

The '20/20/20 Rule' – When Good Intentions and Axiomatic Habit Displace Best Practices

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Abstract

PURPOSE

Optometrists often proffer the '20/20/20 Rule' as advice for clients who experience nearpoint visual strain, or who are subjected to prolonged exposure to nearpoint devices. The 'rule' is offered in the patient's best interests: To help alleviate asthenopia and visual stress from nearpoint strain, and to reduce the risk of onset or the progression of myopia and associated ocular disease. Best intentions aside, there is a paucity of clinical and scientific support for the rule. On the other hand, modern optical tools and methods, and vision rehabilitation practices are known to be helpful in addressing mild to severe binocular vision disorders, to promote comfort, and to slow the progression of myopia. While offering trite advice to address potentially serious concerns might appear to be helpful, its continued use could well be displacing other more appropriate management strategies. This paper addresses some concerns regarding the promulgation of this well-meaning, but misguided, advice.

KEY WORDS:

20/20/20 Rule, myopia, myopigenesis, myopiagenesis, computer vision syndrome, asthenopia

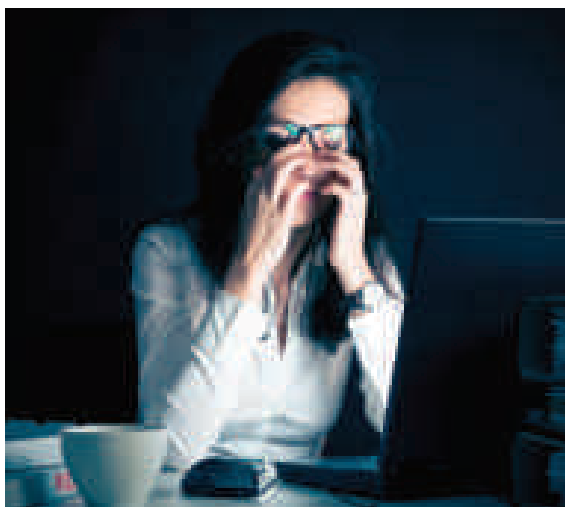
Optometrists are generally regarded as experts in the field of vision and visual function from the perspectives of both ocular and visual neurological health. This expertise extends well beyond simple visual acuity ('20/20 eyesight') and healthy eyes, and includes elements such as binocularity, visuomotor skills and accuracy, phoric posture, comitancy, visual processing-based skills, visual spatial awareness and manipulation, and other features. This broader view of vision permits the diagnosis and treatment of a variety of difficult and often debilitating visual functional deficits that impact comfort, health, and the ability to conduct normal daily activities, such as reading and the use of computers.

Most clinicians are familiar with the 20/20/20 Rule (The Rule) as a therapeutic and palliative guide for patients experiencing the effects of Computer Vision Syndrome (CVS), or for helping to prevent its onset. The Rule can be stated as follows: "Every 20 minutes, take a 20 second break and focus your eyes on something at least 20 feet away".¹ These instructions are routinely offered by optometrists and ophthalmologists, and are now repeated on the Internet through a variety of sources (any search engine can provide several examples). Despite this advice being commonly found in optometric clinical sources, including websites of optometric associations, it has very little evidentiary support and its therapeutic benefits are unclear.

At first glance, there is nothing inherently incorrect or harmful in repeating The Rule as clinical guidance, and this advice is generally given with good intent. Also, looking outward at a distance while reading, every 20 minutes for 20 seconds, surely does no harm. Thus, this recommendation would not be expected to be harmful. Still, there are a few significant problems with this cursory approach to treating vision dysfunction, including a potential for missed opportunities for more appropriate care and, notably, the possibility of giving patients a negative perception of doctors resulting from the latter's offer of non-science-based advice. This paper focuses on these problems with The Rule.

Computer Vision Syndrome

Computer Vision Syndrome (CVS), which The Rule is often intended to alleviate or prevent, is not a new construct in vision science and rehabilitation. Gowrisankaran and Sheedy reviewed CVS in a paper that covered 65 years of research², which effectively includes the time when humans began spending long hours in front of computers. They described CVS as "a collection of symptoms related to prolonged work at a computer display."² Klamm and Tarnow offered a parallel review of the literature from a medical-surgical perspective³ that provides some guidance on the management of CVS that is more detailed even than that offered by The Rule. The American Optometric Association also offers more detailed guidance in the management of CVS.⁴



CVS is often described as "a collection of symptoms related to prolonged work at a computer display."²

CVS is not a single unified pathology, but rather a relatively poorly understood constellation of patient concerns combined with mostly predictable patterns of optometric findings such as disturbed vergence, accommodation, fixation disparity, and ocular disease related to exposure.⁵ The adequate assessment of CVS, and nearpoint concerns in general, requires attention to detail and sufficient expertise to identify these obstacles to visual function and possible ocular or neurological disease. Treatment should proceed logically based on history, findings, the visual and lifestyle demands of the patient, and the ease of access to Optometric Vision Therapy services if required. The Rule cannot be considered OVT.

Myopia Management

The Rule might be given as advice to minimize the risk of myopic progression, or even to prevent the onset of myopia. A generalized version of the theory would suggest that the stress of working at close distances causes sufficient accommodative and vergence strain to lead to an adaptation towards structural myopia. This ‘near-environment stimulus’ hypothesis of myopigenesis is difficult to substantiate given current understanding and research. The distinction between structural myopia, where myopia is a result of excess axial length for the refractive power of the anterior segment, and what may be called nearwork-induced transient myopia (NITM), a transient condition precipitated by the stress of visual work at near proximity, is central to this discussion.

While recent research suggests that there is a trend towards an esotropic posture with the extended use of small handheld devices,⁶ there is no compelling evidence that the use of such devices initiates or accelerates structural myopia, which is the greater concern given it is irreversible, non-transient, and a potential risk to sight and ocular health. Loughheed wrote that “despite ongoing attempts to tie these close behaviours to the onset of nearsightedness, or myopia, researchers have not come up with convincing results.”⁷ There is little doubt that prolonged nearpoint activity can, at least in some cases, lead to accommodative hysteresis (AH) and NITM, which is a clinical entity distinct from structural myopia which can often be addressed using conservative means, such as low add powers suitable to the task. The cause of NITM and the types and benefits of treatment depend on many factors, including vergence ranges and facility, accommodative range and facility, working distance, monocular and binocular refractive status, duration and nature of the visual task, ambient lighting, neurological health, and so forth.^{8,9} Unless there is significant pathology present, such as mTBI/TBI, one should expect NITM patients to respond well to vision therapy and appropriate lenses, or simply lenses.

Recent studies have shown that genetics and exposure to appropriate environmental illumination are much more likely to play a role in the onset and progression of structural myopia¹⁰⁻¹² than the extent and nature of near tasking. For example, Loughheed wrote that “a rapidly growing body of research on certain populations in East Asia is yielding strong evidence linking diminishing levels of exposure to outdoor light with a prevalence of myopia that is approaching epidemic proportions.”⁷ The notion that myopia arises from nearpoint strain disregards the physiological fact that hyperopes experience much greater nearpoint visual strain than do myopes, but they neither exhibit a commensurate progression towards myopia, nor do they gain the relative benefits for near work provided by it.

Research also supports the notion that, while we cannot prevent structural myopia, we can modulate some aspects of myopic progression¹³⁻²¹ and the extent of NITM. In the case of accommodative hysteresis and NITM, in practice, The Rule at best will offer only brief symptomatic relief and such patients would require more in-depth assessment and treatment than the axiom provides. For a significantly hyperopic or astigmatic patient, or in cases of convergence insufficiency, or mild traumatic brain injury (mTBI), The Rule will offer little, if any, relief for the discomfort associated with nearpoint tasking, nor will it advance the patient’s need to thrive.

Poor reading skills and poor academic achievement can be attributed in part to higher degrees of hyperopia, and in some studies better reading skills have been associated with emmetropia or myopia, or strong visuomotor skills²²⁻²⁵. While there is much concern regarding the progression of myopia worldwide, myopia has also generally been associated with higher academic achievement. The Rule can be expected to have little impact on these structural refractive states or their resulting effects on learning and academic outcomes.

Management of CVS and Nearpoint Strain

Birnbaum’s excellent book on the diagnosis and management of binocular vision disorders and nearpoint stress⁵ has become an important reference in visual rehabilitation. While it was written at about the time when desktop computers were only starting to become commonplace in homes and offices, many of the diagnostic and treatment principles apply equally well today, but perhaps with more gravity given our deepening relationships with and dependence upon more modern, near environment devices.

When a patient struggles with near-environment tasks, the clinician should take this as a sign to begin a more in-depth investigation by considering possible medical causes and impediments to visual function. For the purposes of this paper, we assume that no medical issues are contributing to the patient’s discomfort. Furthermore, a full discussion of all possible elements of CVS and nearpoint strain, and the nature of mTBI, is beyond the scope of this review. To address CVS, a much more active and broader intervention is required than The Rule implies. The signs and symptoms of CVS may be grouped as follows:²

- Internal ocular symptoms (strain and ache)
- External ocular symptoms (dryness, irritation, burning, formation of pingueculae/pterygia, keratitis, conjunctivitis)
- Visual symptoms (blur or unsteady focus, double vision)
- Musculoskeletal symptoms (neck and shoulder pain, facial/cranial muscular tension)

The major factors associated with CVS can be classified as follows:

1. Environmental Factors: Improper lighting, display position, size and viewing distance, and exposure of the ocular surface tissue.
2. Factors relating to the user's visual functional profile and functional status vis-à-vis visual tasking demands. These might include inadequate compensation of refractive state for the task at hand given age and health, inadequately compensated anisometropia, unaddressed oculomotor disorders or problems with posture for the task, such as high phoria or strabismus, uncompensated diplopia, tear film abnormalities, and visual health abnormalities (i.e., field loss, nerve conduction concerns).

The proper management of nearpoint strain and CVS requires sufficient care to address the patient's concerns globally, and this requires a more elaborate response that may be obscured when a clinician offers a vague recommendation such as 'take a break every 20 minutes'.

The 20/20/20 Rule and Refractive Status

Unmanaged refractive needs are a common cause of nearpoint strain, and are therefore worthy of brief comment. Even within this narrow domain, there are several distinct reasons why a patient might exhibit signs and symptoms of CVS, and where The Rule would have little or no impact. For example, a 3D myope would not be expected to experience the same relief by gazing in the distance as would a 3D hyperope given the differences in relative accommodative effort at both near and far. The aniseikonic patient might not receive any relief at any distance or for any duration, unless the aniseikonia was appropriately managed, such as through aniseikonic optical solutions.

Similarly, patients with significant astigmatism (greater than 1.00D) will often feel chronic asthenopia at all gaze distances, depending on the visual demand and environment, and this can be exacerbated during reading, especially in the case of compound hyperopic astigmatism. An emmetrope with accommodative hysteresis or dysfunction might also find that The Rule has little to no effect on their chronic concerns, depending on the cause of the AH.

These few examples are only offered to consider how even refractive concerns render The Rule ineffectual. Dismissing these as a simple need to 'take a break' is a disservice to the client and a potential liability risk in those cases where the near point strain is related to current pathology.

Current Support for the 20/20/20 Rule

As recently as November 27, 2016, a search of PubMed for '20/20/20 Rule' returned no results related to management of CVS, myopia, or NITM. Google Scholar also returned no results for this 'Rule' (same date). In a general Google search for '20/20/20 Rule', although several blog posts were identified, none provided any supporting evidence (at least within the first few dozen relevant listings). One could reasonably conclude that, given the apparent lack of supporting literature, no formal research has ever been conducted on The Rule, which now appears to have evolved to a simple meme with no supporting evidence in either clinical or pure science.

If we had sufficient clinical rationale, efficacy, or anecdotal evidence to support The Rule, perhaps we could be justified in offering this 'good advice', despite a lack of research evidence. The rationale behind offering The Rule as advice appears to be 'if you are experiencing asthenopia, remove the offending stimulus' or 'look away from your nearpoint device occasionally to prevent nearsightedness'. Even if we accept this reasoning as valid, we must then assume that, in all cases, having the patient direct their gaze at a distance of 20 feet, at intervals of 20 minutes, and for a period of 20 seconds would be most comfortable. This is one case where the patient would be better off not following their doctor's advice and instead respect their own sense of how much reading they can tolerate comfortably.

Additionally, in the light of objective scrutiny, it is clinically unreasonable to assume that the same prescription of a 20-second break every 20 minutes while reading should somehow apply to all patients, especially given the many diverse reasons why patients struggle with nearpoint visual strain. While such a break might offer brief relief, an honest clinician should not be satisfied with such a superficial understanding of the patient's condition.

DISCUSSION

The 20/20/20 Rule is a quaint axiom that cleverly alludes to 20/20 visual acuity. However, the desire for a crafty turn of phrase might be the tail wagging the dog in this case, where we fit the condition to meet the needs of the treatment. It is difficult to find references to the origins of The Rule itself, but it appears to have been derived from the notion of 20/20 acuity. Clinically, it could have just as easily been derived from the metric measure of acuity, but a '6/6/6 Rule' may not have had the same broad acceptance.

Patients listen to their doctor's advice and consider it valuable by default: Understandably, patients should believe that what their doctor says is true. When treatment options for CVS, NITM, mTBI, or myopigenesis are summarized with a clever axiom, the patient is at risk of being confused with unnecessary words where chair time could otherwise be put to better, more clinically productive use. Analogously, when a clinician offers aspirin to a patient with a fever to minimally, and transiently, affect the patient's temperature, the clinician must follow through and determine why the fever is present in the first place. At the very least, the clinician should develop a plan to monitor and treat the fever with a more evolved clinical approach than ASA QHS RTC PRN. This situation is similar to the case with CVS, myopia management, mTBI, and binocular vision disorders generally: Patients deserve better and doctors should work to raise the standard of care for their patients, and this includes referrals to specialized optometric clinics where OVT rehabilitation services are provided.

In some cases, The Rule might be offered as general guidance for so-called visual hygiene to render reading more comfortable and to prevent the onset of visual functional problems. Regarding the first count, competent readers with either no or negligible visual functional concerns can read for extended periods without breaks or concerns. Chronometric management of reading 'risks' will at best almost certainly interfere with the flow of the task, and possibly create a problem where none exists. Regarding the second point, there is no indication that reading leads to visual functional problems, aside from chronic accommodative hysteresis and/or NITM in some cases.

The CVS patient is affected by the incongruity of their visual functional status and their present visual tasking. A clinician can often address these concerns through thoughtful prescribing and a broad knowledge of available lens technologies. This might include a consideration of multifocal lenses, modified progressive addition lens options such as near PALs, the avoidance of bifocals, and a consideration of isophoric and iseikonic lens designs for anisometropia of 1.0D or more in any meridian (see for example ShawLens.com). Clinically, trial lenses should be used routinely in the prescribing process, and thoughtful prescribing should include consideration of the use of specialty lens designs such as Shaw aniseikonic/anisophoric 'balanced' lenses, and modern progressive addition near-tasking lenses, or lenses with low add power. If the patient is uncomfortable while reading, a detailed optometric assessment and selection of an optimised lens can be a suitable solution for part-time or full-time wear. When lenses alone cannot satisfy the client's needs, visual rehabilitative therapies should be considered.

Reading at near distance and use of near devices such as tablets and phones will not likely alter the structural refractive status^{7,26} or lead to ocular disease, as has been suggested and promulgated in the media.²⁷ With respect to interventions to stop the progression of myopia, Aller stated that "(a)ll of the methods described have been shown to varying degrees to be effective in slowing myopia progression. As they cannot reliably stop progression, prevent onset, or cause true regression of myopia, these methods are limited to reducing the rate of change."²⁶

Vision rehabilitation through Optometric Vision Therapy (OVT) is often the most important therapeutic element in successful longterm treatment for embedded visual strain. Unfortunately, despite research that supports OVT's preferred role in the management of convergence insufficiency, for example,²⁸⁻³⁰ OVT is only infrequently discussed in medical and optometric practice as a possible remedy. The simpler solution to advise patients to 'take a break from reading every now and then', paradoxically admits that there is a problem, but then offers no solution and only weak palliation. In other cases, patients are referred to additional medical diagnostics, imaging, and treatment which fail to address visual functional concerns. Best client-centred prac-

tice would then dictate that time spent advising patients about The Rule could be, and rather should be spent assisting them in locating visual rehabilitative services, pursuing orthoptic solutions to reduce discomfort and improve function, or in advancing medical diagnostics to rule out ocular pathology or pathology of the visual nervous system.

A significant concern related to such cursory treatment of CVS and nearpoint visual strain lies in the fact that the pathology is multi-factorial and requires a much more in-depth assessment of vision than what is provided by the Modified Clinical Technique (MCT), for example.³¹ The Rule has no diagnostic value. In ‘Visual Impediments to Learning’, the author offers supplemental commentary on the sensitivity of the MCT to visual functional concerns³² and a more robust approach to visual assessment. The MCT is a coarse net and lets pass many visual functional concerns; if the source of the CVS and nearpoint strain is not uncovered, further investigations are indicated through a more elaborate optometric visual functional assessment. For example, Quaid and Simpson showed that vergence facility (which is rarely even tested in routine optometric care) is highly predictive of reading problems when combined with symptom questionnaires regarding reading speed and overall reading skills (as determined objectively using the Visagraph infrared tracking device).²² If the 20/20/20 Rule is offered to manage learning concerns, CVS, visual strain, or myopia, this should be taken as an indication that further clinical investigations are required to uncover more clinically relevant and suitable solutions.

As human visual needs and habits evolve, optometrists will play an increasingly important role in the management of visual function, comfort, and development. Identification, assessment, and treatment of CVS, accommodative hysteresis, and myopic progression require attention to detail and knowledge of what is clinically helpful, and what is not. Patients rely on doctors to offer salient advice and pay for advice that is evidence-based and not simply a placebo or a redirection to a protocol that will have only minimal, if any, impact, and which is decidedly without scientific foundation.

In the final analysis, given the paucity of reasons to recommend The Rule, one wonders why it is still offered as professional advice. There is no foundation for this guidance clinically, so perhaps the clinician is simply inclined to “offer something rather than nothing”. Since we cannot say why The Rule would help and since it distracts from pursuing clinically meaningful solutions, this practice should be questioned. In this sense, doing ‘something’ in this case may actually worsen the problem because the opportunity to provide more helpful solutions may be lost when the patient concludes that there is nothing else to be done.

CONCLUSION

The 20/20/20 Rule is a popular optometric axiom that has made its way into popular culture partly, perhaps mostly, due to its promotion by the profession of Optometry. It is intended to promote greater comfort while reading, i.e., to reduce the symptoms of CVS, to abate accommodative hysteresis and NITM, and to prevent myopia or to slow myopic progression. While The Rule’s clinical impact for patients can at best be described as marginal, it will have, in the most extreme cases, no more impact than that of aspirin on a bad fever. The clinician’s role is to diagnose and treat the ill patient; in this case, the patient suffering from nearpoint visual strain, mTBI, or myopic progression. These issues may be addressed through optics, optometric vision rehabilitation, or medical intervention.

The Rule alone will not satisfy troubled patients. It is not based on any definable clinical science, nor does it offer any preventive value for healthy and strong readers. Therefore, it should not be given as professional advice per se. Because it provides such limited benefit to the patient, the time taken to explain The Rule is a missed opportunity for advancing further diagnostics, or for exploring more elaborate options for treatment and palliation. While best practice would include some instruction to the patient to take occasional breaks from reading, the value of doing so should not be overstated, nor should the clinician include the erroneous suggestion that this could prevent the onset of structural myopia and associated ocular disease.

Optometrists and ophthalmologists need to consider the potential problems with public and professional perceptions when they offer trite and unproven advice to resolve complex issues. A greater concern is that pithy advice such as The Rule detracts from and marginalizes the proven benefits of Optometric Vision Therapy, such as the level one evidence presented in the Convergence Insufficiency Treatment Trial,³⁰ and it also diminishes the clinical value of a more comprehensive assessment of binocular visual function, which would lead to a more nuanced and valuable clinical result for the patient. ●

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