

## Galvanic Couple- An artifact during intraoperative electromyography neuromonitoring

Ronald Pearlman  
Howard University, USA

Electromyographic monitoring is a commonly employed neuromonitoring modality for protecting cranial and peripheral nerves for a variety of neck, cranial and spinal surgeries. An artifact resembling an electromyographic (EMG) response caused by contact between two metal instruments within the surgical field may contaminate the interpretation of mechanically-elicited or electrically induced activity. A series of manipulations were devised to determine if this artifact: 1) required an electrolytic medium for its occurrence, 2) could be produced between a metal and nonmetal object, 3) could be detected in a control channel outside the surgical site, 4) could be detected in background waveforms using parameters for averaging a somatosensory evoked potential (SSEP), and lastly 5) could be quantified electrically. The metal-to-metal artifact could be produced when instruments make contact in a fluid medium such as when two instruments are in contact during spinal nerve root manipulation. In contrast, metal-to-nonmetal contact did not produce the artifact in or outside a fluid medium. This artifact was not detected on a control channel from surface electrodes over the deltoid muscle. When tapped or rubbed the artifact sounded like an EMG response, but the morphology was unique. Only when the two metals were rubbed together were the morphologies and sounds similar to an EMG response. Metal-to-metal contact in a fluid medium did not produce an artifact that could be detected in the background activity recorded using parameters for an SSEP. The electrical potential discharge was approximately 100mV after the instruments stayed in solution and made contact after 150 seconds. This artifact is likely attributable to current discharge when two metals contact, a phenomenon referred to as a galvanic couple.

[rpearlman@howard.edu](mailto:rpearlman@howard.edu)