

# ESSR BSSR OXFORD 2005

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## SPORTS

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### **CT & MR IMAGING OF PARS FRACTURES IN THE UNDER 20'S**

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#### Purpose

To assess the usefulness of CT in young patients with suspected pars fracture and an equivocal MR

#### Methods

In this retrospective study, 8 young (<20 years) male patients with equivocal MR scans showing suspected partial or complete pars fractures underwent CT examination. A consensus opinion from 2 expert musculoskeletal radiologists was taken to assess CT and MR scans for (i) presence of partial/complete fracture, (ii) presence of medullary sclerosis/cortical thickening. Oedema present on MR was also documented.

#### Results

For every patient abnormalities were seen at a single level only. On MR, of the 16 pars assessed, one was considered normal; 3 were categorised as complete & 5 as partial fractures. In the remaining pars there was sclerosis and/or oedema with no definite defect. For complete and partial fractures there was good correlation between MR and CT (agreement in 6/8 pars). All suspected complete fractures were confirmed on CT. No complete or partial fractures were seen on CT that were not already suspected on MR. In 1 case a partial fracture seen on MR was considered intact on CT. There was only moderate correlation in the detection of sclerosis on MR & CT. CT did not add any useful additional information in patients with just sclerosis/oedema seen on MR.

#### Conclusion

In equivocal cases of pars fractures on MR, the addition of CT does not appear to contribute greatly. CT is not likely to change the original diagnosis made on MR.

### **CLOSED RUPTURE OF MULTIPLE FLEXOR TENDONPULLEYS ASSOCIATED WITH VOLKMANN'S ISCHAEMIC CONTRACTURE**

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Flexor tendon pulley injuries are uncommon injuries seen in some extreme sports like rock climbing.

We present a 35 year old lady with a background of Volkmann's ischaemic contracture who presented with flexion deformities and pain involving the ulnar three digits of the left hand. This was following a minor trauma while peeling "Blue tac"

adhesive from the wall and was associated with a loud snap. She had no history of rock climbing and despite the Volkmann's ischaemic contracture had a good functional hand with minimal deformity.

A MRI scan demonstrated that the flexor digitorum profundus and flexor digitorum superficialis tendons to all these fingers were intact. There was increased space between the metacarpal head and the flexor tendons on T1 and T2 sagittal scans. Fluid accumulation in these spaces were also visualised on T2 sagittal images. Ruptures of the flexor tendon pulleys at the level of the proximal interphalangeal joints involving all three fingers were diagnosed. The patient was offered reconstructive surgery but refused and was lost to follow up.

Ruptures of the flexor tendon pulleys in patients who have had Volkmann's ischaemic contracture in the past have not been described. The intensity of trauma was minor.

Both dynamic Ultrasound and MRI have been used in recent years to diagnose these injuries, however, it may be more common than was first thought and Radiology may need to extend its role to identify more cases.

## **THE ROLE OF THE LATERAL ULNAR COLLATERAL LIGAMENT AND INDICATIONS FOR SURGICAL REPAIR IN POSTEROLATERAL ELBOW INSTABILITY**

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Disruption of lateral collateral ligamentous complex occurs less frequently than disruption of the medial collateral ligamentous complex and it typically caused by either acute trauma or repetitive motion injuries. Injury to one component of the lateral collateral ligamentous complex, the lateral ulnar collateral ligament (LUCL), may result in posterolateral rotational elbow instability (PREI). The lateral collateral ligament is absent in ten percent of the normal patient population and other destabilizing injuries to the lateral collateral ligament complex or the common extensor tendon may also result in PREI. The presence and adequacy of the LUCL is also important to assess prior to surgery for refractory tennis elbow as an extensor tendon release may also destabilize the lateral elbow if the LUCL is absent or injured. Examination of the lateral elbow with MR imaging provides a detailed assessment of the anatomy and/or degree of injury. MR imaging is also capable of determining what other associated injuries may be present. We examine the anatomic appearance of the LUCL along with the mechanisms of injury that may result in damage to the lateral collateral ligament complex and present the implications of the imaging findings as they relate to surgical treatment of the elbow.

## **ACUTE KNEE INJURY: ROLE OF EARLY MR IMAGING IN CLINICAL MANAGEMENT**

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**Purpose:** To evaluate the role of early magnetic resonance (MR) imaging of the knee in patients with acute knee injury. To assess the correlation of the MR imaging findings with the clinical examination and/ or surgical findings.

**Materials and methods:** 50 patients who had MR of the knee as an inpatient after acute knee injury from the period of Dec 2002 to Dec2004 were retrospectively reviewed. The data was obtained from the radiology database and further analysis of the case notes was done. All the patients were scanned on a 1.0 T scanner. Sequences obtained were T1 weighted saggital with T2 weighted fat suppressed saggital and coronal sequences.

**Results:** The injuries sustained by patients were varied and included sports injuries, road traffic accidents and domestic injuries. Analysis was done for meniscal injuries, collateral and cruciate ligamentous injuries and particularly posterolateral corner injuries. Bone bruises and osteo-chondral injuries were also analysed. The results will be demonstrated in a flow diagram. We include MR images of the above-mentioned injuries.

**Conclusion:** MR findings in the acute setting did help in clinical management and also improved clinician diagnostic certainty. Although there was good correlation of the clinical and MR findings, MR also revealed additional clinically occult findings, which led to changes in management.

## **SOFT TISSUES AROUND THE HIP : GROSS ANATOMY AND MR FEATURES IN PATHOLOGY**

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We present a review of the anatomy of the salient soft tissues around the hip including the bursae, muscles and their origins, with the help of gross and virtual anatomical images.

The bursae described include the greater trochanteric, gluteus medius and minimus, iliopsoas and obturator externus bursae.

We present a pictorial review of the MR imaging features in pathology affecting these structures including bursitis, tendinopathies, avulsion injuries, muscle tears, infections and masses around the hip joint.

We describe briefly the causes of snapping hip syndrome with MR images.

## **THE VALUE OF MRI IN ASSESMENT OF GROIN PAIN IN YOUNG ATHLETES**

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**Purpose**

The aim of the study was to assess the role of MRI in evaluation of acute and chronic pain in young athletes.

#### Materials and Methods

MRI was performed in 17 young male athletes in age from 16 to 22 years (average age 18) with acute-onset or chronic groin pain. Of those patients, 10 were soccer players and 7 were ice-hockey players. In all patients US examination was performed before MRI.

#### Results

In 3 (17,6%) patients abnormal sign in T2 weighted image and STIR image was demonstrated within anterior pubic bone and the attachment of adductor longus and brevis muscles as sign of entesitis.

MRI showed focal areas of muscle fibers disruption within the adductor muscles in two patients (11,8%).

Pubic symphysisitis was found in 3 (17,6%) athletes.

In our youngest patient (5,9%) inguinal hernia was found.

Four patients (23,6%) demonstrated irregularity of the rectus abdominis muscle and increased signal on the T2 weighted image within the rectus abdominis musculotendineous complex.

Iliopsoas bursitis was the cause of the groin pain in one (5,9%) of our patients.

In two (11,8%) patients lesion of the acetabular labrum was found, and in one patient (5,9%) our finding was bilateral sacroileitis as a part of the spondyloarthropathy.

#### Conclusions

MRI significantly correlates with 'the athletes' symptoms and is valuable method for evaluating groin pain in young athletes.

## **NORMAL SONOGRAPHIC ANATOMY OF THE POSTEROLATERAL CORNER OF THE KNEE**

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Goal: To provide an illustrated pictorial review of the normal sonographic appearances of the posterolateral corner of the knee.

Untreated injuries to the posterolateral corner of the knee are an important cause of persistent rotatory instability and graft failure in the post-cruciate ligament reconstructed knee. The principle lateral stabilisers of the knee include the iliotibial band anteriorly, and the lateral collateral ligament, long head of biceps tendon, lateral capsular ligament and popliteal complex posteriorly. The dynamic popliteus muscle-tendon unit, and several static components including the popliteofibular ligament and popliteomeniscal fascicles form the popliteal complex. The oblique popliteal and arcuate ligaments, and the fabello-fibular ligament also contribute to posterolateral knee stability.

Although magnetic resonance imaging is the optimal tool for assessing internal derangements of the knee, the structures of the posterolateral corner can be difficult to delineate. The individual elements of the posterolateral corner of the knee are predominantly superficial and therefore, amenable to assessment by ultrasound.

Sonography can provide a rapid, accessible, cheap and dynamic method of assessing the posterolateral corner of the knee.

We will provide a detailed pictorial review of the normal sonographic anatomy of the posterolateral corner of the knee. Annotated sonographic images will be correlated with explanatory clinical photographs to demonstrate optimal transducer positioning.

## **MENICAL TEARS AND COMBINED MENISCAL AND COLLATERAL LIGAMENOUS TEARS ON MRI OF THE KNEE IN PATIENTS REFERRED FOR ANTERIOR CRUCIATE LIGAMENT TEARS**

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**PURPOSE:** To investigate the frequency and type of Anterior Cruciate Ligament tear- associated meniscal and combined meniscal and collateral ligamentous tears on MR imaging examinations of patients referred with a clinical indication of Anterior Cruciate Ligament tear.

**MATERIALS AND METHODS:** We prospectively evaluated 230 consecutive patients with documented complete ACL tear referred to our Department for MRI examination of the knee. MRI was performed on a 1.5 T magnet. Our examination protocol included an Axial proton density weighted turbo spin-echo with fat suppression sequence, a Sagittal Dual echo spin-echo (T2 weighted Anterior Cruciate Ligament and proton density weighted) sequence and Coronal T1 weighted and proton density weighted turbo spin-echo with fat suppression sequences.

**RESULTS:** Associated meniscus only tears were :

Medial meniscus 36% (84) and lateral meniscus 21,7% (50). 9% (12) were bucket handle type tears.

Combined meniscal and collateral ligamentous tears were:

Medial meniscus and LCL 1,3% (3), Medial meniscus and MCL 6,5% (15), Lateral meniscus and LCL 0,4% (1), Lateral meniscus and MCL 3,5% (8), both menisci and LCL 0,9% (2), both menisci and MCL 1,7% (4), both MCL and LCL and Lateral meniscus 0,9% (2). We found 2 cases (0.9%) with both LCL and MCL tears

**CONCLUSION:** MRI is an important diagnostic tool in the process of formulating therapeutic decisions in patients with clinical signs of ACL tear since it detects associated injuries, difficult to appreciate on physical examination, that may have a major impact on therapeutic management.

## **AN MR IMAGING EVALUATION OF REGENERATION OF THE FLEXOR CARPI RADIALIS TENDON AFTER FULL-THICKNESS HARVEST.**

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**Purpose:** The purpose of this study is to determine if the post-harvest MRI appearance of the flexor carpi radialis (FCR) tendon, harvested during ligamentous reconstruction tendon interposition (LRTI) thumb carpometacarpal (CMC) joint arthroplasty, demonstrates some degree of tendon regeneration.

**Materials and Methods:** Surgical reports and patient medical records for all patients undergoing trapeziectomy with ligamentous reconstruction tendon interposition (LTRI) for severe first carpometacarpal (CMC) joint arthritis between 1995 and 2002 at our institution were reviewed. There were 16 patients who originally underwent harvest of the entire width of the flexor carpi radialis (FCR) tendon, of which 14 underwent MR imaging of the forearm and wrist. Images were interpreted by two radiologists, and the presence, absence, or partial absence of the FCR tendon distal to the harvest site was recorded. When present, the approximate volume of regenerated FCR tendon was calculated using the formula for an ellipse: [volume = length x width x height x .52]. As an internal standard, the approximate volume of the flexor carpi ulnaris (FCU) tendon over the same length was calculated, and the ratio vFCR/vFCU was obtained. Complete regeneration of the FCR tendon was defined as vFCR/vFCU  $\geq 1$ , and partial regeneration was defined as vFCR/vFCU  $< 1$ .

**Results:** At least partial regeneration of the FCR tendon occurred in 11/14 (79%). Of these, 2/14 (14%), demonstrated complete, or nearly complete regeneration. Partial regeneration of the FCR tendon was seen in 9/14 (64%). In 3/14 (21%), there was no appreciable regeneration of the FCR tendon.

**Conclusion:** Partial regeneration and occasional complete regeneration of the FCR tendon can occur after full-width tendon harvest.

## **IMPORTANCE OF MRI IN SOCCER.**

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One of the most stressful examinations for radiologist is that of a famous soccer insured by his club for some million who may miss an important game because of a strain anterior cruciate ligament or a meniscal tear or even finish his career after strong damage of articular cartilage. Meantime the results of such an examination should be immediately sent to the team physician.

**Purpose:** to estimate the character of musculoskeletal trauma in professional soccer players, both men and women, and to indicate the necessity of regular MR examination of players.

**Materials and methods:** we have been working with the greatest soccer clubs of Russia for about 5 years. More than 500 players were examined by MRI and about 25 of them – young women, players of female soccer team. In some cases complex examination included MRI, spiral CT, ultrasound.

**Results:** the most common damaged localization was knee (53.8%), ankle (30.4%), less hip (7.9%), spine (3.6%) and shoulder (1.6%). There were only 2 cases of head trauma and 3 cases of wrist strain in goalkeeper. Commonly the trauma's rates in women were about 5-8% more than in man professional soccer. In more than 25% cases the diagnosed pathology was chronic, been a cause for more sever trauma.

Conclusion: in spite of long and expensive examination all soccer players of professional teams need in regular MRI of musculoskeletal system to diagnose the early chronic changes and to prevent more complicated damages in playtime.

## **THE EVOLUTION OF MRI SIGNAL INTENSITIES IN THE VICINITY OF A STRESS FRACTURE OF PARS INTERARTICULARIS – A CASE REPORT**

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We present a case of a 17-year-old girl with bilateral stress fractures of pars interarticularis of L4. These occurred presumably as a result of her sports and dance activities coinciding with the stress caused by her transitional vertebrae Th12 and L5.

We had the opportunity to perform MRI in this patient both shortly after the onset of her low back pain and during a follow-up 4 months later, after she had refrained from sport and dance. The first examination revealed edema both in the bone marrow of the dorsal elements of the L4 vertebra and in the adjacent paravertebral muscles (increased signal in the IR and T2 weighted sequences). The second examination revealed marked diminishing of the edematous reaction with a prevailing Modic type II like combination of signal intensities in the bone (increased signal in T1 and T2 weighted sequences but low signal in the IR sequence in the pedicles, articular processes and in the neural arch with small remnants of IR hyperintensity in the paravertebral soft tissues). The stress fractures were visible in both examinations, however during the follow-up they became more obvious.

Pars interarticularis defect is sometimes difficult to appreciate on MRI. We therefore find the knowledge of this specific combination of signal changes (high in T1 and T2 and low in IR) important in suggesting the correct diagnosis of a stress fracture as opposed to the differential diagnosis of a mere stress reaction of the dorsal vertebral elements. However this pathognostic combination may be masked by the edema of the ongoing stress in the vicinity of the defect till the patient is put at rest.

The presentation will include a brief overview of the literature on vertebral stress reaction and stress fractures.

## **EVOLUTION OF MYOSITIS OSSIFICANS: THE ROLE OF MAGNETIC RESONANCE**

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**Purpose:** to describe the real diagnostic role of MR in the myositis ossificans.

**Background:** myositis is an aberrant reparative process that causes benign heterotopic ossification in soft tissue. It is commonly associated with trauma, although in almost one-third of cases there is no history of trauma; usually the clinical presentation is a painful soft-tissue swelling that occurs within skeletal muscle of the extremities. **Imaging Findings:** the imaging findings are dependent on the phase of



the disease. Three different appearances of myositis ossificans are noted on MR: in the early phase before the appearance of calcification, MR shows a mass isointense to muscle on T1WI and hyperintense on T2WI with marked adjacent edema. When the calcification appears, this is seen as a mineralized core, hypointense on T1 with hypointense rim both T1 and T2WI due to the surrounding rim of calcifications; in the mature phase, the lesion develops as well-defined calcified mass with a rim of decreased signal intensity in both T1 and T2WI representing the peripheral ossification. Highly diagnostic on radiographs and CT is the presence of calcification that develops between 4 and 6 weeks after the initial trauma. **Conclusion:** plain radiography and CT are superior to MR in demonstrating calcification and ossification, but MR is the best method for early detection, differential diagnosis (that includes malignant process), and for following the progression of changes.

## **IMAGING THE INFRAPATELLAR TENDON IN THE ELITE ATHLETE**

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Goal:

Extensor mechanism injuries constitute a major cause of anterior knee pain in the elite athlete due to acute trauma or overuse. We will illustrate the normal appearances of the infrapatellar tendon on sonography and MRI. A comprehensive imaging review of infrapatellar tendinopathy and partial/full-thickness tendon tears will be provided. We will discuss the value of imaging of the infrapatellar tendon in clinical practice and examine whether sonography can predict symptoms in asymptomatic athletes with imaging features of tendinosis. The use of colour Doppler imaging will be discussed and the patterns of neovascularity in tendinosis will be illustrated. The types of infrapatellar tendon tears will be illustrated and the relative strengths and weaknesses of sonography and MRI in their assessment of tendon tears will be discussed. Acute avulsion fractures, including periosteal sleeve avulsion and chronic avulsion injuries including Sinding-Larsen-Johansson and Osgood-Schlatter syndromes will be illustrated. We discuss the mimics of infrapatellar tendon pathology, including infrapatellar plica injury, patellar tendon-lateral femoral condyle friction syndrome, and Hoffa's syndrome, which represents oedema and haemorrhage within the infrapatellar fat pad.

## **MRI FINDINGS OF PATELLAR TENDON RUPTURES:**

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**Purpose:** To show the effectiveness of MRI in detecting patellar tendon ruptures, classification of the acute/chronic cases and determining the coincidental injuries.

Materials and the Method:

Five patient's 5 knees were examined by MRI referred by orthopaedics department. Clinical findings, X-ray and ultrasonographic examinations of the patients were noted and compared with the findings of MRI.

Imagings were done by 1.5 T MR equipment with routine knee sequences.

**Findings:** MRI was quite able to show more pathologic changes than other imaging modalities may tell so 2 patient's MRI findings were related to acute (traumatic) rupture and 3 of them showed chronic (degenerative) changes. Patellar tendon defect was best seen in sagittal plane T1 W SE and T2 W FSE with fat suppression images.

**Conclusion:** MRI is more reliable imaging method in detecting and classifying patellar tendon rupture than other conventional imaging methods.

## **THE MRI APPEARANCES OF HIP AND GROIN PAIN IN THE ELITE ATHLETE**

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Goal: To provide a systematic MRI pictorial review of the causes of groin pain in the elite athlete.

Groin pain is a common problem in the elite athlete and may lead to prolonged periods of inactivity if inadequately treated. Lower limb dominated sports such as soccer, athletics and ballet are particularly associated with symptoms arising from the hip and groin. Common symptoms are shared by a variety of different pathologies involving the hip joint, bony pelvis and surrounding musculo-tendinous structures, and this can lead to diagnostic confusion for the clinician. It is important to accurately identify the cause of pain to optimise patient management and to ensure minimal "down-time" for the elite athlete. MR imaging, with its multiplanar capability and excellent soft-tissue contrast, is a valuable tool in the imaging and assessment of the athlete presenting with groin pain and can clearly demonstrate the range of associated abnormalities found in this population. The causes of groin pain can be divided into osseous, articular, muscular and tendinous. Bone and articular causes include osteitis pubis, stress fractures, and acetabular labral tears. Musculo-tendinous causes include obturator internus strain, iliopsoas bursitis and gluteus medius tendonitis. This review systematically illustrates the MR imaging findings of these conditions and of a spectrum of disorders causing hip and groin pain in a group of professional sportsmen.

## **MRI OF OVERUSE INJURY IN THE ELITE ATHLETE**

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Goal: To provide a comprehensive pictorial review of magnetic resonance imaging of overuse injury in the elite athlete.

Overuse injuries encompass a broad spectrum of musculoskeletal disorders caused by repetitive micro trauma, usually in association with inadequate recovery time. Overuse injury accounts for up to 80% of all sports physician consultations, occurring in the elite athlete usually between 18 and 30 years of age, or in the “weekend warrior” between 30 and 40 years of age. These injuries are often location, and sports-specific e.g. jumper’s knee, gymnast’s wrist. It is useful to classify the imaging of overuse injuries into the functional anatomical units that may be affected – bone, joints and tendons.

Osseous overuse injuries include stress response, stress fracture, tendo-osseous injury, enthesopathies and bony avulsions. Lower limb bone stress injuries occur more commonly than those in the upper limb with the tibia, metatarsals and navicular being the most commonly affected sites. Skeletally immature patients are particularly prone to physeal and apophyseal injuries.

Articular injuries include osteochondral injury, impingement syndromes, juxta-articular bursitis and labral tears. Overuse injury of tendons often follows a linear progression, with paratendinitis and tenosynovitis, progressing to tendinosis and intrasubstance splits or partial/complete tendon tears.

The excellent soft-tissue contrast resolution of MRI allows assessment of the functional units as outlined above and therefore, provides the optimal imaging modality for suspected overuse injury. We present a pictorial review of MRI of overuse injuries in the elite athlete and professional sportsmen and women.

## **MAGNETIC RESONANCE IMAGING, ARTHROSCOPY, AND HISTOLOGICAL OBSERVATIONS OF AN ANNULAR LIGAMENT CAUSING PAINFUL SNAPPING OF THE ELBOW JOINT**

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Snapping of the elbow joint is a pathological condition in which an interposed or impinged tissue in the elbow joint clicks when the elbow is flexed and extended. The causes of snapping elbow have been attributed to intra-articular loose bodies, instability, synovial plicae, and a torn or loose annular ligament. Diagnosis and monitoring of treatment regimens is most commonly done using arthroscopy. The noninvasive nature and internal resolution power of magnetic resonance imaging (MRI) make it an attractive candidate technology for evaluating internal derangements of joints. However, there has been no reports showing the value and usefulness of MRI in identifying the causes and interposed tissues for snapping elbow. We report a case of painful snapping of the elbow joint caused by a torn or loose annular ligament. MRI clearly demonstrates the interposed tissue of a loose annular ligament in the radiocapitellar joint. The MRI findings correlate well with arthroscopic and histologic data.

## **MR SHOULDER ARTHROGRAPHY WITH SURGICAL CORRELATION IN SHOULDER INSTABILITY: A PICTORIAL REVIEW**

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**Purpose:** To review magnetic resonance arthrography (MRA) in patients with shoulder instability with a view to ascertain the correlation of imaging and surgical findings. To present a pictorial review of the various shoulder instability lesions.  
**Materials and methods:** The data was obtained from Jan 1998-Dec 2004. 33 patients who had MRA of the shoulder were retrospectively reviewed. All these patients clinically presented with shoulder instability. The data was obtained from the clinical record base, radiology database and further analysis of the surgical case notes was done. Shoulder arthrograms were performed under fluoroscopic guidance using a 18-20G spinal needle. Posterior approach was used in patients with anterior instability and vice versa. All the patients were scanned on a 1.0 T scanner within 30 minutes of the injection.

**Results:** The various lesions demonstrated, include Alpsa lesion, SLAP lesions, lax or deficient inferior glenohumeral ligament, loose body, Bankhart lesion both bony and labral and Hill Sachs lesion. Comment has also been made on type of capsular insertion (type I, II, III.). We present a pictorial review illustrating the MRA findings of the above-mentioned lesions. We also include corresponding arthroscopic images in 13 of the patients who underwent arthroscopy prior to the surgical correction.

**Conclusion:** There was good correlation between the MRA findings in shoulder instability with the operative findings as all our patients have undergone stabilisation procedure. MRA is a useful technique providing pertinent preoperative information in shoulder instability

## **THE CONTRIBUTION OF HIGH RESOLUTION U/S IN THE INJURY OF LIGAMENTS AND TENDONS AROUND THE ANKLE (POSTER)**

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### **PURPOSE:**

The study, diagnosis and evaluation of the degree of trauma in the ankle region.

### **MATERIALS AND METHODS:**

Twenty five patients with an injury around the ankle area, aged between 17 and 50 years, were studied by U/S imaging. Our data were collected during a six month period. A superficial high resolution transducer of 10 MHz was used and the presence of injury in the soft tissues, tendons and ligaments was identified. The degree of the injury was also classified.

### **RESULTS:**

We identified a complete rupture of the Achilles tendon in 3 cases, in 1 case complete rupture of the anterior tibial tendon, in 1 case rupture of extensor digitorum, in 4 cases tenosynovitis, in 6 cases partial rupture of anterior talo-fibular ligament, in 3 cases

complete rupture of the anterior talo-fibular ligament, in 1 case partial rupture of the calcaneo-fibular ligament, in 2 cases excess articular fluid in the ankle joint, in 3 cases foreign body in the soft tissues, in 12 cases haematoma and in 22 cases oedema of the soft tissue.

Four cases were re-evaluated post-surgically. The U/S results and the clinical diagnosis were compatible. In 3 of the 25 cases the results helped in the re-evaluation of the clinical diagnosis.

**CONCLUSION:**

The high resolution U/S imaging is a rapid, valuable diagnostic method in the diagnosis and post-surgical evaluation of tendon and ligament injury around the ankle.

**ULTRASOUND IMAGING IN THE STUDY OF THE SCAPHO-LUNATE JOINT AND THE SCAPHO-LUNATE LIGAMENT\_(POSTER)**

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**PURPOSE:**

The U/S study of scapho-lunate ligament and scapho-lunate distance.

**MATERIALS AND METHODS:**

We studied by ultrasound 100 wrist joints (50 healthy persons), using a superficial linear US transducer of high resolution (10MHz). We measured the distance between the scaphoid and lunate bones in a). Neutral position, b). Radial deviation, c). Ulnar deviation; and characterized the visualization of the scapho-lunate ligament, in the palmar and dorsal surfaces. The visualization of the scapho-lunate ligament was characterized as completely visualized, partially visualized and non-visualized.

**RESULTS:**

The scapho-lunate distance was measured between 2.0mm and 6.6mm, with a mean diameter of 4.5mm. The difference in this distance between left and right arm did not exceed 2.4mm.

There was no significant change in the scapho-lunate distance during ulnar and radial deviation.

The scapho-lunate ligament was completely visualized in 52/100 cases, and partially visualized in 23/100 cases, all being studied dorsally.

The scapho-lunate ligament was better visualized by ultrasound in the dorsal surface compared to the palmar one.

**CONCLUSION:**

The scapho-lunate ligament is partially or completely visualized in 75% of wrist joints studied and this finding could help exclude scapho-lunate dislocation or subluxation.

**MR ARTHROGRAPHIC FINDINGS OF FEMORO-ACETABULAR IMPINGEMENT**

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#### PURPOSE:

Femoro-acetabular impingement is a recently recognized cause of early onset osteoarthritis in otherwise normal hips. This study was undertaken to investigate and describe the constellation of MR arthrographic findings of femoro-acetabular impingement.

#### MATERIAL AND METHOD:

All hip MR arthrograms performed over the course of 2 years using 1.5 Tesla magnet. Quantitative assessment of femoral head and neck morphology was performed to assess for osseous protuberance. Presence and type of labral abnormalities and articular cartilage abnormalities were recorded. Clinical and surgical correlation was performed.

#### RESULTS:

After exclusion of patients with prior surgery, fractures, Legg-Calve-Perthes disease and/or slipped capital femoral epiphysis, 50 cases of femoro-acetabular impingement were identified. 60% cases demonstrated osseous abnormalities of the anterior superior femoral head-neck junction. 94% cases demonstrated tears or degeneration of the anterior superior labrum. 70% cases demonstrated anterior superior cartilage abnormalities. 62% patients manifested a characteristic triad of anterior hip osseous protuberance, anterior superior labral abnormality, and anterior superior cartilage abnormality.

#### CONCLUSION:

MR *ARTHROGRAPHY* clearly delineates osseous, femoral head neck junction abnormality, and labral pathology clearly. Typical triad of abnormalities in cases of femoro-acetabular impingement. A careful search for this triad should be performed when one encounters early osteoarthritis in an otherwise normal hip.

### **SUBACROMIAL IMPINGEMENT SYNDROME, WHAT'S THE RADIOLOGIST ROLE?**

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Shoulder impingement syndrome is a clinical diagnosis and it is associated with several signs and symptoms.

Potential etiologies include subacromial spurs, variations in acromial morphology or position hypertrophy acromioclavicular joint abnormalities and rotator cuff injuries.

Impingement, rotator cuff tears and instability can be also common causes of shoulder pain in young patient, especially in throwing athletes.

MR imaging and US plays an important role in the care of this patients because it is a not invasively and accurately demonstrates the presence or absence of a rotator cuff tear.

US imaging and MR imaging are effective for evaluating rotator cuff injuries, with high reported accuracies for detection of complete tears but more disparate results for detection of partial tears. Correctly identifying a partial small and shallow partial rotator cuff tear with ultrasound can be difficult because these tears occur in atypical locations as in the articular surface. MR-arthrography has been show significantly

greater diagnostic sensitivity for small full-thickness tears and for partial tears on the articular side (the most frequently occurring partial tears).

The assessment of fatty atrophy of the muscle of the rotator cuff is particularly important for the prognosis of surgical treatment and the routine assessment of the apparent lipid content of rotator cuff muscles is feasible with proton MR spectroscopy and provides the possibility to quantify fatty atrophy of the supraspinatus muscle. The repair of massive tears of the rotator cuff does not result in substantial reversal of muscular atrophy and fatty degeneration.

Optimal management of rotator cuff disease varies according to the presence and severity of impingement, degree of tendon tear, and functional demands. In a young people (high demanding population) an arthro-RM before surgery may be needed for an adequate diagnosis. The new techniques described: mini open rotator cuff repair and purely arthroscopic repairs are possible in some cases. Radiologist must increase our knowledge in anatomy and surgical options in order to provide more specific information, and aid to surgical planning.

Detection of abnormalities at these sites can determine the need for surgery and the appropriate type of repair. The new techniques of surgery required additional and important radiological information for planning surgery and providing a prognosis.

## TRAUMA

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### **HAND FRACTURES: WHAT TO KNOW AND WHAT TO SAY!**

S Kamath, DAT Silver, AC Redfern

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Hand fractures are common at all ages. Often they are related to sporting activity. Preservation of function is the primary goal of treatment. Proper management at initial evaluation can reduce morbidity and disability. By highlighting features such as angulation at the fracture site and intraarticular extension the radiologist can facilitate optimal management either in the emergency department or by the orthopedic surgeon when appropriate.

The learning objectives of the review are to:

Be familiar with the position and the appearance of the common hand fractures including avulsion injuries.

Understand the classification and significance of fractures around the thumb base.

Be aware of the functional consequences of a variety of fractures.

Recognize the important features to emphasise in the report.

### **MR DIAGNOSIS OF INJURY TO THE SOFT TISSUE STABILISERS IN ACUTE CERVICAL SPINE TRAUMA: REVIEW OF 57 CASES**

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**Purpose;** To identify the proportion of MR imaged cervical spine trauma patients with MR findings of damage to the cervical soft tissue stabilisers including ligaments, discs, facets joints and paraspinal muscles .

To provide a pictorial review of the spectrum of imaging abnormalities seen and review the normal soft tissue supporting anatomy of the cervical spine.

**Method;** 57 consecutive acute trauma cervical spine MRI studies performed over a one year period were retrospectively reviewed blindly by a musculoskeletal radiology consultant. All patients were imaged in a 1.5 T magnet with sagittal T1, T2 weighted and STIR sequences with variable axial sequences.

**Results;** 37 of these studies demonstrated evidence of soft tissue or ligamentous injury. Our pictorial review highlights the spectrum of severity of ligamentous injury identified within this group and also the different patterns of ligamentous injury seen. Appearances ranged from diffuse soft tissue oedema to more discrete ligamentous disruption.

**Conclusions;** Many examples of diffuse oedema and fibre separation around the ligamentum nuchae and adjacent paraspinal muscles were seen, the clinical significance of this is uncertain. Sagittal STIR imaging has proved particularly sensitive in the identification of more subtle ligamentous injuries, in particular, and should be performed in all acute trauma cervical spine MRI's.

### **FAILURE OF HIP ABDUCTOR MECHANISM SECONDARY TO POST RADIATION OSTEONECROSIS: REMOTE COMPLICATION OF DEEP X-RAY RADIOTHERAPY.**

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**Aim:** To present and highlight a remote complication following deep x-ray radiotherapy.

**Background:** Radiotherapy is one the options to treat malignancy. Timing of radiation changes varies in the different organs. Acute radiation pneumonitis is generally seen approximately 2 months after completion of radiotherapy, but radiation pericarditis not until 6–9 months after therapy. Radiation-induced sarcomas do not develop on average until 10–15 years after radiation therapy.

**Case report:** A 39-year old presented to an oral surgeon 29 years ago with a submandibular swelling that was gradually increasing in size. Excision biopsy revealed Follicular, Large cell, Non-Hogdkin's Lymphoma. Lymphogram showed positive nodes in pelvic and para-aortic regions. She was treated with chemotherapy initially. She developed left SI joint pain 2 years later and was treated with radiotherapy. The lymphoma later became chemotherapy resistant and the patient was treated with whole body irradiation. She was in remission since 26 years. She started having discomfort in the left hip region far past 5 years and was reviewed. A recent MRI scan revealed avascular necrosis of the femoral head with little collapse. Changes in the ilium and muscle wasting around the left iliac wing were noted, which were consistent with post radiation osteonecrosis.



Latest radiographs have shown a fracture of the left iliac crest at the origin of the hip abductors thus defunctioning the abductor complex and causing her lurching gait and positive Trendelenberg test. The patient declined any surgical intervention and was reassured with an explanation.

Conclusion: Post radiation osteonecrosis can cause complications as late as 26 years following deep x-ray radiotherapy.

## **RECURRENT ANKLE SPRAINS SECONDARY TO NONUNION OF A LATERAL MALLEOLUS FRACTURE**

I. Alcelik, A. Faraj

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Purpose: A case of an adult man with symptoms of chronic recurrent ankle sprains secondary to non-union of a fracture of the tip of the lateral malleolus is presented. The current case is presented to highlight that fracture of the tip of lateral malleolus can give rise to recurrent ankle instability.

Method: A 36-year old-man presented to the Accident & Emergency Department after a twisting type of injury to the left ankle. The radiograph of the ankle joint showed a fracture of the lateral malleolus (Weber A). The patient initially treated in a below knee cast. At follow-up, 16 weeks after the injury, there was a lack of significant clinical improvement with symptoms of ankle instability on walking. Seven months down the line, there were no clinical or radiological signs of lateral malleolus fracture healing. Magnetic resonance scan of the ankle joint confirmed this diagnosis.

At this stage the decision was made to perform an open reduction and internal fixation with bone grafting of the nonunion. The clinical indication for this was symptomatic painful lateral malleolar nonunion with symptoms of repeated ankle sprains.

The ankle was immobilized for 6 weeks in a below knee cast and weight bearing was avoided. Ten weeks after surgery, the patient was able to weight bear without pain or instability. He was able to go back to work four months after surgery and perform sports activities six months following surgery.

Discussion: Despite limited reports on the non union of the lateral malleolus, there are increased incidence among male patients, supination fractures, and Weber type C fractures. Also malrotation of the distal end of the fibular fragment said to be risk factor for subsequent nonunion. Siliski et al pointed out two more associated factors which were initial fracture comminution and initial treatment with internal fixation, also suggested that open reduction and plating as the treatment of choice. In our case we used tension band wiring technique using absorbable suture material which also gave good result with no skin irritation. We have not seen any evidences that this technique was used previously for this type of fractures. We suggest that these fractures has to be treated without excision. Anatomical reduction and internal fixation adds more to ankle stability rather than excision of the non united fragment.

## **PERIPROSTHETIC STRESS FRACTURE FOLLOWING REVISION HIP SURGERY**

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Purpose of Report:

To illustrate the presentation of an unusual stress fracture following complex revision arthroplasty surgery.

Background:

Thigh pain following recent arthroplasty surgery is likely to be due to prosthetic loosening or infection. Revision arthroplasty patients commonly have reduced bone stock after previous surgery and reduced bone density secondary to medical and immobility reasons making patients susceptible to insufficiency fractures. Post operatively the patient's relatively pain free condition allows early mobilization. This may lead to a relatively rapid increase in activity and load bearing with a risk of fatigue fracture. Few periprosthetic stress fractures are reported in the literature but a series notes lateral tensile stress fractures associated with varus prosthetic alignment. These all occurred near the tip of the prosthesis.

Case Report:

The case of an unusual Gruen Zone 2, Vancouver B1 stress fracture, 9 months following revision arthroplasty is reported. Initially loosening was suspected due to the character of the load bearing thigh pain. Sequential plain radiography revealed the development of a black line, suggestive of a stress fracture. Bone scintigraphy showed the typical appearance of a stress fracture, in the absence of loosening or infection. Blood investigations for infection were normal. The unusual location of this stress fracture allowed consideration of conservative, non weight bearing management which led to the alleviation of symptoms rather than further revision surgery.

Conclusion:

High degree of suspicion and additional investigations are needed to diagnose stress fractures following recent surgery. Non-weight bearing for 3 months resulted in symptomatic recovery and radiological healing of this rare presentation.

## **MISSED INTRA-ARTICULAR GLASS FOREIGN BODY DESPITE ROENTGENOGRAPHIC INVESTIGATION**

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Purpose: Having a basic knowledge of the anatomy and understanding the mechanism of injury will assist in actively looking for and managing this type of potentially devastating injury.

Method: A 31-year-old patient attended our Accident and Emergency department with a leaking wound over his right knee for 5 days, after falling on some glass. Initially, he was seen elsewhere with his injury, had an X ray of his wound and was told that there was no retained glass in the wound and the wound was cleaned and the edges glued together.

On examination he was afebrile, able to full weight bear with 0-90 degrees of active movement of the knee with limitation caused by knee pain on further flexion. There were no signs of an obvious infection. There was no effusion and he could straight leg raise. On inspection he had a wound of 1.5cms size over the supra-patellar pouch approximately 2.5cms above the superior pole of the patella just lateral to the quadriceps tendon.

The patient was sent for a standard X ray of the wound and antero-posterior and lateral X rays of the knee. Although the wound X ray missed the radio-opaque glass foreign body, on the knee X rays, it was clearly seen within the knee joint, well away from the wound.

**Results and Discussion:** Avner and Baker showed that seeing the bottom of the wound was free of glass reduced but not eliminated the possibility of the glass remaining in the wound. This was the case even in the superficial cuts<sup>1</sup>. To investigate this glass foreign bodies routine roentgenography is the modality of choice for the initial investigation due to wide availability, ease of use, and low cost<sup>2</sup>. In our report, the glass foreign body was missed in the initially radiographic examination, and it subsequently migrated into the knee joint. We emphasise the need to not only X ray the wound in case of glass-related injury to the limbs, but also to examine and X ray the adjacent joints.

References:

[1] Avner JR, Baker MD. Lacerations involving glass. The role of routine roentgenograms AJDC 1992;146:600-602.

[2] Gooding GA, Hardiman T, Summers M, Stresser R, Graf P, Grunfeld C. Sonography of the hand and foot in foreign body detection. J Ultrasound Med. 1987;6:441-447.

## **ISOLATED OCCIPITAL CONDYLE FRACTURE FOLLOWING HEAD INJURY**

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### **PURPOSE**

Fractures of the occipital condyles are extremely rare. However; with this injury, associated isolated lower cranial nerve palsies are very common. Presented case report highlights the importance of further imaging in the cases of neck pain following trauma with no obvious initial X ray findings.

### **CASE REPORT**

A 21 year old man was on an off-road motor bike travelling at approximately 35 mph. He struck a bump and fell, landing on the right side of his face. On arrival to A&E, his spine was protected with a hard board and a rigid neck splint. The patient was complaining of head and neck pain. He had no airway, breathing or circulatory problems. Spinal palpation revealed tenderness exclusively over the C2-3 region. Antero-posterior, lateral and peg views of the cervical spine and skull X rays failed to

show any obvious fracture. However, there was a subtle pre-vertebral soft tissue swelling from the level of the cervico-occipital junction down to the level of the third cervical vertebral body. Owing to these signs, the patient underwent head and cervical spine CT scanning. This showed a fracture of the left occipital condyle with minimal infero-medial displacement. The fracture was treated conservatively in a Philadelphia collar. Following this patient had an uncomplicated recovery.

#### DISCUSSION

Plain x-ray films have a role in the diagnosis of this rare injury. Plain x-ray films should be scrutinised for associated soft tissue swelling in a patient who is complaining of neck pain and associated head trauma. However, even if the cervical spine X rays are normal, CT scanning is essential to exclude this injury and slices of the scan must reach the occipital condyles when imaging the cervical spine.

### COMPARISON BETWEEN STANDARD RADIOGRAPHY AND SPIRAL CT WITH MULTIPLANAR RECONSTRUCTION IN THE EVALUATION AND CLASSIFICATION OF FRACTURES OF THE SPINE

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**Purpose:** The aim of this study is to compare the diagnostic efficiency of plain film and spiral axial CT examinations with multiplanar reconstruction (MPR) in evaluation and classification of vertebral fractures.

**Materials and methods:** Plain film ( antero-posterior, lateral ) and spiral axial CT examinations of 17 injured patients were obtained and compared with reconstructed multiplanar images. Image evaluations included trauma location, fracture type, fracture levels involvement and characterization of position and nature of retropulsed fragment in vertebral burst fractures.

**Results:** A total of 20 vertebral fractures were seen in 17 patients. Compression fracture (n=12), mostly seen in thoracolumbar region (91%), was most common type of trauma that is seen better on plain films and MPR than on spiral axial CT. However, plain film was overestimated fractures in one case. Burst fracture (n=8), usually located in cervical (50%) and thoracic regions (37%), was best diagnosed by spiral axial CT and MPR. Posterior column is involved in six of eight cases with burst fracture in which posterior displacement of vertebra was observed. Plain film was not efficient in displaying burst fractures and posterior column involvement. MPR and spiral axial CT detected multi-leveled fractures in more cases (n=6) than on plain film (n=2). Spiral axial CT and MPR were also superior in delineating retropulsed fragments in six cases, which were not identified on plain films.

**Conclusion:** Plain films are limited in the evaluation of spinal fractures, particularly in burst fracture with posterior column involvement. However, spiral axial CT and MPR images were adequate for determining type, level and stability of spine fractures. Moreover, MPR is complementary to spiral axial CT in delineating burst fractures.

## **PSEUDOTUMOUR OF THE THIGH AND ROTATOR CUFF TEAR OF THE HIP - AN UNREPORTED CAUSE**

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A 57 year-old previously well lady presented to our institution with a large painless mass anterior to the left iliac crest, which was clinically thought to represent a sarcoma. An urgent MR scan demonstrated hypertrophy of the tensor fascia lata (TFL) on the left, an ipsilateral low-grade partial tear of gluteus medius, and a high-grade partial tear of gluteus minimus.

TFL hypertrophy is a rare but recognised presentation of a pseudotumour.

Presentation is usually with a painless palpable anterior thigh mass which may be mistaken clinically for a soft tissue sarcoma. We propose a link between TFL hypertrophy, and rotator cuff tear (RCT) of the hip, which has not previously been described. We will review the current literature regarding TFL hypertrophy, demonstrate the anatomy and function of TFL and the hip rotator cuff and explain a mechanism of physiological compensatory hypertrophy relating to RCT of the hip. The tensor fascia lata origin is from the anterior superior iliac spine, the upper part of the anterior border of the iliac wing and the anterior aspect of the outer lip of the iliac crest. Distally it extends to the level of the mid thigh and inserts into the iliotibial band. It acts through the iliotibial tract by pulling it superiorly and anteriorly and assists in flexion, abduction and medial rotation of the hip joint and extension of the knee joint. It thus contributes to the stabilization of the hip and knee.

The rotator cuff of the hip is analogous to the shoulder rotator cuff. It comprises gluteus minimus, gluteus medius and iliopsoas. Gluteus minimus and medius act together to abduct and medially rotate the hip. Tears are most common in the gluteus minimus and anterior third of gluteus medius. Rotator cuff tears of the hip have been described in patients treated for fractures of the neck of femur, and also in patients with lateral hip pain, but no association of RCT and TFL hypertrophy has been documented to our knowledge.

We propose that TFL hypertrophy occurs as a physiological response to improve abduction and medial rotation of the hip in the presence of impaired gluteus minimus and medius function.

## **THE IMAGING AND HISTOLOGICAL FEATURES OF FAT NECROSIS**

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Fat necrosis represents a difficult clinical problem for the radiologist. It is a completely benign and incidental cause of a soft tissue mass, but within the differential diagnosis lurks malignancy. A history of trauma is a common but unreliable feature. It is therefore of paramount importance to have a knowledge of the spectrum of imaging findings in fat necrosis so a more definite diagnosis can be reached.

This pictorial review will retrospectively review the features of biopsy proven fat necrosis using MRI and US, and show correlating histology. The technique used for MRI will be briefly described which routinely involves contrast enhancement. Fat necrosis has been well studied in the breast but is less well described in the extremities.

The imaging findings of fat necrosis are unfortunately heterogenous but typical recurring features are identified which will guide the radiologist to the correct diagnosis. Biopsy is however frequently mandatory in order to reach a diagnosis in equivocal cases. This educational poster will provide the radiologist with the background knowledge to more confidently diagnose fat necrosis in the clinical setting.

### **THE SPECTRUM OF TARSOMETATARSAL (LISFRANC) INJURY PATTERNS ON CONVENTIONAL RADIOGRAPHY WITH MRI CORRELATION**

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#### **LEARNING OBJECTIVES**

1. To review the spectrum of radiographic patterns of tarsometatarsal joint injury.
2. To illustrate the potential role of MRI in identifying tarsometatarsal injuries which are occult on conventional radiographs.

#### **ABSTRACT**

**Purpose:** To describe the spectrum of tarsometatarsal(TMT) joint injury patterns on conventional radiographs and illustrate the additional information obtainable with MRI.

**Methods:** Case records of patients with TMT fracture dislocations were retrieved and available imaging reviewed.

**Results:** TMT fracture dislocations may be classified on conventional radiographs as total, partial medial, partial lateral or divergent. MRI identifies disruption of the Lisfranc ligament as well as radiographically occult fractures and bone contusions which may be associated with persistent pain following initial reduction. TMT joint instability may be associated with normal conventional radiographs, with stress views under anaesthetic identifying instability and MRI identifying ligament injury, fractures and marrow contusions.

**Conclusion:** TMT joint injuries may be occult or extent of injury underestimated on conventional radiographs. Injuries may be more fully delineated with MRI.

### **ABDUCTOR HIP TENDONS AND TROCHANTERIC BURSAE: NORMAL MRI ANATOMY AND PATHOLOGY**

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Trochanteric bursitis is a common clinical syndrome that usually presents as lateral hip pain. Different conditions involving the abductor hip tendons and/or trochanteric bursae may be responsible for the symptoms. Nevertheless, trochanteric bursitis is usually a clinical diagnosis and empirically treated. Therefore, a misdiagnosis may be done especially if advanced imaging techniques such as MRI are not performed. A thorough knowledge of the anatomy, variations and relations of the abductor hip tendons and trochanteric bursae is essential to make an accurate diagnosis. Detailed anatomy of the abductor tendons along with location and anatomical relations of the trochanteric bursae is provided by means of illustrative drawings and representative examples.

Abductor tendon injuries (such as tendinosis, partial or completed tears) are typically related to repetitive microtrauma while avulsion of the greater trochanter is more common in elderly women. Enthesopathy and/or bursal inflammation may appear in inflammatory arthropathies while crystal deposition disease commonly presents with tendon or bursal calcifications. Isolated bursal infection is rare although, when present, tuberculosis bursal infection should be considered in the differential diagnosis. The trochanteric bursae may also be involved when haematogenous infectious seed develops in the groin, hip or thigh regions. Major trauma is not often linked to abductor tendon injury; however, traumatic trochanteric edema may clinically resemble abductor hip tendon injury and may even cause secondary bursal inflammation. Finally, specific surgical procedures which may damage abductor hip tendons are often performed on the hip. As a result, tendon injury and muscle atrophy is a recognized pattern when evaluating the hip several months after surgery. Based on a wide variety of selected proven cases from approximately 11000 hip MR exams performed between 1994-2004, demonstrative MRI examples of all these kind of pathology are provided.

## **CORRELATION BETWEEN POSTEROLATERAL TIBIAL PLATEAU OEDEMA AND POSTEROLATERAL LIGAMENT INJURY IN ACUTE ACL RUPTURE**

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**PURPOSE:** To determine whether injury to the posterolateral tibial plateau protects against injury to the posterolateral structures in acute ACL ruptures. **PATIENTS AND METHODS:** We retrospectively reviewed the MRI Scans of patients who had acute ACL rupture to determine whether tibial plateau oedema and posterolateral ligament injury co-existed. **RESULTS AND CONCLUSION:** To be presented.

## **PICTORIAL REVIEW: NEUROPATHIC CONDITIONS AROUND THE ELBOW JOINT**

A Alam, S Ostlere

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Neuropathy of the median, ulnar and radial nerves and their branches often originate from pathology around the elbow. There are a number of conditions to consider in the differential diagnosis. We review the imaging of a wide range of abnormalities with emphasis on the role of MRI and high-resolution ultrasound.

## **MRI DIAGNOSIS OF INCOMPLETE INTERTROCHANTERIC FRACTURES OF INCOMPLETE INTERTROCHANTERIC FRACTURES**

A Alam, K Willett, S Ostlere

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**PURPOSE:** To establish whether an incomplete intertrochanteric fracture is an MRI-specific diagnosis and whether patients with these fractures can be successfully managed conservatively. **PATIENTS AND METHODS:** A total of 75 patients over 5 years presented with suspected fractured neck of femur and had an MRI scan for further evaluation. The majority of these patients had normal plain radiographs but high clinical suspicion of a fracture. Two patients had an MRI Scan to further evaluate the extent of a greater trochanter fracture. We retrospectively reviewed the hospital notes and imaging of 8 patients with normal plain radiographs but incomplete intertrochanteric fractures on MRI. **RESULTS:** 5 patients were managed conservatively and 3 patients operatively. There was no statistically difference in the length of stay in hospital, the average being 16 days for the non-operative group and 15 days for the surgically-treated patients. All patients were mobilizing on discharge. **CONCLUSIONS:** Incomplete intertrochanteric fractures are MRI-specific diagnosis and are unlikely to be seen on plain radiographs. Patients with this condition should be considered for non-operative treatment.

## **REPORTING OF RADIOGRAPHS BY ORTHOPAEDIC DOCTORS-AN AUDIT.**

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**PURPOSE:**

Under IR(ME)R 2000 Regulations, all radiology examination results must be recorded-either on the RAD system or in the patients notes.

The orthopaedic department at our hospital have agreed to report their own films and not return these films for official reporting by a radiologist. The aim of this audit was to ensure all orthopaedic films had an official X ray report written in the notes.

**STANDARDS:**

The Ionising Radiation (Medical Exposure) Regulations 2000.



7(8) The employer shall take steps to ensure that a clinical evaluation of the outcome of each medical exposure, is recorded in accordance with the employers procedures.

#### METHODS:

Retrospective collection of data was performed by examining patients notes straight after their discharge from the orthopaedic department. Correlation with the RAD system was then undertaken to find out which patients had undergone X rays. 20 Chest X rays and 20 musculoskeletal X Ray reports in the notes were analyzed between 29.10.04 and 10.01.05.

#### RESULTS:

All 20 musculoskeletal X rays had a report written in the notes. 100% standard was achieved. In 17/20 X rays the side was relevant, only 5 of these 17 X ray reports referred to the side in their written report.

Only 8 out of 20 Chest X rays had a report written in the notes. This fell short of standard - only 40% of Chest X rays had a report.

#### CONCLUSIONS AND RECOMMENDATIONS FOR CHANGE:

Recommendations to the orthopaedic department were made regarding more attention to be paid to writing correct side when reporting musculoskeletal films. It was recommended clinical staff need to be reminded regularly it is their responsibility to write a report in the notes.

It was considered whether Chest X rays from the orthopaedic department should be returned routinely to the radiology department for reporting. A re-audit to see if reporting standards have improved in the future will help decide this issue.

## TUMOUR

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### **LIPOMA VARIANTS AS MIMICS OF WELL-DIFFERENTIATED LIPOSARCOMA: REPORT OF 2 CASES AND A REVIEW OF DIFFERENTIAL DIAGNOSIS**

S Kamath, DAT Silver, AC Redfern

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Lipomas are common, benign tumours located in any part of the body in which fat is normally present. Patients are usually investigated with MRI when the suspicion of liposarcoma is present.

Though MRI has a sensitivity approaching 100% for identifying well-differentiated liposarcomas among other fatty masses, its specificity and therefore its accuracy is less (85%) (Gaskin et al). MRI is almost 100% specific in the diagnosis of simple lipoma. Therefore the false positive MRI appearances for liposarcoma result from a number of lipoma variants: chondroid lipoma, osteolipoma, hibernoma, lipoleiomyoma, angioliipoma, and infarcted lipoma.

Cartilaginous or osseous metaplasia in lipomas (chondrolipoma and osteolipoma respectively) is rare and mainly encountered in large-sized, long-standing lipomas. Infarction of lipoma is again rare and occurs when the lipoma is large and outgrows its blood supply. It may occur in a pedunculated lipoma, which twists on its pedicle.

These lesions may result in heterogeneous appearance, with high signal on STIR and enhancement with contrast, thus simulating liposarcomas.

We report 2 cases of lipoma variants thought to be liposarcomas on imaging, but found histologically be an osteocartilaginous lipoma and an infarcted lipoma. The presence of both osseous and chondroid metaplasia in a single lesion is particularly notable, with only a single previous case report.

We discuss the differential diagnosis for liposarcomas on imaging. Clearly the treatment and follow up of liposarcomas will differ from that of lipoma variants. Biopsy of the suspicious area of the lesion is often the only way to distinguish between them.

## **EVOLUTION OF MYOSITIS OSSIFICANS: THE ROLE OF MAGNETIC RESONANCE**

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**Purpose:** to describe the real diagnostic role of MR in the myositis ossificans.

**Background:** myositis is an aberrant reparative process that causes benign heterotopic ossification in soft tissue. It is commonly associated with trauma, although in almost one-third of cases there is no history of trauma; usually the clinical presentation is a painful soft-tissue swelling that occurs within skeletal muscle of the extremities. **Imaging Findings:** the imaging findings are dependent on the phase of the disease. Three different appearances of myositis ossificans are noted on MR: in the early phase before the appearance of calcification, MR shows a mass isointense to muscle on T1WI and hyperintense on T2WI with marked adjacent edema. When the calcification appears, this is seen as a mineralized core, hypointense on T1 with hypointense rim both T1 and T2WI due to the surrounding rim of calcifications; in the mature phase, the lesion develops as well-defined calcified mass with a rim of decreased signal intensity in both T1 and T2WI representing the peripheral ossification. Highly diagnostic on radiographs and CT is the presence of calcification that develops between 4 and 6 weeks after the initial trauma. **Conclusion:** plain radiography and CT are superior to MR in demonstrating calcification and ossification, but MR is the best method for early detection, differential diagnosis (that includes malignant process), and for following the progression of changes.

## **MR PROTOCOL IN PATIENTS WITH MUSCULOSKELETAL TUMORS.**

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**Purpose.** The aim of the study was to establish an optimum MR protocol for patients with musculoskeletal tumors (MST) based on the quantitative analysis.

**Materials and methods.** 71 patients (43 male and 28 female, mean age 34.7±20.8 years) with known or suspected MST underwent MR examination (1.5 T scanner). 53 patients suffered from malignant and 18 from benign MST. We obtained T1-, T2-WI,

T2-WI with fat suppression (T2fs-WI) and T1-WI after intravenous administration of Gadolinium with (enT1fs-WI) and without (enT1-WI) fat suppression in different projections using SE and TSE sequences. On the images obtained we calculated differences in signal intensity (SI) between tumourous tissue and such image components as bone marrow, muscles, perineoplastic edema, calcifications, necrotic areas and hemorrhages. SI was expressed in percentage according to the gray scale, regarding black color as 0% and white color as 100%.

Results. We found no statistically significant differences in SI between benign and malignant MST.

T1-WI demonstrated high contrast between tumour and bone marrow ( $25.4\pm 18.2\%$ ) and fatty tissue ( $36.4\pm 18.9\%$ ), whereas contrast between tumour and muscles was significantly lower ( $2.3\pm 5.1\%$ ). Intratumourous haemorrhages could be seen only on T1-WI with the difference in contrast of  $16.3\pm 9.8\%$ . Administration of gadolinium increased contrast between tumor and muscles ( $21.8\pm 13.3\%$ ), whereas contrast between tumor and fatty tissues (bone marrow, fat) considerably decreased ( $7.1\pm 14.7\%$  and  $18.7\pm 16.3\%$ ). Only enT1-WI allowed revealing necrotic areas in the tumour with high contrast ( $24.6\pm 10.8\%$ ). enT1fs-WI after gadolinium ensured high contrast between tumour and muscles ( $31.7\pm 17.3\%$ ), bone marrow ( $37.0\pm 16.4\%$ ), fat ( $38.2\pm 16.9\%$ ), necrotic areas ( $34.9\pm 14.1\%$ ) and perineoplastic oedema ( $24.0\pm 13.0\%$ ). On T2-WI the differences in SI between tumour and muscles, bone marrow, fat, intratumourous calcifications and surrounding oedema were  $25.7\pm 16.4\%$ ,  $5.1\pm 6.9\%$ ,  $18.9\pm 13.7\%$ ,  $24.0\pm 12.0\%$  and  $11.8\pm 7.8\%$  respectively. Fat suppression on T2-WI significantly increased contrast between tumour and perineoplastic oedema ( $28.3\pm 16.1\%$ ), fat ( $43.8\pm 21.7\%$ ), bone marrow ( $41.5\pm 20.2\%$ ) and muscles ( $41.0\pm 21.9\%$ ).

Conclusion. MR protocol in patients with MST should include T1-WI in longitudinal projections and T2fs-WI in three perpendicular projections. If Gadolinium administered, fat suppressed T1-WI in three perpendicular projections have to be done. This protocol ensures a proper local staging of MST. There is no need to obtain T2-WI, axial T1-WI and T1-WI after Gadolinium without fat suppression.

## **HIP LESIONS: MANAGEMENT WITH PERCUTANEOUS CT-GUIDED INTERVENTIONAL PROCEDURES FOR DIAGNOSTIC AND THERAPEUTIC PURPOSES**

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**Purpose:** To present our experience in percutaneous CT-guided osseous biopsies and abscess drainage of the hip joint and adjacent soft tissues.

**Materials and methods:** In a three-year period 52 patients (22 men, 30 women, mean age 48 years) underwent percutaneous CT-guided osseous biopsy of hip or femur. In the same time percutaneous drainage of abscesses that were located adjacent to the hip joint was applied to 31 patients (18 men, 13 women, mean age 38 years). The mean stay of the drainage catheter was 4 days. All procedures took place under local anesthesia.

**Results:** Adequate samples for histological examination were obtained in all biopsies. Diagnosis was accomplished in 42 cases (80.8%). In the remaining 10 cases a second

biopsy was applied for final diagnosis. All abscesses were successfully evacuated. No major complications occurred.

**Conclusion:** Osseous biopsies and drainage of abscesses located adjacent to the hip joint are safe, cost-effective and can lead to diagnosis and cure respectively.

## **IMAGING AND RADIOLOGIC-PATHOLOGIC CORRELATION OF CHONDROMYXOID FIBROMAS- A PICTORIAL REVIEW**

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Chondromyxoid fibromas are rare and peculiar benign tumours accounting for around 1% of all bone tumours. We retrospectively reviewed 41 cases of pathologically proven cases of rare tumour seen at our institution in the last 25 years. The radiologist plays a critical role at all stages in the evaluation of patients with primary bone lesions. Firstly in diagnosing the lesion on the basis of characteristic imaging findings on various modalities and providing an accurate preoperative assessment. Secondly, helping in treatment planning and then post therapy evaluation.

CMFs tend to occur in the lower extremity mostly in the metaphyseal or metadiaphyseal regions. This pictorial review demonstrates CMFs at these sites and also at relatively uncommon sites such as the tubular bones of the hands and feet and the upper limb on various modalities including CT, MRI and conventional radiographs.

We have highlighted the typical and atypical features of this rare tumour at multiple sites. The histopathological correlation and a range of possible differentials are also illustrated.

## **MR IMAGING OF LIPOMAS AND LIPOSARCOMAS: HOW USEFUL IS THE OHGURI CRITERIA IN CONJUNCTION WITH OTHER INDIVIDUAL MR LESION PARAMETERS?**

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**PURPOSE:** To review the use of magnetic resonance (MR) imaging features in distinguishing lipoma and liposarcomas using the Ohguri criteria in combination with other MR features.

### **MATERIALS AND METHODS:**

MR images (n=20) of 19 patients with histologically verified fatty tumours (8 lipomas and 12 liposarcomas) were retrospectively reviewed. Images were assessed for capsule and internal characteristics as defined by Ohguri et al, largest dimension, presence and enhancement pattern of any solid nodule, tumour location, and the characteristics of internal septa as well as capsule with respect to thickness and degree of enhancement relative to muscle were also assessed.

### **RESULTS:**

In our study population, 11 of 12 liposarcomas demonstrated Ohguri 5 features. 1 liposarcoma demonstrated Ohguri 2 features, was large at 11.5 cm in largest dimension, and had marked septal and capsular enhancement (thickness under 2 mm). 1 lipoma demonstrated Ohguri 5 features, but was small at 1.7 cm in largest dimension, capsule thickness under 2 mm and had no septa. There was no lesion showing any Ohguri 3 or 4 features, but the difference in distribution of Ohguri 5 versus Ohguri 2 lesions is statistically significant ( $P < 0.01$ ).

The following criteria also achieved statistically significant imaging features favoring a diagnosis of liposarcoma: size above 10 cm in largest dimension, presence of solid areas ( $P < 0.001$ ), presence of enhancement of the solid areas relative to muscle ( $P < 0.001$ ), thick capsule at 2 mm for liposarcoma versus 1.2 mm for lipomas ( $P < 0.05$ ), muscle involvement ( $P < 0.025$ ) and overall enhancement of the fatty areas ( $P < 0.001$ ).

**CONCLUSION:** There is a significant overlap in MR appearances of lipoma and liposarcomas. We found the Ohguri visual criteria, presence of muscle involvement, capsule thickness beyond 2mm, presence of solid areas enhancing more than adjacent muscle and enhancement of the fatty components of the tumour to be significant predictors in favour of liposarcoma over lipoma.

## **PSEUDOTUMOUR OF THE THIGH AND ROTATOR CUFF TEAR OF THE HIP - AN UNREPORTED CAUSE**

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A 57 year-old previously well lady presented to our institution with a large painless mass anterior to the left iliac crest, which was clinically thought to represent a sarcoma. An urgent MR scan demonstrated hypertrophy of the tensor fascia lata (TFL) on the left, an ipsilateral low-grade partial tear of gluteus medius, and a high-grade partial tear of gluteus minimus.

TFL hypertrophy is a rare but recognised presentation of a pseudotumour.

Presentation is usually with a painless palpable anterior thigh mass which may be mistaken clinically for a soft tissue sarcoma. We propose a link between TFL hypertrophy, and rotator cuff tear (RCT) of the hip, which has not previously been described. We will review the current literature regarding TFL hypertrophy, demonstrate the anatomy and function of TFL and the hip rotator cuff and explain a mechanism of physiological compensatory hypertrophy relating to RCT of the hip.

The tensor fascia lata origin is from the anterior superior iliac spine, the upper part of the anterior border of the iliac wing and the anterior aspect of the outer lip of the iliac crest. Distally it extends to the level of the mid thigh and inserts into the iliotibial band. It acts through the iliotibial tract by pulling it superiorly and anteriorly and assists in flexion, abduction and medial rotation of the hip joint and extension of the knee joint. It thus contributes to the stabilization of the hip and knee.

The rotator cuff of the hip is analogous to the shoulder rotator cuff. It comprises gluteus minimus, gluteus medius and iliopsoas. Gluteus minimus and medius act together to abduct and medially rotate the hip. Tears are most common in the gluteus minimus and anterior third of gluteus medius. Rotator cuff tears of the hip have been described in patients treated for fractures of the neck of femur, and also in patients

with lateral hip pain, but no association of RCT and TFL hypertrophy has been documented to our knowledge.

We propose that TFL hypertrophy occurs as a physiological response to improve abduction and medial rotation of the hip in the presence of impaired gluteus minimus and medius function.

## **IMAGING OF BONE TUMOURS AROUND THE PELVIS AND HIP – A PICTORIAL REVIEW.**

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In recent years, the management of tumours and tumour-like lesions around the bony pelvis and hip has improved and this is due in part to advances in imaging. However, a delay in the diagnosis of pelvic tumours is not uncommon. Radiographs are usually the first imaging study but detection depends to a certain extent on radiographic technique, size, location and aggressiveness of the lesion. Unfortunately, the prominence of the overlying soft tissues and viscera around the pelvis means that some lesions, particularly those arising in the ilium or sacrum may be obscured until they reach a large size. Cross-sectional imaging, particularly magnetic resonance (MR) imaging has had a major impact in tumour imaging, not only in tumour detection but also in optimal characterisation, pre-operative staging, and suspected recurrence. Excluding metastatic disease and myeloma, chondrosarcoma is the most common primary malignant bone tumour with the majority in the ilium and proximal femur. Of the benign bone tumours, osteoid osteoma and osteochondroma account for more than 50% of benign bone tumours and are most commonly found in the proximal femur. Tumour-like lesions include fibrous dysplasia, simple bone cyst, eosinophilic granuloma and aneurysmal bone cyst. This pictorial review will illustrate the typical imaging features of some of the more common lesions around the bony pelvis and hip.

## **IMAGING OF EXTRA SPINAL MUSCULOSKELETAL TUBERCULOSIS – A PICTORIAL REVIEW.**

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3-5% of patients with tuberculosis (TB) will have bone and joint manifestations. Among these patients extraspinal TB is rare and only accounts for 16 – 19% of all musculoskeletal TB. The involvement of bone may be due to haematogenous spread from active primary infection of the lung, but the more common scenario is spread of infection from a quiescent primary lung site or extraosseous focus.

This diagnosis is often overlooked, as the patient can be surprisingly well. It is, however, an important diagnosis to make as in the vast majority cases, patients will respond well to specific antibiotic therapy.

We will present a series of cases from our own practice and use these to illustrate the common imaging findings seen in proven cases of extraspinal tuberculosis. We will use all imaging modalities to illustrate the findings with an emphasis on the common MR findings.

## **IMAGING OF TUMORAL CALCINOSIS**

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Purpose:

Tumoral calcinosis is a distinct clinical and histologic entity consisting in a large deposition of calcium in the periarticular tissues of large joints. The aetiology remains dark. We report a series of five patients with histologically proved tumoral calcinosis and describe the imaging features of this uncommon syndrom.

Materials and methods

The patients (2 males and 3 females) are from 9 to 57 years old. They consulted for a peri articular mass of the hip (n=2), of the foot (n=1), the elbow (n=1) and of the ankle (n=1). x-ray (n=4), ultrasonography (n=1), computed tomography (n=2) and MRI (n=2) were performed.

Results:

All patients presented with a periarticular mass. Biologically the level of calcemia and phosphatemia were normal. The x-ray and compued tomography showed a well-defined lobular calcified mass stranded by fibrous septa, giving a chicken wire appearance. The ultrasonography showed multiple cavities with liquid content separated by fine and sometimes calcified septations. On MRI, the lesion showed low signal on T1 weighted sequence and heterogenous pattern on T2 weighted sequence. Sedimentation of calcium within lobules of the mass gives rise to fluid levels, this sedimentation sign was present in 4 cases. It was assessed by ultrasound (n=1), CT(n=2) and MRI (n=1).

Conclusions

Tumoral calcinosis is an uncommon syndrome found predominantly in adolescents and young adults. It is most commonly seen in the hips and elbows. Imaging can provide a characteristic appearance ” in nest of bee “or “chicken wire”. The sedimentation sign signs the diagnosis. The treatment consists in surgical excision.

## **IMAGING OF SYNOVIAL SARCOMAS: REPORT OF 11 CASES**

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Purpose

We report a series of 11 patients with histologically proved synovial sarcomas and describe the imaging characteristics of this tumor, particularly MRI features.

#### Materials and methods

This is a retrospective study of 11 cases of synovial sarcomas of soft tissue, observed since 1995 in our institution. The patients were 6 females and 5 males, aged from 13 to 64 years with a mean age of 36.

#### Results

Nine tumors arised in the lower limb, five from which were located around the knee joint. The mean size was 7.8 cm. The tumor was juxta-articular in 9 cases.

Radiographs showed calcifications (n=3), periosteal new bone formation (n=1) and bone densification (n=1).

Ultrasound was performed twice and showed a sharply defined mass with rich Doppler flow. CT (n=3) confirmed the presence of calcifications inside the lesion and showed bone modifications in two cases. On MRI, the tumor showed intermediate to low signal on T1 weighted sequence and heterogeneous pattern on T2 weighted sequence in 8 patients. One tumor showed a cystic appearance (T1 low signal, T2 high signal with no enhancement after gadolinium injection). A modification of bone signal was observed in 4 patients.

#### Conclusions

Synovial sarcomas are malignant soft tissue tumors primarily affecting the extremities in the young adult male. Several clinical, radiographic and MRI signs can contribute to this diagnosis: Patient's age, location nearby a joint space, tumor size, the presence of calcification, heterogeneous pattern on T2Weighted sequence

## **MR IMAGING EVALUATION OF GANGLION CYST OF THE POSTERIOR CRUCIATE LIGAMENT OF THE KNEE**

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**PURPOSE:** The aim of the present study was to assess the value of MR imaging in the diagnosis of ganglion cysts of the posterior cruciate ligament (PCL) of the knee.

**METHOD AND MATERIALS:** Since February 2003, 320 patients (146 males, 174 females; mean age: 38 years; age range: 29 to 55 years) complaining of chronic knee pain and disability without a history of trauma were evaluated with low-field (0,2 Tesla) and high-field (1 Tesla) MR equipments. MR imaging findings were compared with histological features and arthroscopic findings.

**RESULTS:** Nine ganglion cysts associated with the PCL were found. These cysts ranged in size from 16 to 32 mm. In one case, the ganglion was located within the PCL. All ganglia underwent arthroscopic excision and were examined at histology. One year after arthroscopy, patients are free of clinical symptoms.

**CONCLUSION:** Intraarticular ganglia of the knee are uncommon causes of chronic knee discomfort and pain. Our findings suggest that MR imaging has great potential for evaluation of PCL-associated ganglia. Good agreement was observed between imaging findings and arthroscopic features.



## **UNCOMMON LOCATION OF OSTEOID OSTEOMA IN THE SACRAL BONE (POSTER)**

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### **PURPOSE:**

Our goal is to present the imaging findings of an osteoid osteoma in a very unusual location in the sacral bone.

### **MATERIALS AND METHODS:**

Forty four year old woman presented after two months of persistent dull pain in the coccygeal area, worsening when sitting and during the night. The symptoms were relieved only with aspirin but not with NSAIDs.

No obvious lesion was observed on plain radiographs and a CT examination of the pelvis was performed using MPR and 3D reconstruction.

### **RESULTS:**

The CT study demonstrated a small cortical lesion with dense rim and lucent central nidus in the right wing of the sacral bone (S1) adjacent to the sacroiliac joint. The findings were typical of a cortical osteoid osteoma.

Scoliosis was absent on plain radiographs.

### **CONCLUSION:**

Among the osteoid osteomas which occur in the spine, only 2% affect the sacro-coccygeal area. Their incidence is very rare after the age of thirty, with a definite male predominance.

We present the imaging features and a current literature review.

## **THE EFFECTIVENESS OF HIGH RESOLUTION ULTRASONOGRAPHY IN THE EVALUATION AND DIAGNOSIS OF PALPABLE SOFT TISSUE MASS IN LOWER EXTREMITIES (POSTER)**

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**Purpose:** U/S imaging as a diagnostic procedure in the evaluation of a palpable soft tissue mass.

**Materials and Methods:** 40 patients with a palpable mass in the lower extremity were evaluated by ultrasound imaging, using grey scale and Doppler techniques (scan head 10MHz). We evaluated and documented the echogenicity of the mass, its position, size, and consistency of the lesion, the contour and finally the presence or absence of vascularity; and if vascularity existed, we considered its pattern. The ultrasound findings were correlated with the clinical outcome of each patient and in 10/40 cases with CT or MRI findings.

**Results:** In 10/40 cases the ultrasound depicted baker cysts (2/10 ruptured), 5/40 ganglion cysts, 6/40 lipomas, 1/40 liposarcomas, 5/40 tumour lesions, 3/40 hematomas, 5/40 lymph nodes, 3/40 abscess, 1/40 pseudo aneurism of SFA, 1/40 rheumatoid nodules.

**Conclusion:** The high resolution sonography is a valuable diagnostic method in the evaluation of soft tissue palpable masses in the lower extremities.

## **APPLICATION OF THERMOCOAGULATION IN THE TREATMENT OF RARE BENIGN BONE TUMORS: INITIAL EXPERIENCE**

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**PURPOSE:** Surgical excision has been considered as the treatment of choice for small painful benign bone tumors. However, technical difficulties such as preoperative localization and potential hazards such as hematomas, infections, fractures, incomplete eradication and damages of articular cartilages and/or open growth plates, have encouraged the introduction of less invasive therapeutic methods such as thermocoagulation.

Recently, thermocoagulation by means of radiofrequency (RF) energy has been established as an effective, safe and much less invasive therapeutic approach in the management of osteoid osteomas; due to favorable short and long-term results. In this report, the authors present their initial experience with percutaneous radiofrequency ablation of, other than osteoid osteomas benign lesions, such as chondroblastomas, in two patients treated on out patient basis.

**MATERIALS AND METHODS:** Two young males were referred for management of an intermittent, sharp left hip pain of six months duration. In both cases, left femur chondroblastomas, measuring up to 26mm and 29mm respectively, were found to be the cause of the symptoms. Due to the epiphyseal location of the lesions, there are often difficulties in achieving complete surgical eradication and there is major concern regarding articular damaging. Hereupon, minor intervention with RF heat ablation was scheduled.

Drilling via the femur neck was followed by diagnostic curettage and then the lesions were treated, with radiofrequency ablation under accurate fluoroscopic guidance. The RITA RF model 1500 combined with a 15G Starburst probe-needle was used for the ablation procedure. Probe-needles were introduced and advanced through the canal, created during the drilling process. After adequate positioning within the lesions, the prongs were deployed at 2 cm and RF energy was delivered for 6 min at 90°C. In both cases, an additional ablation session was subsequently performed under the same settings, after redirecting the probe-needle adequately in order to encompass the full extent of the lesions. The procedures ended with the apposition of bone grafts.

**RESULTS:** The patients were discharged the next day, experiencing considerable relief of pain. They gradually recovered and on follow-up imaging there was no evidence of any pathologic findings or recurrence.

**CONCLUSIONS:** To the best of our knowledge these represent the first cases of chondroblastomas treated with radiofrequency ablation by using needles with expandable electrodes. No joint damages were noted by applying short-time RF energy, in two overlapping fields. Radiofrequency ablation can be considered, under

further clinical experience, as an alternative minimally invasive treatment method for chondroblastomas, especially in locations with difficult surgical approach.

## **HOW COMMON ARE NERVE TUMOURS AS A SOFT TISSUE TUMOUR DIAGNOSIS?**

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### Method

We reviewed all the patients on our data base to determine the proportion of soft tissue tumours that proved to be of neural origin. We obtained the images of all the patients on our archives to see whether an imaging diagnosis could be made.

### Results

Our data base has 1500 entries of which 1000 were soft tissue tumours.

We found that 395 cases were nerve tumours.

We found 2 atypical neurofibromas, 2 malignant neurolemonas, 2 malignant schwannomas, 158 malignant peripheral nerve sheath tumours, 60 neuromas, 8 patients with neurofibromatosis, 5 perineuromas , 4 plexiform neurofibromas and 4 neurolemmonas and the remainder were schwannomas.

We present the imaging findings of the nerve tumours as an aid to diagnosis.

## **PERIOSTEAL REACTION: INFLAMMATION-FRACTURE-TUMOURRACHIAL PLEXUS**

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### Aims:

To evaluate solid periosteal reactions, to discuss diagnostic difficulties connected with it.

### Methods:

Periosteal reactions can form different shapes: specula, lamellae, scalloping, Codmann's triangle. Solide, tiny periosteal reactions can most frequently cause diagnostic problems, if there is not any associated structural bony alteration. If there are not any antecedents traumatic event in the anamnestic data in childhood, periosteal reaction can cause anxiety. In the background of a characteristic picture there can be several different pathological processes: inflammation, Ewing's sarcoma, osteosarcoma, eosinophil granuloma, and not too rare even stress fracture. Clinical symptoms are not specific: pain, swelling, tenderness (for palpation), and even subfebrility / fever and in case of the lower limb localisation limping can occure.

Laboratory data are usually negatives.

### Results:

If we have a suspect beyond inflammatory or tumorous process for stress fracture but we can not find the characteristic line of a definitive fracture, we should use the complex method by combination of several imaging techniques. With MR and/or CT we can establish the diagnosis of an infraction just before with x ray imaging and even with those we can get further, very useful informations about inflammatory or tumorous processes which can be used during therapy.

Conclusions:

If MR and/or CT suspect inflammatory or tumorous process we have to turn to biopsy. But if we can establish the diagnosis of a stress fracture using several data gained by different imaging methods, we can wait and see as long as the typical infraction line appears on the x ray picture. In these cases we can disregard performing biopsy.

## **INTRAARTICULAR PIGMENTED VILLONODULAR SYNOVITIS OF THE KNEE- HOW RELIABLE IS MRI?**

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Pigmented villonodular synovitis {PVNS} is a relatively uncommon, benign hypertrophy of synovial tissue that mimics numerous intra-articular derangements or neoplasms. We report hitherto the unreported case of localised PVNS arising from the Quadriceps tendon sheath.

Fifty year old female presented to the knee clinic with 6 month history of antero-medial pain over her right knee. She also complains of clicking associated with lump and discomfort on walking upstairs. There is no history of trauma precedent to the onset of symptoms. Clinical examination revealed physiological valgus alignment with complete range of movement over the knee. There is a small clicky lump over antero-medial para- patellar retinaculum. Tests for cruciate and meniscal integrity were negative. Radiographs of the knee joint didn't reveal any abnormal findings. Initial MRI was suggestive of medial meniscal pathology.

Arthroscopy revealed an irregular yellow white pedunculated nodule measuring 17x12x10 mm, which was excised arthroscopically. Histology showed well circumscribed lesion comprising small round and ovoid cells admixed with multinucleated giant cells and spindle cells. Focally haemosiderin pigment and foamy histiocytes are present which are consistent with giant cell tumour of tendon sheath. The initial MRI films were reviewed again retrospectively. Sagittal T1, Sagittal T2 fat sat, Coronal T1 weighted images of the knee showing a well circumscribed low signal nodule arising from the synovium on the inner aspect of the Quadriceps Tendon suggestive of pigmented villonodular synovitis. After arthroscopic excision the patient remained asymptomatic at 1 year follow up.

Intrarticular nodular pigmented villo nodular synovitis is generally single, not of large size, sessile or pedunculated. In its usual site, the knee it often originates from the synovial membrane in proximity of meniscus or it protrudes in the inter condylar notch. Origin from popliteus tendon and Posterior cruciate ligaments have been recently published in literature. In intrarticular variety diagnosis can only be arthroscopic or intraoperative and postoperative. Instances of missing these intraarticular lesions in initial arthroscopy have been reported in literature .We

emphasize the suspicion of diagnosis of localised PVNS in patients with symptoms and especially inconclusive findings in MRI, even in uncommon sites.

## **SOFT TISSUE TUMORS: MR IMAGING AND PATHOLOGIC FEATURES ACCORDING TO THE NEW WHO CLASSIFICATION.**

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Goal:

- 1.- To review the new WHO classification of soft tissue tumors
- 2.- To show the MR findings with pathologic correlation of soft tissue tumors according to the new WHO classification.

Background:

Soft tissue tumors are a large and heterogeneous group of neoplasms. Hence, classification is often difficult. The most effective management decisions are made when a working group participates in the same diagnostic standard criteria in the evaluation of soft tissue tumors. A new WHO Classification soft tissue tumors had been up-to-dated and established in 2002. The new classification include the following groups: 1) adipocytic tumors, 2) fibroblastic/myofibroblastic tumors, 3) so-called fibrohistiocytic tumors, 4) smooth muscle tumors, 5) pericytic (perivascular) tumors, 6) skeletal muscle tumors, 7) vascular tumors, 8) chondro-osseous tumors, 9) neurogenic tumors and 10) tumors of uncertain differentiation.

Imaging findings:

The poster will depict the MR findings with pathologic correlation of soft tissue tumors according to the new WHO Classification.

Conclusion

The new WHO classification of soft tissue tumors, with MR-pathologic correlation, might serve as a guide for radiologists working in a multidisciplinary committee with clinicians, surgeons and pathologists for the purpose of uniformity, better patient management and outcome.

## **GIANT CELL TUMOURS OF BONE OF THE HAND AND WRIST**

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Purpose: To identify the clinical and radiographic features of giant cell tumours of bone (GCTOB) of the hand and wrist and to highlight the differences between tumours at this site and elsewhere in the body.

Materials and Methods: A retrospective review was performed of the tumour database of a specialist orthopaedic oncology centre accumulated over a 20 year period.

Results: We have treated 452 cases of GCTOB of which 57 (13%) involved the hand and wrist. Of the cases involving the hand and wrist, 60% involved the distal radius,

16% distal ulna, 19% metacarpals and 5% phalanges. Female patients were more commonly affected than males. The patient's age ranged from 14 to 71 years, with the mean being 35 years. Campanacci described a radiographic staging system for GCTOB. In our series, Stage 1 tumours represented 7%, Stage 2 28% and Stage 3 65%. Pathological fractures were identified in 20%. Only one patient in the series had multicentric disease, involving the distal ulna and a proximal phalanx.

Radiographically, tumour size ranged from 1cm to 6cm, with all cases arising in a subarticular position apart from one tumour in a skeletally immature patient in a metaphyseal location. 93% of cases demonstrated bony expansion and 65% showed cortical destruction. 85% appeared to arise in a central location and only one case in the hand arose eccentrically. The metaphyseal extent was usually well defined with only 7% of cases having a sclerotic border.

Conclusions: The distal radius is the third most common site of GCTOB after the distal femur and proximal tibia. Tumours in the hand and wrist are generally of a more advanced stage at presentation than those seen in the rest of the body.

Multicentric disease is thought to be more common in patients with hand lesions, however only a single case was encountered in this series. Lesions involving the hand are much more likely to arise in a central location and often involve the whole width of the bone. This clearly differs from the usual eccentric location of GCTOB.

## **VALUE OF CORE NEEDLE BIOPSY HISTOLOGICAL DIAGNOSIS COMPARED WITH FINAL POST SURGICAL DIAGNOSIS IN MUSCULOSKELETAL LESIONS**

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### **Purpose**

Determination of the diagnostic accuracy and clinical usefulness of computed tomography guided core needle biopsies (CNB) for musculoskeletal lesions compared with the post surgical histological diagnosis and the clinical follow-up.

### **Materials and methods**

The medical records of 123 patients investigated in our institution with CT guided CNB from 2001 to 2004 were reviewed. A coaxial system was employed to minimise dissemination of eventual malignant cells within the biopsy path. Five samples were acquired within each lesion. Most patients were treated non-surgically on the basis of the core biopsy results. In only 22 patients, a complementary surgical resection was necessary which enabled a direct correlation with the final histological diagnosis. For the remaining 101 patients, no surgical procedure was performed and the clinical course was studied in order to determine the accuracy of the biopsy results. This study determines the diagnostic accuracy according to the type of lesion, its localisation, the histological result, the clinical follow-up and the presence of eventual complications.

### **Results**

The overall diagnostic accuracy was 82% (101/123). The non-diagnostic cases include biopsy reports inconsistent with the final diagnosis or insufficient tissue samples for diagnosis. The accuracy rate for the patients treated with a surgical resection was 96% (n=22). Within this group the accuracy rate was 100% (n=8) for skeletal lesions,

93% (n=15) for soft tissue lesions, 100% (n=9) for benign lesions and 93% (n=4) for malignant lesions. The case where the biopsy report was inconsistent with the final post surgical diagnosis demonstrated dense fibrous tissue at biopsy and revealed a liposarcoma after surgery. No significant complications were noted after the 123 biopsies.

#### Conclusion

Computed tomography guided core needle biopsy is an accurate, easily performed and safe method for the diagnosis of musculoskeletal lesions. This study is still in progress.

## **POSTTRAUMATIC PSEUDOTUMOUR OF LYMPH NODE MIMICKING SYNOVIAL CELL SARCOMA**

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Posttraumatic pseudotumour is considered to be an exaggerated host response to injury which may be either physical or inflammatory in nature. On some occasions the cause is unknown.

We present here a young footballer who presented to casualty with a swollen knee following a rough tackle. He had been previously completely healthy with no major illness. A MRI scan was performed whereby a tear of his medial meniscus was diagnosed. In addition an infiltrating lesion was also noted in the popliteal fossa. This appeared to arise from the synovium at the posterior aspect of the intercondylar notch with infiltration of fat around the popliteal vessels. The mass did not infiltrate muscle. Based on these images a possibility of a synovial sarcoma or similar malignant soft tissue tumour was raised.

The patient underwent surgery. The soft tissues at the back of the knee appeared inflamed. Biopsy samples were taken from the lesion and sent to pathology.

On histological section the specimen appeared to be a lymph node which showed extensive adipose replacement with a thin rim of lymphoid tissue at the periphery and features of chronic ischaemia which included peripheral sinus sclerosis with focal haematoidin deposition. The vessels in the fatty tissue showed prominent sclerosis with endarteritis obliterans in the arterioles. Several venules showed recanalisation of probable previous thrombotic occlusion. No evidence of malignancy or stromal proliferation was found.

The patient was treated conservatively and made an uneventful recovery with complete resolution of the lesion over the next 2 months. He has been in good health since then.

Posttraumatic pseudotumour has been described in a background of trivial trauma e.g. giant cell reparative granuloma of bone or tangible and documented injury e.g. myositis ossificans. The authors feel that in this case the lesion was brought about by a sudden acute traumatic episode on a background of multiple repetitive trivial traumatic episodes.

There have been prior reports of inflammatory masses mimicking tumours but none with an MR appearance mimicking synovial cell sarcoma.

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### **RADIOGRAPHIC EXAMINATION OF THE LUMBAR SPINE IN A UNIVERSITY HOSPITAL: AN AUDIT OF CURRENT PRACTICE**

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**Purpose:** We reviewed the requests for lumbar spine radiography in a large teaching hospital. The aim was to compare our practice with Royal college of Radiologist guidelines for requesting plain lumbar spine radiography.

**Materials and methods:** Retrospective study of 227 inpatient requests over a one-year period. The following data were collected: indication of the examination, age and sex of the patient, and whether the patient had any further imaging of the lumbar spine.

**Results and Conclusions:** 15% of requests did not comply with the guidelines. A significant number of those (57%) had further imaging in the form of MRI or bone scan.

These findings indicates that a stricter guidelines for requesting plain lumbar spine x-rays and further medical education are needed to clarify the indications and limitations of plain lumbar spine radiography.

### **SAT BANDS IN MID-SAGITTAL THORACIC MRI SCANS– ARE THEY NECESSARY WHILE EVALUATING UPPER THORACIC SPINE PATHOLOGY?**

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**Background:** Surgical exposure of the anterior aspect of the upper thoracic spine (T1-T4) is difficult because of anatomical constraints. Sternotomy is associated with significant morbidity while the great vessels and aortic arch limit access by thoracotomy. Surgical access can be planned without sternotomy or thoracotomy, if the lowest vertebral level tangential to the sternal notch is known preoperatively.

**Purpose:** To estimate the level of the upper thoracic spine approachable anteriorly without sternotomy by assessing the relationship of the upper border of the manubrium to the thoracic spine by magnetic resonance imaging (MRI).

**Materials and Methods:** A series of 102 consecutive midsagittal sections of thoracic MRI scans (T2 weighted) were studied. A line tangential to the upper border of the manubrium was extended posteriorly and the vertebral level of intersection noted. This level represented the most caudal vertebra that could be approached anteriorly without sternotomy. This method was evaluated by performing anterior approach without sternotomy in two patients with upper thoracic pathology where the tangential line was caudal to the affected vertebra (fracture T3, solitary renal metastasis T2).



**Results:** The upper border of the manubrium corresponded to the level of T2 and T3 in 68.7% of the cases (T2=15.7%; T2-3=25.5%; T3=27.5%). In 20% of the cases visualisation of the sternal notch was impaired by the saturation bands that were routinely used in MRI scans to reduce movement artefact. Anterior approach and transsternal approach were employed for the two patients, which gave excellent access to the involved vertebra.

**Conclusions:** The upper border of the manubrium lies at the level of T2-T3 in most cases permitting anterior approach to the upper thoracic spine without sternotomy. Preoperative MRI scans are useful in deciding the approach. As saturation bands obscure visualisation of sternum, we recommend not using them in MRI scans with suspected cervicothoracic pathology. Alternatively, narrow saturation bands may be used to visualise the sternum clearly.

## **IMAGING FINDINGS IN SPINAL INFECTIONS- AN EDUCATIONAL EXHIBIT**

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We present imaging findings in a series of 15 adult patients with chronic renal failure who presented with spondylodiscitis (11) and psoas/ obturator muscle abscesses (4). The likely source of sepsis included a history of recent dialysis catheter insertion or stripping, ERCP, indwelling catheter and cholecystitis.

Blood cultures grew coagulase negative Staphylococcus in 8 patients, methicillin resistant Staphylococcus aureus in 5 patients, methicillin sensitive Staphylococcus aureus in 1 patient and Escherichia coli in 1. Two patients had the diagnosis confirmed by para-vertebral biopsy, 2 by psoas abscess aspiration and 1 by disk aspiration. One patient died. Remaining patients responded well to appropriate antibiotic therapy.

### **Discussion:**

Patients with chronic renal impairment are at increased risk of bacteraemia from indwelling intravascular devices. Infection typically spreads from distant sites haematogenously. Septic emboli entering the vertebral metaphyseal arteries cause an area of infarction and localized infection. Sepsis subsequently spreads through the vertebral body and into the adjacent disc space and may then spread to the epidural space or paraspinal soft tissues.

Imaging findings of spondylodiskitis:

X-rays:

2 weeks-Disc space narrowing

6 weeks-Erosion of vertebral endplate

8-12 weeks-Reactive sclerosis with new bone formation

6-12 months-Intervertebral fusion, usually suggesting a resolution of the infection

**Isotope bone scan:** may be helpful in localizing a lesion that is difficult to diagnose clinically. Some bone scans are falsely negative, so the diagnosis of disc space infection should not be excluded simply because the bone scan is normal.

**MRI:** Sensitive imaging findings for spondylodiscitis include: paraspinal or epidural inflammation; disc enhancement; erosion of at least one vertebral endplate. Less sensitive signs for spondylodiscitis on MRI include decreased intervertebral disc

space; low signal disc on T1W images; effacement of the disc nuclear cleft on T2W images.

## **BRUCELLA SPONDYLODISCITIS**

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Brucellosis is a zoonosis which is caused in humans by one of three species of the Brucella genus: B. melitensis, B. abortus and B. suis. Brucellosis is a disorder of worldwide distribution, relatively frequent in Mediterranean countries and in Middle East. Fever, malaise and hepatomegaly are the most frequent findings. Articular involvement in brucellosis are account for 20 to 85 p100.

Spondylitis, in approximately 6 to 85 p100 of patients with arthritis, are usually non-destructive and differed significantly from the other forms of arthritis in the duration of symptoms (chronic course), age of patients (older individuals) and the paucity of fever and malaise. The second most frequent articular syndrom is sacroiliitis (10 to 45 p 100), while peripheral arthritis are revealed in 22 to 34 p 100. Radiographs and computed tomography scan of the spine showed bone erosion in the anterior borders of the lumbar vertebrae end plates and a soft tissue mass surrounding the interposed disc. Magnetic resonance imaging is a sensitive method for detecting spinal brucellosis and the extension of infection throughout paravertebral structures. It is the investigation method of choice in diagnosing spondylodiscitis, specially in very early stages of the disorder, when other investigations still yield negative results. Diagnosis is confirmed when cultures tests of blood and abscess tissue taken by biopsy, are positive. Serologic diagnosis for brucella is still important

## **PARASPINAL ABSCESES: CAN PERCUTANEOUS UNDER CT-GUIDANCE DRAINAGE LEAD TO CURE?**

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**Purpose:** To evaluate the efficacy of CT-guided percutaneous drainage in the treatment of paraspinal abscesses.

**Materials and methods:** In a four-year period 92 patients underwent in our CT department percutaneous drainage of 106 abscesses. In seventy-four patients the abscesses were located nearby lumbar spine, in sixteen adjacent to the thoracic spine and in two paracervically. Fourteen of the abscesses were bilateral and eight were multilocular. A pigtail catheter (8.0-14.0 F) was placed in all cases under CT-guidance and material was aspirated and sent for cultivation. The drainage catheter was left for a mean time of one week and all patients received antibiotic therapy per os according to the cultivation results.

**Results:** All abscesses were totally drained except for the multilocular that were partially evacuated and percutaneous treatment was followed by surgical treatment.

Mycobacterium tuberculosis was found in 59 patients and streptococcus and enterococcus in 21 and 12 cases respectively.

No complications occurred.

**Conclusion:** CT-guided percutaneous drainage of paraspinal abscesses is a minimally invasive treatment modality that can lead to definite cure in the majority of cases.

## **RADIOLOGIST ROLE IN ADULT SCOLIOSIS: FROM FOCAL DISEASE THROUGH A GLOBAL CONCEPT OF THE SPINE.**

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### LEARNING OBJECTIVES:

1. To review different types of adult scoliosis: Adolescent scoliosis of the adult (type I and II) and de novo adult scoliosis (type III).
2. To describe which radiological features are correlated with clinical outcome.
3. To emphasize the role of multiplanar imaging modalities: multidetector CT (MDCT) with post-processing and MRI.

### ABSTRACT:

Overtreatment of the spine is a matter of concern for the medical community.

This is partially due to overdiagnosis by imaging modalities, especially MRI.

Radiologists have been focusing on the degenerative disease under a regional vision without a global concept of this disease, understanding the spine alignment and the biomechanical concept is necessary in an attempt to decrease the frequency of failed back syndrome.

Adult scoliosis, which is defined as a lumbar curvature exceeding 10° after skeletal maturity, is more frequent than previously thought.

Diagnosis is based on full spine films, but MDCT and MRI provide some important features that can justify patients' pain and help to planned levels of fusion.

Radiological key points:

1. Coronal and sagittal alignment; rotary, anteroposterior and lateral listhesis, obliquities L3 and L4. Overloaded segments have degenerative and Modic type's changes.
2. Foraminal stenosis, kinking roots or central stenosis.
3. Staging the state of discs, facets and pedicles.

## **ASSESSMENT OF SCOLIOSIS**

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This pictorial review illustrates the different causes of scoliosis and assessment using MRI and plain radiographs.

## **HAZARDS OF GARDEN: MECHANISMS OF RECURRENT COMPRESSION FRACTURES FOLLOWING KYPHOPLASTY**

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### Purpose

This presentation is intended to review the biomechanical factors of vertebral compression fractures at adjacent levels following kyphoplasty, as well as list uncommon and unusual mechanisms of injury.

### Materials and methods

Thirty cases of kyphoplasty were reviewed for subsequent VCF at adjacent levels and ten cases selected for presentation based on a notable mechanism of injury or potential for tertiary gain.

### Results

### Conclusions

Recurrent vertebral compression fractures at adjacent levels is a known complication of percutaneous spine procedures utilizing PMMA. Some unusual mechanisms of injury are presented.

## **DONT FORGET MEN GET OSTEOPOROSIS AND INSUFFICIENCY FRACTURES**

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Insufficiency fractures have been described in a lot of clinical scenarios. Most of these relate to post menopausal women following the loss/diminution of oestrogen action.

However there is also an age related diminution of bone mass which occurs in both men and women. This can cause osteoporosis in men which can be compounded by external factors like intake of oestrogen or loss of androgen action.

We present here a series of four men in an age range of 71 to 87 years presenting with low back pain. None of them had osteomalacia or any other complicating factor that may explain the findings. All of them underwent MR scanning whereby insufficiency fractures of the sacrum were diagnosed. The patients were subsequently started on appropriate therapy with reversal of radiological signs in at least 1 patient.

MR remains the investigation of choice for diagnosing insufficiency fractures. Nuclear medicine also has a role where the typical appearances are present in a subset of patients. Plain films are notoriously unreliable in diagnosing this condition.

We feel the index of suspicion of osteoporosis and insufficiency fractures is quite rightly high in women, clinicians and radiologists need to be aware of this possibility in elderly men whereby more such diagnoses can be made and the appropriate therapy commenced.

## **EPIDURAL GAS-CONTAINING PSEUDO CYSTS: A TREATABLE CAUSE OF BACK PAIN.**

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The formation of pockets of nitrogen gas within intervertebral discs is a recognised complication of degenerative spine disease. Known as the 'vacuum phenomenon', it can be visualised with plain radiography, MR and CT, and occurs predominantly in the lower lumbar spine. Gas-containing pseudo cysts have been observed as spherical bubbles within the epidural space. They are associated with disc herniation and a direct connection with the intervertebral discs through an annular tear has been observed. Gas chromatograph analysis of the gas aspirated from these pseudo cysts has demonstrated nitrogen, thus confirming that they almost certainly originate from the gaseous degeneration of intervertebral discs. The pseudo cyst wall has been shown to consist of fibrous material, and their firm non-compressible nature is suggested by their ability to displace nerve roots.

Gas-containing pseudo cysts may be an asymptomatic incidental finding. However, a range of associated symptoms has been reported from pain and radiculopathy, through to complete nerve palsies. Epidural gas is also associated with far lateral disc extrusions and intradural disc extrusions. These findings are relevant to management planning. The management options depend upon the clinical context but may include aspiration of the pseudo cyst or operative pseudo cyst excision. Image-guided percutaneous aspiration offers an alternative to major spinal surgery, and may produce impressive results.

Whilst the incidence of gas-containing pseudo cysts is not known, they are not uncommon in the authors experience. We present CT and MR images of symptomatic gas-containing pseudo cysts in the lumbar spine with the aim of raising awareness of this potentially treatable cause of back pain and radiculopathy.

## ARTHRITIS

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## **IMAGING OF ARTHROPATHIES IN CHILDREN.**

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**Goal;** To present a pictorial review of some of the common and a few less common causes of arthropathy in childhood. To highlight the important radiological features of each.

**Summary;** Arthralgia and musculoskeletal pain are relatively common symptoms in children and have a wide differential diagnosis. Radiological investigations play an important role in the management of these patients. Radiological features (in conjunction with clinical presentation) are vital in determining the most likely aetiology.

It is important that the correct diagnosis is reached. This is because many of the regimes used (for example) in the treatment of juvenile idiopathic arthritis (JIA) are relatively toxic. Non-inflammatory arthropathies will not respond to these drugs.

Plain radiography is the main first line investigation. Radiographs may or may not be abnormal. This is because the evolution of radiographic features is slower in children than adults. Ultrasound is useful in the evaluation of synovial hypertrophy and joint effusion. Contrast enhanced magnetic resonance imaging (MRI) is the most useful investigation for distinguishing active inflammation / synovitis from non-active disease and effusion.

JIA is one of the commonest causes of arthritis in paediatric practice. It is defined as arthritis of unknown cause persisting for at least 6 weeks in a child under 16 years. There are seven subtypes, each showing certain characteristic clinical and / or radiological features.

Another relatively common cause of arthropathy in childhood is infection. This most commonly occurs in children less than three years of age. It is usually the result of haematogenous spread from a distant source.

Images and relevant clinical presentation of two other rare hereditary conditions that may cause confusion are presented. Camptodactyly arthropathy coxa vara pericarditis (CACP) syndrome is a hereditary disorder, with the abnormal gene traced to chromosome 1q25-31. The condition shows some clinical and radiological features similar to JIA, but there are other distinct features. Prompt diagnosis is needed to avoid unnecessary toxic drug therapy.

Progressive pseudorheumatoid dysplasia is an autosomal dominant progressive arthropathy with a clinical picture (during the acute phase) that closely resembles JIA. Distinguishing features are highlighted.

## **MRI FINDINGS OF ACHILLES PERITENONITIS IN PATIENTS WITH SERONEGATIVE ARTHRITIDIS DISEASES**

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**Purpose:** Defining of MRI findings of achilles peritenonitis in patients with seronegative arthritides .

**Material and Methods:** Two young ladies complaining of ankle pain and movement restriction were clinically examined by rheumatology department .Then MRI was planned for their each ankle joint by musculoskeletal radiology department.Routine MR examination were done with 1.5 Tesla equipment.

**Findings:** Achilles peritenonitis were found in the four ankles of two patients . Peritenonitis is characterised by local effusion alongside to the tendons which has no synovium around,like achilles. In one patient there were coincidental flexor hallucis longus tenosynovitis , flexor digitorum tenosynovitis and effusion around the talonavicular joint.The other patient 's MRI showed nonseptic medullary inflamations in calcaneus and cuboid bones besides achilles peritenonitis in each ankle.

Both patient's follow up MRI showed no significant differences in radiologic and clinical findings.

**Result:** Achilles peritenonitis is not a rare cause of retractable ankle pain in patients with seronegative arthritides .MRI has great ability to show pathological changes in the ankle region and should be the first choice of follow up examination.

## **HIP HEMIARTHROPLASTY IN A PATIENT WITH EXTENSIVE FIBROMYOSITIS**

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**Abstract:** We report a case of fractured neck of femur in a patient with severe and extensive fibromyositis following long term pentazocine use for chronic pain. The opioid analgaesic pentazocine was widely used in the 1970's and a common method of administration was intramuscular injections. Since then reports have been published showing that a long term complication of this route of administration is fibromyositis. We report a case of a routine hip hemiarthroplasty for trauma in a patient with such extensive fibromyositis.

### **Case Report**

A 65 year old lady presented to the Accident and Emergency Department complaining of right hip pain and inability to weight bear following a mechanical fall at home. Her past medical history included chronic pancreatitis as a complication of acute pancreatitis 30 years ago. Due to severe chronic epigastric pain she had been self administering intramuscular pentazocine for a number of years.

Examination revealed pain with limited movements of the affected hip, as well as reduced ranges of movement of the hip and knee on the contralateral side. On further examination there was found to be bilateral hard woody indurations in the anterior thigh muscles and gluteal region as well as the upper arms, although other muscle groups seemed to be spared (Figs. 1, 2 and 3).

Plain radiographs showed a fractured intracapsular neck of right femur with associated extensive soft tissue calcification of the muscles surrounding both femora (Figs. 1 and 2). In view of the patient's age and poor mobility prior to the fall, the fracture was managed with an Austin Moore hemiarthroplasty. At the time of surgery, although the approach to the hip was complicated by the hard woody nature of the soft tissues, the joint itself and the capsule were of normal architecture. The head of the femur could be removed through the incision and an Austin Moore Prosthesis was sited with no further difficulty (Fig. 4). The wound was closed in the normal manner and the patient made a good recovery post operatively with no complications.

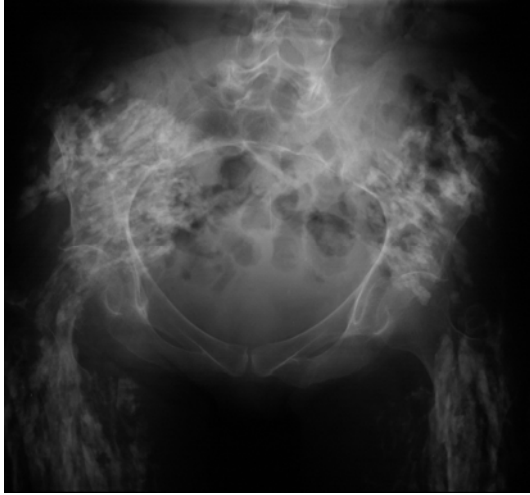


Fig. 1. Anteroposterior radiograph of pelvis showing the fracture of the neck of the femur on the right with extensive soft tissue calcification involving the both upper leg and the lower abdominal wall.



Fig. 2 Anteroposterior radiograph of the knee showing the limits of the soft tissue calcification.



Fig. 3 Pre-operative chest x ray showing the upper arm calcifications. Biopsy specimens were sent of the woody soft tissues encountered during the approach and these were returned from the laboratory reported as follows:  
Fascial tissue – extensively calcified fibrous tissue  
Joint capsule – dense fibrous tissue with acute inflammation.  
There was no evidence of dysplasia or malignancy in either tissue sample.





Fig. 4. Post operative radiograph of the hip joint shows good position of the prosthesis.

#### Discussion

Pentazocine is an opioid analgaesic which has been found to cause various cutaneous complications including fibromyositis, as reported by Schlier et al <sup>1</sup>. They described patients suffering with woody induration of muscles with secondary contractures following long term pentazocine abuse. Most of the data in the literature relates to pentazocine as a drug of abuse, however there are some reports of muscle fibrosis following physician prescribed Pentazocine. A report by Lateur and Halliday <sup>2</sup> in 1978 tells of two such patients who injected pentazocine intramuscularly over long periods of time resulting in fibrous myopathy of the affected muscles. Data from animal studies <sup>3</sup> has shown pentazocine and chlorpromazine to induce muscle fibrosis and contracture in groups of rabbits injected with the substances. A recent case report by Das and Thussu <sup>4</sup> describes a patient with fibromyositis and multiple contractures at injection sites following long term pentazocine abuse.

We believe this is a unique case of hemiarthroplasty in a patient with pentazocine induced fibromyositis.

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### **THE USE OF MAGNETIC RESONANCE IMAGING AS AN AID TO EARLY DIAGNOSIS OF INFLAMMATORY ARTHROPATHY**

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Magnetic Resonance (MR) Imaging has an established role in the diagnosis of early inflammatory arthropathy. Static MR is able to identify evidence of bone oedema and erosions, and contrast enhanced MR can delineate synovitis. It compares favourably with other imaging modalities including nuclear medicine, and it is superior to plain film radiography.

We present an audit of MR Imaging of the hand and wrist over a 5-year period in a large specialist centre. We will include examples of bone oedema, erosions and synovitis on MR. In this period 34 MR scans had been requested by Rheumatologists, of which 26 were requested in the context of possible early inflammatory arthritis. MR was only requested in difficult cases where early inflammatory arthritis was suspected. There were 19 female, and 7 male patients, with a mean age of 47 years (range 23 – 75).

Inflammatory Arthropathy	Number of patients	% With positive MR scan result
Clinical evidence +ve	14	50%
Laboratory evidence +ve	11	55%
Clinical & Laboratory +ve	9	67%
No evidence	4	25%

The above table shows that is difficult to predict MR findings on the basis of clinical findings, or laboratory markers of inflammation alone.

MR scans were all performed on a Phillips 1.5 Telsa scanner with a synovial protocol: Coronal T1W, and T2W; Dynamic Coronal T1W with fat suppression (pre and post intravenous gadolinium); Axial T1W with fat suppression post contrast. Only the hand with dominant symptoms was scanned.

Out of the 26 cases, 11 showed evidence of early inflammatory arthropathy, and 15 showed no evidence of arthropathy. In both positive and negative MR scans there was an overall 85% change in patient management. If there was no evidence of inflammatory arthritis on MR, the disease-modifying drug was stopped (33.3%), patient referred (13.3%), and/ or discharged (73.3%). In cases of inflammatory arthritis shown on MR, 63.6% had a change in their medication, by starting (54.5%), and/ or stopping (9.1%), a disease-modifying agent.

We propose to obtain 2-year follow up of these patients to ascertain the positive and negative predictive values of MR scanning in this group.

We are proposing to introduce ultrasound evaluation of the hands and wrists, in conjunction with MR in a prospective trial, assessing for early inflammatory arthritis.

## **EARLY DIAGNOSTICS OF RHEUMATOID ARTHRITIS OF HAND USING MAGNETIC RESONANCE IMAGING**

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**Purpose:** To investigate early diagnostics of rheumatoid arthritis (RA) in hand using magnetic resonance imaging (MRI).

**Methods:** 24 patients who fulfilled 1987 American rheumatologic association (ARA) criteria for RA, with disease duration 6-37 months, mainly II degree of disease activity, age 19-62 yrs were examined in this investigation. Both patients hands and radiocarpal joints were examined by conventional radiography (CR). Patients dominant hands and radiocarpal joints were examined by MRI . There were determined the ESR, CRP in serum of a blood, count of the pain and swelling joints. T1-SE and T1-GE axial and coronal images were obtained before and after introduction of a contrast medium and STIR images were obtained. The bone erosions and subchondral cysts, damage of hyaline cartilage, synovial membrane hypertrophy, joint effusion and tendosynovitis were investigated.

**Results:** The 285 bone erosions and subchondral cysts were founded by MRI. Joint effusions in 16 patients, tendosynovitis in 19 patients, synovial membrane hypertrophy of different degrees in all patients were founded. Damage of hyaline cartilage (thinning and partial destruction) were indicated in 5 patients.

**Conclusion:** MRI of hands allows to determine exactly the bone erosions and subchondral cysts, synovial membrane hypertrophy, joint effusion and tendosynovitis, as well as, damage of articular cartilage. MRI of hands is a method of a choice for RA diagnostics, particularly in early stages.

## **THE SWOLLEN STERNOCLAVICULAR JOINT – A DIAGNOSTIC DILEMMA**

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The Sternoclavicular joint (SCJ) is a highly mobile synovial joint. Patients may complain of anterior chest wall, shoulder or neck pain, and the affected joint may be swollen and tender. A wide variety of pathology involves the SCJ, ranging from traumatic subluxation, degenerative disease, infection, trauma, malignancy, rheumatoid arthritis and the seronegative arthropathies. We address the problems encountered in establishing a working diagnosis, and suggest an imaging algorithm. The rich supply of enthesis around the SCJ may explain why it is a common target for the spondyloarthropathies. Psoriatic arthropathy is usually apparent from the clinical history, but other conditions involving the anterior chest wall suffer from confusing and controversial nosology. It is possible that SAPHO, CRMO, and sternoclavicular hyperostosis should be considered as a spectrum of the same disease process with overlapping clinical and radiological features. Histology and culture of joint aspirate may not be helpful, and there is no reliable serology assay which can distinguish the spondyloarthropathies from other causes of SCJ arthropathy. Imaging plays a vital role in excluding treatable conditions.

The overlying structures of the thorax means that plain radiography is limited in the evaluation of SCJ disease. Ultrasound may show a joint effusion and the use of power Doppler may demonstrate synovitis. Bone scintigraphy can assess the extent and intensity of the disease. MR may demonstrate erosions and help to differentiate inflammatory arthropathy from osteomyelitis. On balance, CT is probably the imaging

modality of choice for the SCJ. It provides good bone and soft tissue detail which can be displayed in multiplanar reformats, and can be used to guide biopsy of the joint. The considerable overlap in the appearances of the disease entities affecting the SCJ makes it difficult to diagnose the pathology on morphological features alone. Therefore, a clinical approach is important in the diagnosis of SCJ arthropathy. In the acute setting, septic arthritis should be considered. It is particularly important to exclude TB which may present as chronic SCJ arthropathy. The main role of the radiologist is to exclude infection and malignancy, best achieved by CT-guided biopsy. This done, the term “inflammatory arthropathy” should be used in preference to attempting to specify a particular anterior chest wall syndrome.

## POSTOPERATIVE

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### **IMAGING OF HIP PROSTHESIS**

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There has been a progressive increase in the number of patients undergoing hip replacements which is due to a combination of aging population and advent of newer joint prosthesis and surgical techniques. Imaging plays a vital role in determining the success of hip replacements and diagnosing complications. It is imperative for all radiologists to be aware of the normal appearances of hip prosthesis and the radiological features of common complications.

The aim of this pictorial review is to illustrate the imaging features of a normal hip prosthesis and to demonstrate the imaging spectrum of immediate and delayed post operative complications. X rays, scintigraphy, arthrography, CT scan and MRI are all useful in diagnosing complications. The appearances of total hip arthroplasty, hemiarthroplasty and revision arthroplasty are illustrated. Features to be assessed in the baseline x ray such as positioning of the femoral stem, acetabular position, inclination, anteversion, center of rotation and leg length discrepancy are explained. The abnormalities illustrated in the review include loosening, infection, osteolysis, fracture, dislocation, non union, heterotopic bone, cement herniation, polyethylene wear and hardware failure.

### **ARTHROPLASTY FAILURE IN UPPER-LIMB JOINTS: A RADIOLOGIC OVERVIEW**

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## BACKGROUND

The purpose of this study was to prospectively analyse the findings for cases of shoulder, elbow, wrist and knuckle reconstruction with failed hemiarthroplasty or total arthroplasty of these joints, using different imaging methods such as radiographs, ultrasonography (US), computerized tomography (CT) and magnetic resonance (MR).

## METHODS

Since 1998, 10-13 total or partial shoulder arthroplasties, 3-5 elbow (radial head or ulnohumeral) replacements and 10-13 implantations of metacarpophalangeal, interphalangeal knuckles or scaphoid silicone prostheses have been performed in our hospital annually. Patients' age ranged from 46 to 81 years. All patients are followed up immediately after surgery, at 6 months and then yearly or when necessary, using plain films and sometimes US, and rarely CT and MR. US is usually used to confirm or rule out complications such as periprosthetic abscess and/or haematoma and to visualize infected or non-infected subacromial bursitis. CT and MR are used when loosening of non-metallic arthroplasties is suspected clinically and to evaluate surrounding soft tissues.

## RESULTS

We analysed imaging features of the normal and pathological evolution of upper-limb joint prostheses. We describe complications (affecting about 30% of patients) such as infection, periprosthetic fracture, aseptic loosening, osteolytic lesions, heterotopic calcifications, migration of the glenoid component of total shoulder arthroplasty and dislocation of the prosthesis.

## CONCLUSION

Plain films are essential for detection and evaluation of upper-limb joint arthroplasties. US is usually used to confirm or rule out surrounding collections and is useful in guiding percutaneous aspiration of soft-tissue collections if needed. CT and MR enable correct assessment of osteointegration of non-metallic prostheses and CT can also exclude loosened bodies in joint replacement. In comparison to hip and knee arthroplasties, upper-limb joint replacements are less common but have relatively more complications, particularly in non-metallic arthroplasties.

## **RELIABLE MEASUREMENT OF ACETABULAR CUP ORIENTATION AFTER TOTAL HIP ARTHROPLASTY (THA). DESCRIPTION OF A NEW CT SCAN METHOD THAT TAKES INTO ACCOUNT VARIABLE PELVIC POSITIONING DURING THE EXAM.**

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**BACKGROUND:** A number of methods and mathematical calculations have been proposed in the literature, to measure radiologically cup orientation after Total Hip Arthroplasty (THA). Their precision and accuracy depends on a careful radiological technique that assumes positioning of the anatomic plane of the pelvis perpendicular to the X rays and parallel to the level of the table in each case. Standard CT scan measuring techniques also fail to control pelvic positioning hence lacking precision and accuracy. **OBJECTIVE:** To describe a new method of measuring precisely and accurately acetabular cup orientation with a CT scan. Using what is known as double

oblique windows, abduction and anteversion measurements can be made with respect to the anatomic plane of the pelvis no matter what the position of the patient was during the exam.

**METHODS:** A CT scan of a saw bone anatomic model of a pelvis with a standard press fit acetabular cup at 45 degrees abduction and 20 degrees anteversion was done. The pelvis was deliberately placed on the CT scan table with an exaggerated position in flexion, abduction and roll. The double oblique window technique frequently used in other applications was used to correct the misplacement of the pelvis and then measure the acetabular cup orientation precisely with respect to the anatomic plane of the pelvis.

Patients measurements were then realized on standard pelvic CT to note the clinical application of the methods.

**RESULTS:** We obtained a precise measurement of the cup orientation on the model (45 degrees abduction) and (20 degrees anteversion).

**CONCLUSIONS:** This new technique assures improved accuracy and precision by taking into account the pelvic position when measuring cup abduction and anteversion.

## **PLAIN RADIOGRAPHIC IMAGING AFTER HIP ARTHROPLASTY – WHAT THE ORTHOPAEDIC SURGEON WANTS TO KNOW**

S Boddu, T J Marshall, J Nolan, J Cahir, A Toms

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Goal :

To provide a systematic approach to plain radiographs after Hip Arthroplasty.

General contents :

This pictorial review provides a systematic approach to cover the detection and interpretation of radiographic signs that arise as a result of complications such as prosthetic malalignment, loosening (aseptic and septic), prosthetic migration, osteolysis, heterotopic ossification, loss of hardware integrity, peri-prosthetic fractures and dislocation.

## **ADVANCED IMAGING OF HIP ARTHROPLASTY. WHAT THE ORTHOPAEDIC SURGEON WANTS TO KNOW.**

JG Cahir, S Boddu

Norfolk and Norwich University Hospital, Norwich, United Kingdom

AIM

To illustrate the use of MRI, CT and nuclear medicine techniques in the imaging of Hip Arthroplasty.

CONTENT

Hip arthroplasty has become a common treatment for patients with osteoarthritis. The complications following arthroplasty include granulomatous (small particle) disease, heterotopic new bone formation, infection, aseptic loosening, and prosthetic

and periprosthetic fracture. These complications are a source of morbidity and may require surgical revision.

Plain films and nuclear medicine techniques are established in the evaluation of hip arthroplasty. Plain radiographs are often useful to provide global assessment of anatomy but are limited in their ability to demonstrate complex 3D structures. Cross sectional imaging with CT and MRI may be rendered less effective due to image artefact in the postoperative orthopaedic patient.

This pictorial review illustrates the complications of hip arthroplasty and the refinements in MRI and CT techniques that reduce artefact and optimise imaging in the presence of orthopaedic hardware.

## **IMAGING OF JOINTS FOLLOWING ARTHRODESIS – A PICTORIAL REVIEW WITH EMPHASIS ON NON-UNION**

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### **Introduction**

Arthrodesis of joints is a common orthopaedic procedure and non-union is a significant complication occurring in 3-7% of mid-foot arthrodeses. Given the prevalence of this problem, there is surprisingly little information in world literature relating to the imaging findings in such cases, especially with regards to arthrodesis in extremities.

In our study of twelve patients who underwent ankle/subtalar arthrodeses and subsequent surgical exploration for possible non-union, features consistent with bony union on MRI were marrow-to-marrow continuity. On the other hand, fluid type signal on MRI; gas within the joint on CT or a wide gap at the joint space may indicate non-union. Reaching a definitive diagnosis of non-union can be difficult, especially differentiating non-union from fibrous union which may not be possible on CT.

In our poster, we aim to demonstrate the relevant plain film, CT and MRI features relating to arthrodesis and non-union, concentrating on cases in the ankle, where some discrepancy was demonstrated between the imaging features and surgical findings.

## **TAPER SLIP ENGAGEMENT OF TRIPLE TAPER POLISHED CEMENTED FEMORAL STEM.**

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**Aim:** To quantify the early taper slip engagement (so called subsidence) of the triple taper polished femoral stem in the cement mantle.

**Background:** Cemented femoral prosthesis is widely used while performing a total hip arthroplasty. A triple taper stem was introduced in last decade with a theoretical benefit of loading medial side of the proximal femur.

Materials and methods: Immediate post operative, 6-month, 12 month, 24 month follow up radiographs of patients with triple taper stem were digitised.

The taper slip engagement was identified by lucency in Gruen's Zone – 1 between cement mantle and stem or reduction in the lucency of end cap void.

It was quantified by measuring by vertical length of the lucency in Gruen's Zone – 1 between cement mantle and stem or reduction in the lucency of end cap void in the serial radiographs.

Results: Serial radiographs of 43 patients were studied. 23 patients had bone block, 20 gelatin end cap over the tip of the femoral prosthesis. The mean taper slip engagement was 0.88mm at 2yrs in bone block group, 1.26mm at 2yrs in gelatine end cap group. All these patients had improved hip outcome scores.

Discussion: Our results are comparable to the taper slip engagement (stem subsidence in cement mantle) of the exeter stem. It is important to have knowledge of the type of prosthesis used when the radiographs are reported as the appearance of lucency in Gruen's zone-1 can be construed as aseptic loosening.

This radiolucency can increase with time by a few millimetres.

## **DYNAMIC BONE SCAN REQUESTS IN SYMPTOMATIC TOTAL KNEE REPLACEMENT - AN AUDIT OF CLINICAL INFORMATION SUPPLIED AND USEFULNESS OF SUBSEQUENT REPORT**

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Purpose:

Potential complications of total knee replacement (TKR) include prosthetic loosening and infection. These conditions are painful and generate requests for dynamic bone scans. Three phase bone scans can be difficult to interpret, especially if surgery is recent or the timing of surgery is not documented on the request. This audit assessed the usefulness of the clinical information supplied and of the subsequent report.

Materials and Methods:

Dynamic bone scans performed for symptomatic TKRs over a five year period were audited. The proportion of requests giving adequate clinical information and the proportion of requests which generated a useful report (i.e definitely normal or definitely consistent with loosening or infection) were derived. This was used to educate those referring patients for dynamic bone scans to optimise both the information supplied and the report generated.

Results:

Of 90 dynamic bone scans performed over a five year period 40 were considered to be within normal limits, 34 were highly suggestive of infection or loosening and 17 made no useful contribution to patient management. Nine of the clinically unhelpful reports referred to the lack of information relating to timing of surgery. In 7 cases it was stated that due to the timing of the surgery (<12 months previously) the report was inconclusive.

Conclusion:

In order to optimise the quality of the dynamic bone scan report it is imperative that the timing of surgery is known to the reporting radiologist. This can either be



documented on the request or on a patient questionnaire completed at the bone scan appointment.

Knowing the timing of surgery, clinicians need to consider whether a dynamic bone scan is likely to be helpful or not before it is requested as this will also reduce the number of indefinite reports.

## CASE REPORTS

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### GRANULOCYTIC SARCOMA WITH AML-M7: A RARE CASE

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**Purpose:** AML-M7 is a rare type of AML. We presented the radiological findings of granulocytic sarcoma which affected the bone and soft tissue in a patient who have been treated due to acute myeloid leukemia-M7 (AML-M7) one year ago and it was relapsed.

**Material and Methods:** AML-M7 was diagnosed in a three year old girl, and relaps was seen in the patient while follow-up. During treatment swelling and activity limitation were noticed in right hip of the patient. Conventional radiography, ultrasonography, and CT examination were performed.

**Results:** On pelvis roentgenogram of the case, radiolucent lesion located in metaphyseal- diaphyseal area of right proksimal femur was seen and it was expanded and destructed the bone. On sonographic examination, 6x5 cm in size, heterogenous hypoechoic mass was seen at level of right hip and it's margin could not be distinguished from surrounding muscles. On CT, soft tissue mass 6x4x4 cm in size was localized in the 1/3 proximal part of femur. Lesion was including necrotic, hypodense areas. Bone and soft tissue leukemic infiltration-granulocytic sarcoma was proven by histopathological examination of aspiration biopsy material.

**Conclusion:** The ratio of acute myeloid leukemia with granulocytic sarcoma is 3 to 8 percent at all subtypes of AML. Granulocytic sarcoma is mostly seen at M2-M4-M5 types. Bone and soft tissue involvement is called granulocytic sarcoma. We presented radiological findings of granulosytic sarcoma with AML-M7 which may occur rarely and literature reviewed.

### UNUSUAL RADIOLOGICAL APPEARANCES OF THE PATELLA

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We present here 3 patients with unusual appearances, the first with a cyst, the second with post patellectomy ossification and a third patient with a metastatic lytic lesion in the patella.

1) A 21-year old lad fell on ice. Clinical findings were negative except for an effusion. Ultrasound of the knee however showed an intact quadriceps tendon with effusion in the knee and break in the cortical continuity of the patella. Radiographs revealed an undisplaced pathological fracture through a multiloculated cystic lesion in the patella. The fracture was treated conservatively with a cast which was removed at 6 weeks. One year follow-up showed complete resolution of the cyst and full range of movement of the knee.

2) A 45- year old farmer presented to his general practitioner with complaints of anterior right knee pain following a twisting injury to the knee. Examination of the knee was normal. Radiograph of the knee revealed an expansile cystic lesion with well defined margin in the patella. A radiological diagnosis of chondroblastoma was suggested. An elective patellectomy was performed and pathological diagnosis of benign giant cell tumour was made. One and a half year follow-up showed calcification in the region of the resected patella which, however, clinically was asymptomatic. He subsequently presented to the clinic again after 8 years with complaint of recurrence of anterior knee pain. On examination there were tender bony lumps in the region of the patella. Radiographs revealed the presence of dense calcification in the region of the patella. A diagnosis of dystrophic calcification was made. The lesion was excised and pathological examination confirmed dystrophic calcification with no evidence of recurrence of the tumour. At one year follow-up the knee had returned to normal.

3) A 51 year old gentleman presented with painful knees. On X-ray there was significant patello-femoral osteoarthritis bilaterally. However on further close inspection a lytic lesion at the lower pole of the right patella was discovered which on biopsy was confirmed as a secondary metastatic deposit. A primary tumour of the bronchus was detected 3 weeks later.

Tumours of the patella are rare and are asymptomatic and may be diagnosed as incidental findings during investigation for other disease. The common benign lesions include giant cell tumour, chondroblastoma, aneurysmal bone cyst and simple bone cysts. Osteosarcoma is the commonest malignant tumour. The common presentations include anterior knee pain and pathological fracture.

Post patellectomy calcification is also a well known entity and radiologists need to be aware of its presence.

Secondary metastatic deposits to the patella are rare but documented. Most often the primaries are of the bronchus but other primaries are also described in literature.

## **PACHYDERMOPERIOSTOSIS; PICTORIAL REVIEW OF RADIOLOGICAL FOLLOW UP OVER 50 YEARS**

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Pachydermoperiostosis describes a rare clinical syndrome of enlargement of extremities, clubbing of fingers and toes, skin changes, painful swollen joints and irregular thickening of the cortical bone with subperiosteal new bone formation. It is a disease with an autosomal dominant mode of inheritance and occurs almost exclusively in men. 3 different subtypes i.e., complete, incomplete and atypical

(‘forme fruste’) have been described. This chronic and usually self-limited condition must be differentiated from other diseases, such as acromegaly, the osteoarthropathies complicating disorders of the connective tissue and osteoarthropathies in paraneoplastic syndromes.

Although rare, it is important to recognise this condition as misdiagnosis may subject the patient to unnecessary investigation. Early and accurate diagnosis of pachydermoperiostosis can be challenging but is essential as it indicates a favourable long-term prognosis.

We present a case of pachydermoperiostosis followed up radiologically over 52 years, from the time of first presentation to date. This case offers a pictorial review of radiological features of the disease, which affects the entire bony skeleton at various stages of its evolution when followed up over 52 years between the age of 15 and 67 years. We are not aware of any previous reports describing the radiological features of pachydermoperiostosis over such extended period.

Furthermore, this case does not exhibit dermal abnormalities, which identifies it as belonging to the ‘incomplete’ subtype, which is an extremely rare variant. He showed enlargement of extremities, clubbed fingers and irregular thickening of the cortical bone with subperiosteal new bone formation without any causative underlying disorder.

We discuss the diagnostic criteria and the differential diagnosis of pachydermoperiostosis. Its coexistence with other skeletal and joint diseases is also reviewed.

## **OCCURRENCE OF GRISEL’S SYNDROME IN A CHILD WITH DOWN SYNDROME**

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**INTRODUCTION:** Grisel’s syndrome is a nontraumatic subluxation of atlanto-axial joint following an infectious process in the head and neck due to inflammatory ligamentous laxity. Due to the existence of a periodontoidal vascular plexus that drains the posterior superior pharyngeal region through the pharyngovertebral veins, it provides a haematogenous route for the transport of peripharyngeal septic exudates and neoplastic cells to the upper cervical spinal structures. In a large-scale study, atlanto-axial instability was observed in 15 per cent of individuals with Down syndrome, 13.5 per cent asymptomatic and 1.5 per cent symptomatic. Even though Grisel’s syndrome and Down syndrome can cause nontraumatic atlanto-axial instability with different pathogenesis, there is no reported case where Grisel’s syndrome is superimposed on a Down syndrome resulting in atlanto-axial distension of the ligaments and thus subluxation.

**CASE REPORT:** A four-year old boy with Down syndrome presented with neck pain, torticollis and a three-week history of upper respiratory tract infection. Examination showed tenderness in the neck with a relatively stiff neck and no neurological deficit. Plain x-ray of the cervical spine showed atlanto-axial instability. MRI of the cervical spine showed fluid distension of the atlanto-axial joint with increased atlanto-dens interval and distension of the transverse ligament leading to laxity. He was treated conservatively with antibiotics and cervical immobilisation using Philadelphia collar.

With antibiotics to cover against streptococcus and staphylococcus his neck stiffness and pain gradually got better.

**DISCUSSION:** Down syndrome individuals having high prevalence of respiratory infections with decreased immunity has a high chance of the infection being spread via the pharyngovertebral veins to the periodontoid venous plexus thereby resulting in septic exudates in the atlanto-axial joint. It causes distension of the joint stretching the transverse ligament which is in 15 per cent of individuals with Down syndrome is already lax. Hence, it is important to analyse the atlanto-axial joint status in Down syndrome individuals complaining of sudden onset of neck pain following head and neck infections. The key to the adequate management of this condition is early diagnosis and treatment with antibiotics and cervical immobilisation, as a delay in recognising may result in irreversible spinal cord damage.

## **OLLIER'S DISEASE: CASE PRESENTATION AND REVIEW OF LITERATURE**

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Multiple enchondromatosis (Ollier's disease) is a nonhereditary disease characterized by multiple central (medullary) cartilaginous bone tumors of unknown pathogenesis. It usually involves the extremities with a unilateral predominance, and sarcomatous transformation may occur

We report a case of multiple enchondromatosis in a 10-year-old female presented with right hip pain. For diagnose, X-ray and MRI evaluation were performed. Several lytic expansile bone lesions were observed on radiographs, and they were distributed by the hands, feet and femurs. On MR, they have typical signal characteristics of chondroid lesions with low signal on T1 and very high signal on T2. It is our intention to illustrate the imagiological aspects of this rare disease through the presentation of a case report and the revision of the current available literature. A brief discussion of the practical implications of these abnormalities for the radiologist is also done.

## **RADIOLOGICAL FINDINGS OF DYSPLASIA EPIPHYSEALIS MULTIPLEX: CASE REPORT**

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**Purpose :** Dysplasia epiphysealis multiplex is an autosomal dominant rare skeletal dysplasia. In this exhibit, we present the radiograph and magnetic resonance imaging findings in two sibling with dysplasia epiphysealis multiplex of hip.

**Material and methods :** A 8-year-old and 14-year-old children were admitted suffering from bilateral hip pain. They have no trauma history. Pelvic radiographs and magnetic resonance imaging of the hip joints were performed.

**Results :** The conventional X-rays of pelvis showed irregularity of the femoral heads and articular and cortical surfaces. Additionally, small and flat epiphyses were shown. Magnetic resonance imaging of the hip joints demonstrated also bone marrow oedema and acetabular roof.

**Conclusion :** Magnetic resonance imaging is a useful imaging modality to evaluate associated findings in dysplasia epiphysealis multiplex.

## MAGNETIC RESONANCE IMAGING IN SYMPTOMATIC LINBURG-COMSTOCK ANOMALY

Rahime Haykir<sup>1</sup>, Serdar Karaköse<sup>1</sup>, Nazim Karalezli<sup>2</sup>, Aydin Karabacakoglu<sup>1</sup>, Burkay Kacira<sup>2</sup>

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**Purpose:** The anomalous tendon connections from the flexor pollicis longus to the index finger flexor digitorum profundus cause lack of independent excursion of the flexor pollicis longus, first described in 1979 by Linburg and Comstock. We present the effectiveness of MRI in two cases with Linburg and Comstock anomaly where surgical treatment was performed under local anaesthesia after locating the anomaly.

**Methods:** The study was performed on 148 subjects. Of the 148 volunteers, 92 were musicians and 56 were nonmusicians. The subjects were examined by provocative testing and simultaneous flexion of distal interphalangeal joints of the index and/or long fingers was noted.

The extremities of the volunteers whose anomaly was symptomatic were examined by MRI. MRI was performed on a 1,5T MR system. Axial and coronal images were performed by using surface coils. Two of them were treated surgically.

**Results:** The anomaly was found to be positive in 12 (13%) of the musicians, and in 7 (12.5%) of the non-musicians.

The anomaly was symptomatic in 7 of 12 musician especially when their exercises take longer than 1.5 hours but it was asymptomatic in non-musicians in that they were all unaware of the presence of the anomaly and the anomalous movement.

Two of the symptomatic volunteers wanted to be operated for this anomaly and they were examined by MRI. MRI showed the tendinous connections and they were operated on with the assistance of these images under local anaesthesia. The surgical interventions were successful.

**Conclusion :** MRI is a useful imaging technique for many disease, but to our knowledge it has not been used for this anomaly before and surgical excision of the tendinous connection has not been carried out under local anaesthesia with the help of this imaging technique. We think that Magnetic Resonance Imaging helps the surgeon to perform the operation under local anaesthesia and surgical exploration under local anaesthesia enables the surgeon to check the independent flexion of the thumb and the index fingers intraoperatively after excising the tendinous connection with limited incision.

# INFECTION

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## **PERIOSTEAL REACTION: INFLAMMATION-FRACTURE-TUMOR ?**

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### Aims:

To evaluate solid periosteal reactions, to discuss diagnostic difficulties connected with it.

### Methods:

Periosteal reactions can form different shapes: specula, lamellae, scalloping, Codmann's triangle. Solide, tiny periosteal reactions can most frequently cause diagnostic problems, if there is not any associated structural bony alteration. If there are not any antecedents traumatic event in the anamnestic data in childhood, periosteal reaction can cause anxiety. In the background of a characteristic picture there can be several different pathological processes: inflammation, Ewing's sarcoma, osteosarcoma, eosinophil granuloma, and not too rare even stress fracture. Clinical symptoms are not specific: pain, swelling, tenderness (for palpation), and even subfebrility / fever and in case of the lower limb localisation limping can occur. Laboratory data are usually negatives.

### Results:

If we have a suspect beyond inflammatory or tumorous process for stress fracture but we can not find the characteristic line of a definitive fracture, we should use the complex method by combination of several imaging techniques. With MR and/or CT we can establish the diagnosis of an infraction just before with x ray imaging and even with those we can get further, very useful informations about inflammatory or tumorous processes which can be used during therapy.

### Conclusions:

If MR and/or CT suspect inflammatory or tumorous process we have to turn to biopsy. But if we can establish the diagnosis of a stress fracture using several data gained by different imaging methods, we can wait and see as long as the typical infraction line appears on the x ray picture. In these cases we can disregard performing biopsy.

## **MUSCULOSKELETAL MANIFESTATIONS OF HIV AND AIDS**

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The human immunodeficiency virus (HIV) targets the immune system and in doing so compromises host defence mechanisms. A wide spectrum of disease is seen

throughout the body as a consequence of this breach in immunity. The musculoskeletal (MSK) manifestations of HIV are an unusual but important group to consider and include inflammatory and rheumatic conditions, infection and neoplasms. The majority of MSK manifestations of HIV are similar in presentation and have radiological findings in common with the non-infected population. However, HIV can significantly alter the course of these diseases which may present atypically, occur at unusual sites and be caused by uncommon organisms in the case of infection. The introduction of highly active antiretroviral therapy (HAART) has also altered the disease spectrum with a reduction in the number of opportunistic infections and a relative increase in acquired immune deficiency syndrome (AIDS) related tumours. The drugs themselves also have MSK side effects. This pictorial review aims to highlight some of the common MSK manifestations of HIV and AIDS to enable the radiologist to provide a sensible differential diagnosis.

## **BRUCELLAR SPONDYLITIS:MR IMAGING CHARACTERISTICS**

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**Purpose:** This study aimed to identify the distinguishing features of spine brucellosis on magnetic resonance imaging (MRI).

**Materials and methods:** Between 1999 and 2004, MRI was performed in 12 patients with spinal brucellosis, 6 men and 6 women, (range 22 - 70 years, mean 49). The MRI was performed in a 1T scanner using T1-WI SE, T2-WI SE, T2-WI fat-sat and contrast enhanced T1-WI fat-sat in sagittal and axial planes.

**Results:** 30 vertebrae and 14 disc levels were identified as being involved in 12 brucellar spondylitis cases. Multilevel disc involvement occurred in 4 patients (33,3%).

Two (16,6%) patients had cervical spine involvement, 4 (33,3%) patients had thoracic spine involvement and 9 (75%) of them had lumbar spine involvement. The L4 vertebral body was involved in 4 cases. Anterior superior vertebral body involvement was identified in 10 (83,3%) cases. In one case there was sacroiliac joint involvement. Posterior element involvement occurred in only one case.

MRI in the 12 cases revealed abnormal signal of the affected vertebral bodies on at least one MR sequence (n=12), presence of paraspinal or epidural inflammation (n=8), disk enhancement (n=9), hyperintense disk (n=10), endplate erosion or destruction (n=10). Lower sensitivity signs were decreased height of the intervertebral space and disk hypointensity on T1- weighted images.

**Conclusion:** Most of the typical MR imaging characteristics commonly used to diagnose brucellar spondylodiscitis were identified in our study.

Contrary to recent studies, posterior element involvement observed in only one case.

## **IMAGING OF EXTRA SPINAL MUSCULOSKELETAL TUBERCULOSIS – A PICTORIAL REVIEW.**

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3-5% of patients with tuberculosis (TB) will have bone and joint manifestations. Among these patients extraspinal TB is rare and only accounts for 16 – 19% of all musculoskeletal TB. The involvement of bone may be due to haematogenous spread from active primary infection of the lung, but the more common scenario is spread of infection from a quiescent primary lung site or extraosseous focus.

This diagnosis is often overlooked, as the patient can be surprisingly well. It is, however, an important diagnosis to make as in the vast majority cases, patients will respond well to specific antibiotic therapy.

We will present a series of cases from our own practice and use these to illustrate the common imaging findings seen in proven cases of extraspinal tuberculosis. We will use all imaging modalities to illustrate the findings with an emphasis on the common MR findings.

## **MR IMAGING IN PYOGENIC ARTHRITIS OF THE STERNOCLAVICULAR JOINT.**

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*Objective:* To review the MR imaging findings in pyogenic arthritis of the sternoclavicular joint (SCJ).

*Materials and methods:* 12 patients with inflammatory SCJ arthropathy due to possible infection underwent MR imaging. Two patients had involvement of both joints. The average age was 57.1 years (range 28 – 79 years) and eight patients were male. Predisposing factors included drug abuse in 2 cases. All joints underwent needle aspiration/biopsy. Bacteriology confirmed infection in six cases, five due to *Staph. aureus* and the other due to methicillin resistant *Staph. aureus* (MRSA). However, one aspirate grew a coagulase negative *Staph. aureus*, thought to be due to a skin contaminant. The MR features of the non-infected and infected joints were compared.

*Results:* Marrow oedema, soft tissue swelling, erosions and joint effusions were found in both groups but were all more prominent in the infected group. Frank bone destruction was not seen in the non-infected group, but was present in five of the infected group.

*Conclusions:* MR imaging cannot distinguish early septic arthritis of the SCJ from non-infective inflammatory arthropathy. However, where inflammatory changes are marked and frank bone destruction is present, then infection is much more likely. Where there is clinical suspicion of an infected SCJ and MR features of an inflammatory arthropathy then a joint aspiration is indicated.

## **TOPICAL ETHYL CHLORIDE FINE SPRAY. DOES IT HAVE ANY ANTIMICROBIAL ACTIVITY?**

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**Background:**

Ethyl chloride is widely used as a topical anaesthetic agent. The authors routinely use this product for image guided joint and soft tissue therapeutic injections.

The one paper in the literature looking at its possible antimicrobial effects was using the jet spray. The anti microbial effects of fine ethyl chloride spray (Cryogesic ®) has not been previously studied.

The authors postulate that any antimicrobial benefits would accrue either by direct organism death or by growth inhibition allowing time for the natural body defences to activate.

**Aims:**

To assess if ethyl chloride fine spray has any antimicrobial activity.

**Methods:**

Agar plates inoculated with 4 different organisms (staphylococci x2, MRSA, streptococci) were sprayed with ethyl chloride fine spray from 5 to 30 seconds.

The plates were assessed for growth inhibition at 24 and 48 hours by the microbiologist in comparison to non-sprayed control plates.

Further agar plates were similarly sprayed with ethyl chloride using the two different preparations (jet and fine) and the surface temperatures were measured. Skin temperature changes were also assessed in volunteers.

Contact agar plates were used in volunteers to assess typical normal skin flora colony densities. The experiment was then repeated to reflect different colony densities in case the density of the agar plate colonies could mask any inhibition.

Broths were then studied over these temperature ranges (derived from the surface and skin temperature measurements) to assess the growth kinetics.

**Results:**

The full results will be presented in detail but initial results show some growth inhibition seen in Beta haemolytic streptococci.

The skin and agar surface temperature changes achieved were from room temperature to -6°C.

It was found that volunteers could only tolerate the spray up to 10 seconds of spraying.

The authors are awaiting the final growth kinetic and colony density results.

## PICTORIAL REVIEWS

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### **IMAGING OF CHRONIC WRIST PAIN.**

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Chronic wrist pain is a difficult problem to manage. The extensive differential diagnosis often makes it difficult to make an accurate diagnosis. Physical

examination, history, plain x ray , ultrasound and bone scan are used in diagnosis. MRI and MR arthrography are increasingly used in difficult cases.

This pictorial review illustrates a wide variety of cases such as ganglion , De quervains tenosynovitis, Osteoarthritis( Generalised or localised),non union of scaphoid, Keinbocks disease, Preisers disease, AVN of capitate, Scapholunae disassociaton, dorsal rim impaction syndrome, Scaphoid advanced collapse(SLAC), Scaphoid non union advanced collapse(SNAC), Triangular fibrocartilage tear, Ulnar abutment syndromes, hamolunate impaction,Distal radioulnar joint disorders( distortion due to fracture, OA, Unstable), Pisotriquetral OA, non union of hamate fracture,medial and ulnar neuropathy, Rheumatoid arthritis, gout, pseudogout, psoriasis, infections, PVNS and tumours.

We also provide an algorithm for diagnosis of chronic wrist pain, based on MRI, plain x ray, bone scan and ultrasound appearances.

## **MR IMAGING OF TRANSIENT REGIONAL OSTEOPOROSIS OF THE FOOT AND ANKLE.**

F Chowdhury, P Robinson, A Grainger, N Harris  
Leeds Teaching Hospitals, Leeds, United Kingdom

### Goals

To illustrate the pivotal role MR imaging can play in the diagnostic process for this condition.

To make the radiologist aware that although transient regional osteoporosis is a rare cause of foot and ankle pain this condition should be considered in the differential diagnosis of patients with acute foot and ankle pain.

To describe the typical imaging appearances for this condition and make the radiologist aware of the current theories for aetiology and treatment.

To emphasis the importance of recognising this condition thereby allowing an appropriate form of management and obviating the need for more invasive investigation.

### Contents

We will present the MR imaging features of transient regional osteoporosis of the foot and ankle utilising imaging findings from a series of three cases. MR imaging demonstrates changes of bone marrow oedema, with low signal intensity on T1-weighted imaging and corresponding high signal on T2-weighted sequences.

Surrounding soft tissue oedema is frequently present. These changes appear within 48 hours of onset of symptoms and take six to eight months to resolve. In a minority of cases, both the MR imaging abnormality and the clinical symptoms may take longer to achieve complete resolution.

The radiological differential diagnosis for bone marrow oedema is wide and includes stress fracture, bone bruising, tumour, osteomyelitis, reflex sympathetic dystrophy and rheumatoid arthritis. In most cases of transient regional osteoporosis, the other conditions can be excluded given the absence of their typical clinical and radiological hallmarks. In rare cases where diagnostic confusion remains, it may prove necessary to undertake bone biopsy.

Migratory involvement of multiple sites can be seen in this condition. We will present a case with migratory involvement of a number of bones in the foot where bone marrow oedema persisted at two year follow-up.

The pathophysiology of transient regional osteoporosis has not been well elucidated but current theories will be discussed. Postulated causes include microfracture of trabecular bone, osteonecrosis, ischaemia and reflex sympathetic dystrophy.

Treatment principally involves conservative measures aimed at protecting the bone from weight-bearing and to provide pain relief. Bisphosphonate agents are also now being used. The role of core decompression remains controversial.

## **DIFFERENTIAL DIAGNOSIS OF LOOSE BODIES OF THE SHOULDER JOINT: A PICTORIAL REVIEW**

**S VESSAL, A AMBARASU. JC CHANDY. R WELLINGS. SB RAI.**

S Vessal, A Ambarasu, JC Chandy, R Wellings, SB Rai

Coventry and Warwickshire University Hospitals NHS Trust. Clinical Radiology Department., Coventry, United Kingdom

Loose bodies can either be single or multiple; be calcified or non-calcified and are seen in large joints such as the shoulder. This comprehensive pictorial review discusses the different aetiologies of loose bodies seen at our institution. We will demonstrate the spectrum of differential diagnoses using various imaging modalities in such cases.

These will include examples of osteophytic degenerative change, neuropathic arthropathy, osteochondral fracture, rice body formation and synovial osteochondromatosis.

## **NORMAL SONOGRAPHIC ANATOMY OF THE WRIST AND HAND - A PICTORIAL REVIEW**

JC Lee, JC Healy

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Goal: To provide a detailed pictorial review of the normal sonographic anatomy of the wrist and hand.

The advent of ultra-high frequency sonography transducers has significantly enhanced our ability to image superficial structures and sonography can now be considered to be the first-line investigation in patients with tendon injuries of the wrist or hand. A clear understanding of normal sonographic anatomy is required to prevent misdiagnosis and ensure optimal patient management. The anatomy of the wrist and hand is best described by considering the extensor and flexor surfaces separately. The carpal extensor retinaculum divides the dorsal extensor tendons into six separate synovial compartments via its attachments to the radius and ulna. The course of these tendons from the wrist to their insertions can be followed using ultrasound. The intrinsic wrist ligaments, triangular fibro cartilage and dorsal finger extensor hood can also be assessed sonographically. The anatomy of the flexor surface of the wrist is

principally defined by the flexor retinaculum. The median nerve beneath the retinaculum in the carpal tunnel, and the ulnar nerve superficial to the retinaculum in Guyon's canal can be easily visualized. The long flexor tendons in the wrist and hand are also clearly visualized at sonography. The flexor annular pulley system is formed by five focal thickenings along the long flexor finger tendon synovial sheath and the second (A2) and fourth (A4) pulleys can be identified sonographically in the majority of patients. Sonography provides a rapid, cheap, non-invasive and dynamic examination of the soft-tissue structures of the wrist and hand and knowledge of normal structures is a pre-requisite to good quality scanning.

### **PITFALLS AND NORMAL VARIANTS IN BONE SCINTIGRAPHY, A PICTORIAL REVIEW**

S. Ramteke, D.S Kumar, J. Herbert  
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Bone scintigraphy is a sensitive diagnostic tool for bone secondaries and infection. However there are normal variants which can mimic these conditions and may lead to diagnostic confusion. We present a pictorial review of the commonly encountered normal variants in routine practice.

### **PICTORIAL REVIEW - AN A TO Z OF EPONYMS IN MUSCULOSKELETAL IMAGING**

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The word eponym is derived from the Greek word *eponymos*, which means named after. An eponym may be defined as the name(s) of one or more individuals who have devised or described an anatomic structure, classification system, disease, pattern of injury, clinical principle, physical sign, or operative technique. Many clinicians and radiologists have affection for eponyms as aide-memoirs for the clinical sign or disease to which they refer. The association, often historical, with an individual who has been closely identified with the disease reminds us that today's medicine is not entirely the work of our contemporaries.

The purpose of this exhibit is to present the clinical and imaging features of many of the eponymous conditions pertinent to musculoskeletal radiology, along with interesting biographical information about some of the people who gave them their names.

### **MR IMAGING OF THE KNEE: A PICTORIAL REVIEW OF CYSTIC STRUCTURES IN AND AROUND THE KNEE JOINT.**

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1st IKA & KAT Hospitals, Athens, Greece

**Learning objectives:** To present a comprehensive pictorial review of the various normal and abnormal cystic structures found in and around the knee joint and to discuss their characteristic MR imaging features and key points for proper differential diagnosis.

**Background:** MRI examinations of the knee performed for any given indication may reveal a wide spectrum of cystic structures about the knee joint including periarticular and intraarticular locations. These lesions may represent distended or inflamed bursae, synovial recesses or various frank cystic lesions. Knowledge of their distinguishing imaging features and familiarity with the pertinent anatomic relations to the surrounding structures is essential for the differential diagnosis.

**Procedure details:** In our department we perform more than 110 MRI examinations of the knee per month. We present exemplary cases of the wide spectrum of cystic structures about the knee derived from our teaching files and a retrospective review of the MRI examinations of the knee performed during the last 2 years. The various cystic structures found were classified into the bursal locations (e.g. suprapatellar, subcutaneous prepatellar, superficial and deep infrapatellar, pes anserine, tibial collateral ligament, semimembranosus- tibial collateral ligament, fibular collateral ligament), synovial recesses (e.g. gastrocnemius-semimembranosus, subpopliteal, horizontal cleft in the Hoffa's fat pad, lateral synovial recess) and intra- and extra-articular cystic lesions (meniscal cysts, intra- and extra-articular ganglia, cystic adventitial disease). A pictorial review of these cystic structures is presented along with a discussion of their distinguishing MR imaging features and main clinical elements.

**Conclusion:** MRI is the most accurate modality for the assessment of the various cystic structures that can be encountered within and around the knee joint, since it can successfully demonstrate their cardinal distinguishing features.

## **MR ARTHROGRAPHY OF THE HIP: ANATOMY, TECHNIQUE, AND PATHOLOGY**

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### **PURPOSE:**

1. Become familiar with the MR Arthrographic techniques for Hip injections and image Acquisition.
2. Review the Anatomy of the Hip through images acquired using

### **MR ARTHROGRAPHY**

3. Gain the understanding of the indications for **MR ARTHROGRAPHY**.
4. Become familiar with the MR imaging appearances of the pathology commonly encountered with this technique.

### **MATERIAL AND METHODS:**

All the **MR ARTHROGRAPHY** examinations were obtained on a 1.5 Tesla magnet with a Torso phased Array Coil.

Intraarticular contrast injection was performed under the Fluoroscopic guidance. Diluted 1 in 200 Gadolinium was used in all the cases. Field of view was 16-20 cms, slice thickness 3-4mm and matrix was 256x224 or (192), with 2-3 acquisitions. Each MR was performed in three planes axial oblique, sagittal oblique and coronal. Fat suppression was used in at least two planes. Volume acquisition was also acquired and radial reconstruction was performed through the Acetabular Labarum.

#### RESULTS AND CONCLUSIONS:

**MR ARTRHROGRAPHY** is a minimally-invasive technique that can significantly improve the specificity and sensitivity of conventional MRI for intraarticular pathology. MR Artrhrography augments the anatomic details by distending the joints, improving the signal to noise ratio, and highlighting contiguous pathology. In addition we will review indications for MR ARTHROGRAPHY of hips. The special radial reconstruction will highlight the Acetabular pathology.

### **PICTORIAL REVIEW OF PERIARTICULAR FLUID COLLECTIONS AROUND THE KNEE**

S Shakhapur

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Periarticular fluid collections are frequently seen around the knee. These are commonly associated with wide spectrum of pathologies including benign and malignant processes. Fluid collections around the knee usually present as focal swellings or as a painful knee. Abnormal fluid collections usually have a characteristic patterns and location and are easily diagnosed on MRI. Ultrasound is also useful in some cases

This poster discusses the common causes of periarticular fluid collections around the knee.

### **HOW TO PERFORM PALPATORY AND IMAGING GUIDED ANTERIOR AND POSTERIOR INJECTION FOR SHOULDER MR-ARTHROGRAPHY: TECHNIQUES, TIPS AND TRICKS AND COMPARISON IN OUR EXPERIENCE.**

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Shoulder MR-Arthrography depends on an efficace intra-articular injection. Many modalities are available, either palpatory – guided or imaging-guided. Shoulder injection can be performed anteriorly or posteriorly, depending on clinical indications: patients with a previous shoulder open surgery may have necessity of a posterior shoulder injection to avoid the anterior surgical scar, anterior instability could be better evaluated by mean of a posterior access to avoid gleno-humeral ligaments or soft tissue signal alteration). Among anterior accesses, the palpatory access is based on the correct finding of a soft point between the coracoid process and the humeral head, and needle must be inserted in a medial-to-lateral inclination, so avoid the

subscapularis injection. Among imaging guidance techniques, fluoroscopic guidance is the more known, is usually extremely precise and efficace, though relies on iodated contrast preliminary injection and on ionizing radiation. Usually the medial decrescent portion of the humeral head is targeted and an arthrographic confirmation of capsular filling is acquired. Shoulder is usually kepted in extra rotation to facilitate the injection.

The anterior access can be performed also with US guidance, but in this case the coracoid process creates ultrasonic disturbance, reducing the panoramicity and the optimal injection site.

Posterior approach relies more on imaging guidance than palpation, and can be performed by mean of US or fluoroscopic guidance. The typical access point is the same of the arthroscopic posterior access, 2 cm medial and 2 cm below the posterior acromial border. US guided posterior injections are obtained by positioning the patient prone-obliques 45 degree, with a pillow elevating and supporting the shoulder to be examined; shoulder is kepted in intra-rotation to widen the articular space.

Comparing all these techniques, the US guidance seems to be preferred for the posterior approach, while the palpation technique for the anterior injection.

Posterior approach, independently from which technique is chosen, appears to be less tolerated by patients than anterior.

## **MR IMAGING OF THE ELBOW**

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We present a pictorial review of MR imaging of the elbow including our preferred scanning technique, salient anatomical features including the collateral ligaments, flexor and extensor origins and MR features of pathology in and around the elbow. We discuss the aetiology and imaging features in collateral ligament injuries, osteochondritis dissecans, entrapment neuropathy, epicondylitis, biceps tendinopathies, arthropathies, PVNS, synovial osteochondromatosis and a few soft tissue masses in and around the elbow.

## **A PICTORIAL REVIEW OF THE RADIOLOGICAL FINDINGS OF ANKLE AND FOOT PATHOLOGY**

D Kiresi<sup>1</sup>, AS Kivrak<sup>1</sup>, R Haykir<sup>1</sup>, M Arazi<sup>2</sup>

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**Purpose :** Foot and ankle pain is common in population. Although clinical examination often points to the underlying cause, imaging is often necessary to confirm the diagnosis and thus ensure appropriate future management. In this exhibit, to demonstrate radiological findings of foot and ankle lesions.

**Material and methods :** In order to a beter understanding of lesions, a classification based on the anatomic origin are outlined. The spectrum of lesions has been classified in: (1) osseous lesions, (2) ligamentous injuries, (3) tendinous lesions, (4) impingement, and (5) others. These will be discussed and illustrated.

**Results :** We present a variety of ankle and foot pathologys: complete and partial tears of achilles tendon, achilles tendinitis, rupture of talofibular ligament, fractures, bone marrow oedema, simple cysts of calcaneus, hematoma in soft tissue, ganglion cysts, and soft tissue myxoma.

**Conclusion :** As the number of magnetic resonance imaging studies performed continues to increase and MR technology continues to improve, we except futher advancements in MR evaluation of foot and ankle lesions. We hope to continue to work closely with our referring orthopedists in this arena to improve our diagnostic skills and our understanding of foot and ankle lesions.

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