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Novel Tool in Neurorehabilitation: Action Observation Therapy

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A motor deficit is the leading cause of disability following stroke, justifying the implementation of several various neurorehabilitative techniques. One of the most accepted techniques is Action observation therapy (AO) [1].

Action observation therapy (AO) is a neuroscience and recent discovery of the mirror neuron system (MNS). It is dynamic state during the observation in which the observer can understand the other individual is doing by simulating the actions and outcomes are likely to follow from the observed motor action [2]. AO includes action observation and action execution which allows the patient safely motor practice movements and tasks.

In an individual, the particular systematic observation of day-to-day actions followed by the individual imitation represents a novel approach in rehabilitation. AO exploits a well-known neurophysiological mechanism by which the brain observes the action to its motor counterpart.

The purpose of AO is to recover the damaged networks of cerebral and to rebuild the motor function as an alternative to physiotherapy. It also promotes the functional reorganization in the brain via activation of mirror neurons for recovery [3]. There are no specific techniques to perform the therapy. Observing the patient's every motor act after stimulation. There is no time rule to perform the task but this session may take half an hour to explain the patient. There are 2 phases in this AO. They are 1. Observation phase and 2. Execution phase. In Observation phase patient is asked to observe the video carefully and in execution phase patient is asked to perform the motor act as shown in the video [4].

AO is generally based on MNS (Mirror Neurons Systems) in various regions of the macaque cerebral cortex. Mirror neurons system discharge during the execution of goal-directed actions performed with various biological effectors and during the observation of another individual performing the similar or a same action. The combination of action observation with practice of the observed actions seems to constitute the most powerful approach. Various non-invasive procedures have shown experimental evidences in humans confirming the existence of action observation–action execution matching the mechanism in precise regions of the frontal and parietal lobes. Action observation related MNS (Mirror Neuron System) activity mediates motor learning of new skills or relearning motor skills lost due to stroke.

The proposed mode of functioning of MNS (Mirror Neuron System) is simulation of observed actions. This constitutes a basis for imitation and induction of plasticity in the CNS (Central Nervous System).

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