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EDITORIAL

Contrast Sensitivity and Glaucoma

The justification for obtaining a diagnostic test is presumably to improve patient care. To improve patient care, diagnostic tests must be (1) affordable, (2) convenient, (3) sufficiently safe, (4) able to be validated, and (5) relevant, that is, help the way patients feel and the way they function by providing information needing to be known to accomplish that fundamental goal of caring for patients.

1. Patients always ultimately pay for every test, either out of pocket or through insurance premiums, lower wages, or taxes; effective "health care" already costs more than most people or countries want or are able to pay so keeping costs down is essential to good care.
2. A test is useless if the patient cannot access it.
3. The presumed benefit must be greater than the risks, which include false negatives and false positives, as well as cost, emotional, and physical damage.
4. The objective is not an answer, but a valid answer, one that corresponds to reality; for example, a relatively valid understanding of the optic disc can be obtained using ophthalmoscopy, but in actual practice, few ophthalmologists have the skill needed to evaluate the disc validly.
5. There is no justification for finding out information that does not need to be known, such as the retinal nerve fiber thickness of an eye blind from glaucoma. The doctor ordering a test must be able to say to the patient, "*We need to know the results of test X in order to help the way you feel and what you are able to do*." This reason is considered by patients but rarely by doctors (A disturbing fact… Indeed).

Less justifiable reasons for requesting a diagnostic test include as follows: (1) Wanting to follow the "standard of care," (2) hoping to impress the patient, (3) the doctor wanting to benefit financially, and (4) expecting the test will protect the doctor from litigation. However, it should be remembered that the standard of care is often wrong (such as bleeding patients for cholera (which 200 years ago was the standard) and treating patients just because their intraocular pressure is >21 mmHg (which was standard 50 years ago and still is today in many areas); care is best when directed toward a specific individual, and there is no standard individual. Putting on airs is not appropriate, especially in front of those who are vulnerable.

While it is appropriate for doctors providing a useful service to be reimbursed, for them to benefit from equipment they own or use is likely to be a hidden conflict of interest. Litigation usually results from unfulfilled expectations and rarely from obtaining an unnecessary test.

This preamble introduces considering whether or not to it is appropriate to obtain a test of a patient's ability to see boundaries between something darker and something lighter, that is, to discern contrast. As elegantly stated by Robson and Bex, "Contrast sensitivity (CS) defines the threshold between the visible and invisible, which has obvious significance for basic and clinical vision science."[1] Why has testing for CS been rarely used by clinicians? The clinical value of evaluating CS has been known for around half a century. Bodis-Wollner, in 1972, noted that patients with visual acuity (Snellen chart) of 20/30 or better often had "marked departures from normal CS."[2] In 1978, the Arden plates were developed[3] and found useful screening for glaucoma,[4] and Hess and Woo noted that testing visual acuity with a chart "grossly overestimates the nature of the visual world of the cataract patient."[5] In 1988, Kleiner *et al.* found visual abnormalities in patients with age-related macular degeneration that could not be detected with acuity charts.[6] Other studies found CS a better way to assess vision that visual acuity and explained why.[1] However, in 1994, Moseley and Hill wrote, "while diminished sensitivity to contrast is characteristic of the visual loss experienced by many patients with ocular disease..., this finding is seldom of practical benefit to the clinician."[7] The reasons for this infrequent use probably relate to the vast amount of information already developed by assessing visual acuity with charts and visual fields with perimeters, and not because either was an accurate in defining visual loss. Even now relying on visual acuity and visual field has become such a habitual routine that it is, perhaps, assumed that other methods are unneeded. However, not only do measurements of CS detect and characterize visual loss that acuity charts and perimeters miss, the results of CS testing are more sensitive, more specific, and correlate better with quality of life and ability to perform the activities of daily living than any other method of assessing visual function.[8,9]

If the primary objective of medical care is to help patients, such as those with glaucoma, it seems reasonable to use diagnostic tests that are least inexpensive, most accessible, and that best assess what correlates most closely with how patients feel and how they function. The Pelli-Robson chart accomplishes this for central vision. Spaeth/Richman CS accomplishes these both for central and peripheral vision. It can be accessed at https://www.sparcscontrastcenter.com.

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References

1. Pelli DG, Bex P. Measuring contrast sensitivity. Vision Res 2013;90:10-4.
2. Bodis-Wollner I. Visual acuity and contrast sensitivity in patients with cerebral lesions. Science 1972;178:769-71.
3. Arden GB. The importance of measuring contrast sensitivity in cases of visual disturbance. Br J Ophthalmol 1978;62:198-209.
4. Arden GB, Jacobson JJ. A simple grating test for contrast sensitivity: Preliminary results indicate value in screening for glaucoma. Invest Ophthalmol Vis Sci 1978;17:23-32.
5. Hess R, Woo G. Vision through cataracts. Invest Ophthalmol Vis Sci 1978;17:428-35.
6. Kleiner RC, Enger C, Alexander MF, Fine SL. Contrast sensitivity in age-related macular degeneration. Arch Ophthalmol 1988;106:55-7.
7. Moseley MJ, Hill AR. Contrast sensitivity testing in clinical practice. Br J Ophthalmol 1994;78:795-7.
8. Waisbourd M, Parker S, Ekici F, Martinez P, Murphy R, Scully K, *et al.* A prospective, longitudinal, observational cohort study examining how glaucoma affects quality of life and visually-related function over 4 years: Design and methodology. BMC Ophthalmol 2015;15:91.
9. Reighard CL, Pillai MR, Shroff S, Spaeth GL, Schilling SG, Wizov SS, *et al*. The Association between Vision-Related Task Performance, Quality of Life, and Clinical Measures in Patients with Glaucoma in South India. San Francisco, USA: Poster at the American Glaucoma Society Annual Meeting; 2019.

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