

## STATISTICAL EVALUATION IN PEDIATRIC PATIENT OF *LANG I* STEREO-TEST FOR THE DIAGNOSIS OF MICROESOTROPIA IN DAILY PRACTICE

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The usefulness of diagnostic tests for microesotropia is a mismatching problem till nowadays. We have examined the most common and used test to detect microesotropia in daily practice: *Lang I stereo-test*. The aim of our study was to analyze statistically this test to detect its real effectiveness in children.

**Efficacy** considers the extent to which a specific treatment or test produces a beneficial result under ideal conditions, **effectiveness** refers to the actual effect of a treatment or test in the real world of people who comply poorly.

Stereopsis can be quantified in the seconds of arc of retinal image disparity required to produce perception.

The minimal disparity that elicits the response is referred to as the *stereoacuity*. The minimal retinal image disparity in humans that yields the perception of stereopsis is about 14 seconds of arc. Extrafoveal images which project into retinal areas with less resolving power than the foveal images, require greater retinal image disparity to perceive stereopsis. Therefore stereoacuity based on the least disparity in retinal images that produce stereopsis can be used for proving the presence of macular binocular vision. Macular binocular vision is totally unable to cope with strabismus. When misalignment exceeds the 8 prism diopters stereopsis disappears. Many tests are clinically used in common practice.



Lang I stereotest is a very simple test to define the presence of stereopsis between 550 and 1200 seconds of arc, and it is based on a random dots test. It is commonly used in practice to point out the presence of strabismus in children. The test shows figures of common objects very well known in children's world. A cat, a star and a car are shown on different planes, the cat appears nearest in respect to the others two, the car is the farthest. Usually the answers vary according to the patient's age and comprehension.

We considered 312 patients whose age range from 3 to 18 years (mean age 7.5) suspected to be microesotropic. **Children less than 3 years of age were excluded from the study since it was not possible to detect any answer from the Lang I stereo-test due to the early age.** All underwent a full orthoptic and ophthalmological examination. "Paliaga 8 diopters base-in test" was considered the "gold standard" diagnostic test. The stereo-test was presented at a distance of 40-50 cm.

Among all the patients, 281 (90,1%) were considered normal (without strabismus) and 31 (9,90%) were considered affected (with strabismus) at the gold standard test. Among the patients without strabismus the test allowed to detect 279 real negatives (orthotropic with stereopsis) and 2 false positives (orthotropic without stereopsis). Among the patients considered microesotropic 27 were found to be real positives (microesotropic without stereopsis) and 4 were found to be false negatives (microesotropic with stereopsis).

RESULTS	POSITIVES	NEGATIVES
REAL	27	279
FALSE	2	4

The authors found a specificity of 99% and a sensitivity of 87%. We could also calculate the positive predictive value (93%) and the negative predictive value (99%) of the test since we knew the prevalence of microesotropia in our population. Likelihood ratio was detected to evaluate the efficacy of the tests in daily practice and it corresponds to 87.

SPECIFICITY	99%
SENSITIVITY	87%
LIKELIHOOD RATIO	87
PRE-TEST PROBABILITY	5%
ODDS PRE-TEST	0,05
POST-TEST PROBABILITY	81%
ODDS POST-TEST	4,35
POSITIVE PREDICTIVE VALUE	93%
NEGATIVE PREDICTIVE VALUE	99%

- *Specificity* = capacity to diagnose normal pts
- *Sensitivity* = capacity to diagnose affected pts
- *Likelihood ratio* = detects the probability to be affected by a disease after being positive to the test itself.
- *Odds* = defines the probability to be affected by the pathology we consider in the study
- *Positive predictive value* = probability to have a microesotropia in case of a positive test
- *Negative predictive value* = probability to have a normal patient in case of a negative test

Lang I stereo-test is a simple test with a high specificity and a good sensitivity. Positive and negative predictive values correspond to a test with a good reliability in young children. Likelihood ratio stresses the importance of Lang I stereo test in diagnosing microesotropia in children older than 3 years of age. The problem we encountered in our practice was the cooperation of young patients, since we were obliged to exclude in our statistical analysis children younger than three years due to the impossibility to register reliable data. **We stress the importance to involve children aged more than three** to have a good reliability of this test in practice to detect microesotropic patients. Younger children don't allow to collect answers to make the correct diagnosis and should be monitored with other tests with good statistical evaluation according to age.