FOCUSED MUSCULOSKELETAL ULTRASOUND COURSE

(in association with the British Institute of Musculoskeletal Medicine) BIMM

24-25 January 2018

CASE ACCREDITED

Approved by the College of Sports and Exercise Physicians (ECOSEP)

Endorsed by the European Federation of Societies for Ultrasound in Medicine and Biology (EFSUMB)
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Introduction

Diagnostic ultrasound was pioneered by the Glasgow obstetrician Ian Donald. It has been used in the diagnosis of musculoskeletal injuries since the 1970s; more recent developments in ultrasound technology with the use of high frequency, high-resolution transducers have enabled high quality images of soft tissues to be achieved. High frequency ultrasound provides accurate diagnosis of most common musculoskeletal conditions. In addition no other modality can match the capacity of ultrasound to provide relatively comfortable, technically simple, dynamic evaluation of the soft tissue structures.

There are some limitations in the use of musculoskeletal ultrasound; In particular bone cannot be imaged because of the sound wave scattering that occurs at the soft tissue/bone interface. The quality and interpretation of images are primarily dependent on knowledge, expertise and experience of the operator. A good working knowledge of joint and soft tissue anatomy, as well as an understanding of the clinical context of the problem to be investigated, is necessary if a sensible ultrasound report is to be generated.

The use of musculoskeletal ultrasound in clinical practice is regarded as cost effective and non-invasive imaging modality in tendon evaluations and bilateral comparisons. Examinations are quick, easy, with little patient discomfort compared to more invasive procedures and certainly ultrasound modality is less expensive than other imaging modalities. Interest in this growing application is resulting in new areas of investigation.

Rationale

The need for this course has arisen from the desire of sports medicine specialists, orthopaedic surgeons, rheumatologists, physiotherapists, chiropractors, osteopaths, podiatrists, general practitioners, radiologists and radiographers to utilise ultrasound in the assessment of patients with musculoskeletal injuries and those presenting with acute clinical conditions.
The course is to be delivered in two parts; Stage 1: 2 day lectures and practical workshops; Stage 2: Supervised clinical training in hospitals /medical centres followed by a one day final clinical assessment, leading to an assessment of clinical competency (see Appendix 1).

To supplement students learning experience there are six additional one day master classes (one per month) at the SMU, Bournemouth for intensive tutorials and hands-on experience in small groups with expert tutors (see Appendix 2).
Musculoskeletal Ultrasound Programme

<table>
<thead>
<tr>
<th>Programme Name (Title):</th>
<th>Musculoskeletal Ultrasound</th>
</tr>
</thead>
<tbody>
<tr>
<td>Primary Purpose:</td>
<td>To train Musculoskeletal practitioners (MSKP’s) in the safe and competent use of diagnostic ultrasound</td>
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<tr>
<td>Secondary Purpose:</td>
<td>To provide relevant and focused ultrasound expertise in the enhancement of their clinical judgement</td>
</tr>
<tr>
<td>Final Award:</td>
<td>Certification of clinical competency in Musculoskeletal ultrasound RCR Level 1</td>
</tr>
<tr>
<td>Awarding Institution or Body:</td>
<td>AECC</td>
</tr>
<tr>
<td>Teaching Institution:</td>
<td>AECC</td>
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<tr>
<td>Programme Accreditation:</td>
<td>CASE</td>
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</tbody>
</table>

Educational Aims

The course is in three stages, with an initial foundation course followed by a programme of supervised clinical training leading to clinical competency and accreditation with CASE.

Classroom lectures are designed to highlight ultrasound anatomy and pathology with knowledge and understanding of the available ultrasound techniques in the visualisation of relevant musculoskeletal conditions in a clinical setting.
Course Flow Diagram - Training Stages

STAGE 1 (2 DAY) → SEMINAR

STAGE 2 (8-12 MONTHS) → SUPERVISED CLINICAL TRAINING (Including six master-classes)

STAGE 3 (1 DAY) → FINAL ASSESSMENT OF COMPETENCY
Aim of the Training Programme

The aim of the training programme is to train musculoskeletal practitioners (MSKP’s) in the safe use of diagnostic ultrasound imaging in the competent visualisation and interpretation of relevant musculoskeletal conditions to RCR (2005) Level 1 guidelines.

Objectives of the Training Programme

The objectives are to train musculoskeletal practitioners:

- in the safe and accurate acquisition of ultrasound images in the examination of relevant musculoskeletal conditions;
- in making accurate judgement of patient management, based upon the medical history and the outcomes of the ultrasound examination;
- in competently applying the outcomes of the ultrasound examination in compiling the overall management of patients presenting with musculoskeletal conditions.

Course Design

The course is designed by the School of Medical Ultrasound (SMU), AECC University College, Bournemouth, in association with the BIMM (British Institute of Musculoskeletal Medicine).

The structure of course and contents were modified using the RCR (2005) Level 1 Guidelines for non-radiologists in Musculoskeletal Ultrasound with the help and advice from Dr. PP. Raju (Consultant MSK Radiologist, Newcastle), Dr. James Brown (Consultant Sports Medicine Physician, Leeds) and Dr. John Tanner (Course organiser and tutor for BIMM MSK modular course).
MSKP’s, who have satisfactorily completed stage 1 and 2, may present themselves for final assessment of competency in MSK ultrasound to level one.

The course is delivered in three stages:

- Stage 1 lays down the foundation of ultrasound imaging and seeks to engage MSKP’s in the safe application of ultrasound for imaging musculoskeletal conditions.

- Stage 2 is the continuing clinical training element under the supervision of a competent supervisor with a recognised qualification, approved by SMU, MSKP’s must sign a clinical agreement form with their supervisor/training department for the completion of Part 2 of the programme (Appendix)

- Stage 3 addresses MSKP’s “fitness to practice” by undergoing an assessment of competency in MSK ultrasound.

On successful completion of stage 2, MSKP’s can apply for certification of clinical competency as laid down by the guidelines. The final assessment of clinical competency will take place at the SMU, Bournemouth.
## Course Syllabus Summary

<table>
<thead>
<tr>
<th>Module</th>
<th>Topic</th>
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<tbody>
<tr>
<td>M1</td>
<td>Introduction</td>
</tr>
<tr>
<td></td>
<td>Familiarisation with course contents. Structure of modules and delivery.</td>
</tr>
<tr>
<td></td>
<td>Definition of QA parameters. QA(equipment and personnel). QA in hospitals. QA tests.</td>
</tr>
<tr>
<td></td>
<td>Location. Important landmarks. Size/shape. Ultrasound anatomy and pathology Key measurements Technique Advancements</td>
</tr>
<tr>
<td>M2</td>
<td>Ultrasound of the shoulder</td>
</tr>
<tr>
<td>M3</td>
<td>Ultrasound of hand/wrist/ elbow</td>
</tr>
<tr>
<td>M4</td>
<td>Ultrasound of foot/ankle/knees</td>
</tr>
<tr>
<td>M = Module</td>
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</tr>
<tr>
<td>Training Issues</td>
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<tr>
<td>Incorporated at the end of stage 1</td>
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</tbody>
</table>
Stage 1

(2 DAY SEMINAR)
Musculoskeletal Ultrasound (Upper and Lower limb)

Level  [Level 1]

AIMS

The knowledge and understanding of musculoskeletal ultrasound practice to provide the basis on which to build the skills of safe and competent practice. This course aims:

- To develop knowledge and understanding of musculoskeletal ultrasound anatomy and pathology
- To develop knowledge and understanding of obtaining musculoskeletal ultrasound images for diagnostic purposes
- To develop skills in the interpretation and assessment of musculoskeletal ultrasound images
- To develop skills in the dissemination of findings through report writing skills
- To appreciate the role of the professional practitioner as part of a multidisciplinary team in the management of the patient

INTENDED LEARNING OUTCOMES

Having completed this course the student is expected to demonstrate:

1. Systematic understanding and critical knowledge of musculoskeletal ultrasound anatomy and pathology;
2. Critical evaluation of the processes in obtaining relevant and accurate musculoskeletal ultrasound images;
3. Critical knowledge and evaluation of the limitations of the musculoskeletal ultrasound examination;
4. Critical evaluation of musculoskeletal ultrasound images to inform decisions in assessing patients and in making referrals;
5. New skills in valid and credible reporting of musculoskeletal ultrasound examination findings;
6. Critical awareness of professional role in the management of patients.

LEARNING AND TEACHING METHODS

Students will attend formal lectures covering relevant areas. In addition, there will be practical demonstrations and the opportunity for students to have hands-on experience of the equipment using models and patients in a clinical setting. Students will be exposed to the clinical use of ultrasound in small group tutorials at the seminar and master classes. Students will be expected to adopt a self-directed approach to access relevant material and achieve the learning outcomes.

TEACHING STRATEGY

Part 1 (Upper limb)
ILO1 covered in Sectional Anatomy of the MSK system and examination of prosected specimens
ILO2 covered in Approach to Scanning, Ultrasound of the Shoulder, Elbow, Wrist and Hand
ILO3 covered in Ultrasound Potentials and Limitations

MSK short course/doc 2018
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ILO1, 2, 3, 4, 5 and 6 covered in Clinical Workshops/Demos/Interactive Workshops.

Part 2 (Lower Limb)

ILO 1 covered in Sectional Anatomy of the MSK system and examination of prosected specimens
ILO 2 covered in Approach to Scanning, Ultrasound of the Knee, Ankle and Foot
ILO 3 covered in Ultrasound Potentials and Limitations
ILO 1, 2, 3, 4, 5 and 6 covered in Clinical Workshops/Demos/Interactive Workshops.

TEACHING HOURS

4 hours examination of relevant prosected body parts.
12 hours Ultrasound Anatomy, Pathology, Technique, Application, Diagnosis, Report-writing and Patient Management for upper and lower limbs.
26 hours (seminar/masterclasses) of interactive workshops using student models (as recommended in the BMUS guidelines)* covering anatomy, technique, imaging, optimisation of machine controls to produce optimum images as well as diagnosis, report writing and patient management skills.
1 hour Consultant Forum providing students with feedback on their performance in the Clinic Workshops.
2 hours Discussion and presentations on assignments/case-studies including aims and objectives, structure of assignments, and assessment criteria.

ILO 1-6 will be assessed through a critical account of assignment/case-studies in the safe use of musculoskeletal ultrasound in clinical practice supported by empirical evidence. The following applies:
Module 1: Science and Instrumentation 1500 words x 1 assignment/OSE,
Module 2: Ultrasound of shoulder 2500 words x 1 case study;
Module 3: Ultrasound of elbow/wrist/hand 2500 words x 1 study;
Module 4: Ultrasound of knee/ankle/foot 2500 words x 1 study).

INDICATIVE ASSESSMENT

The written assignment/long-case-studies will demonstrate the student’s knowledge and understanding of upper and lower limb ultrasound anatomy and pathology and obtaining accurate and optimum ultrasound images in relevant areas. Students will be expected to make critical interpretations of these images based on available evidence. Students will include critical appraisal of the evidence for the role of ultrasound in musculoskeletal conditions.

Guidelines issued to students:
- In the relevant regions, critically evaluate:
  - Role of ultrasound in visualising MSK anatomy
  - Role of ultrasound in visualising MSK pathology and in making accurate diagnosis
  - Management of patients to include communication skills
  - Potentials and limitations of ultrasound in MSK applications
  - In all of these, students will be expected to evaluate safety and quality assurance issues in safe and ethical practice
  - Support judgements with research and clinical evidence
INDICATIVE CONTENT

• Areas will be upper limb and lower limb excluding adult hip and groin. Students will focus on relevant applications.
• Communication, counselling and report writing skills
• Medical and Ethical issues to take into consideration consent, chaperone, litigation and complaint procedures
• Professional issues (including safety of patient, clinical governance, confidentiality, privacy, Data Protection Act, discrimination, ergonomics of ultrasound equipment and consideration to RSI)
• Management of a musculoskeletal ultrasound service

INDICATIVE KEY LEARNING RESOURCES

Recommended Text:


Additional Text


Journals

British Journal of Sports Medicine
Journal of Ultrasound
Clinical Ultrasound Journal
Journal of Ultrasound in Medicine and Biology

Guidelines

American Institute of Ultrasound in Medicine (AIUM): Practice parameters and guidelines.

European Federation of Societies for Ultrasound in Medicine and Biology (EFSUMB).

European Society of Musculoskeletal Radiology (ESSR).

Safety statements BMUS

Standards for the provision of an ultrasound service: The Royal Collage of Radiologists (RCR)
# Provisional Timetable: Stage 1 (2 Day Seminar)

<table>
<thead>
<tr>
<th>Day</th>
<th>Morning 0800 - 1300</th>
<th>Afternoon 1400 – 1800</th>
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<tbody>
<tr>
<td><strong>DAY 1</strong></td>
<td></td>
<td><strong>CLINICAL WORKSHOP 1</strong>&lt;br&gt;(Student models and patients)</td>
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<tr>
<td></td>
<td>M1: Ultrasound physics&lt;br&gt;<em>Lecture 1</em></td>
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<td></td>
<td>M1: Ultrasound equipment&lt;br&gt;<em>Lecture 2</em></td>
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<tr>
<td></td>
<td>Approach to MSK Ultrasound <em>(Consultant Radiologists overview)</em></td>
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<td></td>
<td>M2: Ultrasound of the Shoulder&lt;br&gt;<em>Lecture/Demo 3</em>&lt;br&gt;(Sectional Ultrasound anatomy&lt;br&gt;Ultrasound pathology&lt;br&gt;Ultrasound Technique&lt;br&gt;Potentials and Limitations)</td>
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<td></td>
<td>M3: Ultrasound of the Hand/Wrist/Elbow&lt;br&gt;<em>Lecture/Demo 4</em>&lt;br&gt;(Sectional Ultrasound anatomy&lt;br&gt;Ultrasound pathology&lt;br&gt;Ultrasound Technique&lt;br&gt;Potentials and Limitations)</td>
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<tr>
<td></td>
<td>Prosection: 3-D Anatomical modelling Upper/Lower Limbs</td>
<td>Summary&lt;br&gt;Feedback&lt;br&gt;Consultants overview</td>
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<tr>
<td></td>
<td></td>
<td><strong>CLINICAL WORKSHOP 2</strong>&lt;br&gt;(Student models and patients)</td>
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<tr>
<td><strong>DAY 2</strong></td>
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<td></td>
<td>M1: Ultrasound quality assurance&lt;br&gt;<em>Lecture 5</em></td>
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<td></td>
<td>M1: Ultrasound safety&lt;br&gt;<em>Lecture</em></td>
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<tr>
<td></td>
<td>Approach to MSK Ultrasound <em>(Consultant Radiologists overview)</em></td>
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<td></td>
<td>M4: Ultrasound of the Knee&lt;br&gt;<em>Lecture/Demo 7</em>&lt;br&gt;(Sectional Ultrasound anatomy&lt;br&gt;Ultrasound pathology&lt;br&gt;Ultrasound Technique&lt;br&gt;Potentials and Limitations)</td>
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<td></td>
<td>Ultrasound of the Ankle&lt;br&gt;<em>Lecture/Demo 8</em>&lt;br&gt;(Sectional Ultrasound anatomy&lt;br&gt;Ultrasound pathology&lt;br&gt;Ultrasound Technique&lt;br&gt;Potentials and Limitations)</td>
<td>Consultants Overview&lt;br&gt;Training Guidelines&lt;br&gt;Feedback&lt;br&gt;Discussion</td>
</tr>
<tr>
<td></td>
<td>Ultrasound of the Foot&lt;br&gt;<em>Lecture/Demo 9</em>&lt;br&gt;(Sectional Ultrasound anatomy&lt;br&gt;Ultrasound pathology&lt;br&gt;Ultrasound Technique&lt;br&gt;Potentials and Limitations)</td>
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Logistics Stage 1 (2 day seminar)

1. **Number of hours:** In total 10 hours of lectures/demonstrations plus 10 hours of supervised practical and clinical workshops (20 hours over 2 days).

2. **Demonstrations:** Chiropractic students are used for demonstration of normal sectional ultrasound anatomy of the MSK system at the end of each lecture.

3. **Practical workshops:** Delegates will practice on our chiropractic students’ ultrasound sectional anatomy, technique and good practice in small groups with expert tutors.

**Student models**

All student models are healthy volunteers who are scanned by the teaching faculty under the supervision of Dr. Raju (Consultant Radiologist and Course supervisor) prior to appointments to the workshop. Students are given information on the nature of the ultrasound training and in any event where suspicion of pathology is evident a full report by the course supervisor, with recommendations, is available for the models GP’s action. All students will be expected to sign a consent form in line with the BMUS (2002) guidelines (see clinical handbook Appendix 3).

**Volunteer patients**

Patients with demonstrable pathology are invited to attend the seminar in a clinical setting for purposes of demonstration of good practice, anatomy and pathology under the supervision of expert tutors. Small group tutorials allow students to appreciate cross-sectional ultrasound anatomy and pathology with emphasis on good technique and safe practice. There is also emphasis on report writing skills, importance of second and higher opinion, clinical governance and effective communications skills.

**Prosection**

The use of cadaver specimens of upper and lower limbs will be utilised under the supervision of the senior anatomist at the AECC, to inform students of cross sectional anatomy in the accurate visualisation of key anatomical landmarks.
Teaching Faculty: From

<table>
<thead>
<tr>
<th>Teaching Faculty</th>
<th>Position/Institution</th>
</tr>
</thead>
<tbody>
<tr>
<td>Dr. Budgie Hussain</td>
<td>Head School of Ultrasound, Bournemouth</td>
</tr>
<tr>
<td>Dr. P.P. J. Raju</td>
<td>Course Supervisor &amp; Consultant Radiologist, University Hospital of North Tees</td>
</tr>
<tr>
<td>Dr. Marian O'Reilly</td>
<td>Consultant Radiologist, Kingston Hospital, London</td>
</tr>
<tr>
<td>Dr. James Brown</td>
<td>Sports Medicine Physician, British Triathlon, Loughborough University</td>
</tr>
<tr>
<td>Dr. John Tanner</td>
<td>Consultant Sports Medicine Physician, Chichester</td>
</tr>
<tr>
<td>Dr. Thamindu Wedatilake</td>
<td>Consultant in Sports and Exercise Medicine, Oxford</td>
</tr>
<tr>
<td>Dr. Gina Allen</td>
<td>Consultant Radiologists, St. Lukes Hospital, Oxford</td>
</tr>
<tr>
<td>Mr. Ron McCullock</td>
<td>Consultant Podiatric Surgeon, London</td>
</tr>
<tr>
<td>Mr. Jonathan Bailey</td>
<td>Senior Lecturer Podiatry, Southampton University</td>
</tr>
<tr>
<td>Mr. Matt Southam</td>
<td>Senior Sonographer, SMU, AECC University College, Bournemouth</td>
</tr>
<tr>
<td>Mr. Warren Foster</td>
<td>Consultant Sonographer, SMU, Bournemouth</td>
</tr>
<tr>
<td>Dr. Kal Parmar</td>
<td>Chief Medical Officer, Club Doctor, Leicester Tigers, Sports Medicine &amp;High Performance Centre</td>
</tr>
<tr>
<td>Dr. James Inglebarger</td>
<td>Consultant Sports Physician, London</td>
</tr>
<tr>
<td>Dr. Tim Swan</td>
<td>Consultant Sport &amp; Exercise Medicine, Prime Health</td>
</tr>
<tr>
<td>Prof. Pat Collins</td>
<td>Senior Anatomist, AECC University College, Bournemouth</td>
</tr>
<tr>
<td>Dr. Jane Cook</td>
<td>Senior Sonographer, SMU, AECC University College, Bournemouth</td>
</tr>
<tr>
<td>Dr. Alf Turner</td>
<td>Senior Sonographer, SMU, AECC University College, Bournemouth</td>
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<tr>
<td>Dr. Phil Hume</td>
<td>Senior Sonographer, SMU, AECC University College, Bournemouth</td>
</tr>
<tr>
<td>Dr. Dave Allen</td>
<td>Senior Sonographer, SMU, AECC University College, Bournemouth</td>
</tr>
<tr>
<td>Mr. Greg Bailey</td>
<td>Senior Sonographer, SMU, AECC University College, Bournemouth</td>
</tr>
<tr>
<td>Dr. Kay Pearce</td>
<td>Senior Sonographer, SMU, AECC University College, Bournemouth</td>
</tr>
<tr>
<td>Mr. John Leddy</td>
<td>Physiotherapist-Sonographer, Reading</td>
</tr>
<tr>
<td>Mr. Mark Maybury</td>
<td>Physiotherapist-Sonographer,</td>
</tr>
<tr>
<td>Dr. Michael Lanning</td>
<td>Senior Sonographer, SMU, AECC University College, Bournemouth</td>
</tr>
<tr>
<td>Mr. Shaun Rick</td>
<td>Senior Sonographer, SMU, AECC University College, Bournemouth</td>
</tr>
</tbody>
</table>

LOGISTICS

The following companies provide support for practical and clinical workshops:

- Samsung
Stage 1: Seminar

Two days of lectures and practical workshops on:

A. Science and Instrumentation:

1. Ultrasound physics
2. Ultrasound equipment
3. Ultrasound quality assurance
4. Safety of ultrasound

B. Ultrasound Practice:

5. Ultrasound anatomy and pathology of the musculoskeletal system:
   - Ultrasound of the shoulder
   - Ultrasound of hand/wrist/elbow
   - Ultrasound of foot/ankle/knee

6. Ultrasound techniques in the visualisation of the musculoskeletal system

7. Ultrasound workshops are designed to demonstrate of good clinical practice, ergonomics, limitations and potentials of MSK ultrasound.
Stage 2

Supervised Ultrasound Practice
Supervised Ultrasound Practice

Aim

To develop safe clinical ultrasound skills in the visualisation of the musculoskeletal system.

Learning outcomes

MSK practitioners will be able to demonstrate the ability to:

- operate equipment controls to produce optimal images of the musculoskeletal system in longitudinal and transverse sections;
- Adapt scanning technique for patient habitués and pathology;
- Critically evaluate ultrasound images with respect to normal and abnormal pattern recognition;
- Critically evaluate the limitations of the examination;
- Take accurate measurements in the longitudinal and transverse sections;
- Produce accurate and concise written reports about the examination findings;
- Refer patients to more experienced ultrasound practitioners for a more definitive examination;
- Carry out basic quality assurance tests on the ultrasound machine;
- Demonstrate knowledge and awareness of ultrasound safety issues.
Supervised Clinical Training

(A minimum of 8 - 12 month period of supervised training).

After Stage 1 MSK practitioners will use their clinical placements to conduct ultrasound examinations on patients with a designated supervisor:

• Carry out 120 hours of ultrasound practice (50 hours must be mentored)

• Complete a record of clinical practice (150 patients):
  Module 2 (shoulder)  50 cases
  Module 3 (hand/wrist/elbow)  50 cases
  Module 4 (foot/ankle/knee)  50 cases

• Of the 150 cases, 30 MUST be abnormal cases (10 cases per module)

• Complete ONE pathological long case study (1250 words each) for each of module

• Complete a case-study in science and instrumentation (1500 words) and a OSE (Objective Structured Examination)

• Complete the supervised clinical work (minimum 8 months – maximum 1 year period).

• Complete successfully assessment of competency in upper and lower limb

Progress and feedback

Mock assessments are carried out by the supervisor in the middle of the clinical training to check MSKP’s progress towards competency. The assessment also gives the supervisor an opportunity to provide feedback to the course leader, resulting in the identification of any problems arising earlier on the course on academic and clinician matters. Progress will be monitored throughout the training programme in order to ascertain the level and standard of clinical competency achieved.
Master classes
In addition students attend 6 master-classes (3- upper limb and 3-lower limb); students would attend at least three of these intensive tutorials and practical workshops. A total of 15 hours of lectures/demonstrations are carried out covering science and instrumentation, cross sectional anatomy and pathology, prosection and hands-on experience on models and patients with demonstrable pathology. A total of 30 hours of practical supervised training in carried out in small groups. Students would need to attend at least 3 master-classes.

In addition MSK practitioners will have to complete:

Assignments

- Module 1: Science and instrumentation (1500 word assignment) and an (OSE) Structured Objective Examination –pass/fail)
- Module 2: Ultrasound shoulder ( 1 x 1250 word assignment)
- Module 3: Ultrasound of hand/wrist/elbow ( 1 x 1250 word assignment)
- Module 4: Ultrasound of foot/ankle ( 1 x 1250 word assignment)

Master-classes

- 6 master-classes (students must attend at least 3)

Competency assessment

- Final assessment will be carried out by the members of the teaching faculty at SMU clinic, Bournemouth
Guidelines Stages 1 & 2
The following table provides guidelines for STAGES 1& 2 training:

<table>
<thead>
<tr>
<th>MODULE</th>
<th>CONTENTS</th>
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</thead>
<tbody>
<tr>
<td><strong>Module 1</strong></td>
<td><strong>Science &amp; instrumentation</strong></td>
</tr>
<tr>
<td>Physics and instrumentation – in-depth knowledge and understanding of the physics of ultrasound – in-depth knowledge and understanding of the technology of ultrasound equipment</td>
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<tr>
<td>Awareness of quality assurance issues</td>
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<tr>
<td>Awareness of safety issues</td>
<td></td>
</tr>
<tr>
<td><strong>Module 2</strong></td>
<td><strong>Shoulder</strong></td>
</tr>
<tr>
<td>Carry out a thorough ultrasound examination of the shoulder in different planes</td>
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</tr>
<tr>
<td>Recognise normal ultrasonic anatomy and common normal variants</td>
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<tr>
<td>Recognise and be aware of difficulties in distinguishing accurately between tendinosis/partial-thickness/complete thickness tears of the rotator cuff</td>
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<tr>
<td>Recognise rotator cuff calcification</td>
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<tr>
<td>Recognise tendinosis, rupture and subluxation of the long head of biceps tendon</td>
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<tr>
<td>Recognise effusions of the shoulder joint and subdeltoid bursa</td>
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<tr>
<td>Recognise abnormalities which need referral to a more experienced ultrasonologist and/or for further investigation</td>
<td></td>
</tr>
<tr>
<td><strong>Module 3</strong></td>
<td><strong>Ultrasound of hand/ wrist/ elbow</strong></td>
</tr>
<tr>
<td>Carry out a thorough ultrasound examination of the elbow in different planes</td>
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<tr>
<td>Recognise normal ultrasonic anatomy and common normal variants</td>
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<tr>
<td>Recognise tendinosis of the common flexor/extensor origins</td>
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<tr>
<td>Recognise tendinosis/partial/comple</td>
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<tr>
<td>Module 4</td>
<td>Ultrasound of foot/ankle/knee</td>
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<td></td>
<td>carry out a thorough ultrasound examination in different planes</td>
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<td></td>
<td>recognise normal ultrasonic anatomy and common normal variants</td>
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<td></td>
<td>recognise joint effusion</td>
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<td>recognise ganglia and bursae, including ruptured Baker’s cyst</td>
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<td>recognise meniscal cysts and associated meniscal tears</td>
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<td>recognise sprains of collateral ligaments</td>
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<td></td>
<td>recognise tendinosis and tears of patellar tendon</td>
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<td></td>
<td>recognise abnormalities which need referral to a more experienced ultrasonologist and/or for further investigation</td>
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<tr>
<td></td>
<td>perform a thorough ultrasound examination of the lower leg in different planes</td>
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<td></td>
<td>recognise normal ultrasonic anatomy and common normal variants</td>
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<tr>
<td></td>
<td>recognise muscle contusions and tears</td>
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<td></td>
<td>recognise muscle herniae</td>
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<tr>
<td></td>
<td>recognise normal ultrasonic anatomy and common normal variants including accessory muscles</td>
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<tr>
<td></td>
<td>recognise tendinosis and tears of achilles, posterior tibial and peroneal tendons</td>
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<td></td>
<td>recognise joint effusions and loose bodies</td>
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<td></td>
<td>recognise plantar fasciitis</td>
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<td></td>
<td>recognise Morton’s neuroma</td>
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<td>recognise ganglia and distinguish them from solid space occupying lesions</td>
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<td>recognise arthropathy</td>
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<td>recognise ankle ligament injuries</td>
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<td>recognise foreign bodies and foreign body reactions</td>
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<td>recognise abnormalities which need referral to a more experienced ultrasonologist and/or for further investigation</td>
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</tbody>
</table>
Stage 3

Final Ultrasound Assessment
Final Assessment

Aim

- The assessment of ultrasound competency in musculoskeletal ultrasound of the upper and lower limb

Outcome

- A demonstration of a safe and competent application of ultrasound imaging in the visualisation and interpretation of ultrasound anatomy and pathology of the upper and lower limb
Final Ultrasound Assessment Procedure

MSK practitioner will:

- scan a minimum of 3 patients in each module to the satisfaction of the assessor in a clinical situation organised by the course leader;
- demonstrate a satisfactory level of ultrasound competency in the selected modules;
- demonstrate an ability to operate an ultrasound machine to produce an optimum image;
- provide a verbal or a written report to the assessor on ultrasound examinations;
- demonstrate an awareness and knowledge of safety and quality assurance issues.

The ultrasound clinics will consist of student models and suitable patients selected by the course leader.

(The clinical workshops are supervised by Dr. PP Raju (Consultant Radiologist and course supervisor), Dr. James Brown (Consultant Sport Medicine Physician), Dr. Marian O’Reilly (Consultant Radiologist) and Dr. John Tanner (Sports Medicine Consultant).

Certification of Clinical Competency

Teaching, Learning Strategies & Methods
Learning support

- Personal tutor/mentor
- Learning resources (computer room and indicative textbooks/access to journals)
- Access to the SMU tutor by email/telemedicine link and the SMU website
- SMU Moodle

Admission criteria

- Practicing MSKP’s with evidence of satisfactory supervised clinical training site

Evaluation of quality & standards in learning & teaching

- SMU
- Course supervisor
- ADQC

Mechanisms for review and evaluation

- SMU

Responsibilities for monitoring and evaluation

- Course Coordinators
- Student Representatives
- CASE

Mechanisms for gaining student feedback

- Course level student questionnaires
- Dissatisfaction with any aspect of the course allows student to lodge a formal complaint via the head of the school.

Staff Development Priorities

- Academic staff undertake activities related to research, teaching, learning, student support and guidance
- Annual staff appraisals match development to needs
Course Logistics

SMU teaching faculty and the Samsung support the practical and clinical workshops. These are carried out using consented volunteers and specially selected patients.