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EUROPEAN FEDERATION OF SOCIETIES FOR ULTRASOUND IN MEDICINE AND BIOLOGY
'Building a European Ultrasound Community'

MINIMUM TRAINING REQUIREMENTS FOR THE PRACTICE OF MEDICAL ULTRASOUND IN EUROPE

Appendix 12: Musculoskeletal

Musculoskeletal ultrasound comprises a wide range of different examinations increasingly performed by practitioners with different background (e.g. radiology, orthopaedic surgery, rheumatology or paediatric). This curriculum is intended for medical doctors who perform musculoskeletal ultrasound scans. It includes standards for theoretical knowledge and practical skills.

Training should be integrated in a 3-level system and modular, as some practitioners may need to be proficient in some specific areas of the musculoskeletal pathology according to their daily practice (e.g. shoulder surgery, hand surgery, paediatrics or rheumatic diseases). At least level 1 competence should be obtained by anyone performing routine unsupervised musculoskeletal ultrasound.

Level 1

Level 1: Theoretical Module

Attendance in a basic course of at least 3 days (18 hours) including:

- Ultrasound physics and instrumentation, ultrasound techniques and administration (see Appendix 2).
- Normal musculoskeletal anatomy, normal musculoskeletal ultrasound findings, common pathological ultrasound findings in the musculoskeletal system.

Level 1: Practical Training

Level 1 competence requires:

- To obtain level 1 status it is recommended that the trainee should perform a minimum of 300 examinations under supervision within a year.
- Examinations should encompass the full range of conditions listed in the competency assessment sheet - level 1.
- A log book (or an illustrated log book) should be kept by the trainee, listing the number and type of examinations. Supervision of half of the 300 examinations can be achieved with approval of examinations in an illustrated log book.
- The trainee should be supervised by a level 2 or 3 practitioner.
- During the course of training a competency assessment sheet should be completed and signed by the supervisor, as this will determine in which area(s) the trainee can practise independently.
- To maintain level 1 status the practitioner should perform at least 300 examinations each year.

Level 1: Competencies to be acquired

At the end of training the trainee should be able to:



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- Perform common musculoskeletal ultrasound examinations (shoulder, elbow, wrist/hand, hip, knee, ankle/foot and common muscles) systematically, accurately, safely and with proper report and documentation.
- Differentiate normal and pathological findings.
- Perform dynamic examinations.
- Recognise when referral for a second opinion is indicated (e.g. any diagnostic doubt, soft tissue tumours).
- Acquire knowledge about advantages, disadvantages and indications of alternative imaging modalities (e.g. MRI).
- Diagnose common abnormal ultrasound findings in shoulder, elbow, wrist/hand, hip, knee, ankle/foot and common muscles (e.g. effusion and synovitis, bursitis and cysts, tendon tears and tendinopathy, entesopathy, common muscle and bone pathology) (see competency assessment sheet - level 1).

Level 2

Level 2: Theoretical Module

Attendance in one or more relevant advanced courses or congresses with a total of at least 3 days (18 hours).

Level 2: Practical Training

Level 2 competence requires:

- To have achieved level 1 competence.
- To have regular ultrasound clinics at level 1 and perform at least 500 examinations under supervision within a year.
- Supervised by a level 3 practitioner or someone who has achieved level 2 competence and has at least 2 years of experience at that level.
- To be able to recognise and correctly diagnose almost all musculoskeletal pathological conditions (or all conditions within a specific area of a musculoskeletal pathology).
- To maintain level 2 status the practitioner should perform at least 500 examinations each year.

Level 2: Competencies to be acquired

- To accept and manage referrals from level 1 practitioners.
- To have knowledge of new ultrasound modalities.
- To teach ultrasound to trainees and to level 1 practitioners.
- To conduct some research (clinical or fundamental) in musculoskeletal ultrasound.
- To recognize and correctly diagnose almost all pathology in the shoulder, elbow, wrist/hand, hip, knee, ankle/foot, muscles, bones and nerves (see competency assessment sheet - level 2).



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- To perform basic, non-complex musculoskeletal US-guided interventions (e.g. aspirations, injections, drainages, biopsies).

Level 3

Level 3: Theoretical Module

Attendance in at least two advanced relevant courses or congresses with a total of at least 6 days during 2 calendar years.

Level 3: Practical Training

Level 3 competence requires:

- To have achieved level 2 competence.
- To have regular ultrasound clinics at level 2 for at least two years (at least 500 examinations per year).
- To be occupied mainly with musculoskeletal ultrasound.
- To perform (or have knowledge about) specialised musculoskeletal ultrasound examinations
- To perform advanced US-guided interventional procedures.

Level 3: Competencies to be acquired

- To accept and manage tertiary referrals from level 1 and 2 practitioners.
- To perform specialised musculoskeletal ultrasound.
- To perform all sorts of musculoskeletal US-guided interventions.
- To conduct substantial research (clinical or fundamental) in the field of musculoskeletal ultrasound.
- To teach musculoskeletal ultrasound to trainees and practitioners at all levels.
- To be aware of and to pursue developments in musculoskeletal ultrasound.

Maintenance of Skills

Having been assessed as competent to practice there will be a need for continued medical education and maintenance of practical skills. Recommended numbers of examinations to be performed annually to maintain skills at each level are given in the text. Practitioners should:

- Include musculoskeletal ultrasound in their ongoing continued medical education (CME) and continued professional development (CPD).
- Audit their practice.
- Participate in multidisciplinary meetings.
- Keep up to date with relevant literature.



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[The Minimum Training Recommendations for the Practice of Medical Ultrasound](#) were published under the EFSUMB Newsletter section in the *Ultraschall in der Medizin/European Journal of Ultrasound*, Volume 29, issue 1 February 2008 page 94-96.

APPENDIX 12: MUSCULOSKELETAL ULTRASOUND TRAINING COMPETENCY ASSESSMENT SHEET

Trainee

Core Knowledge Base – Level 1

- Physics and technology
- Practical instrumentation / Use of ultrasound controls
- Normal musculoskeletal anatomy
- US examination of normal joints and muscles

Trainer Signature Date

Trainer

Competencies/Skills to be acquired - Level 1

To be competent to perform/diagnose etc the following:

	Trainer Signature	Date
Shoulder		
• Full-thickness rotator cuff tear		
• Rotator cuff calcifications (different types)		
• Shoulder joint effusion and synovitis		
• Subacromial-subdeltoid bursitis		
• Biceps tendon (tendinopathy, luxation, rupture)		
• Hill-Sachs lesion		
• Acromioclavicular joint pathology		
• (Rheumatoid erosions)		
Elbow		
• Lateral and medial epicondylitis		
• Elbow joint effusion and synovitis		
• (Rheumatoid erosions)		
Wrist and Hand		
• Ganglion cyst		
• Tenosynovitis		
• Tendon rupture		
• Joint effusion and synovitis		
• Rheumatoid erosions		
Common Muscles		
• Large muscle rupture, hematoma		
• Abscess		
• Myositis ossificans		

	Trainer Signature	Date
Hip		
• Hip joint effusion and synovitis		
• Trochanteric bursitis		
• (Rheumatoid erosions)		
Knee		
• Knee joint effusion and synovitis		
• Baker's cyst (and rupture)		
• Patellar ligament tendinopathy		
• Quadriceps tendon rupture		
• Identification of the menisci		
• Large Meniscus cyst		
• Osgood-Schlatter		
• Collateral ligament strain		
• (Rheumatoid erosions)		
Ankle and Foot		
• Joint effusion and synovitis		
• Achilles tendinopathy and rupture		
• Tenosynovitis		
• Fasciitis plantaris		
• (Rheumatoid erosions)		
Other		
• Identification of bone pathology		
• Fluid at prosthesis/osteosynthesis		
• Detection of foreign body		

APPENDIX 12: MUSCULOSKELETAL ULTRASOUND TRAINING COMPETENCY ASSESSMENT SHEET

Trainee



Trainer



Competencies/Skills to be acquired - Level 2

To be competent to perform/diagnose etc the following:

	Trainer Signature	Date
Shoulder		
• Partial-thickness rotator cuff tear	_____	_____
• Dynamic examination for impingement	_____	_____
• Ganglion	_____	_____
• Rotatorcuff interval pathology	_____	_____
• Frozen shoulder	_____	_____
• Nerve entrapment	_____	_____
• Identification of ant and post glenoid labrum	_____	_____
• US-guided interventions	_____	_____
Elbow		
• Biceps and triceps tendinopathy and rupture	_____	_____
• Nerve entrapment	_____	_____
• US-guided interventions	_____	_____
Wrist and Hand		
• Carpal tunnel syndrome	_____	_____
• Tendon adhesences	_____	_____
• Ligament and pulley lesions	_____	_____
• Other tumours than ganglion	_____	_____
• US-guided interventions	_____	_____
Muscles		
• Small muscle rupture	_____	_____
• Late complication of muscle rupture	_____	_____
• Identification of common muscle tumours	_____	_____
Other		
• Withdrawal of foreign body	_____	_____
• Bone pathology (fracture, tumour)	_____	_____
• Doppler examination of tendons, joints, ...	_____	_____
• Entesopathy	_____	_____
• Identification of common nerves	_____	_____
• US-guided interventions	_____	_____

	Trainer Signature	Date
Hip		
• Other bursitis than trochanteric	_____	_____
• Osteoarthritis	_____	_____
• Identification of ant labrum	_____	_____
• Identification of iliopsoas tendon	_____	_____
• Snapping hip	_____	_____
• Inguinal hernia	_____	_____
• Groin pain	_____	_____
• Pathology of the Infant hip	_____	_____
• US-guided interventions	_____	_____
Knee		
• Meniscus tear	_____	_____
• Meniscus cyst	_____	_____
• Runner's knee	_____	_____
• Pathology of small tendons	_____	_____
• Osteoarthritis	_____	_____
• Cartilage lesion	_____	_____
• US-guided interventions	_____	_____
Ankle and Foot		
• Morton's neuroma	_____	_____
• Tarsal tunnel syndrome	_____	_____
• Ligament strain	_____	_____
• US-guided interventions	_____	_____