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**Literature search results**

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**Search details**

Ultrasound – new technologies

**Resources searched**

Medline, Embase, Cinahl, TRIP, Cochrane Library

**Database search terms**: ultrasound, 3D ultrasound, doppler, harmonic imaging, precision imaging, extended field view, companding images, images, shoulder, shoulder joint, musculoskeletal, ApliPure

**Google search string**: imaging or ultrasound, developments shoulder or musculoskeletal

**Summary**

Nothing found on ApliPure.

**Guidelines**

None found.

**Evidence-based reviews**

1. **Interventions for improving the appropriate use of imaging in people with musculoskeletal conditions** 2010.

**Published research**

1. **A biologically-based algorithm for companding computerized tomography (CT) images.**
Abstract: Computerized Tomography (CT) images are High Dynamic Range (HDR) images of the X-ray attenuation coefficients of the body's tissues. The inability to see abnormalities in tissues with marked differences in their X-ray attenuation coefficients, in a single CT window, poses a significant clinical problem in radiology. In order to provide proper contrast, which reveals all the required clinical details within each specifically imaged tissue, a single CT slice must be viewed by a radiologist four times: the first viewing focuses on the lung window; the second viewing focuses on the soft tissues window; the third viewing focuses on the liver window; and the fourth viewing focuses on the bone window. In order to enhance the ability to perform a complete diagnosis, while decreasing diagnostic time, we developed the BACCT (Biologically-based Algorithm for Companding CT images) method. Our algorithm compresses and expands (compands) the HDR CT image into a single, low dynamic range image. Before performing the companding procedure, unique processing is required which involves operations that enhance and stretch the image. The performance of our algorithm has been demonstrated on a large repertoire of CT body images. All the clinically required CT information is exposed in each CT slice in a single image. The algorithm compands the CT images in a fully automatic way. Collaborating radiologists have already tested the results of our algorithmic method, and reported that the images seem to provide all the necessary information. However, clinical tests for statistical reliability are still required. Copyright Copyright 2011 Elsevier Ltd. All rights reserved.
guided needle precision, should be included in future investigations.

**Source:** MEDLINE

**Full Text:**

Available in fulltext at *Lincoln County Hospital Professional Library*; Note: Username: ulhtlibrary/Password: library

3. Assessing the accuracy and precision of musculoskeletal motion tracking using cine-PC MRI on a 3.0T platform

**Author(s):** Behnam A.J., Herzka D.A., Sheehan F.T.

**Citation:** Journal of Biomechanics, January 2011, vol./is. 44/1(193-197), 0021-9290 (04 Jan 2011)

**Publication Date:** January 2011

**Abstract:** The rising cost of musculoskeletal pathology, disease, and injury creates a pressing need for accurate and reliable methods to quantify 3D musculoskeletal motion, fostering a renewed interest in this area over the past few years. To date, cine-phase contrast (PC) MRI remains the only technique capable of non-invasively tracking in vivo 3D musculoskeletal motion during volitional activity, but current scan times are long on the 1.5T MR platform (~2.5 min or 75 movement cycles). With the clinical availability of higher field strength magnets (3.0T) that have increased signal-to-noise ratios, it is likely that scan times can be reduced while improving accuracy. Therefore, the purpose of this study is to validate cine-PC MRI on a 3.0T platform, in terms of accuracy, precision, and subject-repeatability, and to determine if scan time could be minimized. On the 3.0T platform it is possible to limit scan time to 2 min, with sub-millimeter accuracy (<0.33 mm/0.97 degree), excellent technique precision (<0.18 degree), and strong subject-repeatability (<0.73 mm/1.10 degree). This represents reduction in imaging time by 25% (42 s), a 50% improvement in accuracy, and a 72% improvement in technique precision over the original 1.5T platform. Scan time can be reduced to 1 min (30 movement cycles), but the improvements in accuracy are not as large. 2010.

**Source:** EMBASE

4. Treating frozen shoulder with ultrasound-guided pulsed mode radiofrequency lesioning of the suprascapular nerve: two cases.

**Author(s):** Huang, Chien-Chih, Tsao, Shao-Lun, Cheng, Chan-Yuan, Hsin, Ming-Tai, Chen, Chien-Ming

**Citation:** Pain Medicine, 01 December 2010, vol./is. 11/12(1837-1840), 15262375

**Publication Date:** 01 December 2010

**Source:** CINAHL

5. Validity of ultrasonography and measures of adult shoulder
function and reliability of ultrasonography in detecting shoulder synovitis in patients with rheumatoid arthritis using magnetic resonance imaging as a gold standard.


**Citation:** Arthritis Care & Research (2151464X), 01 August 2010, vol./is. 62/8(1079-1086), 2151464X

**Publication Date:** 01 August 2010

**Source:** CINAHL

**Full Text:**

Available in fulltext at the ULHT Library and Knowledge Services’ eJournal collection

6. Ultrasound tissue Doppler imaging reveals no delay in abdominal muscle feed-forward activity during rapid arm movements in patients with chronic low back pain.

**Author(s):** Gubler D, Mannion AF, Schenk P, Gorelick M, Helbling D, Gerber H, Toma V, Sprott H

**Citation:** Spine, 15 July 2010, vol./is. 35/16(1506-1513), 03622436

**Publication Date:** 15 July 2010

**Abstract:** STUDY DESIGN: Cross-sectional study. OBJECTIVE: Comparison of the timing of onset of lateral abdominal muscle activity during rapid arm movements in patients with nonspecific chronic low back pain (cLBP) and back-pain-free controls. SUMMARY OF BACKGROUND DATA: Rapid movements of the arm are normally associated with prior activation of trunk-stabilizing muscles in readiness for the impending postural perturbation. Using invasive intramuscular electromyography techniques, studies have shown that this feed-forward function is delayed in some patients with low back pain (LBP). Ultrasound tissue Doppler imaging (TDI) provides an ultrasound method for quantifying muscle activation in a noninvasive manner, allowing investigation of larger groups of patients and controls. METHODS: Ninety-six individuals participated (48 patients with cLBP and 48 matched LBP-free controls). During rapid shoulder flexion, abduction, and extension, surface electromyographic signals from the deltoid and motion-mode TDI images from the contralateral lateral abdominal muscles were recorded simultaneously. The onset of muscle activity was given by changes in the tissue velocity of the abdominal muscles, as measured with TDI. Pain and disability in the patients were assessed using standardized questionnaires. Data were analyzed using repeated measures analysis of variance. RESULTS: In both groups, feed-forward activity of the lateral abdominal muscles was recorded during arm movements in all directions. The main effect of "group
membership" revealed no significant difference between the groups for the earliest onset of abdominal muscle activity (P = 0.398). However, a significant "group x body side" interaction (P = 0.015) was observed, and this was the result of earlier onsets in the cLBP group than controls for the abdominal muscles on the right (but not left) body side. No relationship was found between the time of onset of the earliest abdominal muscle activity and pain intensity, pain frequency, pain medication usage, or Roland Morris disability scores.

CONCLUSION: Patients with cLBP did not show a delayed onset of feed-forward activation of the lateral abdominal muscles during rapid arm movements. Earlier activation was observed for one body side compared with the controls. However, the clinical relevance of this finding remains obscure, especially because there was no relationship between the onset of activation and any clinical parameters.

Source: CINAHL

7. Pediatric Dermatofibrosarcoma Protuberans: Case report of a rare soft-tissue sarcoma

Author(s): Pinto D., Caldeira J.P., E Silva J.C.

Citation: Pediatric Radiology, June 2010, vol./is. 40/6(1148), 0301-0449 (June 2010)

Publication Date: June 2010

Abstract: Purpose-Objective: To report the case of an adolescent with a dermatofibrosarcoma protuberans (DFSP) and to discuss the role of imaging in this pathology. Material and methods: We analysed the preoperative Ultrasound and MRI of a 14-year-old boy with a histologically proved DFSP localized in the right shoulder. Results: Ultrasound revealed a circumscribed echogenic solid mass, inhomogeneous with moderate internal hypervascularity seen on Doppler exam. At MRI a huge inhomogeneous plaquelike soft tissue mass in the thickness of the dermis surrounding the right shoulder joint without invasion of the fascia, muscles or bone structures was seen. The tumor was hypointense to subcutaneous fat and isointense to muscle on T1-weighted imaging. On T2- weighted and fast spin-echo T2-weighted sequences, the tumor was hyperintense compared with that of fat. Discussion and conclusion: DFSP is a superficial low-grade sarcoma that rarely evolves into a high-grade fibrosarcoma with a high propensity for local invasion and recurrence. Radiologic studies are not routinely performed because of their typical clinical appearance and superficial location. Although imaging findings are not specific and definite diagnosis is achieved upon histological, immunohistochemical and genetical characteristic findings, MRI is the best suited exam to show its location and extent, thus providing the adequate preoperative guide for a successful surgical treatment and prevent local recurrence, as well as in follow-up these patients.

Source: EMBASE
8. Utility of ultrasound joint counts as predictors of outcome in patients with very early arthritis


Citation: Rheumatology, April 2010, vol./is. 49/(i162-i163), 1462-0324 (April 2010)

Publication Date: April 2010

Abstract: Background: Early aggressive therapy improves outcomes in RA and data suggest that the first 3 months of disease may represent a therapeutic window of opportunity. It is therefore important to accurately predict the development of RA in patients during this window. Musculoskeletal ultrasound (MSUS) is more sensitive than clinical assessment in the detection of joint swelling and more sensitive than conventional radiography in the detection of erosive disease. We therefore evaluated the contribution of MSUS joint assessment as a potential predictor of outcome in patients with very early disease. Methods: We prospectively recruited participants with clinically apparent synovitis of at least one joint and inflammatory joint symptoms of <=3 months. We collected baseline clinical information (66 tender and swollen joint counts, DAS28 score), serological data and conventional radiography of hands and feet. Within 24 h of clinical evaluation, a blinded ultrasonographer systematically assessed 50 joints, grading greyscale synovitis (GS) and Power Doppler (PD) using four point semi quantitative scales and recorded the presence of erosions (Siemens Antares scanner and multifrequency linear array transducers). Participants were followed prospectively for 18 months. Results: 58 participants were included with a mean age of 56 (18-83). Of these, 16 had resolving disease, 13 developed non-RA persistent disease and 29 developed very early rheumatoid arthritis (VERA) of which 14 were ACPA positive. Overall, MSUS detected significantly more joint involvement than clinical examination in all regions. Amongst VERA participants, detection of PIP, MCP and shoulder involvement was not significantly increased by Greyscale MSUS assessment. However clinically silent involvement of wrist (P<0.01), elbow (P<0.01), knee (P<0.01), ankle (P<0.01) and MTP (P<0.001) regions was identified significantly more often by MSUS. MSUS detected significantly more erosions (in 24 joints of 10 patients, one ACPA negative) than radiographs, which revealed only one wrist erosion. The most sensitive predictors for RA were clinical involvement of MCP joints and hand arthritis. The greatest specificity was shown by ACPA positivity, clinical polyarthritis, clinical involvement and symmetry of MTP joints and the following MSUS variables: MCP joints, PIP joints, wrist symmetry and MTP power doppler involvement and symmetry. Regarding predictors of persistence, variables with the greatest PPV were clinical and MSUS MCP, wrist and MTP involvement and symmetry.
and MSUS PIP involvement. Predictive models for the development of RA and persistence of disease are presented. Conclusions: This prospective study shows that MSUS evaluation of multiple joints significantly increases detection of joint involvement in all regions and all outcome groups. Selection of appropriate variables can improve the ability of predictive models to identify those patients requiring treatment.

**Source:** EMBASE

**Full Text:**

Available in fulltext at [Highwire Press](https://www.highwire.org)

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**9. A survey of musculoskeletal ultrasound use in the outpatients department of a district general hospital**

**Author(s):** Papou A., Rahmeh F.H., Richards S.C.M., Westlake S.L.

**Citation:** Rheumatology, April 2010, vol./is. 49/(i135-i136), 1462-0324 (April 2010)

**Publication Date:** April 2010

**Abstract:** Background: A survey was performed to evaluate the efficacy of musculoskeletal ultrasound scans (MSK USS) in an outpatient setting, Poole Hospital NHS Foundation Trust. The Department of Rheumatology has one USS machine with power Doppler. Three of the consultants have training in the use of MSK USS. Our objectives were to establish how many patients had MSK USS performed over one month, what structural changes USS demonstrated and how the management of patients changes because of USS. Methods: All patients seen in Rheumatology outpatient clinics of Poole Hospital in June 2009 who had MSK USS performed as an adjunct to clinical review were included in the study. Questionnaire forms were completed by each doctor who performed the USS and included information about patient demographics, structures examined, abnormalities found and changes of treatment as a result of USS. Results: 4 Rheumatologists performed MSK USS on 66 patients. 27 patients (41%) were new referrals to rheumatology, 17 (26%) were follow-ups and 22 (33%) were from practitioner-led Rheumatology follow-up clinics (patients with inflammatory arthritis). Anatomical structures examined were hand and small joints in 31 patients, wrist in 19 patients, knee in 11, foot in 9, ankle in 6, elbow in 5, shoulder in 5, hip in 3, other sites in 4 patients. In 20 out of 66 patients (30%) USS were normal, in 46 patients (70%) there were various abnormalities. Synovitis was found in 31 patients, tenosynovitis in 7, erosions in 6, bursitis in 3, osteoarthritis with osteophytes in 3, partial rotator cuff muscle tear in 1 patient. In 37 patients (56%) treatment was changed as a result of the USS. Most frequent changes were: injection performed (9 patients), DMARDs increased (5), not started on DMARDs/biologics
(5), injection/aspiration not performed (4), biologic agents started (3),
site of injection determined (2). In 13 patients (20%) doctors would
have requested additional other investigations if USS were not
available. Doctors considered that appropriate treatment would have
been delayed if USS was not available in 15% of new referrals to
rheumatology. Conclusions: USS helps to detect various types of
pathology in outpatient setting, being particularly important for
identifying synovitis. USS influences management of patients,
determining the need for injections/aspirations, helping to decide
whether DMARD/biologic treatment needed. In more than half of the
patients, treatment decisions were influenced by the USS results.
Treatment decisions would have been delayed in 15% of patients if
USS was not available. In at least 1 out of 5 patients other
investigations would have been requested if USS not available. Our
results suggest that the MSK USS is a useful adjuvant in the
management of rheumatology outpatients in a district general
hospital and support its more widespread use.

Source: EMBASE

Full Text:
Available in fulltext at Highwire Press

10. Power Doppler Presentation of Shoulders With Biceps Disorder


Citation: Archives of Physical Medicine and Rehabilitation, April 2010, vol./is. 91/4(624-631), 0003-9993 (April 2010)

Publication Date: April 2010

Objectives: To investigate the patterns of power Doppler signals on
the long head of the biceps tendon at asymptomatic controls and
shoulders with clinically diagnosed biceps disorder. Design: Cross-
sectional study. Setting: Hospital rehabilitation department.
Participants: Asymptomatic adults (n=27) were included in the control
group, and patients with unilateral biceps disorder (n=17) were
recruited for the patient group. Basic gray color ultrasound screening
was performed for rotator cuff tendons antecedently. Interventions:
Not applicable. Main Outcome Measures: Three scan views were
taken on the anterior shoulder by power Doppler sonography,
including the transverse plane of the long head of the biceps tendon,
and the longitudinal planes along the lateral and medial edge of the
bicipital groove. We compared the patterns and the power Doppler
signal area within and between both groups. Results: In shoulders of
healthy controls and the asymptomatic side of patients, the power
Doppler signal area of the longitudinal planes along the lateral edge
of the bicipital groove was significantly larger than that along the medial edge of the bicipital groove. However, there was no significant difference in the painful side of patients. Moreover, the painful shoulders had a higher prevalence of power Doppler signal medial to the biceps tendon in the transverse plane, which paralleled bicipital peritendinous effusion and rotator cuff abnormalities. Conclusions: The power Doppler signal was more frequently observed medial to the biceps tendon in shoulders with clinically diagnosed biceps disorder. Whether shoulders with this specific power Doppler signal pattern benefit more from anti-inflammatory therapy needs further exploration. 2010 American Congress of Rehabilitation Medicine.

Source: EMBASE


Author(s): Chang K, Wu S, Lin S, Shieh J, Wang T, Chen W

Citation: Archives of Physical Medicine & Rehabilitation, 01 April 2010, vol./is. 91/4(624-631), 00039993

Publication Date: 01 April 2010

Abstract: OBJECTIVES: To investigate the patterns of power Doppler signals on the long head of the biceps tendon at asymptomatic controls and shoulders with clinically diagnosed biceps disorder. DESIGN: Cross-sectional study. SETTING: Hospital rehabilitation department. PARTICIPANTS: Asymptomatic adults (n=27) were included in the control group, and patients with unilateral biceps disorder (n=17) were recruited for the patient group. Basic gray color ultrasound screening was performed for rotator cuff tendons antecedently. INTERVENTIONS: Not applicable. MAIN OUTCOME MEASURES: Three scan views were taken on the anterior shoulder by power Doppler sonography, including the transverse plane of the long head of the biceps tendon, and the longitudinal planes along the lateral and medial edge of the bicipital groove. We compared the patterns and the power Doppler signal area within and between both groups. RESULTS: In shoulders of healthy controls and the asymptomatic side of patients, the power Doppler signal area of the longitudinal planes along the lateral edge of the bicipital groove was significantly larger than that along the medial edge of the bicipital groove. However, there was no significant difference in the painful side of patients. Moreover, the painful shoulders had a higher prevalence of power Doppler signal medial to the biceps tendon in the transverse plane, which paralleled bicipital peritendinous effusion and rotator cuff abnormalities. CONCLUSIONS: The power Doppler signal was more frequently observed medial to the biceps tendon in shoulders with clinically diagnosed biceps disorder. Whether shoulders with this specific power Doppler signal pattern benefit more from anti-inflammatory therapy needs further exploration. Copyright CO 2010 by the American Congress of Rehabilitation Medicine

Source: CINAHL
12. Quantification of asymmetrical armswing reduction with ultrasound-based 3D gait analysis in early Parkinson's disease

Author(s): Roggendorf J., Chen S., Seifried C., Van De Loo S., Steinmetz H., Hilker R.

Citation: Movement Disorders, 2010, vol./is. 25/(S307), 0885-3185 (2010)

Publication Date: 2010

Abstract: Objective: Three-dimensional motion analysis is a suitable method to investigate gait disturbances in Parkinson's disease (PD). Aside from conventional spatio-temporal gait characteristics, we aimed to quantify arm swing reduction and side asymmetry of arm movements as an early symptom. Methods: We investigated limb movements and gait parameters in 40 patients with early PD (mean age: 57.9 +/-11 years; HY stages I/II, mean UPDRS III: 12 +/-5) in the drug-off condition compared to 25 age matched controls. Ultrasound-based motion analysis (CMS-HS, Zebris, Isny, Germany) and gait analysis with a force plate integrated treadmill (FDM-T, Zebris, Isny, Germany) were performed during locomotion at four speed levels (2.0-3.5 km/h). Results: Ante- and retroflexion in the shoulder joint ipsilateral to the clinically most affected body side was significantly reduced in HYI PD patients versus controls (p<0.001). Moreover, the side-to-side asymmetry-index of armswing amplitude was higher in PD HYI then in controls (p<0.001). The maximum angels of ipsilateral shoulder retroflexion, abduction, adduction as well as elbow extension/flexion were reduced in PD HYI (p<0.05). In PD patients HYII, a reduction of armswing amplitude and arm retroversion as well as elbow flexion/extension was also found on the contralateral body side (p<0.05). Spatio-temporal gait parameters showed a prolonged stance along with a shortened swing phase in both PD groups compared with controls (p<0.05). At slow speed levels, PD patients in HY stage I also displayed an increased contralateral single-stridewidth (p<0.05). Conclusions: The data demonstrate that the pathological arm swing can be quantified by 3D motion analysis in early PD patients. Unilateral hypokinesia is reflected by a reduced range of shoulder and elbow motions. The side-to-side asymmetry of armswing amplitude turned out to be the most suitable screening marker reliably differing between early PD and control subjects. Particularly, a decreased retroversion in the ipsilateral shoulder seems to occur as a very early sign of PD hypokinesia. The altered spatiotemporal gait parameters are most likely compensational to counteract the dysbalance of the body axis due to asymmetrical movements of the upper limbs in early PD patients.

Source: EMBASE

13. Erosive osteoarthritis is not associated with invading synovial tissue: An ultrasound study

Author(s): Thiele R.G., Paxton L.A., Marston B.A., Tabechian D., Anandarajah A.P.
**Abstract:** Background: In patients with osteoarthritis, bony defects in small joints of the hand can occasionally be seen with conventional radiography (CR). Such a condition may be called erosive osteoarthritis (EOA). Swelling may occur, and the term inflammatory osteoarthritis is occasionally used. The degree of actual synovial proliferation remains unclear. It also remains unclear if bony defects of EOA are associated with synovial proliferation, similar to rheumatoid arthritis (RA). Objectives: To assess if synovial proliferation and synovial hyperemia can be detected sonographically in EOA. Methods: 1091 US studies obtained over 16 months were reviewed. All US studies were performed by a rheumatologist certified in musculoskeletal US, with >15 years of US experience. Studies were performed using a Toshiba Xario US machine with an 18 MHz linear transducer with differential tissue harmonic imaging and high-sensitivity Doppler capability, and a SonoSite M-Turbo machine. Patients with a CR diagnosis of EOA were identified. For the diagnosis of EOA, the radiologist's final assessment was counted. US studies of joints in which EOA had been described by CR were assessed for the following: 1. Effusion, defined as a distension of the hyperechoic, fibrous joint capsule by anechoic synovial fluid; 2. Synovial proliferation, defined as hypo- to hyperechoic tissue within the joint cavity and emanating from the hyperechoic, fibrous capsule; 3. Synovial hyperemia, defined as a pulsatile Doppler signal within the joint capsule, associated with synovial tissue. Doppler signals were graded as follows: 0 = no signal; 1 = single vessel dots; 2 = confluent Doppler signals occupying less than half of the identified synovial tissue; 3 = confluent Doppler signals occupying more than half of the identified synovial tissue. US studies of 13 RA patients were randomly selected and scored as a comparison group. Results: Results were available for 13 EOA patients and 21 joints: DIP, n = 15; PIP, n = 6 (13 RA patients: MCP, n = 104; PIP, n = 104). Effusions were seen in 4/21 (19%) joints in EOA and 67/208 (32%) joints in RA. When effusions in EOA patients were seen, they were seen over the volar aspects of DIP and PIP joints, or immediately adjacent to bone spurs, where the spurs mechanically distended the joint capsule. Synovial proliferation was seen in 2/21 (9.5%) joints in EOA and 120/208 (58%) in RA. The degree was minimal in all cases of EOA. Only a concentric proliferation of the synovial lining was seen, but no invading pannus tissue was appreciated in EOA. Doppler scoring was 0 in 19/21 (90.5%) or 1 in 2/21 (9.5%) in EOA and 3 in 28/208 (13.5%), 2 in 52/208 (25%), 1 in 30/208 (14%) and 0 in 98/208 (47%) in RA. Conclusion: In this US study, synovial changes were found to be fundamentally different in EOA and RA. Increases in synovial fluid around bone spurs in EOA did not have an inflammatory character. Synovial proliferation in EOA was, in stark contrast to RA, minimal. Similarly, synovial hyperemia was rarely seen in EOA, while this is common feature of RA. Invading synovial tissue was not seen.
adjacent to bony defects in EOA. Using sensitive US technology, synovial proliferation and hyperemia were not characteristic of EOA.

Source: EMBASE

Full Text:

Available in fulltext at the ULHT Library and Knowledge Services’ eJournal collection

14. Sonography of the shoulder in hemiplegic patients undergoing rehabilitation after a recent stroke.

Author(s): Pong YP, Wang LY, Wang L, Leong CP, Huang YC, Chen YK

Citation: Journal of Clinical Ultrasound, May 2009, vol./is. 37/4(199-205), 0091-2751;1097-0096 (2009 May)

Publication Date: May 2009

Abstract: PURPOSE: To examine the hemiplegic shoulders for soft-tissue injury by musculoskeletal sonography and to determine the relationship between the motor functions of the upper extremity and these injuries, which play an important role in hemiplegic shoulder pain and may impede rehabilitation.METHODS: The following characteristics of 34 acute stroke patients were recorded: age, gender, height, body weight, side of hemiplegia, type and duration of stroke, Brunnstrom stage, subluxation, and degree of spasticity of the upper extremity. On the basis of the Brunnstrom stage, the patients were divided into 2 groups. Patients with stages I, II, or III were categorized under the lower Brunnstrom stage (LBS) group (n = 21), and those with stages IV, V, or VI were allocated to the higher Brunnstrom stage (HBS) group (n = 13). Both shoulders of each patient were examined by musculoskeletal sonography with a 5-10-MHz linear transducer on 2 separate occasions (i.e., at admission and 2 weeks after rehabilitation).RESULTS: With the exception of age, there were no significant differences in the demographic and clinical characteristics of the patients in the 2 groups. Shoulder musculoskeletal sonography revealed soft-tissue injury in 7 patients (33%) and 15 patients (71%) in the LBS group at admission and 2 weeks after rehabilitation, respectively (p < 0.05), and in 4 patients (31%) in the HBS group both at admission and 2 weeks after rehabilitation.CONCLUSIONS: Acute stroke patients with poor upper limb motor functions are more prone to soft-tissue injury of the shoulder during rehabilitation.

Source: MEDLINE

15. Extended field-of-view sonography: evaluation of the superficial lesions.
OBJECTIVE: To evaluate the usefulness of extended-field-of-view 2-dimensional ultrasonography technique in superficial lesions.

METHODS: During a 6-month period, 44 patients with superficial lesions on various parts of their bodies were evaluated with extended-field-of-view ultrasonography in addition to routine traditional 2-dimensional ultrasonography. If the diagnosis could not be made without the extended-field-of-view images, it was considered diagnostic. The radiologist decided if the extended-field-of-view ultrasonography helped spatial orientation, communicate findings, or compare the contralateral side in a single image, or if it was useful for follow-up evaluation.

RESULTS: By using extended-field-of-view imaging including the surrounding anatomy, 22 musculoskeletal, 8 scrotal, 8 thyroid, 2 breast, and 4 abdominal wall lesions were documented successfully as a single image. Nevertheless, no new cases were diagnosed solely based on the extended-field-of-view images. Extended-field-of-view ultrasonography was considered helpful for spatial orientation in 25 cases (56.8%), for comparing the contralateral side in 16 cases (36.3%), and for communicating findings in 20 cases (45.4%). It was useful for follow-up evaluation in 13 cases (29.5%).

CONCLUSIONS: None of the extended-field-of-view images was diagnostic. However, they did provide valuable additional information and better documentation of the lesions.

Source: MEDLINE

Full Text: Available in fulltext at EBSCO Host

16. Sonographic evaluation of the subclavian artery during thoracic outlet syndrome shoulder manoeuvres

Author(s): Stapleton C., Herrington L., George K.

Citation: Manual Therapy, February 2009, vol./is. 14/1(19-27), 1356-689X (February 2009)

Publication Date: February 2009

Abstract: Clinical tests for vascular thoracic outlet syndrome (vTOS) generally incorporate shoulder horizontal flexion/extension (HF/HE), abduction (ABD) and external rotation (ER). The effect of these clinical tests on blood flow characteristics and the most effective arm positions for detecting arterial compromise are, however, unknown.
The aims of this study are to establish normative vascular responses in the subclavian artery (i.e. arterial diameter \( D \) and peak systolic blood flow velocity \( \text{PSV} \)) to various arm positions, and determine the incidence of abnormal physiological responses. Ten male and twenty-one female (mean age: 25 yr) healthy volunteers were rigorously screened prior to testing. With the subject seated the arm was passively supported in a randomised series of 12 standardised shoulder positions incorporating varying degrees of HF/HE, ABD and ER. Doppler ultrasound insonated the subclavian artery \( D \) (mm) and \( \text{PSV} \) (cm s\(^{-1}\)) in each position. Data comparisons were made using ANOVAs with bonferroni adjustment for multiple comparisons. Alpha level was set at \( p=0.01 \). Significant decreases (\( p=0.008 \)) in \( \text{PSV} \) were recorded from 120degree, 90degree and 45degree ABD (92+/10, 89+/11 and 88+/14 cm s\(^{-1}\), respectively) to 180degree ABD (mean+/95% CI: 52+/16 cm s\(^{-1}\)). Similarly, post-hoc comparisons revealed a significant decrease (\( p=0.008 \)) in \( \text{PSV} \) from 120degree ABD (94+/14 cm s\(^{-1}\)) to 120degree ABD with 30degree HE and 90degree ER (69+/12 cm s\(^{-1}\)). Complete lack of blood flow was demonstrated by six subjects and two subjects at end of range ABD and combined end of range ER and HE, respectively. The heterogenous response of asymptomatic individuals with no past history of TOS symptoms raises uncertainty of the validity of positive test responses from extreme arm positions. Clinical decisions based on false positive outcomes have serious implications for mistreatment such as inappropriate surgical intervention; therefore it is imperative that clinical decision is not based on test outcomes alone. Further research is required to determine the cause of heterogenous responses in asymptomatics and discover means to improve test specificity. 2007 Elsevier Ltd. All rights reserved.

Source: EMBASE

17. Ultrasonographic evaluation and morphometric measurements of the suprascapular notch

Author(s): Yucesoy C., Akkaya T., Ozel O.Ozgur, Comert A., Tuccar E., Bedirli N., Unlu E., Hekimoglu B., Gumus H.

Citation: Surgical and Radiologic Anatomy, 2009, vol./is. 31/6(409-414), 0930-1038 (2009)

Publication Date: 2009

Abstract: Background: The aim of this study was to define the sonographic evaluation and morphometric measurements of the suprascapular notch. Methods: The suprascapular notch was evaluated by ultrasound on both sides in 50 volunteers (25 males, 25 females). By means of ultrasound, the notch width, the notch depth and the distance between the skin and the notch base (skin-notch base interval) were measured and imaging of the superior transverse scapular ligament was attempted. Furthermore, imaging of the suprascapular artery and vein was performed by Doppler ultrasound. Results: On the measurements performed, the notch was found to be deeper in men than in women on both the right (\( P = 0.022 \)) and the
left (P = 0.011) sides. Taking all volunteers into account without grouping sex, no differences were detected between the two sides with respect to the measurements of the notch width, notch depth and distance between the skin and the notch base. The superior transverse scapular ligament was demonstrated in 48 (96%) of 50 volunteers. On color Doppler ultrasound, the artery-vein complex was visualized in a total of 43 (86%) volunteers. Conclusions: Suprascapular notch measurements and the visualization of the anatomical neighborhood, which may be beneficial for the suprascapular nerve blockade procedure, can be successfully performed by the use of high-frequency ultrasound imaging. Springer-Verlag 2009.

**Source:** EMBASE

**Full Text:**

Available in fulltext at [EBSCO Host](https://www.ebscohost.com)

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**18. Metric properties of ultrasound synovitis in rheumatoid arthritis (RA-systematic analysis of the literature)**

**Author(s):** Gaujoux-Viala C., Baillet A., Mouterde G., Claudepierre P., Le Loet X., Fautrel B., Maillefert J.

**Citation:** Arthritis and Rheumatism, 2009, vol./is. 60/(1456), 0004-3591 (2009)

**Publication Date:** 2009

**Abstract:** Purpose: To assess the metric properties of the ultrasound's synovitis examination in RA. Method: A systematic review of the literature using PUBMED, EMBASE, Cochrane library and hand searches was performed until March 2009. The outcomes were reproducibility, criterion validity, construct validity, discriminant validity, predictive validity and sensitivity to change. Results: Of 377 articles, 167 studies with data concerning US synovitis were analyzed. The intra-observer reliability was evaluated in 19 studies: good (Kappa= 0.59 to 0.90) in 17 (14 with Power doppler assessment) and fair (k= 0.25) in the 2 others (1 with Power doppler). The inter-observer reliability, evaluated in 28 studies, was good in 26 (k= 0.59 to 0.98) (17 with Power doppler) and fair in the 2 others (1 with Power doppler). However half of the studies assessed static images reading rather than real-time acquisition reliability. The criterion validity was achieved in 7 studies by comparison with histology and in 3 by comparison with macroscopic appearance. The concordance between US and magnetic resonance imaging was evaluated 24 times with a high level of agreement (62 to 100 %, mode B; 52 to 100 %, Power doppler) in 21 studies. The concordance was low in the 3 remaining works, all concerning the shoulder joint. Using MRI as a gold-standard, US was superior to physical examination to detect synovitis (12 studies). The
Discriminant validity was excellent in cross-sectional studies evaluating RA patients and healthy controls, but low in the 3 studies comparing RA and other arthritides. The positive predictive value for the diagnosis of RA is unknown. The negative predictive value of US synovitis could be high: 80% if lacking any US synovitis and erosion and 95% in patients with negative anti-CCP determination. The predictive validity for the prediction of further structural progression was evaluated by 6 studies, which suggested that US synovitis is correlated to the 1-year follow-up structural changes ($r = 0.59$ to 0.78), even in patients clinically considered to be in remission. The responsiveness was evaluated in 37 studies. 35 demonstrated a reduction in US markers of synovial inflammation following treatment with various agents. This reduction was correlated with similar changes in clinical and laboratory measures of disease activity.

Conclusion: Although further studies are needed to better assess the discriminant and predictive validity, the present results suggest that US examination is a reliable, valid and responsive tool for the assessment of synovitis in RA and more sensitive for assessing signs of disease activity than clinical measures. Further works are needed, particularly therapeutic strategy trials including US synovitis as a surrogate marker for the treatment management.

Source: EMBASE

Full Text:

Available in fulltext at the ULHT Library and Knowledge Services’ eJournal collection

19. The prevalence of neovascularity in patients clinically diagnosed with rotator cuff tendinopathy

Author(s): Lewis J.S., Raza S.A., Pilcher J., Heron C., Poloniecki J.D.

Citation: BMC musculoskeletal disorders, 2009, vol./is. 10/(163), 1471-2474 (2009)

Publication Date: 2009

Abstract: BACKGROUND: Shoulder dysfunction is common and pathology of the rotator cuff tendons and subacromial bursa are considered to be a major cause of pain and morbidity. Although many hypotheses exist there is no definitive understanding as to the origin of the pain arising from these structures. Research investigations from other tendons have placed intra-tendinous neovascularity as a potential mechanism of pain production. The prevalence of neovascularity in patients with a clinical diagnosis of rotator cuff tendinopathy is unknown. As such the primary aim of this pilot study was to investigate if neovascularity could be identified and to determine the prevalence of neovascularity in the rotator cuff tendons and subacromial bursa in subjects with unilateral shoulder
pain clinically assessed to be rotator cuff tendinopathy. The secondary aims were to investigate the association between the presence of neovascularity and pain, duration of symptoms, and, neovascularity and shoulder function. METHODS: Patients with a clinical diagnosis of unilateral rotator cuff tendinopathy referred for a routine diagnostic ultrasound (US) scan in a major London teaching hospital formed the study population. At referral patients were provided with an information document. On the day of the scan (on average, at least one week later) the patients agreeing to participate were taken through the consent process and underwent an additional clinical examination prior to undergoing a bilateral grey scale and colour Doppler US examination (symptomatic and asymptomatic shoulder) using a Philips HDI 5000 Sono CT US machine. The ultrasound scans were performed by one of two radiologists who recorded their findings and the final assessment was made by a third radiologist blinded both to the clinical examination and the ultrasound examination. The findings of the radiologists who performed the scans and the blinded radiologist were compared and any disagreements were resolved by consensus. RESULTS: Twenty-six patients agreed to participate and formed the study population. Of these, 6 subjects were not included in the final assessment following the pre-scan clinical investigation. This is because one subject had complete cessation of symptoms between the time of the referral and entry into the trial. Another five had developed bilateral shoulder pain during the same period. The mean age of the 20 subjects forming the study population was 50.2 (range 32-69) years (SD = 10.9) and the mean duration of symptoms was 22.6 (range 7.5 to 132) months (SD = 40.1). Of the 20 subjects included in the formal analysis, 13 subjects (65%) demonstrated neovascularity in the symptomatic shoulder and 5 subjects (25%) demonstrated neovascularity in the asymptomatic shoulder. The subject withdrawn due to complete cessation of symptoms was not found to have neovascularity in either shoulder and of the 5 withdrawn due to bilateral symptoms; two subjects were found to have signs of bilateral neovascularity, one subject demonstrated neovascularity in one shoulder and two subjects in neither shoulder. CONCLUSIONS: This study demonstrated that neovascularity does occur in subjects with a clinical diagnosis of rotator cuff tendinopathy and to a lesser extent in asymptomatic shoulders. In addition, the findings of this investigation did not identify an association between the presence of neovascularity; and pain, duration of symptoms or shoulder function. Future research is required to determine the relevance of these findings.

Source: EMBASE

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20. **Longitudinal examination with shoulder ultrasound of patients with polymyalgia rheumatica**

**Author(s):** Macchioni P.L., Catanoso M.G., Pipitone N., Boiardi L.,Salvarani C.

**Citation:** Rheumatology, 2009, vol./is. 48/12(1566-1569), 1462-0324;1462-0332 (2009)

**Publication Date:** 2009

**Abstract:** Objective. To determine if ultrasonography (US) and power Doppler (PD) may be useful in identifying polymyalgia rheumatica (PMR) patients with relapsing disease. Methods. For a mean of 41 months, 57 consecutive untreated patients with PMR were prospectively assessed for relapses/recurrences. This cohort represented all the patients diagnosed over a 18-month period in one Italian secondary referral centre. Clinical signs and symptoms as well as ESR and CRP were evaluated. US examination of the shoulders was performed in all 57 patients at diagnosis and after the onset of prednisone treatment (mean 24+/-3 weeks). Power Doppler ultrasonography (PDUS) was performed in 24 patients. Shoulder sonograms were obtained according to standardized techniques.

Results. Prednisone therapy significantly reduced the frequency and the degree of subacromial/subdeltoid bursitis, long head biceps tenosynovitis and glenohumeral synovitis. At diagnosis, a positive PD signal was observed more frequently in the subacromial/subdeltoid bursae (33%). Prednisone therapy significantly reduced the frequency of patients with positive PD signal. Of the 44 patients in remission or with low disease activity at the time of the second US, 26 (59%) still had evidence of persistent inflammatory lesions. There was no association between the persistence of inflammation at US and relapses/ recurrences; in contrast, a positive PD signal at diagnosis was significantly associated with the occurrence of relapses/recurrences at follow-up. Conclusion. Subclinical inflammation detected by US persists in most PMR patients despite glucocorticoid treatment. PDUS may be useful to detect at diagnosis the patients with most active inflammation who have a higher risk of relapses/recurrences. The Author 2009. Published by Oxford University Press on behalf of the British Society for Rheumatology. All rights reserved.

**Source:** EMBASE

**Full Text:**

Available in fulltext at [Highwire Press](https://www.highwire.org)

21. **Assessment of calcific tendonitis of rotator cuff by ultrasonography: Comparison between symptomatic and asymptomatic shoulders**
Author(s): Le Goff B., Berthelot J.-M., Guillot P., Glemarec J., Maugars Y.

Citation: Arthritis and Rheumatism, 2009, vol./is. 60/(1462), 0004-3591 (2009)

Publication Date: 2009

Abstract: Purpose: Calcific tendonitis of rotator cuff is observed on plain radiographs in 10% of adults, but remains asymptomatic in half these cases. Whereas US is widely used for the diagnosis of rotator cuff tears and tendonitis, few studies evaluated this technique in the management of calcific tendonitis. We looked for differences on ultrasound (US) and power Doppler findings between symptomatic and asymptomatic cases of shoulder calcific tendonitis to search for US features associated with pain. Method: Sixty-two patients (81 shoulders) with symptomatic (N = 57) or asymptomatic (N = 24) calcific tendonitis were included. From each patient, we recorded: demographic data, onset and duration of symptoms, intensity of the pain and nocturnal pain. Ultrasonography of the shoulders was performed using a multifrequential linear transducer (5 to 12 Mhz). Calcific plaque morphology, power Doppler signaling, and widening of the subacromial-subdeltoid bursa (SSB) were recorded. US-guided steroid injection into the SSB (N = 21) or needle puncture of calcific deposits (N = 29) was performed at the end of US evaluation in 50 of the 57 patients with symptomatic shoulders, and a questionnaire was sent to each patient after 11 +/-6 months. For statistic analysis, Wilcoxon' signed rank test and Fisher's exact test were used. The p value less than 0.05 was considered statistically significant. Results: The distal supraspinatus tendon was the most common site of calcification deposit (89%). The mean longitudinal (p<0.0001) and transverse (p=0.0015) measurements of the plaques were significantly higher in symptomatic than in asymptomatic shoulders. Fragmented calcifications were also associated with pain (p=0.01). A power Doppler signal was identified in 21 of the 57 symptomatic calcification (36%), but in none of the cases of asymptomatic calcification (p<0.005). It was associated with the existence of nocturnal pain (p=0,03) and the longitudinal size of the calcification (p=0,03). A widening of the SSB was found in 17 of the 57 symptomatic calcification (30%) but in none of the asymptomatic calcification (p<0.005). At least, Doppler signal or widening of the SSB was present in 31 of the 57 (54%) symptomatic shoulders (p<0.001). Long term outcome was favourable for 60% of our patients after steroid injection. However, no correlation was found between the evolution of the pain and the US characteristics at the first evaluation. Conclusion: We found that ultrasonographic findings associated with symptomatic calcific tendonitis are a larger size and a fragmented aspect of the calcification. Positive power Doppler signal within the calcific deposit and SSB widening are also US features strongly associated with pain with a high specificity. US can help physicians to confirm that calcification is responsible for shoulder pain.
22. What the practising rheumatologist needs to know about the technical fundamentals of ultrasonography.

Author(s): Schmidt WA, Backhaus M

Citation: Best Practice & Research in Clinical Rheumatology, December 2008, vol./is. 22/6(981-99), 1521-6942;1532-1770 (2008 Dec)

Publication Date: December 2008

Abstract: A transducer generates ultrasound waves and emits them into the body. Boundaries in or between tissues reflect the waves, and the transducer receives the reflected waves. A computer converts the information into images that are displayed on a monitor. Image resolution is greater with higher frequencies, and penetration is greater with lower frequencies. Linear probes with frequencies between 5 and 20 MHz are mainly used for musculoskeletal ultrasound. Image quality and resolution have improved significantly. Tissue harmonic imaging and cross-beam technology aid in differentiating between anatomical structures, although borders appear artificially thickened. Three-dimensional ultrasound provides additional coronary planes, and contrast agents increase the sensitivity for synovial blood flow in inflamed joints. This chapter provides further information regarding which ultrasound technology is the best for purchase by a rheumatology unit, how to organize ultrasound clinics, and how best to perform ultrasonography in daily practice, including the most important indications for ultrasound in rheumatology.

Source: MEDLINE

23. Shoulder kinematic features using arm elevation and rotation tests for classifying patients with frozen shoulder syndrome who respond to physical therapy.

Author(s): Yang J, Chang C, Chen S, Lin J

Citation: Manual Therapy, 01 December 2008, vol./is. 13/6(544-551), 1356689X

Publication Date: 01 December 2008

Abstract: Physical therapy is an intervention commonly used in the treatment of subjects with frozen shoulder symptoms, with limited proven effect. The purpose of this study was to identify the kinematic
features of patients with frozen shoulder who are more likely to respond to physical therapy. Thirty-four subjects presenting frozen shoulder syndrome were studied to determine altered shoulder kinematics and functional disability. Subjects received the same standardized treatment with passive mobilization/stretching techniques, physical modalities (i.e. ultrasound, shortwave diathermy and/or electrotherapy) and active exercises twice a week for 3 months. Initially, subjects were asked to perform full active motion in 3 tests: abduction in the scapular plane, hand-to-neck and hand-to-scapula. During the test, shoulder kinematics were measured using a 3-D electromagnetic motion-capturing system. In the initial and follow-up sessions, the self-reported Flexilevel Scale of Shoulder Function (FLEX-SF) was used to determine functional disability from symptoms. Improvement with treatment was determined using percent change in FLEX-SF scores over three months of treatment [(final score-initial score)/initial score x 100, >20% improvement and <= 20% nonimprovement]. Shoulder kinematics were first analysed for univariate accuracy in predicting improvement and then combined into a multivariate prediction method. A prediction method with two variables (scapular tipping >8.4 degrees during arm elevation, and external rotation >38.9 degrees during hand to neck) were identified. The presence of these two variables (positive likelihood ratio=15.71) increased the probability of improvement with treatment from 41% to 92%. It appears that shoulder kinematics may predict improvement in subjects with frozen shoulder syndrome. Prospective validation of the proposed prediction method is warranted.

Source: CINAHL

24. Understanding the relationship between image quality and motion velocity in gated computed tomography: preliminary work for 4-dimensional musculoskeletal imaging.

Author(s): Tay SC, Primak AN, Fletcher JG, Schmidt B, An KN, McCollough CH

Citation: Journal of Computer Assisted Tomography, July 2008, vol./is. 32/4(634-9), 0363-8715;1532-3145 (2008 Jul-Aug)

Publication Date: July 2008

Abstract: OBJECTIVES: To study the effect of motion velocity on image quality to determine the requirements for 4-dimensional (4D; ie, 3D + time) musculoskeletal computed tomographic (CT) imaging.MATERIALS AND METHODS: A phantom with resolution targets in both axial (x-y) and coronal (x-z) planes was attached to a motion device and scanned with 64-slice CT using a retrospectively gated CT protocol with pitch values of 0.1 and 0.2. Data were acquired with the phantom at rest and while moving periodically along the x axis at several velocities. Spatial resolution and motion artifacts were assessed both for the axial and coronal targets.RESULTS: A linear relationship was found between motion artifact severity and phantom velocity. Spatial resolution was better preserved in the coronal target. However, coronal images displayed
banding artifacts, with band displacements being linearly related to motion velocity.

**CONCLUSIONS:** The 4D CT imaging of periodically moving objects with velocities up to 20 mm/s is feasible using a pitch value of 0.1 and a motion frequency of 30 cycles per minute.

**Source:** MEDLINE

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**25. A new method for the noninvasive determination of abdominal muscle feedforward activity based on tissue velocity information from tissue Doppler imaging**

**Author(s):** Mannion A.F., Pulkovski N., Schenk P., Hodges P.W., Gerber H., Loupas T., Gorelick M., Sprott H.

**Citation:** Journal of Applied Physiology, April 2008, vol./is. 104/4(1192-1201), 8750-7587;1522-1601 (Apr 2008)

**Publication Date:** April 2008

**Abstract:** Rapid arm movements elicit anticipatory activation of the deep-lying abdominal muscles; this appears modified in back pain, but the invasive technique used for its assessment [fine-wire electromyography (EMG)] has precluded its widespread investigation. We examined whether tissue-velocity changes recorded with ultrasound (M-mode) tissue Doppler imaging (TDI) provided a viable noninvasive alternative. Fourteen healthy subjects rapidly flexed, extended, and abducted the shoulder; recordings were made of medial deltoid (MD) surface EMG and of fine-wire EMG and TDI tissue-velocity changes of the contralateral transversus abdominis, obliquus internus, and obliquus externus. Muscle onsets were determined by blinded visual analysis of EMG and TDI data. TDI could not distinguish between the relative activation of the three muscles, so in subsequent analyses only the onset of the earliest abdominal muscle activity was used. The latter occurred <50 ms after the onset of medial deltoid EMG (i.e., was feedforward) and correlated with the corresponding EMG onsets (r = 0.47, P < 0.0001). The mean difference between methods was 20 ms and was likely explained by electromechanical delay; limits of agreement were wide (-40 to +80 ms) but no greater than those typical of repeated measurements using either technique. The between-day standard error of measurement of the TDI onsets (examined in 16 further subjects) was 16 ms. TDI yielded reliable and valid measures of the earliest onset of feedforward activity within the anterolateral abdominal muscle group. The method can be used to assess muscle dysfunction in large groups of back-pain patients and may also be suitable for the noninvasive analysis of other deep-lying or small/thin muscles. Copyright 2008 the American Physiological Society.

**Source:** EMBASE

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Available in fulltext at [Highwire Press](https://highwire.org)
26. Sites of inflammation in painful rheumatoid shoulder assessed by musculoskeletal ultrasound and power Doppler sonography

Author(s): Stegbauer J., Rump L.C., Weiner S.M.

Citation: Rheumatology International, March 2008, vol./is. 28/5(459-465), 0172-8172 (Mar 2008)

Publication Date: March 2008

Abstract: Ultrasonography (US) and power Doppler sonography (PDS) was used to investigate causes of new onset of shoulder pain and sites of shoulder inflammation in 157 shoulders of 99 patients with rheumatoid arthritis (RA). US detected effusion and/or synovitis in 92/157 glenohumeral joints, subdeltoid bursitis in 56/157 shoulders and tenosynovitis of biceps tendon in 55/157 shoulders. Bursitis and/or tenosynovitis were accompanied by glenohumeral synovitis in 68/90 shoulders. 68% of serologically active and 12% of serologically inactive patients had glenohumeral synovitis. PDS showed increased microvascular blood flow in 33 of the 44 investigated shoulders. Glenohumeral synovitis was correlated to elevated C-reactive protein levels (p = 0.0001) and microvascular blood flow assessed by PDS (p = 0.02). This study shows that rheumatoid shoulder pain is not caused by glenohumeral synovitis in 32% of patients, despite serologically active RA. US and PDS are mandatory to elucidate the origin of inflammatory and noninflammatory shoulder pain. 2007 Springer-Verlag.

Source: EMBASE

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Available in fulltext at EBSCO Host

27. Phase-based ultrasonic deformation estimation

Author(s): Lindop J.E., Treece G.M., Gee A.H., Prager R.W.

Citation: IEEE transactions on ultrasonics, ferroelectrics, and frequency control, January 2008, vol./is. 55/1(94-111), 0885-3010 (Jan 2008)

Publication Date: January 2008

Abstract: Deformation estimation is the foundation of emerging techniques for imaging the mechanical properties of soft tissues. We present theoretical analysis and experimental results from an investigation of phase-based ultrasonic deformation estimators. Numerous phase-based algorithm variants were tested quantitatively on simulated RF data from uniform scatterer fields, subject to a range of uniform strain deformations. Particular attention is paid to a new algorithm, weighted phase separation, the performance of which is demonstrated in application to in vivo freehand strain imaging. Good results support the theory that underlies the new algorithm, and more
generally highlight the factors that should be considered in the design of high performance deformation estimators for practical applications. For context, note that this represents progress with an algorithm class that is suitable for real-time applications, yet has already been shown quantitatively to offer greater accuracy over a wide range of scanning conditions than adaptive companding methods based on correlation coefficient or sum of absolute differences.

Source: EMBASE

28. Quantitative imaging of musculoskeletal tissue.

Author(s): Augat P, Eckstein F

Citation: Annual Review of Biomedical Engineering, 2008, vol./is. 10/(369-90), 1523-9829;1523-9829 (2008)

Publication Date: 2008

Abstract: Quantitative imaging of musculoskeletal tissue, including radiography, computed tomography (CT), and magnetic resonance imaging (MRI), has become the essential methodology in clinical practice for diagnosis and monitoring of various musculoskeletal conditions. Furthermore, quantitative imaging technologies have become indispensable for research and development in diseases of the human skeleton. Standardized methods of image analysis have been developed through the years to quantify measurements on bone and cartilage with high precision and accuracy. Key areas of musculoskeletal disease where quantitative imaging is currently employed are osteoporosis and arthritis.

Source: MEDLINE


Author(s): Bussieres AE, Peterson C, Taylor JAM

Citation: Journal of Manipulative & Physiological Therapeutics, 01 November 2007, vol./is. 30/9(617-683), 01614754

Publication Date: 01 November 2007

Abstract: PURPOSE: Imaging technology can improve patient outcomes by allowing greater precision in diagnosing and treating patients. However, there is evidence that overuse, underuse, and misuse of imaging services occur. The purpose of this project was to develop evidence-based diagnostic imaging practice guidelines for musculoskeletal complaints for use by doctors of chiropractic and other primary health care professionals. METHODS: An electronic search of the English and French language literature (phase 1) was conducted on several databases. Cross references, and references provided by clinicians, were also used. Independent assessment of the quality of the citations used to support recommendations in the
guidelines was performed using the QUADAS, the AGREE, and the SPREAD evaluation tools. A first draft of a diagnostic imaging practice guideline was produced, using the European Commission's Referral Guidelines for Imaging document as a template. Results were sent to 12 chiropractic specialists for a first external review. A modified Delphi process, including 149 international experts, was used to generate consensus on recommendations for diagnostic imaging studies. The reliability of proposed recommendations was further tested on field chiropractors and on a group of specialists both in chiropractic and in medicine in both Canada and the United States. All recommendations were graded according to the strength of the evidence. Results: The research procedure resulted in the recommendations for diagnostic imaging guidelines of adult extremity and spine disorders supported by more than 685 primary and secondary citations. High levels of agreement among Delphi panelists were reached for all proposed recommendations. Comments received by specialists were generally very favorable and reflected high levels of agreement with the proposed recommendations, perceived ease of use of guidelines, and implementation feasibility. Conclusions: These evidence-based diagnostic imaging practice guidelines are intended to assist chiropractors and other primary care providers in decision making on the appropriate use of diagnostic imaging for specific clinical presentations. In all cases, the guidelines are intended to be used in conjunction with sound clinical judgment and experience. Application of these guidelines should help avoid unnecessary radiographs, increase examination precision, and decrease health care costs without compromising the quality of care. All guidelines are documents to be refined and modified regularly with new information and experience.

Source: CINAHL

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Available in fulltext at EBSCO Host

30. Diagnostic Imaging Practice Guidelines for Musculoskeletal Complaints in Adults-An Evidence-Based Approach: Introduction

Author(s): Bussieres A.E., Peterson C., Taylor J.A.M.

Citation: Journal of Manipulative and Physiological Therapeutics, November 2007, vol./is. 30/9(617-683), 0161-4754 (Nov 2007)

Publication Date: November 2007

Abstract: Purpose: Imaging technology can improve patient outcomes by allowing greater precision in diagnosing and treating patients. However, there is evidence that overuse, underuse, and misuse of imaging services occur. The purpose of this project was to develop evidence-based diagnostic imaging practice guidelines for
musculoskeletal complaints for use by doctors of chiropractic and other primary health care professionals. Methods: An electronic search of the English and French language literature (phase 1) was conducted on several databases. Cross references, and references provided by clinicians, were also used. Independent assessment of the quality of the citations used to support recommendations in the guidelines was performed using the QUADAS, the AGREE, and the SPREAD evaluation tools. A first draft of a diagnostic imaging practice guideline was produced, using the European Commission's Referral Guidelines for Imaging document as a template. Results were sent to 12 chiropractic specialists for a first external review. A modified Delphi process, including 149 international experts, was used to generate consensus on recommendations for diagnostic imaging studies. The reliability of proposed recommendations was further tested on field chiropractors and on a group of specialists both in chiropractic and in medicine in both Canada and the United States. All recommendations were graded according to the strength of the evidence. Results: The research procedure resulted in the recommendations for diagnostic imaging guidelines of adult extremity and spine disorders supported by more than 685 primary and secondary citations. High levels of agreement among Delphi panelists were reached for all proposed recommendations. Comments received by specialists were generally very favorable and reflected high levels of agreement with the proposed recommendations, perceived ease of use of guidelines, and implementation feasibility. Conclusions: These evidence-based diagnostic imaging practice guidelines are intended to assist chiropractors and other primary care providers in decision making on the appropriate use of diagnostic imaging for specific clinical presentations. In all cases, the guidelines are intended to be used in conjunction with sound clinical judgment and experience. Application of these guidelines should help avoid unnecessary radiographs, increase examination precision, and decrease health care costs without compromising the quality of care. All guidelines are documents to be refined and modified regularly with new information and experience. 2007 National University of Health Sciences.

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**31. Isotropic 3D fast spin-echo with proton-density-like contrast: a comprehensive approach to musculoskeletal MRI.**

Author(s): Yao L, Pitts JT, Thomasson D

Citation: AJR. American Journal of Roentgenology, February 2007, vol./is. 188/2(W199-201), 0361-803X;1546-3141 (2007 Feb)

Publication Date: February 2007

Abstract: OBJECTIVE: Scanning time considerations have restricted routine use of 3D Fourier transform (3DFT)-encoded MRI to gradient-
recalled echo sequences. We sought to combine isotropic 3DFT acquisition with fast spin-echo at a practical scan duration. This strategy offers versatile image contrast for musculoskeletal evaluation and facilitates image reformation tailored to the depiction of small anatomic features. CONCLUSION: Isotropic 3DFT fast spin-echo is feasible on current MRI scanners and has the potential to improve musculoskeletal evaluation.

Source: MEDLINE

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Note: Username: ulhtlibrary/Password: library

32. Method for determining the spatial position of the shoulder with ultrasound-based motion analyzer.

Author(s): Illyes A, Kiss RM

Citation: Journal of Electromyography & Kinesiology, February 2006, vol./is. 16/1(79-88), 1050-6411;1050-6411 (2006 Feb)

Publication Date: February 2006

Abstract: Several methods have been developed recently for the analysis of the spatial motion of the scapula and the arm, whereby the spatial position of shoulder bones is determined in static conditions by interrupting motion. The authors have developed a 3D motion analysis method recording scapular motion in progress with appropriate accuracy in the course of arm movements of various degrees. The objective of this study is to explore the applicability of the method developed, as well as to compare it with and verify it by other methods developed earlier. The position and displacements of shoulder bones were determined on 30 shoulders of 15 healthy people. The newly developed measurement method is based on the mechanical basic principle stating that the position and motion of a rigid body -- in this case, the bones (segments) forming the shoulder joint -- can be calculated at any moment from the spatial coordinates of three points of a segment and any changes thereof in the course of motion. Ultrasound-based triplets providing the three points (fundamental points) by a segment as required for measurement were fixed on the sternum (modeling the trunk), the clavicle, the acromion (modeling the scapula), the upper arm, and the lower arm. The position of the sixteen anatomical points involved in the study were determined by an ultrasound-based pointer in the local coordinate system specified by the fundamental points before starting measurements. The ZEBRIS ultrasound-based motion analysis system was used for measuring the spatial coordinates of triplets in the course of continuous motion. The spatial coordinates of
the designated anatomical points can be calculated by the method of triangulation. The method was calibrated by a ZEBRIS mapping (3DCAD) software commercially available, and the measurement error rate of the method was determined by statistical calculations. On the basis of calibration and error calculations it could be established that the accuracy and the reproducibility of the method were appropriate, in accordance with the limit values to be found in the literature.

Source: MEDLINE

33. Ultrasound imaging of sports-related musculoskeletal injuries

Author(s): Craig J.G., Gauthier T.P., Cook W.J., Van Holsbeek M.T.

Citation: MedicaMundi, 2006, vol./is. 50/2(14-17), 0025-7664 (2006)

Publication Date: 2006

Abstract: Sports-related injuries of the musculoskeletal system affect millions of individuals every year. Integrating high-frequency Tissue Harmonic Imaging ultrasound with MRI and CT gives the greatest opportunity for diagnosing specific injuries.

Source: EMBASE

34. Interobserver reliability in musculoskeletal ultrasonography: Results from a "Teach the Teachers" rheumatologist course


Citation: Annals of the Rheumatic Diseases, January 2006, vol./is. 65/1(14-19), 0003-4967 (Jan 2006)

Publication Date: January 2006

Abstract: Objective: To assess the interobserver reliability of the main periarticular and intra-articular ultrasonographic pathologies and to establish the principal disagreements on scanning technique and diagnostic criteria between a group of experts in musculoskeletal ultrasonography. Methods: The shoulder, wrist/hand, ankle/foot, or knee of 24 patients with rheumatic diseases were evaluated by 23 musculoskeletal ultrasound experts from different European countries randomly assigned to six groups. The participants did not reach consensus on scanning method or diagnostic criteria before the investigation. They were unaware of the patients' clinical and imaging data. The experts from each group undertook a blinded ultrasound examination of the four anatomical regions. The ultrasound investigation included the presence/absence of joint effusion/synovitis, bony cortex abnormalities, tenosynovitis, tendon lesions, bursitis, and power Doppler signal. Afterwards they compared the ultrasound findings and re-examined the patients.
together while discussing their results. Results: Overall agreements were 91% for joint effusion/synovitis and tendon lesions, 87% for cortical abnormalities, 84% for tenosynovitis, 83.5% for bursitis, and 83% for power Doppler signal; values were good for the wrist/hand and knee (0.61 and 0.60) and fair for the shoulder and ankle/foot (0.50 and 0.54). The principal differences in scanning method and diagnostic criteria between experts were related to dynamic examination, definition of tendon lesions, and pathological v physiological fluid within joints, tendon sheaths, and bursae.

Conclusions: Musculoskeletal ultrasound has a moderate to good interobserver reliability. Further consensus on standardisation of scanning technique and diagnostic criteria is necessary to improve musculoskeletal ultrasonography reproducibility.

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