DOWNLOAD PDF MR NORMAL ANATOMY: UPPER EXTREMITY

Chapter 1 : Lower extremity: MRI of Anatomical atlas

Anatomy of the upper limb: axial slice of the shouler and axillary fossa. Anatomy of the arm, forearm, wrist, shoulder and hand: how to visualize anatomic labels This module is a comprehensive and affordable learning tool for medical students and residents and especially for rheumatologists, orthopaedic surgeons and radiologists.

Shoulder Coil When preparing a patient for a shoulder exam as well as many other upper extremity studies , position the patient toward the edge of the table away from the affected shoulder. In addition, move the table away from the affected side Figure This affords you the best opportunity to position the affected shoulder at the exact isocenter of the magnet. The Oasis MRI system offers a specific positioning pad for use with the multiple array shoulder coil Figures 13 and The table pad was designed with a cut-out area to accomodate the shoulder coil. Specific accessory pads that can be affixed to the outside of the shoulder coil are supplied to assist with coil stability. In addition, thick and thin accessory pads that can be attached inside the coil are provided to aid in patient positioning. Oasis shoulder coil and pad. Patient positioned in Oasis shoulder coil. The pads can help stabilize the shoulder coil on the table, and can be of assistance with positioning, especially for coronal A-P centering. The pads are labeled for correct usage with the right or left shoulder. The shoulder coil fits between the two pads for safe storage. Large Extremity Solenoid Coil Typical positioning of the solenoid coil for a shoulder study involves fitting the coil as snugly as possible along the superior aspect of the shoulder joint Figures 17 and The coil does not have to be used as a bracelet fitting around and over the shoulder. The table straps can be used to secure the solenoid coil in a stable position, while keeping it aligned 90 degrees to the table surface. Large extremity solenoid coil. As seen below, positioning a patient using insufficient padding does not elevate the shoulder to isocenter, and will typically result in suboptimal images figures 19 and Patient not centered in the A-P direction. Anatomy not at A-P isocenter of magnet. When the table is advanced into the magnet, the anatomy will be at the coronal isocenter of the magnet Figures 21 and Isocenter positioning in all three planes is strongly recommended for optimal images on vertical-field open magnets. Patient now centered properly in A-P direction. Anatomy now at A-P isocenter of magnet. Table Straps The system table straps can be used to help stabilize both the patient and the coil, and are particularly helpful when using the solenoid coil. The straps can remain attached to the table so they are readily accessible. Due to the circular shape of the magnet bore, the width of the table is not as generous as that found on open MRI systems. In addition, the patient table does not have lateral movement capabilities. Shoulder Coil The Echelon shoulder coil is the coil of choice for shoulder scanning. Although there are some limitations due to the width of the table, attempts should be made to position the patient near the table edge opposite the affected shoulder. This affords you the best opportunity to position the affected shoulder and shoulder coil as close to isocenter as possible. Similar to the previously mentioned Oasis shoulder coil, a specific table pad and specific accessory pads are supplied for use with the Echelon shoulder coil Figure Pads that can be affixed to the top and bottom of the shoulder coil assist with coil stability. Thick and thin accessory pads that can be attached to the inside of the coil are supplied to aid in patient positioning and stabilization of the shoulder Figure The system table straps can also be used to help stabilize both the patient and the coil. When positioning for the shoulder exam, use the laser localizer beams to display R-L and H-F centering. Echelon shoulder coil and pad. Patient in Echelon shoulder coil. For additional information, please refer to the Echelon Patient Positioning and Coils manual that was supplied with your Echelon system. Axial Scans Our recommendation is to begin a shoulder study with a scan oriented in the transverse or axial plane. Axial slices should cover the area from the AC joint through the glenoid cavity, to include the inferior labrum and fibrous capsule. The slices can be angled in order to align them perpendicular to the orientation of the humerus, as demonstrated in Figure Axial slice setup using coronal images. Coronal Scans Slice positioning and patient positioning for coronal slice setup can vary from site to site. Many sites align their slices parallel to the supraspinatus tendon or supraspinatus muscle, as shown in Figures 27 and This alignment will be made using one of the more superior slices from the axial series. Once you have determined the proper angle to use Figure 29 , inferior slices should be viewed to ensure coverage of the entire glenoid cavity Figures 30 and The images of the humeral head shown below also demonstrate the differences in the position of the bicipital groove with supination of the hand palm up versus pronation of the hand palm down. Coronal slice setup using transverse image. Effects of Hand Position on Images of Shoulder Muscles and Tendons The complex orientations of muscles and tendons will require additional attention to detail when setting up the shoulder studies. The demonstration of specific muscles, in conjunction with the preferences of the radiologist, must be considered when positioning the forearm and hand Figure Supination of the hand palm up tightens the anterior capsule of the shoulder and separates the Supraspinatus from the Infraspinatus in the coronal orientation Figure Pronation of the hand palm down may be a more comfortable position for the patient, but it allows crossing of the aforementioned tendons, which could mimic a rotator cuff tear Figure See additional images below Figures 35 and Alternate Positioning for Coronal Scans If slices are not positioned parallel to the supraspinatus muscle, it is common to position the slices across the bowl of the glenoid joint, as shown in Figure However, this joint space is curved, leading to individual interpretations of the proper angulation. Coronal slice setups using transverse images. Sagittal Scans The sagittal view representation Figure 38 and sagittal MR image Figure 39 may give you a better understanding of the dimension of the shoulder joint. Looking at the sagittal view representation, you can better appreciate the bony support mechanism provided by the scapula. Sagittal slices should be positioned perpendicular to the plane of the coronal slices, as seen in the transverse image of Figure Sagittal slice coverage should include a few slices medial to the glenoid cavity, and should extend laterally through the humeral head to include a few slices past the biceps tendon. Sagittal slice setup using transverse and coronal images. There are a wide variety of pulse sequences available in your Scan Card Library or Task Library that can be used when creating protocols for shoulder examinations. Routine shoulder views show the rotator cuff and anterior stabilizing structures. The ABER view puts stress on the inferior glenohumeral labral-ligamentous complex, helping to expose pathology of those structures. While the injection of a dilute gadolinium solution is considered off-label use of a contrast medium, it can effectively distend the joint capsule, outline intra-articular structures, and leak into abnormalities Figure To perform the ABER view, have the patient raise their arm over their head, keeping their elbow bent and their palm up Figure Provide support and stabilization for the affected shoulder and arm, as well as generalized patient comfort measures. The shoulder coil should be rotated around the shoulder so that the cable now extends from underneath the shoulder joint. If the solenoid coil is used, it can be positioned around the arm as a bracelet, then centered around the shoulder. Patient and shoulder coil positioning for ABER view. ABER view image with contrast. Upper Arm MRI may be requested for: Muscles of the upper extremity. The humerus is the long bone in the upper arm that extends from the shoulder to the elbow. At the shoulder, the bony articulation involves the head of the humerus with the glenoid fossa of the scapula. At the elbow, the bony articulations include the capitulum of the humerus with the radial head laterally, and the trochlea of the humerus with the olecranon process of the ulna medially. As the humerus helps to form both the shoulder and elbow joints, it has many muscle insertions along its length. MRI of the upper arm may be ordered to take advantage of its superior imaging capabilities with regards to the numerous muscles and muscle insertions in this anatomical region Figure Superiorly, the deltoid and teres major muscles can be imaged, in addition to the four muscles that make up the rotator cuff supraspinatus, infraspinatus, teres minor, and subscapularis. The subscapularis inserts at the lesser tuberosity of the humerus, while the other three rotator cuff muscles insert at the greater tuberosity. The bicipital groove separates the tuberosities, and is the location of the tendon of the long head of the biceps brachii muscle. The biceps and triceps brachii muscles run the length of the upper arm. An attachment for the brachioradialis muscle is located inferiorly. The axillary, radial and ulnar nerves that traverse the humerus can also be imaged using MRI. The axillary nerve and axillary artery are at risk for injury from anterior or inferior shoulder dislocations, the use of crutches, or a fracture of the humerus. A humerus fracture can also result in injury to the radial nerve, as the path of the nerve closely follows the length of the bone. Coverage of the entire upper arm can be challenging, especially if the shoulder and elbow joints are to be included. Coil selection, table and accessory pads, table straps, and proper laser light centering are all factors to be considered when preparing for an upper arm study. Use of the solenoid coil also involves careful selection of table pads and accessory pads to maintain the anatomy and the coil at isocenter in all three planes. If a flex coil is used, care must be taken when selecting table pads and when positioning the upper arm to ensure that coronal centering of both the coil and the anatomy is maintained. Regardless of the coil that is selected, every effort must be made to have the anatomy centered in the laser localizer beams in all three directions- head-to-foot axial or transverse plane , right-to-left sagittal plane , and anterior-to-posterior coronal plane. Coils and Positioning Solenoid coils Figures 44 and 45 Figure

Chapter 2 : Entrapment Neuropathies in the Upper and Lower Limbs: Anatomy and MRI Features

Section 2 is a short, but very effective and practical, overview of the technical considerations of MRI of the upper extremity. It provides tips to improve imaging in various contexts, such as metallic artifacts, fat suppression, and gadolinium contrast administration.

Shoulder Girdle Upper Limb I: Shoulder Girdle Shoulder Girdle Trauma to the shoulder girdle is common throughout life, but the site of injury varies with age. In children and adolescents, fracture of the clavicle sustained during play or athletic activities is a frequent type of skeletal injury. Dislocations of the shoulder and acromioclavicular separation are often seen in the third and fourth decades of life, whereas fracture of the proximal humerus is commonly encountered in the elderly. Most of these traumatic conditions can be diagnosed on the basis of history and clinical examination, with radiographs obtained mainly to define the exact site, type, and extent of the injury. At times, however, as in posterior dislocation in the glenohumeral joint, for example, which is the most commonly missed diagnosis in shoulder trauma, only radiographic examination performed in the proper projections may reveal the abnormality. Anatomic-Radiologic Considerations The shoulder girdle consists of osseous componentsâ€”proximal humerus, scapula, and clavicle, forming the glenohumeral and acromioclavicular joints Fig. The joint capsule inserts along the anatomic neck of the humerus and along the neck of the glenoid. In front, it is reinforced by three glenohumeral ligaments GHLs the superior, middle, and inferior , which converge from the humerus to be attached by the long head of the biceps tendon to the supraglenoid tubercle. The other important ligaments are the acromioclavicular, coracoacromial, and the coracoclavicular including trapezoid and conoid portions see Fig. The essential muscles are those that form the rotator cuff Fig. The term rotator cuff is used to describe the group of muscles that envelops the glenohumeral joint, holding the head of the humerus firmly in the glenoid fossa. They consist of the subscapularis anteriorly, the infraspinatus posterosuperiorly, the teres minor posteriorly, and the supraspinatus superiorly mnemonic SITS. The subscapularis muscle inserts on the lesser tuberosity anteriorly. The insertions of the supraspinatus, infraspinatus, and teres minor muscles are on the greater tuberosity, posteriorly. The supraspinatus tendon covers the superior aspect of the humeral head, inserting on the superior facet of the greater tuberosity. The infraspinatus tendon covers the superior and posterior aspects of the humeral head and inserts on the middle facet, located distal and more posterior to the superior facet. The teres minor is lower in position and inserts on the posteroinferior facet of the greater tuberosity Fig. In addition, the long head of the biceps with its tendon, which in its intracapsular portion runs through the joint, and the triceps muscle, inserting on the infraglenoid tubercle inferiorly, provide additional support to the glenohumeral joint. Most trauma to the shoulder area can be sufficiently evaluated on radiographs obtained in the anteroposterior projection with the arm in the neutral position Fig. The one limitation of these views is that the humeral head is seen overlapping the glenoid, thereby obscuring the glenohumeral joint space Fig. Eliminating the overlap can be accomplished by rotating the patient approximately 40 degrees toward the affected side. This special posterior oblique view, known as the Grashey projection, permits the glenoid to be seen in profile Fig. Obliteration of the normally clear space between the humeral head and the glenoid margin on this view confirms the diagnosis see Fig. The Grashey view is also effective in demonstrating developmental variant of anterior portion of the acromion, so-called os acromiale Fig. It represents an unfused accessory center of ossification of the acromion and should not be mistaken for a fracture. It is believed that this anomaly increases the risk of subacromial impingement presumably due to increased mobility. Os acromiale can also be well seen on the axillary projection of the shoulder. Other special views have proved to be useful in evaluating suspected trauma to various aspects of the shoulder. A superoinferior view of the shoulder, known as the axillary projection, is helpful in determining the exact relationship of the humeral head and the glenoid fossa Fig. It also is proficient in showing the os acromiale Fig. This view, however, may at times be difficult to obtain, particularly if the patient is unable to abduct the arm, in which case a variant of the axillary projection known as the West Point view may be similarly effective. In addition to all the benefits of the axillary projection, the West Point view effectively demonstrates the anteroinferior rim of the glenoid Fig. Another useful variant of the axillary projection is the Lawrence view. The importance of this projection lies in the fact that it does not require full abduction of the arm because it can be compensated for by angulation of the radiographic tube Fig. Suspected trauma to the proximal humerus, which can also be demonstrated on the anteroposterior projection see Fig. Because this projection provides a true lateral view of the proximal humerus, it is particularly valuable in determining the degree of displacement or angulation of the osseous fragments see Fig. When trauma to the bicipital groove is suspected, a tangent radiograph of this structure is required Fig. Injury to the acromioclavicular articulation is usually evaluated on the anteroposterior view obtained with a degree cephalad tilt of the radiographic tube Fig. Fracture of the scapula may require a transscapular or Y view for sufficient evaluation Fig. Fracture of the acromion can be adequately evaluated on the shoulder outlet view. This projection is obtained similarly to the Y view of the shoulder girdle; however, the central beam is directed toward the superior aspect of the humeral head and is angled approximately 10 to 15 degrees caudad Fig. This view is also effective in demonstration of morphologic types of the acromion Fig. Anterior A and posterior B views of the osseous components of the shoulder girdle. Ancillary imaging techniques are usually used to evaluate injury to the cartilage and soft tissues of the shoulder. The most frequently used modalities are arthrography and magnetic resonance imaging MRI. Arthrography can be performed using a single- or double-contrast technique Fig. In cases of suspected tear of the rotator cuff, for example, a single-contrast arthrogram may reveal abnormal communication between the glenohumeral joint cavity and the subacromial-subdeltoid bursae complex, which is diagnostic of this abnormality see Fig. Although it is difficult to prescribe for which conditions a single-contrast as opposed to a double-contrast study should be chosen, the latter may be better suited to demonstrate abnormalities of the articular cartilage and capsule, as well as the presence of osteochondral bodies in the joint. A double-contrast study, however, is always indicated when arthrography is to be combined with computed tomography CT scan computed arthrotomography for evaluating suspected abnormalities of the fibrocartilaginous glenoid labrum Fig. The effectiveness of this combination lies in the fact that the injected air outlines the anterior and posterior labrum for better demonstration of subtle traumatic changes on CT images. For this study, the patient is placed supine in the CT scanner with the arm of the affected side in the neutral position to allow the air to rise and enhance the outline of the anterior labrum. To evaluate the posterior labrum, the arm is externally rotated or the patient is positioned prone to force the air to move posteriorly. Anterior A and posterior B views of the muscles, ligaments, and tendons of the shoulder girdle. Anatomy and MRI of the joints. A Schematic of the glenoid fossa with the humerus removed shows the location of the muscles of the rotator cuff and the intracapsular portion of the long head of the biceps tendon. They envelop the joint, blend with the capsule, and grasp their four points of attachment to the humerus, as does the hand in the figure, thus maintaining the integrity of the joint. Modified from Anderson JE. A For the standard anteroposterior projection of the shoulder, the patient may be either supine, as shown here, or erect; the arm of the affected side is fully extended in the neutral position. The central beam is directed toward the humeral head. B On the radiograph obtained in this projection, the humeral head is seen overlapping the glenoid fossa. The glenohumeral joint is not well demonstrated. A For the anteroposterior view of the shoulder that demonstrates the glenoid in profile Grashey projection , the patient may be either erect, as shown here, or supine. He or she is rotated approximately 40 degrees toward the side of the suspected injury, and the central beam is directed toward the glenohumeral joint. B The radiograph in this projection posterior oblique view shows the glenoid in true profile. Note that the glenohumeral joint space is now clearly visible. A year-old man presented with clinical history of shoulder impingement. A Grashey projection shows an os acromiale arrow. This normal developmental variant should not be mistaken for a fracture. A For the axillary view of the shoulder, the patient is seated at the side of the radiographic table, with the arm abducted so that the axilla is positioned over the film cassette. The radiographic tube is angled approximately 5 to 10 degrees toward the elbow, and the central beam is directed through the shoulder joint. B The radiograph in this projection demonstrates the exact relationship of the humeral head and the glenoid. A year-old woman presented with history of shoulder pain. An arrow points to os acromiale. A For the West Point view of the shoulder, the patient lies prone on the radiographic table, with a pillow placed under the affected shoulder to raise it approximately 8 cm. The film cassette is positioned against the superior aspect of the shoulder. B On the radiograph in this projection, the relationship of the humeral head and the glenoid can be as sufficiently evaluated as on the axillary view, but the anteroinferior glenoid rim, which is seen tangentially, is better visualized. For the Lawrence variant of the axillary view of the shoulder, the patient lies supine on the radiographic table, with the affected arm abducted up to 90 degrees. The film cassette is positioned against the superior aspect of the shoulder with the medial end against the neck, which places the midportion of the cassette level with the surgical neck of the humerus. The radiographic tube is at the level of the ipsilateral hip and is angled medially toward the axilla. The amount of angulation depends on the degree of abduction of the arm: Less abduction requires increased medial angulation. The central beam is directed horizontally slightly superior to the midportion of the axilla. The Lawrence view demonstrates the same structures as the standard axillary view. A For the transthoracic lateral projection of the proximal humerus, the patient is erect with the injured arm against the radiographic table. The opposite arm is abducted so that the forearm rests on the head. The central beam is directed below the axilla, slightly above the level of the nipple. B The radiograph obtained in this projection demonstrates the true lateral view of the proximal humerus. A For a tangent film in the superoinferior projection visualizing the bicipital groove sulcus , the patient is standing and leaning forward, with the forearm resting on the table and the hand in supination. The central beam is directed vertically toward the bicipital groove, which has been marked on the skin. B On the radiograph obtained in this projection, the bicipital groove is clearly demonstrated. A To evaluate the acromioclavicular articulation, the patient is erect, with the arm of the affected side in the neutral position. The central beam is directed 15 degrees cephalad toward the clavicle. B The radiograph obtained in this projection shows the normal appearance of the acromioclavicular joint. A For the transscapular or Y projection of the shoulder girdle, the patient is erect, with the injured side against the radiographic table. The arm on the injured side is slightly abducted and the elbow flexed, with the hand resting on the ipsilateral hip. The central beam is directed toward the medial border of the protruding scapula. This view may also be obtained with the patient lying prone on the radiographic table and the uninjured arm elevated approximately 45 degrees. B The radiograph obtained in this projection provides a true lateral view of the scapula, as well as an oblique view of the proximal humerus.

Chapter 3 : Muscles of the Upper Limb - TeachMeAnatomy

The course covers a combination of upper and lower limb MRI acquisition, normal anatomy, normal variations and approach to MRI interpretation of patterns of disease in the shoulder, elbow, wrist, hand hip, knee, ankle and foot.

Pathophysiology of entrapment syndrome is different from other acute nerve injuries, as the development of compressive neuropathy depends on the pressure within these tunnels and the fact that nerves typically can withstand only little pressure. At more than 15 mmHg, the venous supply to the nerves is increasingly hampered, and at over 40 mmHg the arterial blood supply is affected. Irreversible structural nerve damage begins at pressures of around 80 mmHg [3]. Typical MR findings of compressed nerves include increased signal intensity on T2-weighted MR images. Recent studies have demonstrated that the large myelinated axons at the outer portions of the nerve are most affected. This relative sparing of the fibers in the central portion of the nerve supports the theory that the primary mechanism of injury is shear forces; therefore, ischemia appears to be a secondary mechanism [3]. In the early stages, symptoms can be intermittent or even disappear spontaneously. As the disease progresses, fibrotic nerve changes can occur causing further nerve impingement. In chronic cases, severe axonal degeneration and myelin loss are common histological findings. Clinically, there is a permanent loss of nerve function. Long-standing disease causes fatty infiltration and atrophy of the denervated muscles. The abnormal T2 hyperintensity of the nerve, along with proximal enlargement, angulation and displacement, are characteristic findings of nerve entrapment. Regional muscle denervation changes on MR images support the diagnosis of neuropathy. Three-dimensional 3D imaging is of critical importance in tracing the course of peripheral nerves, in identifying points of compression or disruption, and for preoperative planning. In general, MR neurography can be either T2 based or diffusion based. Diffusion- based MR imaging, especially diffusion tensor imaging, allows functional assessment of the nerves, but as yet remains a novel technique, with specific hardware and software requirements in an attempt to enhance the otherwise low signal-to-noise ratio SNR from these small nerves, limiting its application in routine clinical practice. The Magnet The strength of the magnet is an important consideration, with impact on both image quality and speed of acquisition [8]. In general, there is superior performance of MR neurography at 3 Tesla 3T compared with 1. In our institutions, we perform the technique using 3T platforms only. In fact, it is the advent of high Tesla imaging and its widespread availability that has facilitated the development of state of the art MR neurography and made it a reality in daily clinical practice. This translates into higher spatial resolution and thinner slice sections with improved fluid conspicuity, as well as superior contrast-to-noise ratio, which improves anatomic characterization and lesion detection [2]. Increased conspicuity of fluid and more uniform fat-suppression techniques result in better depiction of fascicular appearance of the nerves. There is also less inhomogeneity of the magnetic field. More robust hardware facilitates the application of multiple radiofrequency saturation pulses required for adequate vascular suppression. Furthermore, the application of parallel imaging allows faster acquisition times. It is difficult to produce quality T2-weighted 3D images on lower field strength magnets because of time and hardware limitations. In contrast, high-quality isotropic 3D proton density and T2-weighted images can be acquired with relative ease and speed at 3T, and serve as an invaluable adjunct to two dimensional 2D images. MR Protocol T1-Weighted Imaging High-resolution T1-weighted imaging is excellent for depicting normal anatomy of the peripheral nerves and surrounding structures. Thin sections maximum slice thickness of 4 mm are necessary for adequate resolution of anatomic detail and fascicular morphology. Peripheral nerves appear as linear T1 hypointense structures, following an expected anatomical distribution. Differentiation from adjacent vessels is often possible, especially with the larger nerves, with arteries appearing as flow voids and veins appearing T1 hyperintense due to inflow phenomenon [.

Chapter 4 : Upper Limb I: Shoulder Girdle | Radiology Key

National Imaging Associates, Inc. Clinical guidelines UPPER EXTREMITY MRI (Hand, Wrist, Arm, Elbow, Long bone, or Shoulder MRI) Original Date: September

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. Abstract Peripheral nerve entrapment occurs at specific anatomic locations. Familiarity with the anatomy and the magnetic resonance imaging MRI features of nerve entrapment syndromes is important for accurate diagnosis and early treatment of entrapment neuropathies. Introduction Peripheral neuropathies are relatively common clinical disorders, which may be classified, according to cause, into compressive or entrapment and noncompressive neuropathies [1]. Although nerves may be injured anywhere along their course, peripheral nerve compression or entrapment occurs more at specific locations, such as sites where a nerve courses through fibroosseous or fibromuscular tunnels or penetrates muscles [2 , 3]. Typically, the diagnosis has been based mainly on the combination of clinical history, physical examination, and electrodiagnostic studies. However, such clinical evaluations may provide insufficient information in making an accurate diagnosis, and imaging is being used often to confirm diagnoses. Magnetic resonance imaging MRI and high-resolution ultrasonography US , as noninvasive techniques, provide valuable spatial information in making important diagnostic distinctions that cannot be readily accomplished by using other existing methods [2 , 4 , 5]. While both allow direct anatomic visualization of a nerve, identification of the cause, and location of primary abnormalities, MRI has the ability to demonstrate intrinsic signal abnormalities within the nerve itself and is considered superior in delineating the associated indirect signs related to muscle denervation [2 , 4]. MRI Features The signal intensity of a normal nerve on MRI is of intermediate to low on T1-weighted sequences becoming slightly higher on T2-weighted and other fluid-sensitive sequences [3 , 4]. Enlargement with apparent increase in T2 signal is considered an abnormal MRI appearance [3]. In addition, a hyperintense signal of the denervated muscle is usually identified when entrapment is acute, and fatty infiltration and muscle atrophy are the signs of chronic neuropathy in longstanding cases [2 â€” 4]. Peripheral nerve sheath tumors PNSTs appear as a well-defined mass continuous with a peripheral nerve. Benign PNSTs usually show intermediate signal on T1-weighted images, while on fluid sensitive sequences the tumor shows high signal. The finding of central low signal surrounded by high signal on fluid sensitive sequences a target appearance suggests that the PNST is benign [6]. Schwannomas tend to be eccentric to the nerve trunk in comparison with neurofibromas, although this can be variable. Malignant PNSTs do not display the target appearance and are often heterogeneous with necrosis [6]. There is variable contrast enhancement at MR imaging in both benign and malignant PNSTs, with the pattern of enhancement commonly either heterogeneous and diffuse or peripheral. Generally, more contrast enhancement is apparent in malignant PNSTs [6]. Suprascapular Nerve The suprascapular nerve enters the supraspinatus fossa through the suprascapular notch, which is a fibroosseous tunnel bridged by the transverse scapular ligament. In the suprascapular fossa, the suprascapular nerve gives off two branches to the supraspinatus muscle and the superior aspect of the shoulder joint. The remaining portion of the nerve travels around the lateral margin of the scapular spine, through the spinoglenoid notch, and into the infraspinatus fossa to supply the infraspinatus muscle and posterior aspect of the glenohumeral joint Figure 1 [7 , 8].

Chapter 5 : Stanford MSK MRI Atlas (c)

MRI of the Upper Extremity is a complete guide to MRI evaluation of shoulder, elbow, wrist, hand, and finger disorders. This highly illustrated text/atlas presents a practical approach to MRI interpretation, emphasizing the clinical correlations of imaging findings.

Few web-based anatomy atlases related to radiology and imaging that are available at the moment are reviewed below: Anatomy Atlases at http: This website links to a set of useful educational anatomy atlases that comprise the following: Compare is a website created and authored by M. Various plain film images of the thorax and abdomen; CT scan images of the brain, thorax, abdomen, and pelvis; and angiogram images of the carotid, pulmonary, abdominal, mesenteric, renal, and the upper and lower limb arteries, including the aortic arch, are available. Radiologic Anatomy Browser is sourced from the Uniformed Services University and is accessible at http: The Anatomy Browser in an outline format permits expanding or collapsing levels. The material produced by S. The topics are comprehensively covered and a checklist is an added bonus at the end of the sections. Normal Radiologic Anatomy is a basic primer on Anatomy designed for the Radiologist; it is available at http: This site is authored by a team headed by J. In essence, the image material offers information on anatomical areas such as the head and neck, thorax, abdomen, pelvis, and the upper and lower extremity. A special section on 3D reconstructions is also available. Radiology Anatomy is accessible at http: The material covers regions including the thorax, pelvis, abdomen, spine, extremities, and the head and neck. Each region has a varied set of modalities describing the regional structures. Besides this, there are online quizzes to reinforce learning of various anatomic structures. Radiology Anatomy Models, from University of Washington, is a set of radiology and anatomy teaching files, available at http: The material covers areas such as normal knee anatomy, normal distal thigh anatomy, radiographic anatomy of the upper and lower extremity muscles, etc. Added features in this atlas include the radiographic evaluation of hallux valgus, ultrasound of the shoulder, and a TMJ tutorial, all of which are very well illustrated. Radiologic Anatomy is a website dealing with basic gross anatomy in radiographic studies. Digital Anatomist Project is available from University of Washington at http: The site is famous for hosting its interactive atlases on the brain, knee, and the thoracic viscera in a fascinating and futuristic style. Rosse is an excellent area. Derived from cadaver sections, MRI scans, and computer reconstructions, there are illustrative features on 2D and 3D views of the brain, cortical connections, 3D views of thoracic organs, and 2D and 3D views of the knee. Designed and authored by Gerard J. D, it has multiple modules focused on ENT and musculoskeletal anatomy, wherein structures, discussion, and references are offered for various structures on cross-sectional images. Currently available anatomical topics include brain stem anatomy, CT angiography, anatomy of the abdomen and pelvis, MRI anatomy of the elbow, neck anatomy, temporal bone anatomy on multi-detector CT MDCT , orbit anatomy, and skull base and soft tissue neck anatomy on MDCT. Free Interactive Atlas of Human Anatomy is available at http: More than slices from normal CT and MR exams were selected in order to cover the entire sectional anatomy of human body. The Whole Brain Atlas at http: Thoracic Anatomy at http: The site makes learning cardiac CT meaningful, with classification of the material into four key areas: The Scanner Protocols section has technical material on almost all types of scanners: The teaching file modules are available at http: The Pearls Archive at http: The podcasting and vodcasting sections are available at http: It allows online book searches at http: Footnotes Source of Support: Nil Conflict of Interest:

Chapter 6 : of the Upper Extremity | Radiology Key

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Chapter 7 : Download MRI of the Upper Extremity: Shoulder, Elbow, Wrist and Hand PDF

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MRI of the Thigh: Detailed Anatomy (Superior Part) This webpage presents the anatomical structures found on thigh MRI. Click on a link to get T1 Axial view - T1 Coronal view.

Chapter 8 : Online Training: Hitachi Medical Systems America, Inc.

Imaging Anatomy: Lower Extremity study guide by rahul includes 40 questions covering vocabulary, terms and more. Quizlet flashcards, activities and games help you improve your grades.

Chapter 9 : Arm, forearm, and hand: MRI of anatomy

2. MRI Features. The signal intensity of a normal nerve on MRI is of intermediate to low on T1-weighted sequences becoming slightly higher on T2-weighted and other fluid-sensitive sequences [3, 4]. Enlargement with apparent increase in T2 signal is considered an abnormal MRI appearance.