

Radiographic follow-up analysis of Brånemark[®] dental implants

Abstract

Radiography plays an important role in clinical routine practice and in research projects evaluating dental implants, among them Brånemark[®] System. Presence of a peri-implant radiolucency has been used in studies as a criterion for implant failure without knowledge of its diagnostic accuracy. More precise determination, whether implants are osseointegrated or not, can be achieved if prosthetic constructions are detached to test implant stability. Such an approach is time-consuming and cumbersome. Hence, the accuracy in radiographic diagnosis of clinical instability has to be evaluated. Further, radiography is a commonly used diagnostic tool for monitoring marginal bone loss. Little is known about the observer variation. Long-term follow-up studies have shown conventional implant therapy to be a reliable procedure with few complications and minor average bone loss. Lately, studies have shown progressive bone loss in higher frequencies.

When testing accuracy in diagnosis of clinical instability in intra-oral radiographs, it was found to be as good as of many other radiographic procedures, *e.g.* caries diagnosis. Possibility of predicting instability, however, can be low in populations with low prevalence of implants showing loss of osseointegration.

Intra-observer variation was found to be the largest source of the total variation when studying inter- and intra-observer variability in radiographic bone level assessments. The number of radiographs in which individual implants were displayed had an influence on intra-observer variation, while radiographic density and increased bone loss influenced the total inter-observer variation. Reliability can be improved by multiple readings by one observer or, even better, by letting several observers make several, independent readings, this limits the effect of a single observer who may be an outlier.

Marginal bone level was assessed in 640 patients with a radiographic follow-up of ≥ 5 years. The number of implants with a mean bone level of ≥ 3 mm below the fixture-abutment connection increased from 2.8% at prosthesis insertion to 17.2% after 15 years. Implant-based bone loss was as a mean 0.8 mm (SD 0.8) after 5 years, followed by only minor average changes. Mean bone loss on patient level followed a similar pattern. Disregarding of follow-up time, altogether 183 implants showed a bone loss ≥ 3 mm from prosthesis insertion to last examination, most of them in totally edentulous patients. Seventy of the 183 implants were found in 19 of the 107 patients. Hence, there seems to be a clustering effect. For the entire group of patients significantly larger bone loss was found the older the patient was at surgery and for lower jaw implants. Placement of the implant within the prosthetic construction, regardless of jaw-type, was found to be a predictor of a bone loss ≥ 2 mm with minor bone loss around implants placed in an end position. Other predictors were age and jaw-type. The number of intra-oral radiographs per examination, and more importantly, radiographic examinations can be reduced without jeopardizing good clinical management, a statement valid also for Brånemark[®] implants with advanced bone loss. To conclude, conventional implant treatment can still be regarded as a reliable and safe procedure.

Key words: cluster effect, dental implants, dependency, diagnostic accuracy, long-term follow-up, marginal bone level, observer variation, osseointegration, prediction.

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Accuracy and precision in the radiographic diagnosis of clinical instability in Brånemark dental implants.
Clin Oral Implants Res 1995; 6: 220-226.
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- IV Sundén Pikner S, Gröndahl K.
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