

# Prospective Study of Brain Wave Changes Associated with Cranial Electrotherapy Stimulation

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## OBJECTIVE

The objective of this study was to explore brain wave changes associated with cranial electrotherapy stimulation (CES) among subjects receiving psychiatric care.

### Design

This was an open label, prospective, convenience sample study.

### Primary Effectiveness Endpoint

The primary effectiveness endpoint was qEEG changes when comparing qEEG results pre- and post-CES treatment.

### Secondary Effectiveness Endpoint

Subjective Units of Distress Scale.

### Protocol Summary

Subjects supplied qEEG data via a wireless

single channel EEG. Subjects then received 20 minutes of CES at a comfortable level. The qEEG was repeated and the results were analyzed for changes. This was an open label study which included 50 subjects from the Psychiatric Continuity Service at Walter Reed.

### Subjects

The study was conducted among active duty service members receiving treatment at the Psychiatry Continuity Service, Walter Reed National Military Medical Center in Bethesda, Maryland.

## Results

There was significant increase ( $p=.000$ ) in the higher beta frequencies following the 20 minute CES treatment. The increase in beta frequencies persisted 10 minutes ( $p=0.000$ ) after the CES treatment was concluded while slower wave activity significantly decreased ( $p=0.014$  and  $p=0.049$ ). There was also a significant difference ( $p=.000$ ) in the subjective units of distress before CES (mean = 4.12) and after CES (mean = 3.26).

## CONCLUSION

Brain wave measurements taken immediately after the 20-minute CES session showed a significant and strong effect in the beta region, suggesting an increase in mental alertness, focus and concentration. Significant changes were seen as quickly as 10 minutes and the strong effect in the beta region persisted through the 10 minute follow up, indicating increased mental alertness. Participants also reported significant reduction in distress following the CES treatment. This finding may be related to the increase in beta wave activity. Improved mental focus and corresponding decrease in distraction may be a welcome relief among individuals with overlapping anxiety, depression and trauma symptoms as reflected in this study group.

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