

# Homonymous hemianopia

Your doctor thinks you have a homonymous hemianopia. This refers to an absence of vision towards one side of the visual world in each eye. The damage that caused this problem is in the brain and not in the eyes.

## Anatomy

Many people are familiar with the concept that the left half of the brain receives sensation from and is responsible for movement on the right side of the body and vice versa. In a similar way the left half of the brain receives visual information for vision to the right side of the world from both eyes and the right half of the brain receives visual information from the left side of the world from both eyes.

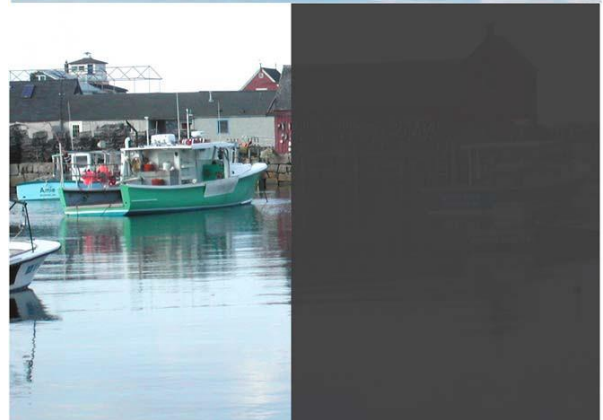
Homonymous hemianopia refers to a condition in which a person can see only to one side, the left or right, and is the result of an injury to the part of the brain where visual signals arrive from one half of the visual world from each of the two eyes. Visual signals from each eye split once the optic nerves enter the head so that an injury to the left half of the brain produces visual loss in the right half of the visual world of each eye, or an injury to the right brain produces visual loss in the left half of the visual world of each eye.

## Symptoms

It is difficult to explain the sensation of a homonymous hemianopia. Affected people often “feel like” the problem is in the right eye when they have a right homonymous hemianopia, but checking each eye by itself shows that the right side of each eye is not seeing.

Affected people often bump into things on the side of the visual field defect. Actions such as crossing the street may be dangerous as patients fail to appreciate oncoming vehicles on that side. Driving may be particularly problematic as they change lanes where there is an oncoming car or sideswipe objects. Objects on a desk or table may not be seen when located to the side of the visual field loss and sometimes even the food on that side of a plate is left uneaten

Attempts to illustrate what a person sees with a homonymous hemianopia often involve showing a picture of a scene and then blanking half the scene out as shown here. This does not really do justice to the sensation produced by a homonymous hemianopia. The affected person does not see half the world and see a blank or dark area in the other half of the world. The missing half of the world simply does not exist.



For example, consider the following paragraph from *Silence of the Lambs*, first the real paragraph, and then the paragraph as it might be seen by someone with a right homonymous hemianopia:

**Clearly something was wrong with him. There was a peculiar cleverness in Crawford, aside from his intelligence, and Starling had first noticed it in his color sense and the testures of his clothing, even within the FBI-clone standards of agent dress. Now he was neat but drab, as though he were molting**

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One way to try and appreciate what people with a homonymous hemianopia see as they move through the world is to keep your body straight, turn your head all the way to the left and turn your eyes all the way to the left. Now try walking backward. You will see about half the world to the left in the direction you are walking. In an unfamiliar environment you can expect to bump into things on your right side.

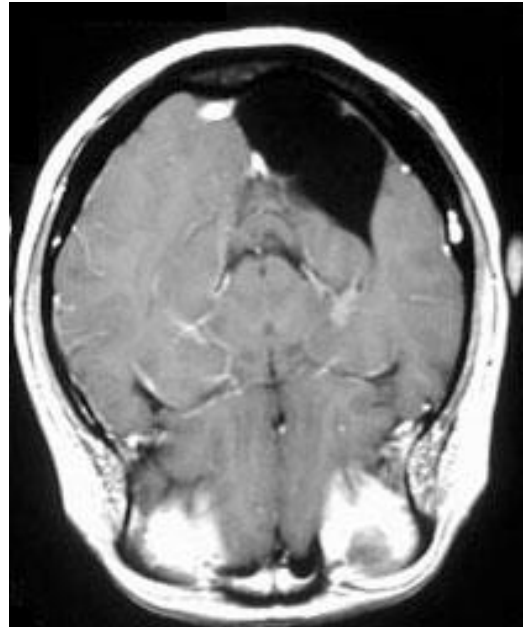
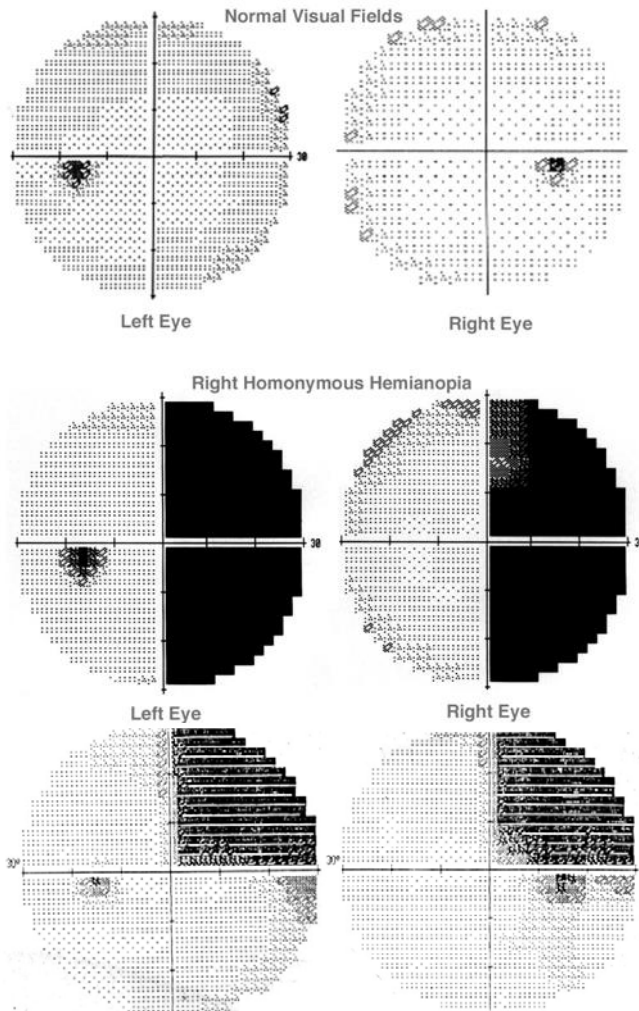
Reading has its own special set of difficulties. People with a left homonymous hemianopia have difficulty finding the correct line when the finish one line and try to move their eyes back to the start of the next line. When reading, the eyes make a series of small quick movements from one word or group of words to the next. Since we read from left to right, people with a right homonymous hemianopia have difficulty with this and make more, smaller movements, often only getting from the beginning to the end of a single word. This makes reading slow and frustrating to many patients.

Visual acuity, that is the ability to see the 20/20 characters on an eye chart, is not affected by a homonymous hemianopia. Only the awareness of the world on that side is lost.

Finally, visual hallucinations are common with homonymous hemianopia, especially if it develops suddenly as it would from a stroke. These hallucinations may be “unformed” – lights, shapes, geometric figures – or “formed”, meaning an image of a recognizable object. Sometimes an object in the normal field is mirrored in the blind field. For example, when moving the arm on the normal side toward a plate on the table, the patient may “see” an arm making the same movement on the other side. Affected people are often reluctant to mention this symptom but should be reassured by their family members and doctors of the cause of the problem. Unlike auditory hallucinations, visual hallucinations usually are not caused by a psychiatric disorder, but are the result of some medical problem in the visual system. In the case of a stroke, the brain adjusts and the visual hallucinations usually resolve after a few weeks. Individual hallucinations may be transient but when they are more persistent it may be helpful to look at them rather than looking away.

## Signs

A complete evaluation of the visual system should be done. Homonymous visual field defects are diagnosed with visual field testing. The patient is asked to fixate a target in front of him while responding to lights flashed above, below, to the right and left of the target. Printouts indicate the sensitivity across the visual field. The figure shows a normal visual field printout, a complete right homonymous hemianopia, and an incomplete right homonymous visual field defect involving only the upper quadrant of the right visual field.



The MRI shows a slice through the brain. The right side of the brain is normal while the dark area at the back of the brain on the left is a large stroke.

## Diagnosis

Homonymous hemianopia may be caused by any disorder that affects the brain including tumors, inflammation, and trauma, but most commonly is due to stroke. Imaging of the brain by MRI is the diagnostic test most commonly used to diagnose the location and cause of the brain injury.

## Prognosis

Recovery of a homonymous hemianopia depends on the underlying cause and the severity of the injury to the occipital lobe. There is often poor recovery if the cause is a stroke, especially if the lesion is as dense and severe as that shown above.

## **Treatment**

Attempts to address the symptoms caused by a homonymous hemianopia may be directed at one of two areas, reading and dealing with the environment.

Reading may be improved by utilizing a straight edge to direct the eyes to the target line of text and working consciously to increase the size of the small eye movements made as one moves along a line of text. Some have had luck holding the text at a 90 degree angle to the normal direction, so that it is read vertically. People with right homonymous hemianopia should read down, thereby keeping the next line of text in the intact left visual field. On the other hand, people with left homonymous hemianopia should read up for the same reason. While this sounds offbeat, many reading teachers sit across from their students and read along with them even though they are viewing the text upside down.

Moving through the environment can be accomplished by directing the eyes toward the hemianopic visual field. Looking for something in the blind field requires a different strategy. Research has shown that people with homonymous hemianopias usually make a series of small eye movements into the blind field when looking for something there. It is more effective if the person consciously makes a very large eye movement into the blind field and then lets the eyes come back to the object. When walking it may be helpful to let the person's partner walk on the bad side and have the patient take their arm. When in groups the family or visitors should be situated on the side of the affected person's normal visual field as much as possible. In theaters the person should sit far over on the side with the visual field defect so that the action is taking place in the normal visual field.

Prisms or mirrors have been used on glasses to compensate for the hemianopia. These may attempt to shift or relocate the visual field toward the defect to attract attention to objects there but still require an active movement of the eyes in that direction to focus on the object.

More formal attempts to induce visual field recovery using computer assisted programs have generated controversy. Ongoing research into the utility of such programs should settle the issue of their ability to induce meaningful improvements in the visual function of people with hemianopia. Until then, caution should be used concerning the investment of large amounts of effort and funds into any unproven treatment program.

Low vision specialists can be consulted to work with patients with these techniques. In general none of these techniques has produced measurable improvement in activities of daily living scales. Affected people are often enthusiastic about them but this usually is true in rehabilitation studies, and telling the difference between placebo effect and real benefit is often difficult.

## **Driving With A Homonymous Hemianopia**

Driving poses a hazard for many people with homonymous hemianopia. Much depends on associated neurologic deficits, especially the presence of neglect. Many rehabilitation facilities have driving simulators both for training and for evaluation driving safety. Taking the drivers test to allow an experienced examiner to assess driving safety may be helpful.

## **Frequently Asked Questions**

**Will my vision improve?**

Any recovery that occurs is likely to begin soon after the stroke and reach its maximum in the first 6 months although some improvement may occur after that. If the underlying cause is not a stroke, the potential for improvement is determined by the ability of treatment to reverse that underlying condition. This potential is specific to each type of underlying condition and moreover, to each patient. This should be discussed with your doctor.

**Will I be able to drive?**

Vision requirements for a license to drive may be found for individual states on the Web at: <http://www.mdsupport.org/library/drivingrequirements.html>. Of the states with specific restrictions, 12 states require a minimum of 90-110 degrees, and 20 states require from 120 to as much as 140 degrees. If you have any doubt about whether your visual field loss disqualifies you from driving in your state, ask your doctor.