

Two of a Kind: Celiac Disease and Thyroid Disease By Cheryl Harris, MPH, RD

Nature doesn't always play fairly. Anyone with an autoimmune condition is predisposed to developing other autoimmune conditions, and there is a particularly strong connection between celiac disease and autoimmune thyroid disease (ATD), which includes Hashimoto's and Graves' diseases. Despite this connection, routine cross-screening is rare.

Since these conditions frequently lead to significant changes in weight, RDs are in a prime position to spot common symptoms and provide clients with potentially lifesaving referrals for further testing and diagnosis. This article will review the overlapping symptoms, examine the current research on the relationship between these diseases, explore how a gluten-free diet affects both conditions, discuss the impact of ATD on diet, and describe the ways in which RDs can most effectively support their clients. Understanding the connection between celiac disease and ATD can help dietitians design strategies for appropriate dietary management, ultimately resulting in improved patient care.

Background

About one-half of the approximately 27 million people with thyroid conditions have not been diagnosed¹, and almost 97% of the approximately 3 million Americans with celiac disease are undiagnosed.² These common, and commonly missed, conditions have a huge impact on health and quality of life.

Celiac Disease

For many years, celiac disease was mistakenly considered exceedingly rare in the United States. Since 2003, studies have confirmed that it affects nearly 1% of the US population³, making it the most common genetically linked condition.

When someone with celiac disease consumes gluten, it causes an autoimmune process in which the body attacks the villi, or lining of the small intestine. It is traditionally considered a gastrointestinal disease, and classic symptoms include diarrhea, weight loss, bloating, and abdominal pain. While these symptoms are often present in young children, estimates indicate that approximately 70% of newly diagnosed people do not present with typical gastrointestinal symptoms, making identification and diagnosis a challenge.⁴ There are a wide array of nongastrointestinal symptoms associated with celiac disease, including anemia, infertility, skin rashes, emotional disturbances, and neurological symptoms.

Recent research has shown that symptoms may not be not ideal indicators for celiac disease. A 2011 study based on screening at a health fair in Wyoming showed that the most common symptoms associated with positive serology were feeling full and heartburn, and 44% of people with positive serology for celiac disease had no symptoms. However, the lack of

symptoms offers no protection from potential complications of celiac disease, including infertility, osteopenia or osteoporosis, and lymphoma.⁵

Thyroid Disease

The thyroid is a gland in the neck that controls most hormones in the body. It determines how quickly the body burns calories, and it regulates heart rate and other vital functions. Many kinds of thyroid disease are autoimmune diseases like celiac disease, except in these cases, the target is the thyroid rather than the small intestine.

The most common thyroid condition is an underactive thyroid, or hypothyroidism. In the United States, this is usually caused by an autoimmune reaction where the body attacks the thyroid and causes lower levels of thyroid hormones to be released into the body. This slows down metabolism and usually results in weight gain. Autoimmune hypothyroidism is also known as Hashimoto's disease and most frequently appears in women during middle age.⁶

Another common thyroid disorder is hyperthyroidism, or an overactive thyroid gland. The most common form is Graves' disease, in which the body's immune response causes the thyroid gland to produce too much thyroid hormone. Graves' disease, like Hashimoto's disease, disproportionately affects women and most commonly begins in people under the age of 40.⁷

Overlapping Symptoms

Symptoms of ATD and celiac disease often overlap, and many of the classic symptoms (eg, weight changes, bowel changes, fatigue) are nonspecific and incorrectly attributed to aging, depression, or even pregnancy. (See table below for a summary.)

While symptoms depend on whether thyroid function is overactive or underactive, patients with ATD often experience severe fatigue and changes in weight, bowel habits, and mood. Pregnant women, whose hormone levels change dramatically during the normal course of pregnancy, often experience a variety of problems due to untreated thyroid conditions.⁸

Research on the Celiac-Thyroid Disease Connection

People with celiac disease are more likely to develop ATD than the general public, and the reverse is also true. The increased risk holds despite treatment with a gluten-free diet or thyroid medications⁹, and studies suggest that much of the shared propensity may be due to overlapping genetic predispositions.

In a recent study by Alessio Fasano, MD, a recognized celiac disease expert, one-half of the people newly diagnosed with celiac disease also had thyroid disease.³ Most studies show a significant but much smaller association. The largest longitudinal study to date showed that adults with celiac disease had 4.4 times the relative risk of hypothyroidism and 2.9 times the risk of hyperthyroidism compared with the general public. In children, rates were higher still at 6 times and 4.8 times the risk, respectively.⁹

While just under 1% of Americans have celiac disease, recent thyroid review studies show that an average of 4.1% of adults with ATD have celiac disease¹⁰ and 7.8% of children with ATD have celiac disease.¹¹ The authors of a review evaluating the usefulness of screening for

celiac disease in patients with ATD concluded, “We believe that undiagnosed and untreated celiac disease may switch on some as-yet-unknown immunological mechanism that sets off a cascade of other disorders.”¹²

A 2008 study by Naiyer et al explored the connection between autoimmune hypothyroidism and celiac disease and hypothesized a mechanism via serum antitissue transglutaminase (tTG) antibodies. It is well established that anti-tTG antibodies are present in patients with active celiac disease and that they decrease and eventually disappear on a gluten-free diet. The study demonstrated that these anti-tTG antibodies bind and react to thyroid tissue as well, which may contribute to ATD development. Antithyroid antibodies were observed more often in patients with celiac disease than in either controls or patients with another autoimmune condition (eg, Crohn’s disease).^{13,14}

Impact of a Gluten-Free Diet

When individuals with celiac disease follow a gluten-free diet, their anti-tTG levels return to normal. This makes perfect sense because in celiac disease, gluten is the trigger causing the autoimmune response, and when it is removed, the autoimmune response disappears. However, a growing amount of research suggests that when people with both celiac disease and ATD adopt a gluten-free diet, not only do their celiac-related antibody levels improve but their thyroid antibody levels decrease as well.¹⁵

A 2010 study in the *Journal of Pediatrics* found that 11 of 15 children with celiac disease who had elevated thyroid-stimulating hormone (TSH) levels when diagnosed saw these numbers normalize after 12 to 18 months on a gluten-free diet.¹⁶ The Naiyer study noted that among people with celiac disease, significantly more people have thyroid antibodies before going gluten free than after (37.5% vs. 4.4%). The study also showed a positive correlation between anti-tTG and thyroid antibody titers in patients with active celiac disease.¹⁶

The only way to reduce anti-tTG levels is to eat a gluten-free diet. These studies suggest that a gluten-free diet has the potential to not only to reduce autoimmune response in celiac disease but also promote normal thyroid function in a segment of people, presumably by reducing autoimmune reactions throughout the body.

According to Mary Shomon, a nationally known thyroid patient advocate and author of *The Thyroid Diet*, “Hashimoto’s isn’t considered curable. Autoimmune diseases are usually lifelong. But for that subset of people that are triggered by underlying celiac disease or even gluten sensitivity, sometimes thyroid function goes completely back to normal. This only happens in a subset of patients, but some regain normal thyroid function and no longer need medication.”

Kathie Swift, MS, RD, LDN, a dietitian at the UltraWellness Center in Massachusetts, agrees: “We see a number of patients in our clinic who have [ATD] associated with both CD [celiac disease] and gluten sensitivity. Thus, if a patient has signs and symptoms of thyroid dysfunction, gluten should be on your clinical radar screen.”

Many clinicians report that eating a gluten-free diet may help improve thyroid function in nonceliac gluten intolerance. “Getting gluten out is primary for patients with Hashimoto’s, even without celiac disease,” says Diana Bright, MS, RD, CCN, CLT, of Bright Integrative Solutions in Golden, Colorado. “I find that many of my clients feel better.”

While not all patients with ATD will improve on a gluten-free diet, people have increasingly learned about the potential connection, and clients with ATD are seeking out dietitians for support and guidance. Since it is impossible to accurately test for celiac disease once someone has gone gluten free, it is vital that RDs reinforce that testing must happen before dietary adjustments to ensure an appropriate diagnosis. Clients interested in experimenting with a gluten-free diet should always be referred to a primary care doctor, endocrinologist, or gastrointestinal doctor for bloodwork and/or biopsy before making dietary changes. If clients have already begun a gluten-free diet, they should understand the importance of testing and a firm diagnosis for their long-term health.

Look Out for Red Flags

Since celiac disease and ATD tend to lead to weight changes and fatigue and adopting a gluten-free diet often leads to weight gain, it’s easy for patients, dietitians, and physicians to incorrectly assign blame. “A lot of thyroid patients assume that if I’m tired, fuzzy brained, and puffy, it must be my thyroid. But if they are doing what they should be and have worked with doctors to optimize their symptoms, it’s time to look further at dietary factors like gluten or food sensitivities,” says Shomon.

Another red flag is when patients take increasingly large doses of thyroid medications and fail to experience the expected response. Similarly, a detailed diet and exercise diary can indicate whether increases in weight are due to eating a highly refined, calorically dense gluten-free diet or whether thyroid problems or other conditions may be contributing, too. As a general rule, when working with clients with autoimmune conditions who are continuing to experience unexplained symptoms despite the proper treatment, further testing may be warranted.

Routine Screening

Increasingly, experts advocate for routine screening for thyroid conditions among patients diagnosed with celiac disease. However, it is often not done, and recommendations in the United States are mixed, which has the potential to lead to confusion among physicians. The National Institutes of Health consensus statement mentions the link between the conditions but makes no recommendations.¹⁷ The 2005 pediatric North American guidelines¹⁸ and 2009 guidelines for the United Kingdom both advocate for routine cross-screening even in the absence of symptoms,¹⁹ although the American Gastroenterological Association 2006 guidelines recommend screening for celiac disease only among people with ATD who are symptomatic.²⁰

Certainly consensus indicates that screening is advisable among people who are symptomatic. As the research evolves showing a substantial proportion of people with celiac disease are asymptomatic, as demonstrated by the Wyoming study mentioned previously, recommendations for routine screenings ideally will follow.

Since routine cross-screening often does not take place automatically, it is important for RDs to be aware of the potential linkages and investigate symptoms or even genetic predispositions that increase the likelihood of comorbidities (ie, a patient with Hashimoto's disease who also has a relative with celiac disease or vice versa). Developing and nourishing relationships with gastroenterologists and endocrinologists benefit both dietetics practitioners and clients and ultimately result in improved patient care. Screening is particularly important given that, as mentioned earlier, celiac disease typically presents with such a broad range of symptoms or, in many cases, no symptoms whatsoever.

Where RDs Fit In

Balancing nutritional needs and weight can be tricky on a gluten-free diet, and adjusting to a gluten-free diet can often be overwhelming at first. Initial counseling understandably focuses on discussing a strict gluten-free diet as the primary goal. However, nutritional balance and long-term health needs to be an integral part of the discussion as well.

Despite the hype about weight loss on a gluten-free diet, many people with celiac disease actually gain weight. Why? Gluten is a unique protein that adds to the cohesiveness, stretchability, texture, structure, and even flavor of most processed foods. In order to re-create those desired characteristics, often less healthful ingredients are substituted, like corn and potato starch, rice flour, and sugar.

Many dietitians encourage their clients to look outside the gluten-free aisle and toward the perimeter of the store for healthful and often more economical gluten-free options. Cynthia Kupper, RD, executive director of the Gluten Intolerance Group, advocates emphasizing from the start that clients eat healthful foods. "I teach my clients that gluten-free products are calorically dense. I teach them comparisons right off the bat that many of these products will lead to weight gain. I get them onto a more naturally gluten-free diet [with] whole grains, fruits, and vegetables and supplement with specialty gluten-free products," she says. Beans, fish, poultry, nuts, seeds, eggs, and dairy round out the selection of naturally gluten-free foods and are nutritious staples to include in a gluten-free diet plan.

Strategies for eating a healthful gluten-free diet is an extensive topic, from lack of fortification to inadequate vitamin and mineral consumption to inadequate grain consumption and beyond. There are many wonderful resources for dietitians on eating a healthful gluten-free diet, including ***Gluten-Free Diet: A Comprehensive Resource Guide*** by Shelley Case, RD, and ***The Gluten-Free Nutrition Guide*** by Tricia Thompson, MS, RD. Since there are a variety of excellent reference materials on a gluten-free diet, much of the remainder of this discussion will focus on the impact of a thyroid condition on diet, as this is a topic that is rarely addressed.

Thyroid's Impact on Diet: Iodine, Goitrogens, and Vitamin D

A quick glance on the Internet reveals a wide variety of supplements and dietary advice for people with thyroid concerns. Here are key common nutritional concerns and sources of confusion:

Iodine

Iodine is a vital nutrient in the body, essential to thyroid function, and an integral part of thyroid hormones. Although in the United States, hypothyroidism is most often an autoimmune disorder, globally, iodine deficiency is the primary cause of hypothyroidism. The classic presentation is the development of a goiter, or the enlargement of the thyroid.

Iodine deficiency is considered rare in the United States largely due to the widespread use of iodized salt. The main exception may be in pregnant women, who have a much greater need for iodine. During pregnancy, iodine deficiency has a profound impact on the developing fetus and can have severe consequences, including mental retardation and stunted growth.²¹ However, as with most nutrients, moderation is key. There are dangers with excess intake, too, with symptoms similar to those seen with thyroid deficiency.

Iodized salt, fish, dairy, and grains are major sources of iodine in the standard American diet.²¹ However, many people with celiac disease are lactose intolerant, tend to eat fewer grain products, and may eat more specialty health foods that use sea salt rather than iodized salt. This may potentially lead to iodine deficiency.

However, supplementation should be approached with caution. Supplemental iodine may cause symptom flare-ups among people with Hashimoto's disease due to the stimulation of autoimmune antibodies.²² Supplemental iodine can also be problematic for people with the skin manifestation of celiac disease, dermatitis hepetiformis.²³

Clearly moderation is key. "I am a big believer in running labs," says Sheila Dean, DSc, RD, LD, CCN, CDE, of the Palm Harbor Center for Health & Healing in Florida. "If the patient is coming back with levels that suggest that iodine levels are normal, then I may not make any recommendations to add any more food or supplement sources of iodine. Irrespective of a diagnosis of Hashimoto's, iodine is still an important mineral for human health—there are iodine receptors on practically all cells in the body. This doesn't mean I will supplement with high doses, but foods such as sea vegetables will be great ways to replete the body of iodine without inducing a Hashimoto's flare. But even this is an individualized recommendation."

Goitrogens

Certain compounds found naturally in foods such as cruciferous vegetables (eg, broccoli, cauliflower, cabbage, Brussels sprouts), soy products, and other select foods often found in a gluten-free diet, such as millet and cassava, may suppress thyroid function. However, this is generally problematic only when coupled with an iodine deficiency. Studies have shown that consuming these goitrogens does not cause hypothyroidism in people with adequate iodine stores.²²

As previously mentioned, most people in the United States have adequate iodine stores, so this should not have a major effect on them, except in populations avoiding iodized salt and other sources of iodine. Additionally, heating denatures much or all of this potential effect in cruciferous vegetables.²⁴ Says Dean, "If you are eating three to four servings per week of cooked or even lightly steamed crucifers, generally, it should not have a negative effect on thyroid health and particularly if iodine consumption/tissue levels are adequate."

The potential exception to this rule may be millet, a nutritious gluten-free grain, which may suppress thyroid function even among populations with adequate iodine.²⁵ If a dietary recall indicates frequent millet consumption in patients with hypothyroidism, it may be wise to advise rotating this grain with other gluten-free options.

Vitamin D

Studies have shown that more than 90% of people with ATD also have a genetic defect that impairs the body's ability to utilize vitamin D.²² As mentioned earlier, vitamin D deficiency is common among people with celiac disease due to malabsorption. Between the two, nearly all people with celiac disease and ATD will have reason for vigilance with vitamin D.

Sunlight is always a source, and certain foods do contain low levels of vitamin D, such as fatty fish, milk, dairy, and eggs. But in many cases, supplements may be necessary. As a fat-soluble vitamin, excess vitamin D can be a concern, and ideally the client's physician will monitor to ensure that the individual's levels stay within an appropriate range.

Weight Management and a Gluten-Free, Thyroid Friendly Diet

Most people with hypothyroidism tend to experience abnormal weight gain and difficulty losing weight, especially until hormone levels stabilize. Typically, this process takes months, and this is often exacerbated with celiac disease because gastrointestinal absorption may be compromised until full villus healing takes place on a gluten-free diet, which studies suggest may take a year or longer.²⁶ It is vital that both dietitians and clients have an appropriate understanding of what is going on and set realistic goals.

Additionally, it is common for patients with Graves' disease to experience periods of both high and low thyroid function. It may take them many months to achieve a stable balance. Especially in these cases, it is essential to focus on healthy behaviors (eg, food, exercise, stress management, sleep) rather than the numbers on the scale.

According to Swift, "Weight issues can be very complex and must be viewed holistically with a full complement of mind-body stress-reduction therapies, movement/physical activity guidelines, mindful eating strategies, and, of course, a whole-foods diet that is 'energy balanced' and takes into account one's unique biochemistry and laboratory findings. In our practice, it is another reason why a nutritionist is on the team."

It is important for dietitians to work with clients to set appropriate weight goals and other measures of success, such as increased fiber intake, higher fruit and vegetable consumption, increased exercise, and proper laboratory measures, to keep them engaged and making progress.

Medications and Supplements

Despite the common perception that foods can contain hidden sources of gluten, products regulated by the FDA are clearly labeled if they contain wheat, and there are only a handful of other words to look for: barley, malt, malt flavoring, rye, oats, and brewer's yeast. With a little training and support, clients can easily identify gluten on food labels. At this point in time, FDA

laws do not extend this labeling requirement to medications, but there is movement in that direction.

The FDA opened a comment period for practitioners and the general public on gluten in medications that ends in March, and the National Foundation for Celiac Awareness received a grant to study the impact of gluten in medications, so possible changes are on the horizon. However, for the foreseeable future, it is necessary for patients with celiac disease to verify with their pharmacist or physician whether medications contain gluten.

Also, in patients experiencing malabsorption due to celiac disease, a gluten-free diet will alter medication absorption levels and can change the amount of thyroid and other medications needed. Clients should be advised to check in more frequently with their medical care team in the months after a celiac disease diagnosis to make adjustments as appropriate.

Since celiac disease is a condition of malabsorption, micronutrient deficiencies are not surprising. At diagnosis, the key nutrients that are often lacking are iron, calcium, magnesium, vitamin D, zinc, folate, vitamin B₁₂, and riboflavin.²⁷

It is recommended that a physician test for key nutrients following a celiac disease diagnosis and supplement as appropriate. However, as subclinical nutrient deficiencies often remain and the body's ability to absorb nutrients is often compromised, experts recommend supplementing with a multivitamin labeled as being gluten free and ideally certified gluten free.²³

Many clients with celiac disease also experience bone loss and have osteopenia or osteoporosis, so calcium supplements are frequently recommended. In most cases, this is sound advice, and the Evidence Analysis Library Celiac Disease Guidelines recommends consuming 1,200 mg of calcium per day from food and supplements.²⁸ However, calcium supplements have the potential to interfere with proper absorption of thyroid medications, and the timing of thyroid medications must be taken into account when administering calcium supplements. Most healthcare professionals recommend spacing out calcium supplements and thyroid medications by at least four hours.²⁹ Dietitians should confirm that clients have received and are adhering to this guidance.

Invaluable Guidance and Support

RDs often get a broad look at a client's health history and are in a unique position to see the potential links and provide guidance and support. The majority of clients seeking an RD's services are either unintentionally gaining or losing weight. Since the overwhelming number of people with both celiac disease and thyroid conditions are undiagnosed, referrals to a knowledgeable family physician, gastrointestinal doctor, or endocrinologist, when appropriate, can provide vital direction and ultimately help clients reach long-term weight and health goals. Recognizing and discussing the links between conditions and referring patients for further support and evaluation may be invaluable.

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Celiac Disease	Hashimoto's Disease	Graves' Disease
Weight loss	Weight gain	Weight loss
Diarrhea and/or constipation	Constipation	Diarrhea
Fatigue	Fatigue	Fatigue
Hair loss (secondary to nutritional deficiencies)	Hair loss	N/A
Depression, anxiety	Depression, "brain fog" or difficulty concentrating	Anxiety, difficulty concentrating, nervousness
Joint or bone pain	Joint pain	Muscle weakness
Infertility, missed periods	Infertility, missed periods	Infertility, missed periods
Miscarriage	Miscarriage	Miscarriage

— Author created table using information from multiple sources

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Examination

1. Common symptoms of celiac disease are primarily:

- A. gastrointestinal, such as diarrhea or weight loss.
- B. hugely varied and often not present.
- C. weight gain.

2. What percentage of people with autoimmune thyroid disease (ATD) also have celiac disease?

- A. 1%
- B. Roughly 4% for adults and 8% for children
- C. 20%
- D. 27% to 30%

3. Common dangers of untreated celiac disease include:

- A. infertility.
- B. osteoporosis.
- C. lymphoma.
- D. breast cancer.
- E. All of the above
- F. a, b, and c

4. Reasons to encourage cross-screening may include:

- A. clients needing increasingly large levels of thyroid medication.
- B. unusual weight gain or loss based on diet food diary and exercise reports.
- C. increased fatigue, bowel changes, mood changes, etc.
- D. All of the above

5. For people with ATD and celiac disease, a gluten-free diet:

- A. improves antitissue transglutaminase antibody levels.**
- B. may improve thyroid-stimulating hormone (TSH) or other thyroid antibody measures.
- C. only improves TSH or other thyroid antibody levels.
- D. a and b

6. Mainstream media articles have suggested that a gluten-free diet may aid people with ATD. Professionals should educate patients regarding the following:

- A. A gluten-free diet will be helpful if clients also have celiac disease.
- B. Clients should be always tested for celiac disease before experimenting with a gluten-free diet.
- C. Clients should do a gluten-free trial for three months. If they see improvement, they should consult a physician about screening for celiac disease.
- D. All clients with ATD should permanently cut back on grains.
- E. a and b

7. A gluten-free diet:

- A. will aid with weight loss for most people.

- B. should be built on the range of the specialty gluten-free foods available.
- C. should ideally be largely composed of naturally gluten-free foods.
- D. is beneficial for everyone.

8. Which of the following nutrient(s) is frequently found in low levels in patients newly diagnosed with celiac disease?

- A. Iron
- B. B vitamins
- C. Vitamin D
- D. Iodine
- E. a, b, and c

9. Regarding supplementation, clients with ATD and celiac disease should be advised to:

- A. get tested for vitamin deficiencies, especially iron, B vitamins, and vitamin D.
- B. take a gluten-free multivitamin.
- C. make sure calcium supplements are spaced out from thyroid medication.
- D. add an iodine supplement.
- E. a, b, and c

10. Iodine deficiency:

- A. is usually the cause of Hashimoto's disease.
- B. is generally rare in the United States, with the exception of pregnant women.
- C. may occur more often in people on specialty or restricted diets.
- D. can cause major health issues, especially in pregnancy.
- E. All of the above
- F. b, c, and d