Comorbidities and Disability Progression in MS
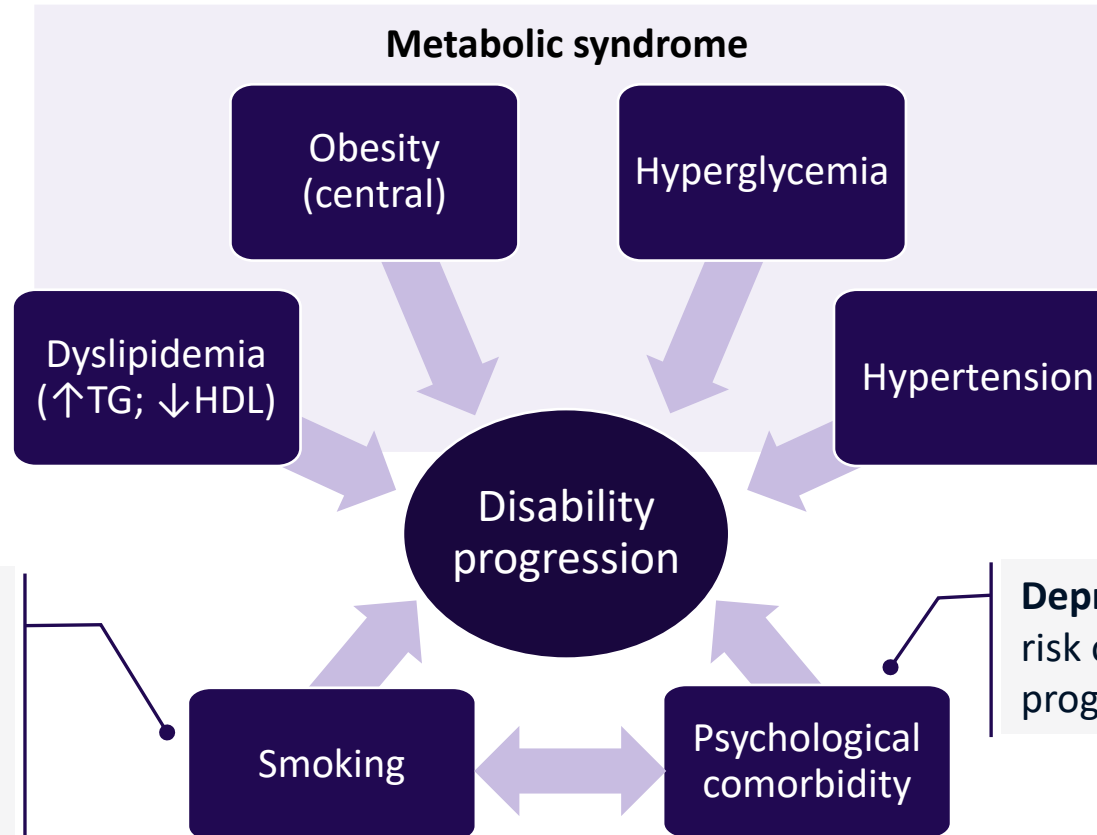
Vascular comorbidity in MS is associated with increased risk of disability progression,[1] ambulatory disability, visual disability, brain atrophy, and worsening health-related quality of life[2]

Vascular comorbidities include current diagnosis of hypertension, hyperlipidemia, diabetes, obesity, cardiovascular disease, peripheral vascular disease, or tobacco use (definitions vary)

Metabolic syndrome

- Obesity (central)
- Hyperglycemia
- Dyslipidemia (↑TG; ↓HDL)
- Hypertension

Disability progression

- Smoking
- Psychological comorbidity

Smoking is associated with:
- Increased risk of developing MS[3]
- Increased risk of disease activity, progression, and brain atrophy[3]
- Increased risk of death[4]
- Depression and anxiety[5]

Depression increases risk of disability progression[6]

1. Marrie RA et al. *Neurology*. 2010;74:1041-1047; 2. Shangraw K et al. *Int J MS Care.* 2022;24:169-174; 3. Rosso M, Chitnis T. *JAMA Neurol.* 2020;77:245-253;
4. Manouchehrinia A et al. *J Neurol Neurosurg Psychiatry*. 2014;85:1091-1095; 5. McKay KA et al. *Mult Scler.* 2016;22:685-693; 6. Binzer S et al. *Neurology*. 2019;93:e2216-e2223.

Impact of Smoking Cessation on Disability Progression in MS

Cross-sectional study of 680 patients registered in a United Kingdom database between 1994 and 2013

Reference group: never-smokers	Hazard ratio (95% CI)	
	EDSS score 4.0	EDSS score 6.0
Former smokers	1.09 (0.81 to 1.46)	0.96 (0.69 to 1.32)
Current smokers	2.42 (1.63 to 3.60)	1.86 (1.19 to 2.91)
Each smoke-free years after cessation	0.96 (0.95 to 0.97)	0.97 (0.95 to 0.98)

10 smoke-free years can account for a 33% and 26% lower risk of reaching EDSS scores 4.0 and 6.0 in former smokers compared with current smokers

The earlier patients quit smoking, the stronger the reduction in risk of reaching disability milestones

Tanasescu R et al. *Nicotine Tob Res*. 2018;20:589-595.

Lifestyle Modification and Comorbidity Management: Patient Counseling

Modifiable factors that affect function and/or disease progression

Body weight/ body mass index	Diet	Exercise	Mental and social stimulation
Psychological stress	Sleep hygiene	Substance use (alcohol, tobacco, marijuana)	Vascular risk factors

Coyle PK. *Continuum (Minneap Minn).* 2016;22:815-836.