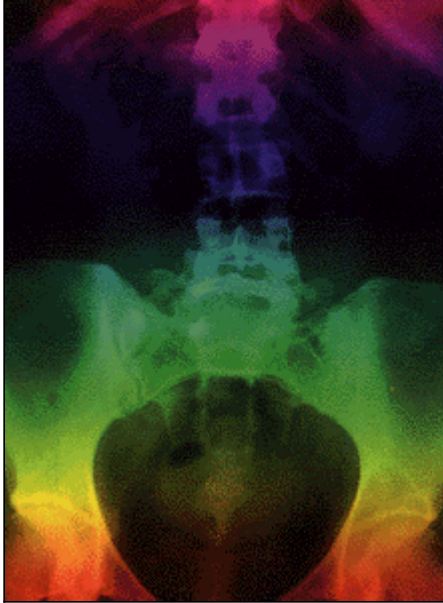


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EVENTS

Italian Conference Underscores Importance of Calcium And Vitamin D for Healthier, Happier Living

By Candy Ostman



With sessions ranging from the role of nutrients in lessening hypertension and blood pressure, to the impact of calcium deficiency in osteoporosis, the formation of kidney stones, and many other related topics, the conference in Rome ranged far and wide in the vital uses the body has for calcium and vitamin D.

The First World Congress on Calcium and Vitamin D in Human Life was a time of discovery and shared enthusiasm for the many researchers, scientists, physicians and lay people who had come from all over the world to attend. Throughout the five days of the conference, held at the Palazzo dei Congressi, in Rome, Italy, there were many lively discussions about the role of calcium and vitamin D that should shape future ideas pertaining to these two vital nutrients.

Unfortunately, current literature contains many conflicting reports as to the benefits of calcium in preventing and treating osteoporosis, a condition marked by a reduction in bone mass. To further complicate things, many have suggested that the dietary recommendations for calcium are the same as the amounts needed to produce adverse biological effects.

It must also be pointed out that in some countries statistics showing relatively low intakes of calcium do not positively correspond with a high incidence of osteoporosis. Part of the problem may be unreported factors, such as level of exercise, hormone levels and so forth that play a significant role in the incidence of osteoporosis. A recurring theme is that there is much to be investigated about the possible role of calcium in relation to health and disease on a worldwide basis.

THE DEADLY LINKS

Nevertheless, according to Dr. David A. McCarron, of Oregon Health Sciences University, Portland, there are many disease states related to the intake of insufficient amounts of dietary calcium. In addition to osteoporosis, some of these include osteoarthritis, cardiovascular disease (hypertension and stroke), diabetes, hyperlipidemias (such as high cholesterol levels) hypertensive disorders of pregnancy, obesity and colon cancer.

Also, there have been significant advances made in exploring the role of calcium-regulating hormones such as vitamin D, parathyroid hormone (PTH), parathyroid hormone-releasing peptide (PTHrp) and others in affecting cell function.

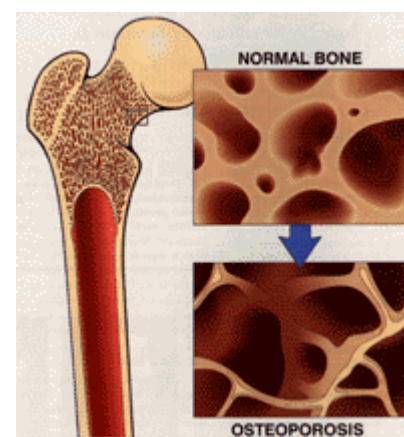
An example of the significance of this is the finding that, as a smooth muscle cell reads a low calcium signal, it contracts, resulting in arterial pressure increasing. The result is that hypertension is manifested with insulin resistance.

By the same mechanisms, the mobilization of fat is impaired, which results in obesity. This can be combined with hypertension and type II diabetes, and thus the cascade effect is in full swing. Dr. McCarron concludes that recognition of these mechanisms and the significant role calcium plays in the normal function of cells is critical to understanding the association between optimal dietary levels of important nutrients and the maintenance of health.

VITAMIN D AND BONE MINERALIZATION

Vitamin D deficiencies have long been known to be exclusively related to bone abnormalities, especially rickets and osteomalacia (softening of the bones). Suffice it to say that vitamin D deficiency and resistance cause severe impairment of bone mineralization. This can be corrected by making sure adequate supplies of vitamin D/phosphate are provided.

Also at the conference, Dr. V. Matkovic, of the Bone and Mineral Metabolism Laboratory at Ohio State University, in Columbus, discussed calcium requirements throughout life. Calcium is crucial to normal growth and skeletal development in humans. It also is the major component of mineralized tissues. Adequate amounts of dietary calcium are required to maximize peak adult bone mass, in addition to maintaining that mass. Calcium also is required to minimize bone loss in the elderly.



Calcium requirements vary throughout an individual's lifetime. The times of greatest need are during adolescence, pregnancy and in the later years of maturity. The need for calcium is largely determined by one's skeletal requirements.

Calcium absorption is closely related to vitamin D intake and its status in the body, particularly the serum calcitriol level. Poor intestinal response to calcitriol due to age and such diseases as spinal osteoporosis accounts for the decline in vitamin D levels. There is now increasing data indicating that low calcium absorption due to menopause in women can be restored by the addition of sex hormones such as estrogen and progesterone.

Carlo Gennari of the Institute of Internal Medicine and Medical Pathology at the University of Siena, Italy, discussed estrogen and intestinal calcium absorption in women. It is well known that estrogen therapy in postmenopausal women improves calcium absorption. It appears that estrogen has a positive effect on the intestinal mucosa cells, making absorption easier.

Osteoporosis is a major public health problem, especially in post-menopausal women. But Dr. Gennari feels it is quite preventable. Several advances have occurred in the last decade in drug therapy to treat this very debilitating disease.

OSTEOPOROSIS IS PREVENTABLE

Osteoporosis therapy can be divided into two categories: Drug therapies that inhibit bone resorption and thus bone turnover, and drug therapies that stimulate bone formation, therefore exhibiting an anabolic effect. Included in this second category are calcium, vitamin D and its metabolites, gonadal steroids, calcitron and bisphosphonates.

The combination of calcium and calcitonin (a polypeptide hormone) may be an acceptable alternative to hormone replacement therapy in the case of those women who cannot tolerate estrogens. Some new advances in that area include nasal sprays containing forms of salmon calcitonin.

These sprays have been shown to actually prevent bone loss in postmenopausal women who do not respond well to conventional hormone therapy. A further alternative showing some promise is the addition of bisphosphates, either through a cyclical treatment with alendronate or continuous treatment using more experimental compounds like pamidronate, which is of particular benefit in combating bone loss due to bone cancer.

CALCIUM, BONE STRENGTH AND THE ELDERLY

Calcium intake in the elderly was also a conference topic. As men and women age, according to several studies, dietary calcium intake and its intestinal absorption generally decrease.

That decrease is more pronounced in women than it is in men. Insufficient calcium balance in the body is detrimental because the body, in order to achieve the correct calcium balance, will mobilize calcium from bone, which can lead to osteoporosis, among other things. This phenomenon is known as homeostasis, which is a system of control mechanisms the body sets in motion to achieve stability, even though it at times has negative effects.

The minimum daily requirement for calcium can vary for individuals according to sex, age and certain physiological conditions like pregnancy. Even one's geographic location can affect the calcium requirements. The recommended daily allowance in westernized countries suggests a general minimum value of 800 to 1,000 mg per day for adults and 1,200 to 1,500 mg per day for the elderly. However, most studies in those same countries indicate that the general population is far below the requirements in terms of calcium consumption.

This statistic is even more pronounced in the elderly. An Italian nutritional study measuring calcium levels among the elderly was conducted in 1986. The results showed that the mean dietary calcium intake of 946 elderly subjects was 718 mg per day in men and 615 mg per day in women. In terms of the RDA in Italy, these results showed that the men were ingesting 68 percent of the requirement and the women were ingesting 60 percent.

Another presentation on osteoporosis noted that bone fractures are the most detrimental side effect of this disease. They are painful, cause deformity, and in the elderly in particular are a leading cause of death due to complications. Those individuals at the highest risk of contracting osteoporosis are women of white or Asian ethnicity who have positive familial histories of bone fragility coupled with low body weight, low calcium intake and high caffeine intake. Other factors include a sedentary lifestyle, alcohol abuse, and cigarette smoking. Currently there are tests available to determine bone mass or density, an important assessment to determine skeletal strength and future risk. By the age of 90, the possibility of sustaining an osteoporotic fracture increases to 50 percent, particularly in women. It was stressed that highly bio-available calcium, like that in milk and other dairy products, should be consumed by everyone. Vitamin D supplementation also must be provided where needed.

CALCIUM AND THE YOUNG

As for young, the skeletal mass of infants doubles during the first year of life, and from the age of 12 months to six years the child's bone mineral content increases at a rate of 10.5 percent annually. It is during adolescence that the most rapid growth and weight gain of the skeleton occurs. Adequate amounts of dietary calcium must be maintained at all times if peak bone mass is to be achieved. The recommended dietary allowances of calcium for children (1-9 years) are 800 mg per day and 1,200 mg per day for adolescents.

Many studies have shown conclusively that persons who consume calcium in greater quantities early in life have greater bone mass later on, thus reducing their risk for osteoporosis. To illustrate the importance of maintaining good bone mass, according to studies of the relationship of bone mass to incidence of fractures, it was shown that a change of one standard deviation in bone mass may alter the risk of fracture by as much as 100 percent.

In an Italian study involving 36 prepubertal boys, it was discovered that the combination of calcium and physical exercise has a tremendous effect on bone mass and bone turnover, which in turn is very important in achieving optimal skeletal health in humans. While diet is important to the maintenance of good bone health, physical activity, particularly weight-bearing exercise, is also extremely important for everyone, including children.

THE IMPACT OF PHYSICAL EXERCISE

In an experiment on the effects of exercise and dietary calcium in relation to bone mass in young people, 58 athletes (26 male and 32 female tennis players) aged 19 to 34 were studied. The frequency of exercise varied from about seven to 14 hours per week, about five days per week over at least five years. The results showed that in every instance, bone mineral density was higher in those individuals who received higher levels of calcium.

Further data showed that, when the only variable was the level of calcium intake, those who received the higher levels of calcium had the greatest bone mineral density. In conclusion, it can be said that peak bone mass can be attained by the synergistic use of both exercise and proper calcium levels.

But sometimes exercise can have an opposite effect. Physical activity is important to bone mineral density only in women who menstruate regularly. Those female athletes, particularly those performing endurance exercise, who suffer from amenorrhea (cessation of menstruation) or oligomenorrhea (irregular menstruation) are at a greater risk for decreased bone mass than those who train intensely but menstruate regularly.

In female ultra-marathon runners, those who ran more than 41.5 miles per week, were much more likely to develop amenorrhea than those who ran less than that amount.

However, conference presenters warned that the differences in bone mass that was evident between these two groups may be due to the marathon runners not having a sufficient amount of estrogen, and not merely a matter of reduced calcium intake. As is evident, the final chapter on calcium and vitamin D has yet to be written.

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