

Visual Acuity Testing/Measurement: Making Sense of the Numbers

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10/20, 5/100 +1, 20/200 -2, 10/200, CF (counts fingers), HM (hand motion), 1M @ 6"

How do you make sense of these visual acuities?

Why are different numbers used for the numerator?

What about near acuity and working distance?

What follows will help you sort out the numbers game we call visual acuity testing.

First, it is important to know that standard projection acuity charts have no acuity levels between 20/100 and 20/200 and 20/200 and 20/400. There is only one 200 and one 400 letter available on these charts. Therefore, standard Snellen charts are only useful if the visual acuity is 20/100 or better.

For individuals with visual impairments, the number of letters per row and the relative spacing between letters and between rows can cause substantial variation in visual acuity scores. The visual acuity charts normally used by low vision practitioners have 5 letters on each line and allow for incremental testing of visual acuity from 5/200 (20/800) to 20/100 or better. Additionally, projected charts are not suitable for testing individuals with visual impairments because they do not provide the contrast or adjustment in range of luminance that is available with printed cardboard or trans-illuminated charts. Finally, projected charts lack flexibility of printed charts to change the testing distance in order to measure poorer acuities.

When testing visual acuity, the chart being used should be noted and the number of correct responses on each line should be recorded such as 20/20-2 or 20/40 +2. 20/20 -2 indicates that the individual was able to read all but 2 of the letters on the 20/20 line. 20/40 +2 indicates that the individual was able to read all of the 20/40 line and 2 letters on the next smaller line.

Many individuals with visual impairments require reduced observation distance and the practitioner should be aware that changing observation distance can influence the acuity score obtained. For example, an individual who can see a 20/10 line of letters at 2' (2/10=20/100), would likely see significantly worse at a 20' test distance.

In this way, 2/10 is not the same as 20/100. When faced with a visual acuity measurement that has a numerator other than 20, you simply need to divide the numerator into 20 and then multiply that number with the denominator. For example, for the visual acuity 5/40, divide 20 by 5=4 and then multiply 40 by 4=160.

Therefore 5/40=20/160, 10/50=20/100 and 4/50=20/250.

"Counts fingers" should never be used as a visual acuity measurement because this acuity notation requires knowledge of the size of the tester's hand, and what test distance they used, for this measurement to be meaningful over time. With the Designs for Vision Acuity Chart, visual acuities can be tested to the 1/200-20/1400 level.

If an individual is unable to see a large test letter or symbol brought towards them at any distance, but could see the examiner's hand moving, a visual acuity of hands motion would be recorded indicating gross object and motion perception without detailed discrimination. The farthest distance at which the patient can see hand motion should be noted (e.g. HM@ 2').

If a person is only able to locate the direction of light, he is said to have light perception with projection and is capable of using it for localization and orientation. Light perception with projection should be tested in at least 8 quadrants.

Light perception means the generalized, rather than localized perception of light. Individuals with light perception cannot localize the direction of the light but can tell whether a light is on or whether it is daylight or dark. A person may be considered completely blind when no exogenous light is seen.

Near visual acuity recording should specify both the observation distance and the size of the smallest print that may be read (e.g. 0.8M @ 4"). The preferred method for measuring print size is in M units. 1M newsprint, 2M= large print (18 point). It is common, although inappropriate; to express print size as a reduced Snellen equivalent, a fraction that expressed the equivalent distance vision acuity required to read that particular print when it is viewed from 40 centimeters (16"). This method becomes clearly inappropriate when the viewing distance is other than 40 centimeters, which is usually the case for an individual with a visual impairment. Also, the Jaeger system should never be used to measure near acuities because of its well-known lack of standardization.

Near visual acuity measurements with reading charts often serve as a basis for determining the magnification that an individual with a visual impairment might require to satisfactorily perform a complex task at near.

Distance visual acuity measurements are much less reliable for this purpose. Finally, once a single letter or word acuity has been recorded, the individual's continuous text reading ability should also be tested.