

# Strabismus Measurements

## HOW IS STRABISMUS MEASURED?

Strabismus (eye misalignment) can be measured by several methods: the reflex of light on eyes, cover testing with prisms, special glasses, or a synoptophore machine. The measurements help guide the surgical and medical management of strabismus. The age, vision, and level of cooperation of the patient determine which method is most accurate and feasible.

## WHAT IS LIGHT REFLEX TESTING?

The simplest form of light reflex testing, called Hirschberg testing, involves directing the patient to look at a point of light held about three feet from the patient's face. If the light reflexes are located in the same spot in each pupil, the reflexes are symmetric, and the eyes are straight. If the light reflexes fall asymmetrically in the pupils, strabismus may be present. Hirschberg testing estimates the size of the strabismus by determining how far the light reflex is off-center. A more accurate form of light reflex testing is Krimsky testing which involves holding a prism over one eye to center the deviated light reflex until the reflexes are symmetric. The amount of the prism needed to center the deviated light reflex estimates the size of the eye misalignment. Although it is not extremely accurate, light reflex testing may be the only means possible in young children and in those with vision too poor to fixate well on a target.

## WHAT IS COVER TESTING?

Cover testing is another method to evaluate strabismus. The patient is instructed to look at a target. While the patient is fixating on the target, one eye is covered. The uncovered eye is observed. If the uncovered eye is well aligned, it will not shift position when the cover is applied. If the uncovered eye is misaligned, its position will change as the eye must move to align with the target. For example, if the left eye is turned in, as the right eye is covered, the left eye will move outward to fixate on the target. Similarly, if one eye is higher and the other eye is covered, the uncovered eye makes a downward movement to fix on the target.

## WHAT ARE PRISMS?



Prisms are clear, triangular shaped objects that bend light. When held in front of an eye, the prism shifts the pathway of light coming into the eye. The amount the light is shifted is measured in a unit called prism diopters. Prism diopter measurements describe the amount of eye misalignment. A prism bar with stacked increasing prism diopter units may be used instead of individual prisms to improve the speed of measurements.

## WHAT IS PRISM AND COVER TESTING?

Prism and cover testing are used to determine the amount of strabismus present. A prism is held over the one eye, and the eyes are alternately covered, giving time between alternation for the patient to fixate on a target. When the proper strength of prism is placed over the misaligned eye, there is no movement of the eyes when the cover is switched back and forth between the eyes. The eye alignment is measured in different gaze directions, including with head tilts, and at near.

## WHAT IS POSITIVE ANGLE KAPPA?

A person can look like they have strabismus because of an off-center light reflex and still have straight eyes. This may occur due to a discrepancy between the center of the front surface of the eye and the part of the retina that gives the sharpest vision called the macula. Patients with a positive angle kappa will have normal strabismus measurements and no eye movement on cover testing.

## WHAT IS PSEUDOSTRABISMUS?

[Pseudstrabismus](#) is a condition where one or both eyes appear misaligned in a child due to a wide nasal bridge. Children and adults with pseudostrabismus will have normal strabismus measurements and no movement on cover testing. For more information see: [pseudostrabismus](#).

## WHY IS IT IMPORTANT TO GET GOOD STRABISMUS MEASUREMENTS?

Medical and surgical treatment of strabismus is based on the amount of eye misalignment present. Sometimes several office visits are needed to obtain accurate and complete strabismus measurements.

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