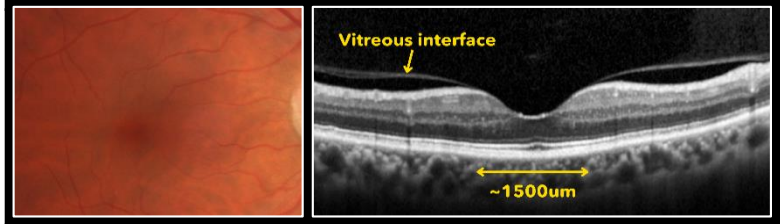
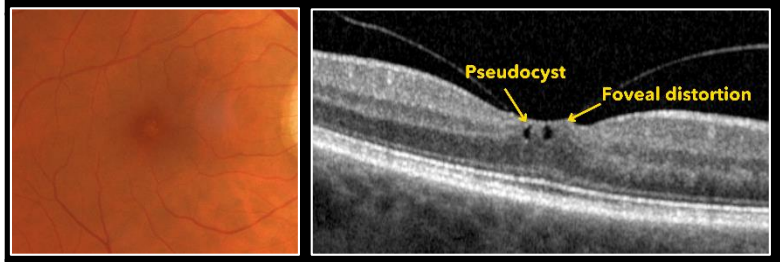
Centre for Eye Health

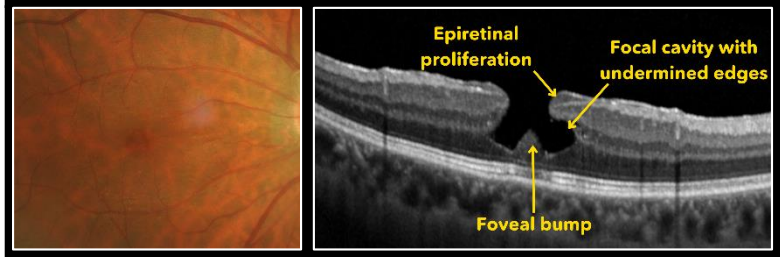
# CHAIR-SIDE REFERENCE: VITREOMACULAR INTERFACE ANOMALIES

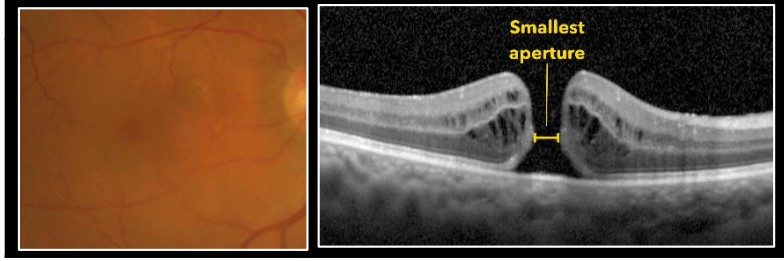
Posterior vitreous detachment (PVD) is a gradual, typically age-related separation of the posterior vitreous from the inner retinal surface. As the vitreous contracts and liquifies, it detaches from the mid-peripheral retina, progressing to then detach from the perifoveal, foveal and peripapillary regions sequentially. When vitreous liquefaction occurs before vitreoretinal separation, localised traction may occur, leading to anomalous PVD with potential complications at the macula.

| Retinal photo | Optical coherence tomography (OCT) | Description |
|---|---|---|
| **Vitreomacular Adhesion (VMA)** | | • Vitreous adhesion to central macula with no evidence of retinal morphologic changes. Normal finding in natural course of PVD.<br>• **Classification**: Based on size of adhesion. Focal adhesion ≤1500um, Broad adhesion >1500um.<br>• **Fundus appearance:** Unremarkable.<br>• **OCT:** Attachment of the vitreous cortex within a 3mm radius of fovea centre with perifoveal vitreous detachment but no detectable distortion in foveal architecture.<br><br>*Review routinely* |
| **Vitreomacular Traction (VMT)** | | • Vitreous traction on the central macula causing anatomical distortion of foveal surface and/or intra-retinal abnormalities. Part of anomalous PVD progression.<br>• **Classification:** Based on size of adhesion. Focal adhesion ≤1500um, Broad adhesion >1500um.<br>• **Fundus appearance**: May have a yellow discolouration of the central macula.<br>• **OCT:** Attachment of the vitreous cortex within a 3mm radius of fovea centre with perifoveal vitreous detachment & associated foveal abnormalities.<br>• **Complications**: Can involve intra-retinal/structural changes: foveal distortion, elevation, schisis, pseudocyst formation, elevation of the retina from the RPE or outer foveal microdefect ( see below).<br><br>*Consider referral if associated with symptoms/reduced VA /history of FTMH in the fellow eye (increased risk)* |
| **Lamellar Macular Hole (LMH)** | | • Partial thickness foveal defect caused by anomalous PVD with partial avulsion of foveal tissue. Possible degenerative mechanism has also been speculated.<br>• Other non-PVD causes include MacTel, partial closure of full-thickness macula hole, cystoid macula oedema (non-primary).<br>• **Fundus appearance**: Darker, reddish round lesion at the fovea.<br>• **OCT**: Irregular foveal contour, focal cavity with undermined edges (assists in differentiating from ERM foveoschisis (below). Signs suggestive of retinal tissue loss (pseudo-operculum, thinning at/around the fovea).<br>• May also show epiretinal proliferation (thick, iso-reflective, non-contractile material), foveal bump or EZ disruption.<br><br>*Consider referral if associated with symptoms/vision reduction* |
| **Full-Thickness Macular Hole (FTMH)** | | • Full-thickness foveal break which can be idiopathic or due to anomalous PVD (primary FTMH)<br>• Other aetiologies include trauma, myopia, Iatrogenic, neuro-degenerative (e.g. MacTel)<br>• **Classification**: Based on size (narrowest aperture) and presence or absence of vitreomacular traction: Small: ≤250um, Medium: 250um-400um, Large: >400um<br>• **Fundus appearance**: Appears as a round red lesion at central macula<br>• **OCT:** Interruption of all neural retinal layers from internal limiting membrane (ILM) up to (not including) the RPE<br>• Edges of the macular hole are typically rounded and pulled anteriorly, often containing pseudocysts<br><br>*Prompt referral: Surgical outcome is better with shorter duration of symptoms, smaller hole size and pre-op VA.* |



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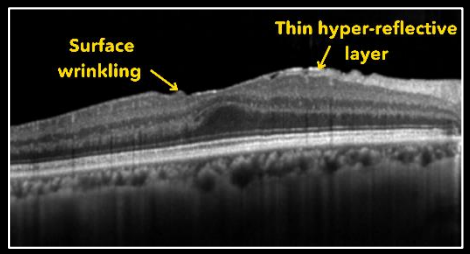
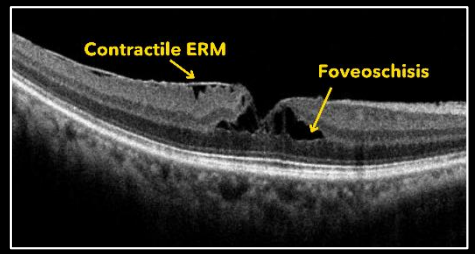
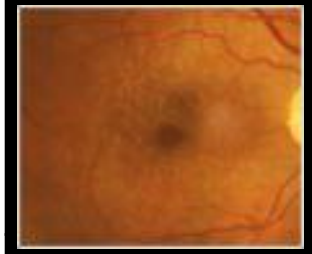
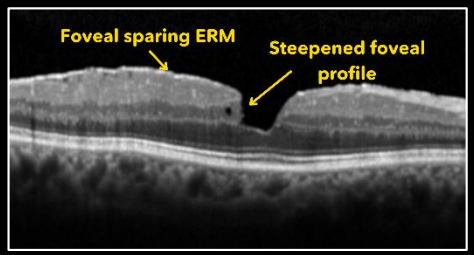
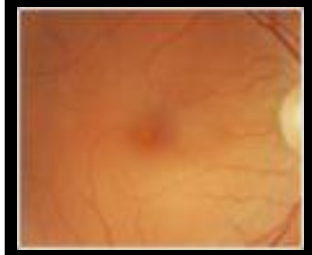
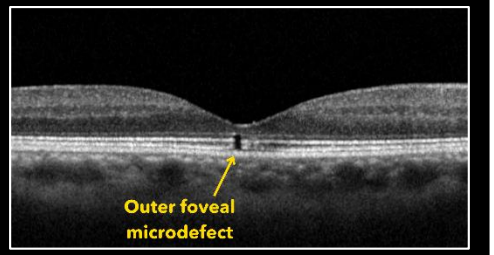
# CHAIR-SIDE REFERENCE: VITREOMACULAR INTERFACE ANOMALIES

| Retinal photo | Optical coherence tomography (OCT) | Description |
|---|---|---|
| **Epiretinal Membrane (ERM)** | | |
|  |  | • A fibrocellular contractile proliferation over the internal limiting membrane (ILM), of unclear aetiology.<br>• Can occur at any stage of vitreous separation (referred to as idiopathic ERM) or secondary to trauma, past surgery, chronic ocular disease.<br>• **Fundus appearance:** A sheen or abnormal reflectivity or wrinkling of the macular surface<br>• **OCT**: Thin distinct hyper reflective layer above ILM.<br>• **Complications**: Can cause tractional stress on underlying retina so may be associated with wrinkling of retinal surface, loss of foveal pit, retinal thickening and pseudocystic spaces.<br><br>*Consider referral if associated with symptoms/vision reduction* |
| **Epiretinal Membrane (ERM) Foveoschisis** | | |
|  |  | • Schisis at the fovea due to contractile epiretinal membrane (previously known as tractional lamellar hole).<br>• Caused by mechanical displacement of retinal layers secondary to tractional force from the epiretinal membrane.<br>• **Fundus appearance**: Roundish, slightly darker central lesion in the fovea.<br>• **OCT:** Foveoschisis at the level of Henle fibre layer (splitting in outer nuclear and plexiform layers).<br>• Presence of contractile epiretinal membrane (differentiating from lamellar macula hole, see previous page).<br>• **Associated signs**: Include microcystoid spaces in inner nuclear layer, retinal thickening and retinal wrinkling.<br><br>*Consider referral if associated with symptoms/vision reduction* |
| **Macular Pseudohole** | | |
|  |  | • Caused by mechanical displacement of retina towards the foveal centre via centripetal tangential traction.<br>• **Fundus appearance**: Discrete, red, round or oval lesion in the fovea. Appearance is similar to full thickness hole but without full thickness defect or signs of retinal tissue loss. No loss of foveal tissue.<br>• **OCT:** Presence of ERM with central opening sparing the fovea and associated surrounding retinal thickening. Has a verticalised/steepened foveal profile.<br>• **Associated signs**: May include microcystoid spaces and near normal foveal thickness.<br><br>*Consider referral if associated with symptoms/vision reduction* |
| **Outer foveal microdefects (OFMD)** | | |
|  |  | • Current naming controversy: also includes macular microhole and foveal red spot syndrome.<br>• Common aetiologies include VMT, previous VMT or adhesion. Other aetiologies include phototoxicity, blunt trauma, chronic macula oedema, spontaneous closure of full thickness macular hole, MacTel2.<br>• **Fundus appearance**: A small reddish foveal lesion with a small focal discontinuity within the outer retina.<br>• **OCT:** Focal discontinuity of RPE, photoreceptors and/or external limiting membrane.<br>• **Associated signs**: May include irregular foveal pit, symptoms of PVD, overlying vitreoretinal traction/adhesion.<br><br>*Review routinely* |

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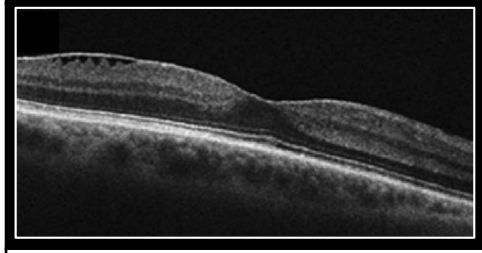
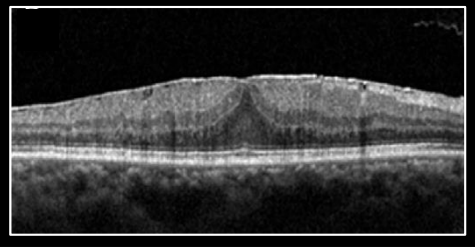
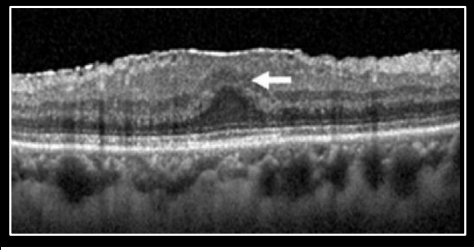
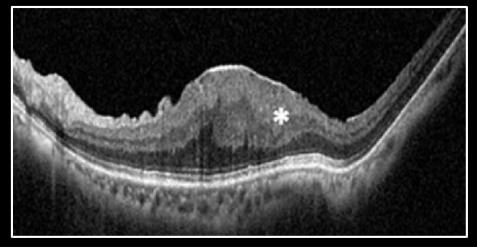
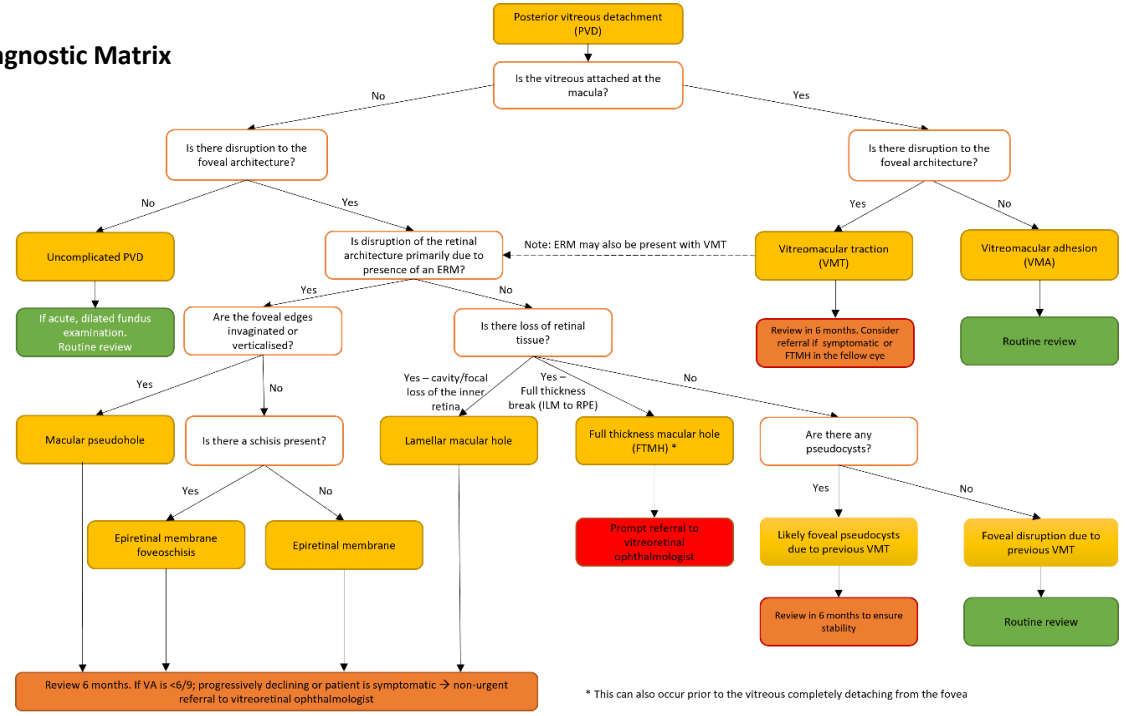
# CHAIR-SIDE REFERENCE: VITREOMACULAR INTERFACE ANOMALIES

In recent years, there have been several important developments in the use of OCT to detect prognostic markers or structural signs associated with ERM that can be used to predict visual outcomes. They key structural signs associated with lower visual acuity and poorer visual outcomes from surgery are the presence of ectopic inner foveal layers (EIFL) and disorganisation of the inner retinal layers. Although there is currently no widely accepted OCT staging system, the successive ERM stages identified by Govetto et al (2017) are associated with progressively worse visual acuity. Studies suggest referral for surgery priori to changes seen in stage 3 and 4 may be beneficial.

## Epiretinal Membrane Progression

| Stage 1 ERM | Stage 2 ERM | Stage 3 ERM | Stage 4 ERM |
|---|---|---|---|
|  |  |  |  |
| The foveal pit is preserved, and individual retinal layers are distinguishable. | There is macular thickening and loss of the foveal pit, but retinal layers are still distinct | Presence of ectopic inner foveal layers (EIFL) seen as a continuous hyper or hyporeflective band extending from the INL and IPL (white arrow). | EIFL with disorganisation of the inner retinal layers (white asterisks) |

## VMI Diagnostic Matrix




Please note this chair-side reference was designed to assist optometrists in distinguishing between the different types of vitreomacular interface disorders. It provides general information only and may not be applicable to atypical cases. For more specific advice, our telehealth service is available to all optometrists in Australia.

CFEH TELEHEALTH
SUPPORTING OPTOMETRISTS

- One-to-one consultation with a senior CFEH optometrist for non-urgent diagnosis and management support.
- Interactive, therapeutic CPD points.
- Consultations are at no charge, thanks to the generous support of Guide Dogs NSW/ACT.

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