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ENHANCEMENT OF RIGHT HEMISPHERE EEG FUNCTIONAL CONNECTIVITY AFTER EMDR THERAPY

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Introduction: Brain connectivity changes have been recently demonstrated in victims of psychological traumas treated with the eye movement desensitization and reprocessing (EMDR).

Objectives: Forty victims of psychological traumas were investigated at the first EMDR session (t0) and at the last one performed after processing the index trauma (t1).

Aims: To investigate differences in EEG functional source connectivity during bilateral ocular stimulation (BS) during EMDR therapy at t0 and t1.

Methods: Brain electrical activity during whole EMDR sessions was record with a 37-channel EEG. EEG functional connectivity analysis was based on the lagged phase synchronization (LPS), derived by a two-step eLoreta procedure: dimensionality reduction of inverse matrix from 6239 voxels to 28 regions of interest (ROIs); LPS index computation, for each spectrum band, in all possible ROI pairs.

Results: Significant differences were detected between t0 and t1 in alpha band LPS indexes. A prevalent enhancement in right intrahemispheric functional connectivity was found in t1 respect to t0, particularly among ROI pairs of (a) frontal regions (anterior frontal, orbital frontal, lateral frontal cortices) and limbic structures (anterior cingulate cortex, ACC), (b) frontal regions and associative areas (insula cortex, parietal lobe), (c) ACC and primary visual cortex and (d) ACC and associative areas.

Conclusions: These findings suggest that EMDR efficacy is associated to electrical brain connectivity changes during BS. An enhancement in the right hemisphere alpha band functional connectivity of areas involved in cognitive control, emotional processing and visual associative functions may play a key role in the elaboration of psychological traumas.

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