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St Jude Wellness Center Presents:

The Science of Strong Bones

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Let's Chat About Bones

When you hear 'bone health' what comes to mind?

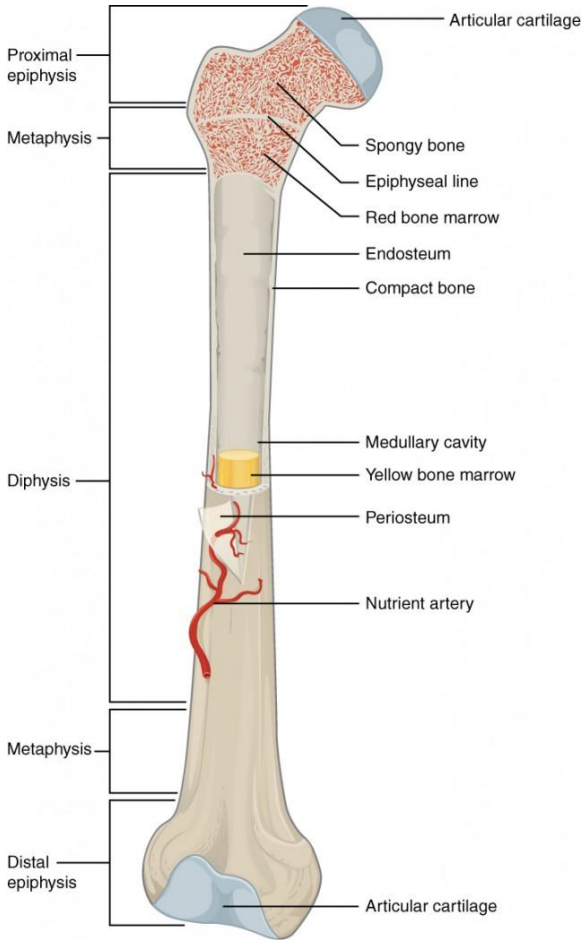
When thinking of your bones, have you ever thought of your pelvis?

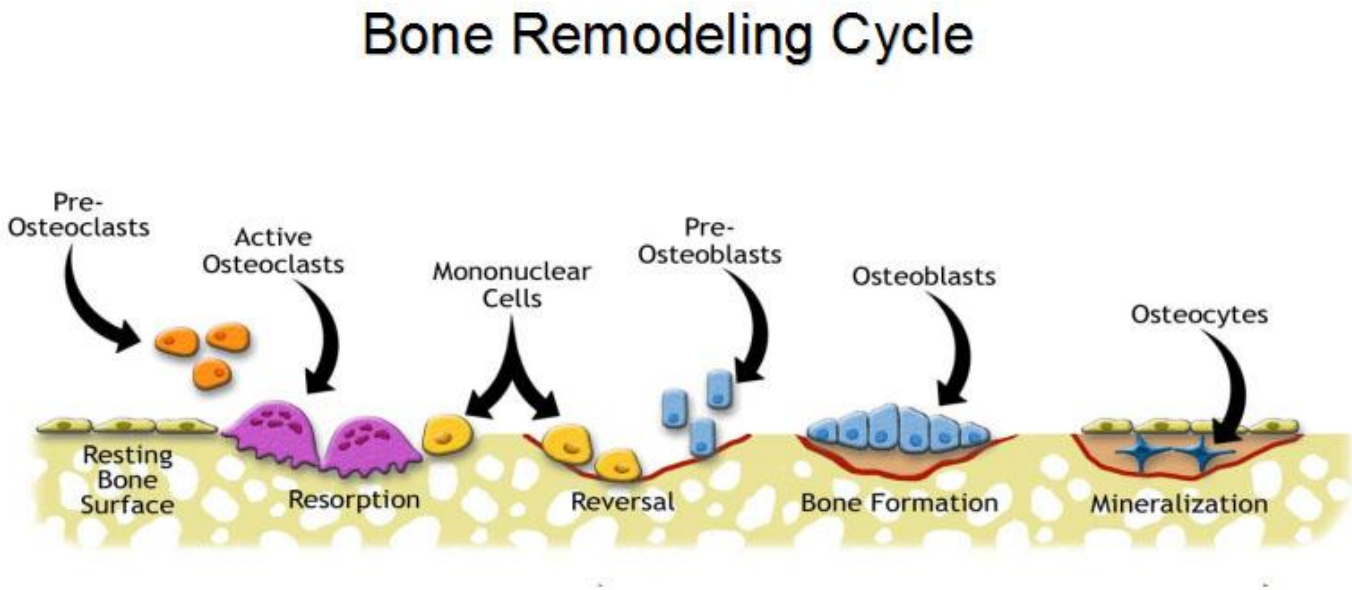
Your immune system?

Your independence?

Today is all about what YOU can do to keep your bones, and everything that they interact with, strong and stable.

Your Bones





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Bones as a Construction Site

Supplies (minerals, proteins) move in and out. If another site elsewhere it low, supplies are taken from the bone site to help out.

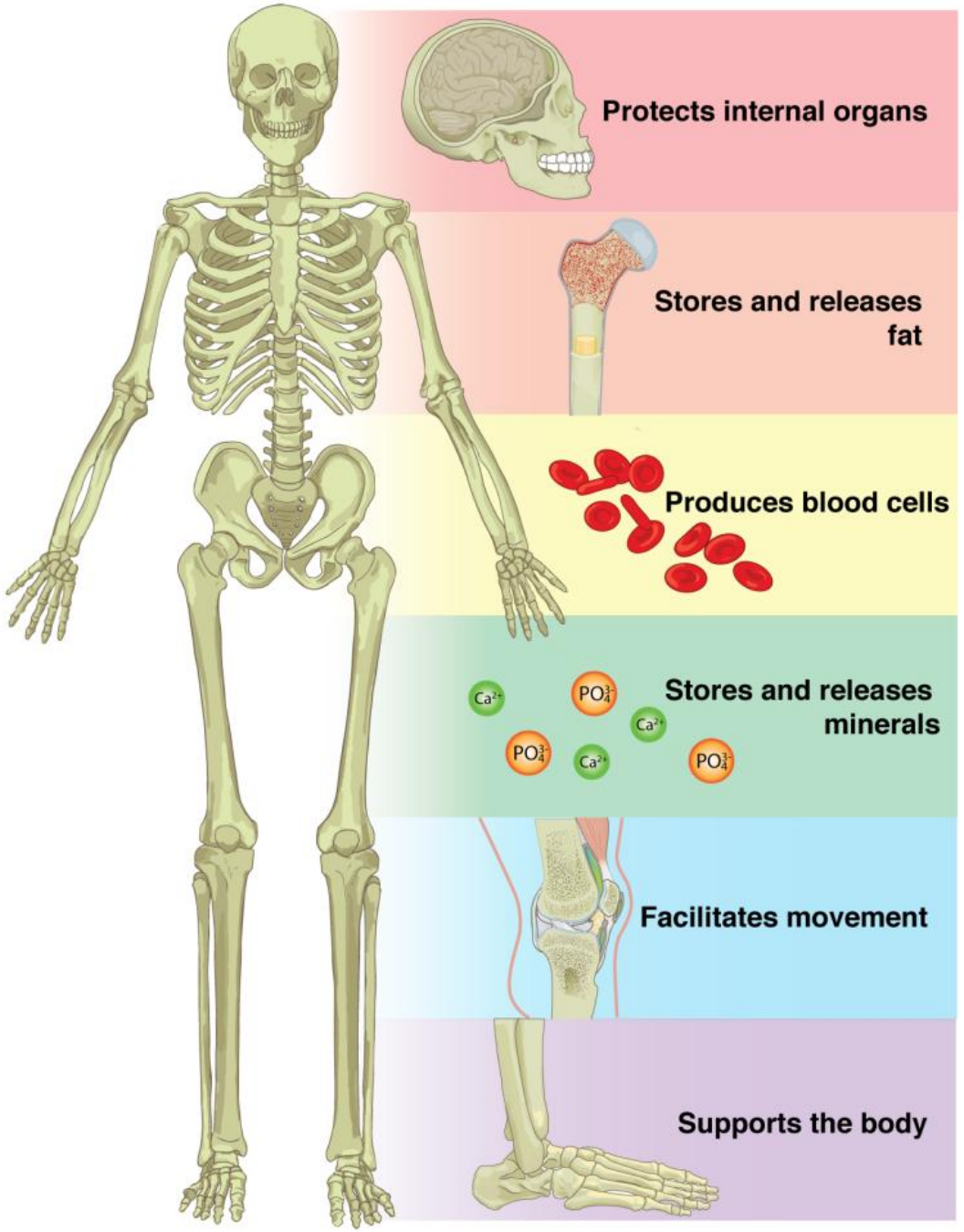
There is a demo crew (osteoclasts) and a rebuild crew (osteoblasts). Constantly rebuilding from materials on site based on messages from management team (hormones).

Meshing & scaffolding gets mudded together and covered with plaster for a strong structure.

Strong structures need less maintenance so the flow of supplies is strong.

Bones are More Than Structure

- ✓ Structure
- ✓ Protection
- ✓ Back up/excess store of minerals to protect other organs
- ✓ Supports muscle structurally but also triggers muscle protein synthesis hormonally
- ✓ Secretes immune factors & blood cells from marrow
- ✓ Osteocalcin crosses BBB to enhance neurotransmitters
- ✓ Hormone & Growth Factor release:
  - ✓ Insulin secretion & sensitivity
  - ✓ Metabolic rate
  - ✓ Brain development
  - ✓ Testosterone production
  - ✓ Cytokines



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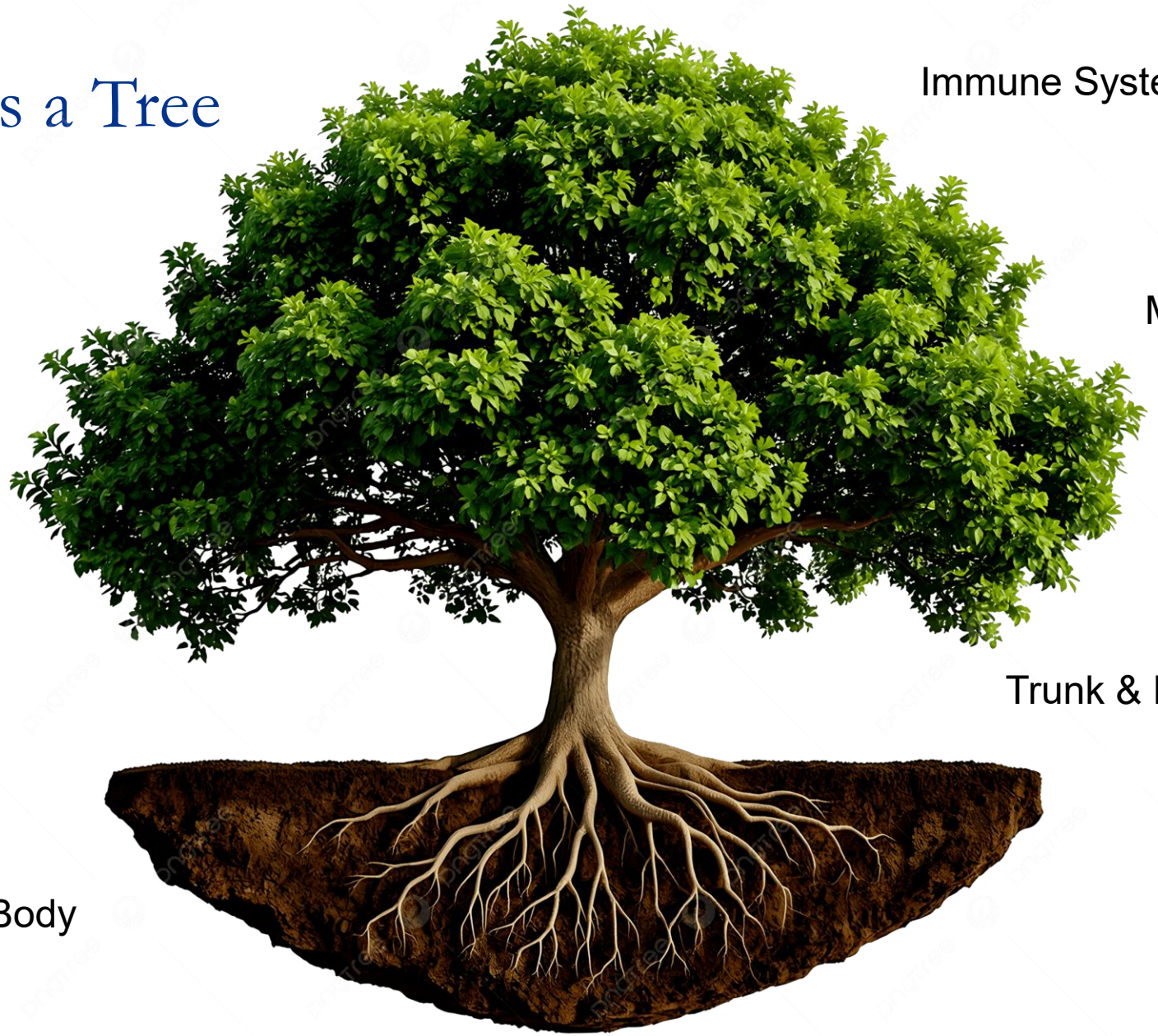
Your Bones as a Tree



Immune System = Leaves

Muscle = Branches

Trunk & Roots = Bones

Soil = Rest of the Body

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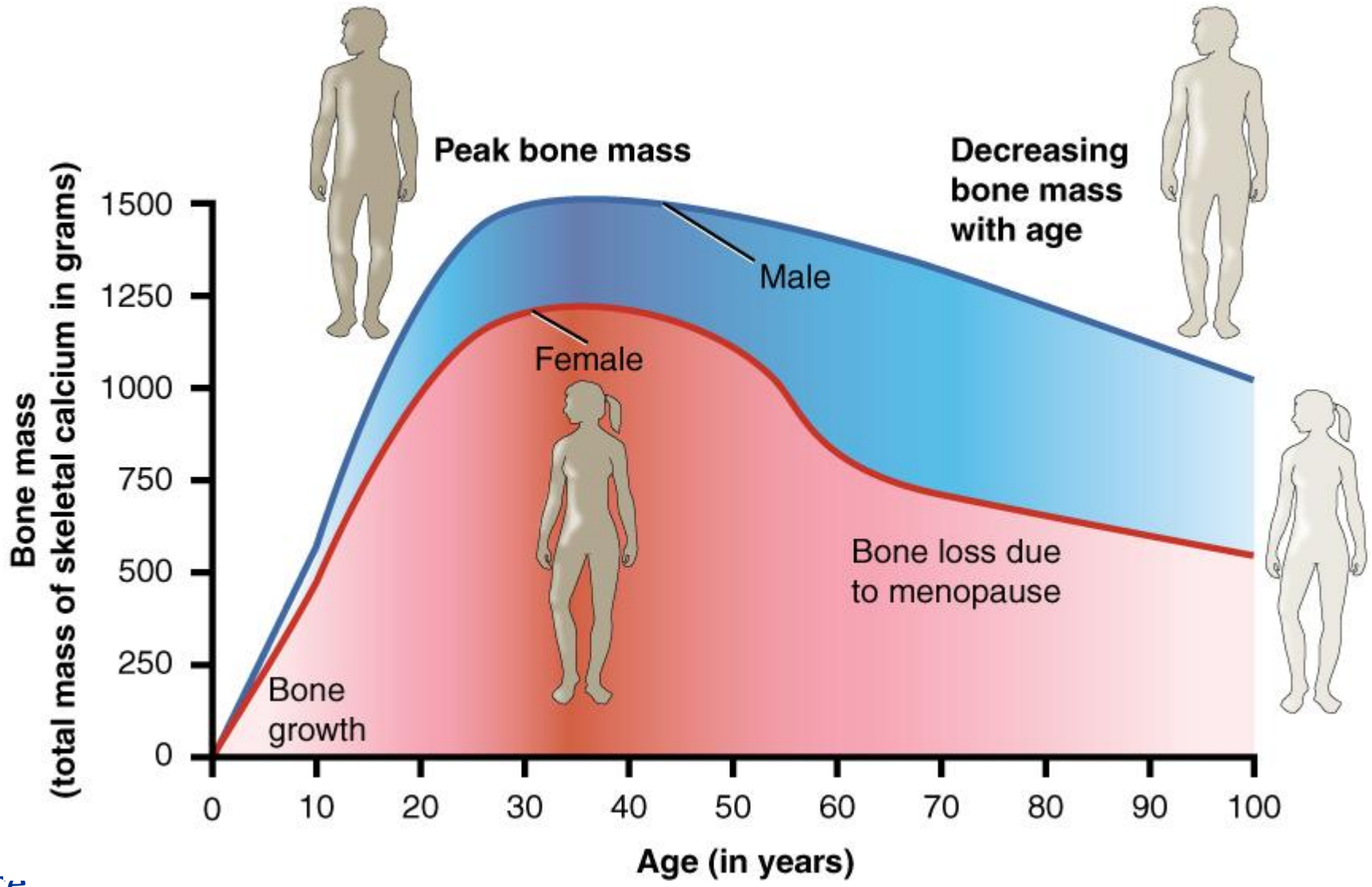
Risk Profiles

- ✓ Genes make up 50-85% of variance in bone mineral density (BMD).
- ✓ Higher risk groups:
  - ✓ Smokers
  - ✓ Overweight or obesity
  - ✓ Significantly underweight, especially under 30 years old
  - ✓ Physically inactive
  - ✓ Other comorbidities, especially IBD, RA, liver/kidney disease
  - ✓ Aging over 30 years old
  - ✓ Women
  - ✓ Women in late perimenopause/early menopause
- ✓ Baseline bone mineral density is not the only factor in how strong and functional our bones are AND baseline BMD can be impacted by lifestyle factors!

Bone Health is a Lifetime Priority



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Lifestyle Pillars of Bone Health

Risky Substances

- ✓ Don’t smoke
- ✓ Minimize alcohol
- ✓ Minimize inactivity

=Removes direct toxic effect on osteoblasts & hormones

Fitness

- Strength
- Balance
- Mobility & Core/Pelvis

=Stimulates mineralization process & improves metabolism & thyroid

Nutrition

- ✓ Protein
- ✓ Vitamins & Minerals

=Substrates for mineralization & hormones, prevents deficiencies that pull from bone stores, supports fitness

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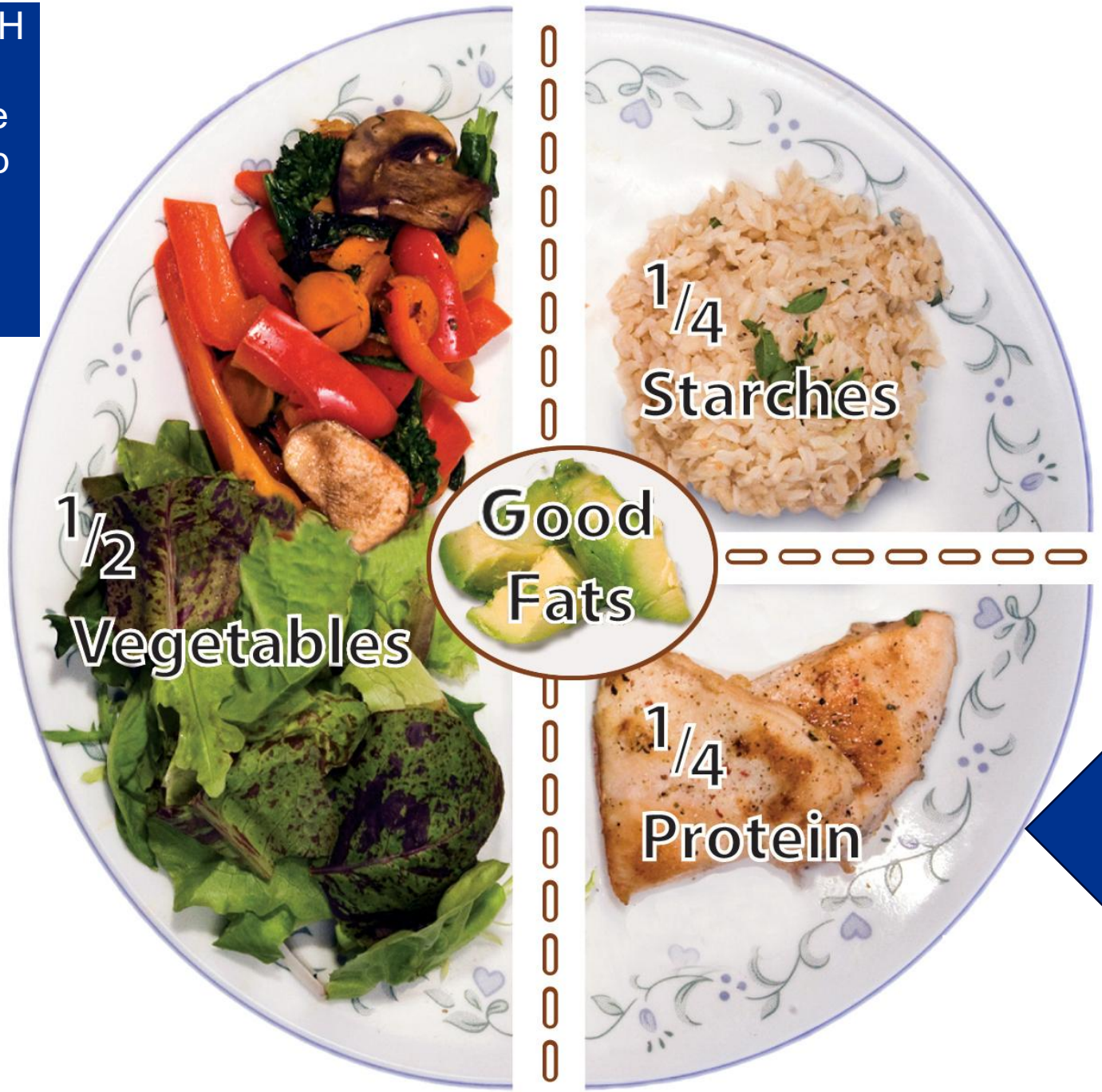
Regulators of Bone System (the supplies & managers)

- Parathyroid hormone
- Vitamin D
- Calcitonin
- Sex hormones
- Growth hormone
- Cytokines
- Glucocorticoids

Mediterranean and DASH diets associated with higher BMD. Adherence showed 5% reduced hip fracture risk with every one-unit increase in adherence score.



Protein

WHY:
Amino acids building blocks for cells, skin, muscles, bones. They create the fibers (aka scaffolding) of the bones that Ca & Phos.

HOW MUCH: 1.2-1.6g/kg/day (10-15g/snack, 20-30g/meal)
- 20-30g = size of your hand
- Spread throughout the day

SOURCES:
- Beef, Bison, Lamb, Pork
- Chicken, Turkey, Eggs
- Fish, Shellfish
- Milk, Yogurt, Cottage Cheese, Kefir, Some Cheeses
- Tofu, Soy Milk
- Protein Milk/Dairy Alternatives
- Beans, Lentils
- Protein Powder, Hemp Seed, Seeds, Nuts/Nut Butters

Ruminant Dairy Protein:
Highest to Lowest

Sheep Yogurt → Goat Yogurt → Cottage Cheese → Greek Yogurt → Ricotta Cheese → Regular Yogurt → Milk → Cheeses

18-20g/serving

7-8g/serving

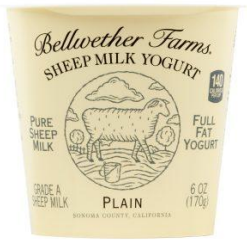
Soy Milk/Yogurt Protein

Protein in Dairy Alternatives per Serving:

- Almond: 1-2g
- Oat: 3-4g
- Coconut: < 1g
- Pea: 4-8g
- Hemp: 2-4g
- Flax: 2-3g
- Macadamia: 1g
- Cashew: < 1g

Low/No Lactose Options

- A2 Milk
- Lactaid
- Sheep/Goat



Milk & "Milk" Assessments

Nutrition Facts

About 4 servings per container

Serving size **1 Cup (240mL)**

Amount per serving

Calories **80**

	% Daily Value*
Total Fat 3.5g	**4%**
Saturated Fat 0g	**0%**
Trans Fat 0g	
Cholesterol 0mg	**0%**
Sodium 220mg	**10%**
Total Carbohydrate 4g	**1%**
Dietary Fiber 1g	**4%**
Total Sugars 0g	
Includes 0g Added Sugars	**0%**
Protein 10g	**13%**
Vitamin D 2.5mcg	15%
Calcium 250mg	20%
Iron 2mg	10%
Potassium 140mg	2%
Phosphorus 90mg	8%

* The % Daily Value (DV) tells you how much a nutrient in a serving of food contributes to a daily diet. 2,000 calories a day is used for general nutrition advice.

Ingredients:

ORGANIC ALMONDMILK (FILTERED WATER, ORGANIC ALMONDS), ORGANIC PEA PROTEIN, ORGANIC NATURAL FLAVORS, CONTAINS 1% OR LESS OF THE FOLLOWING: GELLAN GUM, TRICALCIUM PHOSPHATE, ORGANIC SUNFLOWER LECITHIN, TRIPOTASSIUM CITRATE, SEA SALT, ORGANIC LOCUST BEAN GUM, NATURAL FLAVOR, ERGOCALCIFEROL (VITAMIN D2).

CONTAINS: ALMONDS

CERTIFIED ORGANIC · IF IT'S ORGANIC IT'S NON GMO · CERTIFIED PLANT BASED

- ✓ 10g+ protein per serving
- ✓ 15% DV or more of both vitamin D and calcium
- ✓ Unsweetened
- ✓ Ideally minimal additives/preservatives

1,000-1,200mg/day
Divided doses, Combined with D

600+ IU/day D3 (800+ if over 60)
Combined with Ca

Magnesium: 300-500mg/d
*citrate is best absorbed, but caution

Vitamin K: 90-120 mcg/d
*K2 is from fermented foods & egg yolk

Fermented Foods:
2Tbls-1/2cup per day

Minimize Added Sugar: 6-9tsp/d
Minimize alcohol: max 1/d
Minimize colas

Fitness

Strength Training

- ✓ Improves bone and muscle together.
- ✓ Strength training alone increases BMD by 2-10% depending on area of the body.
- ✓ Heavier lifting at high velocity = greater impact
- ✓ Pelvis strengthening specifically for core & balance
- ✓ **Goal: 3+ days per week**

High Impact Cardio

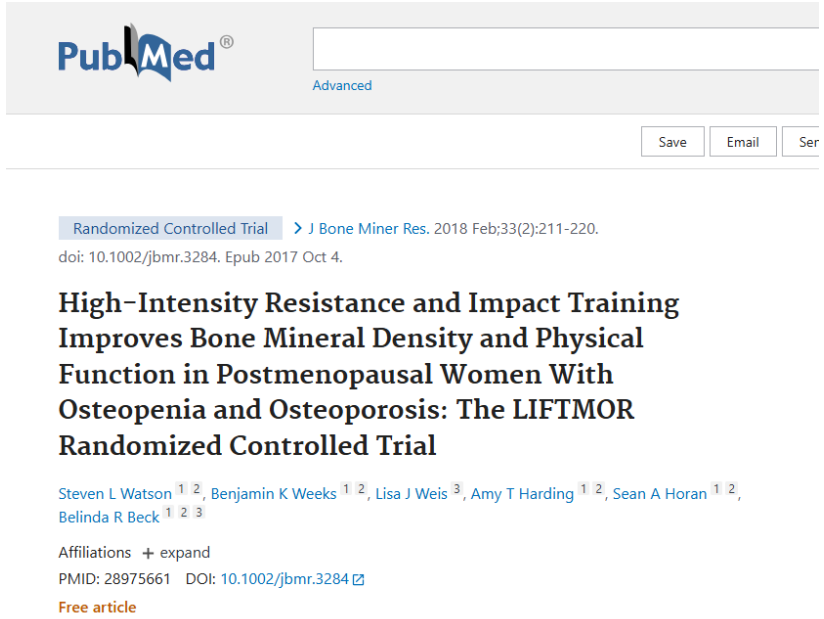
- ✓ Stimulates bone remodeling
- ✓ 150min/week cardio
- ✓ **Goal: 3 days per week of moderate to high impact in short bouts**
  - ✓ Vibration plates are effective

Balance & Mobility

- ✓ Is trainable
- ✓ Is key with weakened bones to prevent falls
- ✓ Spinal extension for mobility
- ✓ Reduces falls by 23% and fall-related fractures by 38-40%
- ✓ **Goal: Daily bouts**

LIFTMOR

- Population: women over 50 WITH osteopenia or osteoporosis
- Twice weekly, 30min sessions of heavy strength training
- 5 sets of 5 repetitions at high weight (>85% max)
- Deadlifts, overhead press, back squat, jumping chin ups
- Outcomes: 2.9% increase in BMD vs. 1.2% in controls with other exercise modalities
- 92% compliance and safety



Exercise Rx for Bone Risk

- **Combination of** resistance training with higher impact exercise provides greatest benefit for BMD and osteo risk
  - BMD improvements translate to 10-11% reduction in 20-year fracture risk

- **St. Jude Bone Health Program**
  1. Physician consult with non-surgical orthopedist
  2. Physical therapy to safety lift heavy and powerfully (6-8 visits)
  3. Wellness Center Osteo Program:
     1. Pre & post evals
     2. Twice weekly fitness based on LIFTMOR & Medical Fitness
     3. Access to gym & functional fitness
     4. Discounts on private services: dietitian, massage therapy, personal training

Other Protective Strategies

- DEXA scan
- Balance screening
- Home safety assessment
- Vision screening
- Discuss hormone therapy
- Sunlight exposure

Your Bone Program

Exercise	Nutrition	Preventive Action	Outcomes After 12-16 Weeks
• Resistance Training 3x/week • High Intensity Cardio 3x/wk • Balance & Posture Daily	• Mediterranean • Protein • Produce • Ca, D, Mag, K • Minimize alcohol & sugar	• Quit smoking • DEXA & balance screening • Vision assessment • Home safety assessment • Sunlight daily	• 2-10% improved BMD • 10-11% lower 20-year fracture risk

- Exercise, nutrition & preventive actions combined all show significantly better BMD & fracture outcomes than any intervention alone
- Any intervention combined with pharmacotherapy show significantly better BMD and fracture outcomes than pharmacotherapy alone

How We Can Help:

*Gait & Balance Assessments in May
*Osteo program
*Comprehensive Nutrient Analysis appointments
*Vibration plate, treadmills, yoga, tai chi…
*Brain Gym: Program & Private Sessions

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