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Frequency Doubling Technology Your Comprehensive Guide

Frequency doubling technology (FDT) is a vision test mainly used to detect early signs of glaucoma, especially before any noticeable vision loss occurs. It's a quick way to check how well the retina and optic nerve are working, specifically, how they handle motion and contrast.

Because of its speed and sensitivity, FDT has earned a place in both routine screenings and early glaucoma detection workflows. It's a particularly valuable tool when time or resources are limited, as the test is quick and doesn't require pupil dilation or a darkened room.

Frequency Doubling Technology Overview

The technique uses an optical illusion with low spatial frequency gratings that flicker at high temporal frequencies. These black and white stripes create a perceived doubling of spatial frequency. This "frequency doubling" effect selectively stimulates the magnocellular pathway, specifically M-cells, which are among the first to be damaged in glaucoma. If the patient's retinal ganglion cells are impaired, this can be an early sign of glaucoma. FDT visual field testing stands out due to its efficiency. Traditional perimetry can take 10 to 15 minutes per eye, whereas FDT can complete a reliable test in under five minutes.

Academic references and clinical validation

A comparison study showed that frequency doubling technology may be more sensitive and specific than Standard automated perimetry (SAP) to detect early visual field impairments in ocular hypertensive patients.

FDT is useful, but further testing will be needed. An older study found it unreliable for screening for neurological visual field defects, and another noted that it is not suitable as a sole glaucoma screening test.

Today's electronic devices, including smartphones, are capable of producing quality FDT tests. This functionality points to more accessible, technologically advanced testing where tabletop perimetry might not be available.

The FDT Eye Exam at a Glance

FDT perimetry presents patients with flickering black-and-white bars (sine-wave gratings) in different quadrants of the visual field. This test maps which regions of the visual field respond appropriately and which ones show defects. Because glaucomatous damage often begins in localized regions of the peripheral field, this test allows for early detection, sometimes even before a patient reports symptoms or before a full threshold test would register loss.

Pros and Cons of Frequency Doubling Technology

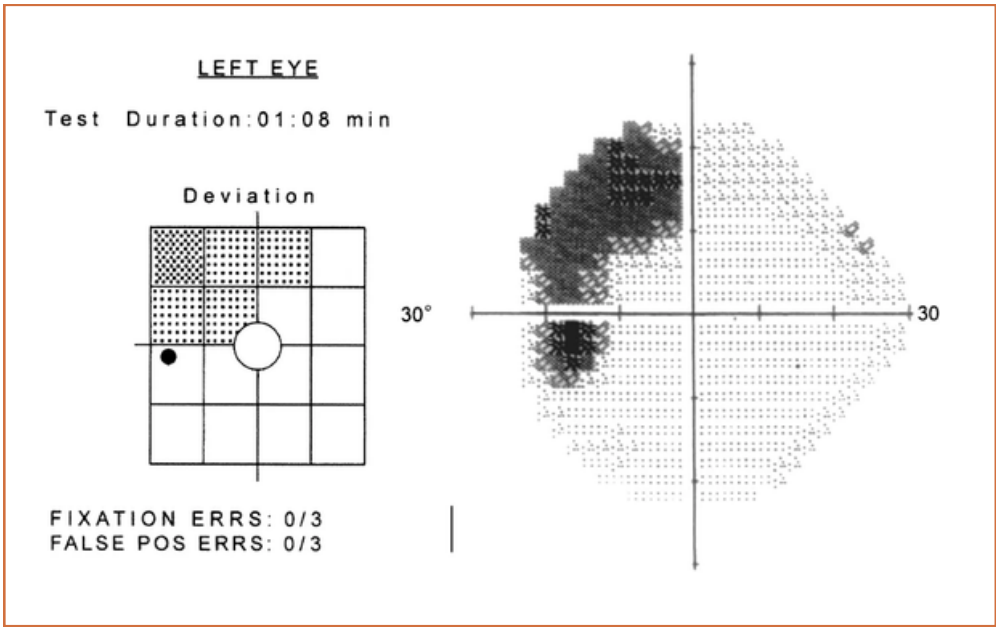
We know the FDT exam is efficient, useful, and widely used, but there are pros and cons to incorporating this test into your routine.

PROS	CONS
Screening is fast, portable, and easy to administer in almost any setting.	Frequency doubling technology is not a full-threshold test and provides less detail than other perimetry exams.
FDT is sensitive to early glaucomatous damage.	It may miss non-glaucomatous visual field loss, such as that from neurological or retinal origins.
Works well with portable FDT perimeter setups, offering flexibility for mobile clinics or limited-space environments.	Patients may find the optical illusion confusing without a thorough explanation.
Integrates easily into routine exams as an early glaucoma screening tool.	

List of Ocular Diseases Monitored and Diagnoses Identified by Frequency Doubling Technology

Primary Open-Angle Glaucoma	FDT is highly effective at catching early glaucoma detection by identifying functional loss in the m-cell pathways. It's a reliable way to track glaucoma progression.
Neurological Conditions	FDT is not the first-line screening for most neurological conditions and may miss significant defects. However, it can be added to the screening workflow to identify a wide range of conditions, such as tumors, hemianopias, and more.
Optic Neuropathies	FDT lacks specificity in distinguishing underlying causes, but frequency doubling technology can detect visual field loss caused by optic neuritis.

Example Frequency Doubling Technology Reports



Source: Nature.com

Billing and Coding for FDT Tests

Frequency doubling technology is billable using CPT code 92081. According to the CMS physician fee schedule, reimbursement ranges from $15 to $42 per exam. Your specific fee amount depends on your practice's location, setting, and the precise type of test you're providing.

When is the frequency doubling technology test required?

About three million Americans have glaucoma, and there are many more who don't realize they have it. Patients at elevated risk of glaucoma, especially people over age 60, Black Americans over 40, people with diabetes, and those with a family history of glaucoma, should be screened frequently. Confirmed patients can benefit from FDT testing twice per year. Patients with suspected optic neuropathies may need frequency doubling technology testing when other tests are inconclusive.

Is FDT testing required for driver's licenses?

No, this test is more specialized and doesn't provide insight into visual acuity, blind spots, or visual field. Driver's licenses in all states require visual acuity testing, and many mandate visual field exams. The Esterman and Full Field 120 tests, when combined with visual acuity testing, usually provide ample information for drivers.

Complete Your Comprehensive Exams with Carrot

Incorporating FDT into your diagnostic toolkit is a convenient and fast way to capture the earliest signs of functional vision loss before irreversible damage occurs. The quicker you identify subtle defects, the sooner you can begin treatment, slow progression, and preserve quality of life.

Carrot's visual field tests can provide more insight and help monitor disease progression. You can add Carrot to your testing routines for comprehensive, precise, and patient-friendly eye exam experiences on a larger scale.

Questions? Contact sales@carrot.io talk to a Carrot expert today.