Objectives In Australian MSBase clinics, we describe baseline characteristics of relapsing-remitting MS (RRMS) patients treated with OCR, treatment pathways and early clinical outcomes.

Methods Secondary analysis using MSBase Registry data for RRMS patients with OCR initiation within 3 months of MSBase recorded visit. Descriptive statistics included demographics, disease course/duration, prior disease modifying therapies (DMT) and EDSS. Relapse data was described in patients with ≥6 months follow-up.

Results As of 4 June 2020, MSBase included 624 eligible Australian RRMS patients newly treated with OCR. Median age at OCR initiation was 42.5 years. OCR was first line therapy in 18.9% of patients. Most frequent DMT's in the 12 months prior to OCR were natalizumab (32.1%) and fingolimod (24.8%). Of 434 RRMS patients with ≥6 months follow-up, 392 remained relapse free (90.3%; 95% CI 81.6, 99.7) over a mean OCR exposure of 1.35 years. In this group, the annualized relapse rate (ARR) was 0.10 (95% CI 0.08-0.13), compared to an ARR of 0.83 in the 24 months pre-OCR start. Treatment discontinuation was recorded for 20 of these 434 patients In the overall RRMS cohort, treatment persistence at 12 and 24 months was 94.3% (95%CI: 90.9%-96.1%%) and 88.7% (95%CI 77.2%-94.0%), respectively.

Conclusion Almost 20% of RRMS patients treated with OCR in Australian MSBase centres received OCR as a first line treatment. During OCR treatment, relapses and OCR discontinuations were rare.

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011   **WORSENING LONGITUDINAL REACTION TIME TRAJECTORIES USING THE MSREACTOR COMPUTERISED BATTERY PREDICTS CONFIRMED EDSS PROGRESSION**

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Objectives To identify and validate longitudinal reaction time trajectories in relapsing remitting multiple sclerosis using a computerised cognitive battery and latent class mixed modelling, and to assess the association between reaction time trajectories and disability progression.

Methods Participants serially completed web-based computerised reaction time tasks measuring psychomotor speed, visual attention and working memory. Testing sessions were completed 6-monthly with the option of additional home based testing. Participants who completed at least three testing sessions over a minimum of 180 days were included in the analysis. Longitudinal reaction times were modelled using Latent Class Mixed Models to group individuals sharing similar latent characteristics. Models were tested for consistency using a cross-validation approach. Inter-class differences in the probability of reaction time worsening and the probability of 6-month confirmed disability progression were assessed using survival analysis.

Results A total of 460 relapsing remitting multiple sclerosis patients were included. For each task of the MSReactor computerised cognitive battery, the optimal model comprised of 3 latent classes. All tasks could identify a group with high probability of reaction time slowing. The visual attention and working memory tasks could identify a group of participants who were 3.7 and 2.6 times more likely to experience a 6-month confirmed disability progression, respectively. Participants could be classified into predicted cognitive trajectories after just 5 tests with between 64% and 89% accuracy.

Conclusion Latent class modelling of longitudinal cognitive data collected by the MSReactor battery identified a group of patients with worsening reaction times and increased risk of disability progression.

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012   **VOLUMETRIC AND CONNECTIVITY PROFILE OF REGIONAL THALAMIC ABNORMALITY IN AMYOTROPHIC LATERAL SCLEROSIS**

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Objectives Neurodegeneration in ALS follows a diffuse pattern of cortical involvement.[1] We have previously highlighted that thalamic abnormality is a robust disease signature in ALS,[2] but the integrity of thalamic nuclei and their clinical association remains unclear. We employed a novel segmentation technique for thalamic nuclei and track-weighted functional connectivity (TW-sFC) to characterize volumetric and connectivity profiles of regional thalamic abnormality.

Methods Forty ALS patients and 27 age-and-education matched controls were recruited. All patients underwent comprehensive clinical examination and 3T MRI scan (T1; DWI; rs-fMRI). Thalamic nuclei were robustly segmented from T1 images using the THOMAS pipeline.[3] Whole-brain white matter fibre tracking was performed using MRtrix and combined with resting-state fMRI to generate combined structural and functional connectivity maps (TW-sFC).[4]

Results Reduced thalamus volume was observed bilaterally in ALS compared to control (p values < 0.036). Bilateral volumetric reduction was consistently observed across all regions except for the anterior thalamus in ALS (p values < 0.05). Significant increased TW-sFC was observed in ALS in the right anterior thalamus (p =0.03) and right anterior ventral nuclei (p < 0.01). TW-sFC of the mediodorsal nuclei correlated with disease duration (p < 0.02) and disease progression rate (p < 0.03).

Conclusions Regional thalamic abnormalities are present in ALS and hold a significant association with clinical features. Variability in thalamic connectivity demonstrated significant clinical associations with disease duration, progression rate, and upper motor dysfunction. The findings reinforce that diffusion and functional MR imaging modalities are promising markers of disease burden in ALS.

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