Biologic width around titanium implants. A physiologically formed and stable dimension over time

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Abstract

Research in implant dentistry has mainly focused on hard tissue integration with much less data available with regards to soft tissue integration involving epithelium and connective tissue. In the present study, the implantogingival junction of unloaded and loaded non-submerged titanium implants has been analyzed histometrically in the canine mandible. In 6 foxhounds, 69 implants were placed. Dogs in the unloaded group were sacrificed 3 months after implant placement. Loaded implants were restored with gold crowns and those dogs were sacrificed after 3 months and 12 months of loading. Non-decalcified histologic sections were analyzed histometrically measuring the dimensions of the Sulcus Depth (SD), the Junctional Epithelium (JE), and the Connective Tissue Contact (CTC). Histometric evaluation revealed that significant changes within tissue compartments (SD, JE, CTC) occurred over time \((P<0.05)\). Sulcus Depth had a mean of 0.49 mm and 0.50 mm after 3 months and 6 months of healing, but after 15 months was 0.16 mm which was significantly different. Similarly, the length of the Junctional Epithelium after 3 months and 6
months of healing was 1.16 mm and 1.44 mm, respectively, and these values were significantly different from measurements taken after 15 months (1.88 mm). The area of Connective Tissue Contact showed a different pattern of change in that after 3 months of healing (1.36 mm) it was significantly different from the same area after 6 months and 15 months which were 1.01 mm and 1.05 mm, respectively. Interestingly, the sum of SD, JE, and CTC, forming the Biologic Width, did not change over the observation period ($P>0.05$). These data indicate that the Biologic Width is a physiologically formed and stable structure over time in the case of non-submerged, one-piece titanium implants as evaluated histometrically under unloaded and loaded conditions. Dynamic changes did occur, however, within the overall Biologic Width dimension. Thus, the use of non-submerged, one-piece implants allow for stable overall peri-implant soft tissues as evaluated under loaded conditions for up to 12 months. Clinical Oral Implants Research 11 (1), 1–11. doi:10.1034