

# Degenerative Myopia with Macular Thinning and Retinal Window Defect: A Stage Before Retinal Detachment

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**Abstract—** This clinical evaluation deals with the possible maintenance and slowing down the development of degenerative myopia in a 29 years old patient. Series of eye examinations were done to disclose why his refractive error continually increased. He was discovered to have degenerative myopia which was inherited, on the basis of family ocular history. Dilated fundus examination revealed pale fundus and the existence of macular thinning on both eyes that appears as an island. Fluorescein angiography was performed to rule out the presence of blood vessel leakage in the thinning region. Retinal window defect was present, but no leakage, this then confirmed why the patient was having difficulty seeing in low light conditions, as the pigmented epithelium might have been slowly detaching from the underlying layers. There is no treatment found yet for this type of myopia. Management options and maintenance were given to the patient as his ocular condition was revealed.

**Keywords:** *myopia, degenerative myopia, macular thinning, retinal window defect*

## I. INTRODUCTION

Myopia is a condition wherein the patient experiences constant blurring of vision at far, that might have been caused by either a too steep cornea, or an elongated eyeball causing the rays of light to fall before the retina. There are many types of myopia, one of which is the degenerative myopia. It is caused by continuous elongation of the eyeball resulting to a damage

on the posterior pole of the eye. The damage on the posterior part of the eyeball leads to detachment of layers of the retina, and in worse cases, macula is included. A damaged posterior pole of the eye may cause a disturbance on the vision of the patient. Degenerative myopia is also classified as high myopia, having an amount of -6.00 D and above, and is usually increasing as the patient grows older. This type of myopia is found to be hereditary, and oftenly starts in childhood and worsens through adolescence.<sup>[1]</sup> This condition also leads to blindness when not monitored and detected early. Loss of nerve impulse transmission to the brain happens when the posterior pole detaches to the eyeball.

This condition damages the posterior pole initially by having minimal detachments on some layers and portions of the retina, called as retinal tear or hole. It makes the vision of the patient appear as some areas are missing. Some clinical manifestations include tilting of the optic disc, lacquer cracks, geographic atrophy, macular thinning, macular hole, blood leakage from damaged vessels, etc. These clinical manifestations leads to vision with distortions, missing areas, metamorphopsia, and other visual disturbances.

Correction for degenerative myopia is unknown, but control and monitoring for this condition have numerous options like: Orthokeratology, mydriatic eye drops, multifocal spectacles, multifocal contact lenses, spectacles, and refractive surgery. Though some studies discuss that once the treatment is stopped, rebound effect have been found to take place, making the condition to reoccur in the same degree or in a worse case.<sup>[2]</sup>

## II. MATERIAL AND METHOD

### A. Procedure

Case history is a significant component of the entire examination method, as it is a way to monitor the severity of the patient's ocular condition, prognosis, and complications that may arise if there is any.

This area of the examination is where preliminary data will be gathered that could be used as basis for some results on further examinations.

### B. Data Analysis

Subjective tests such as: unaided visual acuity, pinhole visual acuity, habitual visual acuity, near point of accommodation, and near point of convergence are done to check for the integrity of vision and the extraocular muscles. Objective tests such as: cover test, corneal reflex test, motility testing, pupillary distance test, pupil reaction to light and accommodation.

Ocular health examination plays a huge role in comprehensive eye examination. Significant findings on any ocular anatomy may uncover an underlying condition. As per this case, there are expected results as to what was recorded in the case history taking, having history of continuous increase in myopia may be caused by a too steep cornea or an elongated axial length that affects the posterior pole of the eye. Two parts of ocular health examination was done, first was an external eye examination through slit lamp biomicroscopy where the ocular adnexa were inspected; then internal eye examination was done through direct ophthalmoscopy wherein the posterior pole was inspected thoroughly.

Two types of refraction were done, objective and subjective. Static retinoscopy at 20-inches was performed as basis for the subjective refraction. Automated refraction was also done as confirmation for the amount of the error of refraction.

Phorometric tests were performed to check if the new refraction causes additional phoria to the patient, if so, it only means that too much dioptric power was given as correction, which will not be helping the patient to see better. Accommodative test on the other hand was done to check the strength of accommodation the patient has, as it is expected to have a normal result as per his age.

It is important to check the visual field (VF) of the patient as an increase in the error of refraction may have an effect on the posterior pole of the eye, which may also cause an effect on the VF. It is important to check the VF for an accurate management to be given. Stereopsis on the other hand is checked to assess the patient's judgement for distance if it is affected or not. The examiner used Titmus fly test to determine his stereopsis, wherein the patient will be asked to wear polaroid spectacles and will be asked to look at the wings of the fly and pinch to where it is seen as elevated; then circles will be showed and detect to which one is elevated.

As the results were revealed, it was important to refer the patient to another eye care specialist, to an ophthalmologist; or to another health professional that will be helpful in the proper diagnosis of the patient's case. Referral is important as it helps in having a specific diagnosis and rule out certain conditions that has the same signs and symptoms; and to know if more tests should be performed to the patient. Further recommendations and/or medications could also be given by

the other health professional that the patient is being referred to.

## III. RESULTS

### A. Case History Taking

A 29-year old salesman came to the Vision and Eye Care Center of Centro Escolar University (January 2019), he complained of a constant blurring of vision at distance since birth, he is a spectacle wearer since he was a child (1994), and used to wear bifocal lenses to help his vision at near. When he was in grade 3, his prescription was altered to single vision spectacles, but he stopped wearing it for three years. He continued to wear spectacles when he was in grade 6, with an estimated refraction of 7.00D of myopia, and updates his spectacle every year.

As his degree of myopia continues to increase, his spectacles become heavier that resulted him not to wear his glasses. He began wearing contact lenses in 2010. He wears yearly-disposable soft contact lenses (Oxyflex). His last eye check-up was in 2010, and since then he never had another pair of spectacles. His blood pressure during the time of examination was 110/80mmHg. He was diagnosed with *hypocalcemia* since 2009, and had his last attack in 2014. His mother and younger sister are both spectacle wearers. He has no family history of any systemic diseases. He is currently taking *Calium*(250mg) every time he experiences symptoms of hypocalcemia.

### B. Preliminary Eye Examination

- *Unaided Visual Acuity; Pinhole Visual Acuity*  
OD – Light perception with localization; 20/200  
OS – Counting fingers at 1m; 20/200  
OU – 20 / 400
- *Habitual Correction and Visual Acuity*  
OD -9.50D (Contact Lenses) – **20/80**  
OS -9.50D (Contact Lenses) – **20/70**  
OU – **20/60**
- *Near Point of Accommodation and Convergence*  
No significant findings.
- *Pupil*  
Size – 3.5mm  
Reaction to light - +3 (Fast)  
Reaction to near target - +3 (Fast)
- *Cover Test*  
Far – orthophoria  
Near – exophoria (moderate recovery)
- *Corneal Reflex Test*  
OU – Centric. No presence of tropia.
- *Motility Test*  
Version, Duction, Saccades – No restrictions, lag; all extraocular muscles are fully functioning.

C. Ocular Health Examination

- **External Eye Examination**  
Significant findings such as Grade 2 – conjunctival injections and presence of neovascularization on the cornea on both eyes confirmed the long-term use of contact lenses; mainly caused by the ocular surface was not having adequate supply of oxygen as contact lenses acts as a barrier between the surface and the oxygen.
- **Internal Eye Examination**  
Ophthalmoscopy findings revealed the macula was pale, and the periphery being *tigroid* but light in color.

D. Refraction

- **Objective Refraction (Static Retinoscopy at 20")**  
OD -12.50Dsph = -1.50Dcyl x 180  
OS -12.75Dsph = -1.00Dcyl x 30
- **Subjective Refraction\***  
OD -12.50Dsph = -1.00Dcyl x 180 20/60  
OS -10.25Dsph = -0.50Dcyl x 180 20/60  
OU 20/60
- **Modified Subjective Refraction\*\***  
OD -11.25Dsph = -1.00Dcyl x 180 20/70  
OS -10.00Dsph = -0.50Dcyl x 180 20/70  
OU 20/70
- \*Unequal size of letters  
\*\*Equal size of letters
- **Automated Refraction**  
OD -14.00Dsph = -1.00Dcyl x 14  
OS -11.75Dsph = -2.00Dcyl x 2

E. Phorometry and Accommodative Tests

Phorometric tests findings show that the old spectacles induce higher exophoria, but with the new prescription, the exophoria was within normal range. Accommodative tests showed no significant findings.

F. Visual Field Test and Stereopsis

Visual field test revealed that some areas are missing when viewing with OD, but is normal when viewing with OS. Facial Amsler test resulted to the eyes being temporarily missing upon opening of eyes but then comes back after a few seconds when again viewed using OD; and no missing areas when viewed using OS.

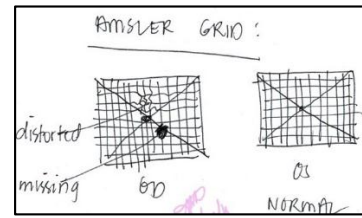


Figure 1. Amsler grid result – unaided vision. OD results to superior to the line of sight was seen as distorted lines, and 5 o' clock to the line of sight was seen as a missing area; OS results are normal.

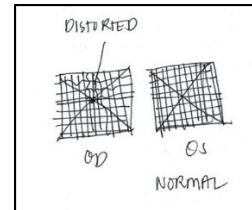


Figure 2. Amsler grid result – with subjective refraction. OD results to missing areas absent but distortions was still present.

Titmus fly test showed stereopsis of 400 seconds of an arc, that is known to be poor stereopsis which is expected as he has a high degree of myopia that alters the judgement of depth.

G. Referral

The patient was referred to an ophthalmologist, for a better assessment on the posterior pole findings. Clinical data gathered prior to the referral was shown to the ophthalmologist. External eye examination revealed *hypoxia* of the cornea due to chronic use of contact lenses. Posterior pole was then assessed. Intraocular pressure was within normal range, the patient's pupils were dilated for the dilated fundus examination.

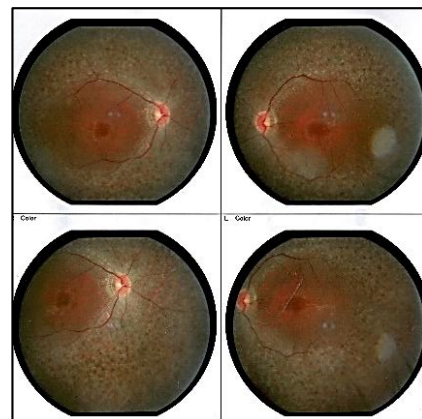


Figure 3. Fundus photo. Dilated fundus examination revealed the macula being abnormal in color, appearing like an "island" and pale; wherein macula should be darker and no borders around it; the fundus of the patient showed macular thinning, very early stage of retinal detachment. And peripheral fundus seen as *tigroid*-like but pale in color,

wherein high myopia patients should have a tigroid fundus that is darker in color.

Due to the presence of tigroid-like but pale fundus, further tests were done. Fluorescein angiography (FA) was done to further assess the condition of the blood vessels in the fundus- to rule out leakages on the retina as it appears pale.

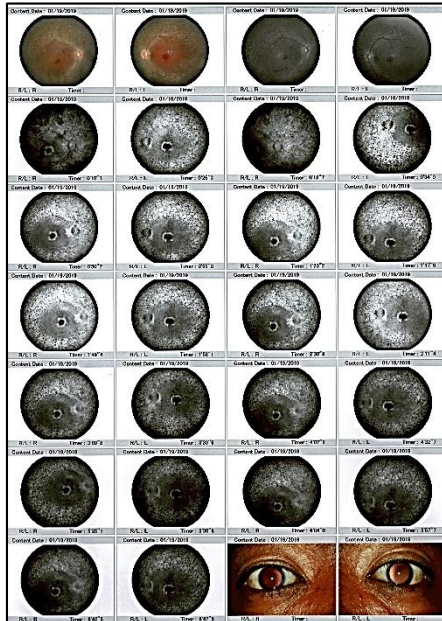


Figure 4. Fluorescein angiography (FA). FA revealed retinal window defect on both of the patient's eyes, there were no leakage but there was absence of blood flow on several areas of the retina, this explains the tigroid-like but pale fundus of the patient.

The patient was prescribed with high index lenses of light weight material to manage his complaint of constant blurring of vision.

He was also prescribed with oral medication by the ophthalmologist: *AstaGold (soft gel)*. This medication is an ocular supplement that would sustain nutrients on the posterior pole of the eye to reduce the risk of retinal detachment.

He was also instructed not to wear his contact lenses for at least two weeks in order to lessen the neovascularization around his cornea, and to prevent possible complications from long term use of contact lenses.

He will also be advised to monitor his ocular condition by having a strict follow up check up to his chosen eye care provider every 6 months to 1 year, in order to monitor the prognosis of his condition.

#### IV. DISCUSSION

The patient reported that he was experiencing blurring of vision at far since he was young, and that he inherited the condition from his mother. The diagnosis for his case is high myopia, usually known to as degenerative myopia. Degenerative myopia is a type of myopia wherein the eyeball continues to elongate without stabilization throughout aging resulting to a high degree of myopia with an amount of -6.00D and above. Increasing amount of myopia often leads to retinal detachment due to axial elongation, but signs before retinal detachment appears first. Clinical manifestation of the patient includes *macular thinning* and *retinal window defect*. The manifestations were seen through dilated-fundus examination, and fluorescein angiography.

#### V. CONCLUSION

The manifestations gave an explanation to the distorted and missing areas on the visual field of the patient. He reported that he noticed it when he was in the restroom staring at the floor tiles. According to researches, there is no cure yet to degenerative myopia, but only to monitor the condition and to refrain further damage on the posterior pole of the eye. High-index lenses will be prescribed to the patient to correct his poor vision and to lessen the development of the disease.

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