Disclaimer

The following presentation is for informational purposes only and is not intended to provide medical advice, diagnosis, or treatment. Always seek the advice of your physician or other qualified health provider with any questions you may have regarding a medical condition. Never disregard professional medical advice or delay in seeking it because of something you have read or seen in this presentation. There is nuance in specific individual cases requiring differing clinical judgement. The information provided here cannot explain all subtleties of bone mass measurement.

This presentation was created in 2025.

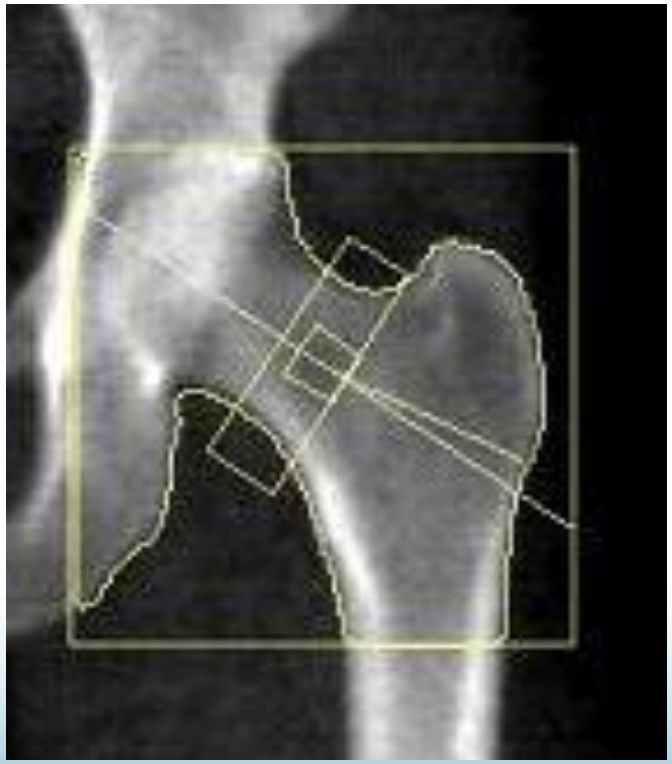
Which bones are scanned for a DXA bone density test

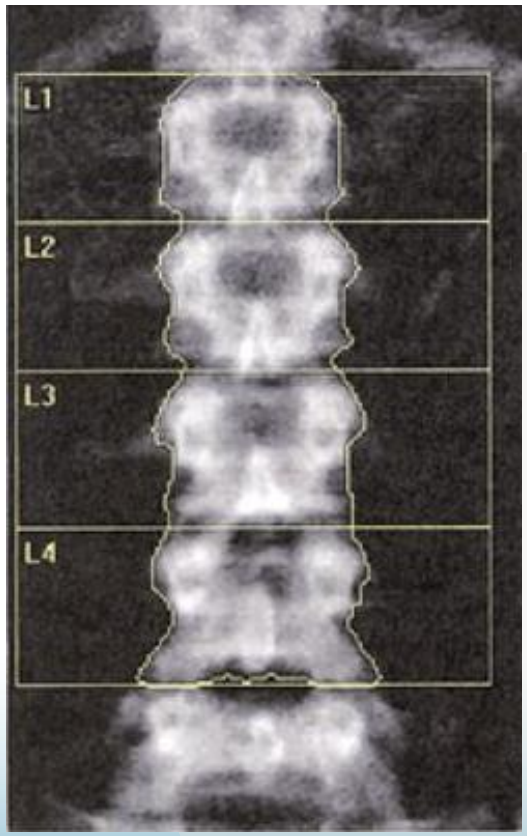
Objectives

1. Define the preferred sites for DXA scans.
2. Identify reasons why the spine and femur are the optimal sites for DXA measurement.
3. Explain factors involved in scan site selection.

Standard DXA sites

- The standard measurement sites for a DXA scan are lumbar spine and hips which include the tops of the thigh bones (femur) as they go into the pelvis at the hip joint.





Why do DXA bone density scans measure the lumbar spine & hips, *but not other body sites?*

Patients often ask…

- **Why aren't you scanning my _____,**
  - it's my _____ that hurts.
  - because I broke my _____.
  - because I have a weak _____.

Bone loss alone is not painful.

A DXA scan cannot determine why a joint or muscle feels weak. It does not assess the cause of pain.

DXA is not about finding fractures, it is about assessing your risk for breaking bones.

We don't need to measure every bone in the body.

→ Actually, it's best not to.

Bone density throughout the body is not exactly the same, but that doesn't mean one area would be considered "weak" and another be considered "strong".

Changes, called ***bone remodeling***, occur at a nearly continuous rate throughout the body. This process replaces bone over time, breaking down the old and building new bone.

Osteoporosis is a systemic disease where remodeling has become unbalanced. It is rarely localized to just one area unless one body site is permanently or temporarily immobile.

- **Regarding bone pain:**
  - A DXA scan does not evaluate the cause of pain.
  - Bone loss and low Bone Mineral Density (BMD) does not cause pain.

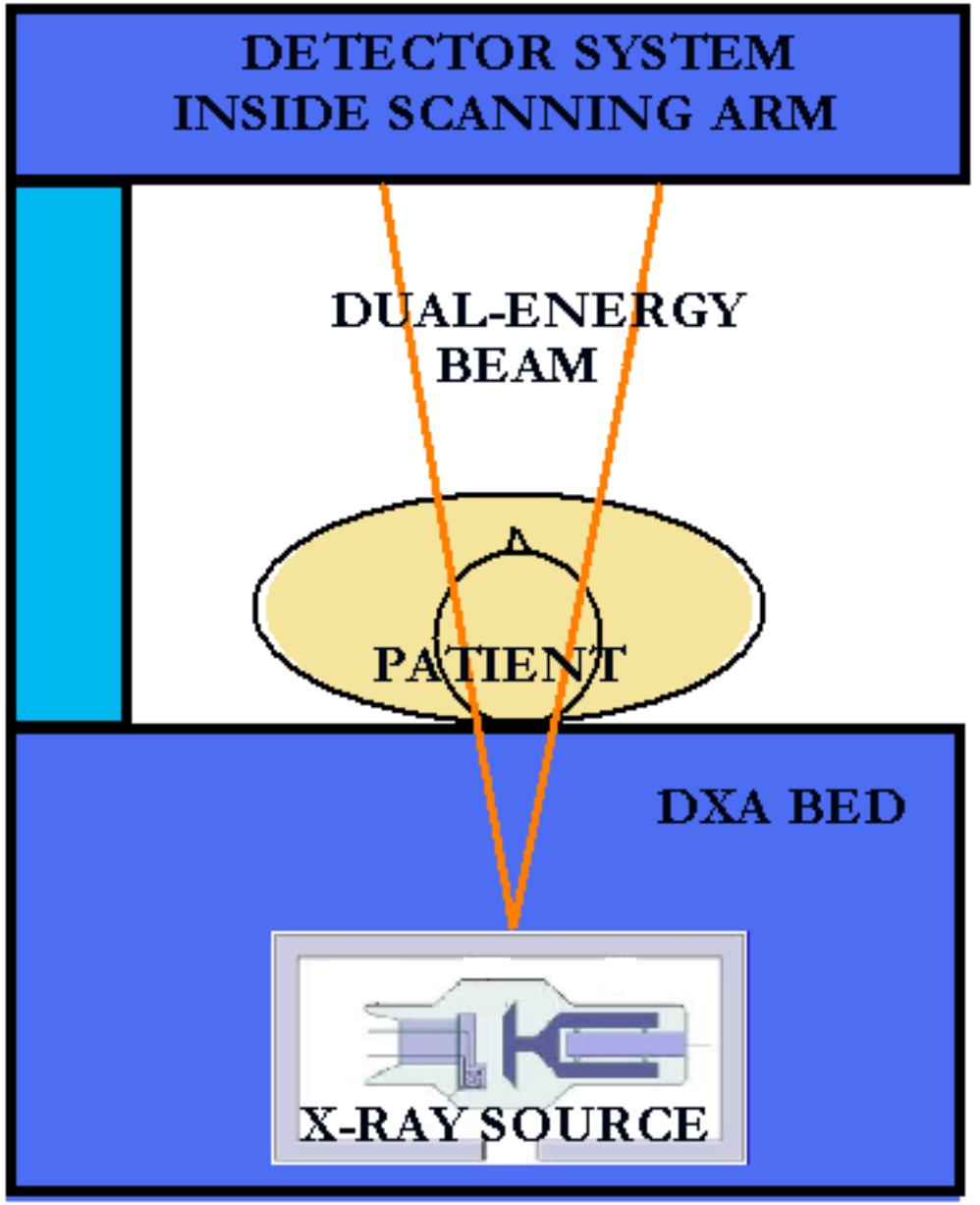
- **Regarding previously broken bones:**
  - We don't want to measure previously fractured bones because during the healing process, a 'callus' of additional bone gets layered over the site of the break.

- **Regarding a sense of weakness:**
  - You cannot feel bone fragility. A feeling of weakness would not be related to the bone itself (unless it's the result of a recent break). It is associated some other problem in the muscles, ligaments, tendons, joints, or nerves.

In most patients... it is best to measure the largest bones

- It provides a large sample size
- Large bones contain the greatest proportion of the inner bone latticework (trabecular bone)
- Sites without overlying bones are required

We need to isolate the measured sites from any overlying bones that would interfere with the measurement



Cortical Bone

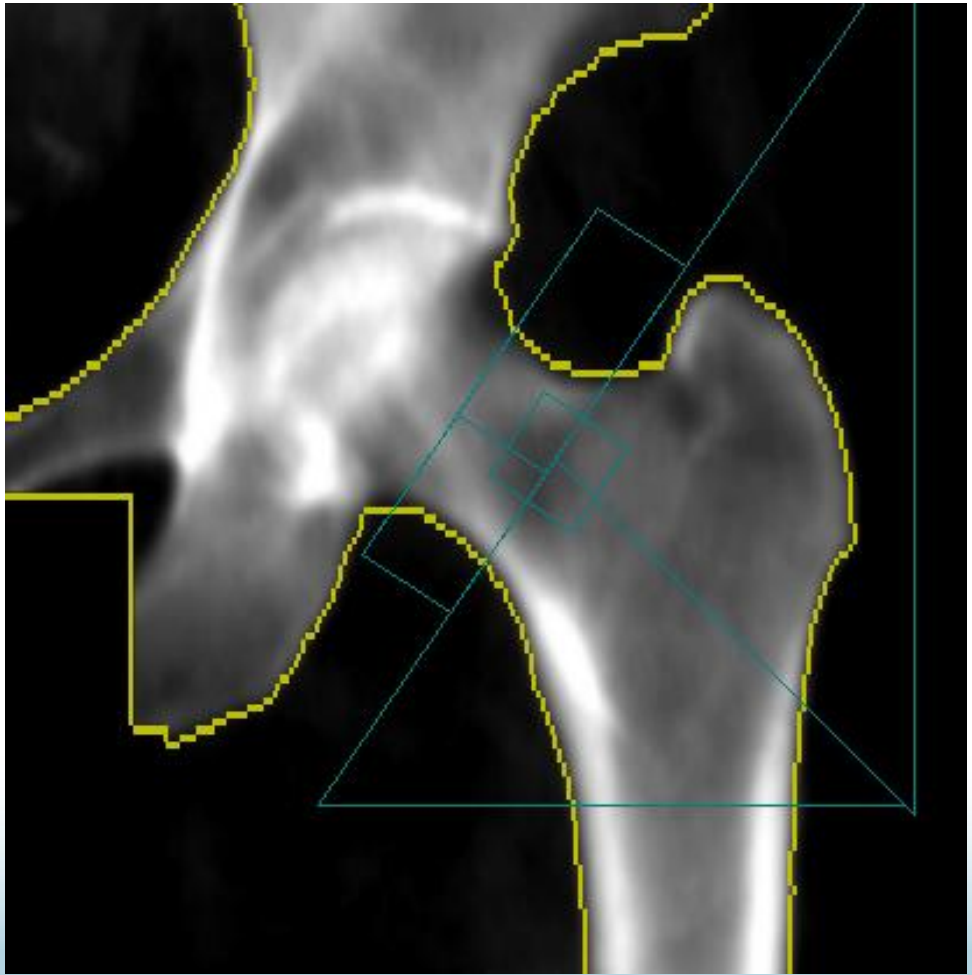
- Cortical bone is the hard outer layer surrounding the outside of bones. It shows up as the whiter areas at the sides of the lower part of femur bone x-ray shown here.
- In most circumstances, cortical bone changes more slowly than the more metabolically active internal trabecular bone.

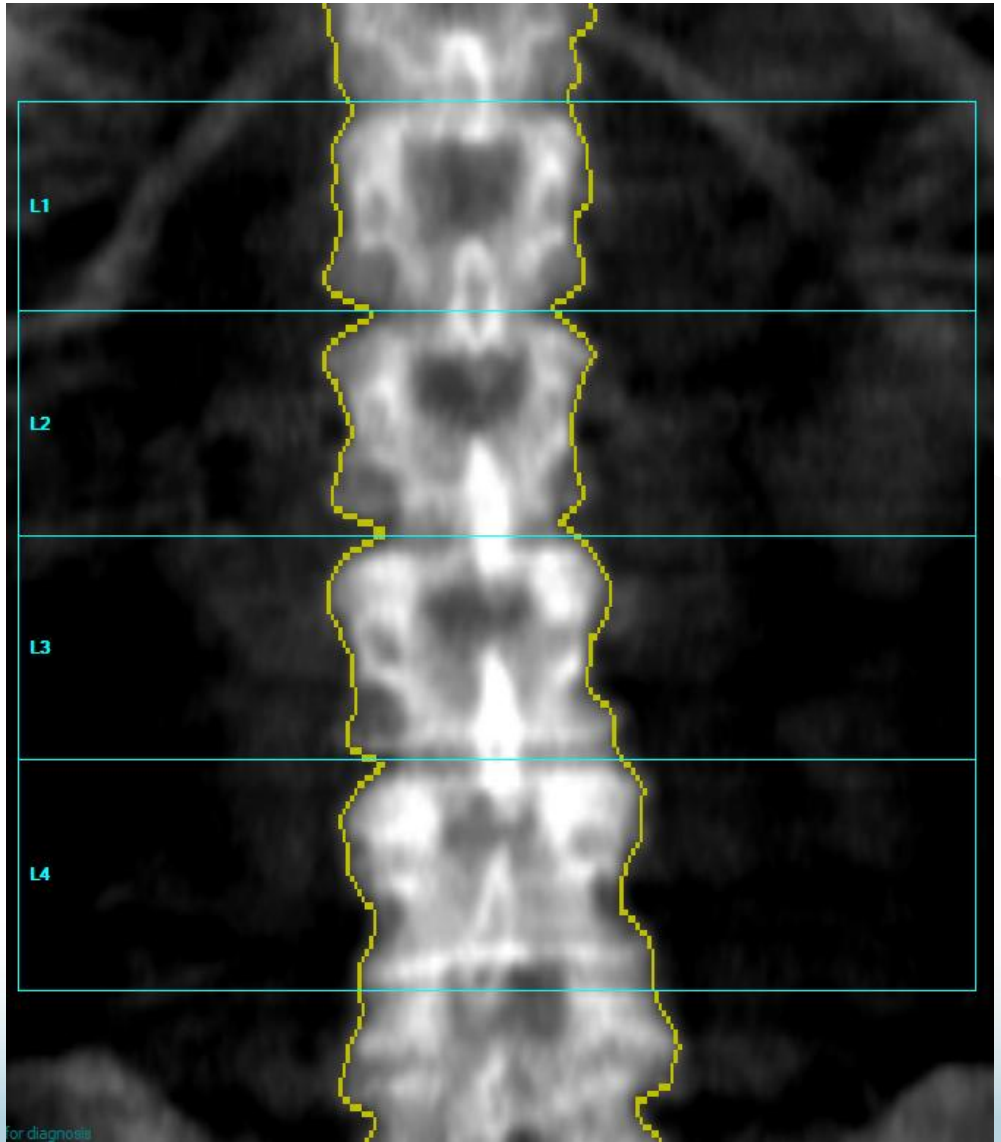
Trabecular Bone

- The inner latticework of plates and rods is called trabecular bone or “spongy” bone.
- Like broken rungs on a ladder, when the struts holding the lattice together begin to thin out, they can chip and break off.
- Because the trabecular bone changes more rapidly, it is better for monitoring bone density change over time.

Lumbar Spine & Hip(s)

Large, highly trabecular scan sites without overlying bone

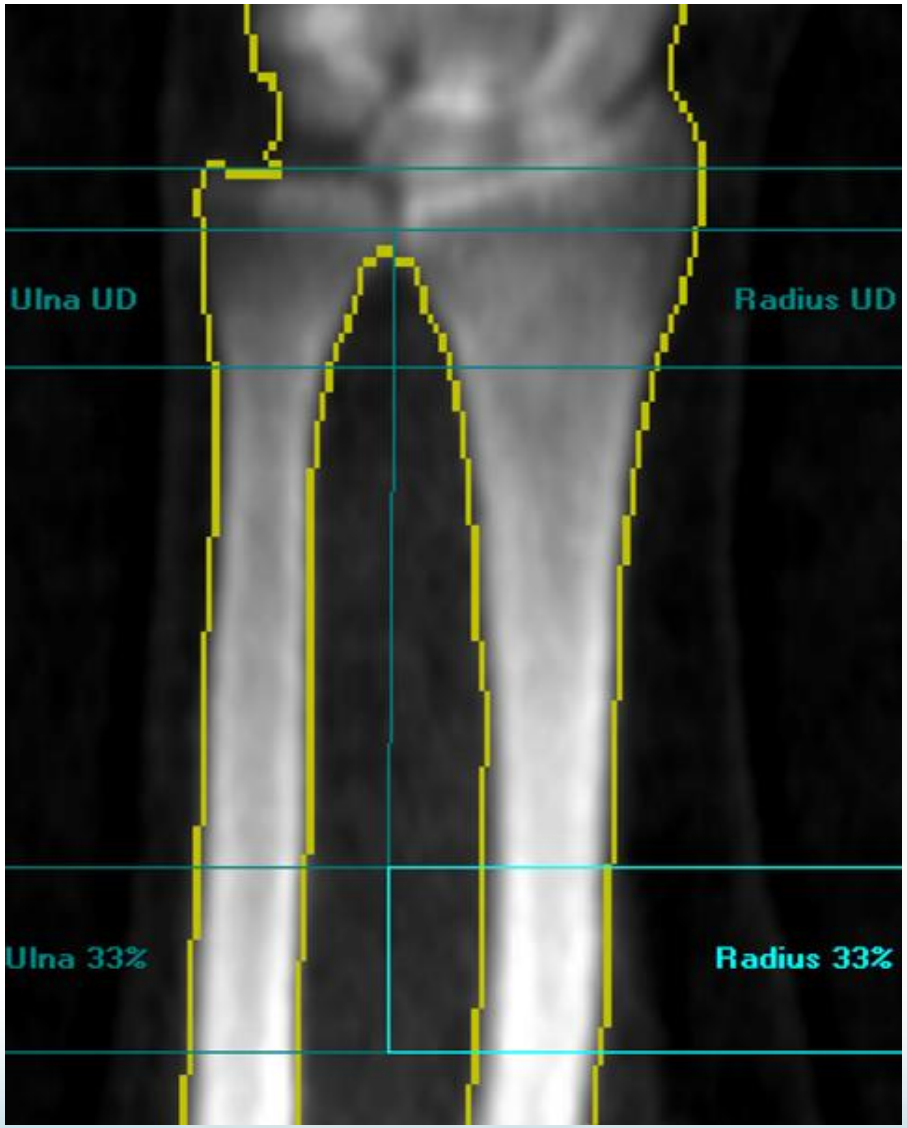




Alternative scan sites

- In circumstances where we cannot acquire diagnostic measurements from the preferred sites, there are less optimal alternatives, primarily the forearm.

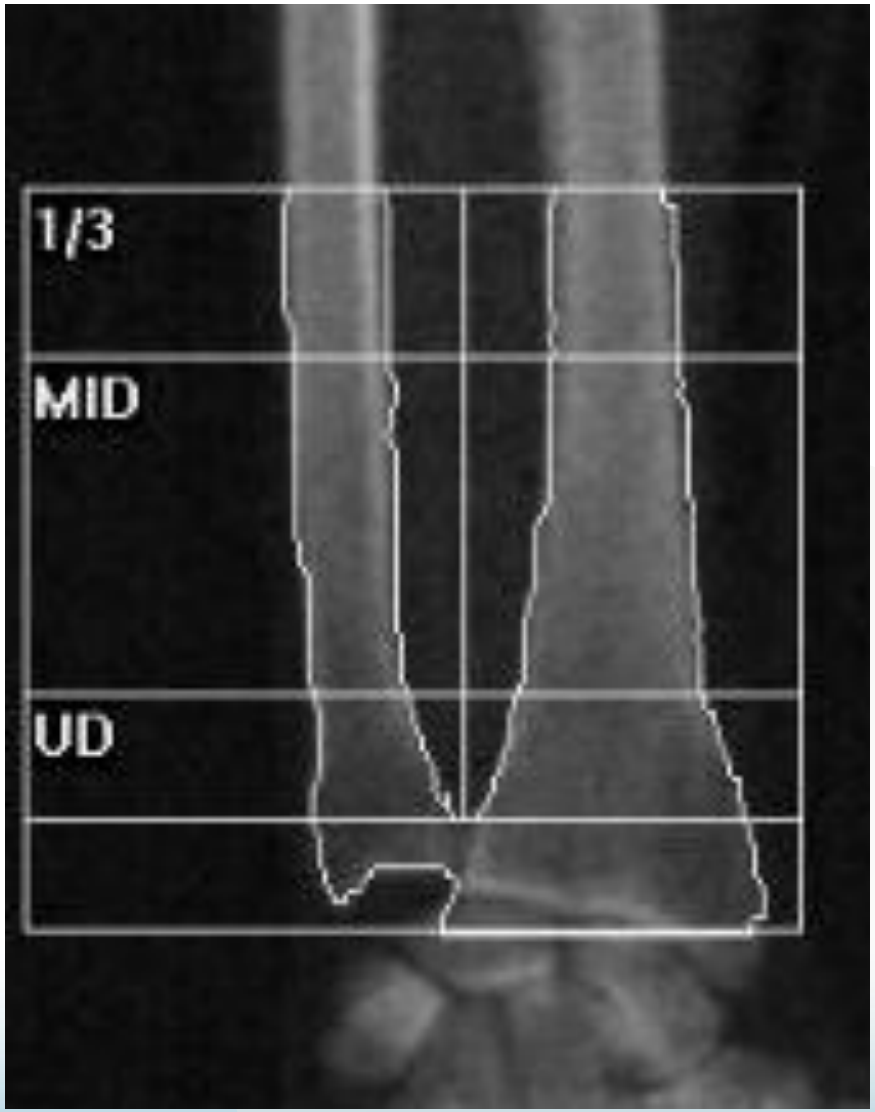
- A forearm DXA scan is also called the One-third Radius.



Why is the forearm not acquired for everyone?

- Smaller highly cortical regions are not as good for monitoring changes over time.

- The forearm has poorer predictive value for major osteoporotic and hip fracture risk.



In summary

- The preferred sites for DXA bone density scans are the lumbar spine and hip(s).
- We want to measure a large area of primarily trabecular bone.
- Sites must be free from other overlying bones.

Thank you.

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