

Automated Test for Strabismus Proves Accurate

Full disclosures (for web only)

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Israeli researchers have developed an automated examination tool that can be used to diagnose and measure strabismus in children.¹ They found that it provides precise detection and measurements of ocular misalignment and is able to differentiate between phorias and tropias. Moreover, it is able to automatically detect the deviating eye.

Basic setup. The researchers used the EyeSwift vision assessment device (NovaSight), which incorporates an eye tracker and provides continuous information on gaze positions. For this study, the participants also wore dedicated, remotely operated wireless occlusion glasses, which allowed each eye to be covered separately. They were then asked to observe fixation targets and short animated movies on a screen. No head constriction was required.

Study specifics. The researchers evaluated 69 children between the ages of 3 and 15 years old. Of these, 36 had an exodeviation, 25 had an esodeviation, eight had a vertical deviation, and eight were orthophoric.

Each child was evaluated manually with the cover-uncover test (CUT) and the prism alternating cover test (PACT). They were then evaluated twice with the automated versions of the tests. All evaluations were performed during the same visit.

Results. The average automated test took 46 seconds to complete. A high correlation ($r = 0.9$; $p < .001$) was found between automated and manual testing results, with the automated system identifying the same direction of the deviation as the manual PACT in all cases.

In addition, in seven children, the system was able to identify a deviation that had not been picked up during the manual exam. “It was encouraging to see how well the EyeSwift diagnosed cases such as dissociated vertical deviation, which were not always clinically apparent,” said Tamara Wygnanski-Jaffe, MD, at the Goldschleger Eye Institute, Sheba Medical Center, in Tel HaShomer, Israel.

Patient selection. The best subjects for this test are those children who can “cooperate, sit still, and fixate nicely on a screen—and who have deviations of less than 60 PD and in whom good visualization of the anterior segment is possible,” Dr. Wygnanski-Jaffe said. “Although children who tend to move their eyes can also be examined properly, the steadier the fixation the faster the exam.”

Even with these guidelines, “We were able to perform the exam on many individuals with more complex conditions—such as poor vision, short attention spans, and developmental delays—without difficulty,” she said. The researchers were also able to measure children as young as 2 years of age. Moreover, she said, “We were surprised by the high acceptance and willingness of all age groups and their caretakers to perform the exam.”

Platform improvements. Since this study was completed, the researchers have added several functions to the system, Dr. Wygnanski-Jaffe said. These include visual acuity testing at near, color vision and stereoacuity testing, the Worth Four Dot test for suppression analysis, contrast sensitivity, fusional reserves for convergence and divergence, and reading performance analysis.

Next steps. Looking ahead, the researchers plan to add the nine-gaze misalignment test and ocular motility and microtropia testing.

—Jean Shaw

1 Yehezkel O et al. *Am J Ophthalmol*. 2020;213: 226-234.

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