



## HYPOTHYROIDISM

### Possible mechanisms of weight loss during treatment of hypothyroidism

#### WHAT IS THE STUDY ABOUT?

The thyroid gland controls the body's energy levels. In hypothyroidism, energy levels slow down and patients frequently gain weight. This is assumed to be an increase in the body fat mass, as opposed to muscle mass (lean body mass). Treatment with thyroid hormone returns energy levels to normal and often results in some degree of weight loss, again the decrease is thought to be from the body fat mass. Hypothyroid patients also retain fluid and thyroid hormone treatment increases fluid excretion. Total body fluid is accounted for when muscle mass is measured. This study was performed to discover how weight loss occurs during the treatment of hypothyroidism by measuring changes in fat mass and muscle mass.

#### THE FULL ARTICLE TITLE:

Karmisholt J et al. Weight Loss after Therapy of Hypothyroidism Is Mainly Caused by Excretion of Excess Body Water Associated with Myxoedema. *J Clin Endocrinol Metab* 2010. jc.2010-1521 [pii];10.1210/jc.2010-1521[doi].

#### WHAT WAS THE AIM OF THE STUDY?

The goal of this study was to determine the cause of weight changes associated with hypothyroidism.

#### WHO WAS STUDIED?

Participants in the study were referred to the Endocrine clinic in Denmark and were newly diagnosed with autoimmune hypothyroidism (Hashimoto's thyroiditis). There were 12 patients included in this study.

#### HOW WAS THE STUDY DONE?

Each participant had a physical examination, measurement of body composition (fat and muscle mass) and resting energy levels. They had their physical activity levels evaluated before starting thyroid medication and again periodically over 1 year. Thyroid function levels

were measured (TSH and free T<sub>4</sub>) to check their thyroid function at baseline and at 1 year. They measured physical activity levels with a questionnaire and pedometers.

#### WHAT WERE THE RESULTS OF THE STUDY?

Body weight decreased an average of 4.3 kg after 1 year of levothyroxine therapy, which was caused by a significant decrease of 3.8 kg in muscle mass. An insignificantly small decrease was observed in the body fat mass. Resting energy levels increased by 11.6%.

#### HOW DOES THIS COMPARE WITH OTHER STUDIES?

There are not many other studies that looked into the mechanisms of body weight changes in hypothyroidism and treatment with levothyroxine. This is the first study to examine changes in body composition in this way.

#### WHAT ARE THE IMPLICATIONS OF THIS STUDY?

The results show that weight loss due to levothyroxine treatment in hypothyroid patients is due to a decrease in muscle mass which results from a decrease in total body fluid. Total fat mass was unchanged. Further, these results show that levothyroxine treatment in hypothyroid patients increases energy levels.

— Heather Hofflich, MD

#### ATA THYROID BROCHURE LINKS

Hypothyroidism: [http://thyroid.org/patients/patient\\_brochures/hypothyroidism.html](http://thyroid.org/patients/patient_brochures/hypothyroidism.html)

Thyroid Hormone Treatment: [http://thyroid.org/patients/patient\\_brochures/hormonetreatment.html](http://thyroid.org/patients/patient_brochures/hormonetreatment.html)

Thyroid and Weight: [http://www.thyroid.org/patients/patient\\_brochures/weight.html](http://www.thyroid.org/patients/patient_brochures/weight.html)

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## **HYPOTHYROIDISM, continued**

### **ABBREVIATIONS & DEFINITIONS**

**Hypothyroidism** — a condition where the thyroid gland is underactive and doesn't produce enough thyroid hormone. Treatment requires taking thyroid hormone pills.

**Hashimoto's thyroiditis** — the most common cause of hypothyroidism in the United States. It is caused by antibodies that attack the thyroid and destroy the gland.

**Levothyroxine** — the major hormone produced by the thyroid gland and available in pill form as Levoxyl™, Synthroid™, Levotheroid™ and generic preparations.

**Thyroid hormone therapy** — patients with hypothyroidism are most often treated with Levothyroxine in order to return their thyroid hormone levels to normal. Replacement therapy means the goal is a TSH in the normal range and is the usual therapy.

**Body Composition** — The human body is composed of fat mass, muscle mass (lean body mass) and bone mass. Total body water is included in the measurements of muscle mass.