A controlled study on the accuracy and precision of intra-oral radiography in assessing interproximal bone defect morphology around implants.

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Background

The number of controlled studies on the accuracy of intra-oral radiographs in bone level assessment around implants with intra-surgical measurements as a gold standard is limited¹.

Aim

Given these gap in the literature, the primary objective of the present controlled study was to determine the accuracy and precision of intra-oral radiography in assessing interproximal bone defect morphology in patients with peri-implantitis. A secondary objective was to evaluate the possible impact of clinical experience on accuracy and precision.

Methods and Materials

In total 50 peri-implant bony defects in 23 patients who were in need of a surgical treatment, were included. Following reflection of a mucoperiosteal flap and removal of granulation tissue the type of bone defect as classified by Goldman and Cohen (1958)² was determined. This intra-surgical registration was considered the true bone defect morphology. For each interproximal site an intra-oral radiograph was taken. Twenty clinicians determined the bone defect morphology on each intra-oral radiography twice with a wash-out period of 3 months.

Results

Using the Goldman and Cohen classification², the overall accuracy of intra-oral radiography in assessing peri-implant bone defect morphology was slight ($\kappa = 0,126$). In fact, only on average 33% of the defects were correctly classified. There was no significant difference between experienced clinicians and trainees ($p = 0.646$).

Pooling 1-, 2- and 3-wall angular defects into 1 category so called "craterlike defects" had an obvious positive impact on the accuracy of intra-oral radiography ($\kappa = 0.387$), with on average 77% of the defects correctly classified. Clinical experience had no significant influence ($p = 0.541$).

Accuracy of intra-oral radiography in assessing interproximal bone defect morphology

Figure 1: Accuracy of intra-oral radiography in assessing interproximal bone defect morphology around implants.

Duplicate evaluation of intra-oral radiographs was fair ($\kappa = 0,355$). Pooling 1-, 2- and 3 wall angular defects into 1 category had an obvious positive impact on the precision of intraoral radiography ($\kappa = 0,560$). Again, clinical experience had no significant influence ($p = 0.285$).

Conclusions

Intra-oral radiography lacks accuracy for assessing interproximal bone defect morphology around implants, especially when a detailed classification is used. Clinical experience does not seem to influence this.

Clinical Relevance

Figure 2: (A) Intra-surgical view showing the true bone defect anatomy from occlusal and the corresponding intra-oral radiography (B).

References

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