Centre for Eye Health

CHAIR-SIDE REFERENCE: AGE-RELATED MACULAR DEGENERATION

AGE-RELATED MACULAR DEGENERATION (AMD)

- This chair-side reference was designed to assist practising optometrists in distinguishing between the different stages and phenotypes of AMD. Current clinical guidelines stipulate that essential components of the clinical examination for the diagnosis of AMD includes a targeted case history, high-contrast visual acuity, refraction, stereoscopic slit lamp examination and dilated fundus examination of the macula. Ocular imaging technologies are recommended; however, this document provides general information only and may not be applicable to atypical cases.

- For further information, readers are encouraged to review the full texts:
  - Ferris et al. Clinical Classification of Age-related Macular Degeneration. *Ophthalmology* 2013;120:844–851
  - Sadda et al. Consensus Definition for Atrophy Associated with Age-Related Macular Degeneration on OCT Classification of Atrophy Report 3. *Ophthalmology* 2018;125:537-548
  - Ly et al. Developing prognostic biomarkers in intermediate age-related macular degeneration: their clinical use in predicting progression. *Clin Exp Optom* 2018;101:172-181

- *Abbreviations: AMD, Age-related macular degeneration; OCT, Optical coherence tomography; FAF, Fundus autofluorescence; RPE, Retinal pigment epithelium; BM, Bruch's membrane; ISe, Inner segment ellipsoid; ELM, External limiting membrane; ONL, Outer nuclear layer; HFL, Henle's fibre layer; GA, Geographic atrophy; FA, Fluorescein angiography; PED, Pigment epithelium detachment*

Optomap/Retinal Photo	Fundus autofluorescence	Optical coherence tomography (OCT)	Description
Normal Aging Changes			• Drupelets only (<63µm diameter, up to approximately half the width of a major branch retinal vein crossing the optic disc margin) • Should not show any characteristics of early, intermediate or late AMD • FAF may appear near normal or display punctate spots of hyper- or hypo-fluorescence • Some drupelets may be too small for OCT to resolve, others appear as just detectable discrete irregularities or elevations of the RPE
Early AMD			• Medium drusen only (63 to 125µm diameter) • Should not have any of the characteristics of intermediate or late AMD • Similar to drupelets, medium drusen may display a variable normal, hyper- or hypo-fluorescence pattern • OCT typically represents drusen as nodular elevations of the RPE/Bruch's membrane complex with medium internal reflectivity
Intermediate AMD			• Large drusen (>125µm in diameter) and/or pigmentary abnormalities (hyper- or hypo-pigmentary associated with at least medium drusen) • No characteristics of late AMD • May feature a range of FAF patterns including: normal, minimal change, focal increased, patchy, linear, lacelike, reticular, speckled, focal confluent, focal plaque-like or scattered • Using OCT, large drusen may appear as dome shaped, occasionally confluent, elevations of the RPE, with visible underlying BM. • Hyper-pigmentary abnormalities may appear as discrete hyper-reflective foci (in the ONL or attached to drusen) with posterior shadowing

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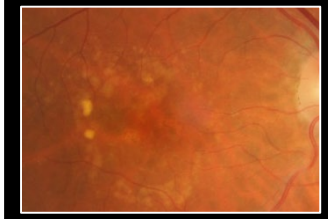
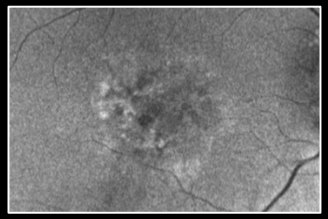
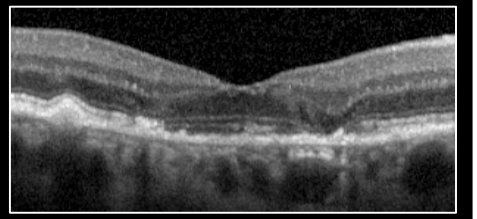
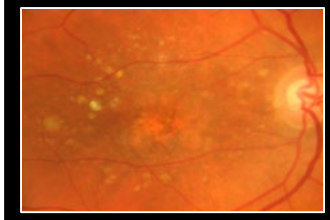
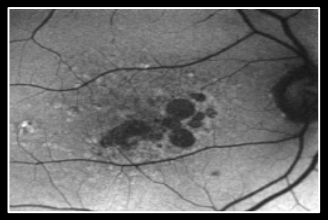
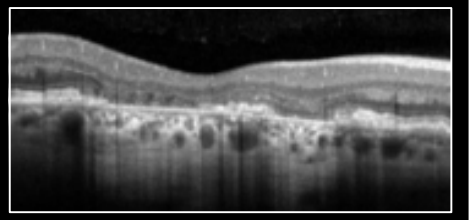
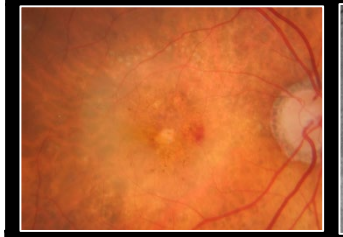
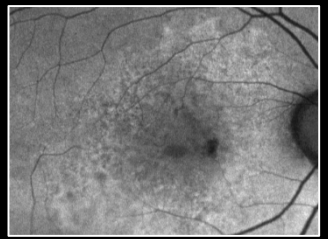
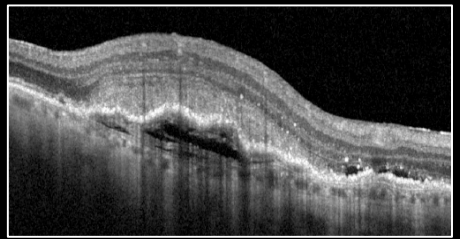
AGE-RELATED MACULAR DEGENERATION (AMD)

Optomap/Retinal Photo	Fundus autofluorescence	Optical coherence tomography (OCT)	Description
Intermediate AMD (Nascent Geographic Atrophy, Incomplete RPE and Outer Retinal Atrophy)			• Not visible using colour fundus photography • Typically shows a mixed FAF pattern (63% of cases) in the central 1500µm of the macula • OCT shows corresponding subsidence of the OPL and INL with a hypo-reflective wedge • The RPE band is present but irregular or interrupted; some posterior hypertransmission may be present but is discontinuous
			
Late AMD (Geographic Atrophy, Complete RPE and Outer Retinal Atrophy)			• Sharply delineated, round or oval hypo-pigmented areas ≥250µm in diameter featuring increased visibility of underlying choroidal vessels • May be uni- or multi-lobular, with or without foveal involvement, and coalesce over time to form a ring, eventually involving the fovea centralis • Also displays signs of other AMD stages • May be easier to visualise using FAF, appearing as single or multiple areas of well-demarcated, marked hypo-fluorescence • OCT shows corresponding zones of RPE disruption, homogenous hypertransmission into the choroid and overlying ONL thinning, ELM or EZ loss
			
Late AMD (Neovascular AMD) – Active Lesion			• May feature any of: RPE or retinal detachment, intraretinal, subretinal or sub-RPE fluid, scarring, glial tissue or fibrin like deposits, subretinal haemorrhage and/or hard exudates • Neovascular lesions may appear subtle, green-grey or pink-yellow often complicated by the secondary signs above • FAF may be increased in the areas of subretinal fluid or reduced in the presence of haemorrhage, exudate and fibrovascular membranes; can also present with normal or near normal FAF • On OCT, PEDs present as broad elevations of the RPE band anterior to BM with hypo- or mixed internal reflectivity with or without serous exudation
			
Late AMD (Neovascular AMD) – Disciform Scar			• Disciform scarring represents regression of the vascular component and an increase in the fibrous component • FAF consistently demonstrates uneven hypo-autofluorescence of the lesion, surrounded by marked hyper-autofluorescence • OCT will typically show a large, well-demarcated, highly hyper-reflective lesion associated with loss and dysplasia of the overlying retinal layers