Abstract:
Humans differ from other animals in the way they can skilfully and precisely operate or invent tools to facilitate their everyday life. Tools have dominated our home, travel and work environment, becoming an integral step for our motor skills development. What happens when the part of the brain responsible for tool use is damaged in our adult life due to a cerebrovascular accident? How does daily life change when we lose the previously mastered ability to make use of the objects around us? How do patients suffering from compromised tool use cope with food preparation, personal hygiene, grooming, housework, or use of home appliances? In this literature review we present a state of the art for single and multiple tool use research, with a focus on the impact that apraxia (impaired ability to perform tool-based actions) and action disorganization syndrome (ADS; impaired ability to carry out multi-step actions) have on activities of daily living (ADL). Firstly, we summarize the behavioral studies investigating the impact of apraxia and other comorbidity syndromes, such as neglect or visual extinction, on ADL. We discuss the hallmarks of the compromised tool use in terms of the sequencing of action steps, conceptual errors committed, spatial motor control, and temporal organization of the movement. In addition, we present an up-to-date overview of the neuroimaging and
lesion analyses studies that provide an insight into neural correlates of tool use in the human brain and functional changes in the neural organization following a stroke, in the context of ADL. Finally we discuss the current practice in neurorehabilitation of ADL in apraxia and ADS aiming at increasing patients’ independence.