

Point/Counterpoint ▶ Cycloplegia

Point: The Usefulness of Cycloplegic Retinoscopy

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Introduction

As technology progresses, it is not uncommon to read articles pertaining to the elimination of standard diagnostic equipment or traditional testing strategies common in the optometric examination. Recent publications have even ventured to question the need for phoropters and direct ophthalmoscopes.^{1,2} Therefore it is not surprising when the necessity for certain procedures is also incorporated into this discussion. Cycloplegic retinoscopy is one such procedure.

The Need

When considering the need for cycloplegia, one must personally gauge the usefulness of the data it provides. Depending on a practitioner's individual prescribing guideline, he/she may argue whether results obtained from cycloplegic agents should have a role in management strategies given that this is not the patient's natural accommodative state. In other words, since the patient does not go about their daily routine with their accommodation arrested, their refractive correction should not treat them as such. Therefore, there is little to no benefit for the clinician to know this information. Yet this is precisely the issue. Most clinicians would agree that patients whose accommodation is the implicated risk factor are in jeopardy of developing maladaptations resulting in high phoric postures, latent strabismus, and/or amblyopia emanating from their unusual demand. Knowing the full state of the demand, as well as understanding its relationship to their posture/vergences, is imperative when identifying these risk factors and developing appropriate management plans that eradicate any and all amblyogenic factors. Despite whether a "full prescription" or "modified prescription" philosophy is utilized, it stands to reason that, at minimum, the practitioner be aware of the full amount present when determining the power of the therapeutic lens.

The Method

Knowing the full amount of accommodative demand requires the practitioner to have a reliable method of obtaining this information. Unfortunately, retinoscopy and accommodation testing are not immune to the same testing artifact one might experience when performing binocular vision tests, determining IOPs, or assessing the posterior segment on a young patient. Normal procedures may be utilized, but outcome measures have to be assessed in consideration of the patient's cooperation. Fixation shifts causing fluctuating reflexes, loss of attention/cooperation, and

latent hyperopia are all unfavorable factors affecting results. For that reason, deliberation has to be given to questions such as "are non-cycloplegic refraction techniques consistently reliable enough to obtain the same maximum plus outcomes as pharmaceutical agents?"

Non-cycloplegic methods such as Mohindra estimation, delayed subjective, fogging lenses, and automated refraction are all frequently used to extract the same information as a pharmacologic cycloplegia. Yet none of these compare to the efficacy in yielding the same amount of hyperopic correction as atropine, cyclopentolate, or tropicamide.³⁻⁵ The Mohindra Dynamic Retinoscopy, as the name would indicate, is intended as an estimate only and has been identified in multiple studies as being an unreliable method of yielding maximum hyperopia in a child.^{6,7} Delayed subjective techniques rely too heavily on patient feedback, and even the most experienced retinoscopist may have difficulty obtaining fixation and cooperation while working through loose fogging lenses. Lastly, autorefraction, often used in research to establish uniformity, has consistently demonstrated over-estimation of myopia and underestimation of hyperopia in children under 12 years of age.⁵ So, once practitioners are able to separate themselves from concerns such as time consumption involved with cycloplegia, the difficulty of instilling drops, the low incidence of toxicity, or the unsupported idea of emotionally damaging a child by using drops, it is clear that pharmacologic cycloplegia is the most effective procedure and should not be replaced in patients where maximum hyperopia should be determined.

Conclusion

Though the indications for cycloplegic agents are numerous, their use does not excuse the practitioner from using near retinoscopy techniques to assess lag of accommodation prior to instillation. Nor does it replace other retinoscopy methods if the prescribing philosophy is based on the patient's response to lenses rather than neutralization. However, a clinician is remiss to imply that cycloplegia not be used in a routine manner when it is evident that accommodation is intimately linked to reading speed, as well as the etiology of vision disorders where maximum plus therapies have been shown effective.^{8,9}

So, should cycloplegic retinoscopy remain an essential component of the pediatric vision evaluation? In short, yes. But then again, I also believe phoropters and direct ophthalmoscopes have an integral and vital role in the examination room.

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Counterpoint: The Myth of a Cycloplegic Refraction

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As the medical delivery system has come under more and more scrutiny, clinicians have needed to reassess guidelines and testing protocols. In the area of refraction, cycloplegic refraction has become an integral part of a primary pediatric eye exam for many practitioners. In some instances, doctors have even recommended a wet refraction in adults who present with blur and other near point symptoms.

Before passage of diagnostic pharmaceutical agents, optometrists had to address their patient's refractive and binocular anomalies without the use of drugs. In most cases, they were successful in prescribing lenses or vision therapy to alleviate the patient's presenting symptoms. Historically, ophthalmologists have always relied on a cycloplegic refraction as the only method to determine a patient's true refractive state.¹ The difference between wet and dry findings is one of the reasons for the discrepancy in prescribing guidelines between the professions. The medical profession has typically established much higher degrees of hyperopia as acceptable versus the optometric profession.^{2,3} Ironically, many optometrists have begun to advocate the need for a cycloplegic refraction as part of every child's examination.

The rationale for this approach has been a concern for missing a significant degree of refractive error in an unsuspecting patient. Many clinicians will share a tale about a young child, who presented with 20/20 acuity with minimal refractive error on retinoscopy, who revealed five diopters of hyperopia under cycloplegia. For each of these exceptional cases, there are hundreds of patients/children who show only a slight increase in plus, which is consistent with the cycloplegic agent. In the realm of myopia, the cycloplegic refraction can even give paradoxical results.

The dependency on cycloplegic refraction has created a quest for a refractive solution for all visual deficits. In other words, the patient who presents with blurred vision, double vision, loss of place, and/or headaches has a latent refractive error, which may be an underlying cause of the presenting

complaints. It is obviously true that some patients can have symptoms secondary to an uncorrected refractive error. On the other hand, these complaints may be caused by a binocular, accommodative, and/or ocular motor dysfunction. For clinicians, who are often over-focused on the results of their cycloplegic refraction, they often ignore other critical tests in the area of a patient's binocular functioning. It is important to note that in my clinical experience, it is rare to find an accommodative dysfunction in isolation without an accompanying binocular dysfunction or vice versa.

The anchoring bias created by the over-use of cycloplegia has limited many practitioners' clinical reasoning to only one diagnostic category, refractive error.

With the emphasis on less testing rather than more testing, it is time to reassess the value of cycloplegic refraction as a standard test. For an asymptomatic child, with 20/20 acuity at distance and near, minimal refractive error, and adequate binocular function, the use of a cycloplegic agent is counter-indicated. For a child who is referred because of a potential eye tracking or school-related problem, it is inappropriate to search for a refractive solution without ruling out a near point deficit, especially in the realm of a convergence insufficiency.^{4,5} The indiscriminate use of cycloplegic agents can also be a significant inconvenience for many patients/children who have to deal with the lingering effects of these drugs on their visual system over an extended time frame. On the other hand, the use of cycloplegic refraction is definitely indicated in specific cases, such as esotropia, amblyopia, and complex refractive errors.

Since binocular anomalies are the second most common visual problem after refractive error,⁶ minimizing the use of cycloplegic refraction will allow us to search for the real cause of many of our patients' visual problems. A binocular work-up should be an integral part of a patient assessment rather than simply adding another diopter or two of plus to the patient's prescription. In many cases, the patient will

be unable to tolerate this unnecessary lens change. The inappropriate prescribing of glasses, limited only to refractive data, sends an unjustified message to the child, parent, and/or other professionals that the patient's vision problem has been resolved. In the final analysis, cycloplegia should be used as needed versus as part of a primary eye care examination.

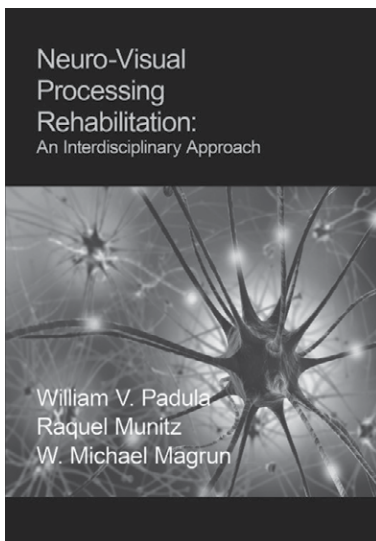
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By William V. Padula, Raquel Munitz, and W. Michael Magrun

Understanding how we see brings to mind the mythical story of the blind men and the elephant. Each responded to the part of the elephant that he encountered, and thus each had a very different impression of the animal. We are often so preoccupied with our conscious visual world that we describe it in limited ways and are thus unable to understand the comprehensive nature of vision. Research has shown that there is much more to visual processing than we have recognized. However, our limited understanding of vision and its multiple sensorimotor interactions have restricted our ability to work, through vision, to affect the rehabilitation of those who are neurologically challenged. The authors invite you to explore *Neuro-Visual Processing Rehabilitation* to learn new ways to think about vision. This book delves into the visual processing relationships of child development, motor and sensory interactions, and postural organization, led by vision, as the basis for understanding vision. From this knowledge, new directions and options will emerge for rehabilitation through the use of non-compensatory prisms and a new mode of treatment that the authors have termed Neuro-Visual Postural Therapy. The implications of understanding neuro-visual processing will change your thinking about vision as well as provide possibilities for helping millions of children and adults who have a neurological condition. Hardbound, 236 pages.

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