An evaluation of the Periotest method as a tool for monitoring tooth mobility in dental traumatology.

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Abstract

BACKGROUND/AIM: The Periotest method is a technique for the objective assessment of tooth mobility. The aims of this study were to determine normal Periotest values in the vertical and horizontal dimensions of periodontally healthy teeth in individuals aged 20-35 years and investigate the reliability of Periotest in terms of intra-series and inter-series reproducibility before and after applying a dental trauma splint in vivo.

MATERIALS AND METHODS: Periotest values were measured in periodontally healthy dental students (n = 33; mean age 24.7 years) at reproducible measuring points in the vertical and horizontal dimensions, before and after splint insertion. Three readings were taken per series to observe the intra-series reproducibility; three series were measured to test inter-series reproducibility (Friedman-test; P ≤ 0.001). Two different wire-composite splints, 0.45 mm Dentaflex and 0.8 x 1.8 Strengtheners, were inserted and the Periotest values were measured.

RESULTS: The median Periotest values before splinting were: canines -2.5, lateral incisors -0.9, and central incisors 0.0 for the vertical dimension, and canines 1.1, lateral incisors 3.2, and central incisors 3.6 for the horizontal dimension. The intra-series and inter-series Periotest values were highly reproducible.

CONCLUSION: The Periotest method provides highly reproducible results. Focused on dental trauma, the method can be applied diagnostically during the splint and follow-up period and for evaluating splint rigidity.

[Periotest-analysis in penradicular surgery: preliminary results of a clinical-prospective study].

[Article in German]


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Abstract

The two objectives of the present study were: to assess the healing after periradicular surgery using the Periotest device, and to compare the recorded Periotest values with the healing category determined after a one-year follow-up using radiographic and clinical criteria. In 43 patients with periradicular surgery, Periotest values could be recorded pre- and postoperatively, as well as after six and twelve months. Cases with a successful healing, as determined at the one-year follow-up, demonstrated a continuous decrease of the Periotest values over time, whereas one-year failures showed increasing Periotest values over the study period. In control teeth, the Periotest values remained unchanged for the whole study period. It appears that the Periotest measurements correlate with the postoperative healing mode following periradicular surgery, and therefore, allow an additional assessment of the healing outcome.

Stability of the bone-implant complex. Results of longitudinal testing to 60 months with the Periotest device on endosseous dental implants.

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Abstract

BACKGROUND: Maintenance of the health and integrity of the bone-implant complex (osseointegration) has been shown to be essential for long term success of root-form, endosseous dental implants. If reliable clinical indicators of adequacy of the bone-implant complex existed, they could stimulate new and innovative early intervention research to arrest of reverse early deterioration of the bone-implant complex. In the absence of such indicators, this has been problematic. The Periotest may have the potential to provide this information by indirectly assessing the status of the bone-implant complex. However, little information is available that documents either the capability of the Periotest to reliably assess changes of the bone-implant complex or the "normal variations" in Periotest values (PTVs) for both HA-coated and non-coated implants.

METHODS: The purpose of this paper was to document changes in PTVs as influenced by various implant surfaces, implant designs, and bone densities. The mean PTVs recorded for each visit, for all implant types and bone densities, were combined to provide an overall average PTV (A-PTV). The changes in stability (PTVs) were analyzed using a generalized linear model (GLM) with repeated measures (Hotelling's Trace).
RESULTS: The A-PTV for all implants over all visits was -3.5. The mean PTVs ranged from -4.2 (SD = 2.4) at uncovering to -3.9 (SD = 2.9) at 60 months. All implants in bone qualities 1 and 2 (BQ-1 and BQ-2) became more stable over time, while those in bone quality 3 or 4 (BQ-3 and BQ-4) showed a slight decrease in stability. In BQ-1, the mean PTVs increased from -4.7 at uncovering to -4.9 at 60 months. A similar increase in stability occurred in BQ-2 (-4.1 at uncovering to -4.4 at 60 months). In BQ-3, the stability of the implants decreased over time (-3.6 at uncovering to -2.9 at 60 months), with similar changes recorded for BQ-4 (-2.5 at uncovering to -1.0 at 60 months). When comparing the stability of all HA-coated with all non-coated implants, the HA implants became less stable (-4.4 to -3.4) over time, while non-coated implants showed an improvement in stability (-3.5 to -4.5). The changes in stability found in BQ-1, BQ-2, and BQ-3 were similar, with HA implants becoming less stable and non-coated more stable. HA- and non-coated comparisons were not possible in BQ-4 since there were too few non-coated implants placed in this type of bone. The HA-coated screw showed a decrease in stability when compared to the non-coated screw.

CONCLUSIONS: Conclusions of the study are as follows: 1) PTVs are influenced by bone quality and surface coating of the implant; 2) the PTVs at the time of uncovering provide the best estimate of a clinically acceptable PTV for that bone-implant complex; 3) while the PTVs for any bone-implant complex may fluctuate +/- 1.0 around the uncovering PTV during routine healing and loading of the implant, a consistent shift toward a positive PTV that approaches "0" should be cause for concern that the bone-implant complex may be at risk of failure; 4) HA-coated implants became slightly less stable (more positive PTVs) over time, while the non-coated implants became more stable (more negative PTVs); and 5) until a "critical PTV" can be accurately identified, it is suggested that a consistent shift in recorded PTVs that exceeds the +3.0 value on the PTV scale should be viewed with concern for possible deterioration at the bone-implant complex.

Abstract

OBJECTIVES: The objectives of this study were to determine the accuracy of Periotest to monitor primary implant stability at first-stage surgery, to identify by multivariate analysis the variables associated with early implant failure and to compare Periotest with radiographic study in the diagnosis of implant stability at second-stage surgery (during osseointegration period).

MATERIAL AND METHODS: A 10-year retrospective study was conducted on 1084 Brånemark implants placed in 316 patients. Clinical variables, implant diameter and length,
Periotest values (PTVs) and radiological variables were analyzed in bivariate and multivariate studies in order to determine their influence on early implant failure.

RESULTS: After examination of the sensitivity and specificity values obtained for different PTV cutoff points, a cutoff PTV of -2 was selected (84% sensitivity and 39% specificity). In the bivariate analysis, early failure was significantly related to smoking habits, implant location, bone type, implant features and PTVs (-2 and >or=-2). In the final multiple logistic model, only age (odds ratio (OR)=4.53; 95% confidence interval (CI), 1.34-15.27), smoking habits (OR=2.5; 95% CI, 1.3-4.79), bone type (OR=1.93; 95% CI, 1.01-3.7) and PTV at first surgery (OR=3.01; 95% CI, 1.5-6.02) were independently related to early failure.

CONCLUSIONS: The Periotest (with -2 cutoff) at first surgery offers high sensitivity in the prognosis of early implant loss and shows a greater capacity to evaluate stability during the osseointegration period compared with radiographic study.

Reproducibility and detection threshold of peri-implant diagnostics.

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Abstract

There is an increasing awareness that, for clinical monitoring of oral implants, there is a need for reliable diagnostics and possibly prognostic parameters. Indeed, reports have too often limited results to an inventory of failures, while no mention was made of progressive marginal bone loss or other symptoms of a future failure. Several parameters, such as marginal bone level assessment and/or probing attachment level, give a precision of up to 0.5 mm. Both measurements also seem related. The damping characteristics of the individual implant/bone unit also offer a highly reproducible diagnostic tool. The Periotest allows for detection of subclinical mobilities, and 95% of repeated measurements fall within a range of one unit on the arbitrary scale. So far, these three parameters offer no prognostic value.

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The Periotest method.

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Abstract
The Periotest is a new instrument for the diagnosis of periodontal diseases. The 'Periotest value' depends to some extent on tooth mobility, but mainly on the damping characteristics of the periodontium. The Periotest measures the reaction to a reproducible impact applied to the tooth crown. The Periotest value is a biophysical parameter.

Validity and clinical significance of biomechanical testing of implant/bone interface.

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Abstract

PURPOSE: The aim of this paper was to review the clinical literature on the Resonance frequency analysis (RFA) and Periotest techniques in order to assess the validity and prognostic value of each technique to detect implants at risk for failure.

MATERIAL AND METHODS: A search was made using the PubMed database to find clinical studies using the RFA and/or Periotest techniques.

RESULTS: A limited number of clinical reports were found. No randomized-controlled clinical trials or prospective cohort studies could be found for validity testing of the techniques. Consequently, only a narrative review was prepared to cover general aspects of the techniques, factors influencing measurements and the clinical relevance of the techniques.

CONCLUSIONS: Factors such as bone density, upper or lower jaw, abutment length and supracrestal implant length seem to influence both RFA and Periotest measurements. Data suggest that high RFA and low Periotest values indicate successfully integrated implants and that low/decreasing RFA and high/increasing Periotest values may be signs of ongoing disintegration and/or marginal bone loss. However, single readings using any of the techniques are of limited clinical value. The prognostic value of the RFA and Periotest techniques in predicting loss of implant stability has yet to be established in prospective clinical studies.

Untersuchungen zur Vereinfachung der Periotestmessung

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Zusammenfassung:

Die vorliegenden Untersuchungen zum Periotestverfahren sollten klären, ob ein Abweichen der Ausrichtung des Handstücks von der exakt orthoradialen Perkussionsrichtung zulässig ist, da diese aufgrund anatomischer Gegebenheiten nicht immer einzuhalten ist. Weiterhin

Periotestwerte in Abhängigkeit von der okklusalen Belastung


Mayer RE, Lukas D, Schulte W.

Zusammenfassung: