



This factsheet tells you about problems with your vision after a TBI and how to treat them.

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What you need to know

- Your vision is important for many aspects of life.
- Traumatic brain injury (TBI) can cause problems with your vision.
- Treatment can either fix the problem completely, improve your vision, or help you better manage the problem.

What is vision and why is it important?

We often think about vision as being simply what we see. However, vision also includes how our brains make sense of what we see. Vision also helps other systems in the body work well. These include the systems for thinking and moving. When the visual system isn't working properly, there can be a wide-ranging impact on our daily living activities (e.g., reading, driving, employment, school, and recreational activities) and quality of life. Depending on its location and severity, a TBI can affect your vision by damaging parts of the brain involved in visual processing and/or perception (e.g., cranial nerves, optic nerve tract or other circuitry involved in vision, occipital lobe).

How are vision problems found after TBI?

Many members of your care team can find vision problems after TBI. An eye doctor may be part of the team and can check for vision difficulties. Therapists or other rehabilitation clinicians may be the first to notice a problem. They can make a referral to an eye doctor who can examine you and offer advice for treatment. Eye doctors who diagnose and treat vision problems after TBI include optometrists (op-TOM-ah-trists) and ophthalmologists (op-thal-MOL-oh-jists). Neuro-optometrists and neuro-ophthalmologists are specialists with additional training in working with people with brain-related vision problems. Consult with your care team to identify the most appropriate resources for your evaluation and treatment.

What are common types of vision problems after TBI?

There are a variety of visual problems that can occur at different time points in your recovery. Some of the most common types of vision problems include the following:

- Blurred vision, especially with seeing up close
- Double vision
- Decreased peripheral vision

There can also be complete loss of vision in one or both eyes depending on the injury.

How can these vision problems affect my day-to-day life?

Many of the visual problems after TBI can make it more difficult for you to read or do activities up close. For example,

- Close objects may look blurry some or all of the time.
- It may take longer than is typical to focus when looking up from reading.
- Printed letters or numbers and other objects may look as if they're moving.
- It may be difficult to read a computer screen.

It may also be harder for you to be comfortable in some kinds of environments. You may feel:

- Irritable in places with a lot of patterns or motion (visual overload).
- Bothered by light or glare.

Vision problems can also cause discomfort or pain. For example,

- Your eyes may ache or hurt.
- Your eyes may tear up more than usual.
- You may feel like your eye is “pulling.”
- You may have more headaches or motion sickness than usual.

Other visual problems can affect posture, balance, or moving through space. These types of problems may cause you to:

- Have difficulty judging where objects are in space (depth perception).
- Lean forward, backward, or to one side when sitting, standing, or walking.
- Feel as if the floor is tilted.
- Have difficulty participating in sports or other recreational activities.

Other visual problems may affect your brain’s ability to take in and understand visual information (visual cognition), including the following:

- Problems moving the eyes together or making other eye movements
- Difficulty searching and scanning for visual information (visual scanning)
- Difficulty mentally focusing on objects (visual attention)
- Problems encoding, recognizing, and/or recalling visual information (visual memory)

What are common causes of vision problems after TBI?

Sometimes, the eye itself is injured during the head injury. There can also be medical conditions that aren’t related to TBI. These include cataracts or glaucoma. Other vision problems occur due to damage to the wiring in the brain.

Vision problems after TBI are complicated. There is often more than one cause for your symptoms. Sometimes, the eyes are causing the problem. Other times, brain processing may be the problem. For example,

- There may be problems with eye movements. The eye movements we use when scanning stationary objects may not work as well. These eye movements point our eyes toward an object so we can see it clearly. People may also have difficulty following a moving target.
- The eyes may not work together properly as a team. For example, the eyes may not move inward toward the nose to see objects clearly up close (convergence insufficiency). Or, the eyes may not realign outward as needed to focus on objects at different distances (divergence insufficiency).
- The muscles that control the lens inside the eye may not be working properly. This causes difficulty with changing focus when a person switches between seeing objects up close and at a distance.
- There may be a weakness or imbalance in the muscles that move the eyes. One or both eyes may be turned in more toward the nose or out toward the side of the face than usual. This is often the result of injury to the nerves that control the eye muscles. Sometimes, a hairline fracture of the eye socket can cause a problem with the muscles that move the eye up or down.
- You may have difficulty seeing above, below, or out to the sides (decreased visual field). When you lose vision to one side (right or left) of your visual field, it is called hemianopia (hem-ee-en-OH-pee-ah). This may cause such problems as bumping into objects, being struck by approaching objects, or falling.

Vision can also be affected by some medications. For example, some medications can affect the focusing of your eyes. Others can make the eyes feel dry.

What kinds of professionals can I consult with and what kinds of treatment are available?

Professionals who provide vision treatment include eye doctors who specialize in brain-injury-related visual problems, low vision specialists, and occupational therapists. Sometimes, treatment is aimed at treating the underlying problem. This may involve surgery and/or vision rehabilitation therapy including therapeutic eye exercises.

If it is not possible to completely treat the problem, then compensatory devices or strategies may be used to help you make up for reduced or lost eyesight. A rehabilitation professional can help determine which devices and strategies will work best.

What kinds of optical devices can help me manage vision problems?

Some options include

- *Corrective eyeglasses.* If you have blurry vision, regular eyeglasses may be recommended. Glasses that magnify objects can be helpful for up-close activities such as reading, using a cell phone, and doing crafts. Sometimes, glasses to improve distance vision are helpful. If you wore glasses before your injury, even a small change in the glasses' prescription may be useful. If you need glasses to see objects that are both near and in the distance, you may find it difficult to use bifocals. It may work better to have separate pairs of glasses for reading and for distance and even a third pair for the computer.
- *Specialized glasses such as prism glasses.* These are glasses with a prism ground into or put onto the lens. The prism changes the way the light comes into the eye. These glasses may help you with double vision or visual field loss.
- *Patching.* Patching one eye or part of the visual field of one eye is sometimes used to help those with double vision. The patch is placed to eliminate the information that results in the double image from coming into the brain. Patching should be done under the supervision of a trained professional, as it can make the double vision worse if not done correctly.

What other types of devices and strategies can help me manage vision problems?

The following devices and strategies may help you, depending on your vision problem. It is always best to consult with an eye doctor trained to evaluate and treat vision problems after brain injury for specific advice for your particular situation.

- Take breaks often when doing tasks that rely on vision. This is especially important when reading, watching television, or using a computer or other electronic devices. Look up every 20 minutes and focus on something at least 20 feet away to give your eyes a break.
- Magnify objects. Magnifying glasses and other types of magnifiers make objects bigger so they are easier to see. Electronic readers can be used to increase print size and contrast.
- Increase contrast. Making an object stand out from the background can make it easier for you to see it. For example, use a dark-colored cutting board instead of a white one to cut an onion.
- Avoid bothersome light sources. Fluorescent lights can be irritating to some people. Use natural light or non-glare nonfluorescent lighting whenever possible. Wearing tinted sunglasses, indoors or out, may help. The vision specialist can help find the best color and type of tint.
- Reduce glare. Wearing tinted sunglasses can help with glare. Covering shiny surfaces that reflect light into the eyes is another possibility. For example, attach a non-glare filter to computer screens.
- Avoid visual overload. Cut down on clutter in your home and at work. Try to keep all the items needed to complete a task together in one place. Designate one storage place for a frequently used item. For example, place a bowl by the door to hold your keys. Not having to search in multiple places for what you need will reduce the amount of input to the visual system. This can help keep you from being overwhelmed by visual information.
- For those with complete vision loss, devices such as talking timers, alarm clocks, microwaves, thermometers, tactile dots, screen-reading software for computers, talking books, various mobile phone apps, and mobility canes may be helpful. Learning Braille may also be helpful.

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Authorship

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