In a prospective nonrandomized trial without controls, we selected consecutive patients to undergo intraoperative mechanomyography (MMG) during instrumented lumbar spine surgery. MMG testing was performed at the original pilot hole, after tapping, and after screw placement, with the minimum current to elicit a recorded MMG response. All patients underwent a postoperative computed tomography scan, and a single radiologist interpreted each pedicle to identify breach. Chi-square test was used to compare patients with and without breaches. Two sample t-tests were used to compare changes in functional outcomes. Sensitivity and specificity of MMG was computed using receiver operating characteristic analysis.

There were 122 consecutive instrumented lumbar surgery patients enrolled, with a total of 890 lumbar pedicle screws tested with MMG. The medial or inferior breach rate was 2.25%, with no statistically significant difference in Oswestry Disability Index or Visual Analog Scale between patients who breached and who did not. For the MMG measurement from the original pilot hole, the area under the receiver operating characteristic was 0.835; the maximum combination was sensitivity (80.42%) and specificity (80.6%) was found for MMG current ≤12mA. We found that an MMG cutoff of >12mA resulted in a 99.5% likelihood of no medial or inferior breach.

MMG can be safely used during instrumented lumbar spine surgery. A cutoff value of >12mA for MMG can accurately predict and prevent medial and inferior pedicle screw breach [1)].

1)
Zakaria HM, Tundo KM, Sandles C, Chuang M, Schultz L, Aho T, Bartol SW, Abdulhak M. Mechanomyography (MMG) for intraoperative assessment of cortical breach during instrumented spine surgery. World Neurosurg. 2018 Jun 21. pii: S1878-8750(18)31221-X. doi: 10.1016/j.wneu.2018.06.007. [Epub ahead of print] PubMed PMID: 29936205.