

APPROACH TO THE BONE PATIENT

Here are some focused things to think about when seeing a patient with potential bone or mineral abnormalities. Not that this is all you'll ask about or look for, but it's a good start.

History

Growth and development

Pubertal history (delayed?)

Are they non-ambulatory, have they had periods on bed rest or in a wheelchair, are they couch potatoes, or are they elite athletes?

Meds: vitamins, steroids, chemotherapy, anti-seizure meds, heparin, DMPA, Depo-Lupron, PPIs, bisphosphonates

Diet: dairy, calcium and vit D fortified foods or beverages

ROS: bone pain, hyperlaxity of joints, joint swelling, fever, easy bruising, stooling, menstrual irregularities, heat/cold intolerance and other thyroid symptoms, IBD symptoms

PMHx: fractures or stress fractures/reactions (with mechanism of injury, location, how many), dental caries, kidney stones, IBD, ED, nutritional deficiency, murmur, vision complaints, celiac, CF, seizures, CP, cancer +/- radiation, prior DXA, vitamin D deficiency, endometriosis

FHx: osteoporosis, fractures, kidney stones, thyroid disease, autoimmune disease, pubertal delay

SocHx: how important is their sport to them? (i.e., are they college scholarship/Olympic-bound? or is it just a social outlet?)

PE

BMI

Sclerae - color

Dentition

Thyroid

Pectus

Heart rate, BP, murmur

Joint laxity, swelling, ROM

Bone pain with palpation

Arachnodactyly (positive thumb sign)

Reduced upper to lower segment ratio (0.85 versus 0.93 in normals)

Arm span exceeding height (ratio >1.05)

Tanner Stage is pre or peri-pubertal

Scoliosis, kyphosis or lordosis

Flat feet/collapsible arches

Labs:

- Spot UCa/Cr ratio (nrml ≤ 0.2 in an adolescent; up to 0.6 in young child): helpful to assess for risk of kidney stones if you're recommending more calcium, repeat if abnormal and then consider 24hr collection if abnormal on second spot sample

- Chem 10 panel, 25OHD (ideal >30 ng/mL and deficiency < 20 ng/mL), PTH often standard initially to assess renal function, vit D status, and calcium homeostasis. DO NOT GET A 1,25(OH)D UNLESS YOU KNOW THE PATIENT HAS RENAL FAILURE OR SUSPECTING METABOLIC BONE DISEASE
- Bone turnover markers: Bone specific alkaline phosphatase and osteocalcin are markers of bone formation. Total alkaline phosphatase also affords some insight into overall bone turnover. Urinary N-telopeptides (NTx) reflect bone resorption. May be obtained if you are considering use of bisphosphonates or if you're concerned about bone cancer. NTx would ideally be measured from a second morning void.
- Other hormonal labs or inflammatory markers depending on clinical picture

Imaging:

- AP/Lateral spine if worried about chronic back pain; consider if low bone density as asymptomatic morphometric compressions fractures are possible
- DXA (remember BMD Z-score, Z-score, Z-score)
- Bone age (if history of delayed puberty/menarche to interpret DXA BMD measures correctly)
- pQCT. Primarily a research tool at the present time.