

Prospective Clinical Trial Evaluating a New Implant System for Implant Survival, Implant Stability and Radiographic Bone Changes

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ABSTRACT

Background: There are a few prospective studies reporting on new implant systems. When a new implant is brought to market, prospective trials should be carried out to determine the predictability of that system.

Purpose: This prospective study evaluates implant survival, Resonance Frequency Analysis (RFA), and crestal bone level changes for a new implant system (Neoss System, Bimodal surface, Neoss Ltd, Harrogate, UK).

Materials and Methods: Seventy-six patients, 38 females (age ranging from 23 to 57 years) and 38 males (ranging in age from 17 to 85 years) received 100 Neoss implants. Patients were consecutively enrolled in the study if they were missing one or more teeth in either arch, or a single tooth was scheduled for removal and immediate implant replacement. Evaluated implants were 4, 4.5, or 5 mm wide and were 7, 9, 11, 13, or 15 mm long. A one-stage approach was followed. At first stage and prior to healing abutment placement RFA measurements were taken. Measurements were retaken at second stage. Fifty-one implants were placed for restoration of single missing teeth and 49 were for short span implant bridges.

Results: The cumulative survival rate at 1- to 2-year interval was 93%. Average initial RFA measurement for all implants was 72.06, while the average final score was 72.58. These changes were not statistically significant. Changes in RFA scores for maxillary implants were insignificant. Forty-two paired mandibular RFA measurements were evaluated. Initial and final mean mandibular RFA measurements were 73.65 (SD 9.203) and 77.186 (SD 6.177), respectively. These changes were statistically significant ($p = .02$). Sixty-four paired radiographs were available for evaluation. Between examinations, there was an average -0.6 mm of bone loss, which was statistically significant ($p = .03$). On average, 4.0-mm-wide implants lost 0.1 mm of bone when compared with 5-mm-wide implants. These differences were insignificant ($p = .86$). Bone loss was adjusted for implant length, and tooth position and there were small, but clinically insignificant changes. Five-millimeter-wide implants lose 0.2 mm more than 4.0-mm-wide implants ($p = .7$). Maxillary incisors lose the least amount of bone 0.152 ($p = .33$).

Conclusions: The implants tested in this study had initially high RFA readings, indicating good primary stability. RFA readings for implants placed in the mandible improved from baseline and the changes were statistically significant. Marginal bone levels revealed clinically insignificant bone loss from implant installation to second stage. Loss of seven implants with initially high RFA readings is surprising.

KEY WORDS: implant survival, prospective, RFA, X-ray measurements
