SOME RESEARCH PAPERS THAT HAVE USED THE FD2 (in date order from 2013)

Stereoacuity with Frisby and Revised FD2 Stereo Tests

Bohr I, Read JC. *PLoS One.* 2013 Dec 12;8(12):e82999

Abstract We compared near stereoacuity, measured with the Frisby test, and distance stereoacuity, measured with the revised Frisby-Davis (FD2) test, enabling a comparison with the original version of the FD2. In the revised version of the FD2 test, a white background is used instead of a backlit background. We also examined the effect of age, gender and visual problems. We used the Frisby test at distances ranging from 30-80 cm and FD2 at 6 m. The best possible score was 20 seconds of arc (arcsec) on the Frisby and 5 arcsec on the FD2; participants who could not perform a test despite demonstrating understanding of it were classed as stereonegative. We examined both the whole population recruited, and a sub-population screened so as to exclude visual problems. We analysed our results in three age-groups: "visually developing" (36 children aged 5-10 years); "visually mature" (300 participants aged 11-49 years) and "older" (29 participants aged 50-82). In the whole population, the median stereoacuity on the Frisby test was 25, 20 and 85 arcsec in the three age-groups. In the sub-population with no visual problems, median Frisby stereoacuity was similar at 20, 20 and 80 arcsec respectively. On the FD2, the medians were 10, 10, 20 arcsec for the whole population and 7.5, 10 and 12.5 for the sub-population. Children were more likely than adults to be stereonegative on the FD2, although none of the children were stereonegative on the Frisby. The two tests showed fair agreement when used to classify people into three categories of stereovision. Poor stereovision was often associated with binocular problems such as tropia, but with many exceptions. In line with previous studies, we found improvements in measured stereoacuity in childhood and declines in late adulthood. **The new FD2 test gives comparable values to the original FD2.**

J AAPOS. 2009 Apr;13(2):136-41. doi: 10.1016/j.jaapos.2008.09.005. Epub 2008 Dec 13.

http://www.plosone.org/article/info%3Adoi%2F10.1371%2Fjournal.pone.0082999;jsessionid=0DC0759EE73D68EB2284A286F53712DE

Evaluation of FD2 (Frisby Davis distance) stereotest in surgical management of intermittent exotropia

Abhishek Singh, Pradeep Sharma, Digvijay Singh, Rohit Saxena, Anudeepa Sharma, Vimla Menon

Br J Ophthalmol 2013;**97**:1318-1321

Conclusions Distance stereoacuity is reduced in X(T) to a greater extent than the near stereoacuity and both improve after surgery. FD2 is useful for deciding timing of surgery and a stereoacuity worse than 20 arcsec is an indication for surgical intervention. A preoperative distance stereoacuity which is worse than 70 arcsec implies a poor prognosis for stereoacuity improvement after surgery.

http://bjo.bmj.com/content/97/10/1318

The effect of induced monocular blur on measures of stereoacuity.

Odell NV, Hatt SR, Leske DA, Adams WE, Holmes JM. *J AAPOS.* 2009 Apr;13(2):136-41.

CONCLUSIONS: Stereoacuity thresholds are more easily degraded by reduced monocular visual acuity with the use of random dot tests (PSR and DR) than real depth tests (Frisby and FD2). We have defined levels of monocular visual acuity degradation associated with fine and nil stereoacuity. These findings have important implications for testing stereoacuity in clinical populations.

http://www.ncbi.nlm.nih.gov/pubmed/19071047

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http://www.ncbi.nlm.nih.gov/pubmed/19071047

Improvement in distance stereoacuity following surgery for intermittent exotropia

Adams WE, Leske DA, Hatt SR, Mohney BG, Birch EE, Weakley DR Jr, Holmes JM. *J AAPOS.* 2008 Apr;12(2):141-4. Epub 2007 Dec 21.

CONCLUSIONS: There was improvement in distance stereoacuity measured with both the FD2 and the Distance Randot stereotests in patients who underwent surgery for intermittent exotropia. The FD2 and Distance Randot may be useful outcome measures in future clinical trials of interventions for intermittent exotropia.

http://www.ncbi.nlm.nih.gov/pubmed/18082437

Distance stereoacuity in prism-induced convergence stress.

Laird PW, Hatt SR, Leske DA, Holmes JM. J AAPOS. 2008 Aug;12(4):370-4. doi: 10.1016/j.jaapos.2008.01.013. Epub 2008 Apr 18.

CONCLUSIONS: Convergence stress is associated with decreased distance stereoacuity that does not appear to be due to accommodative convergence. Performance on real depth stereotests (FD2) is affected more than random dot tests (DR), in contrast to previous findings in intermittent exotropia. There appear to be different mechanisms for decreased stereoacuity in intermittent exotropia and under conditions of convergence stress in nonstrabismic subjects.

http://www.ncbi.nlm.nih.gov/pubmed/18378476

Development of distant stereoacuity in visually normal children as measured by the Frisby-Davis distance stereotest.

Hong SW, Park SC. Br J Ophthalmol. 2008 Sep;92(9):1186-9. doi: 10.1136/bjo.2008.138362. Epub 2008 Jul 9.

CONCLUSION: Distance stereoacuity reaches adult levels at approximately 5 years of age. These data of the age-related normal values could represent a reference frame for the comparison of data obtained for clinical populations.

http://www.ncbi.nlm.nih.gov/pubmed/18614571

New tests of distance stereoacuity and their role in evaluating intermittent exotropia.

Holmes JM, Birch EE, Leske DA, Fu VL, Mohney BG. *Ophthalmology.* 2007 Jun;114(6):1215-20

CONCLUSIONS: The real-world contour-based targets of the new distance FD2 appear to stimulate fusion in intermittent exotropia, even when distance control is poor. In contrast, the new Polaroid vectograph-based DR is very sensitive to disturbances of binocularity. Two new distance stereoacuity tests appear sensitive to opposite ends of the intermittent exotropia spectrum; FD2 performance deteriorates when the patient is constantly tropic, whereas DR performance deteriorates at the earliest stages of intermittency.

http://www.ncbi.nlm.nih.gov/pubmed/17241665

Real depth vs randot stereotests.

Leske DA, Birch EE, Holmes JM. *Am J Ophthalmol.* 2006 Oct;142(4):699-701.

CONCLUSIONS: The type of stereotest influences measurable thresholds, and the results from different tests are not interchangeable. The choice of test should depend on the question being asked; Near Frisby and FD2 would be appropriate for determining presence or absence of stereopsis and best measurable stereopsis. The more rigorous Randot tests would be appropriate for determining subtle changes.

http://www.ncbi.nlm.nih.gov/pubmed/17011876

Effect of age on adult stereoacuity as measured by different types of stereotest.

Garnham L, Sloper JJ. *Br J Ophthalmol.* 2006 Jan;90(1):91-5.

Stereoacuity has been measured in 60 normal subjects aged 17-83 years by a single observer using TNO, Titmus, Frisby near, and Frisby-Davis distance stereotests. Motor fusion was measured at (1/3) metre and 6 metres.

CONCLUSIONS: Although subjects showed some decline in stereoacuity with age by all tests, the large drop in stereoacuity seen in some older subjects using the TNO test was probably due to difficulty overcoming the dissociative effect of the test rather than a true reduction in cortical disparity detection. Results of random dot stereotests should be interpreted with caution in older patients, particularly with respect to their ability to perform everyday visual tasks.

http://www.ncbi.nlm.nih.gov/pubmed/16361675

W E Adams, S Hrisos, S Richardson, H Davis, J P Frisby, and M P Clarke *Br J Ophthalmol*. 2005 November; 89(11): 1438–1441.

http://www.ncbi.nlm.nih.gov/pmc/articles/PMC1772919/

Testing distance stereoacuity with the Frisby-Davis 2 (FD2) test.

Holmes JM, Fawcett SL. *Am J Ophthalmol.* 2005 Jan;139(1):193-5.

CONCLUSION: The FD2 stereotest is a useful measure of distance stereoacuity, provided the presentation protocol accounts for monocular cues.

http://www.ncbi.nlm.nih.gov/pubmed/15652852
