The Weston A. Price Foundation

Dem Bones: Do High Protein Diets Cause Bone Loss?

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Myths & Truths About Osteoporosis

An estimated 15 to 20 million Americans suffer from osteoporosis–thinning of the bones leading to back pain, increased fractures, and frailty, frequently with extensive suffering. One theory proposed to explain its prevalence in the US is a diet that is high in protein, from excessive consumption of meat.

The protein theory was first presented in 1968[1] and followed up in 1972 with a study comparing bone density of vegetarians and meat eaters.[2] Twenty-five British lacto-ovo vegetarians were matched for age and sex with an equal number of omnivores. Bone density, determined by reading X-rays of the third finger metacarpal, was found to be significantly higher in the vegetarians. Two years later, a study on North Alaskan Eskimos reported that bone loss, determined by a technique called direct photon absorptiometry, was significantly greater in Eskimos than in whites, and began at an earlier age.[3] Although growth patterns and bone densities in children were similar for both groups, by age 70, Eskimos were found to have bone densities 15% below comparable whites, with Eskimos females at 30% below comparable whites. The authors of the study attribute the decline in bone mass to the high protein diet of

the Eskimos, especially its high meat content. Some studies with animals, as well as further studies with humans, given diets high in protein also indicate a greater loss of calcium and thinner bones than controls on low protein regimes.

But the pioneering research of Dr. Weston Price indicates that we should not accept the protein theory without further study. Dr. Price found many groups throughout the world subsisting on high meat diets. Although he did not directly study bone density in these peoples, he did study their teeth. He found that groups on high meat diets–including Alaskan Eskimos–had a high immunity to tooth decay, were sturdy and strong, and virtually free from degenerative disease. Groups subsisting mainly on plant foods were less robust and had more tooth decay. Pre-Columbian skeletons of American Indians whose diets consisted largely of meat show no osteoporosis, while those of Indians on largely vegetarian diets indicate a high incidence of osteoporosis and other types of bone degeneration. The implication of Dr. Price's research and other anthropoligical studies is that high meat diets *protect* against osteoporosis. How do we explain this discrepancy?

The research of Dr. Herta Spencer, of the Veterans Administration Hospital in Hines Illinois, supplies us with clues. She notes that the animal and human studies that correlated calcium loss with high protein diets used isolated, fractionated amino acids from milk or eggs.[4] Her studies show that when protein is given as meat, subjects do not show any increase in calcium excreted, or any significant change in serum calcium, even over a long period.[5] Other investigators found that a high protein intake increased calcium absorption when dietary calcium was adequate or high, but not when calcium intake was a low 500 mg per day.[6]

The textbooks tell us that the body needs vitamin D for calcium utilization, and vitamin A for both calcium and protein assimilation. Protein given as a powder lacks these fat-soluble co-factorsthat the body can use to build and maintain healthy bones.

Synthetic vitamin D, on the other hand, can cause hypercalcemia, a disturbance of calcium equilibrium leading to excessive blood calcium and calcification of soft tissues.[7] Synthetic vitamin D added to commercial milk does not have the same beneficial effect as vitamin D from cod liver oil in preventing rickets and strengthening the bones.

Fats, especially animal fats, also supply usable vitamin K. This nutrient is associated with blood clotting–individuals who lack the ability to use vitamin K suffer from hemophilia and risk uncontrolled bleeding when injured. But Vitamin K also plays an important role in bone metabolism. Vitamin K is more available in dairy fats than in the oils found in green vegetables.

Studies indicate that vitamin K is more completely absorbed from vegetables consumed with butter than with vegetables eaten plain.[8] Vitamin K is also manufactured by intestinal flora. Use of antibiotics can inhibit vitamin K production, leading to bone loss. Consumption of lacto-fermented foods such as yoghurt and old fashioned sauerkraut promotes the growth of beneficial flora in the intestines, and hence contributes to healthy bones.

Fat soluble vitamin E also plays a role in promoting bone health, by protecting the calcium depositing mechanism from free radical disruption. In a recent study, investigators at Purdue University found that high levels of free radicals from omega-6 linoleic acid (found principally in corn, soy and safflower oils) interfered with bone formation, but that vitamin E gave needed protection in a diet high in polyunsaturates.[9] In addition, they found that high levels of saturated fat also gave protection. That's right, the much-maligned saturated fats, found in tropical oils, butter and other animal fats, play an important role in bone modeling. This may be a major reason that population groups in tropical areas, where coconut and palm oils form a major component of the diet, have very little osteoporosis.

Bone loss in women coincides with diminution of estrogen and progesterone at the onset of menopause. But archeological evidence indicates that menopause does not necessarily initiate osteoporosis. Human skeletons of Huguenot women ages fifteen to eighty-nine recently exhumed in London showed little difference in bone density between premenopausal and post menopausal women.[10] Once again, the role of animal fats in the diet can explain this contradiction. Vitamin A in animal fats is absolutely essential for the health of the entire glandular system, and hence the continued production of regulating hormones throughout life. Hormone replacement often recommended for the prevention of osteoporosis is not an ideal substitute for the natural hormones produced in properly nourished bodies. Estrogen is also synthesized in the adipose (fat) tissue.[11] Perhaps this is why women naturally gain some weight at menopause. The extra body fat supplies them with additional estrogen and protects them from bone loss. Maintaining a svelte figure in middle age, either through weight loss or liposuction, does not necessarily confer health benefits. Very thin women are much more at

risk for bone loss than those who allow themselves to enjoy good, wholesome food and become pleasingly plump.[12] Many women smoke cigarettes to keep their weight down, a habit that lowers estrogen concentration in the blood stream and inhibits its effects.[13]

Only a rich, wholesome and varied diet can supply the many nutrients needed for the complex process that maintains the integrity of our bones. Dairy products, vegetables, nuts, meat and old fashioned bone broths supply calcium. Dr. Spencer's research indicates that post-menopausal women need about 1200 mg of calcium per day–400 more that the recommended daily allowance of 800 mg.[14] One quart of whole milk, or six ounces of whole natural cheese supply the optimum 1200 mg of calcium. Individuals with a poor tolerance to milk products must take extra care to obtain sufficient dietary calcium. Fish, chicken or beef broth, prepared with a little vinegar to pull calcium from the bones, are excellent sources, and have supplied easily assimilated calcium to pre-industrialized peoples throughout the globe. Leafy green vegetables and grains, nuts and seeds are also good sources if properly prepared. Vegetables and grains should be consumed with animal fats like butter or eggs; and nuts, legumes and grains should be soaked, sprouted or sour leavened to neutralize phytic acid, a substance that can block calcium absorption.[15]

The "acid-ash" of meat is given as the reason high meat diets cause bone loss. But meats also supply phosphorus, which counteracts this acidity. Phosphorus is needed for the phosphate component of bone matter. Meats are also excellent sources of vitamin B12, which plays a recently discovered but little understood role in maintaining the integrity of the bones.[16]

Plant foods such as fruits, especially apples, nuts and grains supply boron, needed for the conversion of vitamin D to its active form, and for the formation of estrogen. Iodine found in natural sea salt, sea foods and butter helps maintain healthy ovaries and thyroid gland, both of which play a role in maintaining bone integrity. Magnesium, found in whole foods, also contributes to bone health as does natural fluoride, present in hard water as calcium fluoride. Chromium may also contribute to bone health by normalizing insulin activity. Type I diabetics are prone to osteoporosis. Chromium picolinate has been found to reduce the amount of calcium excreted in the urine and therefore may protect against bone loss.[17] Refined carbohydrates such as sugar and white flour can cause chromium deficiency.

But sodium fluoride added to drinking water is one of a number of substances that is harmful to our bones. It causes an apparent increase in bone mass, but the bone structure is abnormal and weak.[18] Recent studies indicate that hip fractures are more common in areas where water is fluoridated.[19]

The late distinguished dentist, Dr. Melvin Page, demonstrated that sugar consumption upsets the natural homeostasis of calcium and phosphorus in the blood. Normally, these minerals exist in a precise ratio of ten to four. Sugar consumption causes serum phosphorus to decrease and calcium to rise.[20] The excess serum calcium, which comes from the bones and teeth, cannot be fully utilized because phosphorus levels are too low. It is excreted in the urine or stored in abnormal deposits such as kidney stones and gallstones. Caffeine also upsets the natural balance of calcium and phosphorus, and causes increased calcium to be excreted in the urine. Phosphoric acid in soft drinks is a major cause of calcium deficiency in children and osteoporosis in adults.[21] Aluminum from antacids, cans and pollution also contributes to bone loss.[22]

Osteoporosis is often associated with excess consumption of alcohol.[23] This is the likely explanation of bone loss in Eskimos, who are highly prone to alcoholism. The fact that the Eskimo is an obligate carnivore may also explain his susceptibility to both alcoholism and bone loss. Isolated groups like Eskimos and Irish sea coast peoples, whose traditional diet has been rich in marine oils, lack the desaturating enzymes needed to produce very long, highly unsaturated fatty acids needed for prostaglandin production.[24] People with arctic or sea coast ancestry would be wise to supplement their diet with cod liver oil, a rich source of very long chain fatty acids needed for virtually every metabolic process.

Even small changes in the native diet of carnivorous populations render them vulnerable to degenerative disease like osteoporosis and alcoholism. A recent article on the Canadian Inuits indicates that commercial foods like jam, white bread and peanut butter have replaced some of the meat in their diet, even while they continue to maintain a traditional lifestyle.[25]

The 1972 study comparing British vegetarians and omnivores calls for additional comment. Bone density determinations through absorptiometry or X-ray are highly subject to error[26], especially in unblinded studies where researchers may be biased towards obtaining pre-determined results. Subjects were matched merely for age, height and sex, but not for body

composition and dietary habits such as smoking and sugar, coffee and alcohol consumption. A group of omnivores that smokes, drinks and indulges in a calcium-poor diet of refined carbohydrates will naturally have more of a tendency to bone loss than a group of health-conscious lacto-ovo vegetarians who consume plenty of dairy products. (British vegetarians do,

in fact, tend to be very health conscious, avoiding not only meat but also alcohol, cigarettes, coffee and soft drinks. Unlike American vegetarians, they understand the importance of calcium-rich whole dairy products in the diet and eat plentifully of milk, cheese, butter and eggs.) When researchers compare the effects of high-meat diets to normal diets *in the same person*, no adverse effects are found, even over extended periods of time.[27]

Individuals who find they do better on high meat diets need not, therefore, worry about osteoporosis, as long as their diet includes complementary animal fats, plenty of calcium and a variety of other properly prepared whole foods.

References

1. A Wachman and D S Bernstein, "Diet and osteoporosis" *Lancet* 1968 1:958
2. Frey R Ellis, et al, "Incidence of osteoporosis in vegetarians and omnivores" *American Journal of Clinical Nutrition*, June 1972, 25:555-558
3. Richard B Mazess and Warren Mather, "Bone mineral content of North Alaskan Eskimos" *American Journal of Clinical Nutrition*, September 1974 2:916-925
4. Herta Spencer and Lois Kramer, "Factors contributing to osteoporosis", *Journal of Nutrition*, 1986 116:316-319
5. Herta Spencer and Lois Kramer, "Further studies of the effect of a high protein diet as meat on calcium metabolism", *American Journal of Clinical Nutrition*, June 1983 37 (6):924-929
6. HM Linkswiler, et al, "Calcium retention of young adult males as affected by level or protein and of caclcium intake", *Trans. N. Y. Acad. Sci*, 1974 36:333
7. Judith A DeCava, *The Real Truth About Vitamins and Antioxidants*, Brentwood Academic Press, Columbus Georgia, pp 102-113.
8. C Vermeer et al, "Role of vitamin K in bone metabolism", *Annual Review of Nutrition* 1995 15:1-22
9. BA Watkins et al, "Importance of Vitamin E in Bone Formation and in Chondrocyte Function" Purdue University, W. Lafayette, IN 47907
10. B Lees et al, "Differences in proximal femur bone density over two centuries", *Lancet* March 1993, 341:673-675
11. M E Nelson, "Hormone and bone mineral status in endurance-trained and sedentary postmenopausal women" *Journal of Clinical Endocrinology and Metabolism* May 1988,

66(5):927-933
12. R N Baumgartner et al, “Associations of fat and muscle masses with bone mineral in elderly men and women”, *American Journal of Clinical Nutrition* 1996 63:365
13. National Institute of Health Consensus Conference: “Osteoporosis” *Journal of the American Medical Association August 1984* 252(6):799-802
14. Herta Spencer and Lois Kramer, “Osteoporosis: Calcium, Fluoride and Aluminum Interactions”, *Journal of the American College of Nutrition 1985* 4:121-128
15. Lindsey H Allen, “Calcium absorption and requirements during the life span”, *Nutrition News*, February 1984 47(1):1-3
16. M E Melton and M L Kochman, “Reversal of severe osteoporosis with vitamin B12 and etidronate therapy in a pateint with pernicious anemia”, *Metabolism: Clinical & Experimental 1994* 43 (4) 468-9
17. McCarthy, *Med Hypotheses* 1995 45:241-246
18. Yiamouyiannis, John, *Fluoride, The Aging Factor*, Health Action Press, 1986
19. C Cooper et al, “Water fluoridation and hip fracture”, *Journal of the American Medical Association*, July 1991, 19(32):513-514
20. Melvin E Page, *Degeneration, Regeneration* 1949. Available from the Price Pottenger Nutrition Foundation, San Diego, CA
21. E Mazariegos-Ramos et al, “Consumption of soft drinks with phosphoric acid as a risk factor for the development of hypocalcemia in children: A case control study”, *Journal of Pediatrics* 1995 126:940-942
22. Herta Spencer and Lois Kramer, “Osteoporosis: Calcium, Fluoride and Aluminum Interactions”, *Journal of the American College of Nutrition* 1985 4:121-128
23. Herta Spencer, et al, “Chronic Alcoholism: Frequently Overlooked Cause of Osteoporosis in Men”, *The American Journal of Medicine*, March 1986 80:393-397
24. D F Horrobin, *Reviews in Pure and Applied Pharmacological Sciences Vol 4*, 1983 Freund Publishing House 339-383
25. Yvette Cardozo and Bill Hirsch “Northern Exposure: An Inuit Adventure” *Relax*, January 1996 21-27
26. *Alternative Medicine, The Definitive Guide*, Future Medicine Publishing, Inc., Puyallup, Washington, p 776
27. Herta Spencer, et al “Do Protein and Phosphorus Cause Calcium Loss?” *American Institute of Nutrition*, 1988:657-660

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