Centre for Eye Health

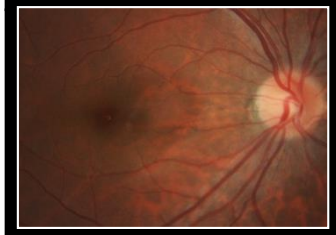
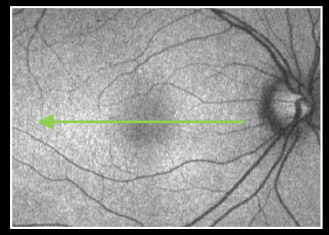
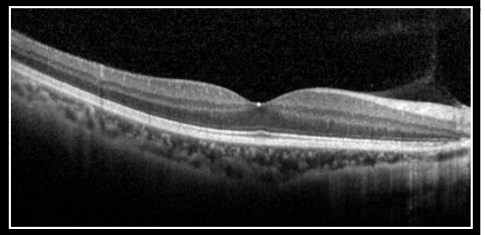
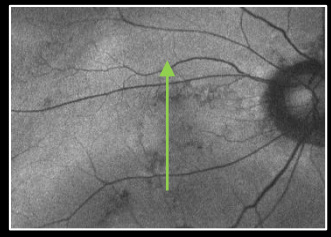
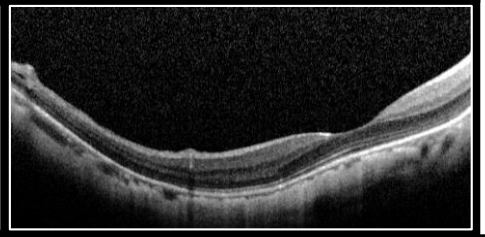
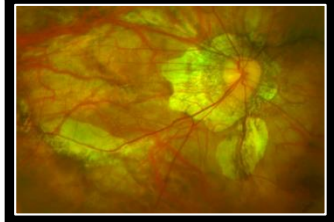
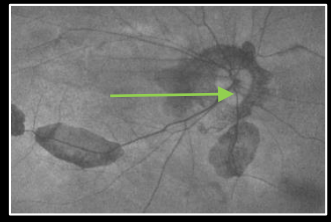
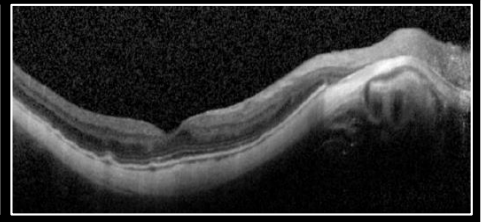
# CHAIR-SIDE REFERENCE: MYOPIC MACULOPATHY

## MYOPIC MACULOPATHY

Myopic maculopathy refers to structural changes at the macula induced by high myopia (refractive error >-6.00DS), in which an excessive axial length (>26mm) and/or posterior staphyloma is the main common factor in conjunction with other factors. While several classification systems have been proposed, Ruiz-Medrano et al.[1] have suggested categorising the spectrum of myopic maculopathy into **atrophic, tractional** and **neovascular** components .

This chair-side reference depicts the various manifestations of myopic maculopathy using multi-modal imaging techniques. For peripheral myopic changes, please refer to the Centre's chair-side reference on peripheral retinal lesions. All management recommendations below are based on the assumption that other coexisting pathologies requiring more urgent follow-up are absent.

## ATROPHIC ALTERATIONS IN MYOPIC MACULOPATHY

| Optomap/Photograph | Fundus Autofluorescence | OCT | Description |
|---|---|---|---|
| **Tessellated Fundus** |  |  |  | • **Fundus appearance**: Increased visibility of choroidal vasculature secondary to attenuation of RPE.<br>• **OCT:** an intact retinal profile with no associated retinal atrophy.<br><br>*Routine review required.* |
| **Diffuse Chorioretinal Atrophy** |  |  |  | • **Fundus appearance**: Yellowish-white appearance to the posterior pole, starting at the optic disc and macula and spreading to involve the entire staphyloma.<br>• **OCT**: an intact retinal profile with no associated retinal atrophy, thin choroid<br>• Associated with development of patchy atrophy, lacquer cracks or choroidal neovascularisation.<br><br>*Annual review required.* |
| **Patchy(Multifocal) Chorioretinal Atrophy** |  |  |  | • **Fundus appearance:** Well defined greyish-white areas of atrophy in the macular area and around the disc, and choroidal vessels are visible within these areas. In advanced cases, the sclera is visible within areas of atrophy.<br>• **OCT:** complete loss of the choriocapillaris and over time can develop to loss of the outer retina and RPE.<br>• Associated with an increased risk of developing myopic neovascularisation.<br>• Round, atrophic areas at the central fovea are classified as macular atrophy<br><br>*6-12 monthly review required.*<br>*Advise patient to perform Amsler grid self-monitoring.*<br>*Consider referral to ophthalmology to rule out CNV.* |

*Ref:* Ruiz-Medrano J, Montero JA, Flores-Moreno I et al. Myopic maculopathy: Current status and proposal for a new classification and grading system (ATN). Prog Ret Eye Res . 2019;69:80-115.

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# CHAIR-SIDE REFERENCE: MYOPIC MACULOPATHY

## TRACTIONAL ALTERATIONS IN MYOPIC MACULOPATHY

| Optomap/Photograph | Fundus Autofluorescence | OCT | Description |
|---|---|---|---|
| **Tractional Myopic Maculopathy with Outer Foveoschisis** | | | • **OCT:** Separation of intraretinal layers affecting the outer retinal layers. The separation may involve the fovea or non-foveal area.<br>• Associated with axial length >31mm and chorioretinal atrophy and vitreoretinal interface disorders<br>• Slowly progressive and may lead to foveal detachment or full thickness macular hole (FTMH)<br><br>*Annual review required.*<br>*Advise patient to perform Amsler grid self-monitoring.*<br>*Reduced VA and/or structural progression: referral is indicated.* |
| **Tractional Myopic Maculopathy with Inner and Outer Foveoschisis** | | | • **OCT:** Separation of intraretinal layers, affecting both the inner retinal layer (red arrow) and outer retinal layer (blue arrows).<br>• Slowly progressive and may lead to foveal detachment or FTMH<br><br>*Annual review required.*<br>*Reduced VA and/or structural progression: referral is indicated.* |
| **Tractional Myopic Maculopathy with Foveal Detachment** | | | • **OCT**: Separation of the neurosensory retina from the RPE, which is typically shallow.<br>• Associations with axial length >31mm, chorioretinal atrophy and vitreoretinal interface disorders.<br><br>*Referral is indicated.* |
| **Tractional Myopic Maculopathy with Full-thickness Macular Hole** | | | • **OCT**: a defect involving all layers of the retina up to the retinal pigment epithelium<br>• Risk factors for long-term progression of myopic macular holes include the absence of dome-shaped macula and more severe posterior staphyloma.<br><br>*Referral is indicated.* |

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# CHAIR-SIDE REFERENCE: MYOPIC MACULOPATHY

## NEOVASCULAR ALTERATIONS IN MYOPIC MACULOPATHY

| Optomap/Photograph | Fundus Autofluorescence | OCT | Description |
|---|---|---|---|
| **Lacquer Cracks** | | | • Ruptures in RPE-Bruch's membrane-choriocapillaris complex caused by stretching of ocular tissue with axial elongation<br>• **Fundus appearance**: multiple yellow-white lines within the macula. These are usually horizontal and can be linear, stellate, branching or crisscrossing.<br>• **FAF**: Hyo-FAF<br>• **OCT:** discontinuities of the RPE layers with increased hyper transmission into deeper tissues.<br>• Strong association with patchy chorioretinal atrophy and myopic choroidal neovascularisation which forms along the cracks.<br><br>*Annual review required.*<br>*Advise patient to perform Amsler grid self-monitoring*<br>*Reduced VA or neovascularisation: referral is indicated* |
| **Myopic Choroidal Neovascularisation (CNV)** | | | • **Symptoms:** decreased vision, metamorphopsia and central scotoma if located close to the fovea.<br>• **Fundus appearance:** an area of grey discolouration, sometimes with a pigmented border if chronic or recurrent. Retinal haemorrhage and exudates are often minimal.<br>• **FAF:** FAF patterns vary and change over time<br>• **OCT**: a hyper-reflective lesion above the level of the RPE with intra-retinal or sub-retinal fluid (hypo-reflective spaces within or beneath the retinal layers).<br><br>*May require fluorescein angiography to aid diagnosis. Referral is indicated.* |
| **Foster-Fuch's Spot** | | | • Pigmented scar formation following regression of CNV<br>• **Fundus appearance:** A raised round or oval-shaped pigmented lesion, often found adjacent to a focal region of chorioretinal atrophy<br>• **FAF**: hypo-FAF<br>• **OCT**: flattened, well-defined hyper-reflective lesion above the RPE<br><br>*Annual review required*<br>*Advise patient to perform Amsler grid self-monitoring*<br>*Consider referral to ophthalmology to rule out CNV.* |

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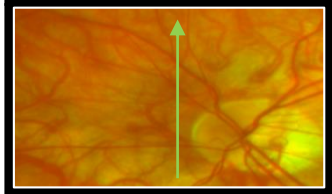
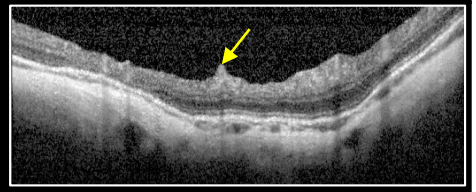
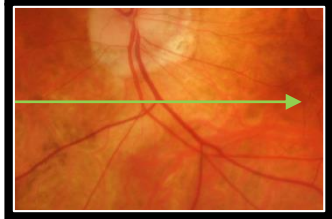
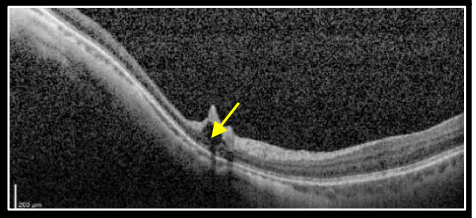
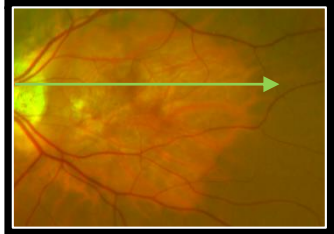
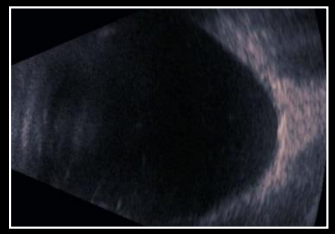
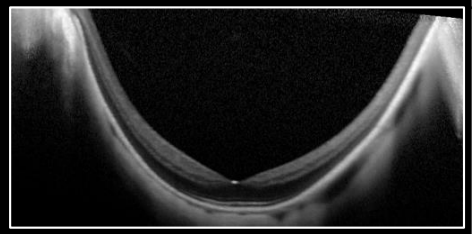
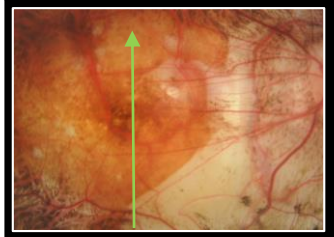
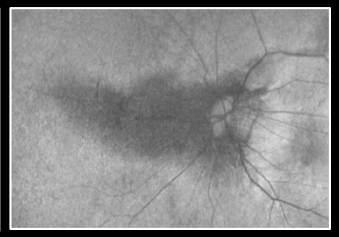
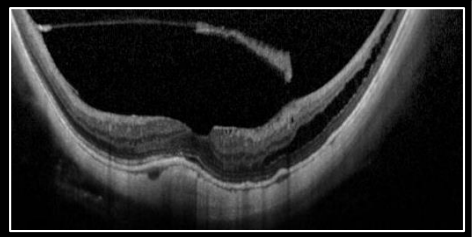
# CHAIR-SIDE REFERENCE: STRUCTURAL CHANGES IN MYOPIA

## MYPOIC VASCULAR ALTERATIONS

| Optomap/Photograph | Fundus Autofluorescence | OCT | Description |
|---|---|---|---|
| **Vascular Microfolds** | | | • **OCT:** Peaks of increased retinal thickness corresponding to retinal vasculature.<br>• Seen in up to 44% of those with pathological myopia using OCT imaging.<br>• In eye with paravascular cysts, the incidence of retinoschisis at the vessels is much higher than if cysts alone are present.<br><br>*Routine review required* |
|  | *FAF not available* |  | |
| **Paravascular Cysts** | | | • **OCT**: Small hollow spaces adjacent to large retinal vessels.<br>• Detected in 50% of high myopes when examined with OCT imaging.<br>• Increased occurrence with age, axial length, degree of myopia and presence of posterior staphyloma.<br>• Associated with paravascular lamellar holes (if cysts rupture) and retinoschisis, particularly when seen with vascular microfolds.<br><br>*Routine review required* |
|  | *FAF not available* |  | |

## ALTERATIONS TO GLOBE MORPHOLOGY (SCLERAL CHANGES)

| | | | |
|---|---|---|---|
| **Staphyloma** | | | • Posterior protrusion of the globe that is accompanied by a stretching of the posterior fundus.<br>• Present in up to 90% of high myopes.Prevalence increases with age.<br>• **Fundus appearance**: Tessellated fundus and/or horizontal ellipse-shaped fundus pallor, typically extending from the nasal side of the disc towards the macula.<br>• **B-scan:** Useful to visualise the posterior extent of the staphyloma<br>• **OCT**: posterior bowing of the sclera, choroid and retinal layers.<br><br>*Annual review required* |
|  |  |  | |
| **Dome-Shaped Macula (DSM)** | | | • **Fundus appearance:** no specific abnormality associated with DSM<br>• **OCT:** Convex elevation of the macula within an area of posterior staphyloma in different orientations. Often require both vertical and horizontal scans or radial scanning.<br>• May present with reduced vision and metamorphopsia.<br>• Associated with development of SRF, myopic CNV, full-thickness macular hole formation and extrafoveal retinoschisis .<br><br>*Annual review required.*<br>*Advise patient to perform Amsler grid self-monitoring*<br>*Reduced VA, subretinal fluid or neovascularisation: referral is indicated.* |
|  |  |  | |