Background:

In order to separate abnormal from normal, the criteria for normality needs to be established. This may seem obvious, but surprisingly often, the normal distribution of physiological parameters is undefined. The custom to use 20/20 (0.0 logMAR) as a criterion for normal visual acuity in adults originates from Snellen, and many visual charts do not contain optotypes above this value. This is in spite of the fact that Snellen himself cautioned against interpreting his “norm value” as an accurate limit for normal visual acuity. Some authors even argue that the use of 20/20 as a norm value is based on a miscalculation. According to Velasco e Cruz, Snellen used calculations of a full grating cycle when determining the minimum visual angle in his E-chart. Snellen’s norm value should thus be 20/10 instead of 20/20!

To our knowledge, very few studies have been published on what is to be considered normal visual acuity in adolescents and adults. The aim of this study was to establish visual acuity in a population-based sample of normal 17-18-year-olds.

Methods:

In a previous, population-based study in 1998, a total of 1046 12-13-year-old children were examined with a full eye examination. 2.25% of these children (n=262) were randomly selected and invited to a re-examination in 2003. A total of 147 accepted participation and 116 attended (44%). Out of the examined group, 38% reported a history of serious eye disease or visual pathology (results taken from the examination in 1998), mean best-corrected visual acuity increased to –0.12 ± 0.07 logMAR.

Results:

Mean best-corrected visual acuity was –0.10 logMAR across the examined group. There was no significant difference between those with history of visual pathology and those without (p > 0.1). Out of the examined group, 38% reported a history of serious eye disease or visual pathology (results taken from the examination in 1998), mean best-corrected visual acuity increased to –0.12 ± 0.07 logMAR.

Discussion:

Our results fit well in with previous publications on normal, mean visual acuity. The distribution of visual acuity (logMAR) in our sample resembles normal distribution, even if the peak is bifid. Normal distribution requires a shape completely determined by the mean and the standard deviation, and not the median or mode.

Conclusions:

Visual acuity in healthy teenagers is considerably better than 20/20 and possibly normally distributed. This is of importance for several reasons: firstly because it is in accordance with Fechner’s law, which states that the human visual system is logarithmic. Secondly, it means that the 20/20 value should be replaced when setting visual acuity standards.

References:


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