

The 20/20 patient who can't read

Amadeo R. Rodriguez, MD,* Jason J.S. Barton, MD, PhD, FRCPC†

ABSTRACT • RÉSUMÉ

To understand how reading can be disrupted in patients with good acuity, it is important to realize the complexities that underlie this task, which normally seems so effortless. The process of reading is an interplay among vision, eye movements, attention, and linguistic processing, and impairments in any of these functions can result in reduced reading efficiency. The goal of this review is to provide a systematic review of these functions that can help clinicians generate a logical and useful differential diagnosis of impaired reading in the patient with 20/20 vision.

Pour comprendre les troubles de lecture chez des patients ayant une bonne vision, il est important de saisir la complexité d'une telle action, qui semble se faire habituellement sans effort. La lecture fait appel à la vision, aux mouvements des yeux, à l'attention et au traitement linguistique. Une déficience d'une seule de ces fonctions peut diminuer l'efficacité de la lecture. Le présent article vise à passer systématiquement en revue ces fonctions pour aider les cliniciens à poser un diagnostic différentiel logique et utile des troubles de lecture chez un patient ayant une acuité de 20/20.

The written language is a complex form of communication that is a relatively recent development in human evolution. In literate societies, it is one of the most important sources of information in the workplace and at home, and problems with reading perhaps constitute one of the most frequent visual complaints in ophthalmologic practice. In many patients this is related to reductions in visual acuity: acuity of at least 20/50 is required to read newsprint at 25 cm of viewing distance, and more modest reductions of acuity can also impair reading efficiency.¹ Excluding problems such as inadequate refraction, corneal disorders, cataract, maculopathy, and optic neuropathy is the ophthalmologist's responsibility in a patient with poor acuity that impairs reading. However, patients may complain of reading problems even if they have 20/20 vision.

To understand how reading can be disrupted in patients with 20/20 vision, it is important to realize that reading is a complex task that involves an interplay among vision, eye movements, attention, and linguistic processing. As impairments in any of these functions can result in reduced reading efficiency (Fig. 1), we will provide a systematic review of these functions to help clinicians generate a logical and useful differential diagnosis of impaired reading in patients with good visual acuity.

VISUAL FIELDS

During normal reading one does not process only the letter at the fovea, but an array of information from the parafoveal field. This processing area is asymmetric, a

“perceptual span” extending up to 15 letters to the right of fixation and 3 to 4 letters to the left for languages read from left to right, such as English, with a reversal in this asymmetry for languages read from right to left, such as Hebrew and Arabic.² Seeing the upcoming text to the right of fixation helps the English reader to plan where to place his or her next fixation, even if it falls on a part of the retina without enough resolution to determine the word or letter. Any scotoma that affects this parafoveal processing region will reduce reading efficiency; however, patients will generally not complain of poor reading unless the region is affected in both eyes.

For this reason, homonymous hemifield defects are among the most common causes of impaired reading in the patient with 20/20 vision.³ Hemianopic dyslexia will be present if the field defect affects the central 5 degrees.^{4,5} For left-to-right English readers, a right hemianopia is more problematic than a left hemifield defect.^{4,6} This is because it eliminates the large right parafoveal zone used in reading, as well as the preview of upcoming text that aids in planning the location of the next fixation. Eye movement recordings show that these patients read with a series of many small saccades, creeping along the line (Fig. 2), with resultant prolongation in the time needed to read.^{4,6,7} Patients with left hemianopia do not have difficulty reading along the line, but once they reach the end of the line, they have problems finding the beginning of the next line, have to make a number of small saccades to find it (Fig. 2), and sometimes end up on the wrong line.^{4,7} Patients with homonymous hemianopia can develop compensatory strategies such as eccentric fixation, in

From the *Departments of Surgery (Ophthalmology) and Medicine (Neurology), McMaster University, Hamilton, Ont.; and †Departments of Medicine (Neurology), Ophthalmology and Visual Sciences, and Psychology, University of British Columbia, Vancouver, B.C.

Originally received Jan. 29, 2015. Final revision May 9, 2015. Accepted May 26, 2015

Correspondence to Amadeo R. Rodriguez, MD, 2757 King Street East, Hamilton ON L8G 5E4; arodrig@mcmaster.ca

Can J Ophthalmol 2015;50:257–264

0008-4182/15/\$-see front matter © 2015 Canadian Ophthalmological Society. Published by Elsevier Inc. All rights reserved.
<http://dx.doi.org/10.1016/j.jcjo.2015.05.013>

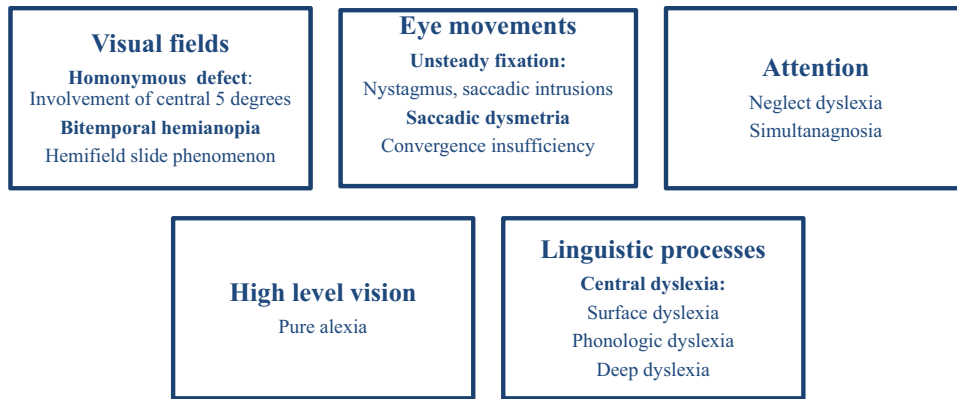


Fig. 1—When reading does not work.

which there is a shift of the field defect toward the hemianopic side.⁴ An innovative optokinetic approach to rehabilitation has used text scrolling to the left to improve reading speed in right hemianopic dyslexia, possibly by promoting the development of larger rightward saccades during reading.⁸ This therapy is available online for free (<http://www.readright.ucl.ac.uk>), and a study of 33 patients with right homonymous field defects showed

improved reading speed.⁹ For patients with hemianopic dyslexia, magnification is not helpful; in fact, if they have partial macula sparing, they may do better with smaller rather than larger print. Learning to read vertically (i.e., the page turned 90 degrees) using the intact visual field is a cumbersome strategy but can still be useful for some patients. Reading upside down, an even more drastic change, can allow subjects with right hemianopia to place

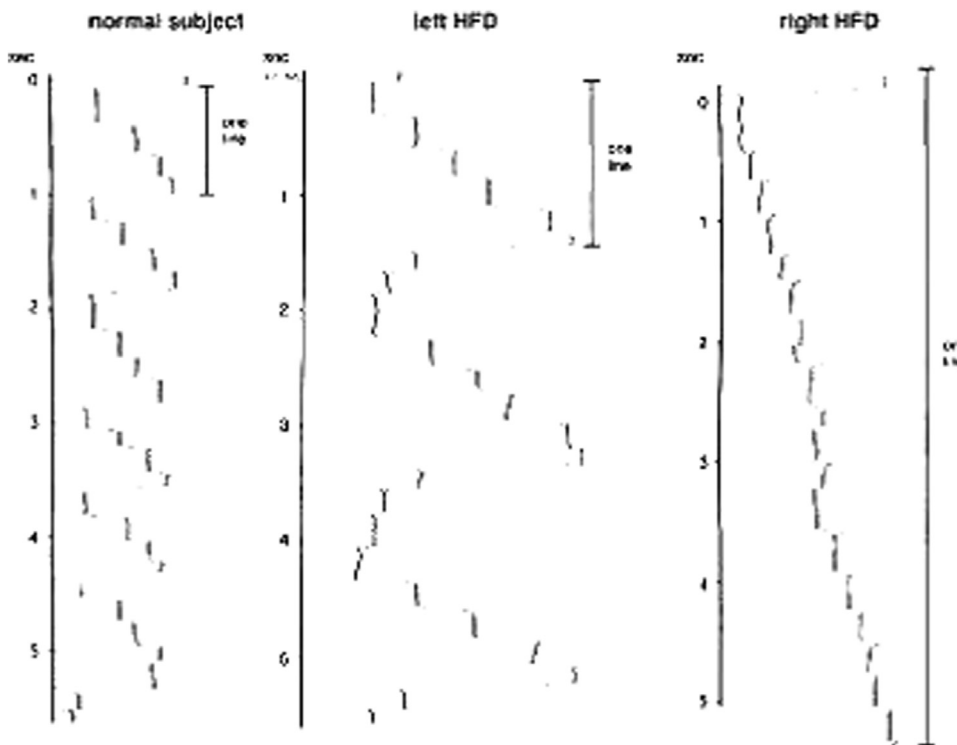


Fig. 2—Scanning patterns during reading in a healthy subject (*left*), a subject with left hemianopia (*centre*), and a subject with right hemianopia (*right*). Horizontal eye position is plotted on the x-axis, and time on the y-axis, starting from the top. (*Left*) Healthy subjects move horizontally from left to right along the line with saccades, separated by fixation pauses (vertical segments). After reaching the end of the line, they make a large saccade to reach the beginning of the next line. (*Centre*) A patient with a left hemianopia moves along the line relatively well, but then has trouble finding the beginning of the next line, making several small searching saccades. (*Right*) A patient with right hemianopia makes many very small saccades when reading from left to right, taking much more time to read each line. (From Trauzettel-Klosinski S, Brendler K. Eye movements in reading with hemianopic field defects: the significance of clinical parameters. *Graefe's Arch Clin Exp Ophthalmol.* 1998;236:91-102.)⁴

Download English Version:

<https://daneshyari.com/en/article/4009053>

Download Persian Version:

<https://daneshyari.com/article/4009053>

[Daneshyari.com](https://daneshyari.com)