

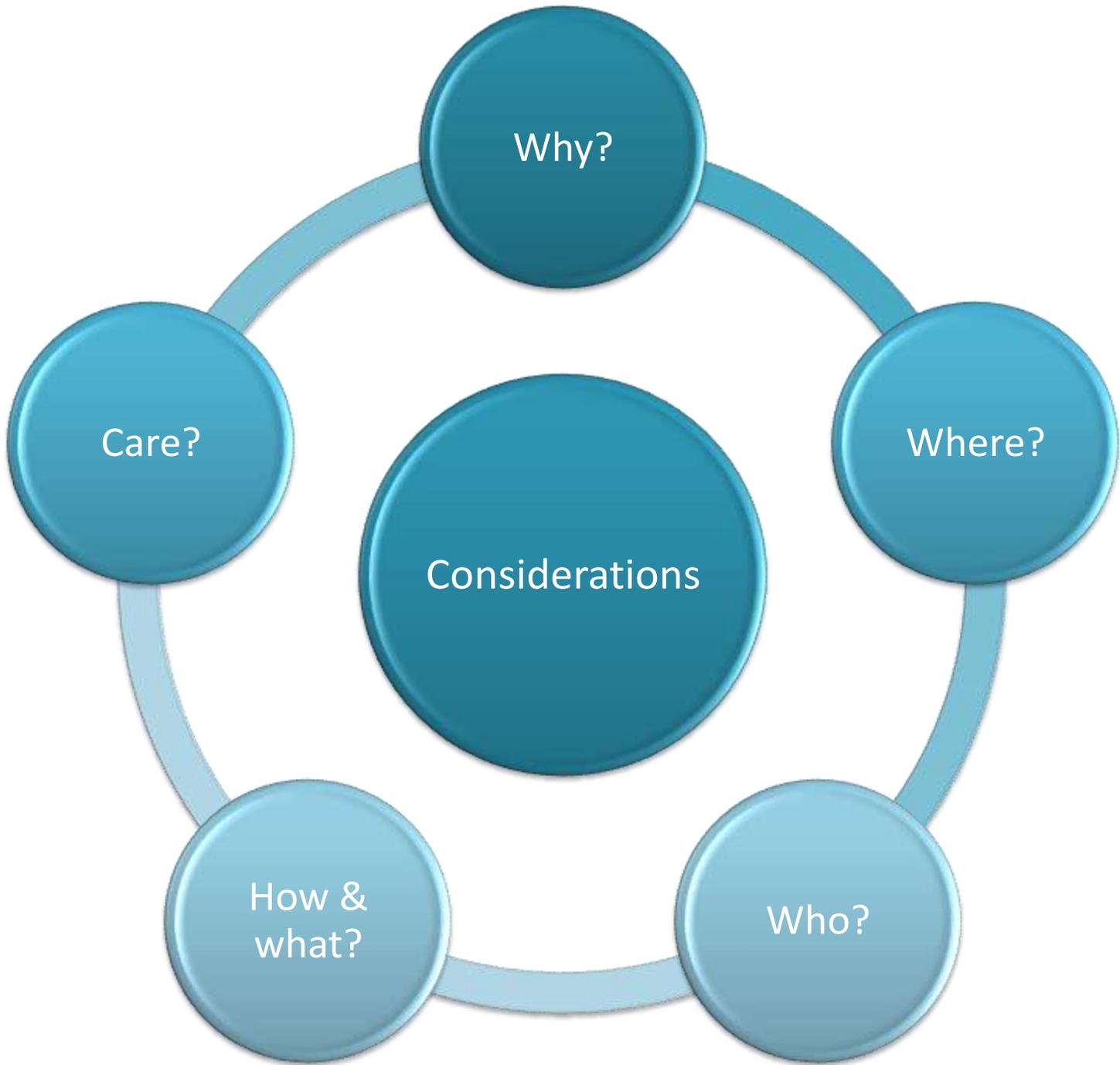


The use of portable ultrasound in living anatomy teaching: *lessons learned.*

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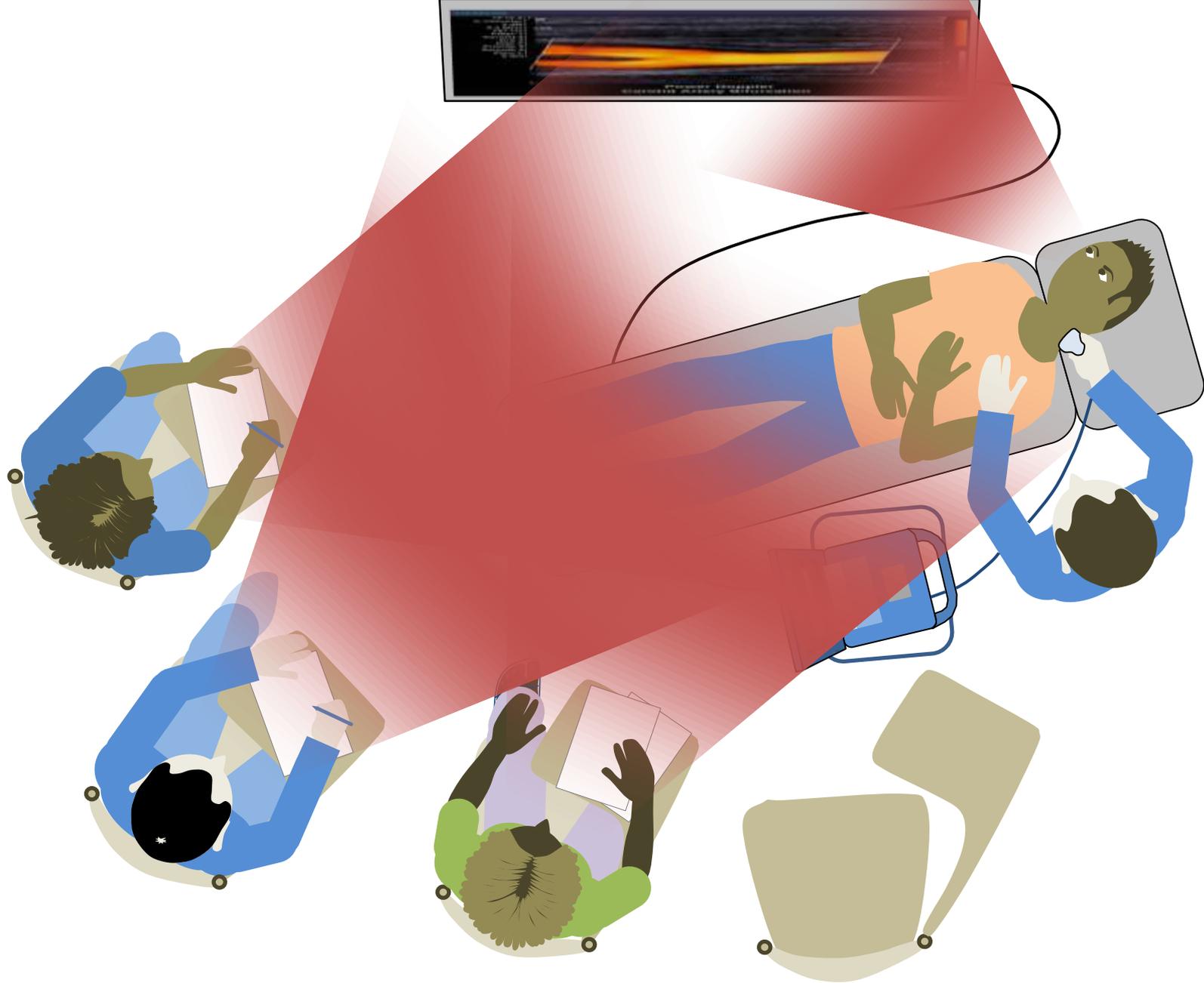


Why scan?

- Patient safety (NICE)
- To *'future-proof'* students
- Ultrasound adds a dynamic element to the study of anatomy
- Developing transferable skills in cross-sectional image interpretation

Whereabouts to scan? Creating the optimal learning environment

- Small group teaching
- Optimise ambient lighting conditions
- Use high quality audio-visual equipment to display the image
- Operator's hand should be visible to allow orientation alongside the projected ultrasound image



Who to scan?

- Student volunteers
 - Accessible
 - Low cost
 - Scanning is confined to limbs & neck
 - Altered learning experience for volunteer
- Clinical Skills Partners (CSPs)
 - Less accessible , require induction & training
 - Higher cost
 - Can scan more body regions
 - Standardised learning experience for all students

Who to scan?

- Informed consent required for all volunteers
 - British Medical Ultrasound Society (BMUS) have published a suitable consent form¹

- Obtain informed consent for the use &/or publication of any anonymized ultrasound images

What to scan? Discovery of 'circumstances which require further investigation'



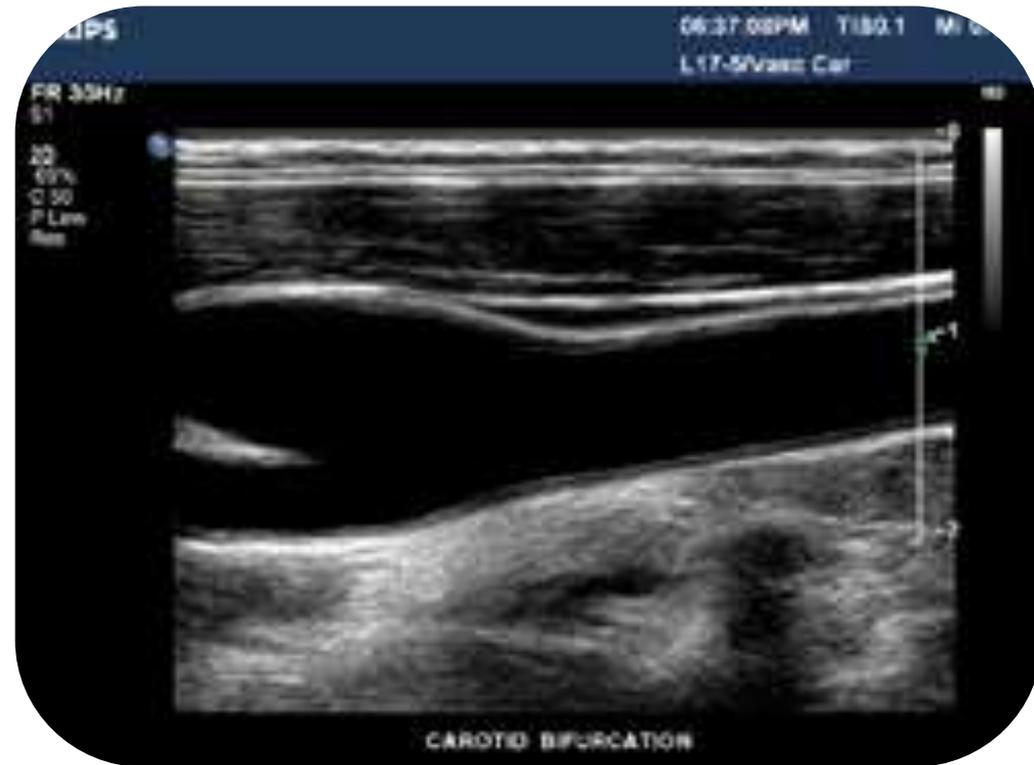
- Pre-scan volunteers prior to teaching session
- Mechanism for referral, e.g. Occupational health or general practitioner

How to scan?

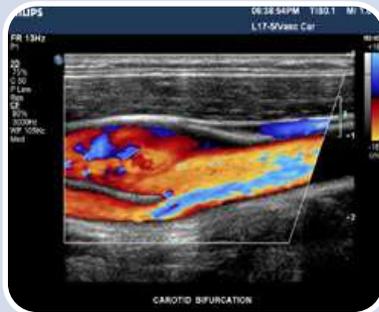


How to scan?

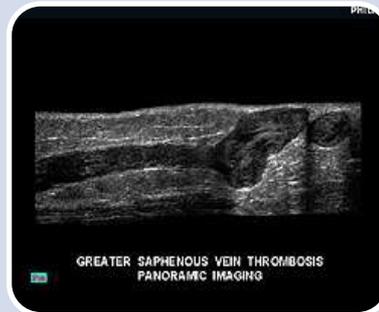
- Some areas lend themselves to demonstration
- Always introduce the learning activity by explaining image orientation (e.g. skin surface, depth of scan, etc)



What to scan? Tried and tested



Carotid



Femoral
veins



Heart



Abdomen

Care in scanning

- Anyone scanning (tutor/students) should follow BMUS guidelines
- Pre-scan volunteer prior to teaching session
- MI (<0.3) and TI (<0.5) should be considered
- Avoid scanning pregnant volunteers
- Practice good ergonomic technique

The British Medical Ultrasound Society

Guidelines for the safe use of diagnostic ultrasound equipment

Prepared by the Safety Group of the British Medical Ultrasound Society.

Part I: Basic guidelines

The following Basic Guidelines should be read in conjunction with Detailed guidelines for the safe use of diagnostic ultrasound equipment

Key principles for the safe use of ultrasound

- Medical ultrasound imaging should only be used for medical diagnosis.
- Ultrasound equipment should only be used by people who are fully trained in its safe and proper operation. This requires:
 - an appreciation of the potential thermal and mechanical bio effects of ultrasound
 - a full awareness of equipment settings
 - an understanding of the effect of machine settings on power levels.
- Examination times should be kept as short as is necessary to produce a useful diagnostic result.
- Output levels should be kept as low as is reasonably achievable whilst producing a useful diagnostic result.
- The operator should aim to stay within the BMUS recommended scan times (especially for obstetric examinations).
- Scans in pregnancy should not be carried out for the sole purpose of producing souvenir videos or photographs.



Developing learning activities

- Consult with a sonographer
- Consult with other practitioners using ultrasound
 - e.g. In regional anaesthesia, rheumatology , physiotherapy, etc
- Pilot new teaching sessions
- Evaluate teachings session

Regional use of portable ultrasound in undergraduate healthcare teaching programmes.

*Durham & Newcastle Medical students (years 1 & 2)	UHNT & Hartlepool Medical students (year 3)	Teesside Radiography students (year 1)	Northumbria Physiotherapy students (year 3)
<p>Clinical contextualisation of anatomy teaching.</p> <p>Interpretation of cross-sectional images of anatomy.</p> <p>Living anatomy teaching.</p> <p>*Clinical skills; principles of blood pressure measurement</p> <p>*Physiology teaching: measuring stroke volume during simulated haemorrhage.</p>	<p>Confirmation of patient diagnosis at the bedside using portable ultrasound (e.g. Liver disease, splenomegaly, etc)</p>	<p>Basic principles of ultrasound scanning.</p> <p>Interpretation of cross-sectional images of anatomy.</p> <p>Clinical contextualisation of anatomy teaching.</p>	<p>Project work, recording measurements, (tendon length, etc pre- & post-treatment), gathering physiological data.</p>

References

1. BMUS. *Guidelines for the management of safety when using volunteers & patients for practical training in ultrasound scanning*. <http://www.bmus.org/policies-guides/pg-guidelines02.asp> 2009 [cited 2009 17 Nov 2009]; Available from: <http://www.bmus.org/policies-guides/pg-guidelines02.asp>.
2. Society, B.M.U. *Guidelines for the safe use of diagnostic ultrasound equipment*. 2009 [cited 2009 Nov 2009, Nov 17]; Available from: <http://www.bmus.org/policies-guides/pg-safety03.asp>.
3. Patten D, Donnelly L, Richards S. Studying living anatomy: the use of portable ultrasound in the undergraduate medical curriculum. *International Journal of Clinical Skills*. 2010;4(2):72-7.

Acknowledgements

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Simon Richards (Teesside University) for sharing his time and expertise.

Student feedback (Durham University, 2008)

- Struggle with image interpretation initially
- Increases clinical contextualisation of anatomy teaching
- Aids understanding of cross-sectional & surface anatomy
- Want more & want to opportunity to use the equipment

Student feedback- qualitative (2009)

- *“The actual **doing it myself** it’s because it’s living and it’s because I’m actually doing it myself, **I remember better that way**”*
- *“Same as when you’re putting in a central line, central line usually just a blind stab into the neck but now it’s, well should always be done under ultrasound, so like I say, **it’s going to become a bigger part of our jobs when we become doctors.** I think the more we can get used to it now the better”*
- *“I enjoyed using it because it is the kind of thing that you’re going to be doing when you working and that’s what we’re all here for, you know, although this is very academic, we’re like doing a lot of clinical stuff and it kind of **makes it seem as though being a doctor is a little bit nearer than you think.** But I think we don’t do enough of it really”*