

**Title of Abstract:** “Patient Transparent” Intraoperative Neurophysiological Monitoring in Minimally Invasive Spine Surgery (MISS).

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**Introduction:** Electro-diagnostic tests including EMG, SSEP (somatosensory evoked potentials), and surface EEG have been successfully utilized as reliable diagnostic and monitoring techniques for spinal surgery, in compressive radiculopathy, in spinal cord injuries in order to prevent undue neural trauma and to facilitate a safer MISS.

**Methods:** The information obtained and interpreted by various neuro monitoring modalities such as EMG, SSEP, Motor evoked potentials, triggered EMG and surface EEG are reviewed. The major benefits and limitations of each modality or in combination of other modalities and overall value as a diagnostic/monitoring tool to prevent undue neural trauma are presented. With increased utilization of multiple-complex digital high tech technologies and advanced surgical instruments in the digital operating room (DOR) for MISS procedures, a “seamless digital technology convergence and DOR control system”, SurgMatix® system provides a real time monitoring of neuro compressive effect, and neuro decompressive effect from MISS, was created to monitor MISS and to prevent undue neural trauma.

**Results:** NCV and EMG intraoperative neurophysiological monitoring with SurgMatix® during endoscopic MISS significantly prevents undue neural trauma. The routine nerve root myotomal distribution and monitoring indications are presented. Also neurophysiological surface EEG (BIS system) monitoring is utilized to achieve optimal and safe anesthesia and reducing amount of the anesthetics.

**Conclusion:** Intraoperative neurophysiological monitoring, with EMG, EEG and all patient related wave form and imaging information on a real time basis facilitates a safer MISS. The seamless SurgMatix® system was developed to fulfill the need of technological convergence, integration and control in neurophysiological monitoring, and in order to provide a “patient centric” and “patient transparent” DOR to improve surgical patient safety and quality of care.

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