Influence of magnet on tissue healing after immediate implantation in extraction sockets of dogs

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Background

The clinical use of electric and electromagnetic fields for fracture healing applications began in the early 1970s. Since then, several technologies have been developed and shown to promote healing of fractures. Developments of these devices have been aided in recent years by basic research and several well controlled clinical trials not only in the medical field but in dentistry

Aim/Hypothesis

The aim of this study was to compare alveolar bone reduction following immediate implantation using implants onto which magnets were attached in fresh extracted sockets

Materials and Methods

Four mongrel dogs were involved. Full buccal and lingual mucoperiosteal flaps were elevated and third and fourth premolars of the mandible were removed. Implants with magnets and implants without magnets were installed in the fresh extracted sockets(Fig1) and after 3 months of healing the animals were sacrificed. The mandibles were dissected and each implant sites were sampled and processed for histological examination

Fig. 1. Photograph illustrating the position of the implants placed.

Results

The marginal gaps that were present between the implant and walls of the sockets at the implantation stage disappeared in both groups as a result of bone fill and resorption of the bone crest. The buccal bone crests were located apical of its lingual counterparts. At the 12 week interval the mean of marginal bone resorption in the control group was significantly higher than that of the magnet group(Fig2,3). The majority of specimens in magnet group presented early bone formation and less resorption of the buccal marginal bone compared to the control group(Table I,II).

Fig. 2. Micrographs showing longitudinal buccal section of magnet group (A) and control group (B) after 12 weeks of healing in the cervical region of the implants. CT, connective tissue; E, epithelial tissue; I, implant. (H-E staining; original magnification×40).

Fig. 3. Micrographs showing longitudinal lingual section of magnet group (A) and control group (B) after 12 weeks of healing in the cervical region of the implants. B, bone; CT, connective tissue; E, epithelial tissue; I, implant. (H-E staining; original magnification×40).

Table I. Results of histometric measurements (mm) describing the distance between the landmarks (mean ± SD)

	M-BI		
	Buccal	Lingual	Total
Magnet group	1.46 ± 0.18*	0.88 ± 0.17*	1.17 ± 0.34*
Control group	2.96 ± 0.29*	2.19 ± 0.24*	2.58 ± 0.48*
Total	2.21 ± 0.82*	1.54 ± 0.70*	

*represents significant difference according to paired t-test ($P < .05$).

Conclusions and Clinical Implications

Within the limitations of this study, it could be concluded that implants with magnets attached in the early stages of implantation may provide more favorable conditions for early bone formation and reduce resorption and remodeling of marginal bone

References

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Table II. Bone-to-implant contact percentage of the implant (mean ±SD)

	Bone to implant contact (%)		
	Buccal	Lingual	Total
Magnet group	50.7 ± 17.7*	55.0 ± 7.2	52.9 ± 13.2
Control group	28.7 ± 21.9*	45.0 ± 19.7	36.9 ± 21.7
Total	39.7 ± 22.3	50.0 ± 15.2	

*represents significant difference according to paired t-test ($P < .05$).