Abstract

Pneumonia is the leading cause of death in a large proportion of neurological diseases. Respiratory physiotherapy serves as a non-pharmacological option for supporting airway hygiene. However, current awareness of respiratory physiotherapy in neurological patients is not satisfactory. The aim of this thesis is to verify the effectiveness of expiratory muscle strength training (EMST) in three neurological diseases: multiple sclerosis (MS), Parkinson's disease (PD) and multiple system atrophy (MSA). The results of this thesis show: 1) EMST led to a significant increase in expiratory muscle strength and voluntary peak cough flow in patients with MS. Therefore, we have shown that EMST is an effective method of respiratory physiotherapy in promoting airway hygiene in patients with MS. 2) We found in a demographic study that the PD healthcare model in Czechia is suboptimal. The utilization of a respiratory physiotherapy is low, and therefore its reorganization is needed. 3) We developed and patented a mobile application SpiroGym which provides visual feedback during training and sends the training results via a secure server directly to the therapist for telemedicine needs. In a pilot study, we verified its feasibility in patients with PD. The study results indicate that EMST coupled with the SpiroGym app is feasible and potentially useful in patients with PD. Patients considered EMST with the SpiroGym app to be motivating, understandable, and user-friendly. 4) We demonstrated that EMST is feasible and well tolerated in MSA patients and resulted in significant improvements in expiratory muscle strength. Moreover, Index of pulmonary dysfunction has been shown as a potentially useful instrument for detecting MSA patients at risk of decreased cough efficacy and expiratory muscle weakness.