

Quantitative Electroencephalogram Standardization: A Sex- and Age-Differentiated Normative Database

Juhee Ko, et al.
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Purpose

- Because the results of QEEG are often affected by the age and gender, it is essential to compare the data from QEEG with the standardized data in the baseline set.
- Although gender is a reliable factor on the EEG pattern, recent studies only explain about QEEG's Normative Database that correspond to the ages.
- The intention of this study is to obtain a sophisticated ISB-Normative Database by age and gender and utilize it as basic information.
- Finding a new biomarker that can diagnose and cure Alzheimer's disease, Parkinson's disease, acute ischemic stroke, depression, anxiety, and any brain-related diseases by using QEEG.

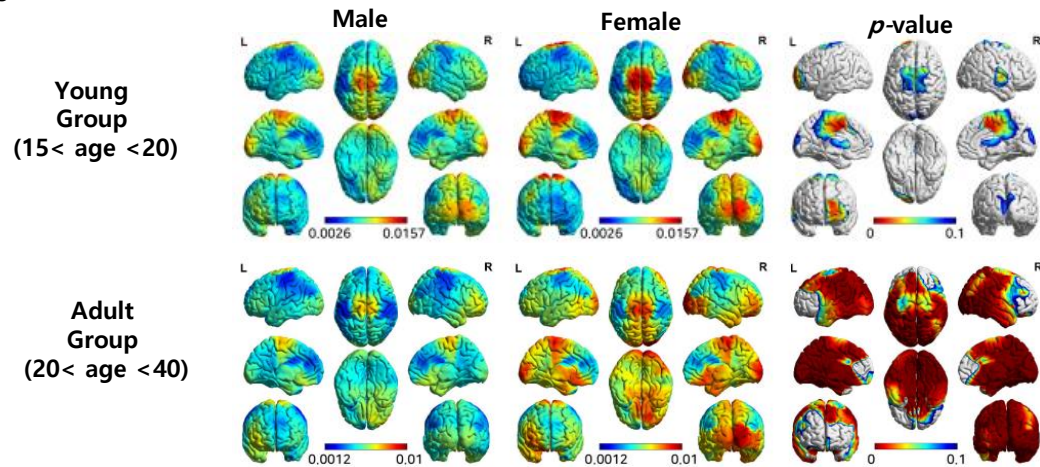
Subjects / Methods

- 1300 healthy participants in the age range of age 4 to 80. (same ratio of men and women)
- The result is QEEG analysis proceeded by EEG analyzing Artificial intelligence 'iSyncBrain.'

Results

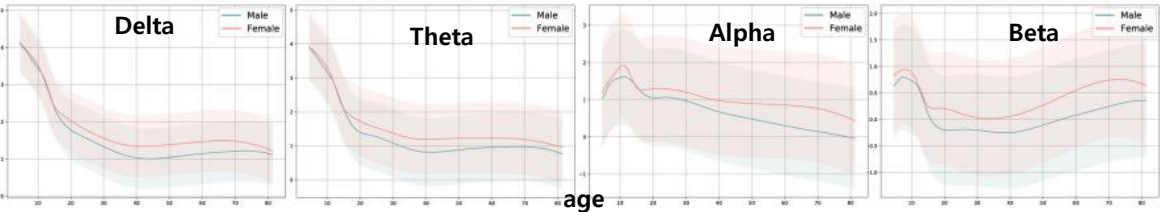
[3-Dimensional Image of Brain – Age & Gender differentiated]

Observation of Theta band power that is sensitive to changes in brain function with respect to cognition and memory by age and gender.



1. There is a significant difference between the Young group and the Adult group in the brain region showing a significant difference between men and women.
2. Even with the same EEG indicator, it is necessary to subdivide the differences according to age and gender.

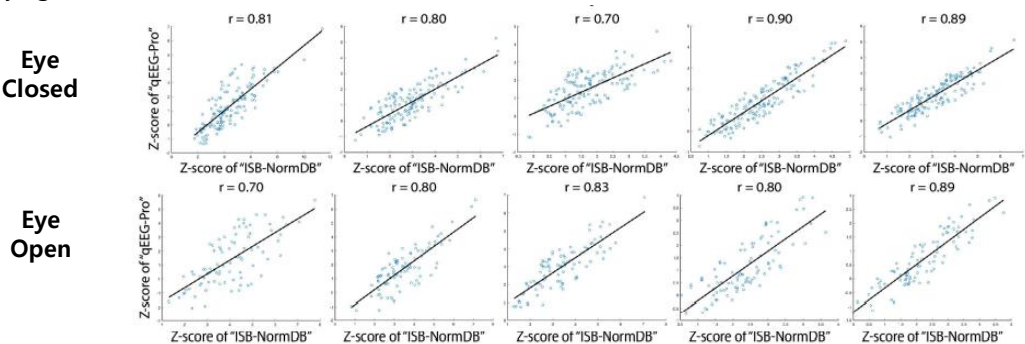
[IGAM(Non-linear) model – OEEG Norm DB]



1. Delta wave sharply decays in the stage of infant and teenager(age 4~19) and after the age 20, the Delta wave is relatively stable. -> As adults, Converges into a stable trend from Theta to Alpha.
 2. Alpha wave shows a strong fluctuation in the stage of infant and teenager(age 4~19). After the age 20, the fluctuation gradually decreases.
 3. Beta wave decreases in the stage of infant and teenager(age 4~19). After the age 20, the Beta wave gradually increases.
- ⇒ Consistent with the previous results. Development of a Model for change in EEG according to age.

[ISB-Norm DB – Verification]

Verifying the z-score correlation between ISB-Norm DB and QEEG-Pro DB



⇒ Indication of high correlation by "r" being greater than 0.7 in every frequency band.

Discussion

- The importance of gender besides the age in the QEEG analysis become clear, and the significance of DB construction is emphasized.
- First Asian Healthy People Standardized Data is established from Seoul National University's EEG data center for 8 years.
- ISB-Norm DB, which verified subdivided age and gender variables, is able to generate a Z-Score, so it is expected to be helpful in the process of the brain disease study,