Full Bone Health Protocol

Dexascan Protocol (LS and bilateral femoral necks)

Osteoporosis is defined as a T-score less than -2.5
Osteopenia is defined as a T-score of -1 to -2.4

Who Needs a First Dexascan?

- Women who are entering menopause (baseline scan)
- Men age 65 and older
- Younger Women and men with risk factors
- Women and men with radiographic findings suggestive of osteoporosis
- Women and men receiving prolonged drugs that can cause bone loss
- Men and women with one or more low-impact fractures
- Men and women with a disease known to contribute to low bone mass or bone loss
- Men and women who have lost more than 1.5 inches or 4 cm of their peak height (American nurse today, 2008).
- Patients scheduled for total joint arthroplasty

Who Needs a Follow-up Dexascan?

- Anyone 1 year after treatment has been initiated.
- Women, 1-2 years after baseline scan at menopause
- Otherwise every 5 years

Recommended Treatment Plan:
The surgeons @ MOPA do not offer long-term medical management of osteoporosis. However we will screen patients, get them started on therapy and refer them for appropriate long-term management. Dr. Armsey, in our group offers osteoporosis management, if patients desire it.

- Order Dexascan @ first office visit
- Review Dexascan @ follow-up visit.
- If treatment is indicated (osteoporosis):
    - Give patient informational handout
    - Recommend dietary supplements and Vitamins (see handout)
    - Recommend impact exercises (see handout)
    - Start first line agent; usually Fosamax 70mg /week.
    - Give patients a choice: Dr. Armsey or their PMD for further treatment and follow-up.
- Refer to Dr. Armsey for consultation:
    - Any patient that you started on treatment that does not want to use their PMD for follow-up.
    - If you are not certain whether to recommend treatment.

- If a patient is osteopenic, they should follow-up for another scan and evaluation by Dr. Armsey in 1-2 years.

Osteoporosis risk factors include:

- Advanced age
- Genetics
- Lifestyle factors such as smoking, low calcium and vitamin D intake, high caffeine intake, alcohol
- Being thin
- Previous fracture
- Sedentary lifestyle/immobilization

Secondary causes of bone loss include:

Medications:

- Oral glucocorticoid
- Gonadotropin-releasing hormone
- Intramuscular medroxyprogesterone acetate
- Immunosuppressives
- Heparin
- Long term use of anticonvulsants
- Excessive thyroxine doses
- Cytotoxic agents
- Proton pump inhibitors (prilosec, Protonix, etc)

Genetic disorders:

- Osteogenesis imperfecta
- Thalassemia
- Hypophosphatasia
- Hemochromatosis

Disorders of calcium balance:

- Hypercalciuria
- Vitamin D deficiency

Endocrinopathies:

- Cortisol excess
- Cushing's syndrome
- Gonadal insufficiency
- Hyperthyroidism
- Type 1 diabetes mellitus
- Primary hyperparathyroidism

Gastrointestinal disorders:

- Chronic liver diseases
- Malabsorption syndromes
- Total gastrectomy
- Billroth I gastroenterostomy

Other disorders:

- Chronic renal disease
- Rheumatoid arthritis
- Multiple myeloma
- Nutritional disorders
- Lymphoma and leukemia
- Systemic mastocytosis

Treating osteoporosis

- Exclude secondary causes of osteoporosis: halt progression through prevention (stop smoking, decrease alcohol intake, modify risk factors)

- Calcium and Vitamin D: Calcium 1500mg/day with Vitamin D 1000 IU daily should be taken in the diet or given supplements concurrently with any of the above treatments. Both are inadequate alone in the majority of patients.

- Exercise: Impact exercise maintains bone density and recommended for both prevention and treatment of osteoporosis (walk, jog, step-aerobics).

- Oral Bisphosphonate: Alendronate (Fosamax), Risedronate (Actonel)
    1. Mechanism: Inhibits osteoclast-mediated bone resorption; has been shown to achieve bone stabilization, increase bone density and decrease fracture risk when given continuously for 3 years. Reduced risk of vertebral fracture by 30 – 50%.
    2. Contraindications:
        a. Esophageal abnormalities which may delay esophageal emptying (achalasia, stricture).
        b. Creatinine clearance < 35 ml/min
        c. Hypocalcemia
    3. 1% increase in bone mass in 1 year.
    4. Cost: Wal-Mart generic
    5. Dosage: Fosamax 70mg weekly p.o.

- Raloxifene (Evista)
    1. A selective estrogen receptor modulator (SERM) which acts on the bone, but does not stimulate the endometrium or breast. Reduced risk of vertebral fracture by 36% in trials.
    2. Side effects: Hot flashes, leg cramps, risk of thromboembolic events, vaginitis

- Calcitonin-Salmon (Miacalcin)
    1. Mechanism: Thought to inhibit osteoclastic resorption of bone, but this is uncertain at dose of 200 IU/day. Also produces and analgesic effect for bone pain.
    2. Indications: Second line after Alendronate or Risedronate for postmenopausal osteoporosis. May be used to manage bone pain following osteoporotic fracture.

- Estrogen Replacement Therapy (ERT)
    1. Greatest benefit if begun early in menopause because greatest rate of bone loss is in first 5 – 7 years of menopause
    2. Contraindications: History of breast cancer, estrogen-dependent neoplasia, undiagnosed abnormal genital bleeding, history of or active thromboembolic disorder
    3. In light of the results of WHI, hormone therapy is currently considered as second-line therapy after non estrogen therapies have failed or caused intolerance to side effects

- Teriparatide (Forteo)
    1. Mechanism: Teriparatide is a portion of human parathyroid hormone (PTH) which is the primary regulator of calcium phosphorus metabolism in bones.
    2. Dosage: 20 mcg SQ daily
    3. 10% increase in bone mass in one year.
    4. Side effects: Nausea, dizziness, leg cramps and headache

- Denosumab (Prolia)
    1. Mechanism: Monoclonal antibody inhibiting RANKL. RANKL is secreted by osteoblasts to inhibit osteoclasts.
    2. Dosage 60mg SQ q 6months
    3. 3-6% increase in bone mass in 1 year.
    4. Cost: $825 /dose.
    5. Does not incorporate directly into bone like bisphosphonates
    6. Rare ON jaw < 1:1000, no atypical Fx reported yet.

Medication	Dosage	Route	Cost
Elemental calcium Vitamin D	1000 to 1500 mg per day 1000 IU per day	Oral Oral	$13 to $20 $1
Alendronate(Fosamax)	Prevention: 5 mg per day or one 35 mg tab once weekly. Treatment: 10 mg per day or one 70 mg tab once weekly	Oral	$61 (5mg or 10 mg)
Raloxifene (Evista)	60 mg per day	Oral	$61
Calcitonin (Calcimar)	200 IU per day or 50 to 100 IU per day	Intranasal or SQ/IM	$36 to $59
Conjugated estrogens	0.625 to 1.25 mg per day	Oral	$16 to $23
Estradiol skin patch (Estraderm)	0.05 mg every week	Topical	$26 to $68
Prolia	60 mg q 6 months	SQ	$ 825/dose

References

Healthy People 2010 retrieved electronically November 11, 2006 from:http://www.healthypeople2010.gov

Mauck, K., & Clarke, B. (2006). Concise review for clinicians: Diagnosis, screening, prevention and treatment of osteoporosis. Mayo Clin. Proc., May 2006; 81(5):662-672 retrieved electronically November 11, 2006 from: www.mayoclinicproceedings.com

National Osteoporosis Foundation (2006). Retrieved electronically from: http://www.nof.org

The Center for Disease Control, 2006. Retrieved electronically September 11, 2006 from: www.cdc.gov

The United States Preventative Services Task Force, 2006. Retrieved electronically September 11, 2006 from: http://USPSTF.gov

The World Health Organization (2006). Retrieved electronically from: http://www.who.gov

Weinstock, M., & Neides, D., 2005. The resident's guide to ambulatory care. Anadem: Ohio. Patients should avoid major dental work while on fosamax.

Risk of Fosamax is small. Reflux is common. Osteonecrosis of the jaw is extremely rare except for IV bisphosphonates.