Titanium Particles in Dental Peri-implantitis Tissue

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Objective: Dental peri-implantitis as an acute and chronic form of an inflammatory oral disease is currently considered to have a multifactorial etiology and is characterized by peri-implant bone loss eventually leading to the loss of the dental implant. Titanium wear particles are currently being discussed as a confounding factor in peri-implant diesease.

Material & Methods: Soft and hard tissue biopsies were collected from 30 peri-implantitis patients during explantation. The obtained biopsies were paraffin embedded and sectioned for microscopic analysis. The tissue sections were examined using a polarization microscope to detect metal particles. Synchrotron Radiation X-Ray Fluorescence (SXRF) Spectrometry was then used to identify the nature of these metal particles.

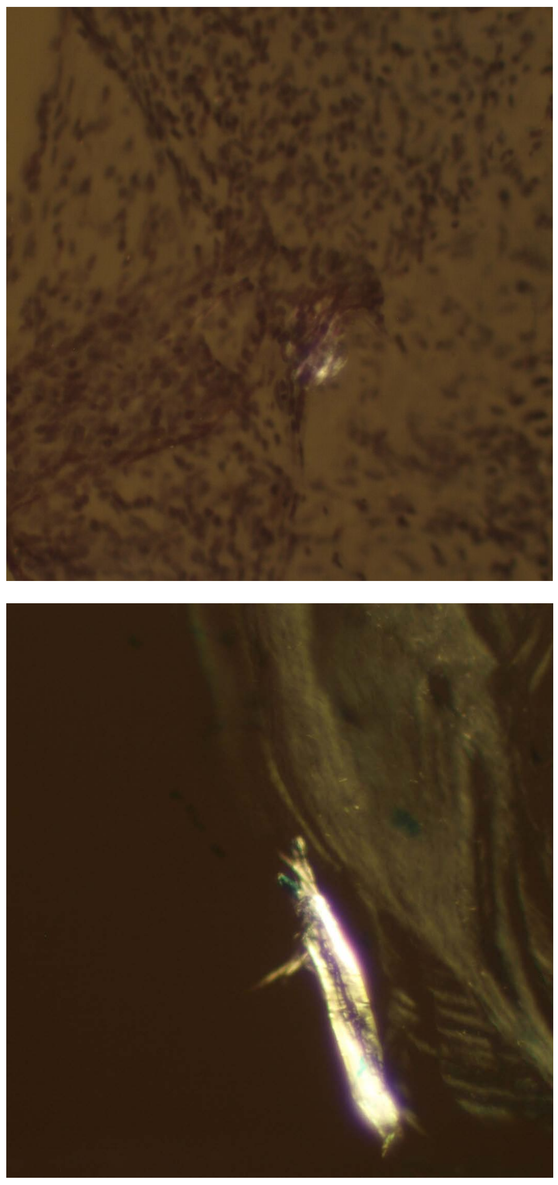

Fig. 1 Metal elements in soft and hard tissue samples – PLM.

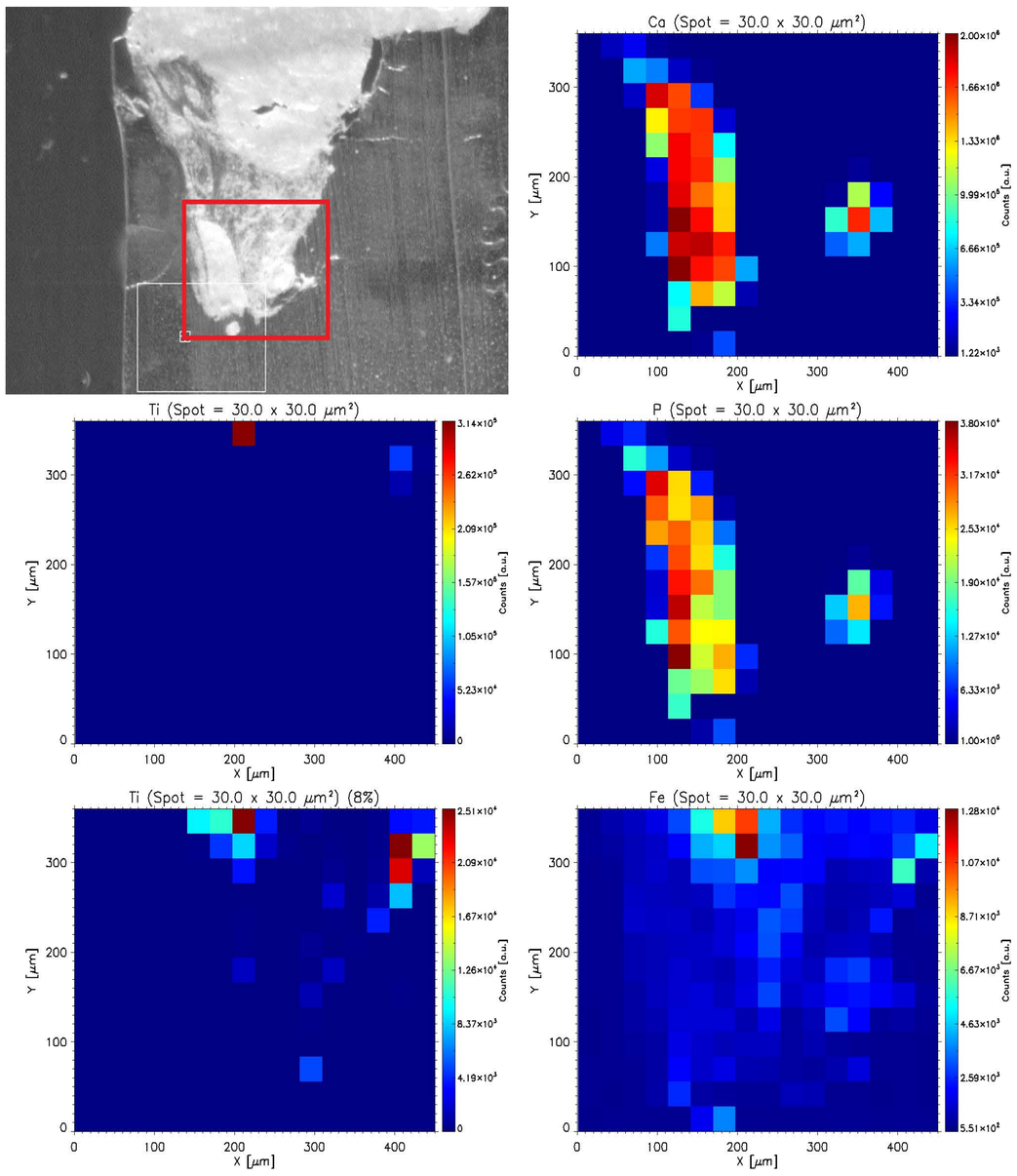

Fig. 2 Area scans of bone sample (25B) showing Ti, Fe, Ca und P content – SXRF.

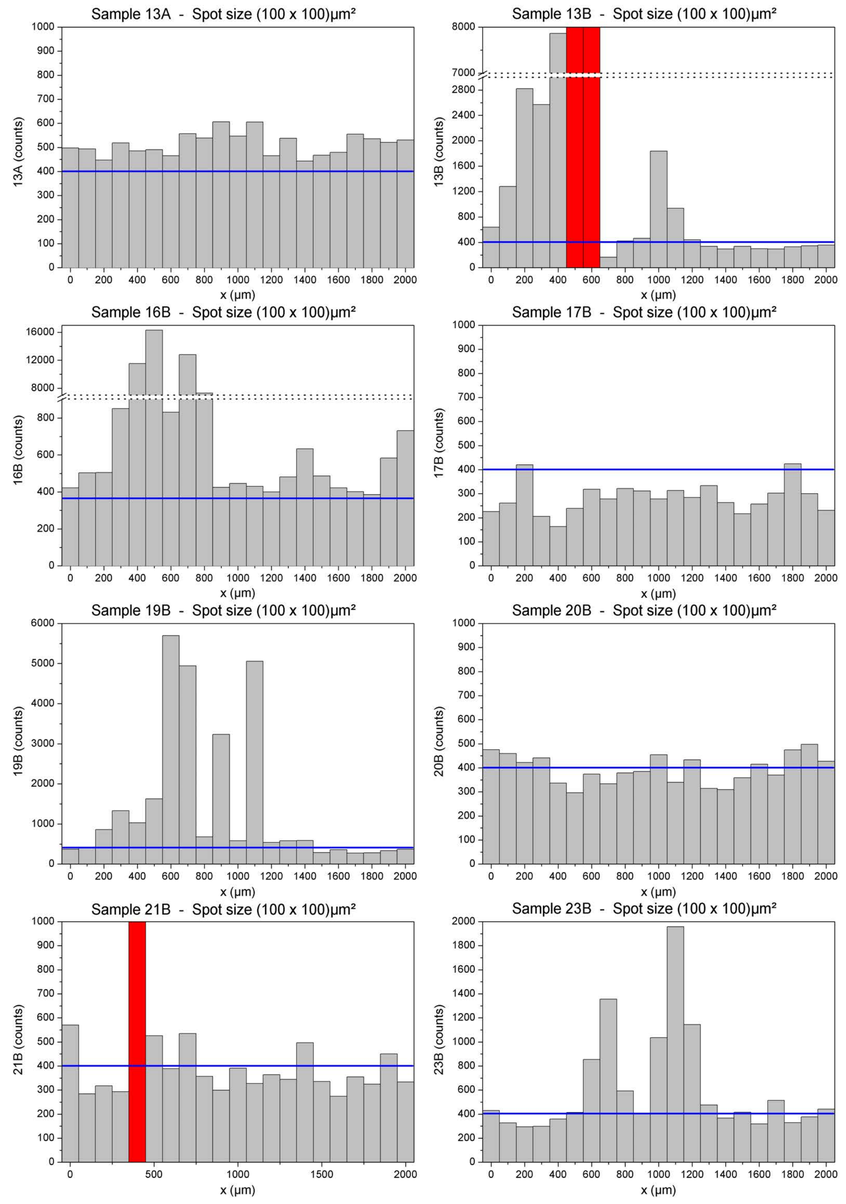

Fig.3 Line scans of 8 different soft and hard tissue samples – SXRF.

Results: In ten of the thirty tissue samples titanium particles were identifiable in soft as well as hard tissue sections using polarization light microscopy (Fig.1) and with SXRF Spectrometry (Fig. 2 & 3). The presence of lymphocytic infiltrate appeared to be in close relationship with the detected titanium particles.

Conclusion: Titanium particles were identifiable in peri-implantitis soft and hard tissue biopsies. The role of these particles in the pathogenesis and/or disease progression remains to be investigated.