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Evaluation of Pulsed Electromagnetic Fields on Bone Healing After Implant Placement in the Rabbit Mandibular Model

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Abstract: Although bone healing around titanium implants has already been evaluated, the effect of pulsed electromagnetic fields (PEMF) during the period of bone maturation around titanium dental implants has not yet been investigated. The aim of this study was to evaluate the effects of PEMFs on bone formation following the insertion of titanium-dental implants in the rabbit mandibular model. Ti-6Al-4V (Sulzer Calcitek, California, USA) dental implants were inserted into the mandibulae of 28 New Zealand rabbits (6 weeks old). Fourteen were stimulated with PEMFs for 2 consecutive weeks, 4 h/day, at a magnetic intensity of 0.2 milli Tesla (mT), while the other 4 animals were not treated (control group). The rabbits were sacrificed at 2 and 8 weeks (after 6 weeks of non-stimulation) for histopathologic analysis around the implants. No significant difference in bone osteoblastic activity, new trabecular bone and fibrous tissue formation were observed between the control and the PEMF treated groups. However, significant differences in bone osteoblastic activity and new trabecular bone formation were observed between the control group and the PEMF treated group at week 8 ($p<0,001$). These results indicate that PEMF had an effect on the bone inductive properties in the area surrounding the implant.

Key Words: Electromagnetic field, implant, bone healing

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