Week 4  Oct 16, 2014
Osteoporosis
Protecting your Brain and Immune System

Peachy Seiden, MS, RDN
TODAY’S OBJECTIVES

- Understand the bone’s building process
- How Osteoporosis develop
- Know the Causes of Osteoporosis
- And Treatment of Osteoporosis
- Understand Osteoporosis Prevention
- Learn Choices to make for a Healthy Brain
- Gain knowledge on Strengthening the Immune System
Bones are

• Dynamic, ever-changing just like all the other tissues
• Normal bone mass peaks at age 20-30, and gradually declines
• Need to be taken cared of early by at least 13 years old

• As we age, they tend to shrink and become brittle and easy to snap
• Our bodies are designed to build and remodel bone in an effortless way throughout life.

• Our bones are constantly being regenerated, an essential body wisdom that we do throughout our lives, so that even bones that have already weakened can regain strength.
OSTEOCLAST

• An osteoclast (from the Greek words for "bone" and "broken") is a type of bone cell that resorbs bone tissue (breaks down)
• Critical in the maintenance and repair of compact bones
• These bones are stronger than aluminum on a weight basis: composed of hydrated protein and minerals.\[1\]
• It disassembles this very strong composite at a molecular level by secreting acid and a collagenase, also called bone resorption.
• Osteoclasts and osteoblasts are instrumental in controlling the amount of bone tissue
OSTEOBLASTS

• An osteoblast is a cell that is generating new bone matrix — i.e., a bone forming cell.
• It does this by creating the organic component in bone, namely collagen.
• As osteoblasts move along the bone matrix, they get stuck in the tissue and turn into osteocytces.
• This creates new bone growth and repair. It also strengthens your bones so they can handle the mechanical stress you put on them.
EXAMPLE

- Running is a weight bearing activity and it requires your body to engage in osteoblastic activity and bulk up the bones so they don’t become injured.
- Compare running with cycling. Cycling is not a weight bearing activity, which means osteoblastic activity is not needed.
- The adage “form follows function” is apt if you consider that a bone grows or remolds itself based on the demands put on it, according to Wolff’s law.
ALKALINITY/ACIDITY

The human body is amazing at adapting to maintain the exact level of pH needed to live

• eat more protein than you needed, your body converts the amino acids to organic acids, which would acidify the blood if your body did not release calcium (alkaline) to counteract the acid buildup

• eating a diet too high in protein will lead to osteoporosis (from leaching calcium from the bone to maintain pH homeostasis because of the consumption of excessive amounts of protein).

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• Immune status and bone health are closely connected, both areas governed by the first emotional center.
• Osteoclasts (bone destroyers) derived from the same bone marrow cells that make white blood cells.
• This is why individuals with unrelated diseases as rheumatoid arthritis, lupus, diabetes, multiple sclerosis, hepatitis, depression, and lymphomas often have osteoporosis in addition to their other symptoms.
• Scientists have found that anything that stirs the T cells—a component of the immune system—into action also triggers them to start dismantling bone.
• Many women never reach their peak bone mass.
• 50 percent of a woman’s bone loss over a life span is lost before the onset of menopause
• Each of the first five years after a woman’s menopause, bone density falls an average of 2–5 percent
FACTS ABOUT OSTEOPOROSIS

- Worldwide, 1 in 3 women over 50 will experience osteoporotic fractures, 1 in 5 men
- Osteoporotic fracture occurs every 3 seconds
- 75% of all hip fractures occur in women
PREVENTING OSTEOPOROSIS

• Role of Exercise

force or weight on ligament and tendon stress points makes bones deposits, more calcium containing matrix
MANAGING AND TREATMENT OF OSTEOPOROSIS

- There is no cure for osteoporosis, only steps to take to prevent, slow or stop its progress.
- Able to improve bone density and reverse the disorder to some degree.
- Getting enough calcium and vitamin D as well as are essential to bone health.
- There are also medications available to reduce the risk of broken bones. These medicines either (1) slow or stop bone loss or (2) rebuild bone.
CALCIUM SUPPLEMENTS

- Calcium citrate is the most absorbable
- Avoid dolomite and oyster shells
- Researchers found that women who took Tums had an increased risk of hip fractures

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NUTRITION

• Osteoporosis is essentially unknown in countries whose diet include little or no meat

• Studies of American vegetarians have shown a very low incidence of osteoporosis
HIGH PROTEIN DIET

- High protein diets are very acidic
- One way to prevent acidity is to buffer the blood
- Bone acts as a major buffering system
- If blood is too acidic, calcium is mobilized from the bones to neutralize the acid

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As we age we lose the ability to keep calcium out of our cells, leading to cellular damage to DNA and cell membranes by increasing free radical generation.

In the brain this may lead to neurodegenerative disease. (Calcium related to the brain, oh my!)

Increased calcium within the arterial cells is a powerful trigger for atherosclerosis.

HOW DO WE SOLVE THIS DILEMMA?........next slide
NUTRITIONAL PRACTICES TO PREVENT ACIDITY

• Need to buffer the blood with diet high in fruits and vegetables
• Fruits and vegetables contain large amounts of buffers (magnesium, potassium, boron, zinc, etc)
• When buffers are present in the blood, calcium moves back into the bones

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VITAMIN K IN VEGETABLES

• Studies have shown that Vitamin K in green leafy vegetables has been shown to enhance the active form of Osteocalcin in the bone which forms the anchor for calcium.
HOW MUCH PLANT FOODS?

- Seven to ten servings of fruits and vegetables, especially **VEGETABLES**
- Mix them, eat them all!
OSTEOCLAST
AND
OSTEOBLAST

The function of both osteoclasts and osteoblasts is influenced by

1. levels of estrogen and testosterone
2. thyroid hormone and insulin
3. hormones produced by emotional stress such as norepinephrine and cortisol.
Osteoporosis is an autoimmune condition caused by a misfiring immune system (autoimmunity) attacking the protein Osteoprotegerin which is responsible for helping maintain bone density. When this protein is attacked by the body's immune system, bone loss (loss of bone density) becomes accelerated. In order to heal, you need to restore proper immune function at the cellular level, thus sequestering the autoimmune attack at the source.
NUTRITION TO PREVENT OSTEOPOROSIS

- Balanced diet with plenty of vegetables and fruits
- Minimize meat intake
- Eat lots of legumes, nuts and seeds
- Avoid soft drinks: phosphorus draws calcium from the bone
- Avoid too much salt: promotes excretion of calcium in urine
- Limit caffeine: also contributes to urinary calcium loss

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ACIDITY & ALKALINITY OF FOODS

**Acid**
- All meats
- Bacon
- Bread, pasta, rice
- Corn, lentils
- Cranberry, plum
- Cakes, cookies

**Alkaline**
- All Milk and dairy
- Almonds, coconut
- All greens esp beet
- All fruit except Cranberries & plums
- Molasses

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GOOD-FOR-YOUR-BONES

- Dairy: cheese, low fat yogurt
- Fish: Sardines and canned salmon with bones’ fresh salmon, mackerel, tuna
- Vegetables: Kale, collard and beet greens, spinach, bok-choy, okra, dandelion, broccoli
- Fruits: oranges, sweet potato, banana, prunes, sweet bell peppers, grapefruit, papaya, strawberries, melons, tomato products
- Beans and legumes
- Calcium fortified foods
TO SUMMARIZE

- Osteoporosis is preventable if we are conscientious about our lifestyle
  
  EAT RIGHT – lots of vegetables  
  PLAY RIGHT – exercise
THE BRAIN AS WE AGE

• Research indicates years of accumulated free-radical damage leads to degeneration of the brain 😞
• Most neurological disease don’t become obvious until 75% of brain in affected area is dead 😞
• Cells and blood vessels weaken and lose fluidity in aging 😞
• Blood brain barrier begins to fail, allowing toxins to enter the brain 😞
• We become deficient in: Vitamin B₁₂, B₆, Riboflavin, Beta carotene, Iron, Zn = all needed for cognitive function 😞

These Damages can be prevented and new neurons can still develop 😊 😊 😊 😊 😊 😊

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NUTRITION AND THE BRAIN

• Brain is never at rest and needs constant supply of sufficient nutrients
• A lifetime of eating processed foods can lead to deficiencies
• Regular vitamin E intake = preserve ability to think and reason later in life
• Poor memory is related to high homocysteine levels
• Damage is due to nutritional abuse, toxic metal accumulation, pesticides, herbicides, industrial chemicals
FOR BRAIN HEALTH

- Take your antioxidants: berries, fruits and vegetables
- Get your omega-3s. Eating fish may also lower your risk of developing Alzheimer’s disease.
- Limit calories and saturated fat.
- Eat more fruit and vegetables.
- Drink green tea.
- Drink wine (or grape juice) in moderation. Red wine appears to be the best option, as it is rich in resveratrol, a flavonoid that boosts blood flow in the brain and reduces the risk of Alzheimer’s disease.
- For mental energy, choose complex carbohydrates
IMMUNE SYSTEM

- Highly complex network, working in concert to clear infections
- Ages in a faster rate than rest of the body, why older persons are susceptible to damages of infection.
- Weak immune system, increase risk for cancer of blood forming tissues: leukemia, myeloma, lymphoma and auto-immune diseases.
2 CLASSES OF LYMPHOCYTES

- **B Cells**: from bone marrow, produces antibodies, attaches to foreign bodies marking them for destruction

- **T Cells**: from thymus, patrols for foreign invaders, attacks and destroys them. Coordinates overall immune response
PSYCHOLOGICAL STRESS

- Disrupts the communication between nervous, endocrine and immune system

- Stress hormones affect the thymus, where lymphocytes are produced; inhibit the production of cytokines and interleukins, which stimulate and coordinate white blood cell activity.
STRESS AND IMMUNITY

‘STRESS HAS SURPASSED THE COMMON COLD AS THE MOST COMMON HEALTH PROBLEM IN NORTH AMERICA’

Immune System may be overpowered by chronic STRESS and other factors

Overpowered Immune System, results in
• Inability to fight infection ex: HIV infection
• Disease development
• Delayed wound healing
HEALTHY WAYS TO COPE WITH STRESSORS

- Eat a healthy diet
- Regular exercise
- Plenty of sleep
- Practicing relaxation techniques
- Learning to meditate, practice Yoga
- Fostering healthy friendships
- Having a sense of humor
- Strong social relationships
- Seeking professional counseling when needed

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STRENGTHENING THE IMMUNE SYSTEM

- Requires BALANCE and HARMONY
- Exercise
- Meditation
- De Stress
- Nutrition

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THE POWER OF MASSAGE

• Stimulate the lymph modes and lymphatic system
• Stretches weak, tight, atrophied muscles
• Pump oxygen and nutrients into tissues and vital organs, improving circulation.
• Increases joint flexibility

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PHYSICAL ACTIVITY

Helps regulate Neuropeptides, significant pain reduces and promotes feeling of euphoria

3 Types of Exercise Helps Slow Aging

- Weight resistance
- Flexibility
- Cardio/Aerobic

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THE POWER OF MEDITATION

- Meditation yields a number of health benefits:
  - Stress reduction
  - Improved attention
  - Better memory
  - Increased creativity and feelings of compassion
REST AND RELAXATION

STRESS → Cortisol production → Memory loss
Weight gain
Inflammation

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LAUGH AND BE HAPPY!
ASK ME ANYTHING

For References: Please email PEACHYSEIDEN@GMAIL.COM

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