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placed in the mandibles immediately following extraction of premolar teeth in 1 group of 4 dogs and following 6 months of healing in a second group of 4 animals. The implants were allowed to heal for 8 months underneath the mucosa before they were removed and examined histologically. Fluorochrome dyes were injected at 2 different times during the 8 months of healing. All implants in both groups osseointegrated. Implants placed immediately had 76% of their surface covered with bone and implants placed after bone healing had 81% of their surface covered with bone. The implants placed following bone healing had a larger number of hemidesmosomes and a shorter soft tissue to implant zone when compared to implants placed immediately following extraction of the teeth. The differences, however, were small and not statistically significant. The authors concluded that the differences in bone and soft tissue healing between immediate and delayed implant placement are minimal. (BEIRNE)

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BRODBECK WG, SHIVE MS, COLTON E, NAKAYAMA Y, MATSUDA T, ANDERSON JM. Influence of biomaterial surface chemistry on the apoptosis of adherent cells. *J Biomed Mater Res* 2001;55:661-668.

A common component of the foreign-body response to implanted materials is the presence of adherent macrophages that fuse to form foreign-body giant cells (FBGCs). These multinucleated cells have been shown to concentrate the phagocytic and degradative properties of macrophages at the implant surface and are responsible for the damage and failure of the implant. Therefore, the modulation of the presence or actions of macrophages and FBGCs at the material-tissue interface is an extensive area of recent investigations. A possible mechanism to achieve this is through the induction of the apoptosis of adherent macrophages, which results in no inflammatory consequence. We hypothesize that the induction of the apoptosis of biomaterial adherent cells can be influenced by the chemistry of the surface of adhesion. Herein, we demonstrate that surfaces displaying hydrophilic and anionic chemistries induce apoptosis of adherent macrophages at a higher magnitude than hydrophobic or cationic surfaces. Additionally, the level of apoptosis for a given surface is inversely related to that surface's ability to promote the fusion of macrophages into FBGCs. This suggests that macrophages fuse into FBGCs to escape apoptosis. (ANDERSON/STANFORD)

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CRUZ M, REIS CC, MATTOS FD. Implant-induced expansion of atrophic ridges for the placement of implants. *J Prosthet Dent* 2001;85:377-381.

The applicability of endosseous implants is directly related to the topography and quality of the patient's residual bone. Several techniques have tried to expand the applicability through implant design alterations and surgical techniques for bone augmentation. This article describes an implant-induced bone expansion procedure that facilitates the placement of implants in atrophic alveolar ridges. This procedure expands the cortical plates of the alveolar ridges with or without fracture using wedge-shaped implants and the principles of guided-tissue regeneration. The use of implants of larger diameters and the remodeling of the ridge external contour can be achieved with this procedure. (CRUZ/STANFORD)

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CHANG CK, WU JS, MAO DL, DING CX. Mechanical and histological evaluations of hydroxyapatite-coated and noncoated Ti6Al4V implants in tibia bone. *J Biomed Mater Res* 2001;56:17-23.

This paper evaluates the behavior of hydroxyapatite (HA) coated and noncoated Ti6Al4V implants in dog tibia after 3 and 5 months' implantation. The coated implants were obtained by plasma spraying. XRD, SEM, and EPMA were employed to estimate the coating characteristics and their behavior in vivo. Investigation of material characteristics showed that the as-received coatings consisted mainly of amorphism and HA phase. Other phases such as TCP and CaO were identified because of thermal changes of HA particles in plasma flame. SEM micrographs showed a typical microstructure of plasma-sprayed coating. The as-received coating was formed by well melted, pancake-like splats that lead to a dense coating with a rough surface. Lamellar structure, micropores, and microcracks, observed inside the coating, are characteristic of plasma spraying. Push-out tests revealed that HA coating had a significant promotion of interfacial shear strength. The shear strength between bone and MAP-coated implants was much higher than that between bone and noncoated implants because of the different bone-implant interfaces formed after implantation. SEM observation revealed a direct attachment between HA coating and newly formed bone. However, noncoated implants were separated from newly formed bone by fibrous tissues. Ti ions were found to be released into the surrounding environment after long time immersion in body fluid, and thus caused low shear strength. Prolongation of implantation time had different effects on shear strength. It improved the shear strength between MAP-coated implant and newly formed bone. However, it had little effect on that between noncoated implant and surrounding tissues. (CHANG/STANFORD)

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