



# Thyroid Eye Disease



Courtesy of American Academy of Ophthalmology and Dr. Steven A. Newman, M.D.

## What is thyroid eye disease?

**Thyroid eye disease** or thyroid related ophthalmopathy (TRO) is an **autoimmune** condition in which your body's immune system triggers inflammation in the eye socket (also called the orbit), affecting the muscles that move the eye and the fatty tissue behind the eye. This can cause the eyes to bulge forward (**proptosis**), the eyelids to open more so it looks like you are staring (**eyelid retraction**), double vision, decreased vision, red eyelids and eye irritation. Rarely, it can cause **pressure on the optic nerve** (the nerve that connects the eye to the brain) causing vision loss or an ulcer on the front of the eye (the cornea) causing pain.

The immune system normally produces antibodies to fight off infection. In autoimmune diseases, the immune system gets confused and produces antibodies that instead attack parts of the body such as the eye sockets, producing inflammation. The antibodies that cause thyroid eye disease often attack the thyroid as well, causing abnormal thyroid function, but in some cases, the thyroid hormone levels are normal. When the antibodies increase thyroid function, it is called Grave's Disease, and when the antibodies cause decreased thyroid function, it is called Hashimoto's Disease.

Too much thyroid hormone causes:

- Shaking
- Weight loss
- Rapid or irregular heartbeat
- Nervousness
- Sweating

Not enough thyroid hormone causes:

- Fatigue
- Sensitivity to cold
- Weight gain
- Hair loss
- Constipation

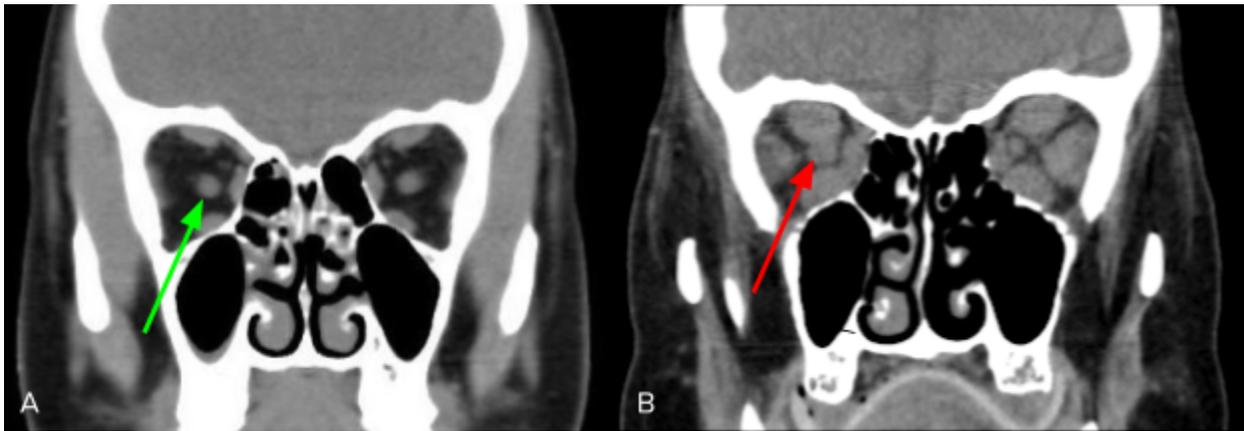
How does thyroid eye disease affect my eye?



**The appearance of the eyes and eyelids in a patient with thyroid eye disease.** Note the eyelid retraction (upper lid elevation) and protrusion of the eyes (proptosis), eyelid swelling, and redness of the eyes.

- **The antibodies that attack the thyroid gland can also attack the fat and muscles around the eye. This can happen even if your thyroid levels are normal.** Thyroid eye disease affects the eyes in many ways, including the following:
  - The upper eyelid gets pulled upward, exposing more of the eye (**eyelid retraction**)
  - Protrusion or bulging of the eye forward (**proptosis**)
  - Eyelid swelling
  - Blurred or distorted vision
  - **Dry eyes**
  - **Double vision:** the muscles that move the eyes may swell and scar. When this happens, the eyes do not move as well and point in different directions, causing misalignment of the eyes and double vision.

- **Optic nerve damage:** if the muscles swell too much, they may **press on the optic nerve, resulting in vision loss.** This is rare (around 5%) and may be reversible.



A. Modified from [Radiopaedia.org](http://Radiopaedia.org). Case courtesy of Dr. Dalia Ibrahim. [rID: 44049](https://pubs.rsna.org/lookup/doi/10.1148/radiopaedia.44049). B. Courtesy of Dr. Nagham Al-Zubidi.

#### CT scan of the orbit.

**A. Normal eye.** The optic nerve (green arrow) is surrounded by normal eye muscles (gray ovals).

**B. Thyroid eye disease.** The eye muscles (gray ovals) are enlarged with **compression** of the optic nerve (red arrow).

## What is the prognosis of thyroid eye disease?

Thyroid eye disease often comes and goes. The inflammation of the orbit can last for 6 months to a few years (**active phase**) before it calms down (**inactive phase**). The effects on your eyes may become permanent, especially if untreated.

Even after the inflammation resolves, the eyes may not go back to what they looked like beforehand. **Cigarette smoking (as well as second-hand smoke) worsens the severity and prolongs the active phase of thyroid eye disease.**

## How is thyroid eye disease treated?

The goal of thyroid eye disease treatment is to decrease the symptoms and severity of orbital involvement. **Avoiding tobacco smoking** and **returning thyroid hormone levels to normal** decrease the severity of eye involvement. **Treatment is most effective early in the active phase.**

Your doctors, including your **primary care provider** and **endocrinologist**, will work with you on controlling your thyroid hormone levels.

- **High thyroid hormone levels:** you may be treated with medications, radioactive iodine, or thyroid surgery.
- **Low thyroid hormone levels:** you will need to take hormone replacement medication.

Other important factors that help with treatment are:

- **Stop smoking**
- Artificial tear solution during the day and lubricating ophthalmic ointment at night
- Taping the eyelids closed at night if the eyelids are not closing completely
- Humidifiers, moisture chamber goggles/glasses and punctal plugs
- Supplementation with a natural mineral called selenium.

**Double vision** treatments include:

- Temporary prism glasses to shift the images into single vision
- Covering one eye (either eye may be covered)
- Eye muscle surgery

Treatments for **decreasing inflammation around the eye** include:

- **Steroids**
- **Low-dose radiation** can cool off inflammation during the active phase of the disease.

**Occasionally, surgery** may be necessary to treat your symptoms:

- **Orbital decompression surgery** creates more room in the eye socket by removing some of the bones of the eye socket, removing some of the fatty tissue in the eye socket, or both.
- **Eye muscle surgery** helps correct double vision.
- **Eyelid surgery** helps to restore the eyelids to a normal position.

## **Are there new treatments available for thyroid eye disease?**

Teprotumumab is an injected medication that targets one of the triggers for inflammation in thyroid eye disease. It has been shown to improve symptoms of thyroid eye disease in the active phase by decreasing inflammation and swelling behind the eye. **The main side effect is increased blood sugar.** It is a new treatment and has not yet been studied for all cases of thyroid

eye disease. In January 2020, the FDA approved teprotumumab for the treatment of thyroid eye disease.

## Additional Reading/Resources

### Other Websites

- **Thyroid Eye Disease**
  - <http://gdatf.org/about/about-graves-disease/patient-education/>
  - [Thyroid Eye Disease leaflet](http://patient.info/health/thyroid-eye-disease-leaflet) (<http://patient.info/health/thyroid-eye-disease-leaflet>)
- **American Thyroid Association**  
<http://www.thyroid.org/graves-eye-disease/>
- **International Thyroid Eye Disease Society**  
<http://thyroideyedisease.org>

## Support Groups

- <https://www.thyroideyes.com/thyroid-eye-disease-support/ted-and-vision-support-groups>
- <https://www.facebook.com/ThyroidEyes>
- <https://www.facebook.com/SER4ThyroidPage>

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