THE EFFECT OF SURFACE TEXTURE AND BACTERIAL PLAQUE ON THE TISSUES SURROUNDING VITREOUS CARBON IMPLANTS

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While bacterial plaque is a widely recognized etiologic factor in periodontal disease and has been shown to contribute to the disease process commonly found around metal dental endosteal implant devices, several clinicians have denied it plays a significant role in chronic tissue destruction around vitreous carbon dental implants.

It is common clinical practice for the carbon surface in the area of the gingival sulcus to be textured either by sandblasting during fabrication or by instrumentation at the time of crown preparation. It seems reasonable that bacterial plaque retention should be related to surface texture. This study, therefore, involved both surface texture and bacterial plaque as variables in order to test if these factors were significant in affecting the tissue health around vitreous carbon implants. It also sought to ultrastructurally study the interface tissue.

Twenty-two vitreous carbon rods were implanted in a stump tail monkey (Macaca arctoides) and stabilized with gold splints.

One proximal side of each implant was textured by sandblasting, the other remained glazed. Clinical measurements were taken at regular intervals for (1) amount of crevicular fluid, (2) gingival recession and (3) sulcular depth.

After three months the animal was euthanized. Block sections were fixed either for transmission electron or light microscopy and embedded accordingly. The implant segments were carefully removed from the specimens to be studied by light microscopy prior to paraffin embedding.

TEM analysis illustrated (1) cords of epithelial cells close to surface, surrounded by connective tissue, (2) carbon particles adherant to junctional epithelium, (3) neutrophils amongst the fibroblasts, (4) interface contacting both connective tissue and epithelium in same area, (5) foreign body giant cells at the deep interface, and (6) bone and thin layer of osteoid close to implant at the deep layer.

Paraffin embedded specimens were sectioned and stained. Areas of inflammation and the distance from the gingival crest to the end of the junctional epithelium were measured and recorded.

Clinical data revealed a statistical significance showing increased pocket depth with plaque.

Considerable tearing occurred when the implant segments were removed from their tissue beds. This tearing made measurement difficult and inaccurate. No statistical significance was shown between tissue health (as measured by the microscopic parameters) and either surface texture or plaque, although definite trends were apparent.

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