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Research Article

Influence of Fogging and Cycloplegia on Hyperopic Refraction

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Abstract

Subjective refraction is an important part of an optometric examination. Despite auto-refraction is still today the best starting point, different research reports support the reliability of these systems particularly when autorefraction is performed under cycloplegia while Non- cycloplegia measurements using autorefractor has been shown to underestimate the hyperopic refractive state. Fogging is the simplest technique that seems to provide similar accommodative relaxation to that provided by cycloplegia to satisfy adults hyperopic visual needs and to minimize their symptoms and signs. A retrospective review of 100 hyperopic adults between 20 - 35 years old undergoing manifest and cycloplegic refraction at a private optical center, resulting in a similar agreement for patient's comfort level and more acceptable spectacle prescription than non-cycloplegia autorefraction for adults in a clinical environment.

Keywords: Cycloplegia; Hyperopic Refraction; Fogging

Introduction

Subjective refraction is an important part of optometric examination. Despite auto-refraction is still today the best starting point, different research reports support the reliability of these systems particularly when auto refraction is performed under cycloplegia.

- There are several disadvantages associated with cycloplegia including:
- The time needed to achieve full effect.
- Its association with patient discomfort.
- Inconvenient additional cost.
- Risk of increase intraocular pressure.
- Limited access as a diagnostic drugs to optometrists.

While non- cycloplegia measurements using auto refractor has been shown to underestimate the hyperopic refractive state this is defined as latent error.

- Many studies have measured latent errors and report values ranging from 0.1D to 2.0D.
- Higher latent errors have been shown to be associated with higher levels of hyperopia.

The purpose of this study is to compare the subjective refraction with an auto refractor with and without cycloplegia with the values obtained by fogging technique.

Fogging is the simplest technique that seems to provide similar accommodative relaxation to that provided by cycloplegia to satisfy adults hyperopic visual needs and to minimize their symptoms and signs.

Fogging to achieve B.V.A

- The patient attention is directed towards the acuity chart.
- Place plus lenses over the habitual refraction in the plane of the trial frame in front of one eye, occluding the other.
- Slowly and precisely reduce the plus power in 0.25 steps (allowing enough time in each line for the patient to make a decision)until the vision begins to improve.
- when it is clear it's time to stop reducing plus.
- The goal is to find the smallest line the patient can read.
- Accommodation could therefore theoretically be relaxed.
- Minimize accommodation = increase comfort
- Do not remove the trial frame lens until the new one is in place.
- You are expecting a vision change one line per 0.25DS subtraction.
- Rule of thumb: give the most positive lens that provides maximum vision.
- Periodic eye and vision examinations are needed thereafter to help ensure the provision of treatment appropriate to the changing visual needs of the hyperopic patient.
- Although fogging is an alternative method used to measure hyperopia in adults, it requires a trained person to perform the technique.

Material

A retrospective review of 100 hyperopic adults between 20 - 35 years old under going manifest and cycloplegic refraction at a private optical center.

Data collection

- Optometric examination of our patients includes:
- History.
- Review of the nature of the presenting problem.
- General health history.
- Family history.
- Visual acuity.
- Binocular examination for distance and near.
- Ocular alignment (was measured to be normal).
- Patients complaints that they had an ocular discomfort such as focusing problem, headache, eye strain.

Method

Monocular subjective refraction measurement was obtained in three conditions in this sequence:

- Non-cycloplegic refraction was taken by autorefractor.
- Without cycloplegia, fogging technique is employed by finding the maximum amount of positive power that can be tolerated by the eye without causing blurring of the retinal image.
- Finally cycloplegic refraction was done.

Results

- Objective refraction for the whole sample, as autorefractor with Cycloplegia ranged from +1.00 to + 5.00DS.
- with maximum amount of astigmatism - 0.75D.
- According to the degree hyperopia categorized to:
- low hyperopia consists of an error of + 2.00D or less.
- Moderate hyperopia
- include a range from + 2.25 to + 5.00DS.

Direct comparison of measurements obtained from three refraction methods show

Significant difference between auto refraction with cycloplegia and without to give more positive values with cycloplegia.

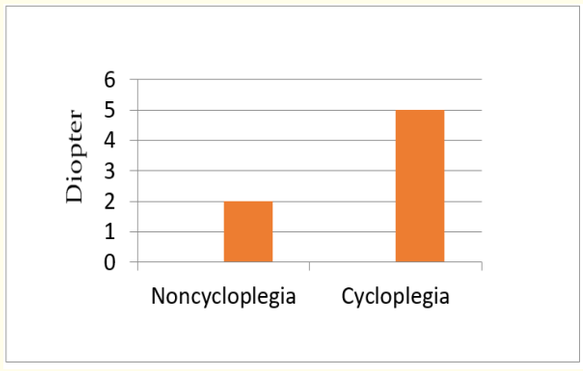

Figure 1: Comparison of values obtained from two subjective refraction method.

Asymmetry in measurements between noncycloplegia and fogging technique.

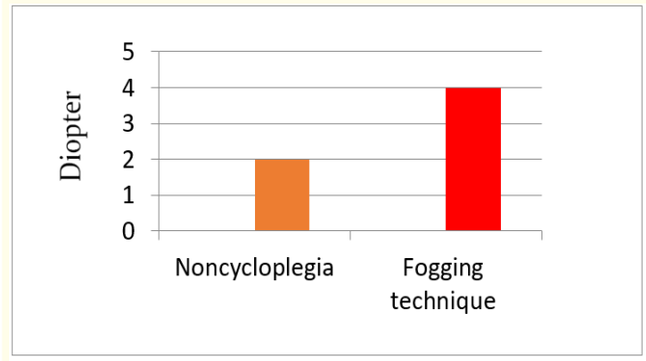

Figure 2: Comparison of values obtained from two subjective refraction method.

Overall, there was no marked difference between cycloplegia auto refraction using autorefractor and fogging technique.

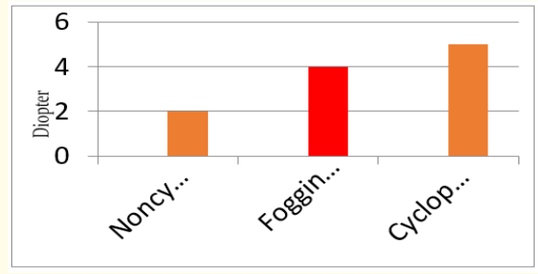

Figure 3: Comparison of values obtained from three subjective refraction method.

The two conditions (Fogging technique and cycloplegia) where the accommodation was supposed to be under control display similar agreement for patient's comfort level.

Figure 4: Difference in agreement between cycloplegia and fogging technique

- The visual performance of the fogging technique prescription was markedly better than non cycloplegia autorefractor result.
- A large number of patients reported ocular discomfort when wearing their autorefractor prescription.
- However, the rest of them were able to adapt to fogging refraction prescription.

Figure 5: Patient responses when asked to rate the performance of their prescription.

Discussion

- The effects of hyperopia on visual acuity depends on:
- The magnitude of hyperopia.
- The patients age.
- Visual demands.
- Accommodative amplitude available to overcome hyperopia.
- Adults with low to moderate hyperopia generally have normal visual acuity as they have sufficient accommodative reserve to maintain clear retinal images.
- But when visual demands are high, they may experience blurred vision and asthenopia.
- When such patients become visually fatigued or the accommodative reserve insufficient due to visual tasks, they demonstrate inconsistent levels of near, and some times distance visual acuity.
- Wearing prescribed lenses with low amounts of plus power usually alleviates the problem [1-4].

Our results suggest that fogging technique adding an important relaxation effect to:

- Reduce the severity of hyperopic symptoms.
- Produce a more accurate and acceptable spectacle prescription than non cycloplegia auto refraction for adults in a clinical environment.
- Considering that the average of spherical equivalent refraction in such circumstances is very similar to that obtained under cycloplegia and this was clinically significant.
- This methodology could be used by optometrist who are not able to use diagnostic drugs.

Optometrist mission

The findings cope with our mission of securing the best possible vision performance by:

- Providing the highest quality vision.
- Helping patients to maintain healthy eye throughout there life in a comfortable, professional environment.

Bibliography

1. Antonio Queiroz, Influence of fogging lenses and cycloplegia on open-field automatic refraction.
2. American Optometric Association, Care of the patient with hyperopia.
3. Richard j Kolter. Subjective Refraction and Prescribing Glasses.
4. Shelley Hopkins. A Comparison of two methods of accommodation control.

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