Final Report Summary - MOVING BEYOND (Industrial Academic Initial Training Network towards focused treatment of age-related motor symptoms.)

PROJECT OBJECTIVES

Locomotion is crucially influenced by supraspinal motor centres of the brain, including the basal ganglia as the main node and "bottleneck" for motor, cognitive and limbic circuits with cortical involvement. Despite important insights, significant gaps in our understanding of supraspinal motor control and their relationship to ageing and neurodegeneration states still exist. The present project focuses on the role of supraspinal motor control mechanisms in ageing and Parkinson's disease (PD). It spans the entire spectrum from basic understanding of these mechanisms, over diagnostics to therapeutic applications of supraspinal motor control deficits.

The consortium included: Eberhard-Karls Universitaet Tuebingen (Coordinator), University College London, McRoberts BV, The foundation for medical research, infrastructural development and health services next to the medical center Tel Aviv, Stichting Katholieke Universiteit, and Karolinska Institutet as academic partners as well as Hocoma AG, Motek Medical BV and Robert Bosch Healthcare GmbH as private partners.

WORK PERFORMED SINCE THE BEGINNING OF THE PROJECT

Moving Beyond partners established a lively network and profited from the exchange of both knowledge and research means and resources, implemented by secondments. All fellows were integrated in the training program of Moving Beyond – both local and network-wide training measures. They presented their results both to a scientific community – during numerous conferences and with publications– and to lay people during outreach events. In addition, the Moving Beyond website (Moving-beyond.eu) was established to raise public awareness of the project. It also contains internal pages that are used as a teaching and reference tool for the fellows.

MAIN RESULTS

Improve understanding of supraspinal movement control: Moving Beyond contributed to the basic understanding of the mechanisms of supraspinal motor control mechanisms by examining the effects of age and PD on probabilistic task cueing, by investigating the mechanistic regulation of gait dynamics during ageing and by investigating functional motor control in the lamprey, a highly conserved vertebrate species, from an evolutionary perspective.

Improve ambulatory diagnostics of supraspinal movement control deficits: Data extracted out of body-worn sensors were used to analyse gait in clinical investigations as well as during daily living with the aim to reveal preclinical and progression parameters for PD, to reveal fall risks and to assess measures that affect quality of life measures in PD patients. The applicability to use virtual reality applications for research and clinical applications in PD was assessed.

Improve treatment of supraspinal movement control deficits: Several therapeutic interventions, e.g. for overcoming freezing of gait in PD patients, were developed and analysed. A novel algorithm with computerised visual feedback was implemented and validated for the gait robot Lokomat, aimed at assessing gait ability during training in patients with mild to severe walking impairments. The algorithm adapts automatically the support provided by the robot based on the patient's performance during walking.

FINAL RESULTS AND THEIR POTENTIAL IMPACT AND USE
Moving Beyond produced a group of well-trained young scientists for the future of this important field, with a strong focus on intersectoral and international collaboration that is also reflected by the plan to award double PhD degrees from both the Dutch and the German academic partners. The strong focus on inter-sector working experience with both academic and industrial partners, plus a broad-ranging scientific training enabling “thinking outside the box” and complementary skill training, enables the fellows to meet the demands of the European employment market.

Furthermore, Moving Beyond contributed to improved understanding of supraspinal movement control and developed new diagnostic approaches and tools as well as innovative treatment strategies for PD and other age-related disorders.

SOCIO-ECONOMIC IMPACT AND THE WIDER SOCIETAL IMPLICATIONS OF THE PROJECT

Apart from educating fellows for the European job market, also the outreach programme should be mentioned as Moving Beyond measures to attain impact related to the society. However, the by far largest socio-economic impact has been achieved by improving basic understanding, as well as diagnostics and therapeutic interventions for supraspinal motor control deficits. This has a direct and indirect positive impact for patients, care takers and patients’ families.

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Informations connexes

| Résultat en bref | Age-related motor deficits |

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