Clinical Neurophysiology Practice 2 (2017) 206–213

Contents lists available at ScienceDirect

Clinical Neurophysiology Practice

journal homepage: www.elsevier.com/locate/cnp

Review article

Connectome: Graph theory application in functional brain network architecture

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ARTICLE INFO

Article history:
Received 20 February 2017
Received in revised form 28 July 2017
Accepted 6 September 2017
Available online 24 October 2017

Keywords:
Graph theory
Functional connectivity
EEG
eLORETA
Resting-state networks

ABSTRACT

Network science and graph theory applications have recently spread widely to help in understanding how human cognitive functions are linked to neuronal network structure, thus providing a conceptual frame that can help in reducing the analytical brain complexity and underlining how network topology can be used to characterize and model vulnerability and resilience to brain disease and dysfunction. The present review focuses on few pivotal recent studies of our research team regarding graph theory application in functional dynamic connectivity investigated by electroencephalographic (EEG) analysis. The article is divided into two parts. The first describes the methodological approach to EEG functional connectivity data analysis. In the second part, network studies of physiological aging and neurological disorders are explored, with a particular focus on epilepsy and neurodegenerative dementias, such as Alzheimer's disease.