Introduction: Multiple Sclerosis (MS) is an idiopathic, inflammatory and autoimmune demyelinating disease involving central nervous system white matter that can present with optic neuritis (ON). ON is often asymptomatic and patients with apparently no history of previous ON become a clinical challenge. We aim to study the role of automated layer segmentation in MS patients' management.

Material and Methods: Retrospective study that included 39 patients (78 eyes) with confirmed diagnosis of MS and 35 healthy age-matched controls. Macular spectral-domain optical coherence tomography scans (SD-OCT, Heidelberg Engineering, Heidelberg, Germany) were obtained followed by automated retinal layer segmentation at the center of fovea and at a radius of 3 to 6mm from the superior, inferior, temporal and nasal sectors (ETDRS grid).

Patients with MS were subdivided into two groups: 1) with known previous ON, 2) not known previous ON. Statistical analysis using two sample t-test was made to calculate significant results between groups with 95% confidence interval.

Results: Total central and inner layers macular thickness was significantly reduced in MS patients compared to control group (p<0.05) predominantly due to retinal nerve fibre (RNFL), ganglion cell (GCL) and inner plexiform layers (IPL) reduction in foveal, parafoveal and perifoveal sectors with exception of RFNL temporal sector. GCL and IPL were significantly reduced in foveal and parafoveal sectors between group 1 and 2 (p<0.05) while no significant RNFL reduction was observed between these groups.

Conclusions: Reductions in total central and inner layers macular thickness can be detected in MS eyes with or without a previous history of known ON. As many ON episodes are not clinically detected, OCT may act as CNS imaging tool documenting neuronal degeneration in MS patients.