

Absence of Titanium Particles After Irradiation of Implants Using Er,Cr:YSGG-Laser

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Introduction

Titanium ions and particles (TiP) are associated with localized inflammatory response and may play a role in further peri-implant tissue breakdown¹. Previous studies from our lab showed presence of TiP after instrumentation using stainless steel curettes and ultrasonic devices².

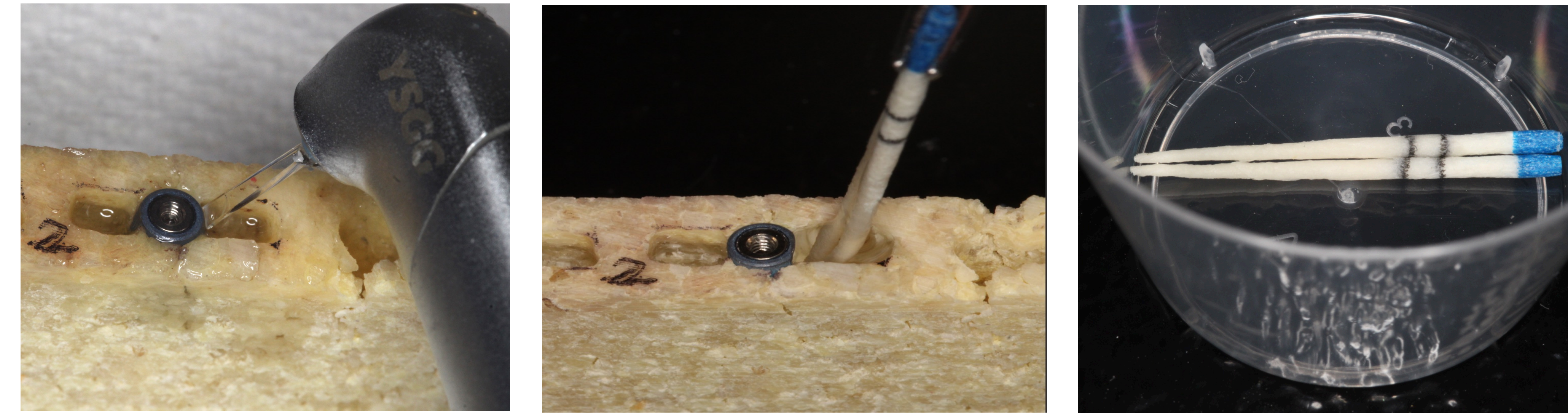
Objective

The purpose of this study was to evaluate the presence of TiP after decontamination of implant surfaces using an Er,Cr:YSGG-laser.

Methods

- An Er,Cr:YSGG-laser (WaterLase MDplus, flat tip MC3-9mm) was used to irradiate the implant surfaces of two implants having two simulated peri-implant defects in type II bone block (Figure 1).
- The Er,Cr:YSGG-laser tip was placed in contact with Ti implant surface at a 45-degree angle, an output power of 2 w and a frequency of 75 Hz (40% water: 2% air).
- The Ti implant surfaces were irradiated by corono-apical strokes for total 30 seconds. Twenty samples were collected using paper points after 15 seconds and after a total 30 seconds of irradiations of implant surface with distilled water spray from the laser device.
- Chemical composition analysis of the liquid samples before and after irradiation were examined with an x-ray fluorescent spectrometer.
- Descriptive statistical analysis was performed.

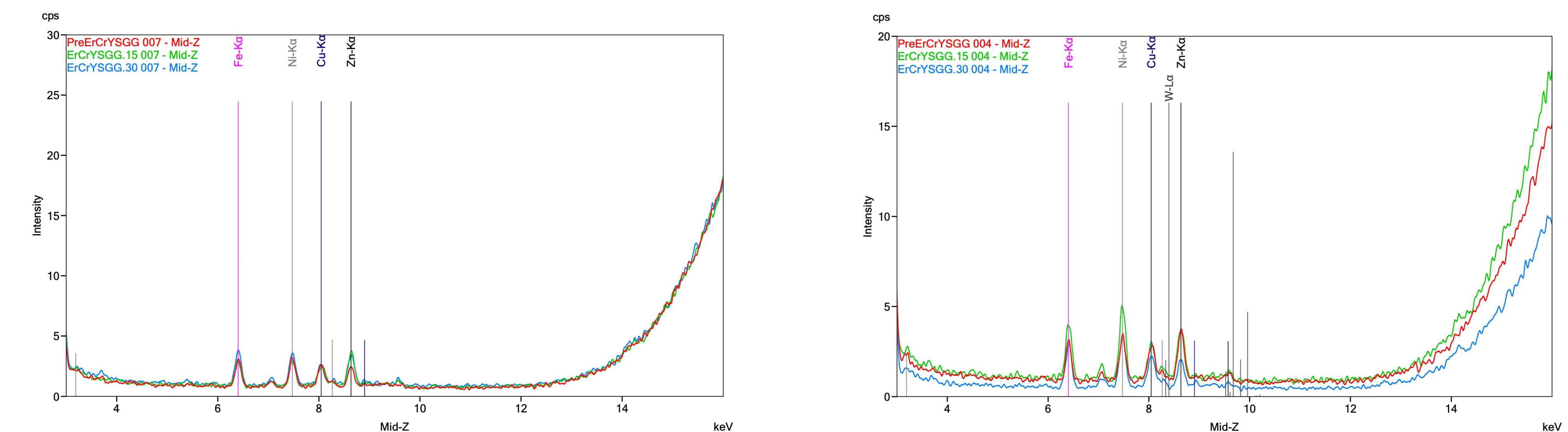
Figure 1. Position of Er,Cr:YSGG-laser inside of the simulated peri-implant defect, collection of samples and x-ray fluorescent spectrometer analysis using endodontic paper points.



Results

Titanium ions were non-detectable at baseline, 15- and 30-seconds after irradiation with Er,Cr:YSGG-laser (Figure 2).

Figure 2. Semi-quantitative spectrometry analysis showed no presence of TiP after irradiation with Er,Cr:YSGG-laser.



Conclusion

Irradiation of titanium implant surfaces using the Er,Cr:YSGG-laser did not result in release of titanium ions and particles and therefore it may be used safely for the treatment of peri-implantitis.

Reference

1. Pettersson, M., Pettersson, J., Johansson, A., Thoren, M.M. Titanium release in peri-implantitis. *J Oral Rehabil.* 2019;46:179-188.
2. Wang, T. (2021, July). Presence of Titanium Particles After Cleaning of Implant Surfaces. Poster presentation at the meeting of International Association of Dental Research, Virtual.