How to perform forearm pQCT

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Overview

• Background
• Forearm length measurement
• Scout views
  • Adults
  • Children
• Scan sites & outcomes measures
• Scan grading
• Common mistakes
Why measure the forearm?

- Fractures of the distal radius are relatively common
  - 25% of paediatric fractures (Nellans et al. 2012)
  - 18% of fractures in the elderly (Nellans et al. 2012)
- It is a non-loading site
  - Why might this be of interest?
    - Less confounded by weight
    - Less confounded by changing weight
How does this relate to forearm DXA?

2 mm thick pQCT cross-sections at equivalent forearm sites highlighting the portions of trabecular (red) and cortical (white) bone.
Forearm length measurement

- Non-dominant arm unless impracticable
  - Injury to limb
  - Immobilisation of limb
  - Metal implants
- Arm bent at a right angle
- Distance measured is from the olecranon to the distal edge of the ulnar styloid process
- Measured with a metal ruler to the nearest 0.5 mm
- NB only measure adults at visit 1 – you may not get the same length twice
Participant positioning

Tips

• **NB If your participant is comfortable they will move less!**
• If necessary we can raise or lower the scanner height
• Be mindful of elbows and shoulders
• If the chair has wheels – apply the brakes
Scout views
Quick refresher...

• What’s wrong each tibia scan?
  • (a)
  • (b)
  • (c)
Children = growth plate

- For children we always use the growth plate for our reference line – why?
What about adolescents??

- When should we move from the growth plate to the endplate
- If the growth plate <50% resorbed into the endplate – use growth plate
- If the growth plate >50% resorbed into the endplate – use endplate
Adults = endplate

- Scout view should run along the flattest part of the radius endplate
- Be careful as sometimes the endplate can be angled
- If there is movement on the scout or you are unsure where the reference line should go consider rescanning
Scan grading

• Scan grades 0, 1, 2 & 3
• Which would you exclude?
• Is there anything you could do to improve the data you get from this scan?
Q: Is there any other reason you might see a scan like this?
A: Object length entered incorrectly (e.g. 30 mm vs 300 mm)
Other potential issues?

• Excessive movement on SV
• Extending SV
• Stopping an SV early
• Growth arrest lines...
Now you have your scans...

- What are you going to look at?
  - Bone mineral density
  - Bone geometry
  - Bone strength
  - Bone microarchitecture
  - Mineral distribution
  - Fat area
  - Muscle density

- Bone microarchitecture: [X]

Why can't we measure cortical bone at the 4% distal radius?
Questions?