MECH 493 Web Summary

The Application of EEG in Exploring Brain Function Responses at Different Frequencies of Mechanical Vibration of the Head

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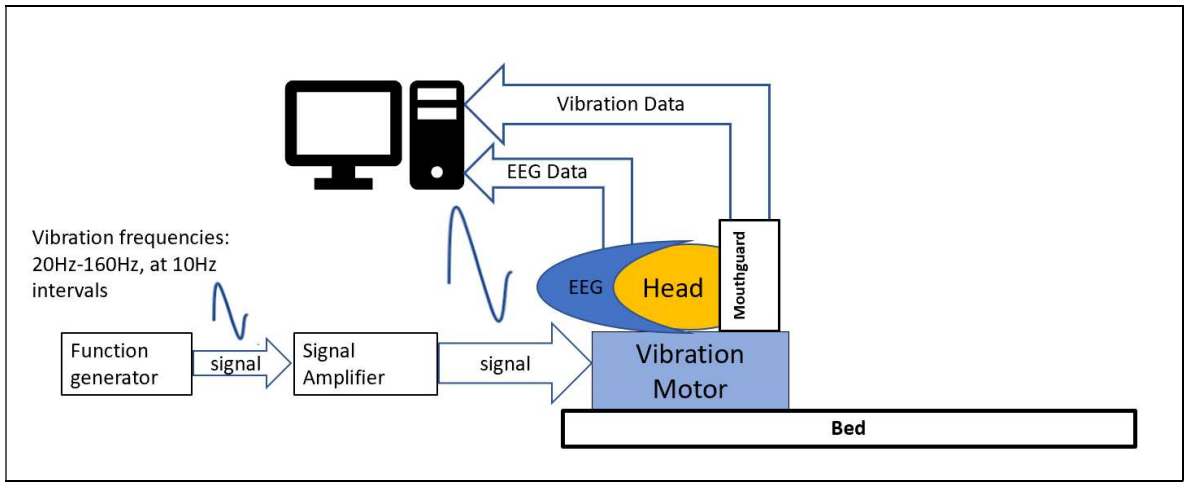

Mild traumatic brain injury (mTBI) is a major health problem caused by mechanical insults to the head. Among potential contributing factors to the injury mechanism, there is an increasing interest in the frequency-dependence of the brain's response to mechanical input. Past research has found that the skull motion frequency has effects on the brain's functional responses. In addition, an imaging technique called magnetic resonance elastography (MRE) has applied varying-frequency mild vibrations to human participants to measure the brain's mechanical properties. In this project, we aim to investigate the relationship between vibration frequency and brain response. By comparing the electroencephalogram (EEG) power spectral densities at different locations on the scalp across different frequencies, we have found that the brain's electrophysiological response changes with head vibration frequency, with higher power generally observed in higher frequencies. Our preliminary experiment was limited by sample size, and further experiments are required for confirming the initial observations. This study has broad implications for injury prevention, by gaining a better understanding of the potential effect of head motion biomechanics on brain function response.