Reading with AMD

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F. G. Holz et al., *Age-related macular degeneration*
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The loss of reading ability is the main complaint heard from patients with age-related macular degeneration (AMD). The significance of reading is high in our visually orientated world, being important for education, work and the general quality of life. In everyday life we encounter numerous types of reading material: not only newspapers and books, but also timetables, telephone books, bank statements and private correspondence. The loss of reading ability can make it impossible to work, leading to unemployment and dependence, or in the elderly even to admission to a nursing home. Therefore, one of the main goals in rehabilitation of AMD patients is the improvement of reading ability. Owing to the increasing number of AMD patients, the need for rehabilitation will continue to increase in the coming years. Reading is not a sequence of single letter recognition tasks. Reading is a complex sensorimotor–cognitive process, which can be impaired by various factors, and especially by central visual field defects. On the other hand, this process can also be improved by specific measures utilising what is known about the pathophysiology of reading.

### 8.1 Physiological Principles

The retinal area used for reading amounts to only a few square millimetres, but it is disproportionately overrepresented in the visual cortex. The central 10° of the visual field, which corresponds to approximately 2% of the total visual field, utilises more than 50% of the primary visual cortex (Horton and Hoyt 1991; see also Trauzettel-Klosinski et al. 1994a).

Visual acuity decreases rapidly with increasing eccentricity (Fig. 8.1). A visual acuity of about 0.4 is necessary to recognise newsprint at a distance of 25 cm. One place where this visual acuity can be found is at the margin of the fovea. During fixation, a group of letters is perceived, and a reading visual field of a certain minimum extent is therefore required: 2° to the right and to the left of fixation, and 1° above and also below (Aulhorn 1953). This minimum reading visual field corresponds approximately to the “visual span” (Legge et al. 1997) and the “word identification span” (Rayner 1986). Its extent is more or less in keeping with the size of the fovea. The total perceptual span during a fixation can exceed this minimum by up to 5° in the reading direction (Rayner 1986; McConkie and Rayner 1975).

Therefore, visual acuity alone is an inadequate measure of reading ability, because it tests only one optotype at a time. The range of reading ability is limited on the one hand by resolution of the retinal area used and on the other by its minimum extent,