INTRODUCTION -

Myopia is a very important disease of the eye which affects a very large segment of the population all over the world. Several researchers have tried to determine the frequency of occurrence of myopia in the general population and the minor geographical variations apart they have calculated it to be as high as 31.1% and as low as 4.99%. Thus it becomes a very important ocular disease.

In various literatures myopia has been correlated with several complications, a very important of which is retinal detachment and is considered to be a very serious and sight threatening condition. Its incidence has been shown to be much higher in myopes than in emmetropes.

It has also been proven that retinal detachment is predisposed by some specific changes in the peripheral retina, e.g., retinal breaks which predispose to the rhegmatogenous type of retinal detachment and also the chorioretinal thinning which predisposes to retinal detachment in case of any trauma.

We know that the chorioretinal thinning is found in myopia and also there are certain changes which are found in the peripheral retina of the myopic eyes. It is these changes
which if recognised early enough can be treated prophylactically and the eye thus saved from the disastrous sequelae of the retinal detachment.

With these things in the background let us now introduce ourselves with the changes taking place in the fundus of the myopic eye.

**FUNDUS CHANGES IN MYOPIA**

Evaluating the fundus offers the most reliable method to distinguish pathologic from physiologic myopia. It also forms the most reliable basis to decide the prognosis of the pathological myopia.

Direct ophthalmoscopy has serious limitations in the examination of an eye with high myopia. Sterioscopic examination is essential and the binocular indirect ophthalmoscopy is the ideal method of examining such cases.

Ophthalmoscopically there are four signs which indicate excessive expansion of the eyeball -

1. Crescent formation
2. Supertraction
3. Tessellation with pallor
4. Posterior staphyloma formation
The last one is pathognomonic of pathological myopia and was first described by Scarpa and is thus called Scarpa's staphyloma.

All the changes described to occur in the myopic fundus are now detailed one by one.

1. **Tesselation with pallor** -

   Generalised tesselation with pallor results from under-pigmentation of the retinal pigmentary epithelium and is considered to be abnormal only when seen in moderate to heavily pigmented eyes.

2. **Crescent formation** -

   This occurs as a result of the disparity in area between the scleral shell and the retinal pigmentary epithelium-choriocapillaris complex. The crescent is usually found on the temporal side. Crescent size upto one tenth of the disc diameter is supposed to be normal. It is rarely more than one third of the disc diameter in low myopes but may be more in high myopes.

3. **Supertraction** -

   It was first described by von Jaeger. This is due to an apparent dragging of retinal and choroidal tissue nasally over the surface of the optic nerve. With advancing of myopia there
is expansion of the globe and thus there is flattening of the supertraction mould.

4. Posterior staphyloma –

Its presence is pathognomonic of pathological myopia. By the fifth decade almost half the eyes with posterior staphyloma have visual acuity less than 3/60. This is best detected by indirect ophthalmoscopy and its incidence is said to be directly proportional to the degree of myopia.

5. Changes in the macula –

The earliest change is the hyperpigmentation of unusual degree in the macular area. This is possibly due to hyperplasia of the retinal pigment. Pallor of the surrounding fundus accentuates this appearance. Staphyloma formation further accentuates the spreading out of the retinal pigment epithelial cells and gives the macula a granular appearance. In late stages the chorioretinal degeneration may involve the macula. The foveal reflex becomes dull due to retinal thinning and flattening.

Macular degeneration in myopia occurs earlier than in the patients of senile macular degeneration. It is often bilateral and females are involved more than males. Fuch's spots are more common in myopes.
Macular holes are more frequent in myopes and it thus becomes important that prior to blaming them for the retinal detachment one should thoroughly check and rule out the peripheral retinal breaks.

6. **Optic nerve changes**

Crescent formation, tilting and supertraction are the principal changes in the early myopia. In the staphylomatous area the vessels may straighten in their course. Also the staphyloma causes the eversion of the inner aspect of the optic nerve and this causes the central retinal artery and vein to get exposed posterior to their primary bifurcation and they assume the configuration of horizontal T or Y.

Peripapillary atrophy is also a frequently evident change. The margin of the crescent is involved first. This causes the enlargement of the blind spot but has no effect on the central vision.

7. **Chorioretinal changes**

In the early stages, this is characterized by lacquer cracks, retinal hemorrhages and small focal areas of chorioretinal atrophy.

The location of the choroidal hemorrhages is indetermi-
nate. They usually absorb over a period of weeks without any sequelae.

The lacquer cracks are seen as yellow-white irregular lines that course across the posterior pole. They have a slight male predilection and are associated with the presence of posterior pole staphylomata. They are usually multiple and are horizontally oriented. They may also form a reticular pattern. Lacquer cracks are fissures in the retinal pigment epithelium-lamina vitrea choriocapillaris complex and are thought to originate as mechanical tears. On fluorescein angiography they appear as pseudo-fluorescent tracts. There is no subretinal dye leakage. Their prevalence decreases with age and when they involve the macular region the prognosis is always guarded.

Focal areas of chorioretinal atrophy may occur in association with lacquer cracks or independent of them. Initially these areas are not confluent but in later stages they tend to do so. The margins become pigmented and are no longer sharply defined.

Subretinal neovascularisation most commonly involves the macula and peripapillary region. The hemorrhages per se or hyperplasia of retinal pigment epithelial cells or both may give rise to Foster-Fuch's spots. They are dark spots which disinte-
grate over time and become surrounded by a halo of fundus atrophy.

8. Changes in peripheral fundus -

The normal postnatal expansion of the globe occurs in the orpequatorial region. This is true even in the presence of a deep posterior staphyloma. This expansion leads to peripheral retinal changes that can lead to retinal breaks and detachment.

The yearly incidence of retinal detachment in the phakic population is 5 to 10 persons per 100,000 population (0.005 to 0.010%). This amounts to a life time risk of retinal detachment in these patients of 0.30 to 0.60%. On the other hand, the life time risk of retinal detachment in the myopes of above -5.00 D living upto 60 years is 2.40%.

It is generally agreed that the higher the myopia, the greater the possibility of detachment. In myopes the detachment is bilateral in 8 to 32%. Most eyes with detachment have increased equatorial diameter.

Myopic eyes are more prone to retinal detachment due to earlier onset of posterior vitreous detachment, increased prevalence of lattice degeneration, thinned retina and areas of abnormal vitreo-retinal adhesions.
Thus we see that the changes in the peripheral fundus are extremely important and they are chiefly responsible for the increased incidence of the retinal detachment in the myope population.

Thus the aim of this study is to discuss the various types of changes taking place in the peripheral retina in the eyes of the myopes in comparison to the emmetropic population.