Faculty of Sport and Exercise Medicine UK

These Guidelines have been produced in conjunction with The British Society of Skeletal Radiologists (BSSR).

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Guideline	
Initial Training Recommendation	Theoretical training (delivered by a CASE accredited course or FSEM UK approved equivalent) to include: 1) Physics of US 2) Equipment 3) Image Recording 4) Reporting 5) Artefacts 6) Relevance of other imaging modalities to US.
Further initial training	Mentored clinical experience to include a minimum of 50 supervised scans per region, with a further 50 per region with low supervision (except for where University course stipulates otherwise) – **Total 200 scans:** e.g. • 50 upper limb directly supervised + 50 low supervision • 50 lower limb supervised + 50 low supervision Whether part of University certified course or mentorship scheme, the FSEM UK MSK US Syllabus elements should be signed off by the MSK US mentor once competency in each element has been demonstrated. The MSK US Mentor can ask for the trainee to undertake further scanning experience if they do not feel that competency has yet been displayed. **NB:** The entirety of the syllabus (apart from sections in grey, which are compulsory) need not be completed, but clinical practice must then be limited to those sections that have been signed off and where competency maintained (see below).

MSK US Mentor	Consultant MSK US Radiologist **OR** FSEM UK approved mentor with regular commitment to MSK US (operating at minimum Level 2 as per RCR guideline) **OR** MSK US Mentorship Scheme offered by University courses **OR** Specific (potentially 'paid for') mentoring service approved by FSEM UK
Attributes of MSK US Mentor	Consultant MSK US Radiologist (operating at minimum Level 2 as per RCR guideline) **OR** FSEM UK approved MSK US Mentor with: • **3 years** clinical MSK US experience • Regular commitment to MSK US (minimum 1 clinic per week where US routinely used) • Regular commitment to MSK US CPD • Undertake minimum **400 scans per year (irrespective of whether full/part-time job plan)** Approval as FSEM UK MSK US mentor (whether as part of University course, other course or stand-alone) will be based on Academy of Royal Colleges' "Requirements for Colleges and Faculties in relation to Examiners and Assessors" guidance (2014) as adopted by the GMC.
End of Training Assessment	Formal assessment of practical competence as part of CASE accredited University-led course or FSEM UK approved course (Short course/PG Cert/PG Dip) **OR** Assessment of practical competence at discretion of Supervisor based on completion of the Competencies outlined in the FSEM UK MSK US Syllabus (which can be limited to one body part or body region as desired; MSK US practice must be limited to that body part or region however)
CPD	• Demonstrate minimum **200 scans/year** (could take form of logbook or US clinic list for example) **or 100 scans/year for a single body part/region** • Demonstrate breadth of scans against FSEM MSK US Syllabus (*and if only scanning one region/body part demonstrate this*) • MSK US should feature in ongoing CPD and PDP • MSK US should be included in annual appraisal and revalidation. • Audit MSK US practice • Keep up to date with relevant literature • Peer review minimum every 2-3 years: ○ As part of MSK US Training course[§]

	OR ○ by Consultant MSK US Radiologist **OR** ○ by FSEM UK Approved MSK US Assessor* • Must demonstrate competence on anatomy/joints/areas that Clinician regularly scans (MSK US practice must be limited to that body part or region however)
MSK US guided injection training, assessment and appraisal	Mentored clinical experience to include a minimum of 25 supervised US guided injections, with a further 25 with low supervision (except for where University course stipulates otherwise). Whether part of University certified course or mentorship scheme, the FSEM UK MSK US Syllabus elements should be signed off by the MSK US mentor once competency in each element has been demonstrated. The MSK US Mentor can ask for the trainee to undertake further scanning experience if they do not feel that competency has yet been displayed. **NB:** The entirety of the syllabus (apart from sections in grey, which are compulsory) need not be completed, but clinical practice must then be limited to those sections that have been signed off and where competency maintained (see below). **Allied Health Professionals:** AHP's must also complete an Injection Therapy Course. (Physiotherapists: as per CSP Guidelines) **MSK USGI Mentor, Assessment and CPD:** MSK US guided injection Mentor attributes, end of training assessment and CPD is the same as for the practice of diagnostic MSK US

Syllabus for FSEM UK MSK US Training (based on RCR (2017) guideline syllabus)

Core Knowledge and Skills base for diagnostic and interventional (as option) MSK US – Level 1	**Trainer Signature**	**Date**
• Physics and Technology		
• Practical instrumentation/use of US controls		
• US techniques		
• Administration including report writing; saving images		
• Sectional and US anatomy		
• Pathology in relation to US		
• Infection control measures for US equipment		
• Infection control measures for US guided injection (USGI only)		
Competencies/scanning skills to be acquired – Level 1		
Shoulder		
• Knowledge of normal anatomy and variants		
• Biceps tendon including dynamic assessment for subluxation		
• Subscapularis		
• Supraspinatus		
• Infraspinatus		
• Posterior GHJ		
• ACJ		
Pathology		
• RC tendinosis, tears and calcification		
• Tendinosis, rupture and subluxation of biceps tendon		
• Effusions of shoulder (LHB tendon sheath) and subdeltoid bursa		
• Knowledge of paralabral cyst		

USGI		
• Aspiration of focus of calcification		
• Therapeutic/diagnostic injection in bursa		
• Therapeutic/diagnostic injection of GHJ		
• Therapeutic/diagnostic injection of the ACJ		
Elbow		
• Knowledge of normal anatomy and variants		
Anterior:		
• Brachioradialis muscle		
• Radial nerve		
• Anterior humero-radial (radio-capitellar)joint		
• Radial fossa		
• Anterior humero-ulnar (trochlear) joint		
• Coronoid fossa		
• Brachialis muscle		
• Brachial artery and vein		
• Pronator teres		
• Median nerve		
• Biceps tendon (including dynamic scanning)		
• Dynamic scanning of the annular recess of the neck of the radius		
Lateral:		
• Lateral epicondyle and attachment of common extensor tendon		
• Lateral collateral ligament complex		
• Lateral humero-radial joint, including dynamic imaging as indicated		
• Radial nerve course via lateral elbow and supinator muscle (PIN and superficial radial nerve)		
• Proximal attachment of extensor carpi radialis longus		
Medial:		
• Medial epicondyle and attachment of common extensor tendon		

• Ulnar collateral ligament		
• Ulnar nerve		
• Dynamic flexion-extension to evaluate for ulnar nerve subluxation and/or snapping triceps		
• Dynamic valgus stress of ulnar collateral ligament		
Posterior:		
• Posterior joint space		
• Triceps tendon		
• Olecranon process		
• Olecranon bursa		
Pathology:		
• Tendinosis or rupture of common flexor/extensor origins or biceps/triceps tendons		
• Knowledge of joint effusion and loose bodies		
• Knowledge of ulnar nerve entrapment		
• Olecranon bursitis		
USGI		
• Aspiration/injection of bursal effusion		
• Therapeutic/diagnostic injection of joint		
• Therapeutic/diagnostic injection at CFO/CEO		
Wrist/hand		
• Knowledge of normal anatomy and variants		
Volar:		
• Transverse and longitudinal images from the volar wrist crease to the thenar muscles		
• Carpal tunnel contents:		
○ Flexor retinaculum		
○ Median nerve		
○ Flexor pollicis longus tendon		
○ Flexor digitorum profundus and superficialis tendons		
• Dynamic examination with flexion and extension – motion of tendons and median nerve		

• Palmaris longus tendon		
• Flexor carpi radialis longus tendon		
• Ulnar nerve and ulnar artery within Guyon's canal		
• Flexor carpi ulnaris tendon		
• Ability to work out carpal bones/joints including hook of hamate		
Dorsal:		
• Tendons in the six dorsal compartments		
• Dynamic tendon examination—flexion/extension of the fingers (as indicated)		
• Dorsal scapholunate ligament		
• Trace all tendons followed to their sites of insertion if clinically indicated		
• Joints as clinically indicated		
• Superficial radial nerve		
Pathology:		
• De Quervain's tenosynovitis		
• Effusions in tendon sheaths		
• Knowledge of tendinosis and tendon ruptures		
• Knowledge of carpal tunnel syndrome		
• Knowledge of ulnar nerve entrapment		
• Ganglia and knowledge to distinguish them from solid space-occupying lesions		
• Knowledge of inflammatory arthropathy		
• Knowledge of pulley injuries		
• Ligament injuries		
• Knowledge of foreign bodies and reactive changes		
USGI		
• Aspiration and therapeutic injections of joints and tendon sheaths		
• Aspiration and therapeutic injection of ganglia		
Groin		
• Knowledge of normal anatomy and variants		

• Indirect and direct inguinal hernia examination		
• Femoral hernia examination		
• Femoral vessels and nerve		
• Strains/tears of rectus abdominis and adductor muscles and tendons		
Hip		
• Knowledge of normal anatomy and variants		
Anterior:		
• Sartorius at ASIS		
• Lateral femoral cutaneous nerve of the thigh		
• TFL at ASIS		
• Rectus femoris at AIIS (direct and indirect heads)		
• Anterior hip joint, femoral head, femoral neck, capsule and anterior recess		
• Anterior labrum		
• Iliopsoas tendon		
• Knowledge of iliopsoas bursa		
• Knowledge of causes of snapping hip with dynamic scanning technique		
• Hip joint effusion		
USGI		
• Hip joint diagnostic/therapeutic injection		
Lateral:		
• Gluteus medius muscle and tendon		
• Gluteus minimus muscle and tendon		
• Tensor fascia and iliotibial band		
• Gluteus maximus		
• Greater trochanteric bursa (and other related bursae)		
• Gluteus medius/minimus tendinopathy/tears		
• Dynamic scanning for snapping hip		
• GT bursal aspiration and therapeutic injection (USGI only)		

Medial:		
• Adductor muscles and tendons		
• Distal iliopsoas tendon		
• Pubic bone and symphysis pubis		
• Adductor tendinopathy/tears		
Posterior:		
• Ischial tuberosity		
• Hamstring muscles and tendons		
• Sciatic nerve		
• Proximal hamstring tendinopathy/tears		
Thigh		
• Knowledge of normal anatomy and variants		
• Muscles and tendons of the thigh		
• Knowledge of contusions and tears of the quadriceps and hamstrings		
USGI		
• Aspiration of thigh haematoma		
Knee		
• Knowledge of normal anatomy and variants		
Anterior:		
• Quadriceps tendon		
• Suprapatellar and medial and lateral patellofemoral joint recesses		
• Medial and lateral patellar retinaculum		
• Patella and Prepatellar bursa		
• Patellar tendon		
• Superficial infrapatellar bursa		
• Deep infrapatellar bursa		
• Tibial tubercle		
• Vastus medialis and medial retinaculum		

• Vastus lateralis and lateral retinaculum		
Medial:		
• MCL		
• Pes anserine tendons and bursa		
• Medial meniscus		
• Medial patellar retinaculum		
• Valgus stress testing		
Lateral:		
• LCL		
• Iliotibial band and bursa		
• Lateral meniscus		
• Biceps femoris tendon		
• Common peroneal nerve		
• Popliteus tendon		
• Lateral patellar retinaculum		
• Varus stress test		
• Proximal tibiofibular joint		
Posterior:		
• Popliteal fossa		
• Semimembranosus and semitendinosus		
• Medial gastrocnemius muscle, tendon and bursa		
• Popliteal artery and vein		
• Tibial and common peroneal nerves		
Pathology:		
• Knee joint effusion		
• Baker's cyst (document communicating stalk) and knowledge of ruptured baker's cyst		
• Ganglia/other bursae/meniscal cyst		
• Sprains of collateral ligaments		

• Tendinosis and tears of patella tendon		
• Tendinosis and tears of quads tendon		
USGI		
• Therapeutic aspiration/injection of knee joint (USGI only)		
• Patella tendinopathy high volume injection (USGI only)		
• Baker's cyst aspiration/injection (USGI only)		
Lower leg		
• Knowledge of normal anatomy and variants		
• Muscle contusions and tears		
• Muscle herniae		
• Superficial peroneal nerve emerging from anterior compartment		
Ankle/Foot		
• Knowledge of normal anatomy and variants		
Anterior:		
• Tibialis anterior (from musculotendinous junction to insertion)		
• Extensor hallucis longus		
• Extensor digitorum longus		
• Deep peroneal nerve and dorsalis pedis artery		
• Anterior joint recess (effusion, loose bodies and synovial thickening)		
• Anterior joint capsule		
• Anterior inferior tibiofibular ligament		
Medial:		
• Posterior tibialis		
• Flexor digitorum longus		
• Flexor hallucis longus		
• Posterior tibial nerve		
• Medial and lateral plantar nerves		
• Tibial artery and veins		

• Deltoid ligament (3 components)		
Lateral:		
• Peroneus brevis		
• Peroneus longus		
• Superior peroneal retinaculum		
• Anterior talofibular ligament		
• Calcaneofibular ligament		
• PTFL (as able)		
• Dynamic assessment for peroneal subluxation		
Posterior:		
• Achilles tendon and paratenon		
• Plantaris tendon		
• Retrocalcaneal bursa		
• Retro-Achilles/superficial Achilles bursa		
• Dynamic scanning in of Achilles (as indicated to assist with tear evaluation)		
• Sural nerve		
Inferior:		
• Plantar fascia		
• Plantar fat pad		
Midfoot:		
• Navicular/cuboid/cuneiform and related joints and ligaments		
• Lisfranc ligament		
Toes:		
• Intermetatarsal bursa		
• MTPJs		
• Plantar plates		
• Sesamoids		

Pathology:		
• Tendinosis and tears of Achilles tendon		
• Tendinosis, tenosynovitis and tears of tibialis posterior and peroneal tendons		
• Joint effusions and loose bodies		
• Plantar fasciitis		
• Morton's neuroma		
• Knowledge of foot ganglia		
• Knowledge of arthropathy		
• Ankle ligament injuries		
USGI		
• Ankle joint therapeutic injection (USGI only)		
• Sub-talar joint therapeutic injection (USGI only)		
• Mid-foot joint therapeutic injection (USGI only)		
• Therapeutic injection of plantar fasciitis (USGI only)		
• Therapeutic injection of Morton's neuroma/bursal complex (USGI only)		
• Therapeutic injection of MTPJs (USGI only)		
General		
• Know when to refer to a more expert ultra sonographer/radiologist		
• Knowledge of appearances and characteristics of "lumps and bumps" /injuries /atypical findings and when to refer on for a more expert opinion and/or further investigation		
MSK US record keeping		
• Demonstrate appropriate labelling of MSK US images		
• Use of arrows and measurement callipers		
• Maintain a procedure log of all diagnostic and interventional MSK US procedures that they observed and performed. This information can assist when determining competency at annual appraisal.		
• Demonstrate how to capture, store and transfer MSK US images.		

• Ensure that images are stored safely for at least 7 years Ideally, images should be stored on a PACS system (RCR guidance) but if this is not possible, images should be stored on a secure drive/DVD and comply with the data protection act, GMC/AHP guidelines		
• Record a report of the scan in the patients' record. Reports should contain positive findings with mention of relevant structures in order to show they have been looked at, and a report should not be a blanket statement of normality. Since we are performing ultrasound as an extension of our clinical examination, any conclusion may include clinical and ultrasound information.		
Further Training (Level 2 onwards)		
• Further CASE-accredited course/Diploma/MSc		
• Minimum 3 years performing at Level 1		

References:

Academy of Medical Royal College, 2014. *Requirements for Colleges and Faculties in relation to Examiners and Assessors [online*]. London: Academy of Medical Royal Colleges. Available from: http://www.aomrc.org.uk/wp-content/uploads/2016/05/Requirements_for_Examiners_and_Assessors_1014.pdf [Accessed 10 Dec 2018]

Anon. , 2011. Chartered Society of Physiotherapy expectations of educational programmes in injection therapy for physiotherapists: supporting good governance in neurological and musculoskeletal injection therapy. *JOURNAL- ASSOCIATION OF CHARTERED PHYSIOTHERAPISTS IN WOMENS HEALTH*, (109), 21-29.

Faculty of Sport and Exercise Medicine UK, 2013. *The SEM Sonographer – Proposed Standard of FSEM (UK) – Appendix 1 [online].* London: Faculty of Sport and Exercise Medicine UK. Available from: https://www.fsem.ac.uk/members-area/my-development/ultrasound/ultrasound-guidelines/sonography-in-sem/ [Accessed 22 March 2018]

Faculty of Sport and Exercise Medicine UK, 2013. *Ultrasound Guidelines for Sport and Exercise Medicine Practitioners [online]*. London: Faculty of Sport and Exercise Medicine UK. Available from: https://www.fsem.ac.uk/members-area/my-development/ultrasound/ultrasound-guidelines/guidelines-for-msk-ultrasonography-in-sem/ [Accessed 22 March 2018]

Royal College of Radiologists, 2017. Ultrasound training recommendations for medical and surgical specialties, Third edition [online]. London: Royal College of Radiologists. Available from: https://www.rcr.ac.uk/system/files/publication/field_publication_files/bfcr173_ultrasound_training_med_surg.pdf

Rollins S, 2018. *An Audit to establish whether Regional Rehabilitation Unit Clinicians performing diagnostic ultrasound and ultrasound-guided injections are appropriately qualified*. Aldershot: Regional Rehabilitation Unit Aldershot. Unpublished. Available via Military Diagnostic and Interventional Ultrasound Working Group sarah.rollins405@mod.gov.uk