



LEA Symbols Low Vision Book

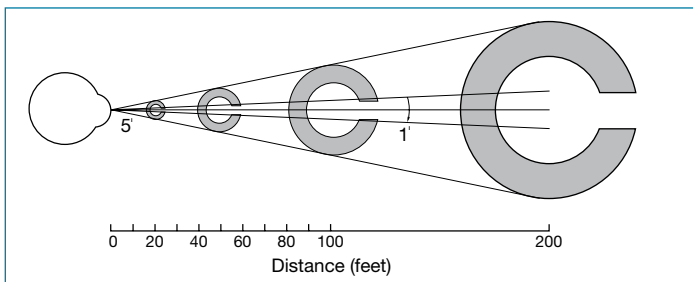
Part Number: 527400, 575500, 527500, 575600

Lea Symbols Low Vision Introduction

Visual Acuity Tests

Visual acuity tests are used more than any other tests in ophthalmology, optometry and in vision screening in preschool, school and occupational health care. Therefore it is important that the tests used have standardized structure and that they are used correctly. In vision screening, sizable savings are possible by using a near vision test as an additional test.

Visual acuity can be measured with several different tests that depict different qualities of vision. The basic test is the line test, which has at least five optotypes (test symbols) on the test lines with spaces between the optotypes that are equal to the width of the optotypes of that line. The distance between the test lines is equal to the height of the lower line (Visual Acuity Measurement Standard (1984) Consilium Ophthalmologicum Universale, Visual Function Committee).



Even though the international recommendation was published more than ten years ago and was well known in the 70's (originally described by Green in 1868) it has not been complied with in the design of visual acuity tests in all countries. The name 'line test' is also used to describe tests that do not follow the recommended design. A near vision test may be called "Reihentest", line test, but the space between the symbols varies from circa 80% of the symbols' width on the smallest lines to 5-6% between the largest symbols. This leads to a varying crowding effect from line to line.

In the LEA test series there are line tests, tests with more crowded symbols and single symbol tests to allow assessment of function of the visual system in these three functionally different situations. The number of tests has grown over the years because the needs in screening and assessment of children and adults vary at different ages and different functional levels.

Even when the tests are standardized there are still other factors that affect the results and that are difficult to control. Luminance level is one of the important variables. If regular room illumination is used, luminance on the vertical test surfaces is lower than

recommended, 85 candelas per square meter or more. In the 70's this was solved in the large multicenter studies by using back illuminated tests in standardized lightboxes. This ETDRS lightbox has become a standard world wide. It is big and heavy and thus difficult to move and therefore smaller lightboxes have been manufactured in several countries.

Even when the tests, test situations and luminance level are standardized, there is still one important variable that resists standardization, the tester. Every tester has his/her personal way of talking to the child, waiting for the response and supporting the child. Therefore visual acuity values measured by two people, well trained and motivated to test in the same way, still vary. This needs to be taken into account when values from different test series are compared. There is also variation in the child cohorts' cultural background, motivation and intellectual capabilities. When different visual acuity tests are compared the values should preferably be measured at least twice to balance for the different uncontrollable variables.

The testers should follow the instructions to the letter. Such 'details' as the distance of the card covering the line above or pointing or not pointing at the optotypes may cause a surprising difference in the visual acuity values in some children. Test instructions in this manual are written in a very detailed way with the hope that the test situations will become standardized. When testing adults it is customary to test distance vision first, followed by near vision. It is also customary to first test each eye separately, then binocularly. When testing children, better results are obtained by starting with near vision testing before proceeding to greater distances. This allows the child to learn the testing procedures and symbols. The examiner learns what to expect from the child under the most favorable conditions. Also, when testing children, it is important to create a pleasant play situation before testing near and distance vision. Test both eyes first, then each eye separately.

Communication

Before testing starts, a method of communication must be established such as naming (signing) or matching. If the child does not spontaneously name the symbols ask "What should we call this? Should we call it 'apple' or 'heart', 'house' or 'garage', 'window' or 'box', 'ball' or 'ring'?"

The child can decide the names of the symbols by playing with the LEA 3-D Puzzle (#251600), Flash Cards (#251800), or the Response Key Card (#251700). Let the child choose which names to use. Note that the child may change the names during the test. For example, if the larger symbol was called "house" the smaller one may be called "dog house" and "apple" may become "berry", etc. If a multihandicapped child cannot point at the symbol or make a selection with his or her hand or foot, arrange the Flash Cards or the LEA puzzle pieces farther apart so the child can point with eye gaze, if voluntary eye movements are accurate enough, or with head movements.



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Luminance Level

Luminance level should be kept at or above the standard level of 85 candelas per square meter. This is difficult to achieve in a regular room because the test is vertical and thus does not reflect much of the light from ceiling lamps. The small lightbox for the 9"x14" tests has a luminance level of 120 cd/m². During measurement of near vision luminance level is usually at acceptable levels because the test is held tilted to be perpendicular to the line of sight of the child.

Definition of Visual Acuity Threshold

According to the Visual Acuity Measurement Standard, "A line of optotypes is generally considered to have been read correctly when more than 50% (e.g., 3 of 5, 4 of 6) of the optotypes presented have been read correctly."

Details About Testing

Start testing with binocular testing at near. Distance testing and monocular testing with occlusion of one eye follows naturally once confidence with the child is established. When testing monocularly, test the right eye (O.D.) first followed by the left eye (O.S.), unless there is an obvious negative response to occlusion of the left eye.

In follow up testing and in amblyopia training the -1, -2, and +1, +2 system should be used to give credit for minimal changes. For example, "20/32 (+1)" "(6/9.5 (+1) or 0.63 (+1))" indicates the child met the 20/32 line criteria and also correctly named one symbol on the next smaller size, 20/25 (6/7.5 or 0.8).

Since these tests are mainly used in amblyopia screening it is important to keep in mind that skipping symbols is a feature typical to amblyopic eyes. Even if the visual acuity difference is less than two lines between the eyes, it is an important finding. If one notices that the child has motor difficulties, like skipping symbols, the tester should be alerted to the possibility that the child might have beginning mild amblyopia developing in an eye or has undiagnosed brain damage.

Visual acuity charts are among the least expensive clinical tests that we use. However, in a number of hospitals and screening places visual acuity tests have not been replaced in 10-15 years. The tests are old, brown and smudged, no more proper high contrast tests. Take good care of your tests, do not leave them in sunshine and clean them with a nonabrasive detergent. Watch that children do not have an opportunity to draw on your tests with pen. Never use a pen to point on optotypes when you are testing a child who cannot fixate at the symbols without pointing. Use a pointed wooden stick. The low contrast visual acuity charts need special attention, keep them in the plastic cover.

Instructions

- When examining young children, introduce the distance chart to the child after near testing by saying, "Let's look at the same pictures a little further away."
- Point to the first symbol in each line in descending order when testing binocularly.
- Move down until the child hesitates or misidentifies a symbol.
- Move back up one line and ask the child to identify all the symbols on that line.
- If the child identifies all symbols correctly go to the next line with smaller symbols and ask the child to identify all symbols on that line.
- If the child skips a symbol ask the child to try again while briefly pointing to that symbol.
- A child with fixation problems may skip symbols within a line of symbols.
- Visual acuity is recorded as the last line on which at least 3 of the 5 symbols are identified correctly. The visual acuity value is found in the margin adjacent to that line.
- After obtaining good responses with binocular testing, proceed by testing each eye separately.
- When testing monocularly, use the first symbol of each line or every second line for one eye and the last symbol of each line for the other eye to determine on which line to start testing close to the threshold value.
- If the child has profound low vision, the lowest rows of the test can be used as a near vision test. The distance of 25 cm is the most practical distance because calculation of the visual acuity values is simple. They are $\frac{1}{4}$ of the value printed next to the last line read. (To calculate $\frac{1}{4}$ of a Snellen value, you multiply the denominator by 4.)