CLINICAL ORAL IMPLANTS RESEARCH

5-year study of short implants placed in the atrophic posterior maxilla: crown-to-implant ratio

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Background: A short implant length may provide unfavorable crown-to-implant length ratio (C/L) for long-term prognosis because of its low surface available for osseointegration.

Aim/Hypothesis: The performance of short implants placed in atrophic posterior maxilla vs. C/L ratio was assessed. This is the first study to report C/L variation over time considering both crestal and endo-sinus bone level changes.

Material and methods: TE® SLActive implants (Straumann AG, 8-mm) were placed using osteotome sinus floor elevation technique. Prior to surgery, sinuses were randomized to receive graft (control) or not (test). All implants were seated in the osteotomy site until the rough surface limit was no longer visible. After 10-week healing, implants were functionally loaded with single crowns. Antagonists were natural teeth or implants, and all but one indications were a free-end edentulism. Radiographies were taken after surgery (0), at 8 weeks (8w; before prosthesis placement), at 10 weeks (10w; crown in place) and 5 years (5y). The distance L was measured between the most apical and coronal bone-implant contact. C was the sum of the distance from the most occlusal point to the implant-abutment interface, crestal bone loss and implant neck length. Data were analyzed using mixed linear models. Success rates were tested using Fisher's exact test.

Results: In 12 patients, 20 control and 17 test implants were placed. Two early failures were related to the placement of implant control in fused corticals. One late failure was due to the recurrence of periodontal disease treated before placement of implant test. The 5-year overall implant success rate was 91.9% (94.1% test, 90.0% control; $P = 0.66$). Table details measurements for both implant groups. The mean C/L was 3.1 ± 1.3 at 10 weeks and 2.1 ± 0.6 at 5 years ($P = 0.06$).

Conclusions and clinical implications: C/L ratio did not affect success rate of the short studied implants, despite single crown restorations and unfavorable initial bone-to-implant contact. Surface treatment, thread pitch design and tapered shape may optimize success rates of short implants in the posterior maxilla.

	Control	Test	p
L0 (mm)	2.2±0.8	2.6±0.9	0.14
L8w (mm)	5.2±1.4	4.5±1.6	0.004
L5y (mm)	7.1±1.2	6.5±0.9	0.004
C/L10w	2.7±1.0	3.5±1.5	0.036
C/L5y	2.0±0.8	2.2±0.4	0.133