



## SUBCLINICAL THYROID DISEASE

# There is no effect of subclinical thyroid dysfunction on bone density or hip fracture risk in older adults

### BACKGROUND

It is well known that overt thyroid dysfunction, especially hyperthyroidism, is associated with osteoporosis in both men and women. Subclinical thyroid dysfunction, in which the TSH is abnormal but the  $T_4$  and  $T_3$  levels are normal, is common in the elderly, but its relationship to bone mineral density and hip fracture in this population remains unclear. Several previous studies examining the effects of subclinical thyroid dysfunction on bone have had mixed results. The aim of this study was to investigate the association between subclinical hypothyroidism and hyperthyroidism and bone mineral density and hip fracture in older adults.

### THE FULL ARTICLE TITLE

Garin MC et al. Subclinical thyroid dysfunction and hip fracture and bone mineral density in older adults: the Cardiovascular Health Study. *J Clin Endocrinol Metab.* May 30, 2014 [Epub ahead of print].

### SUMMARY OF THE STUDY

A total of 4936 men and women aged 65 years and older who were enrolled in the Cardiovascular Health Study and not taking thyroid hormone preparations were included in the study. Eligible individuals were identified from Medicare eligibility rosters between 1989 and 1993. Thyroid stimulating hormone (TSH) was measured at baseline and at subsequent visits in 1992–1993, 1994–1995 and 1996–1997 in the majority of participants. Free  $T_4$  was measured in individuals with abnormal serum TSH values. Serum total  $T_3$  was measured in subjects with serum TSH  $<0.10$  mIU/L. Based on their initial thyroid-function tests, participants were classified as euthyroid (TSH, 0.45–4.50 mIU/L), subclinically hypothyroid (TSH, 4.50–20 mIU/L), or subclinically

hyperthyroid (TSH,  $<0.45$  with normal  $FT_4$  and  $T_3$ ). Among the participants, 678 had subclinical hypothyroidism and 82 had subclinical hyperthyroidism. Over 12 years of follow-up, 564 hip fractures occurred, out of which 160 were in men.

The study found that patients with subclinical thyroid dysfunction did not have an increased hip fracture risk as compared to individuals with normal thyroid function. There was also no association between thyroid function and spine or hip bone density among the 1317 participants with bone densitometry measurements. Risk on bone density and fracture risk could not be assessed in patients with subclinical hyperthyroidism due to small numbers.

### WHAT ARE THE IMPLICATIONS OF THIS STUDY?

This study did not find an association between subclinical thyroid dysfunction and bone mineral density at the spine, total hip or femoral neck, as well as hip fracture risk in older men and women. This is an important finding, as controversy exists in regards to decision making on treatment of subclinical thyroid dysfunction in older adults, who are undeniably more vulnerable to fractures. Further studies are needed to examine the effects of treatment of subclinical thyroid dysfunction on bone.

— Maria Papaleontiou, MD

### ATA THYROID BROCHURE LINKS

Thyroid and the Elderly: <http://www.thyroid.org/hypothyroidism-elderly>

Hypothyroidism: <http://www.thyroid.org/what-is-hypothyroidism>

Hyperthyroidism: <http://www.thyroid.org/what-is-hyperthyroidism>

## DEFINITIONS AND ABBREVIATIONS

**Overt Hypothyroidism:** clear hypothyroidism an increased TSH and a decreased  $T_4$  level. All patients with overt hypothyroidism are usually treated with thyroid hormone pills.

**Subclinical Hypothyroidism:** a mild form of hypothyroidism where the only abnormal hormone level is an increased TSH. There is controversy as to whether this should be treated or not.



## SUBCLINICAL THYROID DISEASE, continued

**Overt Hyperthyroidism:** a condition where the thyroid gland is overactive and produces too much thyroid hormone.

**Subclinical Hyperthyroidism:** a mild form of hyperthyroidism where the only abnormal hormone level is a decreased TSH.

**TSH: Thyroid Stimulating Hormone** — produced by the pituitary gland that regulates thyroid function; also the best screening test to determine if the thyroid is functioning normally.

**Thyroxine ( $T_4$ ):** the major hormone produced by the thyroid gland.  $T_4$  gets converted to the active hormone  $T_3$  in various tissues in the body.

**Triiodothyronine ( $T_3$ ):** the active thyroid hormone, usually produced from thyroxine.

**Bone Mineral Density (BMD):** this is usually measured in the lumbar (lower) spine and the hip and the results give information as to the strength of the bone and the risk of fractures. The results are expressed as T scores, which as standard deviations from the average bone density in a person in their 20s, when bone mass is the highest. A T score of -1 to -2.5 is termed Osteopenia and a T score  $>2.5$  is termed Osteoporosis.

**Osteoporosis:** a decrease in bone mineral density in which the individual is at a significantly increased risk for fractures with little or no trauma or force. This occurs with a bone mineral density T score of  $>-2.5$ . The areas at highest risk for osteoporotic fractures are the wrist, spine and hip.