**Endosseous Implants**


This article tested the belief that resonance frequency analysis (RFA) of implants is a predictor of the strength of the implant-bone interface. Ten dogs had all their premolar teeth removed. After 3 months of healing, 80 implants were placed in the mandibles. At the time of placement, bone density was assessed by measuring the torque required to tap the bone, and implant stability was tested using RFA. After 1 month of healing, 5 dogs were killed; the remaining 5 were killed after 3 months of healing. At the time of sacrifice, RFA was performed on all implants. The mandibles were removed, and the implant bone interface was analyzed histomorphometrically. The results indicated that at the time of implant placement there was no correlation between bone density and RFA. At 1 and 3 months of healing there was no correlation between the RFA values and bone-to-implant contact and peri-implant bone density. These results suggest that RFA does not act as a predictor of the actual bone-to-implant interface.


This review paper examined the validity of using Periotest (Gulden-Medizintechnik, Germany) and resonance frequency analysis (RFA) as a predictor of implant stability and failure. The authors conducted a review of the literature examining studies that examined both the Periotest device and/or RFA. The studies involving RFA often cite a number dubbed the implant stability quotient (ISQ). Those implants with higher ISQ numbers were thought to be more stable. Research demonstrated that implants with progressively decreasing ISQ values may be an indicator of failure. Stable implants have been found to maintain ISQ values. However, the authors state that there is no value of ISQ that can indicate if an implant is stable or failing. Thus they state that RFA has little clinical value. The Periotest device, like RFA, is postulated to detect implant stability. The Periotest values (PTV) have been shown to be related to several factors, including striking position on the abutment and location within the jaw (maxilla/mandible). Negative PTVs have been demonstrated to indicate stable implants whereas high positive PTVs have been associated with unstable implants. Despite this, the authors stated that single PTV readings are of limited clinical value because these values have not been shown to reflect the nature of the bone-to-implant interface. Rather, multiple PTVs of the same implant over time can indicate increasing or decreasing implant stability. The conclusion of the paper was that single RFA and Periotest readings are of limited clinical value. The ability of these devices to predict loss of implant stability has not been established.


This study examined the effect of irradiation on the bone adjacent to implants. Eleven dogs were separated into 3 groups: 4 who had irradiation 4 weeks after implants were placed, 4 who had irradiation 8 weeks prior to implant placement, and 3 without irradiation. A total of 88 implants were placed into the mandibular premolar and molar regions. The dogs received fluorescent markers of osteogenesis both at the time of implantation and on the second day of irradiation. The dogs were killed 6 months postimplantation. The results indicated that 3 of 88 implants were mobile at 6 months postplacement. These were in the dogs with irradiation prior to implantation. The irradiated groups demonstrated more porosity and less homogenous distribution of mineral compared to the control groups. Bone remodeling was in progress several weeks after irradiation. The authors concluded that osseointegration could be obtained after irradiation. They recommended a 6-month waiting period after irradiation prior to implant placement.


This animal study examined the effect of implant perforation into the maxillary sinus. Eight dogs had the maxillary premolars and first molar removed bilaterally. After 3 months of healing, implants were placed such that they perforated the sinus 2, 4, or 8 mm. After 6
months of healing, the computed tomography scans of the sinus were performed and then the animals were killed and the tissues were subjected to histologic analysis. The results indicated that there were no signs of pathology in the sinuses and no implants lost integration. The implants that perforated the sinus 2 mm were surrounded by sinus membrane. Those that perforated the sinus 4 and 8 mm were not fully covered by sinus membrane. No inflammatory reactions were noted. These results suggest that implant penetration into the sinus may not result in any inflammatory reaction.

**BASIC RESEARCH**


This article examined the ability of experimental implants to osseointegrate. Two groups of 10 implants were inserted into the tibia of rabbits. The experimental implants were screw-shaped titanium implants with a magnesium ion incorporated oxidized surface. The control implants were machined screw-shaped titanium implants. The rabbits were killed at 3 and 6 weeks postimplant placement. The implants were tested for removal torque, and osseointegration speed was measured by comparing removal torque at 3 and 6 weeks. The results indicated that the removal torque and speed of osseointegration was significantly greater in the experimental implants. Moreover, the bonding failure of the experimental implants was within the surrounding bone compared to the control implants that failed at the implant bone interface. This paper suggested that this surface treatment may result in an improved bone-to-implant integration.

**Bone Grafting**


This paper outlines a technique for preoperatively sizing allogeneic block grafts prior to their placement. The patient is first sent for a computed tomography (CT) scan of his or her jaw. Using the CT data, a 3-D model of the jaw to be grafted is fabricated. The model is then sterilized and under sterile operating conditions the block allografts are prepared to fit the sterile model, including screw access holes and finally fixating the grafts to the model with the appropriate titanium screws. The model is then transferred to a sterile envelope and saved for surgery at a later date. At the surgical appointment, the area to be grafted is exposed and decorticated. The allografts are removed from the model and rehydrated in 0.9% saline. Subsequent to this, the grafts are secured to the edentulous ridge with the titanium screws. Voids are filled with particulate material, and the block grafts are covered with resorbable collagen membranes. The grafts are left for 5 to 6 months prior to uncover, screw removal, and implant placement. The author demonstrated this technique with a case presentation about a patient who received a premaxilla graft and subsequent implant placement.