CONDITION

Heterochromia

Heterochromia is a difference in colour between the irises or within one iris.

WHAT IT IS
Difference in colour between or within the irises

BODY SYSTEM
Eyes

MAIN SYMPTOMS
Different iris colours, coloured segment, inner colour ring

WHAT CAUSES IT
Inherited traits, development differences, eye disease, injury, or medicines

HOW IT IS DIAGNOSED
Medical history and complete eye examination

MAIN TREATMENT
None usually; treatment of an underlying cause

CAN IT BE CURED?
No - colour difference is usually permanent

IS IT AN EMERGENCY?
Sometimes - sudden change with pain or vision loss

LONG-TERM OUTLOOK
Usually stable, with normal vision

Overview

Heterochromia means that the coloured parts of the eyes do not all have the same colour. This may involve two differently coloured eyes or more than one colour within a single eye.

The coloured part of your eye is called the iris. Its colour comes mainly from melanin, the same pigment that helps give skin and hair their colour. Differences in the amount or distribution of melanin can create heterochromia.

There are three main patterns:

Heterochromia may be present at birth or become noticeable during infancy. This is called congenital heterochromia. It may also develop later because of an eye condition, injury, surgery, or medicine. This is called acquired heterochromia.

Most people who have had stable heterochromia since early childhood have healthy eyes and

normal vision. However, a new colour difference can occasionally be a sign of inflammation, injury, or another eye problem. An eye examination can help separate a harmless colour feature from a change that needs treatment.

- Complete heterochromia: one iris is a different colour from the other
- Sectoral heterochromia: part of one iris is a different colour
- Central heterochromia: a ring around the pupil differs from the rest of the iris

Symptoms

The main feature is a visible difference in iris colour. You may have two different eye colours, a wedge-shaped patch in one iris, or a differently coloured ring around a pupil.

Heterochromia itself usually does not cause pain, redness, discharge, or blurred vision. It may be subtle and noticed only in bright light or photographs. Lighting, pupil size, camera settings, and reflections can also make matching eyes appear different.

Symptoms such as eye pain, light sensitivity, redness, a drooping eyelid, or reduced vision are not typical of harmless heterochromia. They may point to an underlying eye or nerve condition.

In babies, iris colour can continue to develop during the first months of life. A colour difference that remains, becomes more obvious, or appears with other unusual features should be mentioned during routine medical care.

Causes and risk factors

Congenital heterochromia often results from a harmless difference in how pigment developed in the irises. It may occur on its own, without illness or other symptoms. It can run in families, although a person may also be the only family member affected.

Some inherited or developmental conditions can include heterochromia. Examples include Waardenburg syndrome, which may also involve hearing loss and changes in hair or skin pigment, and congenital Horner syndrome, which affects the nerves supplying one side of the face and eye. These conditions are uncommon, and most people with heterochromia do not have them.

Heterochromia that develops later has a different range of possible causes. These include:

Prostaglandin-type eye drops used to lower pressure in glaucoma can gradually darken the treated iris. This is more noticeable in some mixed-colour eyes and may be permanent. Do not stop prescribed eye drops because of a colour change without discussing it with the

prescriber.

The chance that heterochromia has an underlying cause is higher when it begins suddenly, changes over time, or occurs with pain, redness, abnormal pupil size, eyelid drooping, or a change in vision.

- Eye inflammation, including certain forms of uveitis
- An eye injury, surgery, bleeding, or a retained metal fragment
- Conditions affecting the iris, pigment cells, or eye pressure
- A growth or other structural change in the iris
- Damage to the nerves controlling the eye
- Medicines that increase iris pigment

Diagnosis

Heterochromia is identified by looking at the irises, but the purpose of an assessment is to find out whether there is an underlying cause.

An eye care professional will ask when the colour difference was first noticed and whether it has changed. Childhood photographs can help show whether it has been present for many years. You may also be asked about injuries, eye surgery, medicines, family traits, and symptoms such as pain or blurred vision.

A complete eye examination may include checking your vision, pupils, eye movements, and eye pressure. A slit lamp-a microscope with a bright light-allows the iris and other structures at the front of the eye to be examined closely. Dilating drops may be used so the retina and optic nerve at the back of the eye can be checked.

Further tests are not needed for every person. Imaging, blood tests, or specialist nerve assessment may be considered if the examination suggests injury, inflammation, Horner syndrome, or another medical condition. Genetic assessment may be useful when heterochromia occurs with hearing loss, distinctive pigment changes, or a strong family pattern.

Treatment and management

Stable heterochromia that is not linked to an eye problem usually needs no treatment. The colour difference does not have to be corrected, and routine eye care is generally sufficient.

When a condition has caused the change, treatment focuses on that condition rather than the iris colour. Management may involve controlling eye inflammation, treating abnormal eye pressure, or caring for an injury. Treatment may protect comfort and vision, but it may not restore the previous iris colour.

If a medicine is responsible, its benefits and effects can be reviewed with the prescriber. Iris darkening from some glaucoma drops may remain even if the medicine is later changed. Never stop pressure-lowering eye medicine on your own, because untreated glaucoma can damage vision.

A coloured contact lens can make the eyes look more similar if the colour difference bothers you. Contact lenses should be properly fitted and cared for because poorly fitted, shared, or contaminated lenses can injure the cornea or cause infection.

Procedures marketed solely to change iris colour, including cosmetic iris implants, can cause serious eye damage. Possible problems include inflammation, glaucoma, corneal injury, cataracts, and loss of vision. They are not the same as medically necessary iris surgery used to repair an injured eye.

Complications

Heterochromia itself usually causes no physical complications and does not reduce vision. It is a colour difference rather than a progressive eye disease.

Complications are possible when the colour change comes from another condition. Ongoing inflammation can affect several parts of the eye. An injury may damage the iris, lens, or drainage system. High eye pressure can harm the optic nerve if it is not managed.

A visible difference may also attract comments or unwanted attention. Some people enjoy the feature, while others feel self-conscious about it. Cosmetic contact lenses are an option, but they bring a risk of infection or corneal damage if they are not fitted and cleaned correctly.

Prevention

Congenital heterochromia usually cannot be prevented. It develops through inherited traits or differences in pigment development before or shortly after birth. Nothing a parent did during pregnancy is known to cause an isolated, harmless colour difference.

Not every case of acquired heterochromia can be prevented either. You can reduce the risk of eye injuries by using suitable protective eyewear during activities involving tools, metal fragments, chemicals, or fast-moving objects.

Use prescribed eye medicines as directed and attend recommended eye-pressure checks. If an eye drop changes iris colour, this does not necessarily mean the eye is being harmed. The medicine should be reviewed rather than stopped without advice.

Prompt assessment of persistent redness, pain, light sensitivity, or visual change may help identify inflammation or injury before it causes further damage.

Living with it and what to expect

Congenital heterochromia often remains stable for life. It does not usually spread from one eye to the other, and it generally has no effect on reading, driving, work, exercise, or other daily activities.

Eye colour can mature during infancy, so a baby's irises may not look exactly the same over the first year. After early childhood, a clear new colour change is less likely to be part of normal eye development.

Acquired heterochromia may remain stable, become more noticeable, or change with the condition causing it. Even when the underlying problem is treated, the altered pigment may be permanent. Your long-term outlook is mainly determined by whether the eyes are otherwise healthy.

Routine follow-up is usually straightforward. A person with longstanding, symptom-free heterochromia may need only usual eye examinations. Someone with glaucoma, inflammation, an injury, or another identified cause may need regular checks of vision, eye pressure, and eye structures.

Photographs taken in similar lighting can help document a suspected change, but day-to-day differences in pupil size and lighting can be misleading. An examination is more reliable than comparing photographs alone.

When to get medical help

Arrange a routine eye examination if heterochromia is newly noticed, has not been assessed before, or appears to be changing. A child with a persistent colour difference should have the eyes checked, particularly if there is hearing loss, a drooping eyelid, unequal pupils, or unusual hair or skin pigmentation.

Contact an eye care service promptly if a colour change occurs with ongoing redness, mild eye pain, sensitivity to light, new floaters, or gradual visual change. These symptoms can occur with inflammation or other treatable eye conditions.

Seek urgent or emergency care for:

A stable colour difference without pain or vision change is not usually an emergency.

- Sudden loss or marked reduction of vision
- Severe eye pain, especially with redness, nausea, or headache
- A chemical splash or penetrating eye injury
- A colour change after significant eye or head trauma
- A new drooping eyelid or unequal pupils with weakness, confusion, or severe headache

Common questions

Is heterochromia dangerous?

Heterochromia present from early childhood is often a harmless pigment difference. It matters more when it appears later, changes, or occurs with pain, redness, unequal pupils, eyelid drooping, or reduced vision. An eye examination can check for an underlying cause.

Does heterochromia affect eyesight?

Heterochromia alone usually does not affect eyesight. If vision is reduced, the cause may be a separate eye condition, an injury, inflammation, or abnormal eye pressure rather than the colour difference itself.

Can heterochromia develop as an adult?

Yes. Acquired heterochromia can follow eye inflammation, injury, surgery, nerve problems, or treatment with certain eye drops. A new colour difference in adulthood should be examined even if it is painless.

Can glaucoma eye drops change eye colour?

Some prostaglandin-type glaucoma drops can gradually increase brown pigment in the iris. The change may be permanent. Because glaucoma treatment protects the optic nerve, do not stop the drops without discussing the change with the prescriber.

Can I make my eyes look the same colour?

A professionally fitted coloured contact lens may make the eyes look more similar. It does not change the underlying iris. Cosmetic iris surgery carries significant risks and is not a routine treatment for harmless heterochromia.

Will my child inherit heterochromia?

It can run in families, but many cases occur without a family history. The chance of passing it on

is not the same for everyone because several genes and developmental conditions can affect iris pigment. Genetic assessment is usually considered only when other features suggest an inherited syndrome.

Sources

- American Academy of Ophthalmology EyeWiki. "Heterochromia."
- National Center for Biotechnology Information, StatPearls. "Heterochromia."
- National Eye Institute. "Uveitis."
- MedlinePlus Genetics. "Waardenburg syndrome."
- US Food and Drug Administration. Xalatan-latanoprost ophthalmic solution prescribing information.