

Background

- ❖ Calcium is a necessary mineral in the human body to build strong, dense bones throughout our lives.
- ❖ 99% of calcium in our bodies is in our bones and teeth (National Osteoporosis Foundation, 2011).
- ❖ Every day we lose calcium through our skin, nails, sweat, urine and feces, leaving our body not able to produce calcium.
- ❖ **Without adequate calcium in our diets, calcium is taken from our bones, increasing the chances of developing brittle bones with an amplified risk of fractures in the hip and spine which are characteristics of osteoporosis.**
- ❖ Osteoporosis:
 - Large cause of injury and
 - Loss of independence...

That contributes to **300,000 plus** hip fractures each year in the United States (Jackson, LaCroix & Glass, 2006).

Methods

❖ Longitudinal study measuring five control groups:

- Smoking, weight bearing exercises, obesity/overweight, nutrition and estrogen/progestin levels...

To see if calcium has an effect on slowing the rate of bone mass loss.

❖ Subjects selected from volunteer pool

❖ Participants compensated at 20 years

❖ BMD (Bone Mass Density) results compared at beginning of study, 10 years and 20 years.

❖ Participants will journal time and date of daily calcium intake (supplementation or dietary)

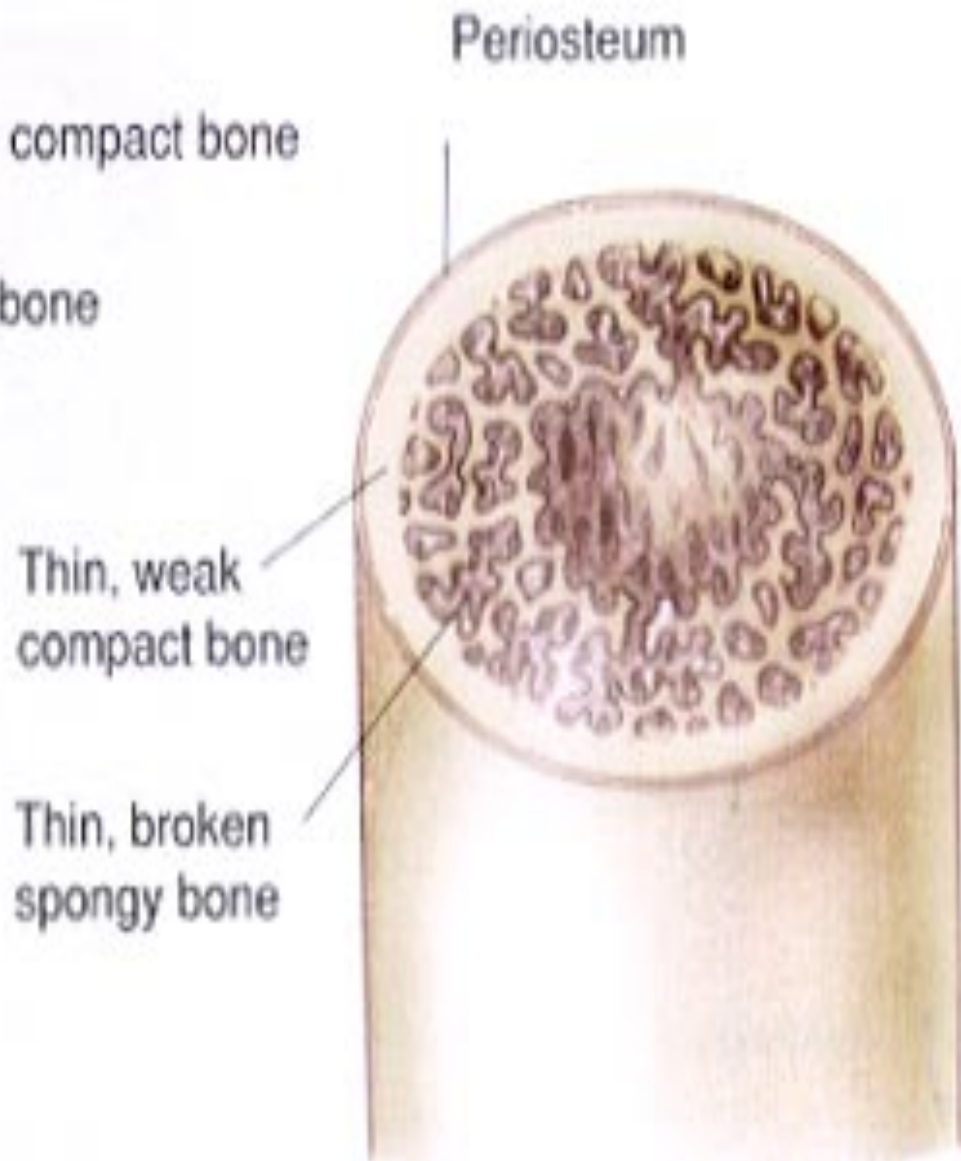
Controlled Groups	Amount of Women (N=20)	Characteristics of Controlled Group
Smoking	20	Have smoked minimum of 5 years.
Obese/overweight	20	(See Appendix for BMI measurements under obese/overweight sections)
Weight Bearing Exercises	20	Perform weight-bearing exercises at least three times a week. Includes hiking, yoga, walking, dancing, racquet sports and strength training.
Hormonal Effects of Estrogen/ Progestin	20	Blood test will be taken at beginning of study, middle (10 years) and after study complete (20 years).
Nutrition	20	Eat calcium enriched foods and journal what and when you eat them for data results. Must consume 600-1000mg of calcium daily.

Estimated Risk of Developing A Fracture

T Scores (measured in SD units)	Meaning of scores
0 or lower(negative #)	BMD is equal to norm for healthy adult; Negative #: Greater the #, more risk you have of developing fracture down the road.
+1 to -1	Normal or healthy
-1 to -2.5	Low bone mass but not low enough to be diagnosed with Osteoporosis.
-2.5 or lower	You have Osteoporosis.



Normal bone



Osteoporotic bone

Normal Spongy Bone (A)
Osteoporotic Spongy Bone (B)



Recommendations For Future Studies

- ❖ Does smoking take away benefits of calcium supplements?
- ❖ Does smoking take away benefits of calcium through dietary intake?
- ❖ Does increased body fat percentage cause higher rate of bone mass loss?

Conclusion

- **Associations with smoking**, hip fracture risk and low bone density is cause and effect. How many cigarettes smokers smoke in a day will relate to dose response in body (Law & Hackshaw, 1997).
- **Obesity relates to excessive fat mass** not total body weight (fat, lean muscle and bone mass), therefore it's difficult to link obesity to osteoporosis factors.
- **Calcium enriched foods** aid in slowing age related bone loss and reduces fracture risks in later adult years (Miller, Jarvis, McBean, 2001).
- This study showed that **estrogen/progesterone treatments** could increase BMD results and reduce risk of fractures in healthy postmenopausal women (Cummings, Lewis, Cauley, Robbins, & Chen, 2003).
- Falling is the most common cause of osteoporotic fractures due to many individuals having poor muscle strength, poor balance and very little power in the legs (Heinonen, Kannus, Sievanen, & Oja, 1996). High impact exercises can improve their movement skills, balance, coordination, muscle strength and power in the legs. **High impact training** is suitable for increasing BMD and neuromuscular performance (Heinonen, Kannus, Sievanen, & Oja, 1996).

Sources

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