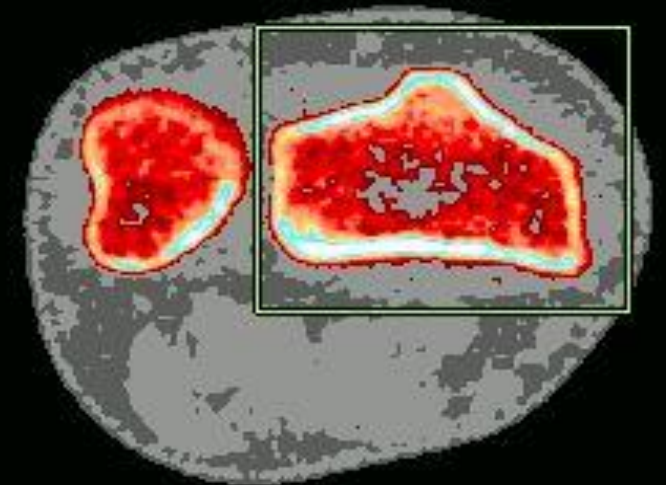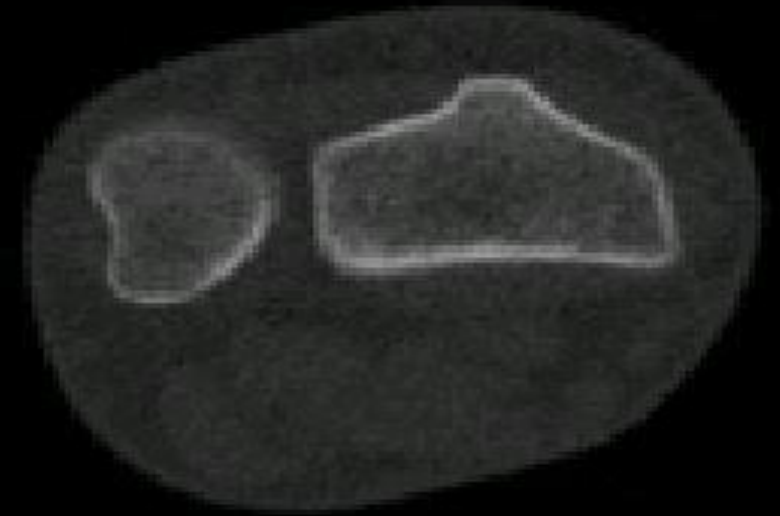# How to perform forearm pQCT

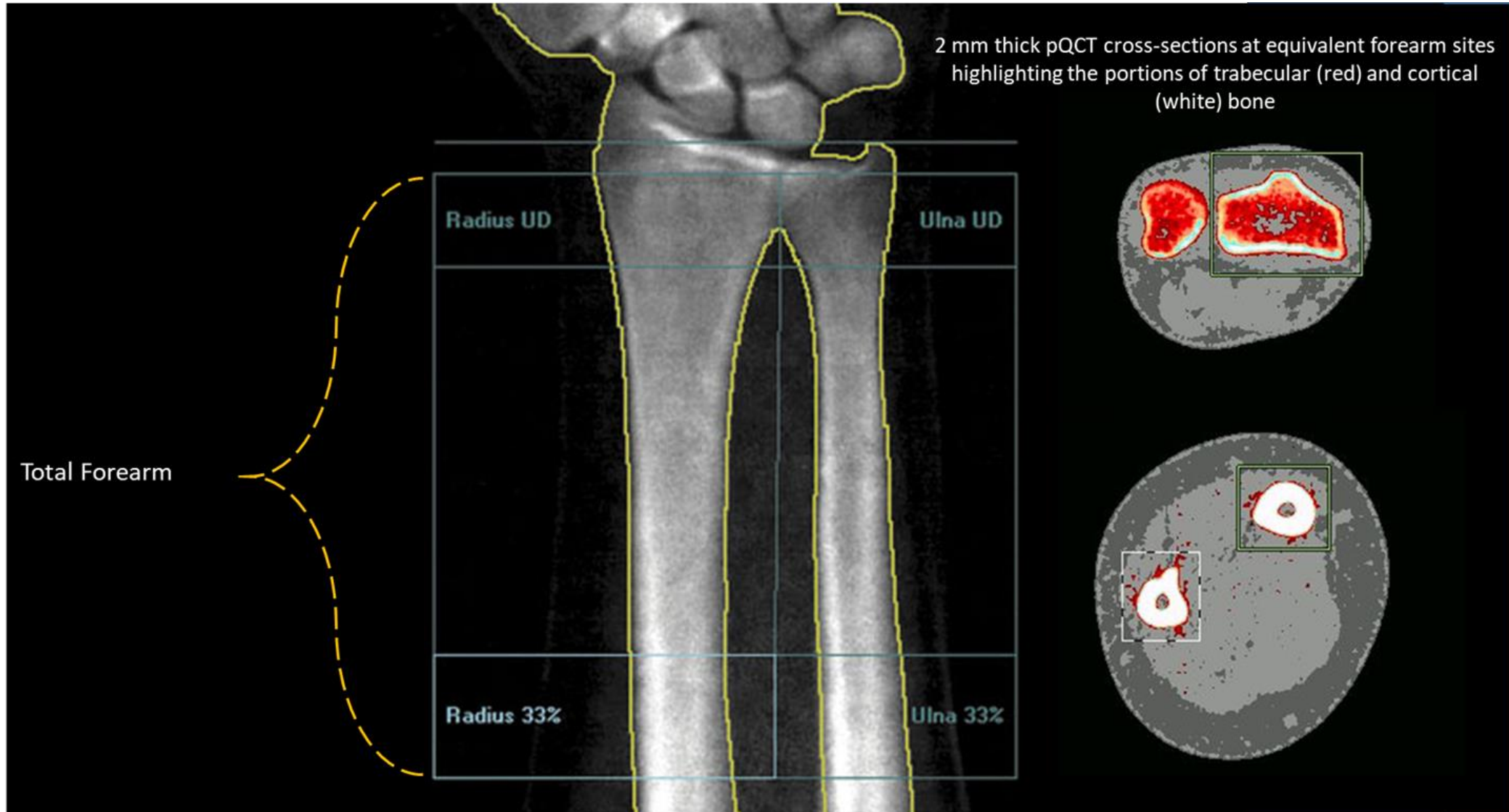Dr Mícheál O'Beasail

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

Total Forearm

Radius UD   Ulna UD

Radius 33%   Ulna 33%

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
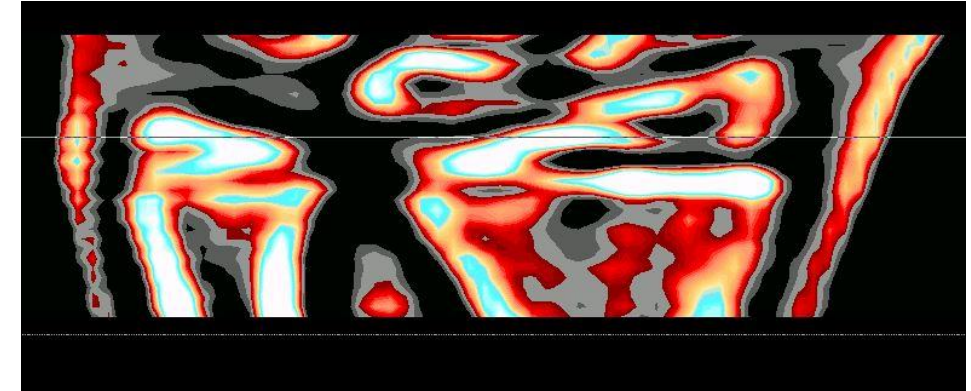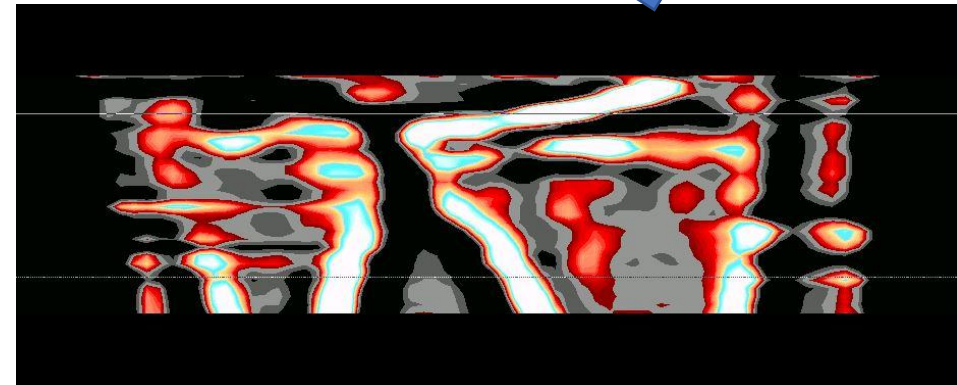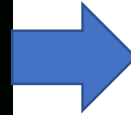- If the chair has wheels – apply the brakes
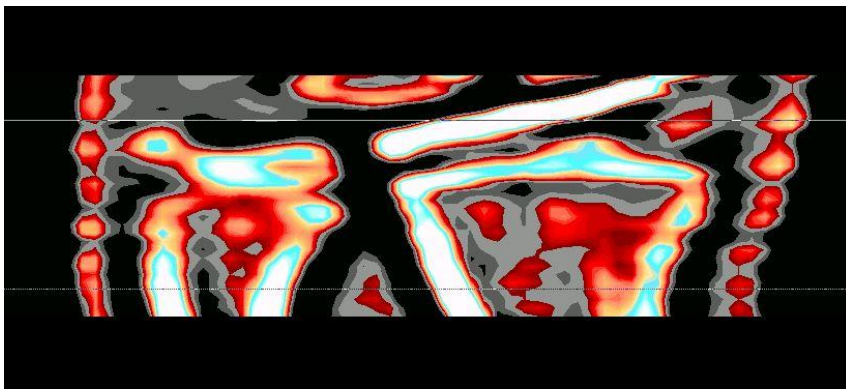
Scout views
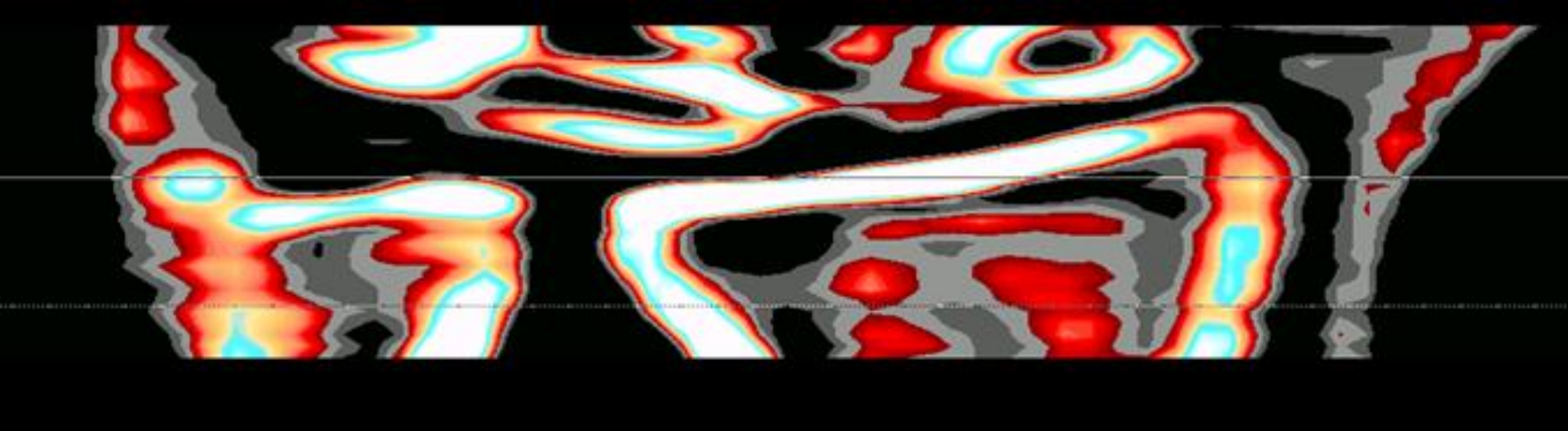
Quick refresher…

- What's wrong each tibia scan?
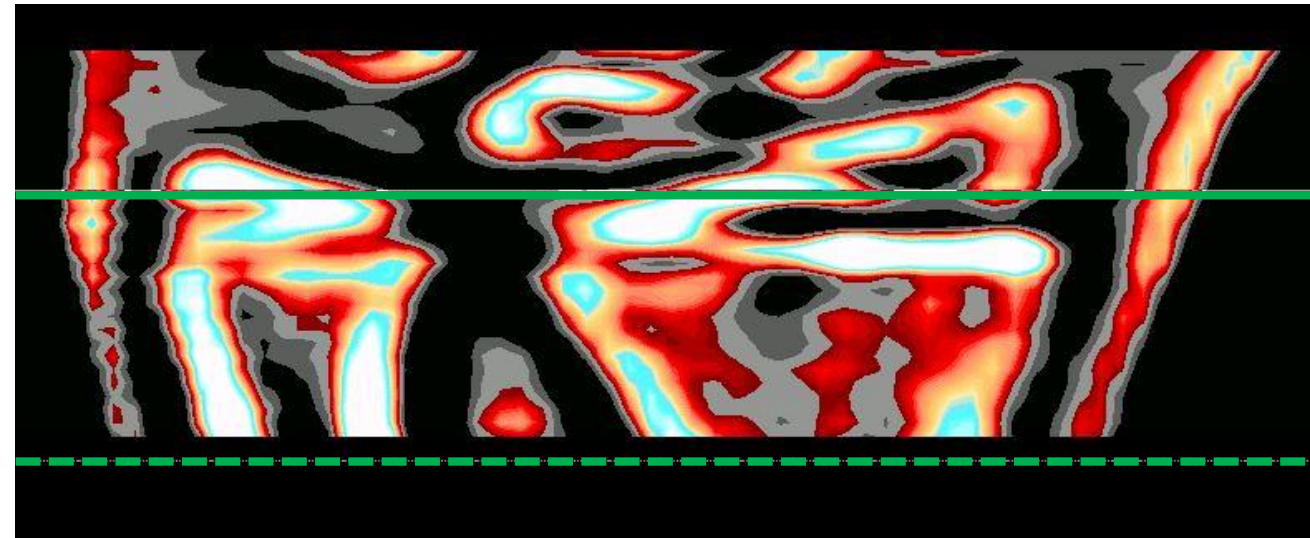 - (a)
  - (b)
  - (c)

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
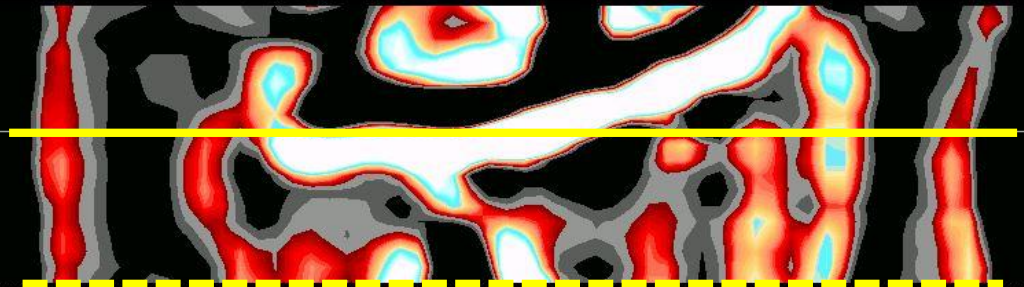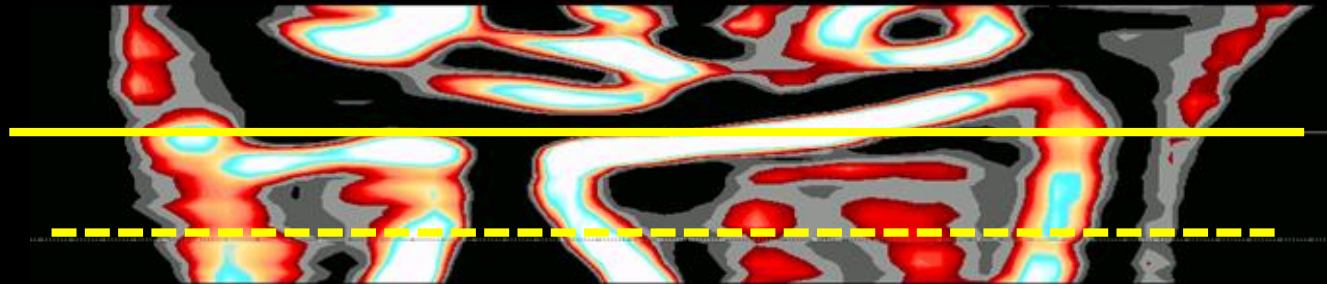
Adults = endplate

- 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
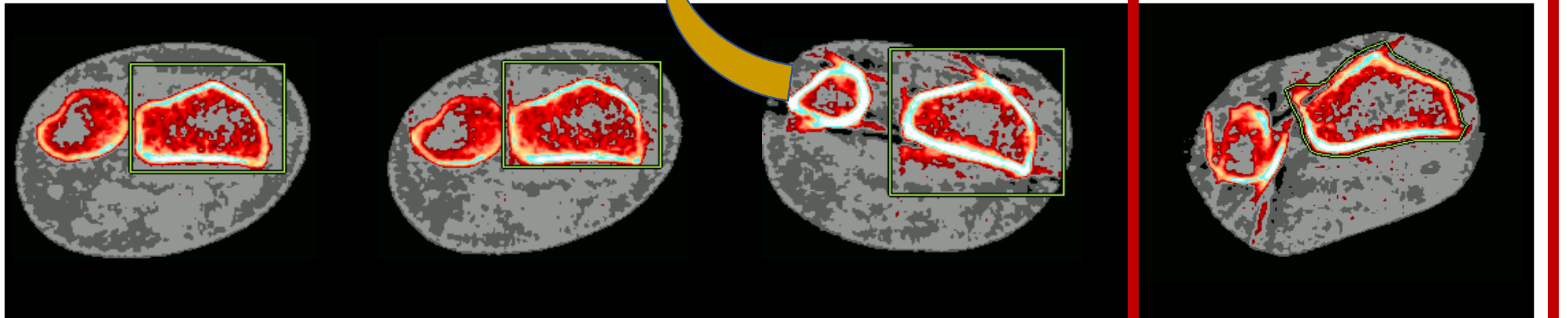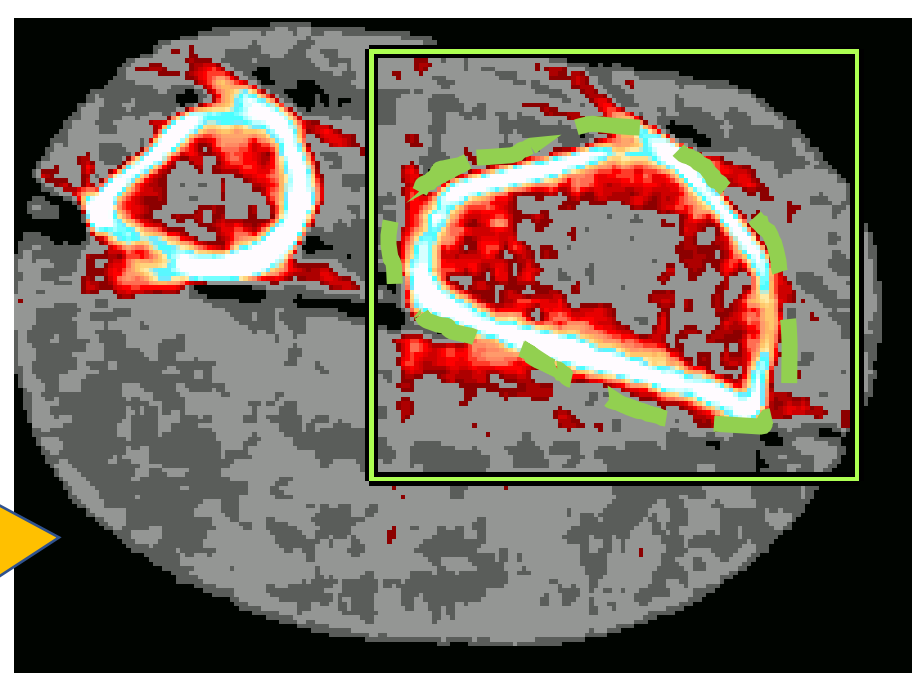
reference line

measurement line

Scan grading

- Scan grades 0, 1, 2 & 3

- Which would you exclude?

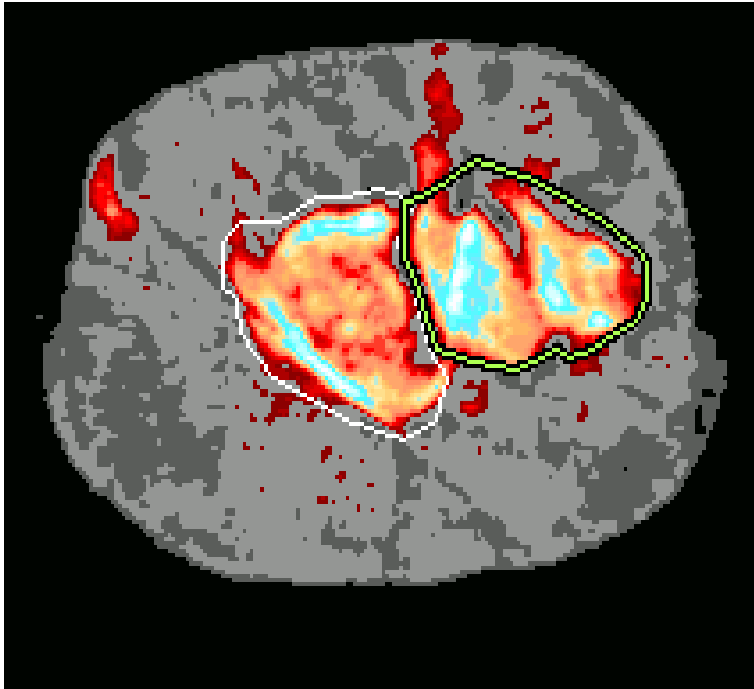- Is there anything you could do to improve the data you get from this scan?

exclude

1   2   3   4

Common mistakes

What's wrong with this scan?

Q: Is there any other reason you might see a scan like this?

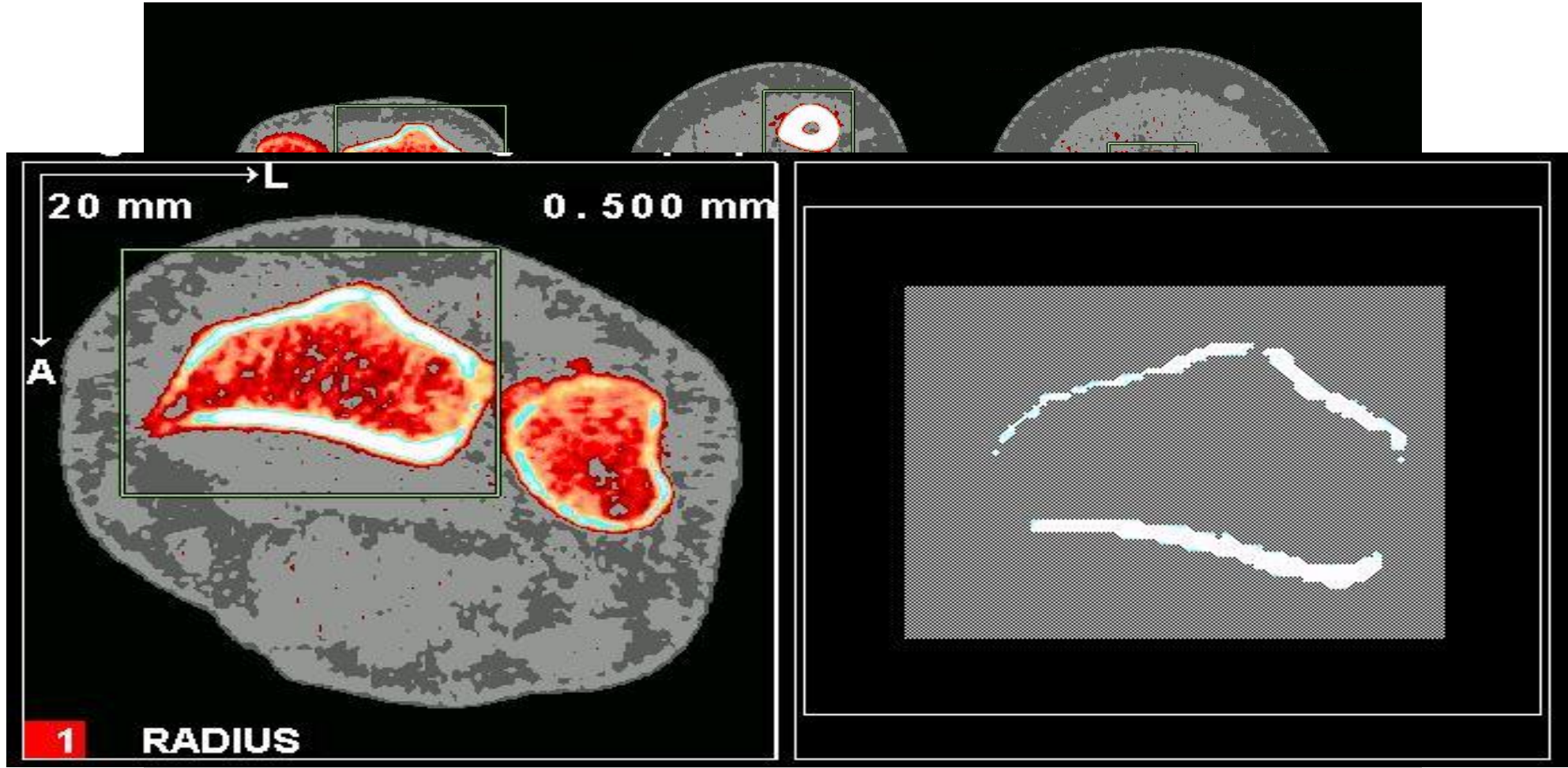A: Object length entered incorrectly (e.g. 30 mm vs 300 mm)

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 ✓
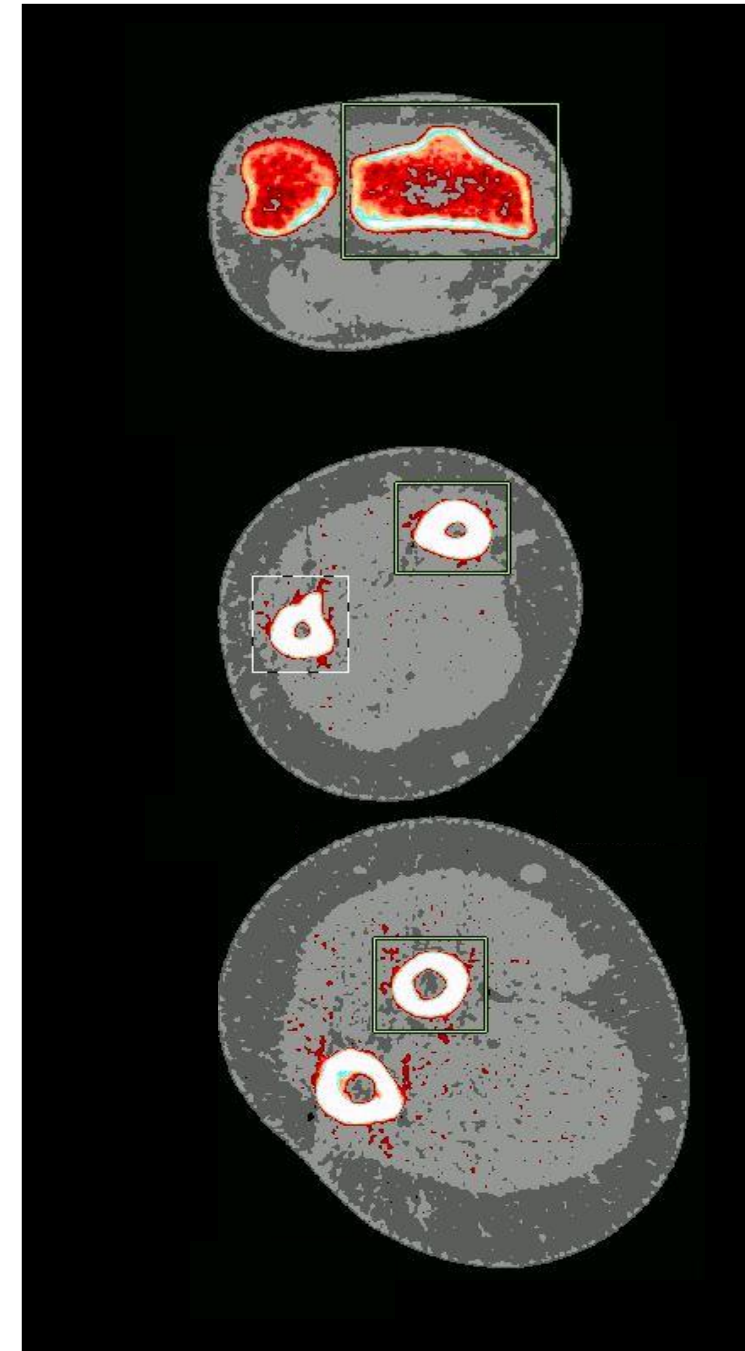
	Endosteal circumference	Endosteal circumference	
	Periosteal circumference	Periosteal circumference	
		Muscle CSA	Body composition measures
		Fat CSA	
		Muscle Density	

Questions?