Brain Shrinkage (brain volume loss) and Multiple Sclerosis
Media Fact Sheet

What is brain shrinkage in neurological diseases?
Brain shrinkage (brain volume loss) is the permanent loss of brain tissue (both myelin and axons)\(^1,2\). It can affect the whole brain or be limited to specific regions, is associated with the loss of physical (e.g. walking) or cognitive (e.g. memory) function, and can predict a patient's disability over time\(^3\). For example, if some elements of the cerebral hemispheres (the two lobes of the brain that form the cerebrum) are affected, conscious thought and voluntary processes may be impaired\(^4\).

How is brain shrinkage measured?
Brain shrinkage is measured by Magnetic Resonance Imaging (MRI). MRI uses a strong magnetic field to create detailed images of pathological changes in the brain including areas of inflammation, damage or scarring in nerve tissue\(^4\).

How is brain shrinkage linked to multiple sclerosis (MS)?
Brain shrinkage occurs three to five times faster in people with MS compared to those without MS\(^5-8\). This acceleration starts early in people with relapsing MS, before patients even notice their symptoms\(^9-12\). Based on growing evidence, damage from lesions and brain shrinkage leads to worsening of the symptoms for MS\(^9,13-15\).

MRI images of the brain demonstrate the extent of brain shrinkage in people with MS compared to a person without MS\(^16\)

Assessing brain shrinkage is increasingly becoming an important consideration in monitoring MS treatment effects. Several clinical trials have shown that brain shrinkage is a predictor of long-term disability in MS\(^8,9,15,17-18\), and the prognostic value of brain shrinkage for future disability progression has now been established in a number of studies. It is also becoming a standard secondary outcome in clinical trials\(^4,19\).

There are now disease-modifying therapies (DMTs) that aim to alter the natural course of MS by modifying the immune response. There are DMTs available that can reduce the frequency of relapses, delay the accumulation of physical disability and minimize brain shrinkage\(^20\). The differences between the efficacy profiles of DMTs in relation to brain shrinkage may be explained by the different effects they have on the CNS\(^21,22\).

References:

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9. Di Stefano N et al. Clinical Relevance of Brain Volume Measures in Multiple Sclerosis. CNS Drugs 2014; published online January 22nd