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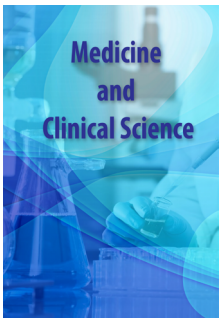
Short Communication



Declining Notation of Visual Acuity and Use of the Ophthalmoscope

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Ophthalmology is not alone in its suffering as a neglected feature of the physical examination, all aspects of bedside medicine are in decline [1]. However, ophthalmoscopy in particular has fallen into virtual disuse in the emergency room and family practice environments and one wonders if surveys on use in the offices of internal medicine and neurology are not exaggerated out of embarrassment [2].

At the same time, no one argues the value of getting a good look at the ocular fundus in conditions that would be considered not primarily ophthalmologic. For instance, the ACGME states that all neurologists graduating a full residency in neurology must be able to diagnose papilledema on ophthalmoscopy. Hypertension, diabetic retinopathy, central retinal artery and vein occlusion, Hollenhorst plaques, are just a few findings on ophthalmoscopy that can dramatically affect diagnosis and management. However, it is undisputed that direct ophthalmoscopy through an undilated pupil is difficult and, in unpracticed hands, can be unreliable. Dilating the pupil increases the ease with which the optic nerve and retina can be seen but there is great resistance to keeping dilating drops on hand and waiting several minutes for them to work in a busy ED or medical clinic. Regardless of how loudly neuro-ophthalmologists call others to the duty of a dilated funduscopic examination that effort appears to be lost, at least with traditional equipment.

Two new ophthalmoscope heads developed and issued by Welch Allyn have made the job of direct ophthalmoscopy through an undilated pupil much easier. They still require practice and especially continued use, but a much improved view is more easily obtained than with the traditional 5 degrees of view from a standard ophthalmoscope. I would also note that both of these instruments are far better when used with a dilated pupil and there are no good arguments for not dilating the pupil. We routinely use Cyclomydril which is a weak concentration of cyclopentolate and phenylephrine. We carefully check and document pupillary and accommodative function first and then continue on with the neurological examination while the drops work. Adequate dilation is achieved by the time we are ready for it. We would add that no neurosurgeon would be confused by a walking talking patient with bilaterally dilated pupils but some indication of the dilation and time should be left with the patient.

Practice is one of the great deterrents of ophthalmoscopic skills. That is, the practitioner must use the instrument on many, many patients with normal findings to be good enough with the instrument to detect pathology when it is present. It is clear that most practitioners would rather give up the number of positives they would find if they acquired greater skill with the ophthalmoscope than go through the investment of time and effort to look at enough normal eyes in a careful manner.

At this point we seem to be at a stand-off by saying, “I’m not going to do ophthalmoscopy because I’m not good at it,” with the implied alternative, “I’m not good at ophthalmoscopy because I don’t do it.”

Direct ophthalmoscopy is admittedly, a difficult skill to learn and one that is quickly extinguished by lack of practice. The Stanford Medicine 25 places ophthalmoscopy second in its educational modules, “Promoting the culture of bedside medicine”. Stanford makes no indication that this is a rank of degree of difficulty or necessarily of clinical importance but clearly placing ophthalmoscopy as the second module speaks to the fact that the creators of these modules consider it to be taken very seriously [3]. It is of particular note that the Stanford module demonstrates the use of one of the new models of direct ophthalmoscope produced by Welch Allyn specifically for a wider field of view and possible use through an undilated pupil. Welch Allyn has made great strides with making direct ophthalmoscopy more effective with the introduction of the

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panoptic and the panoptic plus ophthalmoscopes. The panoptic provides a much wider field of view than the traditional five degrees and is better suited to viewing a greater extent of the fundus through an undilated pupil. The panoptic plus has different optics and is principally designed to get an excellent view of the optic nerve head though an undilated pupil. Both require a relatively co-operative patient and are best done in a darkened room.

Great hope has been placed in new technological developments that allow a view of the ocular fundus without the use of ophthalmoscopy. The non-mydriatic wide view fundus camera was introduced to great fanfare in emergency medicine in 2011 and neurologic evaluation in 2012. The Fundus Photography vs. Ophthalmoscopy Trial Outcomes in the Emergency Department (FOTO-ED) study found ED doctors to be seriously deficient in ophthalmoscopy skills (ED providers missed relevant ophthalmological findings 100% of the time even when they tried to use the direct ophthalmoscope, which was rarely), and a non-mydriatic fundus camera provided a far superior diagnostic range (still, ED providers only got 50% of ophthalmologic abnormalities even after training on the photos the camera provided) [4-7]. Several points are of interest here, the fundus camera used in the FOTO-ED study was not purchased by the Emory ED but this is not surprising since it was a research study. It is more surprising that these studies were published in 2011 and 12 years later non-mydriatic cameras in EDs are virtually non-existent outside of university settings and even these are rare. In spite of the ability of technicians to accurately photograph the ocular fundus, use of these devices has remained largely limited to academic centers that wish to study them. Expense and training of personnel have been given as major reasons for the lack of adoption of these cameras but I suspect the greater reason is that the physicians looking at the photographs lack the confidence to interpret them and if you have the time and sophistication to do fundus photography you probably have the time and sophistication to get an ophthalmology consult. Further studies have been done using telemedicine with an ophthalmologist remotely evaluating the images. This could be an effective way of dealing with the issue but, again, for probable logistical reasons this answer has not seen even limited adoption.

All these problems notwithstanding, it is the opinion of the authors of this report that some form of non-mydriatic imaging device of acceptable size, price, and operational consistency seems inevitably likely to become the preferred method for non-ophthalmologists to view the ocular fundus. This inevitable day has not arrived and in fact does not even appear to be close. In the meantime the ophthalmoscope, in one of its current forms, will be ubiquitously available and awaiting the use of a skilled examiner. To reiterate, ophthalmoscopy is a perishable skill and must be part of routine examination to be of use in those circumstances where an abnormality is present. The best ophthalmoscope to use in a diagnostic endeavor is the one you have available to you. If you are in doubt about a finding, dilate the pupils.

Instruction on the use of the direct ophthalmoscope can only be done in person but once a few training sessions have been completed a refresher on how to maximize the opportunity of getting the best look possible at the ocular fundus with a standard direct ophthalmoscope is helpful. It would be difficult to find more succinct advice than that given in Biousse and Newman *Neuro-Ophthalmology Illustrated* which I quote here verbatim [8]:

Get close to the patient.

1. Use your right eye to look into the patient's right eye, and use your left eye to look into the patient's left eye.
2. Find the red reflex and get closer until you see the retina.
3. After focusing on the retina, follow the blood vessels toward the patient's nose to find the optic nerve.
4. To easily find the macula, ask the patient to look into the light.
5. Dilate the pupils to allow easier examination.

I would add only that you should make sure your instrument is in good working order and fully charged prior to beginning your examination. Some older ophthalmoscopes are prone to bulb dimming prior to complete failure and so should be changed yearly at least depending on use. The lenses in the rotating dial may get dirty and obscure the view. Just because Helmholtz did it by the light of a candle doesn't mean you should limit your abilities by dim light. Regarding Helmholtz, for those who enjoy reading the classic origins of modern medicine Helmholtz's three volume treatise on *Physiologic Optics* is fascinating. A more painstaking guide to the practical use and technique of the ophthalmoscope can be found in Allbutt's *On the Use of the Ophthalmoscope* 1867 [9]. Several more modern texts of physical examination give a more detailed written account of use of the ophthalmoscope. I prefer DeGowin and DeGowin's *Bedside Diagnostic Examination* [10] but more recent texts are quite adequate and any number of demonstrations are available on the internet.

While the ophthalmoscope impacted medicine with a sharp inflection, it is less clear when testing visual acuity and visual fields became a widely recommended practice taught in every medical school. It has been startling to the senior author to find himself involved in several cases where a patient presented to neurology with only visual complaints and yet no visual acuity was documented by anyone anywhere on the chart and at least two of these patients went completely blind while in hospital overnight. Herman Snellen developed the Snellen visual acuity chart in 1862 at the behest of his much more famous colleague Donders so that visual acuity measurements could be standardized. The Snellen chart, I suspect, exceeded the wildest dreams of its originators, and became the most popular poster sold in the world to this day. For all its success the Snellen chart has short comings and for the purposes of nationally funded studies the ETDRS chart with its log Mar notation has become the gold standard. Still, there is a Snellen chart or improved equivalent in every ED and every clinic we have ever been in and the excuses for not recording a visual acuity are few. The most common reason given by trainees for not recording a vision is that the patient could not see the large E. As we all know this is naïve at best. The next step in a vision test below the large E is to walk the patient toward the chart until they can see it and record this distance, such as 4/200, meaning the patient could see the big E at 4 feet. If this is impossible, we go on to counting fingers, best done in each quadrant, failing that light perception. What is never acceptable is to record nothing where there should be a visual acuity even if that notation is No Perception of Light (NLP). If the patient is bedridden the pocket chart, usually a Rosenbaum, becomes the target of choice. Again, it is far from perfect due to the need for near vision capability and standardization of distance read as the most obvious but not the only defects. We emphasize again that the detractions from the accuracy of the Rosenbaum pocket chart are far less than the benefits of using it. Get a number on the chart, argue

about it afterwards if argument is warranted but get a number in the chart before you move on to Cranial Nerve III (which is apparently so tempting).

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