

# Bone health

## A life long priority...

### Bone health is important for every individual

Changing lifestyles and increased life-expectancy result in disclosure of age-related diseases (ref 1). Osteoporosis, an age-related disease, is increasingly being recognised as a major healthcare problem facing both sexes. The morbid event in osteoporosis is fracture, associated with a decrease in general well-being and rising health-care costs. Alarming figures show that unless decisive steps for preventive intervention are taken, a global epidemic of osteoporosis seems inevitable.

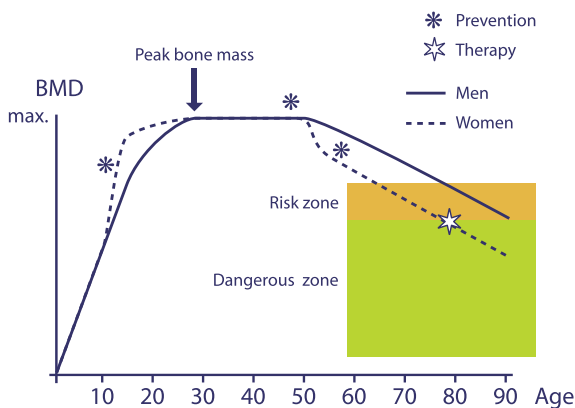


Fig 1, ref 3: Schematic course of bone mineral density (BMD) from birth onwards with indication (\*) of important moments of intervention

### Facts & figures (ref 2)

- Europe, USA and Japan: osteoporosis affects an estimated 75 million people.
- Worldwide: by 2050, the incidence of hip fracture in men is projected to increase by 310% and 240% in women.
- European Union: a fracture from osteoporosis occurs every 30 seconds.
- US: 10 million individuals suffer from osteoporosis, 18 million have low bone mass.
- Australia: 2 million are affected by osteoporosis.
- Hong Kong: incidence of hip fracture increased by 200% in the last 3 decades.

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- Japan: new hip fractures increased 1.7-fold from 1987 to 1997.
- Latin America: from 1990-2050 the number of hip fractures for women and men aged 50-64 will increase by 400%. For age groups older than 65 the increase will be 700%.

### Nutritional investment in bone health

Bone formation and bone loss are influenced by a variety of genetic and environmental factors, including nutrition. Nutritional interventions during puberty and adolescence in order to establish a high peak bone mass, might be a useful strategy for early prevention or inhibition of postmenopausal and of age-related bone loss. Supportive nutrition and a healthy lifestyle should preserve bone mass

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during middle age, and inhibit 'bone withdrawal' in the period thereafter e.g. reduced bone turnover and controlled serum parathyroid hormone (PTH) levels.

### Nutrients known or suggested to play a role in bone acquisition (ref 4)

<b>Calcium (Ca) and vitamin D</b>	Supporting bone mineral density
<b>Magnesium (Mg)</b>	Involved in bone strength, preservation, remodelling
<b>Fluorine (F), strontium (Sr)</b>	Bone forming effects. Too high amounts may reduce bone strength
<b>Copper (Cu), manganese (Mn), zinc (Zn)</b>	Cofactors for enzymes involved in bone metabolism
<b>Boron (B)</b>	Effective in case of vitamin D, magnesium and potassium deficiency
<b>Vitamin K</b>	Essential for activation of osteocalcin
<b>Vitamin C</b>	Stimulus for osteoblast-derived proteins

### Calcium, vitamin D and magnesium:

*key nutrients in battling barriers*

Calcium and vitamin D have shown beneficial effects on BMD and fracture rate. Calcium intervention trials and calcium balance studies support a calcium intake of at least 1300 mg per day for adolescents and may even be closer to 1,500 mg. These figures also apply to postmenopausal women and justify increment of the present US-DRI (1997: 19-50 yrs 1,000 mg / >51 yrs 1,200 mg). An upper level of 2,500 mg per day is considered safe in healthy individuals. Higher intakes of both calcium and vitamin D can accomplish reduction of PTH levels, a primary goal in preventing postmenopausal and age-related bone turnover (ref 5,6,7). Recommendations for vitamin D are still discussed and may be higher than currently advised. Although data on magnesium is still limited, magnesium may play an underestimated role in bone health (ref 4).

### Milk as a nutritional solution

The use of milk and other dairy foods as a good source of bone-supportive nutrients, should be encouraged; especially, because of the contradictory findings of critical nutrition-related problems among children and teenagers, including low

calcium intakes. It is suggested that caseinophosphopeptides (CPPs) and lactose in milk stimulate calcium absorption (ref 4).

Studies indicate higher bone density in the age between 18 and 50 in men and women drinking milk with every meal and after the age of 50 than for those drinking milk less frequently (ref 9).

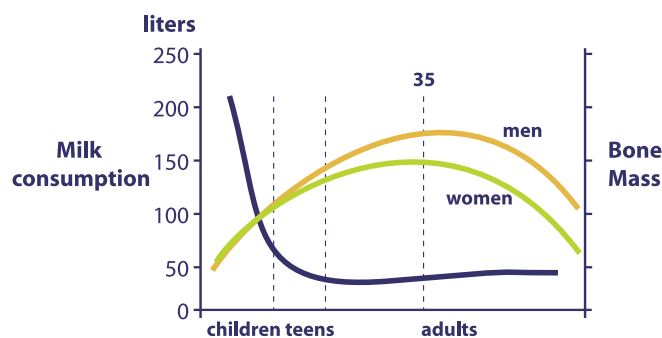


Fig 2. Negative relation milk consumption versus bone mass

## For medical professionals only

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