Olfactory Function and Retinal Nerve Fiber Layer Thickness in Multiple Sclerosis Patients.

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Background: Olfactory impairment is an increasingly recognized symptom in multiple sclerosis (MS), potentially reflecting central neurodegeneration. However, its relationship with clinical parameters and structural markers of axonal damage, such as retinal nerve fiber layer (RNFL) thickness, is still under investigation.

Aims:

- evaluate olfactory function in RRMS patients
- explore its associations with demographic, clinical variables, including RNFL thickness measured by optical coherence tomography (OCT).

Material and Methods: olfactory evaluation with Sniffin' Sticks (Threshold, Discrimination, Identification; TDI score); peripapillary RNFL by SD-OCT; covariates included age, sex, disease duration, EDSS, DMT efficacy (high vs low/moderate), and smoking. We tested TDI–RNFL–clinical associations (Pearson/Spearman) and built a multivariable linear regression to identify independent RNFL predictors.

Results: 56 RRMS patients (mean age: 43.3 ± 11.6 years; 65% female), smokers 46.4%, mean EDSS 2.74 ± 1.72 and mean disease duration 12.4 ± 8.99 years.

Olfactory performance	Mean ± SD
TDI score	29.5 ± 3.5
Threshold	6.75 ± 1.9
Discrimination	10.6 ± 2.2
Identification	12.1 ± 2

Table 1. Olfactory performance (Normosmia: TDI ≥ 30.5)

Pearson' Correlation		
TDI/disease duration	r = -0.572	p < 0.001
Thr/disease duration	r = -0.214	p = 0.114
Disc/disease duration	r = - 0.404	p = 0.002
Ident/disease duration	r = -0.354	p = 0.008
TDI/RNFL	r = 0.302	p = 0.024

Table 2. Pearson'correlation: no significant association with EDSS.

Predictor	B (per unit)	95% CI	p
Disease duration	- 0.652	-1.23 to -0.08	0.027
EDSS	- 2.443	-4.98 to 0.09	0.059
TDI	0.120	-1.29 to 1.53	0.865

Table 3. Multivariate linear regression - Outcome RNFL thickness (R^2 = 0.304, p = 0.005)

Discussion and Conclusions: In MS, worse olfaction aligns with longer disease duration and thinner peripapillary RNFL, supporting diffuse neurodegeneration, but TDI is not an independent predictor of axonal loss.