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New Stereotests

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Summary: Two tests for stereopsis screening are presented. The new stereo test of Lang is based on a combination of pano-
graphy and random-dots. It allows rapid examination of
stereopsis and does not require glasses. In patients who
fail this test, the two pencil test is carried out. It al-
 lows assessment of gross depth perception comparing mono-
cular and binocular performance and is especially suitable
for patients with vision impairment and strabismus.

Two stereotests are presented, one, a brand new one, and the
other a very old one, but seemingly not well known.

Recently a number of stereotests have become available,
among them in particular random-dot tests.

The advantage of random-dots are well-known. However, the
disadvantage of most random-dot tests is that they require
red-green or polaroid glasses.

Therefore we have combined Julesz' random-dot with the pano-
graphy technique. Panography or lenticular screens was inven-
ted in 1912 by the Swiss ophthalmologist W.R. Hess, who pre-
viously had described the Hess coordImetry method for exami-
nIng eye muscle paresis which is still in use today. Hess
first practised ophthalmology for four years and then chan-
ged to physiology and became a professor of physiology at the
University of Zurich. In 1949 he was awarded the Nobel prize
for his research on the diencephalon. He called his technique
"free eye" stereoscopy.

Lenticular screens provide a separate image to each eye. The
two pictures consist of fine strips which are alternatively
seen by each eye when focused through the cylindrical lens ele-
ments. This is shown in the patent specification of Hess (fig.1).
The two pictures are fused and if disparity in some parts exists,
this disparity provides a stereoscopic impression.
The great advantage of panography and of our new test is that no glasses are necessary. The stereoscopic picture is seen spontaneously when the test card is held in a frontoparallel position in front of the examined person. The test should be held by the examiner and not by the patient, otherwise the examinee will tilt it in different directions.

In our test (9,5 x 14,5 cm) the examinee sees a car, a star and at a nearer distance a cat. When held at a distance of 40cm, the disparity of the car and the star is 600 seconds and of the cat 1200 seconds (fig.2 and 3).

fig.1: Patent specification of Hess.

fig.2: Lang stereotest, front side.
fig. 3: The three objects of the Lang stereotest: Cat, star and car.

Our test provides a very quick screening for binocular vision even in young children by a very simple procedure. If children are not willing or not able to pronounce the name of the object, the ophthalmologist still can judge whether the child sees the objects from the eye movements, or the child may try to grasp them. Our procedure is therefore especially suited for screening in kindergarten and also for pediatricians. It is also extremely useful in everyday ophthalmological routine examination and in orthoptics.

We have the clinical impression that subjects with anisometropic amblyopia pass the test, whereas microtropia fails. When a patient fails the test, we immediately proceed to a vertical two pencil test under monocular and binocular conditions. This shows whether he has all the same some gross binocularity.

The two pencil test is a very simple test, but full of information. It shows very quickly the amount of stereopsis useful in daily life. The examiner holds a pencil vertically in front of the patient and the patient is asked to hold a second pencil, bottom down, vertically above the examiner's pencil and to bring his pencil slowly down in an attempt to touch the examiner's pencil. This test should be done first with both eyes open, then
occluding the weaker or the deviating eye of the patient. The binocular and monocular performance are then compared. In doing so, it sometimes becomes evident that even an eye with impaired vision down to 0.1, e.g. due to a cataract or to a maculopathy, allows useful stereopsis which immediately is lost when the weak eye is occluded.

Also in squinting patients with harmonious anomalous correspondence this test shows useful stereopsis when both eyes are open, which is lost after covering the deviating eye. However, in cases of normosensorial late convergent squint, the loss of stereopsis under binocular conditions can be well demonstrated. This test therefore could help to reach an agreement between strabologists about the value of peripheral binocular vision. For years showing this test everywhere I have apparently been without overwhelming success. This test, however, is the most beautifully illustrated one of all orthoptic tests, since already 350 years ago Peter Paul Rubens in the work "Opticorum Libri" of Franciscus Aquilonius has drew a wonderful sketch. The putto or cherub holds a rod in front of the scholar who tries to touch the rod from the side with his index finger. If Aquilonius and Rubens were still living, I would suggest to them that the scholar should hold an other rod vertically above the first one and should perform the test in a vertical way in order to make as much use as possible of the horizontal disparity.

fig.4: Illustration of Peter Paul Rubens in the work of Franciscus Aquilonius.
fig.5: The two pencil test.

Our illustration with the horopter shows that the bottom of the examiner's pencil represents the fixation point of the horopter. When the patient's pencil is too far or too near, the horizontal disparity, even in an eye with impaired vision, helps to adjust the pencil to the fixation point.

The limited time does not permit us to go into more detail about the value of the Lang stereotest and of the two pencil test. However, with some experience one will in short time become aware of the great value of these tests.

fig.6: Two pencil test and horopter.

Literature: