# Short-latency somatosensory evoked potentials following vibrotactile stimulation

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**Abstract**

Somatosensory evoked potentials (SSEPs) are typically elicited through electrical nerve stimulation yielding short- (P9, N9, P11, N11, P13/P14, N18, P20, N20, N30, P45) and long-latency (P100, N150, P250, P350) components. However, for certain experimental paradigms, researchers may prefer using more naturalistic vibrotactile stimuli. While long-latency SSEPs can be reliably evoked using vibrotactile stimulations, there is limited information available on short-latency SSEPs due to their smaller amplitudes. To address this gap and facilitate future SSEP research, we aimed to characterize the short-latency potentials produced by brief vibrotactile stimulations at different amplitudes. Twenty participants received 200 repetitions each of sinusoidal vibrotactile stimulations (20 ms, 280 Hz) at four supra-threshold amplitudes (42, 97, 134, and 190 $\mu$m) in a randomized order. The inter-stimulus interval was set to 2200 ms. Our findings reveal a centro-parietal short-latency (44 - 48 ms) positive peak corresponding to a P45 at the CP3 electrode, located near the somatosensory cortex contralateral to the stimulation. The latency of the P45 component did not differ significantly among the four stimulation amplitudes. Furthermore, a preliminary analysis of the averaged signal during the P45 peak (36-56 ms) demonstrated a significant difference in SSEP amplitude at CP3 based on the stimulation amplitudes. To better contrast short-latency SSEPs elicited by electrical and vibrotactile stimulations, we plan to retest the participants using electrical stimulations. Additionally, we intend to conduct further detailed analyses of all components and their topographies, aiming to present a comprehensive overview of SSEPs following electrical versus vibrotactile stimulations.

**Keywords:** EEG, SSEP, vibrotactile

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