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Autore	Lyon-Caen, Robert
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Autore	Aleksandra Vuckovic
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Sommario/riassunto

The primary purpose of Brain Computer Interface (BCI) systems is to help patients communicate with their environment or to aid in their recovery. A common denominator for all BCI patient groups is that they suffer from a neurological deficit. As a consequence, BCI systems in clinical and research settings operate with control signals (brain waves) that could be substantially altered compared to brain waves of able-bodied individuals. Most BCI systems are built and tested on able-bodied individuals, being insufficiently robust for clinical applications. The main reason for this is a lack of systematic analysis on how different neurological problems affect the BCI performance. Neurological problems interfering with BCI performance are either a direct cause of a disability (e.g. stroke, autism, epilepsy) or secondary consequences of a disability, often overlooked in design of BCI systems (chronic pain, spasticity and antispastic drugs, loss of cognitive functions, drowsiness, medications which are increasing/decreasing brain activity in certain frequency range) . While some of these deficits may decrease the performance of a BCI, others may potentially improve its performance compared to BCI tested on a healthy population (e.g. overactivation of motor cortex in patients with Central neuropathic pain (CNP), increased alpha activity in some patient groups).Depending on the neurological condition, a prolonged modulation of brain waves through BCI might produce both positive or detrimental effects. Thus some BCI protocols might be more suitable for a short term use (e.g. rehabilitation of movement) while the others would be more suitable for a long term use. Prolonged self-regulation of brain oscillation through BCI could potentially be used as a treatment for aberrant brain connections for conditions ranging from motor deficits to Autism Spectrum Disorders (ASD).Currently, ASD is an increasingly prevalent condition in the U.S. with core deficits in imitation learning, language, empathy, theory of mind, and self-awareness . Understanding its neuroetiology is not only critical and necessary but should provide relevant insights into the relationship between neuroanatomy, physiology and behaviour.In this Research Topic we welcome studies of the highest scientific quality highlighting how BCI systems based on different principles (SSVEP, P300, slow cortical potential, auditory potential, operant conditioning, etc) interact with the underlying neurological problems and how performance of these BCI system differ compared to similar systems tested on healthy individuals. We also welcome studies defining signatures of neurological disorders and proposing BCI based treatments.We expect to generate a body of knowledge valuable both to researchers working with clinical populations, but also to a vast majority of BCI researchers testing new algorithms on able-bodied people. This should lead towards more robust or tailor-made BCI protocols, facilitating translation of research from laboratories to the end users.We are looking for the original work, data supported findings, as well as comprehensive review articles that map out what is and is not possible in this filed in the near and far future.