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Above 15-year follow-up of single machined Bra°nemark implants

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Background: Since the late 1980s dental implants have been used in the indication of single-tooth replacement.

Aim: The aim of this study was to evaluate the radiographical and clinical outcome of single-machined Bra°nemark implants with at least 15 years of follow-up.

Methods: Fifty-one patients who received 63 single implants between 1987 and 1994 were randomly selected. In this patient group three implants failed (4.8%), leaving 60 implants to be clinically investigated. Mean interproximal probing depth, bleeding and plaque index were measured around each implant. Peri-apical radiographs were compared for marginal bone level between baseline (¼within 6 months after abutment connection) and 2–4 years, 5–8 years and 15–22 years of follow-up. Mean interproximal bone level was measured from the implant shoulder as a reference point. Overall changes in marginal bone level were analyzed with the Friedman test and 2-by-2 comparison between time points was evaluated with the Wilcoxon signed ranks test.

Results: The group consisted of 29 males and 22 females with a mean age of 24 years (range 14.7–57.4) at implant placement. Mean follow-up time was 18.5 years (range 15–22). Mean probing depth was 3.9 _ 1.27mm (range 2–10.3). Bleeding and plaque indices were 1.2 _ 0.81 and 0.2 _ 0.48, respectively. Mean bone level after 15–22 years was 1.7 _ 0.88mm (range _0.8 to 5). There was no correlation found between radiographic bone level and probing depth. The Friedman test indicated a statistically significant change in marginal bone level between time points ($P < 0.05$). Wilcoxon signed ranks test showed a statistically significant difference between baseline and all other time points. After 2–4 years no statistically significant differences could be found.

All but one implants (98.3%) were within the currently accepted success criteria corresponding to a maximum accepted bone loss of 4.3mm after 15 years. If one accepts a mean bone level of 2.1mm from the implant shoulder (¼2nd thread), 81.7% of the implants are successful. If a mean interproximal probing depth of 5mm is accepted, 91.7% of the implants are successful. If both these criteria are combined, 76.7% are successful.

Conclusions and clinical implications: The machined Bra°nemark implant used as a single-tooth replacement is a predictable solution with high clinical survival and success rates. In general, a steady state bone level can be expected over decades. New criteria for long-term implant success should be determined.