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Ito M. et al Effect of the Presence of Remnant Thyroid Tissue on the Serum Thyroid Hormone Balance in Thyroidectomized Patients. *Eur J Endocrinol*. June 15, 2015 [Epub ahead of print].

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The dose of levothyroxine needed to return the thyroid

hormone levels to normal in hypothyroidism depends on many factors, one of which is the residual thyroid function of the thyroid gland. Indeed, hypothyroid patients who have a thyroid gland often will require a lower dose than a patient who has no thyroid at all. This study aimed at determining the contribution of the thyroid to the levothyroxine dose and the degree of increase the dose after having a thyroidectomy.

Del Duca SC et al Individually-tailored thyroxine requirement in the same patients before and after thyroidectomy: a longitudinal study. *Eur J Endocrinol*. June 19, 2015 [Epub ahead of print].

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Low thyroid hormone levels in pregnancy and risk of ADHD symptoms in children

Low thyroid levels in the mother during pregnancy can have major effect on the developing baby. Overt hypothyroidism in the mother has been associated with impaired brain development in the children. Transient hypothyroxinemia also has been linked impaired brain development in children. This study examined the association between low thyroid hormone levels in the mother and ADHD in the children.

Modesto T et al. Maternal mild thyroid hormone insufficiency in early pregnancy and attention-deficit/hyperactivity disorder symptoms in children. *JAMA Pediatr*. July 6, 2015 [Epub ahead of print].

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Low thyroid hormone during pregnancy may lower the child's math scores at 5 years of age

Thyroid hormone is essential for normal development of the brain. Some studies have shown that even mildly low thyroid hormone levels in the mother may result in abnormal brain development tests in their children. This study was done to see the effect of low thyroid hormone levels in pregnant women on their children's test scores in school at 5 years of age.

Noten AM et al Maternal hypothyroxinemia in early pregnancy and school performance in 5-year-old offspring. *Eur J Endocrinol* 2015 Aug 25 [Epub ahead of print].

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Clinical Thyroidology for the Public

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CLINICAL **THYROIDOLOGY** FOR THE **PUBLIC**

A publication of the American Thyroid Association

VOLUME 8 • ISSUE 10 • OCTOBER 2015

EDITOR'S COMMENTS

Welcome to another issue of *Clinical Thyroidology for the Public*. In this journal, we will bring to you the most up-to-date, cutting edge thyroid research. We will be providing summaries of research studies that were discussed in a recent issue of *Clinical Thyroidology*, a publication of the American Thyroid Association for physicians. These summaries are presented in lay language to allow the rapid dissemination of thyroid research to the widest possible audience. This means that you are getting the latest information on thyroid research and treatment almost as soon as your physicians. As always, we are happy to entertain any suggestions to improve *Clinical Thyroidology for the Public* so let us know what you want to see.

We also provide even faster updates of late-breaking thyroid news through **Twitter** at [@thyroidfriends](https://twitter.com/thyroidfriends) and on **Facebook**. Our goal is to provide patients with the tools to be the most informed thyroid patient in the waiting room.

Also check out our friends in the **Alliance for Thyroid Patient Education**. The Alliance member groups consist of: the *American Thyroid Association*, *Bite Me Cancer*, the *Graves' Disease and Thyroid Foundation*, the *Light of Life Foundation*, *ThyCa: Thyroid Cancer Survivors Association*, *Thyroid Cancer Canada* and *Thyroid Federation International*.

Join us for a free thyroid patient forum at the Walt Disney World Swan and Dolphin hotel in Orlando, FL, on Sunday, October 18 from 1–3 PM.

October is **Thyroid Nodule Awareness Month**.

In this issue, the studies ask the following questions:

1. Do some elderly patients with mild hypothyroidism do worse when treated?
2. Do hypothyroid patients do better if they have some underlying thyroid function?
3. Is the dose of levothyroxine affected by the presence of the thyroid gland?
4. Do low thyroid hormone levels in the mother during pregnancy increase the risk of ADHD in the children?
5. Do low thyroid hormone levels in the mother during pregnancy lead to poor math performance in the children?

We welcome your feedback and suggestions. Let us know what you want to see in this publication. I hope you find these summaries interesting and informative.

— Alan P. Farwell, MD



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**HYPOTHYROIDISM****Some elderly patients with subclinical hypothyroidism apparently do not need treatment****BACKGROUND**

Hypothyroidism, caused by an underactive thyroid gland, is characterized by a high thyroid stimulating hormone (TSH) and a low free thyroxine (T_4) hormone. Subclinical hypothyroidism occurs when the TSH is elevated but the free T_4 is normal. It has been observed that healthy elderly patients often have TSH levels slightly above the upper limit of normal. Previous reports from the Leiden Longevity Study on some 400 Dutch families with at least two siblings in their 90s have indicated that the middle-aged children of these elderly siblings tend to have a higher TSH and lower free T_3 and free T_4 levels than their spouses/partners. This study examines the metabolism and the thyroid function in some children of the 90+ year old siblings and their partners.

THE FULL ARTICLE TITLE

Jansen SW et al Human longevity is characterised by high thyroid stimulating hormone secretion without altered energy metabolism. *Sci Rep* 2015;5:11525.

SUMMARY OF THE STUDY

A total of 135 children of the 90+ year old siblings and their partners were studied at the Leiden University Medical Center for 5 days between 2012 and 2013. All subjects had their body composition estimated and also ingested a capsule that measured their temperature every 5 minutes. Thyroid function tests were obtained and TSH bioactivity was measured.

The children of 90+ year old siblings had higher TSH levels, whereas the free thyroid hormone levels, resting metabolic rate and core body temperature did not differ from the levels in the children's partners. The TSH levels were higher both during the day and the night in the children as compared to their partners. There was no significant difference in TSH bioactivity between the two groups.

WHAT ARE THE IMPLICATIONS OF THIS STUDY?

This study shows that TSH levels are slightly higher in subjects who have a genetic tendency for living longer, as compared with their partners from the general population. The free thyroid hormone levels were not significantly different in the two groups, which may suggest that the TSH in the elderly is less effective in stimulating secretion of thyroid hormone. These data suggest that mild hypothyroidism in patients with a history of long life in their family may not necessarily need to be treated. However, it still remains unclear whether a small but persistent increase in TSH in older patients from the general population without very old parents needs to be treated.

— Maria Papaleontiou, MD

ATA THYROID BROCHURE LINKS

Thyroid and the Elderly: <http://www.thyroid.org/thyroid-disease-patient>

Hypothyroidism: <http://www.thyroid.org/hypothyroidism>

ABBREVIATIONS & DEFINITIONS

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

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.

Bioactivity: Being biologically active, having an effect on a living organism.

**HYPOTHYROIDISM****Thyroid hormone levels in individuals who have had thyroid surgery for papillary thyroid cancer****BACKGROUND**

Thyroid hormone replacement therapy is required after the thyroid is completely removed surgically (ie total thyroidectomy). Studies have shown that thyroid hormone replacement is also needed ~40% of the time after a partial thyroidectomy (ie removal of one thyroid lobe). It is unclear what the contribution to the levothyroxine dose is by the remaining thyroid remnant after a partial thyroidectomy. The authors of this study compared thyroid hormone blood levels after thyroid surgery in patients with papillary thyroid cancer who had normal thyroid function before their surgery to that of controls matched by serum TSH concentration.

THE FULL ARTICLE TITLE

Ito M. et al Effect of the Presence of Remnant Thyroid Tissue on the Serum Thyroid Hormone Balance in Thyroidectomized Patients. *Eur J Endocrinol*. June 15, 2015 [Epub ahead of print].

SUMMARY OF THE STUDY

The authors reviewed the medical records of 253 patients with papillary thyroid cancer who either had a total thyroidectomy or a partial thyroidectomy. All patients had normal thyroid function before their thyroid surgery. The authors divided the patients according to the following treatment groups: total thyroidectomy and thyroid hormone treatment with levothyroxine, partial thyroidectomy and thyroid hormone treatment with L-T₄, and partial thyroidectomy with no thyroid hormone treatment. The authors reported that post-operative free

T₄ levels were higher and free T₃ levels were lower in individuals who had a total thyroidectomy compared to controls matched by TSH level. In the patients who had a partial thyroidectomy and were on levothyroxine, thyroid hormone levels were not significantly different from controls. The patients who had partial thyroidectomy and were not on levothyroxine had significantly lower free T₄ measurements but not significantly different free T₃ measurements compared to controls.

WHAT ARE THE IMPLICATIONS OF THIS STUDY?

This study suggests that patients with a thyroid remnant after a partial thyroidectomy have higher T₃ levels than patients who have undergone a total thyroidectomy. The authors of this study conclude that remaining thyroid remnant after a partial thyroidectomy continues to contribute to the maintenance of serum free T₃ levels even if the patient is on levothyroxine. The clinical significance of these results is not known. More studies, including examining the quality of life of patients after undergoing thyroid surgery, needs to be done.

— Anna Sawka, MD

ATA THYROID BROCHURE LINKS

Thyroid Hormone Treatment: <http://www.thyroid.org/thyroid-hormone-treatment/>

Thyroid Surgery: <http://www.thyroid.org/thyroid-surgery/>

Thyroid cancer: <http://www.thyroid.org/cancer-of-the-thyroid/>

ABBREVIATIONS & DEFINITIONS

Papillary thyroid cancer: the most common type of thyroid cancer.

Thyroidectomy: surgery to remove the entire thyroid gland. When the entire thyroid is removed it is termed a total thyroidectomy. When less is removed, such as in removal of a lobe, it is termed a partial thyroidectomy or hemithyroidectomy.

Thyroxine (T₄): the major hormone produced by the thyroid gland. T₄ gets converted to the active hormone T₃ in various tissues in the body.

Triiodothyronine (T₃): the active thyroid hormone, usually produced from thyroxine.

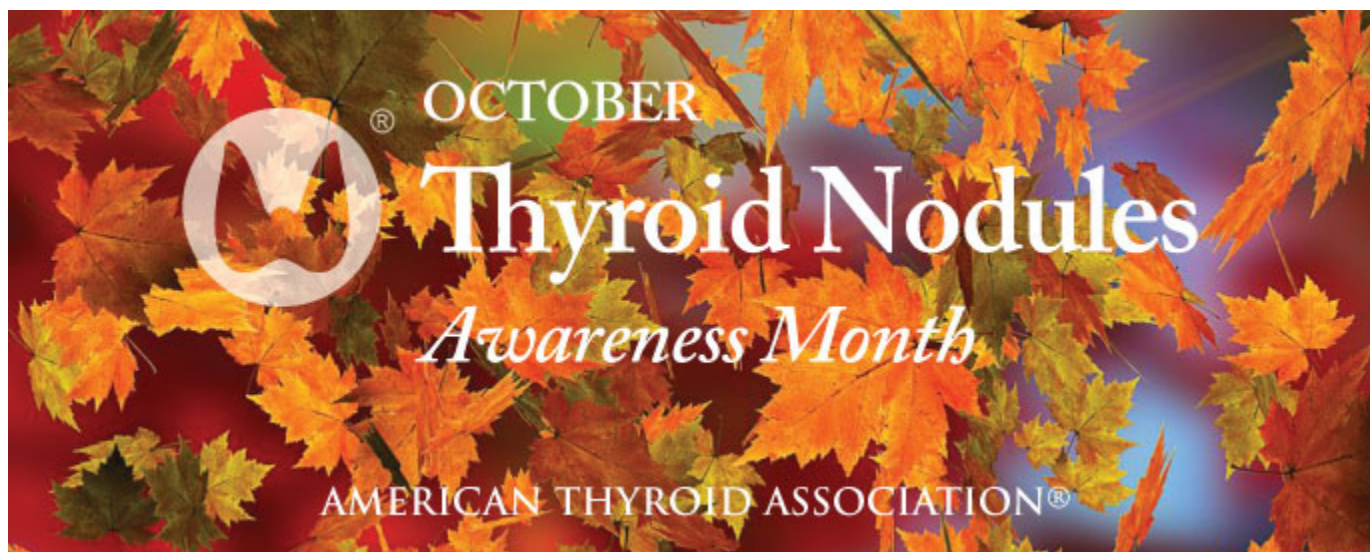


HYPOTHYROIDISM, continued

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.

Levothyroxine (T₄): the major hormone produced by the thyroid gland and available in pill form as Synthroid™, Levoxyl™, Tyrosint™ 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.





HYPOTHYROIDISM

Is the replacement dose of levothyroxine affected by the presence of the thyroid?

BACKGROUND

Levothyroxine is the preferred medication used to treat people who are hypothyroid since it is the synthetic form of the predominant hormone that the thyroid makes. The dose needed to return the thyroid hormone levels to normal depends on many factors such as age, body weight, the timing of administration and whether the patient has other medical issues. It also depends on the cause of the hypothyroidism. For example, a patient with hypothyroidism due to Hashimoto's thyroiditis and who has a thyroid gland often will require a lower dose than a patient who has no thyroid at all, such as after treatment of thyroid cancer.

The goal of treating a patient with levothyroxine is to reach normal levels of thyroid hormone quickly, avoiding doses that are either excessive or insufficient. Some patients require many changes of their dose before achieving this goal. This is concerning because there are circumstances in which achieving a specific blood level is part of the treatment of a condition such as thyroid cancer, in which it is desirable for many patients to have a blood level higher than normal for some time. This study aimed at determining the contribution of the thyroid to the levothyroxine dose and the degree of increase the dose after having a thyroidectomy.

THE FULL ARTICLE TITLE

Del Duca SC et al Individually-tailored thyroxine requirement in the same patients before and after thyroidectomy: a longitudinal study. *Eur J Endocrinol*, June 19, 2015 [Epub ahead of print].

SUMMARY OF THE STUDY

This study was done using patients who had a multinodular goiter and were followed in a clinic. As part of the treatment of the goiter to try to shrink the gland, they were given thyroid hormone in a dose slightly higher than normal and those levels were consistent for one year. They all took the same brand of levothyroxine and at the same time of the day. Eventually, a group of 158 patients had surgery due to either a diagnosis of thyroid

cancer, or symptoms of discomfort in the neck due to the goiter. Of the 83 patients that had thyroid cancer, 23 were chosen for this study, because they had a cancer that was considered early stage and low risk, and as such, they needed to maintain slightly higher than normal blood levels of thyroid hormone for at least one year after the surgery. After their treatment was completed, the patients were given the same dose they were on before the surgery and their labs were checked regularly. The doses were adjusted as needed to achieve the same blood level as they had before the surgery.

Despite the fact that patient's weight and dose was identical before and after surgery, only 2 out of the 23 patients reached a blood level that was similar to their level before surgery without requiring a dose increase. In the remaining 21 patients, the dose needed to be substantially increased in order to be at goal. After 1 year, the patient's average dose was 30% higher than before the surgery. Despite the increase in dose to get the TSH level to the intended level, the levels of the T₃ and T₄ hormones did not change significantly.

WHAT ARE THE IMPLICATIONS OF THIS STUDY?

This study suggests that the thyroid itself may contribute up to 30% of a patient's levothyroxine requirements. This study also helps to clarify the change in dose needed when a patient with hypothyroidism undergoes a thyroidectomy. This study is important to patients because it adds to the information available regarding adjusting thyroid hormone levels in patients with hypothyroidism. More studies are needed to help us understand why these changes happen so that treatment can be potentially further improved.

— Jessie Block-Galarza, MD

ATA THYROID BROCHURE LINKS

Hypothyroidism: <http://www.thyroid.org/hypothyroidism>

Thyroid cancer: <http://www.thyroid.org/cancer-of-the-thyroid/>

**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.

Hashimotos thyroiditis: the most common cause of hypothyroidism in the United States. It is caused by antibodies that attack the thyroid and destroy it.

Goiter: a thyroid gland that is enlarged for any reason is called a goiter. A goiter can be seen when the thyroid is overactive, underactive or functioning normally. If there are nodules in the goiter it is called a nodular goiter; if there is more than one nodule it is called a multinodular goiter.

Thyroidectomy: surgery to remove the entire thyroid gland. When the entire thyroid is removed it is termed a total thyroidectomy. When less is removed, such as in removal of a lobe, it is termed a partial thyroidectomy.

Levothyroxine (T_4): the major hormone produced by the thyroid gland and available in pill form as Synthroid™, Levoxyl™, Tyrosint™ and generic preparations.

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.

**THYROID AND PREGNANCY****Low thyroid hormone levels in pregnancy and risk of ADHD symptoms in children****BACKGROUND**

Thyroid hormone is essential for normal brain development in the baby during pregnancy. Hypothyroxinemia, or low thyroid levels, in the mother during pregnancy can have major effect on the developing baby. Overt hypothyroidism, with high TSH and low thyroid hormone levels, in the mother during pregnancy has been associated with adverse pregnancy outcomes, including impaired brain development in the children born to these women. Transient hypothyroxinemia, which occurs when the thyroid hormone levels are low but the TSH levels are normal, also has been linked to impaired brain development in children. In contrast, mild hypothyroidism, with increased TSH but normal thyroid hormone levels, also affects pregnancy outcomes, although the effects are more subtle. This study sought to further investigate the potential association of low thyroid hormone levels with a particular focus on symptoms of attention deficit hyperactivity disorder (ADHD) in children born to mothers who had transient hypothyroxinemia during early pregnancy.

THE FULL ARTICLE TITLE

Modesto T et al. Maternal mild thyroid hormone insufficiency in early pregnancy and attention-deficit/hyperactivity disorder symptoms in children. *JAMA Pediatr.* July 6, 2015 [Epub ahead of print].

SUMMARY OF THE STUDY

This study was part of a larger population study of children born in the Netherlands, known as the Generation R Study. Children in this study were followed from birth until young adulthood. For this particular analysis, 3873 mother-child pairs were examined in depth on a variety of outcomes. Most women enrolled in the study during pregnancy. Thyroid hormone levels were measured during pregnancy (at an average of approxi-

mately 14 weeks) and their children's ADHD symptoms were assessed at 8 years of age by symptom questionnaires given to the mothers. Hypothyroxinemia in the mothers during pregnancy was identified in 127 (3.4%) of women. Children born to women with hypothyroxinemia had significantly higher ADHD symptom scores than children born to mothers with normal thyroid hormone levels during pregnancy. This association remained despite controlling for a number of other potential contributing factors to ADHD symptoms scores, including maternal, child and environmental factors (i.e gender, ethnicity, maternal age, maternal education, family income, child IQ). The authors conclude that low thyroid hormone levels in pregnancy influences brain development in the children.

WHAT ARE THE IMPLICATIONS OF THIS STUDY?

Children born to mothers with low thyroid hormone levels during early pregnancy showed higher ADHD symptom scores. This study provides support to the growing body of research demonstrating the importance of maintaining thyroid hormone levels during pregnancy to neurologic development of the fetus. While it is clear that overt hypothyroidism should be treated during pregnancy, additional research is needed to understand whether treating hypothyroxinemia with normal TSH levels during pregnancy would be beneficial.

—Whitney Woodmansee MD

ATA THYROID BROCHURE LINKS

Thyroid and Pregnancy: <http://www.thyroid.org/thyroid-disease-pregnancy/>

Hypothyroidism: <http://www.thyroid.org/hypothyroidism>

**THYROID AND PREGNANCY**, continued**ABBREVIATIONS & DEFINITIONS**

Hypothyroxinemia: A term that specifically refers to low thyroxine (T_4) levels. The term differs from hypothyroidism in that it is usually used to describe transient / temporary low thyroxine level that occurs without an associated rise in TSH.

Transient hypothyroxinemia: temporary decrease in the blood level of thyroxine (T_4) after delivery in pre-term infants, followed by the return of normal levels in the absence of any treatment.

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.

Mild/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.

Thyroid Awareness Monthly Campaigns

The ATA will be highlighting a distinct thyroid disorder each month and a portion of the sales for Bravelets™ will be donated to the ATA. The month of October is **Thyroid Nodule Awareness Month** and a bracelet is available through the [ATA Marketplace](#) to support thyroid cancer awareness and education related to thyroid disease.



**THYROID AND PREGNANCY****Low thyroid hormone during pregnancy may lower the child's math scores at 5 years of age****BACKGROUND**

Thyroid hormone is essential for normal development of the brain. This is especially important during early pregnancy, when the baby is entirely dependent on the mother's supply of thyroid hormone. It is clear that overt hypothyroidism, with high TSH and low thyroid hormone levels, in the mother during pregnancy has been associated with adverse pregnancy outcomes, including impaired brain development in their children. Some studies have shown that even mildly low thyroid hormone levels in the mother may result in abnormal brain development tests in their children. This study was done to see the effect of low thyroid hormone levels in pregnant women on their children's test scores in school at 5 years of age.

THE FULL ARTICLE TITLE

Noten AM et al Maternal hypothyroxinemia in early pregnancy and school performance in 5-year-old offspring. *Eur J Endocrinol* 2015 Aug 25 [Epub ahead of print].

SUMMARY OF THE STUDY

This was a study of mothers and their infants participating in the Amsterdam Born Children and their Development (ABCD) study. Thyroid blood tests in the mothers were collected at the last part of the first trimester and their child's school math and language test results were recorded at age 5 years. From the original group of 8,266 pregnant women who enrolled in the study, there were complete information for only 1,196 of these, which was the sample size used to report the results.

The researchers reported that the pregnant women whose thyroid hormone levels were in the lowest 10% tended to be more overweight, had less education, were

of non-Western ethnicity, were smokers during their pregnancy, had high blood pressure and had symptoms of depression. These women had children who had a 1.6 times increased risk of poor math scores at age 5. There were no significant findings related to mother's thyroid blood levels and their children's language test results.

WHAT ARE THE IMPLICATIONS OF THIS STUDY?

This study supports, in part, other studies that have also shown that low thyroid hormone levels during pregnancy may affect children's brain development and function, including abnormal tests of language, reaction times, and IQ scores. The study is limited by the inability to study the original full group of pregnant women, and the conclusions suggest that the results may have been affected by this loss of some participants.

The option of whether to test women during pregnancy for abnormal thyroid hormone levels in the blood has been controversial, as not all studies have shown poor outcomes and there are costs associated with such testing. Further studies are needed to help answer this question, preferably using large diverse and multiethnic groups of women who have thyroid blood testing done as early in pregnancy as possible and with complete, longterm neurological follow up of their children.

— Angela M. Leung, MD, MSc

ATA THYROID BROCHURE LINKS

Thyroid and Pregnancy: <http://www.thyroid.org/thyroid-disease-pregnancy/>

Hypothyroidism: <http://www.thyroid.org/hypothyroidism>

ABBREVIATIONS & DEFINITIONS

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

Overt Hypothyroidism: clear hypothyroidism an increased TSH and a decreased T₄ level. All patients

with overt hypothyroidism are usually treated with thyroid hormone pills.

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.

**ATA Alliance for Thyroid Patient Education****GOAL**

The goal of our organizations is to provide accurate and reliable information for patients about the diagnosis, evaluation and treatment of thyroid diseases.

We look forward to future collaborations and continuing to work together towards the improvement of thyroid education and resources for patients.

WHO WE ARE (in alphabetical order)

- **American Thyroid Association**
- **Bite Me Cancer**
- **Graves' Disease and Thyroid Foundation**
- **Light of Life Foundation**
- **ThyCa: Thyroid Cancer Survivors' Association, Inc.**
- **Thyroid Cancer Canada**
- **Thyroid Federation International**

AMERICAN THYROID ASSOCIATION

www.thyroid.org

ATA Patient Resources: <http://www.thyroid.org/patients/>

Find a Thyroid Specialist: www.thyroid.org

Phone (toll-free): 1-800-THYROID

e-mail: thyroid@thyroid.org

ATA Mission: The ATA leads in promoting thyroid health and understanding thyroid biology.

ATA Vision: The ATA is the leading organization focused on thyroid biology and the prevention and treatment of thyroid disorders through excellence and innovation in research, clinical care, education, and public health.

ATA Values: The ATA values scientific inquiry, clinical excellence, public service, education, collaboration, and collegiality.

To further our mission, vision and values the ATA sponsors "Friends of the ATA" online to advance the information provided to patients and the public such as this publication, *Clinical Thyroidology for the Public*. We welcome your support.

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ThyCa: Thyroid Cancer
Survivors' Association, Inc.SM
www.thyca.org



**ATA Alliance for Thyroid Patient Education****Continued...****BITE ME CANCER**<http://www.bitemecancer.org>

Bite Me Cancer was formed as a nonprofit foundation in September, 2010, by Nikki Ferraro, who was 17-years old at the time. Nikki was diagnosed with a rare form of thyroid cancer in April 2010 when she was a junior at Chantilly HS in Virginia. Nikki was determined to lead a Relay for Life team just two weeks after her diagnosis. She named the team Bite Me Cancer and experienced immediate success. When Nikki decided to create a foundation a few months later, she wanted to continue the legacy of her team name and thus her foundation became the Bite Me Cancer Foundation.

e-mail: info@bitemecancer.org**GRAVES' DISEASE AND THYROID FOUNDATION**www.gdatf.org

Phone (toll-free): 1-877-NGDF-123 or 643-3123

e-mail: Gravesdiseasefd@gmail.com

Founded in 1990, the Graves' Disease Foundation offers support and resources to Graves' disease patients, their families, and health care professionals. Their mission is to find the cause of and the cure for Graves' thyroid disease through research, to improve the quality of life for persons with Graves' disease and their caregivers and to educate persons with Graves' disease, their caregivers, healthcare professionals, and the general public about Graves' disease and its treatment. The web site features a monitored bulletin board.

LIGHT OF LIFE FOUNDATIONwww.checkyourneck.comemail: info@checkyourneck.com

The Light of Life Foundation, founded in 1997, is a nonprofit organization that strives to improve the quality of life for thyroid cancer patients, educate the public and professionals about thyroid cancer, and promote research and development to improve thyroid cancer care.

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Cancer de la thyroïde Canada

**ATA Alliance for Thyroid Patient Education****Continued...****THYCA: THYROID CANCER SURVIVORS' ASSOCIATION, INC.**www.thyca.org

Phone (toll-free): 877 588-7904

e-mail: thyca@thyca.org

ThyCa: Thyroid Cancer Survivors' Association, Inc., founded in 1995, is an international nonprofit organization, guided by a medical advisory council of renowned thyroid cancer specialists, offering support and information to thyroid cancer survivors, families, and health care professionals worldwide.

THYROID CANCER CANADAwww.thyroidcancercanada.org

Phone: 416-487-8267

Fax: 416-487-0601

e-mail: info@thyroidcancercanada.org

Thyroid Cancer Canada is a non-profit organization founded in 2000. The organization works towards creating an environment in which people who are dealing with thyroid cancer, especially the newly diagnosed, are met with support and information. Their goals & objectives include facilitating communication among thyroid cancer patients, providing credible information about the disease, providing emotional support, and assisting thyroid cancer patients with voicing their needs to health care professionals and those who are responsible for health care policy.

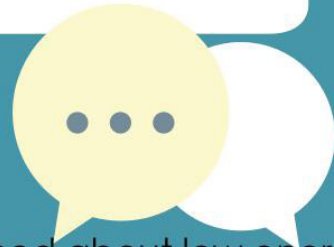
THYROID FEDERATION INTERNATIONAL<http://www.thyroid-fed.org/>e-mail: tfi@thyroid-fed.org

Thyroid Federation International (TFI) was established in Toronto in 1995. Thyroid Federation International aims to work for the benefit of those affected by thyroid disorders throughout the world by providing a network of patient support organizations.

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Survivors' Association, Inc.SM
www.thyca.org

FREE PUBLIC HEALTH FORUM

Thyroid Disease and You



Concerned about low energy?
Memory loss?
Fatigue? Depression?
Rapid heartbeat?
Restlessness? Infertility? Weight or
hair changes?
A lump on your neck?

WHO

Anyone who has had an overactive or underactive thyroid, thyroiditis, a thyroid nodule, thyroid cancer, or a family history of thyroid problems or related disorders, including rheumatoid arthritis, juvenile diabetes, pernicious anemia, or prematurely gray hair (starting before age 30) Please come if you have questions, symptoms, or concerns about a thyroid problem. Receive free educational materials.

WHEN & WHERE

Sunday, October 18, 2015
1:00 pm – 3:00 pm
Lake Buena Vista (Orlando), Florida

Location: Asia 1 Room, Third Floor/Lobby Level, Dolphin Building
Walt Disney World Swan and Dolphin Resort
1500 Epcot Resorts Boulevard, Lake Buena Vista, FL 32830
Phone: 1-407-934-4000
RSVP: thyca@thyca.org
\$9 self-parking; \$13 valet parking

COULD IT BE YOUR THYROID?

Thyroid experts from the American Thyroid Association (ATA), the Alliance for Thyroid Patient Education, and thyroid patients come together to inform the general public, other thyroid patients, and their friends and families about thyroid disease

This program is free and all are welcome, including walk-in-attendees. Reservations are encouraged to ensure we have enough seating. For more information and to register, please e-mail ThyCa at thyca@thyca.org.



Thyroid Nodules

WHAT IS THE THYROID GLAND?

The thyroid gland is a butterfly-shaped endocrine gland that is normally located in the lower front of the neck. The thyroid's job is to make thyroid hormones, which are secreted into the blood and then carried to every tissue in the body. Thyroid hormone helps the body use energy, stay warm and keep the brain, heart, muscles, and other organs working as they should.

WHAT IS A THYROID NODULE?

The term thyroid nodule refers to an abnormal growth of thyroid cells that forms a lump within the thyroid gland. Although the vast majority of thyroid nodules are benign (noncancerous), a small proportion of thyroid nodules do contain thyroid cancer. In order to diagnose and treat thyroid cancer at the earliest stage, most thyroid nodules need some type of evaluation.

WHAT ARE THE SYMPTOMS OF A THYROID NODULE?

Most thyroid nodules do not cause symptoms. Often, thyroid nodules are discovered incidentally during a routine physical examination or on imaging tests like CT scans or neck ultrasound done for completely unrelated reasons. Occasionally, patients themselves find thyroid nodules by noticing a lump in their neck while looking in a mirror, buttoning their collar, or fastening a necklace. Abnormal thyroid function tests may occasionally be the reason a thyroid nodule is found. Thyroid nodules may produce excess amounts of thyroid hormone causing hyperthyroidism (see *Hyperthyroidism brochure*). However, most thyroid nodules, including those that are cancerous, are actually non-functioning, meaning tests like TSH are normal. Rarely, patients with thyroid nodules may complain of pain in the neck, jaw, or ear. If a nodule is large enough to compress the windpipe or esophagus, it may cause difficulty with breathing, swallowing, or cause a "tickle in the throat". Even less commonly, hoarseness can be caused if the nodule invades the nerve that controls the vocal cords but this is usually related to thyroid cancer.

The important points to remember are the following:

- Thyroid nodules generally do not cause symptoms.
- Thyroid tests are most typically normal—even when cancer is present in a nodule.
- The best way to find a thyroid nodule is to make sure your doctor checks your neck!

WHAT CAUSES THYROID NODULES AND HOW COMMON ARE THEY?

We do not know what causes most thyroid nodules but they are extremely common. By age 60, about one-half of all people have a thyroid nodule that can be found either through examination or with imaging. Fortunately, over 90% of such nodules are benign. Hashimoto's thyroiditis, which is the most common cause of hypothyroidism (see *Hypothyroidism brochure*), is associated with an increased risk of thyroid nodules. Iodine deficiency, which is very uncommon in the United States, is also known to cause thyroid nodules.

HOW IS A THYROID NODULE EVALUATED AND DIAGNOSED?

Once the nodule is discovered, your doctor will try to determine whether the rest of your thyroid is healthy or whether the entire thyroid gland has been affected by a more general condition such as hyperthyroidism or hypothyroidism. Your physician will feel the thyroid to see whether the entire gland is enlarged and whether a single or multiple nodules are present. The initial laboratory tests may include measurement of thyroid hormone (thyroxine, or T4) and thyroid-stimulating hormone (TSH) in your blood to determine whether your thyroid is functioning normally.

Since it's usually not possible to determine whether a thyroid nodule is cancerous by physical examination and blood tests alone, the evaluation of the thyroid nodules often includes specialized tests such as thyroid ultrasonography and fine needle biopsy.

Thyroid Nodules

THYROID ULTRASOUND:

Thyroid ultrasound is a key tool for thyroid nodule evaluation. It uses high-frequency sound waves to obtain a picture of the thyroid. This very accurate test can easily determine if a nodule is solid or fluid filled (cystic), and it can determine the precise size of the nodule. Ultrasound can help identify suspicious nodules since some ultrasound characteristics of thyroid nodules are more frequent in thyroid cancer than in noncancerous nodules. Thyroid ultrasound can identify nodules that are too small to feel during a physical examination. Ultrasound can also be used to accurately guide a needle directly into a nodule when your doctor thinks a fine needle biopsy is needed. Once the initial evaluation is completed, thyroid ultrasound can be used to keep an eye on thyroid nodules that do not require surgery to determine if they are growing or shrinking over time. The ultrasound is a painless test which many doctors may be able to perform in their own office.

THYROID FINE NEEDLE ASPIRATION BIOPSY (FNA OR FNAB):

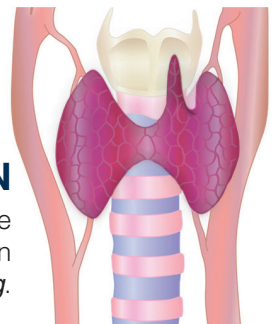
A fine needle biopsy of a thyroid nodule may sound frightening, but the needle used is very small and a local anesthetic may not even be necessary. This simple procedure is often done in the doctor's office. Sometimes, medications like blood thinners may need to be stopped for a few days before to the procedure. Otherwise, the biopsy does not usually require any other special preparation (no fasting). Patients typically return home or to work after the biopsy without even needing a bandaid! For a fine needle biopsy, your doctor will use a very thin needle to withdraw cells from the thyroid nodule. Ordinarily, several samples will be taken from different parts of the nodule to give your doctor the best chance of finding cancerous cells if they are present. The cells are then examined under a microscope by a pathologist.

The report of a thyroid fine needle biopsy will usually indicate one of the following findings:

1. The nodule is benign (noncancerous).
 - This result is obtained in up to 80% of biopsies. The risk of overlooking a cancer when the biopsy is benign is generally less than 3 in 100 tests or 3%. This is even lower when the biopsy is reviewed by an experienced pathologist at a major medical center. Generally, benign thyroid nodules do not need to be removed unless they are causing symptoms like choking or difficulty swallowing. Follow up ultrasound exams are important. Occasionally, another biopsy may be required in the future, especially if the nodule grows over time.
2. The nodule is malignant (cancerous) or suspicious for malignancy .
 - A malignant result is obtained in about 5% of biopsies and is most often due to papillary cancer, which is the most common type of thyroid cancer. A suspicious biopsy has a 50-75% risk of cancer in the nodule. These diagnoses require surgical removal of the thyroid after consultation with your endocrinologist and surgeon.
3. The nodule is indeterminate. This is actually a group of several diagnoses that may occur in up to 20% of cases. An Indeterminate finding means that even though an adequate number of cells was removed during the fine needle biopsy, examination with a microscope cannot reliably classify the result as benign or cancer.
 - The biopsy may be indeterminate because the nodule is described as a Follicular Lesion. These nodules are cancerous 20-30% of the time. However, the diagnosis can only be made by surgery. Since the odds that the nodule is not a cancer are much better here (70-80%), only the side of the thyroid with the nodule is usually removed. If a cancer is found, the remaining thyroid gland usually must be removed as well. If the surgery confirms that no cancer is present, no additional surgery to "complete" the thyroidectomy is necessary.
 - The biopsy may also be indeterminate because the cells from the nodule have features that cannot be placed in one of the other diagnostic categories. This diagnosis is called atypia, or a follicular lesion of undetermined significance. Diagnoses in this category will contain cancer rarely, so repeat evaluation with FNA or surgical biopsy to remove half of the thyroid containing the nodule is usually recommended.
4. The biopsy may also be nondiagnostic or inadequate. This result is obtained in less than 5% of cases when an ultrasound is used to guide the FNA. This result indicates that not enough cells were obtained to make a diagnosis but is a common result if the nodule is a cyst. These nodules may require reevaluation with second fine needle biopsy, or may need to be removed surgically depending on the clinical judgment of your doctor.

FURTHER INFORMATION

Further details on this and other thyroid-related topics are available in the patient information section on the American Thyroid Association® website at www.thyroid.org.



Thyroid Nodules

NUCLEAR THYROID SCANS:

Nuclear scanning of the thyroid was frequently done in the past to evaluate thyroid nodules. However, use of thyroid ultrasound and biopsy have proven so accurate and sensitive, nuclear scanning is no longer considered a first-line method of evaluation. Nuclear scanning still has an important role in the evaluation of rare nodules that cause hyperthyroidism. In this situation, the nuclear thyroid scan may suggest that no further evaluation or biopsy is needed. In most other situations, neck ultrasound and biopsy remain the best and most accurate way to evaluate all types of thyroid nodules.

MOLECULAR DIAGNOSTICS:

Can any other tests assist in evaluation of thyroid nodules?

Yes! While still mainly research tests and not widely available, new tests that examine genes in the DNA of thyroid nodules are being developed. These tests can provide helpful information about whether cancer may be present or absent. These tests are particularly helpful when the specimen evaluated by the pathologist is indeterminate. These specialized tests are done on samples obtained during the normal biopsy process. There are also specialized blood tests that can assist in the evaluation of thyroid nodules. These are currently available only at highly specialized medical centers, however, their availability is increasing rapidly. Ask your doctor if these tests are available and might be helpful for evaluating your thyroid nodule.

HOW ARE THYROID NODULES TREATED?

All thyroid nodules that are found to contain a thyroid cancer, or that are highly suspicious of containing a cancer, should be removed surgically by an experienced thyroid surgeon. Most thyroid cancers are curable and rarely cause life-threatening problems (see *Thyroid Cancer brochure*). Thyroid nodules that are benign by FNA or too small to biopsy should still be watched closely with ultrasound examination every 6 to 12 months and annual physical examination by your doctor. Surgery may still be recommended even for a nodule that is benign by FNA if it continues to grow, or develops worrisome features on ultrasound over the course of follow up.



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