

Elizabeth Mallia

I am a Maltese, MSc Clinical Neuroscience graduate and an HCPC registered physiotherapist. I have engaged with the field of motor control both from a practical as well as an academic perspective; as a physiotherapist I worked closely with elderly people and Parkinson's disease patients, while as a student I conducted BSc and MSc research projects on different aspects of motor control.

I investigated an aspect of motor learning called error-based learning for my MSc, where I looked into the role of different types of reward feedback on this type of learning during adaptation to visuomotor perturbations. Such adaptation requires information processing to move optimally within a particular environment. The sensory and reward based processes, that are thought to contribute the information for this type of task, had been described as being two distinct processes (Doya, 2000), with the cerebellum being implicated in sensory-based processes and the basal ganglia, and D2 receptors implicated in reward and negative reward-based processes respectively. However, the investigation showed that negative reward feedback (monetary loss) seems to lead to a higher rate of error-based learning, and this suggests that connections between the cerebellum and basal ganglia, which have been previously described (Hoshi et al., 2005) might be involved.

Combining my main interest with my understanding of biomechanics, at BSc level I chose to investigate trunk control in patients up to 6 months post-stroke. Both balance and co-ordination are required for good trunk control, and the latter is often overlooked during physiotherapy, with greater emphasis being placed on upper limb and gait rehabilitation. Trunk control is essential for proper limb rehabilitation. I showed that trunk control can be improved if extended therapy sessions are allowed, highlighting the need for intensive physiotherapy.

Now I would like to further my knowledge and experience by investigating the central mechanisms involved in our ability to react to unpredictability, with the implications this may have for falls in the elderly and movement in Parkinson's disease patients, as well as looking forward to the collaborative pan-EU nature of the project.