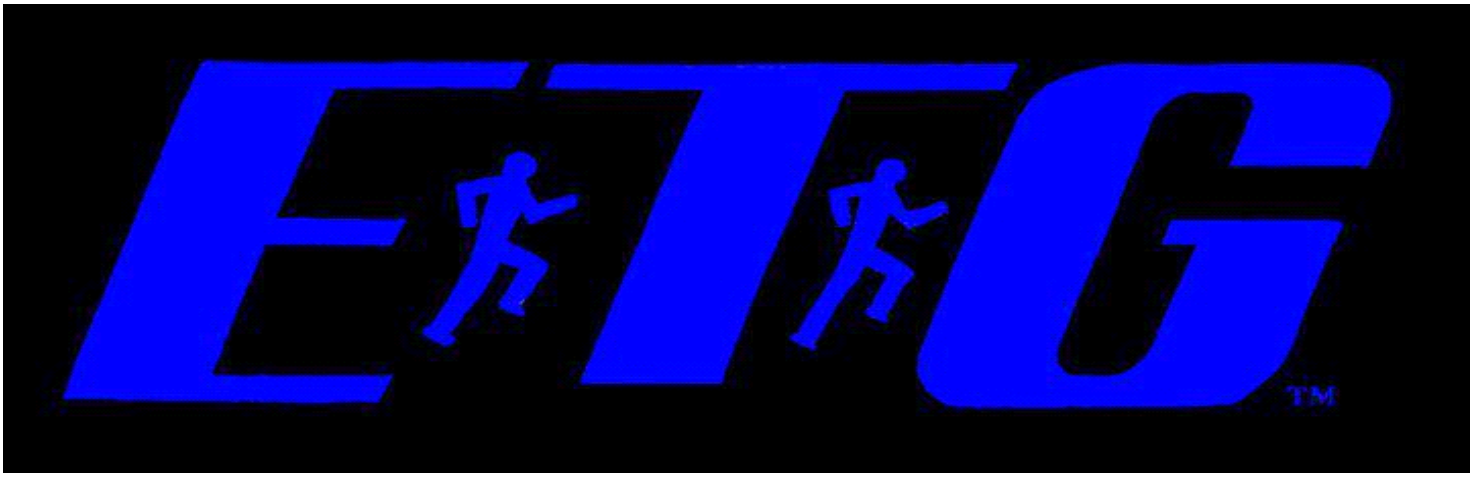

TheElite Training Group track club

Expanding the area of what is possible

In Track & Field Distance Running & Competent Self-Care in medicine and psychology

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Mechanisms of Osteoporosis

A major part of TheETG mission is to expand the area of what is possible in competent self-care in medicine and psychology. TheETG's primary method of achieving that is to proliferate applied science based information by way of $free packets containing plain language info for anyone seeking to move themselves or others forward in these areas. TheETG packets attempt to address the following;

"….takes an average of 17 years to translate 14% of original research into benefit…..average of 9 years for interventions recommended as evidence-based practices to be fully adopted."
[M.Tinkle, et al -- Dissemination and Implementation -- Nursing Research and Practice -- Volume 2013]

"......the benefits that US health care currently deliver may not outweigh the aggregate health harm it imparts."
[Journal Of The American Medical Association...Volume 302 #1..July 1, 2009...page 89 - 91]

".....1.5 million U.S. residents are harmed or killed each year because of medication errors, according to an Institute of Medicine report."
[Nature Medicine -- Volume 12 #9 -- September 2006 -- page 984 - 985....News In Brief]

"It is estimated that more than 700,000 individuals are seen in hospital emergency departments for adverse drug events each year in the United States."
[Centers For Disease Control -- 2015]

"Most drugs are only effective for a small percentage of people who take them."
[Michael Leavitt -- U.S. Secretary of Health & Human Services 2005 - 2009]

".....A recent study for example, found that only half of all cardiac guidelines are based on scientific evidence."</p>
[President Barack Obama -- Speech to the American Medical Association -- June 15, 2009]

"All the good things....they don't teach us in medical school, because the drug companies pay for our education."
[Dr. John Sessions M.D.]

"Not enough doctors adapt appropriately to new scientific findings.....An insufficient number of medical faculty members are well prepared, effective educators, and too few medical schools prepare their students for a lifetime of learning and change."
[J.Hilliard,et al. -- The Lancet -- Volume 385 #9969 -- February 21, 2015 -- page 672]

Reversing Osteoporosis

Looking like osteoporosis has less to do with hormone issues, more to do with other stuff, collagen production [lack thereof], and chronically elevated acidity in the environment around bone similar to the de-mineralization of teeth. Like most degenerative issues in humans, a correctable, reversible problem.

Reversing or preventing osteoporosis.....

--- Lift weights throughout your life, especially partial-squats, calf raises, jumping exercises, in other words stuff that's fully weight bearing and preferably done with weights at home or at a gym

--- supplements 3 to 4 days a week....
vitamin K2 -- to aid calcium going to bone instead of to calcifying the walls of your blood vessels
vitamin D3 -- for normal functioning of all cells including those related to bone
magnesium -- to aid in bone building and rebuilding
vitamin C -- to aid in collagen formation in bone

--- eat raw mixed vegetables, preferably the combo of cucumber, carrot, broccoli, and Romano tomato
to alkalize the diet reduce bone loss via acid environment.

--- eat mixed berries such as strawberry, raspberry, blue berry, black berry for minerals and anti-oxidants.

--- Perhaps say no to calcium supplements if you're not a kid or pregnant woman.

--- absorbable hydrolyzed collagen supplement, the form used in bone

--- reduce soda consumption to limit potential bone de-mineralization via acidity or thyroid malfunction issues
.

Osteoporosis, a unitary hypothesis of collagen loss in skin and bone
S.Shuster
Medical Hypotheses....Volume 65 #3.....2005.....page 426 - 432
"Progress in osteoporosis has been stultified by repetitive, statistic-driven studies and catechistic reviews; in the absence of concept and hypothesis research is aimless, and the trivial associations it continually reveals, has led to the cul-de-sac of multifactorialism."

"A return to hypothesis-led research which seeks major causal defects and the conclusive therapies that arise from them is essential."

"The hypothesis proposed evolved from research into the mechanism of senile purpura. This predicted a causal loss of skin collagen that was contrary to contemporary opinion, but was confirmed when collagen was expressed absolutely, instead as a percentage or ratio: women have less collagen than men and it decreases by 1% a year in exposed and unexposed skin. Corticosteroids (which also produce shear purpura) reduce skin collagen and androgen and virilism increase it; growth hormone produces the greatest increase, and there is a decrease in hypopituitarism."

"All these changes in skin collagen correspond to changes in bone density, and the circumstances are too various for coincidence."

"This led to the hypothesis that the changes found in skin collagen also occur in bone collagen, leading to the associated changes in bone density; thus a loss of collagen in skin and bones with aging is the causal counterpart to loss of bone density in senile osteoporosis. If this is correct then, as with aging, androgen and virilisation, corticosteroids, growth hormone and hypopituitarism, changes in bone density should correspond to systemic changes in skin collagen."

"This correspondence is found to occur in osteogenesis imperfecta and Ehlers-Danlos syndrome, two genetically discrete families of disordered collagen production, and other situations, e.g., scurvy and homocystinuria."

"A primary loss of collagen in osteoporotic bones is an essential prediction of the hypothesis; in fact this loss is well established but, inexplicably, it has been assumed to be secondary to the bone loss. Because of the comparable changes in skin and bones, the hypothesis implies that skin collagen could be used to predict the state of the bones and their response to treatment."

book.....Death By Calcium
Amazon....."In his newest book, Death by Calcium, board-certified cardiologist, Thomas E. Levy, offers scientific proof that the regular intake of dairy and calcium supplementation promotes all known chronic degenerative diseases and significantly shortens life. Written for both the layperson and scientist, Dr. Levy explains the dangers inherent in supplementing with calcium. "It is now clear that excess dietary calcium, as is realized with the routine ingestion of milk and other calcium-laden dairy foods, is also a toxic and potentially life-shortening practice."
.
Clinical Trials....U.S. National Institutes of Health
Biological Bone Markers and Hydrolyzed Collagen Supplement in Menopausal Healthy Women.....
"Preliminary scientific studies, in both animals and humans suggest that oral consumption of hydrolyzed collagen acts on the bone remodeling process by stimulating the activity of osteoblasts responsible for bone formation while improving the bone mineral density and biomechanical resistance of long bones."
"The objective of this clinical research is to measure changes in biomarkers of bone turnover in postmenopausal healthy women, not osteoporotic, in response to consumption of hydrolyzed collagen for three months."

"For this, we propose to measure blood and urinary markers of formation and bone resorption before consumption, then 45 and 90 days after daily consumption of 10g of hydrolyzed collagen."

collagen hydrolysate……

"Preferential accumulation of 14C-labeled gelatin hydrolysate in cartilage as compared with administration of 14C-labeled proline has been reported. This preferential uptake by cartilage suggests that Pharmaceutical-grade collagen hydrolysate may have a salutary effect on cartilage metabolism. Given the important role for collagen in bone structure, the effect of Pharmaceutical-grade collagen hydrolysate on bone metabolism in osteoporotic persons has been evaluated. Studies of the effects of calcitonin with and without a collagen hydrolysate-rich diet suggested that calcitonin plus Pharmaceutical-grade collagen hydrolysate had a greater effect in inhibiting bone collagen breakdown than calcitonin alone, as characterized by a fall in levels of urinary pyridinoline cross-links. Pharmaceutical-grade collagen hydrolysate appeared to have an additive effect relative to use of calcitonin alone."

"Collagen hydrolysate is of interest as a therapeutic agent of potential utility in the treatment of osteoarthritis and osteoporosis. Its high level of safety makes it attractive as an agent for long-term use in these chronic disorders."

R. Moskowitz, et al
Role of collagen hydrolysate in bone and joint disease
Seminars in arthritis and rheumatism....Volume 30 #2....2000.....page 87 – 99

"Current options to promote joint comfort are limited to medicines that can reduce pain but can also have adverse effects. Collagen, a major component of joint cartilage, is found in the diet, particularly in meat. Its hydrolysed form, collagen hydrolysate, is well absorbed. collagen hydrolysate may stimulate the joint matrix cells to synthesize collagen, so helping to maintain the structure of the joint and potentially to aid joint comfort."

"In a randomized, double-blind, controlled multicentre trial, 250 subjects with primary osteoarthritis of the knee were given 10g collagen hydrolysate daily for 6 months."

"There was a significant improvement in knee joint comfort..."

"Subjects with the greatest joint deterioration, and with least intake of meat protein in their habitual diets, benefited most."

P. Ruiz-Benito, P, et al
A randomized controlled trial on the efficacy and safety of a food ingredient, collagen hydrolysate, for improving joint comfort
International Journal Of Food Science & Nutrition.....Volume 12...2009....page1 –15

"Currently, osteoarthritis affects nearly 21 million people in the United States, accounting for....half of all Non-Steroidal Anti-Inflammatory Drugs prescriptions."

"Although these drugs are effective for reducing pain associated with osteoarthritis, they do not reverse the disease. In addition, there are considerable side effects...."

"Previous studies have shown that undenatured type II collagen is effective in the treatment of rheumatoid arthritis, and preliminary human and animal trials have shown it to be effective in treating osteoarthritis."

"The present clinical trial evaluated the safety and efficacy of undenatured type II collagen as compared to a combination of glucosamine and chondroitin in the treatment of osteoarthritis of the knee."

"The results indicate that undenatured type II collagen treatment was more efficacious resulting in a significant reduction in all assessments from the baseline at 90 days..."

"Thus, undenatured type II collagen treated subjects showed significant enhancement in daily activities suggesting an improvement in their quality of life."

D.C. Crowley
Safety and efficacy of undenatured type II collagen in the treatment of osteoarthritis of the knee: a clinical trial
Internaltional Journal Of Medical Sciences...Volume 6 #6....2009...page 312 - 321

Human Physiology: Mechanisms of Osteoporosis

"Bone Remodeling" is the general term used to describe the process of structural changes that take place in bone. There are two main cells, osteoclast cells and osteoblast cells. Bone is comprised of calcium phosphate, which these cells will either breakdown or build. Following exercise, there is debri from the matrix structure of bone that must be removed. Osteo**clast** cells are responsible for resorbing this debri and releasing the calcium into the blood stream. Osteo**blast** cells are like engineers that take up calcium from the blood stream and use it to lay down a new and stronger bone matrix to withstand greater loads. This process is the "stress reaction" aspect of bone remodeling. It is a normal adaptive function within bone.

Bone Loss

As people become more sedentary in their life style, a situation exists where the rate of osteoclastic activity exceeds the rate of osteoblastic activity. Bone resorbtion exceeds bone deposition, thus there is a net loss of bone. This net degeneration of bone weakens the overall integrity of the bone. Menopause, lack of exercise, and/or psychological stress, cause a decrease in production of estrogen and testosterone, which further facilitates osteoclastic activity and decreases osteoblastic activity. Estrogen promotes apoptosis (cell destruction) of osteo**clasts**. Thus reduced estrogen causes reduced regulation of osteoclast activity. Low calcium availability due to low calcium intake, intake of caffeine, or decreased estrogen (estrogen aids absorption of calcium in the diet), further complicate the situation since calcium is needed to inorder to build bone.

Falling Down

When the overall strength of the bone is lost due osteoclastic activity, the bone may break. In elderly people who have osteoporosis, the order of events is not as it seems. They do not fall and break their hip. Their hip breaks, and then they fall.

Building Bone: Exercise

Weight bearing exercise is the most potent stimulator of osteoblastic activity. "Weight bearing", means that one's feet are on the ground, supporting your body weight, such as in walking or running, or in lifting weights. For example, bicycling is not a weight bearing exercise since most of your weight is supported by the seat. Fluid comprises a substantial part of bone (~20%). Compressive forces on bone during weight bearing exercise causes fluid movement within the bone. The force of the movement of fluid through the bone creates a force on osteoblast cells, which is the mechanism by which these cells are stimulated to build more bone. The velocity of fluid movement through bone is similar to the rate that weight is applied to the bone, thus the greater the weight, the greater the fluid movement. Therefore, greater weight, can result in greater stimulus for osteoblast cells to build more bone. This is why lifting weights is such a potent stimulus for bone strength increases. Lift weights throughout life!!!

Characteristics Of Aging Humans

Two of the major characteristics of people as they age is that they tend to decrease their weight bearing exercise levels and their intake of foods high in calcium. Thus, as they age, they effectively decrease the stimulus for osteoblast activity, and decrease their intake of the main nutrient needed for bone building. Bone loss through the life span is normal. However, in these people, one will see an accelerated rate of bone loss. Bone is much like muscle. When it goes unused, it will atrophy, weaken, and have a decrease in the forces that it can deal with. Strength training studies on elderly populations show that this accelerated bone loss can be **reversed**, and/or slowed substantially.

Exercise & Aging

Perhaps the most functional way to view exercise in the context of aging, is the ability of exercise to keep the body functioning in the manner that allows one to continue living one's desired life style well into "old age". If your objective is to be mobile, strong, and independent late in life, then you must train to do so. Hence the concept, "training to live, training for life". Our bodies will adapt to the training that we do. They will gain and maintain the aerobic capacity that we train them to have. Our muscles and bones will gain and maintain the strength that our training creates in them.....reguardless of age. Atrophy and degeneration of the body is more a symptom of cessation of the exercise process rather than a result of the aging process. The fact is that 80 year old marathoners have a far higher aerobic capacity than 20 year sedentary people.

Estrogen Replacement Therapy

At menopause, estrogen production in women decreases significantly. Reduced estrogen levels contributes to bone loss and osteoporosis as mentioned earlier. Doctors attempt to prevent this by recommending estrogen replacement, by pill or skin patch. Providing the body with more estrogen increases the chance that some significant amount of it will bind to estrogen receptors on tumor cells in the breast and/or ovaries, and act as a growth factor. Thus estrogen replacement therapy to prevent osteoporosis, has been shown to contribute to cancer growth in the breast and ovaries. Fortunately, exercise contributes to short term estrogen production which will bind to receptors mainly in bone and muscle, rather than tumor cells. One can also increase intake of soy products which contain substances refered to as "plant estrogens" (isoflavonoids). They function like estrogen produced in the body to some degree, however they also compete with estrogen for binding sites on receptors located on tumor cells. These plant estrogens fail to have the same level of growth promoting effects in tumor cells. Thus you can get the estrogen without using costly pills and patches that are highly likely to promote breast cancer and/or ovarian cancer.