Academy of PHYSICAL MEDICINE

Broadcast Summary

Caution: These notes should be used in conjunction with the recorded interview. While every effort is made to ensure accuracy, APM cannot guarantee freedom from any errors. Treatment should be based on the advice given by the expert speaker during the interview. Please let us know if you find any errors in this text so that we can correct them.

Diagnostic Ultrasound for MSK Therapies
With Chris Myers

About Chris Myers

- Highly experienced Osteopath, Extended Scope Physiotherapist and MSK Sonographer. Has fully integrated diagnostic ultrasound into his clinical practice and carries out articular and peri-articular ultrasound-guided injections.

- Qualified in musculoskeletal sonography, with a PG Certificate and CASE accredited qualifications from Canterbury Christ Church University. Has taught ultrasound both nationally and internationally on a variety of courses and conferences, at Universities and Professional sports clubs.

- Teaches a diagnostic ultrasound as visiting lecturer at University College of Osteopathy (UCO) and Canterbury University.

- Runs a group of private physiotherapy practices, Complete Physio, based in London treating recreational and elite level sports people. Has worked for the English Institute of Sports (EIS), British Athletics, Tottenham FC, and at the London Olympics.

- Has a particular interest in tendon pathology and shoulder pain.

Ultrasound machines

- Very operator-dependent. The quality of information gathered largely depends on the skill, experience, and knowledge of the operator/ultrasonographer. Not having a good ultrasound machine makes it even harder to produce appropriate information.

- A cheaper machine can be good for scanning superficial structures like the Achilles or the patellar tendon, but has limited capabilities. It cannot produce good information when

used for scanning slightly deeper structures (e.g. proximal hamstrings, lateral/anterior hip).

- The scans that are done in a physio/osteopathy clinics are mostly musculoskeletal. The machines used, specifically those with good spatial resolution can reliably scan up to about 4 centimetres deep.

- Scans over six centimetres deep would need other imaging modality such as an MRI.

- Key to selecting a good ultrasound machine is not on the basis of its price but on its ability to pick up details.

- Depth button alters the penetration of ultrasound. Higher frequencies give better spatial resolution (i.e. better image). The lower frequencies look at deeper structures.

- A good ultrasound machine has a specific set up for specific joints.

Diagnostic ultrasound scan

- Using ultrasound imagery as an extension of the clinical assessment does not need CQC regulation. Setting up an "Ultrasound Clinic Service" would.

- US scanning can form part of the initial assessment as an 'extra thing' to encourage more clinic bookings.

- A clinical assessment with ultrasound scan provides high uality information as a basis for clinical decision-making.

- Ultrasound is not as useful for intra-articular pathology (i.e meniscal tears or osteochondral defects). But it can be used to rule out extra-articular structures (i.e. joint effusion).

- Ultrasound is very useful for assessing tendons in the upper/lower limb. It is also good for differentiating foot pain (i.e. Morton's neuroma).

Details picked up by an ultrasound machine

• Shards of glass, wood • Ulna nerve, radial nerve, the median nerve • Joint lines (effusion); triceps	• Shoulder tears (full thickness symptomatic and asymptomatic tear)
	• Elbow injuries – distal biceps tendon, common flexor, extensor
	• Calcification in the cuff

Record keeping

- There is no single rule for record keeping – everybody does it differently. This needs to be regulated more.

- Clinicians should never separate their ultrasound report from their clinical notes. One of the skills to develop by a clinician is the ability to translate those images into words.

Demo (administering ultrasound scan)

(39:10 – 1:09:37 in the broadcast recording)

- There are body areas that are easier to scan than others (i.e. the shoulder is one of the hardest areas to scan because it is round and what is actually being scanned are the tendons that wrap around the bone).

- When clinicians are learning ultrasound scanning, they need to learn normal anatomy first. Get used to what looks normal (i.e. scan and look at a good young normal anatomy). It is very hard to visualize the structures because the books do not always represent the way they actually are.

- On the ultrasound training course, the delegates are taken through in a progressive way (normally starts with scanning around the Achilles and the calf, up towards the knee) so that they will know what all the normal structures look like. Protocol-based scanning is done (i.e. If a patient has anterior knee pain, it is not recommended to scan the entire knee – just separate the bursae from the fat pad from the patellar tendon).

- The angle of incidence is the angle at which the ultrasound waves encounter the surface of the structure. It affects the way it is presented on the screen. If the angle is perpendicular, a better image is generated.

Patellar tendon

- The MRI tends to be overused generally in musculoskeletal medicine, for example when assessing the patellar tendon. An ultrasound can actually pick up details because it has better spatial resolution than MRI.

- The tendon will be thicker when someone has patellar tendinopathy.

- The correlation between imaging findings and pain sometimes do not always match. There are cases when the patient does get better functionally but the imaging looks the same (or the structure gets worse). That is why clinicians do not monitor tendon issues on ultrasound (i.e. patella tendons, Achilles tendons, rotator cuff tendons).

Bursa

- The infrapatellar bursa appears in the scan as a thin slip of fluid, which cannot be seen with the knee straight. It can be seen only when the fat pad actually starts to retract.

- One can see a lot of details when scanning the knee flexed – to see the groove and the cartilage.

Medial collateral ligament (MCL)

- It is a very long structure. It is in the deep band where a lot of tears occur. If there is damage on the MCL, it will appear thicker and there will be some fluid that can be seen during the scan.

- A stress is applied onto the MCL (i.e. probe is pressed over the joint line) to see how much of that joint opens up. An MCL that is lax may give patients more long term issues. An MCL that has healed is not going to be lax.

Shoulder

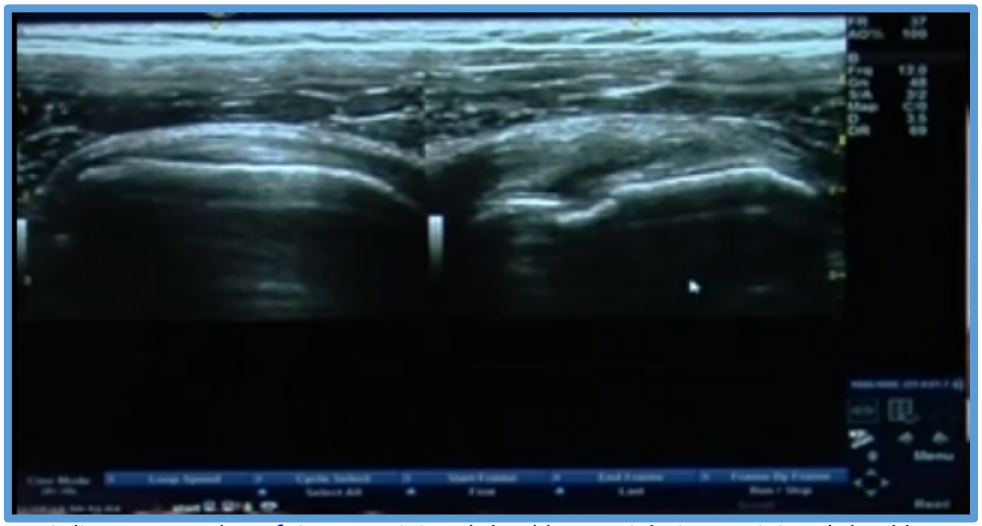
- Most shoulder injuries in an osteo-physio clinic do not need an MRI. An ultrasound gives more detail than an MRI would.

- An ultrasound diagnosis in the right hands is just as sensitive and specific to generating information if the rotator cuff is torn.

Sample Imaging:

Complaint: Painful right shoulder, pain shoots down the arm to the wrist. Painful when the arm is lifted up.

The image below shows the potential shoulder injury of a 38-year old man following a road traffic accident.



Split screen mode: Left image uninjured shoulder vs. Right image, injured shoulder

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What the scan shows – right image previous page

- Fluid around the long head of biceps. There is swelling at the top, indicative of inflammation.
- Some cortical irregularity around the tuberosity; there is a subscapularis tear that needs further investigation. There is thickening of the bursal plane.
- Infraspinatus and superspinatus look normal.

Recommendation:

- Investigate further. A CT scan and X-ray image can provide more information that will help in generating the appropriate clinical diagnosis for this case.

Clinical relevance of MSK ultrasound

- On top of the clinical assessment, the ultrasound imagery helps in getting the right clinical diagnosis.
- An ultrasound cannot provide information about bone density.
- Detecting blood clots is outside the remit of an MSK sonographer – it is within the remit of a vascular sonographer.

Competency pathway

A basic level of competency can be achieved over a year of doing about 250 scans. It is not advisable for clinicians to put an ultrasound machine in their clinic if they are not able to go through the learning pathway.

A. Formal competency pathway

- The formal competency pathway to becoming a competent and skilled sonographer is about getting a case-accredited post-graduate certificate in musculoskeletal ultrasound. Most of the learning will be done in the clinic with a clinical supervisor over a 10-month period. Also 5-10 days' university attendance. Fee in the region of £2.5k.
- Part of the requirements is to come up with a log book of about 250 scans (i.e. a mix of supervised and unsupervised scans), plus a physics exam.
- A post-graduate certificate does not always guarantee standards. What guarantees standard is when clinicians go back to their clinics, they practice, and undergo clinical supervision.

B. Informal competency pathway

- A large part of the process is self-learning. An informal competency pathway can be pursued through -
  a) purchasing an ultrasound machine;
  b) attending an introduction course;
  c) getting a lot of learning resources (i.e. read books; watch YouTube videos);
  d) aiming for 250 scans in a log book; and
  e) auditing your own scans.

- Earning competency through an informal pathway needs to be properly documented. A portfolio of scans should be generated as evidence.

- Part of the learning pathway is delivering the information/findings to patients. Describe them in such a way that patients understand their condition without being frightened or intimidated.

C. Supervision pathway

- A Mentorship Programme is offered at the University College of Osteopathy. A clinician can do a supervised scanning with skilled sonographers there. A logbook will be required to track/audit whether those scans are correct.

- Individuals will have to undergo a competency exam where they will be watched how they administer ultrasound scanning.

- It is difficult to get a clinical supervisor. It takes a lot of time to supervise somebody. The Mentorship Programme guarantees the presence of a clinical supervisor (clinicians can scan and learn with the latter).

Note: Learning with a radiologist closely is another way to acquire competency– sit in, take notes, and practise. Join a network E.g. SMUG Ultrasound Forum on FB which is for anybody who has attended one of SMUG's Mentorship courses. Scans are uploaded and people get to comment on them regarding treatments to do, among others.

Other relevant points

- Never scan anything that you would not clinically assess like a bump and a lump unless it is a musculoskeletal contusion caused by an impact during a game.

- Get trained by someone who does ultrasonography for a living rather than someone who only knows how the ultrasound works. Note that most NHS sonographers scan breasts and lumps and do not scan the musculoskeletal system.

- Clinicians should get as much training they can because they will most likely be doing the scans and generating diagnosis on their own – unlike in the NHS which is a protected environment where clinical diagnosis is decided by a multi-disciplinary team.

- A new machine of adequate quality for someone learning the skill costs about £7-8 thousand.

- The idea of setting up a one-stop shop/facility includes having a directory of practitioners who had undergone sufficient competency-based training on diagnostic ultrasound for MSK therapies – other osteopaths, physios, and chiros may refer to them.

The official website of SMUG (Sports Medicine Ultrasound Group): https://www.ultrasoundtraining.co.uk/ . Run by physiotherapists committed to providing accessible MSK ultrasound courses with high-quality teaching.

- Has an article on *The Top 10 Tips to Get Started On Ultrasound*. The site contains other relevant resources and blogs.

About SMUG

- The courses are multi-disciplinary – bring together a variety of clinicians including MSK radiologists, sports doctors, orthopaedic surgeons, physiotherapists, sonographers, osteopaths, podiatrists and GPs.

- Provides a competency-based mentorship programme in MSK Ultrasound that includes a dedicated clinical supervisor. Also delivers a 2-day Cadaveric Musculoskeletal Ultrasound Guided Injection course.