

# The prevention and management of osteoporosis in elderly women

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## Introduction

A leading cause of death in elderly women is the complications resulting from hip fracture associated with osteoporosis. A number of preventive measures include the use of exercise, increasing dietary intake of calcium and the use of calcium supplements. The impression the observer has of public health campaigns and commercial advertising is that the focus of prevention of osteoporosis is encouraging the intake of “adequate” amounts of calcium, primarily via the consumption of dairy products and calcium supplements.

The Ministry of Health’s nutrition guidelines (Health June 1996) to optimise skeletal health includes:

“Meeting the body’s calcium needs and maintaining regular exercise throughout life; a dietary pattern which does not supply too much sodium, animal protein or caffeine; avoidance of smoking and excessive alcohol consumption; a small amount of daily sun exposure; and avoidance of amenorrhea in premenopausal women.”

This assignment explores several of the inter-relating issues to do with the prevention and management of osteoporosis in elderly women.

## Calcium recommended daily allowances

What is the RDA for calcium for older people – particularly elderly women? According to the Journal of Public Health and Nutrition (Gennari 2001), the expert committee of the European Community in the Report on Osteoporosis-Action - on prevention, has given the RDA for calcium at all stages of life. For the elderly population, above age 65 the RDA is 700-800 mg/day. Recker (Recker 1993) published estimates of the threshold intake levels for all stages of life. They range between 1.3 g/day for infants to 1.5 g/day for women past menopause. Closer to home, Prince (Prince 1993) recommended increasing the Australian recommended dietary intake for postmenopausal women to 1500 mg calcium per day.

The Ministry of Health Guidelines (Health June 1996) state that:

“Calcium is clearly one of the nutrients supplied least adequately in the diets of older people. The commonly observed intakes of 500–600 mg/day are not adequate to sustain positive calcium balance in many

healthy adults. The Australian recommendations adopted by New Zealand specify 1,000 mg/day for women aged 54 years and over and 800 mg/day for men over 64 years. Many older New Zealanders, particularly women do not meet these recommended intakes.”

## **Vitamin D and osteoporosis**

Is the solution as simple as steadily bumping up the intake of calcium?

The prestigious American Journal of Nutrition (Nutrition February, 2003) reported that calcium has been the focus of nutritional research for the prevention of postmenopausal osteoporosis as many clinical trials of calcium supplementation have found that it can indeed reduce bone loss and lower the risk of bone fractures. However, the report cautioned the trials often include a simultaneous treatment with vitamin D, which makes it difficult to attribute the benefits to calcium alone. In addition, the report noted, the bone density increase found during the first year or two of calcium supplementation may not substantially increase in the long term. Additionally, in contrast to most clinical data, most observational studies did not find a significant association between calcium intake and fracture risk or bone loss. While milk and other dairy foods seem beneficial in women under the age of 30 years, there has been no clear benefit documented for women over the age of 50 years. It noted further that sufficient amounts of vitamin D are important in the prevention of postmenopausal bone loss. Calcium intake, on its own, did not appear to be associated with fracture risk. The report further noted that some 25 percent to 50 percent of the elderly have vitamin D deficiency, which can lead to loss of muscle strength and an increased likelihood of falling that, in turn, increases the risk of hip fracture.

## **The dairy – osteoporosis paradox**

Does the consumption of dairy reduce risk of fracture? Maybe yes – maybe no. We only need to look at populations, including vegetarians and many non-Westernised societies, in which dairy is rare or absent to realise that osteoporosis is not the inevitable consequence of low or nil consumption of dairy products. Why, in a country like New Zealand, which is awash with milk, is osteoporotic fracture of the hip such a huge and growing problem? In addition, why is it an increasingly significant health problem for those ageing women raised as children on the “milk in schools” programme of the

50's and 60's? Is there any scientific evidence to support these anecdotal observations?

Turner (Turner, Hunt et al. 1999) found dairy-product intake was significantly associated with hip fracture. Women who had suffered hip fracture reported higher dairy use than women who had not experienced these fractures, a finding that is inconsistent with the literature. However, we must not jump to conclusions – the researchers cautioned that this finding might reflect behavioral changes resulting from the hip fracture event – or does it? Let us explore some of the other factors at play that may explain why dairy consumption alone does not reduce risk of fractures in the elderly.

## **Protein intake and osteoporosis**

Some argue that we consume too much protein and that we would not have such a high calcium requirement if only we would eat less meat. Klevay (Klevay and Wildman 2002) tested the hypothesis that mice fed meat would have fragile bones. They measured the breaking strength of femurs. The meat diet produced femurs 23% weaker in comparison to a meat plus liver diet. Why would this be the case? It appears, according to the authors, that trace minerals, such as magnesium, copper and zinc that are relatively absent in steak, but present in liver, are necessary for bone health.

In his review of the subject Heaney (Heaney 2002) reported it has been known for nearly 80 years that increasing protein intake increases urinary calcium loss. Because urinary calcium loss is the most important physiologic determinant of calcium retention, excess protein intake should therefore be bad for bone, other things being equal. Heaney noted that some studies have indeed found this, but others found exactly the opposite. Rather than being harmful to bone, Heaney noted increased protein intakes for those with osteoporosis substantially improve recovery after hip fracture and reduce age-related bone loss in the other hip.

It appears that protein and calcium act synergistically on bone if both are present in sufficient quantities in the diet. However, protein may seem to be detrimental to bone density because of its ability to cause one to excrete calcium in the urine when calcium intake is low. This naturally leads into the issue of malnutrition.

## **Malnutrition and osteoporosis**

Rizzoli (Rizzoli, Ammann et al. 2001) reported that malnutrition, most notably protein deficiency, contributes to the occurrence of osteoporotic fractures not only by decreasing bone mass but also by altering muscle function. Furthermore, malnutrition is associated with increased morbidity in patients with osteoporotic fractures.

It would appear there is little point of increasing calcium intake if the elderly person remains malnourished.

How prevalent is malnutrition among the elderly? Martinez (Martinez Olmos, Martinez Vazquez et al. 2002), in a study to validate a protocol for the detection of malnutrition risk in a population of elderly patients (Over 65 yrs) admitted to a general hospital for non-surgical reasons, found a high prevalence of protein-energy malnutrition in the population studied (79%). Constans (Constans 2003) Reported that malnutrition is highly prevalent in elderly populations: 4% in the community and nearly 50% in hospital and long-term care facilities.

My personal experiences working in facilities for the aged and in New Zealand hospitals give every impression that similarly depressing rates of malnutrition exist in New Zealand.

## **Bone mineral and its role in metabolic acid – base buffering**

There is an additional factor: acidity and the calcium-robbing effect of it. We are talking about the stealing of buffering minerals, especially calcium to neutralise acid producing foods in order to maintain body PH neutral or even slightly alkaline. It is essential, as well, that adequate minerals are taken in through diet to maintain blood reserves of calcium, magnesium, sodium and potassium for heart and muscle function. If not, the bodily response is to rob these minerals from the bones, teeth, joints and muscles in order to buffer and neutralise acids. Can the consumption of acid foods lead to a severe mineral deficiency, including osteoporosis? While the jury is still out, let us explore some of the evidence for and against this hypothesis.

In a study of rats fed large amounts of cola (Garcia-Contreras, Paniagua et al. 2000) the data suggested that heavy intake of cola soft drinks has the potential of reducing femoral mineral density (Cola and most carbonated drinks have acidic phosphates added to maintain the “fizz” and to give taste).

Spencer (Spencer, Kramer et al. 1988) concluded controlled human studies show that a phosphorus intake of up to 2000 mg/day does not have adverse effects on calcium metabolism; however, the caution is added in the report that the type of phosphate contained in carbonated beverages may not behave in the same manner as those used in the studies examined.

What about diets opposite to acidic – diets that are alkaline in nature? Do these have a calcium-sparing action? It would appear they might have a calcium-sparing function. Tucker (Tucker, Chen et al. 2002), in an analysis of the Framingham Osteoporosis Study, concluded dietary pattern is associated with bone mineral density. High fruit and vegetable intake (An alkali/neutral diet) appears to be protective in men. Interestingly, high candy consumption was associated with low bone mineral density in both men and women – a clue as to what we should be recommending to our clients (Many health experts believe a high sugar/carbohydrate diet contributes to body acidity).

New, (New 2002) in a published lecture on the role of the skeleton in acid-base homeostasis speculated that a “fruit and vegetable approach to bone health maintenance may provide a very sensible (and natural) alternative therapy for osteoporosis treatment, which is likely to have numerous additional health-related benefits”. Hurrah!

## **The indirect calcium-depriving effect of beverages consumption**

The association of beverages with osteoporosis may be indirect. Heaney (Heaney and Rafferty 2001) concluded the skeletal effects of carbonated beverage consumption are likely due primarily to milk displacement. While wholesale milk displacement is certainly the case in younger people, is this true for elderly people?

When researching this assignment, a gem of a clue turned up. Brunstrom (Brunstrom 2002) studied the effect of dry mouth on the satiating effect and acceptability of beverages. Brunstrom concluded:

“Physically drying the mouth appears to increase the acceptability of beverages that are either cold or acidic. It may be significant that two important determinants of mouth wetting are temperature and acidity. Cold or acidic beverages are also likely to be regarded as 'thirst-quenching.' Thus, shifts in acceptability, 'thirst quenching' and satiety may all be related to the mouth-wetting properties of a beverage. If a

common underlying process exists, then this may help to elucidate reasons for voluntary dehydration and aberrant drinking behavior in the elderly.”

Anybody working with the institutionalised elderly is all too aware of the high rates of medication of this population. The most frequent side effect of all of this medication is – yes, you guessed it – dry mouth. Would acidic beverages like tea, coffee, Coke and Fanta be preferred to mucous-producing alkaline milk within heavily medicated populations who suffer consequent dry mouth? From personal experience, the answer is “yes”!

## ***Conclusions and Recommendations***

The human being is a complex biochemical and intellectual machine that interacts in equally complex ways with its physical and social environment. It may be convenient from a marketer’s perspective to promote and publicise simplistic solutions to complex issues such as osteoporosis in elderly women. However, as indicated in this assignment, such simplistic “marketeting” solutions may be just that – simplistic to the point of possibly being of limited benefit. Practical recommendations for the prevention and management of osteoporosis need to be comprehensive and based on sound science while anticipating general evidential trends and then seasoned with a liberal dressing of good old common sense, intuition and experience!

The following recommendations, a-la Gary Moller, to prevent and manage osteoporosis in elderly women, are bundled within the context of promoting general good health and quality of life:

**Exercise** to stimulate and strengthen the circulation, burn calories, stimulate appetite, improve strength, balance and coordination and stimulate bone formation

1. Vigorous exercise (depending on ability of the individual) such as aerobics, rowing, brisk walking or circuit weight training of 15-40 mins every second day with a significant cardiovascular and weight-bearing component.
2. Exercise daily of an incidental nature (activity), such as gardening or walking 5-10 minutes, every 2<sup>nd</sup> or 3<sup>rd</sup> hour of the waking day (This is also essential for the prevention of DVT and other circulation problems).

3. Exercises such as Tai Chi and dancing, 2-4 times a week that develop balance and coordination.

## **Nutrition** to ensure an adequate intake of nutrients, including calcium

1. Eat a wide variety of foods with a preference for:
  - a. Meat from a variety of sources – red meat, offal, poultry and sea food.
  - b. Leafy green vegetables, including high calcium cabbage and broccoli.
  - c. Legumes.
  - d. Whole grains rather than refined grains.
  - e. Fresh fruits of all kinds.
  - f. Dairy foods with preference for non-homogenised milk and natural yoghurt.
  - g. Nuts and dried dark fruits.
  - h. High Omega-3 oils such as olive oil, flaxseed oil and fish oil (These non-animal fats are neutral PH).
2. Foods to avoid:
  - a. Highly refined food of any kind - especially those containing added preservatives, colouring, sugars, salt, oil and fat.
  - b. Food that is nutrient-sparse while being calorie-dense including most biscuits, convenience drinks, beverages, alcohol, cakes, sweets and most fast foods.
  - c. Acidic foods such as colas, soft drinks, excess animal protein (other than whey protein), animal fats and refined grains.

## **Supplementation** to top up an already healthy diet:

1. A daily broad-spectrum multi-mineral supplement.
2. Additional calcium supplementation to top up diet if intake appears to be less 1g/day on average.
3. Cod liver oil during winter months and at other times if tests show low vitamin D levels.
4. Whey protein supplementation, if indicated.

## Medication and healthcare

1. Review all medications with special attention to possible adverse effects relating to:
  - a. Cognitive function.
  - b. Balance and proprioception.
  - c. Energy levels.
  - d. Digestive processes.
  - e. Dry mouth.
  - f. Calcium balance
2. In addition, review if any medications can be reduced or replaced through activity, nutritional, social or physical environmental changes.
  - a. Example: will supplementation with vitamin E and fish oil, plus a home-heating subsidy through winter obviate the need for “circulation pills?”
3. Ensure best dental health practices are in place, including the fitting of quality dentures.

## Environment

1. Single-level dwelling without steep paths or steps and uneven surfaces.
  2. Grab/hand rails where there are steps and in shower and toilet.
  3. Good lighting.
  4. No obstructions, including mats that curl up at the corners.
  5. All storage at arms length.
  6. Non-slip surfaces.
  7. Availability of assistance with high-risk activities, such as bathing.
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## **Further information by Gary Moller**

- [News feeders about osteoporosis](#)
- [News feeders about vitamin D](#)
- [Articles by Gary Moller about osteoporosis](#)
- [Articles about sunlight and vitamin D by Gary Moller](#)
- [How to interpret your vitamin D Test results](#)
- [Biphosphonate articles by Gary Moller](#)

➔ Gill Sanson's Books

➔ About Gill Sanson

➔ Watch the Osteoporosis Documentary 2001



The book, “the myth of osteoporosis” and more [by health researcher, Gillian Sanson](#)



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