Referenties ultrasound

Amoo-Achampong, K., et al. (2016). "An orthopedist's guide to shoulder ultrasound: a systematic review of examination protocols." The Physician and sportsmedicine **44**(4): 407-416.

 BACKGROUND: The utilization of musculoskeletal ultrasound has expanded within the setting of the orthopedic clinic as a cost-effective, point-of-care diagnostic tool for shoulder pathology. In experienced hands, ultrasound exhibits capabilities equivalent to that of magnetic resonance imaging in the diagnosis of many shoulder diseases including full-thickness and partial-thickness rotator cuff tears. Although similarly effective in identifying additional shoulder disease processes, major obstacles to its widespread use include user dependence and intrinsic limitation to extra-articular diagnosis. OBJECTIVES: The purpose of this review is to present a step-by-step guide of how to perform a comprehensive shoulder examination and to discuss the appropriate use, economic benefit and implementation of ultrasound within the clinic. METHODS: A systematic search (June 2016) of PubMed, Scopus, and EMBASE databases was conducted according to the Preferred Reporting Items for Systematic Reviews and Meta-Analyses (PRISMA) guidelines for literature presenting shoulder ultrasound examination protocols. Included studies were peer-reviewed articles or academic society endorsed protocols presenting comprehensive sonographic examinations of the adult shoulder. Papers with limited or single structure examination descriptions, non-English language, and publication dates before 1980 were excluded. Final papers meeting criteria were secondarily screened for publication after 2005 to reflect the current state of ultrasound imaging. RESULTS AND CONCLUSIONS: The search yielded 1,725 unique articles with 17 studies meeting final selection criteria. Information from identified studies was summarized to formulate a 4-part shoulder examination protocol, including steps most pertinent to orthopedic in-office diagnoses. In agreement with previous studies, the inexperienced orthopedic surgeon can be quickly trained to expert level proficiency in shoulder ultrasound diagnosis. Using an established protocol, a comprehensive, yet effective shoulder ultrasound examination can be performed within ten minutes. Further, ultrasound provides opportunity to off-set costs through the engagement of revenue generating activity for the orthopedic practice.

Flavell, C. A., et al. (2019). "Measurement of transversus abdominis activation in chronic low back pain patients using a novel standardized real-time ultrasound imaging method." Ultrasound (Leeds, England) **27**(1): 31-37.

 Real-time ultrasound imaging (US) to measure abdominal muscle dimensions has aided low back pain rehabilitation and research. Notwithstanding, ultrasound imaging measurement of transversus abdominis muscle activation in chronic low back pain populations has been characterized by variable and generally suboptimal intra-observer reliability. Methodological deficiencies of 'freehand' ultrasound imaging are uncontrolled probe-skin pressure, inclination and roll of the probe. Despite previous attempts to standardize these parameters, intra-observer reliability in chronic low back pain was poor to moderate (0.32-0.62). Therefore, a standardized method that controls and records probe force, inclination and roll during ultrasound imaging may optimize measurement reliability in chronic low back pain. This pilot study investigated utility, standardization and intra-observer reliability of ultrasound imaging transversus abdominis thickness measurement in chronic low back pain patients (n = 17). Transversus abdominis imaging over two separate measurement sessions was conducted using a novel method to standardize probe parameters. Resting and contracted transversus abdominis thickness, and transversus abdominis activation measurements were obtained from duplicate paired images (n = 68). Intra-class correlation coefficients were reported with 95% confidence intervals. Transversus abdominis thickness at rest (intra-class correlation coefficient = 0.97 confidence interval: 0.93, 0.99), when contracted (intra-class correlation coefficient = 0.99 confidence interval: 0.97, 0.99) and transversus abdominis activation (intra-class correlation coefficient = 0.93 confidence interval: 0.81, 0.97) measurements were highly reliable. Ultrasound imaging of transversus abdominis using the novel standardized ultrasound imaging method produced highly reliable intra-observer transversus abdominis measurements, superior to 'freehand' ultrasound imaging, despite the physical limitations typically associated with a chronic low back pain population. Unique standardizing ranges for 'probe force device' probe parameters were obtained. This novel standardized ultrasound imaging method may optimize transversus abdominis activation assessment in chronic low back pain and other populations, aiding future research.

Gupta, H. and P. Robinson (2015). "Normal shoulder ultrasound: anatomy and technique." Seminars in musculoskeletal radiology **19**(3): 203-211.

 Shoulder ultrasound (US) is one of the most common applications of musculoskeletal US due to the high incidence of rotator cuff disorders. It can be used effectively for the diagnosis of rotator cuff diseases, and several studies have shown very high sensitivity and specificity for rotator cuff tears comparable with that of MRI. Shoulder US has several advantages over MRI such as lower cost, comparatively easier availability, short examination duration, dynamic capability, and ability to perform guided injection at the same appointment. However, it depends on the skill of the operator and therefore requires a standardized detailed protocol to avoid errors in diagnosis. A symptomatic area-only focused examination should not be performed because it is not uncommon to have symptoms away from the actual site of pathology. Detailed understanding of what anatomy can be evaluated is required, and this article discusses the relevant anatomy covering the rotator cuff, subacromial bursa, and acromioclavicular joint. The equipment requirements and technique of examination of different anatomical structures with transducer positions and normal sonographic appearances are described. Pitfalls and artifacts associated with shoulder US are covered; understanding them is crucial to avoid misinterpretation of findings.

Klauser, A. S., et al. (2012). "Clinical indications for musculoskeletal ultrasound: a Delphi-based consensus paper of the European Society of Musculoskeletal Radiology." European radiology **22**(5): 1140-1148.

 OBJECTIVE: To develop clinical guidelines for musculoskeletal ultrasound (MSKUS) referral in Europe. METHODS: Sixteen musculoskeletal radiologists from seven European countries participated in a consensus-based interactive process (Delphi method) using consecutive questionnaires and consensus procedure meetings at several European radiology meetings. The evaluation of musculoskeletal diseases was established by literature reviews, followed by consensus on clinical utility in three consensus meetings. This involved a thorough, transparent, iterative approach which including interview, questionnaire, Delphi and standard setting methodologies. European MSK radiologists with a special interest in MSKUS formed two different expert groups who worked on reaching a consensus in the first two meetings. The third meeting resolved questions that did not achieve a consensus level of 67% using the first two questionnaires. RESULTS: On expert consensus, the use of MSKUS is indicated to detect joint synovitis, fluid and septic effusion for potential aspiration, and poorly indicated to detect loose bodies. Recommendations for most appropriate use of musculoskeletal ultrasound are reported in six areas relevant to musculoskeletal ultrasound: hand/wrist, elbow, shoulder, hip, knee and ankle/foot. CONCLUSION: A comprehensive evidence-based, expert consensus-defined educational framework on clinical ultrsound is presented. This should facilitate referrals for this important imaging technique throughout Europe. KEY POINTS: Musculoskeletal ultrasound is indicated for detecting joint synovitis, effusions and fluid collections. \* Musculoskeletal ultrasound is poor at detecting loose bodies. \* Musculoskeletal ultrasound is relevant for most joints.

Thoomes-de Graaf, M., et al. (2019). "Agreement between physical therapists and radiologists of stratifying patients with shoulder pain into new treatment related categories using ultrasound; an exploratory study." Musculoskeletal science & practice **40**: 1-9.

 STUDY DESIGN: A systematic overview of the literature and an agreement study. OBJECTIVES: The aim of this study is to explore the inter-professional agreement of diagnostic musculoskeletal ultrasound (DMUS) between physical therapists (PT) and radiologists, using a new classification strategy based upon the therapeutic consequences in patients with shoulder pain. BACKGROUND: DMUS is frequently used by PTs, although the agreement regarding traditional diagnostic labels between PTs and radiologists is only fair. Nevertheless, DMUS could be useful when used as a stratifying-tool. METHODS: First, a systematic overview of current evidence was performed to assess which traditional diagnostic labels could be recoded into new treatment related categories (referral to secondary care, corticosteroid injections, physical therapy, watchful waiting). Next, kappa values were calculated for these categories between PTs and radiologists. RESULTS: Only three categories were extracted, as none of the traditional diagnostic labels were classified into the 'corticosteroid injection' category. Overall, we found moderate agreement to stratify patients into treatment related categories and substantial agreement for the category 'referral to secondary care'. Both categories 'watchful waiting' and 'indication for physical therapy' showed moderate agreement between the two professions. CONCLUSION: Our results indicate that the agreement between radiologists and PTs is moderate to substantial when labelling is based on treatment consequences. DMUS might be able to help the PT to guide treatment, especially for the category 'referral to secondary care' as this showed the highest agreement. However, as this is just an explorative study, more research is needed, to validate and assess the consequences of this stratification classification for clinical care.