pre-terminal" or "collateral" branches that leave the plexus at various points along its length.

Received Aug 14; Accepted Sep This is an open access article distributed under the Creative Commons Attribution License, which permits unrestricted use, distribution, and reproduction in any medium, provided the original work is properly cited. This article has been cited by other articles in PMC. Knowledge of anatomical variations of posterior cord and its branches is important not only for the administration of anaesthetic blocks but also for surgical approaches to the neck, axilla, and upper arm. The present study aimed to record the prevalence of such variations with embryological explanation and clinical implication. Cadavers were dissected during routine anatomy classes for medical undergraduate. Dissection includes surgical incision in the axilla, followed by retraction of various muscles, to observe and record the formation and branching pattern of posterior cord of brachial plexus. Posterior cord was formed by union of posterior division of C5 and C6 roots with posterior division of middle and lower trunk there was no upper trunk in Posterior cord of brachial plexus was present lateral to the second part of axillary artery in Axillary nerve was taking origin from posterior division of upper trunk in It is important to be aware of such variations while planning a surgery in the region of axilla as these nerves are more liable to be injured during surgical procedures. Introduction Posterior cord of brachial plexus is formed by union of posterior division of upper, middle, and lower trunk of brachial plexus. It lies posterior to, second part of axillary artery. The posterior cord of brachial plexus after giving upper subscapular, thoracodorsal, lower subscapular, and axillary nerve in the axilla continues distally as the radial nerve [1]. Knowledge of the variations of posterior cord and its branches is important for the administration of anaesthetic blocks, surgical approaches to the neck, axilla, and upper arm [2 , 3]. The present study describes the variations of posterior cord observed in population from central India. Material and Method The formalin-fixed 37 cadavers, that is, 74 upper extremities constitute the material for study. During routine dissection of axilla and supraclavicular region of medical undergraduates in L. Medical College Bhopal, the skin and various muscles were reflected and superficial fascia and deep fascia were separated to visualize the formation and branching pattern of posterior cord. Results We recorded variations in the formation, location, and branching pattern of posterior cord. Upper subscapular, lower subscapular, and radial nerve origin were normal in all 37 cadavers.

Chapter 9 : Brachial plexus - Simple English Wikipedia, the free encyclopedia

The brachial plexus is easier to learn if you break it down into its component segments and tackle them one at a time: these are roots, trunks, divisions, cords and terminal branches. ROOTS - There are five nerve roots from C5-T1, which give three nerve branches.