TEST

Refraction

Refraction measures the lens power needed to bring your vision into clear focus.

WHAT IT MEASURES
Lens power needed to focus light clearly

SAMPLE
None; measurements are taken through the eyes

FASTING NEEDED?
No

HOW LONG IT TAKES
Usually 5 to 15 minutes

RESULTS IN
Usually immediately; no laboratory processing needed

USED FOR
Diagnosing refractive error and choosing corrective lenses

MAIN LIMITATION
Focusing effort and responses can shift the prescription

Overview

Refraction is an eye test used to find the lens power that gives you the clearest vision. It helps determine a prescription for glasses or contact lenses.

The test can identify refractive errors. These happen when the shape or focusing power of the eye prevents light from landing sharply on the retina, the light-sensitive layer at the back of the eye. Refractive errors include:

During subjective refraction, you look through different lenses and say which gives clearer vision. Objective methods, such as an autorefractor or retinoscopy, estimate the prescription without relying entirely on your answers.

Refraction is often part of a wider eye examination. By itself, it does not fully assess eye health or rule out conditions such as glaucoma, cataracts, retinal disease, or problems involving the optic nerve.

- Myopia: distant objects look blurred
- Hyperopia: near or distant objects may look blurred

- Astigmatism: uneven focusing causes blur or distortion
- Presbyopia: age-related loss of near focusing ability

Why the test is ordered

Refraction may be ordered to:

Headaches or eye strain can have many causes. Refraction may show whether focusing effort or an outdated prescription is contributing, but it cannot establish every possible cause.

- Investigate blurred, strained, or uncomfortable vision
- Check whether your existing prescription has changed
- Choose lenses for glasses
- Provide a starting measurement for contact lens fitting
- Assess how well each eye can see with correction
- Check children for focusing problems that may affect visual development
- Measure vision before or after certain eye procedures

Who should have the test

You may need refraction if your vision is blurred at distance or near, if you squint to see clearly, or if reading and screen use have become uncomfortable. It can also be useful when your glasses no longer seem effective.

Children may have refraction after a vision screening concern, suspected squint, unequal vision, or difficulty seeing at school. Young children often need special eye drops to temporarily relax the eyes' strong focusing muscles.

People with diabetes, cataracts, corneal conditions, previous eye surgery, or medicines that affect focusing may need refraction as part of broader eye care.

How often you need testing is based on your age, symptoms, eye health, prescription, family history, and local recommendations. A new vision problem should not be put off simply because a routine examination is not yet due.

How to prepare

You can eat and drink normally. Coffee does not usually interfere with refraction, although large amounts may make it harder to sit still or concentrate.

Bring your current glasses and, if available, a copy of your previous prescription. Tell the examiner about eye surgery, eye injuries, diabetes, pregnancy, and medicines or eye drops you use.

Ask whether you should remove contact lenses before the appointment. Soft lenses may need to be removed for a period before some measurements. Rigid lenses can temporarily alter the shape of the cornea and may need to be left out longer, especially when accurate measurements are needed before surgery.

If cycloplegic or dilating drops may be used, consider bringing sunglasses. The drops can cause temporary light sensitivity and blurred near vision. Ask the clinic whether you may need someone else to drive you home.

What happens during the test

You usually sit facing an eye chart and cover one eye at a time. The examiner first checks how clearly you can see without correction or with your current lenses.

An autorefractor may shine light into the eye and produce an estimated prescription. Alternatively, the examiner may use retinoscopy, moving a light across the pupil while placing lenses in front of your eye.

For subjective refraction, you look through a device called a phoropter or through lenses placed in a trial frame. The examiner changes the lens power and asks questions such as, "Which is clearer, one or two?" It is fine if two choices look the same. Refraction does not rely on finding a perfect answer every time.

In some cases, drops are placed in the eyes to relax focusing. This is called cycloplegic refraction . It is especially useful for children and for people whose focusing effort may hide farsightedness or make them appear more short-sighted.

Understanding your results

Refraction results are written in diopters, a unit of lens power. A prescription may include:

A minus sign usually indicates myopia. A plus sign usually indicates hyperopia or added near power. "Plano" means no spherical lens power is required, although astigmatism correction may still be present.

A larger number does not automatically mean poorer eye health. It means more lens power is needed to focus light.

There is no laboratory reference range for refraction. Interpretation varies with the method used, age, sex, pregnancy status, medicines, and clinical context. The most useful result is the prescription that provides clear, comfortable vision while fitting your needs.

- Sphere: correction for short-sightedness or farsightedness
- Cylinder: correction for astigmatism
- Axis: the direction of the astigmatism correction
- Add: extra near power, often used in reading or multifocal lenses
- Prism: correction used for selected eye-alignment problems

What affects the results

Refraction can change even when the equipment is working correctly. Important influences include:

Time of day usually has only a small effect, but dry eye, fatigue, or heavy near work can make vision more variable later in the day.

- Focusing effort: especially in children and young adults, active focusing can hide farsightedness or create an overly strong minus prescription
- Dry eyes: an unstable tear layer can make letters fluctuate and produce inconsistent astigmatism measurements
- Contact lenses: recently removed lenses, particularly rigid ones, can temporarily change corneal shape
- Recent close work: prolonged reading or screen use may temporarily affect focusing in some people
- Blood glucose changes: rapidly changing glucose levels can temporarily alter the eye's focusing power
- Pregnancy: hormonal and fluid changes can cause temporary prescription shifts
- Medicines and eye drops: some can alter focusing, pupil size, tear production, or visual clarity
- Cataracts or corneal irregularity: these may cause changing or inconsistent results
- Previous eye surgery: healing and corneal changes can affect the measured prescription

- Attention and communication: tiredness, uncertainty, or difficulty comparing lenses may reduce consistency

Accuracy and limitations

Subjective refraction is the usual method for finalising a glasses prescription because it includes your experience of clarity and comfort. However, repeated tests may not produce exactly the same numbers. Small differences can occur without representing a meaningful change.

The test may miss hidden farsightedness when the eye's focusing muscles remain active. In that situation, cycloplegic refraction is often more informative. It may also suggest astigmatism that is not stable when dry eye or an irregular cornea is affecting the image.

Autorefraction is useful as a starting point, but its result is not always the best final prescription. It may provide too much minus power in someone who is actively focusing. Retinoscopy or cycloplegic refraction may be better for young children or anyone unable to give consistent responses.

Refraction shows whether lenses improve vision. It does not explain every case of reduced vision. If the chart remains blurred with the best lenses, an eye health examination and other tests may be needed.

A contact lens prescription requires additional measurements and fitting. It cannot be created by simply copying a glasses prescription.

Risks and complications

Refraction without eye drops is non-invasive and is not expected to harm the eyes. You may briefly notice eye strain or visual oddness after comparing many lenses.

Cycloplegic drops can sting briefly and cause temporary near blur, glare, or light sensitivity. Serious reactions are uncommon. Seek urgent help after drops if you develop severe eye pain, marked redness, vomiting, breathing difficulty, or a sudden lasting loss of vision.

What happens next

The examiner may recommend new glasses, keeping your current prescription, or arranging a separate contact lens fitting. Small prescription differences do not always require new lenses,

particularly if your current vision is clear and comfortable.

If the result is inconsistent, you may be asked to return after treating dry eye, leaving contact lenses out, stabilising blood glucose, or allowing the eyes to recover from surgery. Children who receive cycloplegic drops may have their prescription discussed after the drops take effect.

Routine follow-up is appropriate for gradual changes in vision or difficulty with an existing prescription. Do not wait for a routine refraction if you develop sudden vision loss, a curtain-like shadow, new flashes with many floaters, a painful red eye, new persistent double vision, or vision loss after an injury. These symptoms need urgent eye assessment.

Common questions

Can I drink coffee before a refraction test?

Yes. Fasting is not needed, and coffee does not usually alter the prescription. Avoid an unusually large amount if it makes you restless or affects your concentration.

Does the time of day matter?

Usually not. If your vision changes through the day because of dry eye, fatigue, blood glucose changes, or prolonged close work, tell the examiner when your vision is clearest or worst.

Can I exercise beforehand?

Normal exercise is unlikely to affect refraction. If intense activity leaves you dehydrated, tired, or temporarily unable to focus comfortably, allow time to recover before the test.

Should I wear my contact lenses to the appointment?

Ask the clinic. They may want to examine your lenses in place, but accurate refraction or corneal measurements may require you to remove them beforehand.

Will my eyes be dilated?

Not always. Children and people with strong focusing responses may receive cycloplegic drops, which also enlarge the pupils. A standard adult refraction often does not require them.

Can I drive home afterward?

Usually, if no drops are used and you feel your vision is safe for driving. Cycloplegic or dilating drops may cause glare and blurred near vision, so follow the clinic's advice and arrange alternative transport if needed.

Sources

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