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Treatment of Reverse T3 Dominance

August 13, 2017 / Thyroid Weight Loss / By Dr. Jeff Whelchel / 17 COMMENTS

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Reverse T3 dominance could be the reason why you still have hypothyroid symptoms even though you are taking thyroid medication.

Or why you struggle to lose weight even when your thyroid labs are "normal."

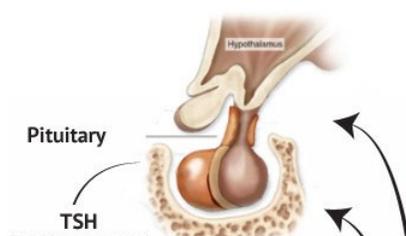
Never heard of reverse T3 dominance? Most people haven't, including most doctors.

High levels of reverse T3 could be slowing down your metabolism, reducing thyroid function at the cellular level, and causing multiple symptoms of hypothyroidism.

The purpose of this article is to inform you about reverse T3 - its purpose in the body, what causes it to get elevated, how to test for it, and how to reduce it back to optimal levels.

Let's get started...

What is Reverse T3?

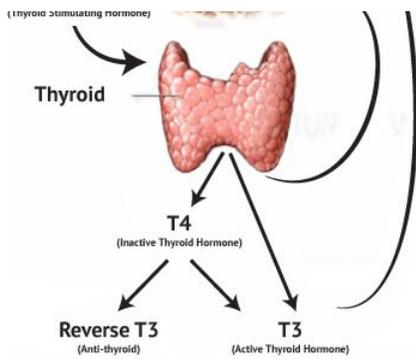


Dr. Jeff Whelchel

Dr. Whelchel is a family physician v specializes in functional medicine, especially hormone optimization. F over 20 years experience in private practice managing patients with va medical issues. His passion is help patients reach their full potential of wellness and quality of life.

He grew up in the Texas Panhandle he currently lives. He is married and awesome children.

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The thyroid gland primarily produces T4. That is thyroglobulin with 4 iodine molecules attached to it.

T4 is the inactive transport form of thyroid hormone. In order to be used by the body, an enzyme called a deiodinase must cleave off an iodine molecule to convert it to T3.

T3 is the active hormone that can then interact with cells of our body and turn on certain cellular functions.

However, T4 can also be converted into reverse T3.

Reverse T3 will also bind to the cellular thyroid receptors. However, it doesn't trigger any cellular reactions.

So basically reverse T3 serves as a "brake" to our thyroid system.

Why Do We Have Reverse T3 in the First Place?

The production of reverse T3 is normally not a bad thing. It gives our body another way of regulating our energy production and output.

Reverse T3 production will increase during times of extreme stress.

That makes sense if you think about it closely.

For example, if you have an acute infection such as pneumonia, a kidney infection, or you've had something like a car accident and have suffered multiple injuries, your body needs to turn down the metabolism to conserve energy so it can be used to fight the infection or injuries.

This system works very well for such acute situations.

There is actually a medical term for this condition - [Euthyroid sick syndrome](#).

However, with the onslaught of chronic conditions and resulting inflammation in our society, it has also become extremely common outside of the acute setting of a hospital.

People that are under extreme stress develop this condition which results in a high reverse T3 level, low free T3 level, and a normal TSH and T4 level.

Does this sound familiar? Do your labs look like that?

In 20+ years of private practice, I have never seen this diagnosis given to a patient that wasn't in the hospital.

But if you look at studies like [this one](#), something as common as a calorie-restricted diet can raise reverse T3 levels and lower free T3 levels and cause other symptoms that "resemble euthyroid sick syndrome."

So what is going on? What causes the reverse T3 levels to increase (reverse T3 dominance)?

Let's talk about it more...



What Causes Reverse T3 Levels to Increase?

From what we have discussed so far, unless you are acutely ill or have suffered a major injury of some sort, you want your reverse T3 level to be as low as possible.

Does an elevated reverse T3 cause any symptoms?

The answer is yes!

The symptoms will be the same as you would think of with someone with an extremely slow metabolism (which is what reverse T3 dominance causes):

- » **Constant weight gain without changing your eating habits**
- » **Severe fatigue**
- » **Symptoms of hypothyroidism**
- » **Depression or anxiety**
- » **Joint pain**

If you have any of these symptoms, it's important to get your reverse T3 level checked and follow the treatment instructions that I will discuss below.

But first...

What are some of the most common causes of reverse T3 dominance?

- ⚠ **Chronic physical or emotional stress** - This can include job stresses, financial problems, family issues, death of a loved one, and divorce. It also includes trauma including PTSD or permanent injuries from car wrecks, etc.
- ⚠ **Chronic illness or infections** - This can include infections such as mono or SIBO, or chronic illness such as cancer, diabetes, heart disease, or even obesity.
- ⚠ **High or low cortisol (Adrenal fatigue)** - Either end of the cortisol spectrum will affect reverse T3 levels. [Read more here.](#)
- ⚠ **Low ferritin** - Suboptimal levels of iron and ferritin have been [shown to increase](#) reverse T3 levels.
- ⚠ **Acute illness or injury** - Patients with an [acute issue](#) that requires ICU treatment have been shown to have low T3, high reverse T3, and normal TSH levels.
- ⚠ **Severe calorie restriction** - especially HCG diets or very low calorie diets. [These diets](#) have been shown to increase reverse T3, slow metabolism, and make it almost impossible to have permanent weight loss.
- ⚠ **Chronic inflammation** - [Any inflammation](#) will result in reduced T4 to T3 conversion and an increase in reverse T3 production. Inflammatory conditions include autoimmune disease, [leptin resistance](#), insulin resistance, intestinal dysbiosis, and cancer.

- ▲ **Chronic untreated gut infections or imbalances** - Up to 20% of all conversion of T4 to T3 occurs in our gastrointestinal tract. Any gut imbalance therefore has a huge impact on thyroid function. Examples of this includes SIBO, GERD, yeast overgrowth, inadequate gut bacteria, overuse of antibiotics, and inflammatory bowel disease.
- ▲ **Certain medications** - Medications that can increase reverse T3 levels include beta blockers, diabetes medications, anti-seizure medications, depression medications and narcotics.

If you have one or even more of the above issues, it is important for you to be tested for reverse T3 dominance.

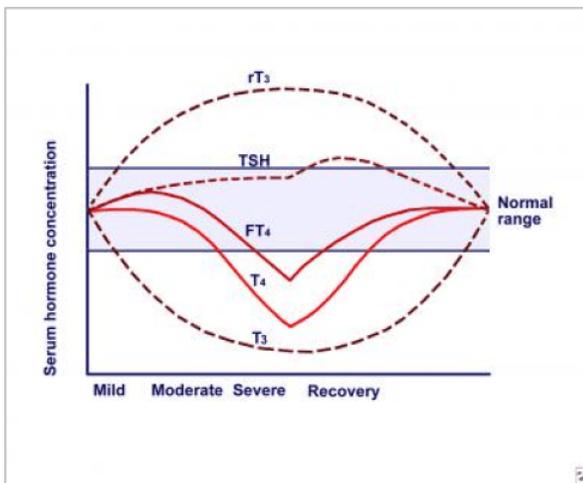
How to Test for Reverse T3 Dominance

Testing for reverse T3 dominance is readily available but may be hard to get ordered.

You will need to see a doctor that has a full understanding of the thyroid and doesn't just depend on the TSH to determine thyroid health and function.

It is critical that you get a complete thyroid panel. I discuss this more in [this article](#).

This will include the **TSH, free T4, free T3, reverse T3, TPO antibodies** and **thyroglobulin antibodies**.



As you can see from this graph, when reverse T3 dominance occurs, the TSH level will remain normal the vast majority of time. So will the free T4 level, which is the other lab test that most conventional doctors will order.

The lab tests that will show an abnormality the quickest will be the reverse T3 level and the free T3 level. You can see that as the reverse T3 levels rise, the free T3 levels fall.

Even though your TSH may be normal, your thyroid is not working well at all!

That is why the reverse T3 and free T3 are absolutely **the most important** thyroid tests to get when assessing for reverse T3 dominance.

You will also want to check the ratio of **reverse T3 to free T3** to get an idea of what is happening in your cells.

Normally you want your free T3 to be as high as possible and your reverse T3 to be as low as possible.

I consider a **reverse T3 > 15** to be abnormal.

It is possible to have a normal free T3 level but still have a very high reverse T3. That is why the ratio is important.

To get the ratio, divide your free T3 by your reverse T3. **The ratio should be >0.20.**

Any number less than 0.20 indicates that you have too much reverse T3 and you need to take steps to lower it.

How to Lower Reverse T3 Levels

Okay, so you've gotten the necessary lab tests, and your reverse T3 level is > 15 and/or your free T3: reverse T3 ratio is < 0.20.

What can you do to decrease your reverse T3 dominance?

The single most important thing is to identify the **root cause**. This is always the primary goal of functional medicine.

If your diabetes is out of control and you don't change your diet and lifestyle, your reverse T3 will not decrease.

If you are in a toxic job or a toxic relationship, you will never get your cortisol levels in the optimal range which will prevent your reverse T3 level from dropping.

I could give several other hypothetical situations, but I think you get my point.

Focus primarily on the issues that you know you have FIRST. Then consider some of the other treatment options I will discuss below.



1. T3 Medication



The quickest way to reduce reverse T3 levels is by using pure T3 hormone.

This includes short acting T3 such as Cytomel or liothyronine, but also sustained release T3 from compounding pharmacies.

This is so effective because you are able to skip the conversion step required with medications that contain T4 such as Synthroid and levothyroxine.

Your body can't make reverse T3 unless it has T4. If you remove the T4, the reverse T3 levels will obviously drop.

Make sense?

When you give T3 only medication, it will result in the free T3 level rising, T4 level dropping, reverse T3 level dropping, and the TSH level dropping.

When on this therapy, it is very important to monitor your reverse T3 levels closely, usually every 1-2 months.

Typically the reverse T3 level will drop below 10 within 2 months (assuming you are on enough T3).

This is by far the fastest way of reducing your reverse T3 dominance, but if you don't identify and correct the **root cause**, it will just go back up.

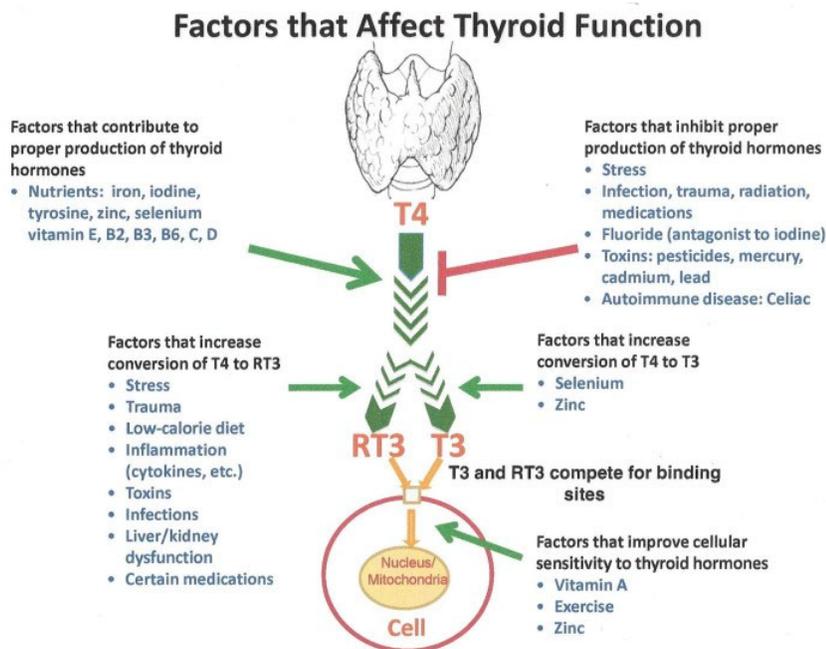
By the way, natural desiccated thyroid (NDT) medications such as Armour Thyroid, Nature-throid, and others may not be adequate to lower reverse T3 levels.

They are still about 80% T4, which may still provide too much T4 that can be converted to reverse T3.

If you are on an NDT medication, you may need to reduce the dose for a couple of months and add T3 to lower the reverse T3 levels.

Again, it will be imperative to identify the root cause of your reverse T3 dominance, or else the reverse T3 levels will go back up once you return to your typical NDT dose.

2. Increase T4 to T3 Conversion



Every patient with a thyroid issue is going to need one or more supplements.

Why?

When you have low thyroid you produce less stomach acid which results in less nutrient absorption.

I discuss many nutrient deficiencies and supplements [here](#), but for this article I will only mention those that help with conversion of T4 to T3.

The primary nutrients that have been shown to increase this conversion are **zinc** and **selenium**. Increasing conversion of T4 to T3 means less conversion to reverse T3 which will lower its level.

My preferred supplements are below:

How to Supplement with Selenium

Why I Like It



May reduce antibodies in patients with Hashimoto's



Also acts as an anti-inflammatory



May help reduce anxiety symptoms



Helps boost T4 to T3 conversion (helpful in those with high reverse T3)

Who Should Use It

- ⚠ Patients with hair loss or hair thinning
- ⚠ Patients with a known thyroid disorder and hair loss
- ⚠ Patients with other nutrient deficiencies like zinc or iodine
- ⚠ Patients who frequently take acid blockers for acid reflux
- ⚠ Patients with other GI related issues (IBS, gas/bloating, IBD)
- ⚠ Patients also taking zinc

How to Use

- Take 200-400 mcg per day (do not exceed 400 mcg daily)

My Recommended Brand and Product

[Get Selenium Here](#)

How to Supplement with Zinc

Why I Like It



Many people are deficient in zinc



May help with T4 to T3 conversion



May increase cellular sensitivity to thyroid hormone



Has anti-inflammatory effects

How to Tell if You Need It

- ✓ If you have Hashimoto's and hair loss
- ✓ If alkaline phosphatase is < 70

How to Use

- Take 30-60 mg daily (do not take more than 60 mg)

My Recommended Brand and Product

Get Zinc Here

3. Manage Leptin Resistance and Insulin Resistance



Most hormones in the body work together.

When there is a change in one hormone, it will affect other hormones as well.

In fact, hypothyroidism has been linked with [leptin resistance](#) as well as [insulin resistance](#).

Hypothyroidism leads to a state where it is easy to develop leptin resistance and insulin resistance.

Conversely, leptin and insulin resistance slow metabolism and increase inflammation which increase reverse T3 production, which makes losing weight almost impossible.

Very high reverse T3 levels are almost always found with elevated insulin and leptin levels.

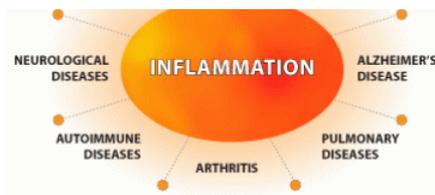
That's why you need to request a fasting insulin and leptin level if your reverse T3 is > 15.

You will not be able to get your reverse T3 level down and keep it down if you don't also address the leptin and insulin resistance.

You can read more about how to do that in my article [here](#).

4. Decrease Inflammation





Inflammation is a vague concept.

We all know that excessive or prolonged inflammation is bad, but what do we do about it?

It is hard to measure and even harder to treat.

However, it's important to identify and address because inflammation directly increases conversion of T4 to reverse T3.

The lab tests that we use to measure inflammation in the body are nonspecific, meaning they do not tell us what is causing the inflammation.

If they are elevated, it can still indicate to us that inflammation is high in the body and we need to identify the source of it.

The primary tests that indicate inflammation are:

- ✓ **C-reactive Protein (CRP)** - Should be as low as possible (<1.0)
- ✓ **Erythrocyte Sedimentation Rate (ESR)** - Best if this is < 10.

If you have high levels of inflammation AND high levels of reverse T3, you can safely assume that inflammation is causing or at least worsening your reverse T3 dominance.

The next step is to identify the source of the inflammation.

In hypothyroid patients, the source of inflammation is usually from one of 3 issues:

- ⚠ **Food Sensitivities** - typically gluten and dairy but there may be others. They promote inflammation, primarily in the gut.
- ⚠ **Gut imbalances** - such as SIBO or yeast overgrowth. Both also increase inflammation.
- ⚠ **Hormone imbalances** - especially insulin resistance and leptin resistance.

If your CRP or ESR levels are elevated, you should look closely at these 3 common sources and address them.

If you don't know the source of your inflammation, you can still consider some supplements that help reduce inflammation by improving the detoxification of the body, primarily in the liver:

- 💡 **Milk Thistle** - improves liver function and promotes optimal phase 1 and phase 2 metabolism of medications and nutrients in the liver. It can also reduce AST and ALT levels if you have fatty liver.
- 💡 **Krill Oil + Astaxanthin** - This combination reduces inflammatory cytokines
- 💡 **Curcumin** - this herb activates PPAR-gamma levels which helps to reduce inflammation.
- 💡 **Quercetin + Bromelain** - This combination is particularly helpful with digestive issues and those with chronic URI symptoms.

Just blindly treating inflammation is far from ideal but can be helpful if you can't identify the source of your inflammation.

5. Lifestyle Changes



Without getting overly technical, doing 4 basic things can make a huge impact on your health, including your reverse T3 levels:

- ✓ 8 hours of quality sleep per night
- ✓ Reducing and managing your stress
- ✓ Eat a balanced diet of whole, real foods
- ✓ Daily low intensity exercise and episodes of high intensity exercise 1-3 times per week

Just doing these 4 things alone will do more to bring you back to a state of health than anything else we have discussed.

On the other hand, if you do everything else that I recommend in this article but neglect these 4 things, you will not be successful and your reverse T3 dominance will continue.

I realize these things are easier said than done, but they have to be a primary focus for you to have success.

By the way, reverse T3 is an important component of our thyroid hormone system.

Decreasing reverse T3 levels are not harmful in the short term and can in fact be helpful.

However, persistently low levels of reverse T3 increases the risk for hyperthyroidism if left suppressed for a long time.

That's why the goal will be to "flush" out the elevated reverse T3 levels for only a short period of time and then allow the body to balance out the levels of T3 and reverse T3.



Summary

Reverse T3 dominance is a common problem for many hypothyroid patients.

It may be the primary reason why some patients have persistent hypothyroid symptoms despite being on thyroid medication and why so many thyroid patients have difficulty losing weight and keeping it off.

In order to diagnose reverse T3 dominance, you need to have your free T3 and reverse T3 levels checked.

A reverse T3 level > 15 is considered abnormal, and a T3:reverse T3 ratio of < 0.20 indicates that you have too much reverse T3.

Treatment includes taking T3 medication for a short period of time, taking supplements to improve T4 to T3 conversion, and making appropriate lifestyle interventions to reduce stress, inflammation, and leptin/insulin resistance.

Doing all of these things can help get your body back and balance and reduce your hypothyroid symptoms and weight loss resistance.

Now it's your turn:

Do you have reverse T3 dominance?

What treatments have you tried?

What has worked for you?

Leave your comments below.



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In "Thyroid"

The Best Treatments for Hypothyroidism
June 14, 2017
In "Thyroid"

Why is My T4 Low (and What Can I Do About It)?
June 11, 2018
In "Lab Tests"

About the Author **Dr. Jeff Whelchel**

Dr. Whelchel is a family physician who specializes in functional medicine, especially hormone optimization. He has over 20 years experience in private practice managing patients with various medical issues. His passion is helping patients reach their full potential of wellness and quality of life. He grew up in the Texas Panhandle where he currently lives. He is married and has 3 awesome children.

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17 comments

**Margaret Herring says**

August 14, 2017

I am currently still gluten free however. Dairy is ver y much in my diet. I also take the supplements you recommend daily. I was once told by a holistic. (I'm not sure that's the name). But a naturalist dr of sorts that I had an over abundance of yeast in my body and that I was allergic to that yeast. I'm game to try to leave off dairy also but what would be the treatment for the yeast overgrowth

[→ Reply](#)**Dr. Jeff Whelchel says**

August 22, 2017

Removing all sources of sugar is the first step for treating yeast overgrowth. That would definitely included dairy. Keep in mind that it may take several weeks to notice a difference. In some patients I will even use Diflucan for a short time if we feel that diet isn't enough.

[→ Reply](#)**ANN Staetz says**

October 29, 2017

I take selium

→ Reply



Dawn says

January 30, 2018

I requested RT3 testing and it came back high but 2 endocrinologists and my PCP tell me it doesn't matter. How can I get proper treatment when the doctors don't believe it matters and only test my TSH? I've also been told by a functional medicine doctor that I am have weight loss resistance but again the 2 end is and pcp don't believe that's a real diagnosis. It's frustrating, after 2 yrs I finally found endo who switched me to armour but only checks TSH. I'm from western PA. If you know of a good, well versed doctor who understands the thyroid, I would greatly appreciate it if you could give me their name. Thank you.

→ Reply



Dr. Jeff Whelchel says

January 31, 2018

Hi Dawn. I understand your frustration. Most doctors simply don't know about some of these lab tests and don't really know what to do with the results. I would suggest that you go to this website and see if you can find a functional medicine doctor near you that is willing to look at your labs and treat you appropriately. I hope you find the help you deserve.

<https://www.ifm.org/find-a-practitioner/>

→ Reply



Suzanne says

May 14, 2018

My reverse T3 is 40. I'm on 45 mcg of pure T3 with 30 mcg of T4. Should I not take the T4 since that will only cause it to convert to reverse T3?? Please advise. Thank you

→ Reply



Dr. Jeff Whelchel says

May 15, 2018

Hi Suzanne. A treatment option is to stop the T4. Without seeing the other thyroid labs, it is hard to give a solid recommendation. You could also consider taking iodine, selenium, and zinc supplementation to help with conversion of T4 to T3.

→ Reply

**Kim says**

June 27, 2018

I have a rev t3 of 21 T-shirt 0.850 and free t3 3.4 and free t4 of 0.90
Now on cytomel for two complete months free t3 has not change , still the same and t4
now 0.70, down slightly. T-shirt hasn't posted on the patient portal yet. Rev t3 not ordered
on this new lab draw. I do have bad inflammation and take Mobil 15 mg daily and have
IBS, constipation . Should I go ahead and take selenium or what supplements and should
my endocrine doctor increase my cytomel. I do not feel any change with the current low
dose of 5 mcg. I have read it will help you lose some weight and I struggle, to lose, I have
tried every diet known even hcg. What does of t3 do you "think" would be optimal. I am a
paramedic 24 yrs now, I love life, and my family, mostly God, I want my energy and my
weight to be back to what it use to be. Pls advise. God bless.

[→ Reply](#)**Dr. Jeff Whelchel says**

June 27, 2018

Hi Kim. Sorry you aren't feeling well. I typically like the free T3 level to be >3.5
and the reverse T3 level to be <15. 5mcg of Cytomel is pretty low. I would
definitely ask your doctor about raising it.

As far as supplements, I typically start with selenium 200mcg daily and zinc
30mg daily. Both can help with thyroid conversion. Also make sure your iron
levels are normal. My articles will have links to my preferred brands on Amazon
if you need them.

Good luck!

[→ Reply](#)**Jon Lockner says**

July 29, 2018

I didn't see anything mentioning fructose. When the level fructose is higher then what the
liver can break down. That causes the thyroid to produces the rt3 hormone. Also, it could
be that the rt3 hormone not only blocks the t3 hormone it causes other hormones to
work differently. Which means the rt3 to t3 ratio can determine how some hormones
work. Examples could be. A t3 favored ratio with insulin then glucose is used. A rt3
favored ratio with insulin would mean fat is made and stored. A t3 favored ratio and
leptin then hunger is reduced. A rt3 favored ratio and leptin then hunger is increased.
Then you can feel hungry and full at the same time.

[→ Reply](#)**Nancy Dettloff says**

August 2, 2018

Would rev.t 3 cause un manageable high blood pressure problems? On thyroid med. for 50 years? Have tried 7 or 8 hbp med, either bad side affects or no results in lowering blood pressure.

→ Reply



Dr. Jeff Whelchel says

August 2, 2018

Hi Nancy. A high reverse T3 should not cause a rise in your blood pressure. If anything, it might be elevated due to the same thing that is affecting your blood pressure. Make sure you have a good kidney workup. I have found in my practice that resistant high blood pressure is often due to problems with the kidneys.

→ Reply



Dee Moses says

August 5, 2018

What if the doctors used radiation to kill your thyroid?

→ Reply



Dr. Jeff Whelchel says

August 5, 2018

Hi Dee. Radiation treatment should not have an effect on the function of the deiodinase enzymes which convert T4 to T3. You will still need to monitor the complete thyroid panel and adjust your thyroid medication accordingly.

→ Reply



Dr. Jeff Whelchel says

August 16, 2018

Hi Dee. So I assume you had Grave's Disease? Even with an irradiated thyroid, you will feel better if you can get your free T3 and reverse T3 levels optimized.

→ Reply



Trisha says

September 29, 2018

I recently had a partial parathyroidectomy. I thought all of my pain and exhaustion would go away once my calcium levels normalized. But, my joint pain is almost worse and I still get really tired most days. My labs do not seem too out of line. Free T3 2.8 / reverse t3 15/ tsh 2.15 / t4 7.9 All of my thyroid antibody tests were normal so no hashimotos. Is it possible that having hypercalcemia for a very long time has damaged my joints irreversibly? Or can a ratio of 18.1 be enough to cause joint pain and fatigue? I do not have thyroid disease and do not take any medications for my thyroid. I did lose 20% of my thyroid during my parathyroid operation. It has been almost 5 months since surgery. Thank you for your advice.

→ Reply



Dr. Jeff Whelchel says

October 6, 2018

Hi Trisha. I'm sorry you are still feeling bad. I like the free T3 level to be 3.5 or higher, so in my opinion you are a bit hypothyroid. I would also suggest having your doctor test for other sources of inflammation, such as checking an ESR and CRP. Good luck!

→ Reply

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