

A Human Histologic Analysis of Osseotite and Machined Surfaces Using Implants with 2 Opposing Surfaces

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A human histologic study was conducted to compare the percentage of bone-to-implant contact (BIC) at 6 months for Osseotite and machined, commercially pure titanium implant surfaces. To eliminate potential influences caused by differences in bone density at different intraoral locations, 2 mm x 5 mm, threaded, 2-surfaced titanium implants were manufactured; 1 side received the Osseotite surface modification and the opposite side maintained a machined surface. In each of 11 patients, 1 test implant was placed in the posterior maxilla (Types III and IV bone) during conventional dental implant surgery. Following 6 months of unloaded healing, the conventional implants were uncovered, and the test implants and surrounding hard tissue were removed. Histologic analysis indicated that at 6 months of unloaded healing, the mean BIC value for the Osseotite surfaces ($72.96\% \pm 25.13\%$) was statistically significantly higher ($P < 0.05$) than the mean BIC value for the machined surfaces ($33.98\% \pm 31.04\%$). When the BIC values for the machined and Osseotite surface pairs were ranked from high to low based on the machined BIC value range of 93% to 0%, the upper 50th percentile (20 surface pairs) mean BIC value was $86.1\% \pm 16.7\%$ for the Osseotite surfaces and $60.1\% \pm 18.3\%$ for the machined surfaces. The lower 50th percentile (19 surface pairs) mean BIC value was $59.1\% \pm 25.3\%$ for the Osseotite surfaces and $6.5\% \pm 10.8\%$ for the machined surfaces. Differences between mean BIC values for the 2 surfaces in both the upper and lower 50th percentiles were statistically significant ($P < 0.05$). The results of this study indicate that in the poorer quality bone typically found in the posterior maxilla, a statistically significantly higher percentage of bone contacts Osseotite surfaces when compared to opposing machined surfaces on the same implant. INT J PERIODONTICS RESTORATIVE DENT 1999;19(2):117–129.