1: Clin Oral Implants Res 2000 Aug;11(4):354-60

Pulsed electromagnetic fields promote bone formation around dental implants inserted into the femur of rabbits.

Matsumoto H, Ochi M, Abiko Y, Hirose Y, Kaku T, Sakaguchi K.

Department of Fixed Prosthodontics, School of Dentistry, Health Sciences University of Hokkaido, Ishikari-Tobetsu, Hokkaido 061-0293 Japan.

The present study examined the effect of applying a pulsed electromagnetic field (PEMF) on bone formation around a rough-surfaced dental implant. A dental implant was inserted into the femur of Japanese white rabbits bilaterally. A PEMF with a pulse width of 25 microseconds and a pulse frequency of 100 Hz was applied. PEMF stimulation was applied for 4 h or 8 h per day, at a magnetic intensity of 0.2 mT, 0.3 mT or 0.8 mT. The animals were sacrificed 1, 2 or 4 weeks after implantation. After staining the resin sections with 2% basic fuchsin and 0.1% methylene blue, newly formed bone around the implant on tissue sections was evaluated by computer image analysis. The bone contact ratios of the PEMF-treated femurs were significantly larger than those of the control groups. Both the bone contact ratio and bone area ratio of the 0.2 mT- and 0.3 mT-treated femurs were significantly larger than the respective value of the 0.8 mT-treated femurs ($P < 0.001$). No significant difference in bone contact ratio or bone area ratio was observed whether PEMF was applied for 4 h/day or 8 h/day. Although a significantly greater amount of bone had formed around the implant of the 2-week treated femurs than the 1-week treated femurs, no significant difference was observed between the 2-week and 4-week treated femurs. These results suggest that PEMF stimulation may be useful for promoting bone formation around rough-surfaced dental implants. It is important to select the proper magnetic intensity, duration per day, and length of treatment.

PMID: 11168228 [PubMed - indexed for MEDLINE]