

# Pulsed electromagnetic fields as adjuvant therapy in bone healing and peri-implant bone formation: an experimental study in rats.

by Daniel R Grana, Hernán J Aldana Marcos, Gabriel A Kokubu

Acta odontologica latinoamericana AOL (2008) , Volume: 21, Issue: 1, Pages: 77-83

## Abstract

---

The objective of this study was to determine whether short exposure to pulsed electromagnetic fields (PEMF) accelerates bone repair and peri-implant bone formation in a rat tibial model at different times. Sixty Wistar rats were employed. Sterile custom fabricated commercially pure cylinder threaded titanium implants were placed in the right tibial crest, and an osteotomy was performed in the left tibial crest of each animal. Thirty rats were treated with PEMF (72 mT 50Hz), twice a day in sessions of 30 minutes each, and 30 rats of the control group were sham-treated. Rats were sacrificed at 5, 10 and 20 days postsurgery (n = 10 per group). Tibias were fixed in formaldehyde and decalcified, embedded in paraffin, and stained with hematoxylin-eosin (half samples of left tibias), or they were included in methylmethacrylate, grinded and polished (right tibias and half samples of left tibias). Bone healing was evaluated by image analysis in terms of ossification area, and perimeter and diameter of the lesion. Peri-implant ossification was assessed in terms of ossification percentage. At day 10 the area of ossification index was higher in the PEMF group than in the control group (p = 0.012). At day 20 the osteotomies of the PEMF group were almost completely remodeled. The ossification percentage was higher in the PEMF group (p = 0.018). In conclusion, short daily electromagnetic stimulation appears to be a promising treatment for acceleration of both bone-healing and peri-implant bone formation.