The effect of abutment materials on peri-implant soft and hard tissue level for three years

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Aims:

The aim of this study was to evaluate the effect of peri-implant soft and hard tissue changing level with different abutment materials using X-ray and diagnosis models for three years.

To test the null hypothesis of no difference between with zirconia and titanium abutment with respect to survival and for maintaining healthy hard and soft tissues around dental implant and implant abutments.

Materials and methods:

The patient a healthy, 27 year old female, had four congenital missing teeth of bilateral congenital missing maxillary canines and mandibular second premolars (13, 23, 35 and 45). Besides second primary molars were prolonged retention (Fig. 1). After orthodontic treatment, four camlog K-Series SCREW-LINE Promote plus implants (13, 23: ⌀3.8 mm, length 11mm, 35, 45: ⌀4.3 mm, length 11 mm) have been placed in these regions.

First, two implants were placed in regions 13, 23 with two-stages procedure. Two implants were inserted immediately in regions 35, 45 after flapless tooth extraction (both second primary molars) and gingival formers were placed. Three months after two implants in regions 13, 23 were operated reentry and gingival formers were placed. After uneventful healing, impressions were taken with snap impression posts using a closed tray technique for making provisional screw-retained crown. The provisional screw-retained crowns were placed. After hearing the soft tissue, final impression was taken with custom impression post added representable emergence profile of the provisional crown. A customized zirconia abutment (23, 35) and titanium abutment (13, 45) were placed, and the abutment screw was tightened to the required torque. All ceramic crowns were cemented adhesively (Fig. 2). A baseline peri-apical (PA) radiograph was taken with the use of a film holder device to position the x-ray cone perpendicular to a film positioned parallel to the long axis of the implant (Fig. 3). Standardized intraoral radiograph of the coronal part of the implant was taken (n = 4, two places per1each implant (mesial, distal)) (Fig. 4) and were taken impressions for making diagnostic models for measuring soft tissue level at baseline (n = 2, one place per1each implant (middle)) (Fig. 5), one, two and three years (Fig. 6).

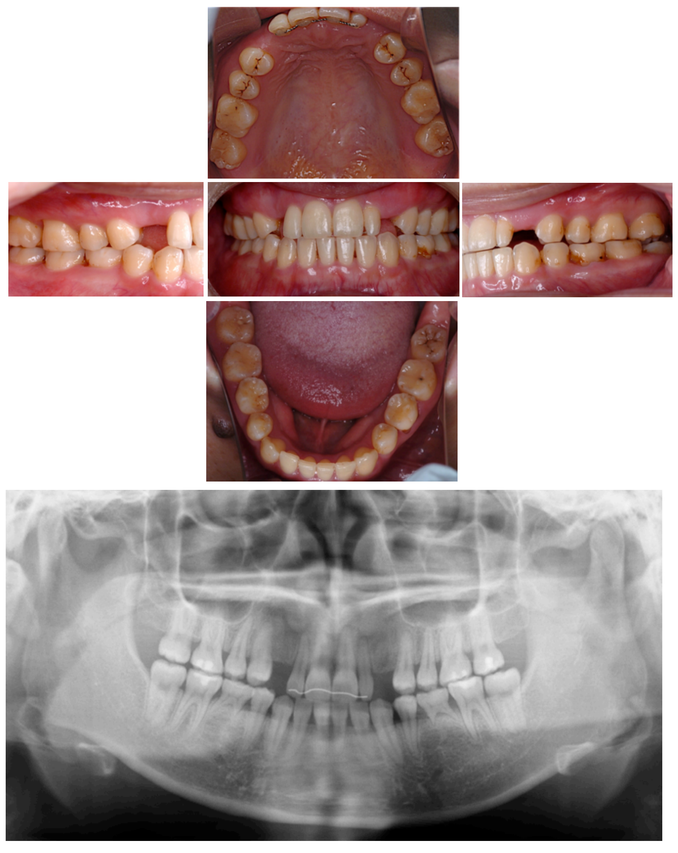

Fig. 1 First visit observations and preoperative panoramic radiograph

Fig. 2 Surgical procedure and prosthetic treatment

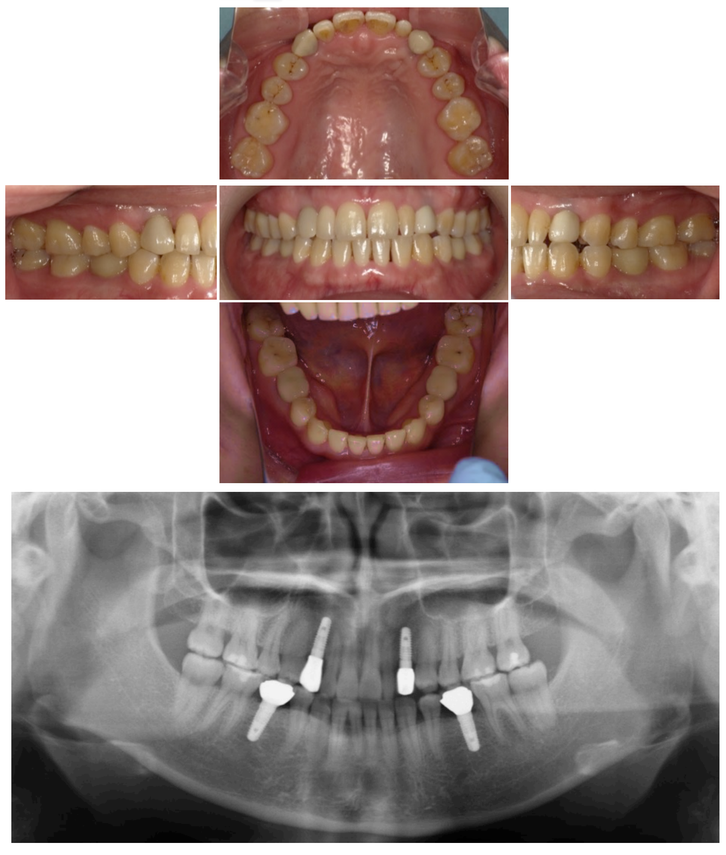

Fig. 6 After three years observations from set final superstructure

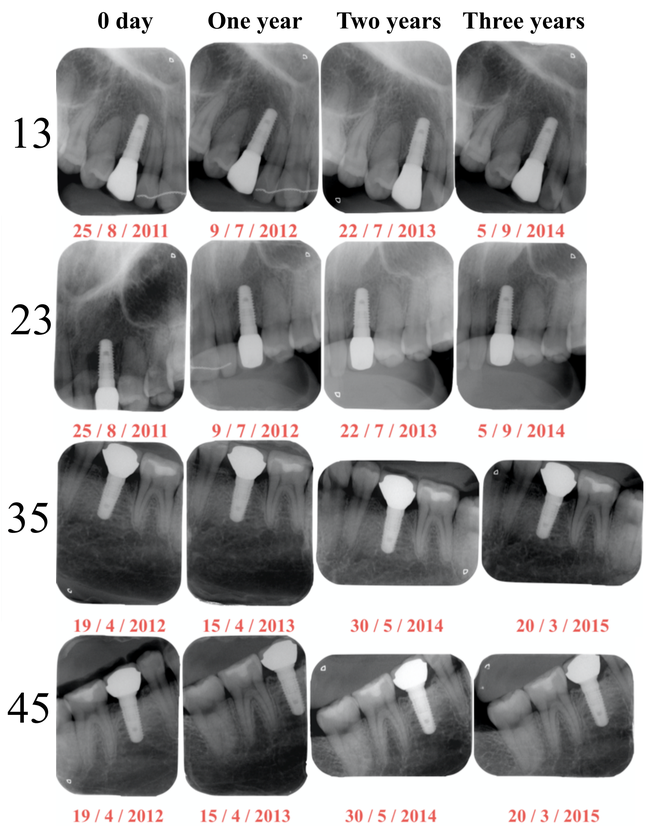

Fig. 3 A film holder device and X-ray images for three years follow-up

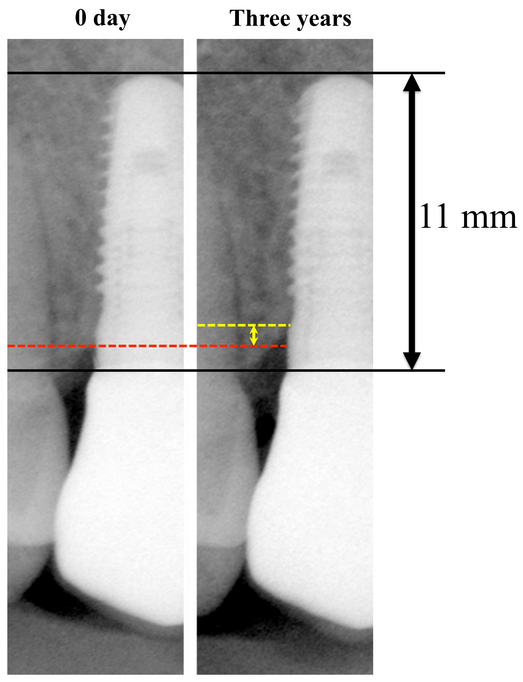

Fig. 4 Measuring area of bone changing value around each implant (mesial, distal) in standardized intraoral radiograph (Red line: baseline, Yellow arrow: measuring area)

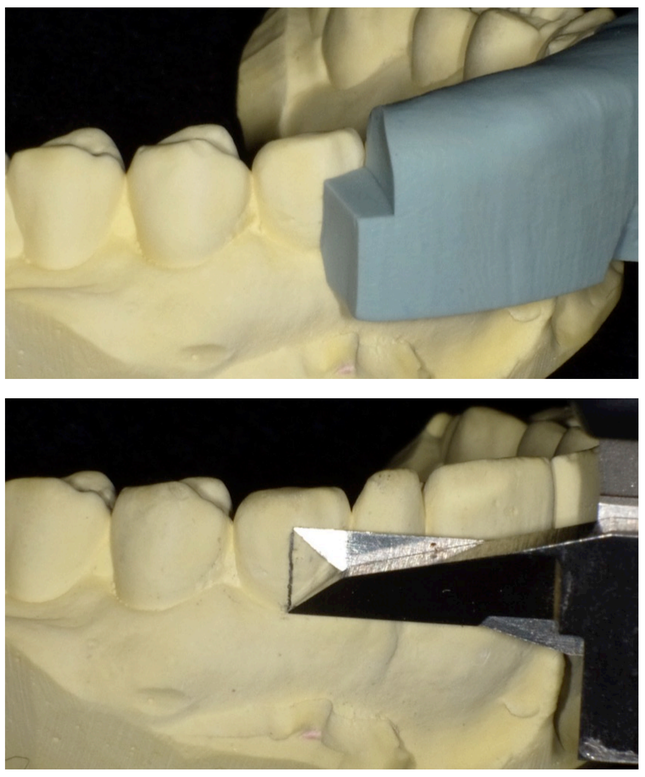

Fig. 5 Measurement of soft tissue level in diagnostic study models

Results:

All implants were successfully integrated at three years, with healthy peri-implant soft tissues. And all abutments were survival. Therefore, the null hypothesis was accepted.

Radiological bone changes: Fig. 7

The bone change values were 0.12 ± 0.23 mm (zirconia abutments: 23, 35) and − 0.03 ± 0.19 mm (titanium abutments: 13, 45) after three years, respectively. (+: loss, −: gain)

Soft tissue changes: Fig. 8

The soft tissue levels were 0.04 mm (zirconia abutments: 23, 35) and 0.19 mm (titanium abutments: 13, 45) recession from a reference line after three years, respectively. (+: loss, −: gain)

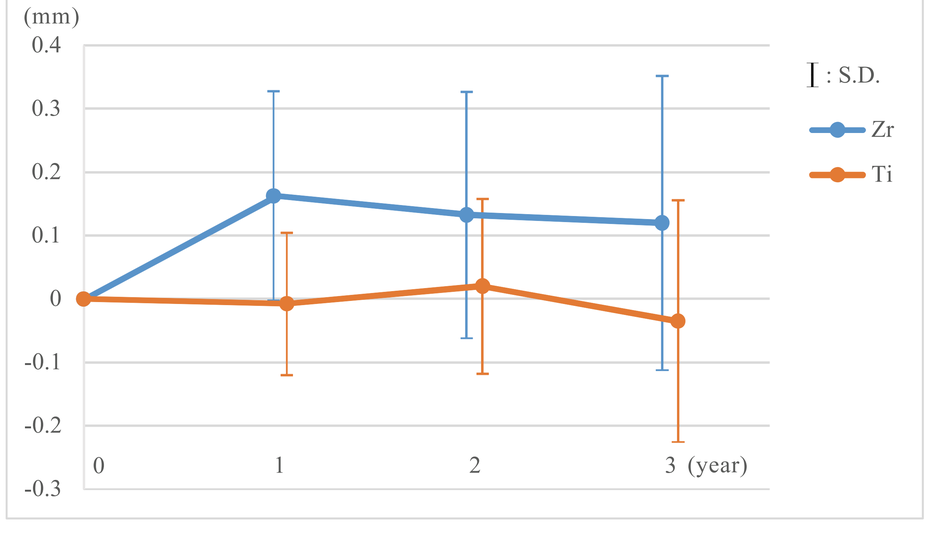

Fig. 7 Radiological bone change value for three years

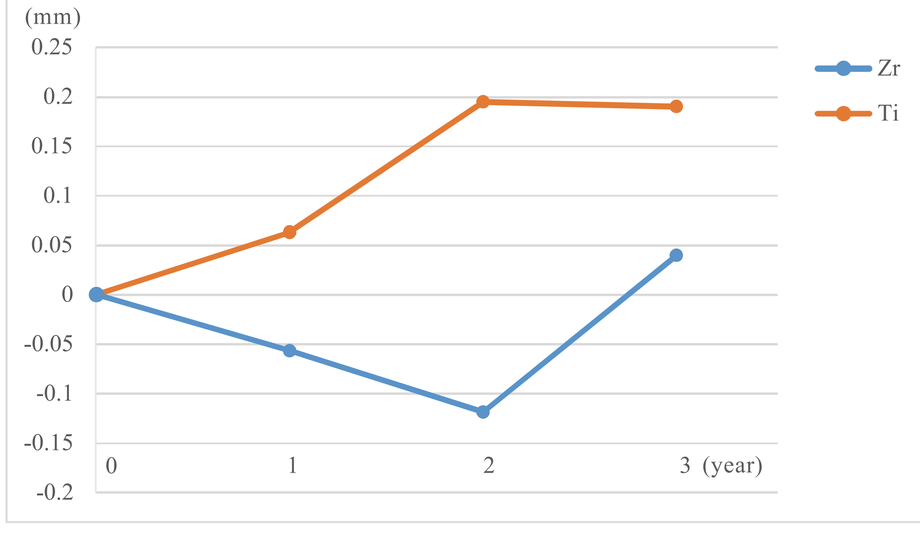

Fig. 8 Soft tissue change value for three years

Conclusions:

There is limited clinical information regarding the effect to hard and soft tissue around implant abutment with zirconia and titanium. Results of this study suggest that both abutment materials (zirconia and titanium) may be effective in reducing bone loss and in preserving esthetics around dental implants.

Acknowledgement:

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