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Combined magnetic field is superior to pulsed electromagnetic field bone stimulation after thoracolumbar fusion surgeryMahboub El Hashemi¹, Khoi D Than² and Barry Cheaney²¹International University of Africa, Sudan²Oregon Health & Science University, USA

Introduction: Bone growth stimulators have been used as an adjunct to spinal fusion surgery in efforts to increase fusion rates. These electrical stimulators are designed to deliver electrical fields that modulate bone cell activity to enhance bone formation. In this study, fusion rates were compared in patients using pulsed electromagnetic field stimulation (PEMF; Orthofix, Lewisville, TX) versus combined magnetic field stimulation (CMF; DJO Global, Vista, CA) after thoracolumbar fusion surgery.

Methods: The authors retrospectively reviewed the medical records for patients who underwent thoracolumbar fusion surgeries (posterolateral only, interbody only, or posterolateral and interbody) by a single surgeon and were prescribed bone growth stimulators. The patients were separated into two groups, either PEMF or CMF, and computed tomography radiographic results at one year of follow-up were compared (solid fusion, stable nonunion, and pseudarthrosis).

Results: A total of 44 patients were included; 19 were prescribed PEMF and 25 were prescribed CMF. There were no significant differences between age, sex, BMI, or tobacco use in the two groups. The average number of spine levels treated was 4.58 for PEMF and 3.64 for CMF, with an average follow-up of 14.47 months and 14.16 months, respectively. Of the 19 PEMF patients, 13 (68.4%) demonstrated radiographic evidence of solid fusion and five (26.3%) displayed pseudarthrosis. Of the 25 CMF patients, 20 (80%) demonstrated solid fusion and two (8%) displayed pseudarthrosis. Two (8%) patients with PEMF required re-operation for pseudarthrosis, compared to zero patients with CMF. These findings were all statistically significant.

Conclusions: This is the first study to compare PEMF and CMF bone growth stimulators in patients who underwent thoracolumbar spinal fusions. Patients using CMF postoperatively appear to have higher rates of solid fusion, lower rates of pseudarthrosis, and lower rates of re-operation when compared to PEMF.

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