

Somatosensory Evoked Potential Sensitivity

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- **Objective:** Somatosensory evoked potentials (SSEP) are a part of multimodality monitoring utilized during spinal deformity surgery, and may help to reduce post operative deficits that result from iatrogenic injury during surgery (Schwartz et al., 2007, Schwartz et al., 2011, Faulkerson et., 2007, Hwang 2012., & Zuccaro et al., 2017). Alert criteria has been established and a 50% decline in amplitude designates a significant change (Thirumala et al., 2017, Nuwer et al., 2008, Nuwer et al., 1995) This paper examined the the incidence of post operative deficits following 50% decrease and 100% decrease in amplitude from baseline.
- **Methods:** After obtaining IRB approval, a retrospective quantitative analysis was performed on 992-patients (258-male, 734-female). All patients were diagnosed with scoliosis and undergoing spinal deformity correction surgery. SSEPs were stimulated at the posterior tibial nerve at the ankle and recorded from the subcortical and cortical montages. All baselines were obtained by a consistent neuromonitoring team using Caldwell cascade pro. Anesthesia for each patient consisted of a total intravenous anesthetic protocol and no neuromuscular blockade. Baselines were recorded prior to incision and were recorded every 15-20 minutes throughout the entire procedure.

- **Results:** Total number of SSEPs performed and recorded for the 992-patients was 44,056, with 70 amplitude decreases identified. This number of performed/recorded SSEPs was categorized into one of the following groups, 50% decrease in amplitude (N=70) and 100% decrease in amplitude (N=50). Post operative neurological deficits for each group consisted of 50% decrease (1 deficits) and 100% decrease (1 deficits) in amplitude. SSEPs sensitivity was calculated utilizing previous data published on motor evoked potentials. SSEP sensitivity was calculated at 50% decrease (4.4%), and 100% decrease (3.1%) in amplitude.
- **Conclusion:** This study supports the continued utilization of 50% drop in amplitude as an acceptable threshold. Additionally, This study demonstrated low sensitivity for detecting neural injury with Sseps. Furthermore, It is recommended that SSEPs are utilized with Transcranial electric motor evoked potentials to increase the sensitivity and decrease the risk for post-operative neurologic injury.

	number	Neuro Deficit	True pos SSEP	true neg	false pos	false neg	no recovery	Sensitivity- SSEPs	Specificity- SSEPs
total number of SSEPs	44056								
amplitude changes:	70	2	70	42456	0	1530	2	4.4%	100.0%
50 percent decrease	70	1	70	42456	0	1530	1	4.4%	100.0%
100 percent decrease	50	1	50	42456	0	1550	1	3.1%	100.0%

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