AN ULTRASTRUCTURAL STUDY OF BABOON TISSUE INTERFACING WITH PYROLYTIC CARBON DENTAL IMPLANTS

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The science of dental implantology has advanced greatly in recent years both in materials development and knowledge of supporting tissue reaction. The ultrastructure of these tissues, however, has not as yet been extensively studied. The purpose of this investigation was to more thoroughly evaluate the ultrastructure of these tissues and to correlate the findings with light microscopic evaluation.

Four blade type endosteal dental implants fabricated of silicon-alloyed, low-temperature-isotropic, pyrolytic carbon (LTI-Si) were surgically placed interdentally between the canine and second molars in the jaw bones of a male baboon. The surgical sites had been edentulatized three months earlier. Each implant had a pergingival post which was stabilized with a cast gold splint which extended from the canine to the second molar. One rod of the same implant material was surgically placed endosteally in the symphysis area of the mandible and was completely buried.

Six months after placement, block sections containing the implants were removed. One half of the blade implants along with the buried rod were fixed for transmission electron microscopy, the other half of the blades for light microscopy. All specimens were embedded in epon. The epon blocks containing the specimens were sectioned into segments measuring approximately 1 mm thick and the implant removed by thermal stress fracturing.

Tissue specimens were then reembedded in epon, oriented and sectioned for either light microscopic or TEM analysis.

Findings: Foreign body giant cells were found at the interface at all levels. There was evidence of a direct bony interface in the areas remote from the pergingival site. There were also areas of considerable osteoblastic activity. An abundance of lymphocytes and plasma cells gave evidence of a chronic inflammatory gingivitis in the pergingival tissue.

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