

# Magnesium may protect against hip fractures

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Credit: colourbox.com

Drinking water with a relatively high concentration of magnesium protects against hip fractures, according to results of a study from the Norwegian Institute of Public Health.

There are considerable variations in the quality of drinking water in Norway. The researchers studied variations in magnesium and calcium levels in drinking water between different areas, as these are assumed to have a role in the development of bone strength. They wanted to examine whether there was a correlation between magnesium and calcium concentrations in drinking water and the incidence of [hip fracture](#).

The study results show that magnesium protects against hip fracture for both men and women. The researchers found no independent protective effect of calcium.

## **Enrich drinking water with dolomite**

The results can probably help to understand why there are so many hip fractures in Norway. It is conceivable that enriching drinking water with magnesium may reduce the number of hip fractures. To produce good drinking water and to prevent corrosion, water utility companies add lime to the water. This makes drinking water less acidic, but calcium is added to the water as a by-product.

"Perhaps water utility companies should use dolomite in addition, or as an alternative, to lime. Dolomite contains both magnesium and calcium, while lime contains only calcium carbonate", says Cecilie Dahl, a research fellow at the Norwegian Institute of Public Health.

## **More research will yield more reliable results**

No one has previously examined the relationship between calcium / magnesium and hip fractures in this way. The results may be limited by a component in drinking water that scientists have not included in their analysis and that is strongly associated with magnesium is the underlying cause of hip fractures.

"The protective effect of magnesium was unsurprising but the correlation between calcium and magnesium in water and hip fracture was complex and somewhat unexpected. Therefore more research is needed to get a more reliable result of the relationship between drinking water and hip fractures and to get a better picture of the biological mechanism in the body," says Cecilie Dahl.

## Major public health problem

Hip fractures are a major [public health](#) problem and Norway has one of the highest levels in the world. Each year, about 9,000 people in Norway have a fracture, with major consequences for those affected and for society. Many risk factors for the disease are known, such as smoking, height and weight, physical activity and diet, including intake of vitamin D. However, these factors explain only a small part of what we call risk of hip fracture. Several studies have also shown that there are relatively large variations in the incidence of hip fractures between regions in Norway.

## About the study

This project is unique for two reasons; researchers at the Norwegian Institute of Public Health created a registry of all hip fractures in Norway and a map showing the coverage of the various water utility companies in Norway. This made it possible to determine which water utility company is most likely to supply each area in Norway. The researchers used geographical information systems to do this.

The researchers compiled data from three sources; an earlier project on [drinking water](#) in Norway (Trace Metals Project), the National Population Register with inhabitants in Norway from 1994 until 2000, and the register of hip fractures in Norway. These data sources were linked together to create a compilation of fractures in areas with the highest and lowest areas of [calcium](#) and [magnesium](#).

The researchers followed approximately 700,000 men and women over seven years and registered about 5,500 hip fractures among men and 13,600 hip fractures for women in this period.

**More information:** Dahl, C., AJ Sogaard, GS Tell, TP Flaten, D. Hongve, TK Omsland, K. Holvik, HE Meyer and G. Aamodt (2013). "Nationwide data on municipal drinking water and hip fracture: Could calcium and magnesium be protective? A NOREPOS study." *Bone* 57 (1): 84-91. [www.thebonejournal.com/article ... \(13\)00235-4/abstract](http://www.thebonejournal.com/article ... (13)00235-4/abstract)

Provided by Norwegian Institute of Public Health

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