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Written and published by Ann Gerhardt, MD
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CALCIUM DOES NOT = BONE

by Ann Gerhardt MD

Bottom line at the top: Calcium and vitamin D are necessary but not sufficient to maintain healthy bone and prevent fractures. For healthy bone, consider hormones, do weight bearing exercise, optimize your diet and take calcium & D supplements if you consume a low calcium diet.

The recently publicized Women's Health Initiative (WHI) and RECORD trials of calcium and vitamin D prove that it is not a slam-dunk that taking supplements will prevent fractures. But we've known that. Since the 1980's.

Most old people don't fracture because of calcium or vitamin D deficiencies. Most fracture because they are hormone deficient or malnourished or take medications that diminish their bone health. **The loss of estrogen at menopause and testosterone with aging are the primary causes of age-related osteoporosis.** Men lose testosterone gradually over years and women lose their estrogen relatively suddenly during menopause. Women have more problems with osteoporosis than do men because they lose more bone more quickly at an earlier age.

If people aren't fracturing BECAUSE they lack calcium or vitamin D, they certainly aren't going to get better FROM calcium or vitamin D. On the other hand, we all need calcium in order to build bone. We also need calcium to keep our body from thinking that it is low in calcium: If the body and parathyroid gland think blood levels are low, they pull calcium out of bone in order to maintain optimal blood levels. A severely calcium-deficient person's bones grow holes.

Scientific studies in the 1980's concluded that calcium is NECESSARY but NOT SUFFICIENT (all by itself) for bone health. Hormonal status, physical activity and

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dietary status all contribute to fine-tuning the genetically predetermined quantity, size and shape of a person's bone.

In both early-adulthood and post-menopausal life, **physical activity and hormones** each trump diet and calcium with respect to effect on bone. However, if a person with low bone density fixes the major underlying problem, by taking hormones or dramatically improving his nutritional state or stopping prednisone, he stills needs a good diet to reverse osteoporosis. A severe deficiency of calcium, or any other nutrient necessary for bone, limits the material necessary to build bone. It would be like having a construction crew and piles of wood, but no nails.

Bone building and maintenance require MANY building materials – protein, calcium, phosphorus, magnesium, boron and calories – and their helpers – vitamin D, vitamin C, vitamin K, copper, zinc, potassium, and all the micronutrients necessary for energy and protein metabolism. No one of these will make bone or prevent fractures: They are all crucial.

Bone is a protein matrix with a lattice-like structure. When calcium and phosphate are deposited on the lattice, it becomes calcified and hard. Without the protein matrix, there is nothing to calcify. No matter how much calcium one consumes, the absence of even one of the many other nutrients necessary to build the matrix halts the whole bone-building process.

The overall quality of the diet and weight bearing exercise determine skeletal growth during adolescence and the early adult years. A poor diet short-changes the body, providing insufficient material to optimally build bone. A superb diet enables the body to attain the maximal bone density and size pre-determined by an individual's genes.

Adolescents consuming abundant calories and dairy foods have greater bone mass by age 30 than do those who scrimp on them. Women usually achieve peak bone mass by age 25-35 years.

After achieving peak bone mass, the body constantly breaks down and replaces bone (sort of like hair naturally coming out in your comb and being replaced by new hair growing in). The **balance of bone loss & replacement** reflects a balance of parathyroid hormone, calcitonin, estrogen, testosterone, diet and physical activity.

Calcium intake by women in the decade prior to menopause does not appreciably affect bone mass. During the early post-menopausal period, calcium balance changes and the bone balance shifts to more breaking down and less building. Calcium balance changes because they have lost their hormones, not because they suddenly changed calcium consumption.

Calcium supplements do improve the part of the bone balance equation that is due to inadequate calcium intake. Calcium supplementation does improve calcium absorption and bone mass of women on low-calcium diets. It does little to improve calcium status in women who consume at least 800 mg of calcium in their diet.

Calcium, at any level of intake, does not prevent bone loss by early post-menopausal women who do not take hormones. It has never, in any study, entirely reversed the bone-loss process associated with aging, which is why the WHI and RECORD results really do not conflict with prior study results.

The WHI study compared two groups of ~18,000 post-menopausal women, who took calcium and/or vitamin D or placebo for an average of seven years. Officially the placebo group got no calcium or vitamin D, but neither group was told to stop their own supplements or dairy foods. The study participants were also part of overlapping, concurrent studies of estrogen and diet. Approximately equal numbers of each were group were on estrogen and given dietary advice.

At final tally 38.5% of *each* group consumed more than 1200 mg/day of calcium and 42% of each group consumed more than 400 Units of vitamin D daily. By 7 years only 59% of the supplement group was still consuming their study pills. Bone density improved and there were 12% fewer fractures in the supplemented group, but these differences did not achieve statistical significance. The statistical analysis concluded that supplements did not prevent fractures.

The RECORD trial tested calcium and vitamin D in people who had already suffered at least one fracture. The investigators followed 5292 participants in the United Kingdom for two to five years. Six hundred eighty nine (13%) sustained a further fracture, including 183 with hip fractures. Neither calcium nor vitamin D supplementation improved the risk of fracturing again. The findings do not support the *routine* use of calcium and/or vitamin D for the prevention of further fractures in older people with a recent low-trauma fracture.

Neither trial made an effort to identify and selectively supplement people with inadequate diets or calcium or vitamin D deficiencies. Large trials often suffer from a wash-out effect, in which the people who don't need the intervention (like calcium supplementation) far out-number those who might benefit. This skews the statistics away from showing a benefit, even if a sub-population might need it.

The new studies haven't changed anything. They've only 'proved' that calcium is not some super-nutrient that, in large quantities, can do the job of multiple nutrients and hormones. Calcium is still necessary, but not sufficient. **Elderly people who do not consume at least 800 mg calcium and 400 Units vitamin D per day should continue to take supplements,** so that calcium deficiency does not contribute to weak bones.

Anti-Osteoporosis medications: The notion that Calcium = Bone looms so large in the minds of many people, that they equate anti-osteoporosis medications with calcium, believing that they are just another form of the mineral. They are not. Those medications either mimic estrogen, replace parathyroid hormone or calcitonin, or cobble together a new bone structure. People on those drugs should make sure they consume enough calcium, about 800 mg/day, and all the other building blocks for bone, either in the diet or as supplements. Neither the drugs nor the nutrients are sufficient alone to maintain healthy bone and prevent fractures.

GETTING THE MOST OUT OF YOUR DOCTOR #5 *by Ann Gerhardt, MD*

In the last DrG'sMediSense I wrote about rude medical office staff. In this issue I write about an aspect of rude patient behavior. It may seem minor, but doctors are human too, and behavior like this may affect how much a doctor wants to bend over backwards to help you when more important issues arise.

Scenario 1: Mrs. Jones' insurance suggests that she can fill her 10 prescriptions at a mail-order pharmacy. By receiving three months' of drugs per prescription, she doesn't have to go to the pharmacy every month. This will save her time, and the lower co-pays save her money. She calls the doctor's office and asks that the doctor write all new prescriptions to be sent to her.

The doctor has the chart pulled to obtain the list of drugs, spends 10 minutes getting writer's cramp writing all new prescriptions and hands them to staff, who take time to look up her address for the envelope. The doctor gets home that much later for dinner. (Usually doctors accomplish these types of paperwork tasks after patient hours.) If asked in person in the middle of the day, the process cuts into the next scheduled patient's time, and takes the doctor's time, so the patient can save time and money.

She repeats the whole request 9 months later, when she gets fed up with the mail-away pharmacy because they don't send her prescriptions on time, and she switches back to a local pharmacy. Doctor rewrites her prescriptions 4 days later, a passive-aggressive delay expressing resentment for her inconsideration.

Scenario 2: Mr. Smith decides to try getting his 10 prescriptions from a Canadian pharmacy. He sends a request to the doctor, with a written list of his medications, taken from the bottle labels, with name, dose, instructions and calculated number for a three-month supply. (Like this: Allegra, 60mg, one twice a day, #180.) He encloses a self-addressed, stamped envelope. He thanks the doctor and encloses a small token of \$10 for the doctor's time, knowing that this service can't be billed to insurance.

Doctor writes the prescriptions and they get sent off, quickly, since the process takes minimal time and the doctor happily accommodates someone who is clearly considerate of her time and effort.

End of scenarios. You get the idea.



NANCY H. BERNHEIMER

25 YEARS EXPERIENCE

2580 Fair Oaks Blvd. #20
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TEACHING MEDICINE IN PERU

By the time you read this Dr G will be teaching medicine to Peruvian doctors in Lima, Peru. I am going under the auspices of Health Volunteers Overseas, an organization that places healthcare personnel in third world countries to teach, rather than do. That way, the knowledge and work continues after we leave the country, rather than being dependent on our presence. Read about medicine and health in Peru in the next issue of DrG'sMediSense.

I had hoped that I could have asked you donate healthcare-related items that I could take for donation to rural clinics. It turns out that Peru's restrictive customs system makes that problematic. I'll be taking medical books, which they don't seem to mind.

To make a tax-deductible donation to support the trip, please send a check made out to Health Volunteers Overseas and send it to me at P.O.Box 19274, Sacramento, CA 95819. I will batch and forward them to HVO. Extra funds will support HVO.

Many of you contributed to the trip I had hoped to make to Sri Lanka after the tsunami. I regret that your generosity didn't pay off. I never went or cashed the checks. The cash sat in a drawer, waiting for the next chance to volunteer, which is now.

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AIRBORNE by Ann Gerhardt, MD

Bottom line at the top: Airborne has an interesting ingredient list, could be toxic if taken as suggested for many days in a row, and may exert a positive placebo effect, if you believe in it.

As cold season persists on into Spring, the makers of Airborne, a compilation of vitamins, minerals, herbs and amino acids, continue to convince consumers that it prevents and cures colds.

This “medical marvel” was developed by a second grade teacher. While she may not be a virus and immunology expert, she seems to be a successful entrepreneur, since in her words Airborne is “one of the fastest selling products in retail history.” At the cheapest price I could find on the internet, 55 cents per tablet, she’s probably doing fairly well.

While stores have trouble keeping up with demand for the stuff, one has to wonder if there is any validity for its claims. No clinical trials of proving its efficacy have been published. The *New York Times* reports that the basis for Airborne’s cold-cure claims came from “a small, company-sponsored clinical trial.” According to *The Times*, “the study has not been published in a medical journal. [The company] would not disclose where the study was done.”

Colds usually last 3-7 days, and resolve on their own, thanks to the amazing human immune system. Most people are happy if a cold goes away within a few days, and it’s quite possible it will without supplements. If you take Airborne and the cold disappears, you never know whether the pill you took shooed the cold away, you believed in the pill so much that it exerted a powerful positive placebo effect, or the cold would have disappeared in the same time by itself.

The teacher also markets Airborne to prevent colds. The directions encourage consumers to take one “before entering crowded environments.” Most of us encounter a lot of crowded environments. If we take a pill and somehow miraculously survive every time without acquiring a cold, we never know whether the pill really helped or the person, whose cough spewed germs our way, didn’t aim well enough.

Airborne contains large amounts of vitamin A palmitate (5000Units), vitamin C (1000 mg), vitamin B2 (2.8 mg) and Manganese (3 mg). Used as suggested, up to one every three hours, this could cause liver and skin toxicity, especially in children. Modest amounts of vitamin E (30 IU) and zinc (8 mg), and tiny amounts of magnesium (40mg), selenium (15mcg),

glutamine + lysine (50 mg) and potassium (75 mg) add to the length of the ingredient list.

The recommended dose of one immediately before entering a densely populated area or at the first sign of a cold, then every 3 hours as needed, will result in bright yellow urine that might make you think you are getting something good.

According to herbal medicine types, the herbs, Lonicera, forsythia, Schizonepeta, ginger, Isatis root and Echinacea, do have effects that might fight a cold – or at least cold symptoms. The addition that makes less sense, Chinese vitex (also known as chasteberry), reduces fever, but it also “regulates menstrual periods” and contains testosterone and progesterone – not a good thing for women at risk for breast cancer – and may raise blood pressure.

If the herbs do have potential medicinal benefit, the dose is very low, probably not enough to do much good. The maximum dose suggested per day, 8 pills, supplies a total of 2800 mg of all of the herbs combined, just barely approaching the recommended dose of any single one of them. Increasing the dose to therapeutic levels of herbs risks toxicity from vitamin A and the herbs.

Dr G’s qualifications for presuming to think you might want to read her news

Board Certified, Internal Medicine and Clinical Nutrition

Clinical Professor of Internal Medicine, University of CA, Davis

Medical Director (Internal Medicine), Cardiac Transplant Program, Sutter Community Hospitals

Medical Nutrition Director, Mercy General Hospital
Recipient of numerous awards for work with eating disorder patients

Founder of the non-profit organization, We Insist on Natural Shapes

Has done research and realizes that one study raises more questions than it answers

Practices what she preaches

Reader input: If you want any particular subject to be discussed in Dr G’s MediSense, just let me know. If I’m clueless about it, I’ll let you know. If you want me to publish an alternate point of view, write to me. If I don’t think you are off your rocker, I’ll print it: I like controversy. But remember, it’s my newsletter. **Contact** algerhardt@sbcglobal.net.

BANANA BUST by Ann Gerhardt, MD

A number of people have asked me to comment on a circulating email that touts the benefits of bananas. The email proves that the Internet has its share of misinformation and all that is written is not true. It is almost not worth refuting, but in so doing, I can impart some good nutrition information. The email claims are in italics and the debunking is in non-italics.

Exercise: Containing three natural sugars - sucrose, fructose and glucose combined with fiber, banana gives an instant and substantial energy boost.

Research has proven that just two bananas provide enough energy for a strenuous 90-minute workout.

Only if 'strenuous' consists of mild office work. Two bananas supply 210 calories, perhaps enough for a tiny, non-muscular person's 90 minute workout, but not for most people. Athletes like bananas because they are quick, relatively healthy, sources of sugar. Sugar maintains blood sugar levels, but the major energy source for the workout is body fat.

Depression: According to a recent survey undertaken by MIND amongst people suffering from depression, many felt much better after eating a banana. This is because bananas contain tryptophan, a type of protein that the body converts into serotonin, known to make you relax, improve your mood and make you feel happier.

Wrong, on two counts. Bananas contain very little tryptophan (an amino acid building block of protein), so they can't raise tryptophan levels directly. We know that people feel better after eating sugar and banana has plenty of sugar. Dietary sugar prevents blood tryptophan from being taken up by muscle cells, allowing more of it to enter the brain and be turned into serotonin. Bananas do contain pre-formed serotonin (5-hydroxytryptamine), which may be calming, but corn, rice, barley and ginger, which all contain at least three times as much, should work much better. Try chocolate instead.

PMS: Forget the pills -- eat a banana. The vitamin B6 it contains regulates blood glucose levels, which can affect your mood.

Bananas are a rich source of vitamin B6, but B6 has nothing to do with glucose metabolism and blood glucose has nothing to do with preventing PMS. Large doses of B6 (500 mg) have been successful in alleviating PMS symptoms, but cause nervous system toxicity. A banana has only 0.66 mg. Try exercise instead.

Anemia: High in iron, bananas can stimulate the

production of hemoglobin in the blood and so helps in cases of anemia.

At 1/3rd of a mg of iron per banana (1/54th of the daily requirement), bananas are not high in iron. The significant vitamin B6 content, though, might help anemia, as a requisite for hemoglobin production.

Blood Pressure: This unique tropical fruit is extremely high in potassium yet low in salt, making it the perfect way to beat blood pressure.

High potassium foods DO help blood pressure and bananas are a good source. *Per calorie*, though, they provide only ~ 4.5 mg potassium. Compare the per-calorie potassium of other fruits -dried apricots (5.8 mg), cantaloupe and most melons (over 8 mg), guava (5.6 mg), kiwi (5.5 mg), loquats (5.7) and papaya (6.6 mg). They all **pale compared to a tomato**, with 10.5 mg potassium per calorie. Since there are other choices, you don't have to eat large numbers of calories from bananas to stock up on potassium.

Brain Power: 200 students at a Twickenham (Middlesex) school were helped through their exams this year by eating bananas at breakfast, break, and lunch in a bid to boost their brain power. Research has shown that the potassium-packed fruit can assist learning by making pupils more alert.

Many studies show that eating ANY food for breakfast improves scholastic performance. Three bananas a day!! Kids need the nutrition that comes with variety.

Constipation: High in fiber, including bananas in the diet can help restore normal bowel action.

Many people tell me they eat a banana to plug them up when they have loose stools, not the opposite. Bananas contain only moderate fiber - a medium sized banana contains 2.7 grams. A cup of most types of berries (with a third the calories) has at least twice that. An ideal daily fiber intake is more than 20 grams. A mere 2.7 grams is not going to make the difference between misery and smooth sailing.

Hangovers: One of the quickest ways of curing a hangover is to make a banana milkshake, sweetened with honey. The banana calms the stomach and, with the help of the honey, builds up depleted blood sugar levels, while the milk soothes and re-hydrates your system.

I'm not an expert on hangovers, but drunks tell me that milk and a banana aren't the solution. The symptoms of hangover are due to build-up of acetaldehyde, a metabolic product of alcohol, and bananas don't change that.

Heartburn & Ulcers: Bananas have a natural antacid effect in the body, so if you suffer from heartburn, try

eating a banana for soothing relief. The banana is used as a food for intestinal disorders because of its soft texture and smooth-ness. It is the only raw fruit that can be eaten without distress in chronic ulcer cases. It neutralizes over-acidity and coats the stomach.

Eating food to buffer acid and coat the stomach helps heartburn and ulcer symptoms but leads to weight gain. Overfilling the stomach will aggravate heartburn. It is much better treat the underlying acid or bacteria problem with specific therapy – Don't just placate symptoms by boosting Chiquita sales.

Morning Sickness: *Snacking on bananas between meals helps to keep blood sugar levels up and avoid morning sickness.*

Morning sickness is not due to low blood sugar. Eating multiple bananas a day, as snacks, will help gain the 25-30 pounds of pregnancy quickly.

Mosquito bites: *Before reaching for the insect bite cream, try rubbing the affected area with the inside of a banana skin.*

Have at it. Let me know if it works.

Stress: *Bananas are high in B vitamins that help calm the nervous system.*

B vitamins only calm the nerves if you have a deficiency. Except for the previously discussed B6, banana provides no more than a tenth of the RDA for any of the B vitamins.

Overweight and at work? *Studies find that pressure at work leads to gorging on comfort food. Of 5000 hospital patients, the most obese were more likely to be in high-pressure jobs. The report concluded that, to avoid panic-induced food cravings, control blood sugar levels by snacking on high carbohydrate foods every two hours.*

Eating every 2 hours prevents hunger-induced gorging, not stress over-eating. Eating a banana or any carbohydrate food every two hours IS stress eating and will cause weight gain. Bananas will not stop stress eating, but they're better than chips.

Temperature control: *Many other cultures see bananas as a "cooling" fruit that can lower both the physical and emotional temperature of expectant mothers and their babies.*

Whatever makes you happy. Have some melon.

Seasonal Affective Disorder (SAD): *Bananas can help SAD sufferers because they contain the natural mood enhancer tryptophan.*

See Depression. The author must be confusing tryptophan with 5-hydroxy-tryptamine. See

DrG'sMediSense issue 1-4 for the appropriate treatment for SAD.

Smoking: *Bananas can also help people trying to give up smoking. The B6 & B12 they contain, as well as the potassium and magnesium, help the body recover from nicotine withdrawal.*

Banana contains no B12 and only one-tenth the day's requirement for magnesium. The nutrients are irrelevant, however, since they do not help with nicotine withdrawal. Try the patch.

Stress: *Potassium is a vital mineral, which helps normalize the heartbeat, sends oxygen to the brain and regulates your body's water balance. When we are stressed, our metabolic rate rises, thereby reducing our potassium levels. These can be rebalanced with the help of a banana snack.*

Everything in that passage is incorrect, except for potassium being a vital mineral that maintains a regular heart rate. Potassium doesn't reduce stress. Take a vacation.

Strokes: *According to research in The New England Journal of Medicine, eating bananas as part of a regular diet can cut the risk of death by strokes by as much as 40%!*

This has to be misquoted. NOTHING except good blood pressure control, cuts stroke risk that much.

Down with apples: *So maybe its time to change that well-known phrase so that we say, "A banana a day keeps the doctor away!"*

Every fruit has its benefits and none should be eaten exclusively or in excess. If you need the extra calories eat more fruits each day, including a banana. Vive variety!!!

Newsletter Disclaimer: Because you are an extraordinary manifestation of a tangle of unique genetic material, think first, before applying any or all of these articles' information to your life choices. Dr G's just trying to interpret medical and nutrition news reports for you - within the framework of information already known and the limitations of how the studies were done. Articles this size can't possibly contain every bit of information that was ever published on a subject. Distillation may leave some things out: Hopefully not crucial pieces. Don't crucify me if some new tidbit of information comes along that contradicts what I wrote. This newsletter offers some insight, not The Cure: It's not a doctor's prescription. PLEASE discuss any changes in therapy or lifestyle with your doctor. Subscribing to this newsletter presumes that you accept your own risk when making decisions about your health.