Multiple Sclerosis is a chronic neurological disease that, without therapy, causes a serious disability in a substantial number of patients. We are not able to cure the disease yet, but with current repertoire of drugs we are able to significantly influence the inflammatory part of the disease and if patients response to a therapy, we can fundamentally change their prognosis. The treatment must be started early, i. e. in a phase when axons are still preserved, optimally in a clinically isolated syndrome. A great issue at this stage is to properly estimate the prognosis of an individual patient and to choose the right treatment for the right patient. Moreover, after the start of the treatment, it is very important to carefully monitor the patient's treatment response. Among the surrogate markers that are available today, MRI is one of the most utilised in an everyday practice.

Our work is trying to find the answer to the question what is the evolution of total and regional brain atrophy and which MRI parameters best reflect clinical status of an MS patient. We analysed 2- and 5-year clinical and MRI data of 181 patients from the original ASA (Avonex-Steroids-Azathioprine) study. In accordance with other papers we confirmed significant brain atrophy already in the early phase of the disease. This total atrophy evolution is mostly caused by gray matter volume loss. Also, in advanced stages of the disease, the gray matter atrophy is mostly responsible for total brain loss. Whole brain atrophy measurement showed stronger correlation with disability than T2-lesion volume in a 2- and 5-year interval. The gray matter volume also correlated with clinical status but the correlation was weaker than the one of total brain change with clinical status. The other interesting finding was, that patients with a higher number of relapses, despite being stable from a disability point of view, showed faster accumulation of brain atrophy than stable patients with no relapses.