DEMYELINATING DISEASES — MS vs NMOSD vs MOGAD

Distinguishing the three main inflammatory demyelinating diseases. **Confirm AQP4-IgG and MOG-IgG serostatus (cell-based assay) before long-term treatment** — misdiagnosis leads to harmful or ineffective therapy.

Feature	Multiple Sclerosis	NMOSD (AQP4-IgG)	MOGAD (MOG-IgG)
Target antigen	None identified (T-cell–mediated CNS demyelination)	**AQP4** water channel on **astrocytes**	**MOG** on the **oligodendrocyte** / myelin surface
Demographics	Young adults; **F:M ~3:1**	Median ~40 y; **F:M up to ~9:1**; more common in non-white populations	All ages incl. children; F ≈ M
Optic neuritis	Usually **unilateral**, mild–moderate	**Severe**, may be bilateral; **posterior/chiasmal**; poor recovery	Often **bilateral**, painful, with disc edema; usually **good recovery**
Myelitis	Short-segment, partial	**LETM** ≥3 vertebral segments, central cord	**LETM**, often **conus/cauda; H-sign** on axial
Other hallmark attacks	Brainstem/cerebellar, cognitive	**Area postrema** (intractable nausea/vomiting/hiccups), diencephalic, narcolepsy	**ADEM** (esp. children); cortical encephalitis with seizures (FLAMES)
Brain MRI	Periventricular ovoid (**Dawson fingers**), juxtacortical, infratentorial	Periependymal (around 3rd/4th ventricle & area postrema), diencephalic	Fluffy / ill-defined, ADEM-like, often **resolves**; cortical FLAIR-hyperintensity
CSF oligoclonal bands	**Positive** ~85–95%	Usually **negative** (<20%)	Usually **negative**
Serology	No specific antibody	**AQP4-IgG** (cell-based assay)	**MOG-IgG** (cell-based assay); low/transient titers can be false-positive
Course	Relapsing → secondary progressive; progression *independent* of relapses	Relapsing; **no progressive phase** — disability is attack-driven	Monophasic *or* relapsing; disability attack-related
Attack recovery	Usually moderate	Often severe / incomplete	Often good
Acute treatment	IV methylprednisolone ± PLEX	IV steroids + **early PLEX**	IV steroids (steroid-responsive/dependent) ± IVIG/PLEX
Maintenance	DMTs (interferons → anti-CD20; see MS DMT sheet)	Eculizumab, ravulizumab, inebilizumab, satralizumab (FDA); rituximab	Off-label: rituximab (less reliable), **IVIG**, MMF, azathioprine — no FDA-approved therapy
⚠ **Key pitfall**	—	MS DMTs (IFN-β, natalizumab, fingolimod) WORSEN NMOSD	Don't over-call on a low/transient MOG titer; re-test if uncertain

Bottom line: MS — OCB-positive, short lesions, progressive course, treat with DMTs. NMOSD — AQP4-IgG, LETM & area postrema, severe attacks, treat with complement/IL-6/anti-CD20 (never MS DMTs). MOGAD — MOG-IgG, ADEM/bilateral ON, steroid-responsive, often monophasic; no approved therapy.