Immediately-Loaded Short Implants In The Posterior Region: 5-year Prospective Clinical Results

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#1424

OBJECTIVE

– This prospective multicenter study assesses the marginal bone resorption, cumulative survival rate (CSR), and soft tissue health at 7-mm long Brånemark Mk III Shorty (BMKS) and NobelSpeedy Shorty (NS)[1,2] implants after 5 years of function.

MATERIALS AND METHODS

– BMKS and NS implants (7-mm long) were placed in healed or extraction sites in a flapless or flap surgery.
– Both implants have TiUnite surface with an external hexagonal connection and a parallel (BMKS) or slightly tapered (NS) geometry (Figure 1).
– Bone grafting was allowed and performed in some cases.
– All implants were inserted with a minimum insertion torque of 30 Ncm and immediately loaded.
– Follow-up visits took place at 3 and 6 months, and 1, 3 and 5 years after surgery.
– The evaluated parameters included the CSR, marginal bone remodeling, bleeding on probing (BOP), papilla index and plaque. To measure marginal bone levels, intra-oral peri-apical radiographs were taken at implant insertion (baseline) and follow-up visits. Marginal bone remodeling was calculated as the average of mesial and distal using paired radiographs.
– For metrically scaled variables, means and standard deviation (SD) and for categorical variables frequencies and percentages are given. All significance tests were two-sided and conducted at the 5% significance level.

Figure 1: Design of study implants with reference point. The line represents the reference point for X-ray bone level analysis.

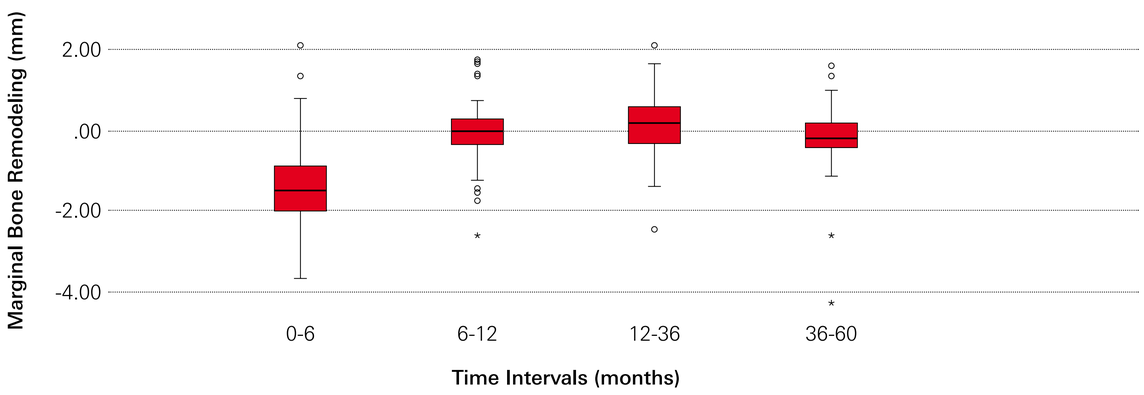
RESULTS

– Four centers placed 25 BMKS and 61 NS short implants in 38 patients, of which 94% (n=81) were inserted in the posterior region and 67% (n=58) in the mandible.
– Patients received either single tooth restorations (55%) or fixed partial bridges. 31 patients with 49 NS and 20 BMKS implants were followed for 5 years.
– One BMKS and two NS implants failed over the 5-year period yielding a CSR of 96.5% (Table 1).
– After the initial remodeling during the first 6 months post-insertion marginal bone remained stable up to 5 years with -0.20±0.90 mm of marginal bone remodeling from 6 months to 5 years post implant insertion. (p=0.633; Figure 2/Table 2).
– The papilla index and plaque accumulation improved significantly over the 5-year period (both p≤0.001) (Figure 3).
– The BOP showed a trend toward improvement from insertion to 5 years (p = 0.065).

Table 1: Cumulative survival rate. Survival rate was calculated according to van Steenberghe[3] criteria.

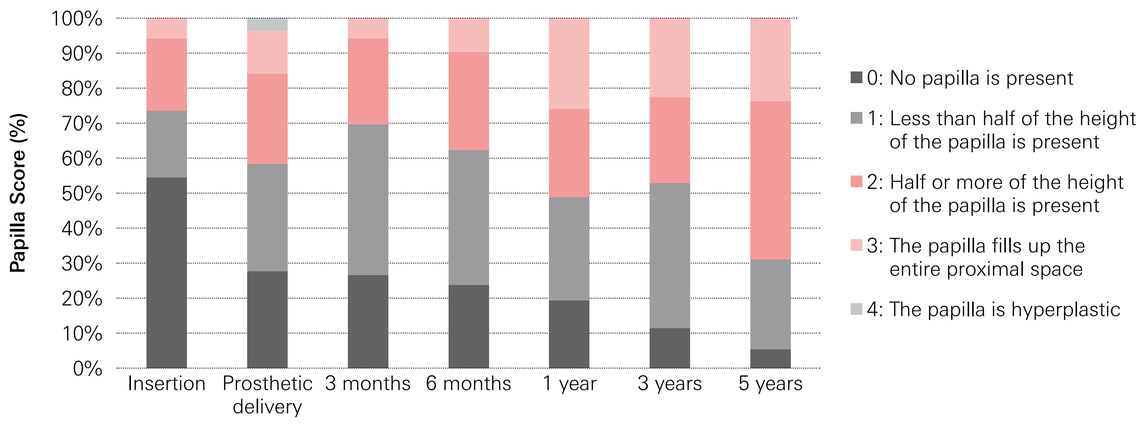
	6 months	1 year	3 years	5 years
CSR (%)	98.8	98.8	97.7	96.5
N (NS+BMKS)	85	85	85	84

Figure 2: Marginal bone remodeling over consecutive time intervals. Negative numbers indicate bone loss. The boxes indicate quartile distributions, where top is the upper quartile (75%), the bottom is the lower quartile (25%), and the middle line is the median. Circles denote outliers farther than 1.5 interquartile ranges but closer than 3 interquartile ranges, stars denote outliers farther than 3 interquartile ranges.



NS+BMKS	Implant insertion to 6 months	6 months to 1 year	1 year to 3 years	3 years to 5 years	6 months to 5 years
Mean (SD) in mm	-1.34 (1.10)	-0.01 (0.80)	0.11 (0.76)	-0.17 (0.91)	-0.20 (0.90)
Paired radiographs, n	53	55	61	50	40
p-value	<0.001	0.975	0.247	0.200	0.633

Figure 3: Distribution of papilla scores over time according to Jemt[4] at the different follow-up times for study implants. For each implant type the worst of mesial and distal value of the dichotomous papilla was used in the analysis.



CLINICAL CASE

– A 52-year old healthy female was treated with 6 NS implants in the mandible in positions 45-46-47 and 34-35-36 (Figure 4a).
– Final Procera Zirconia implant bridge was delivered 4 months after implant insertion (Figure 4b).
– All implants remained in function throughout the study period (Figure 4c).

Figure 4a: Radiological evaluation (panoramic view) at implant insertion

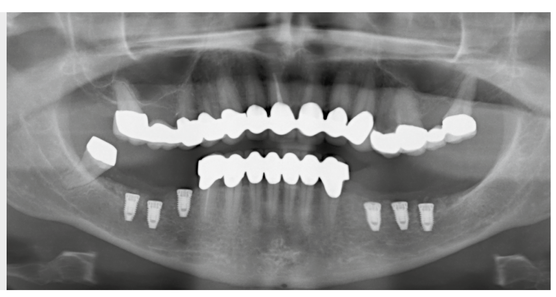
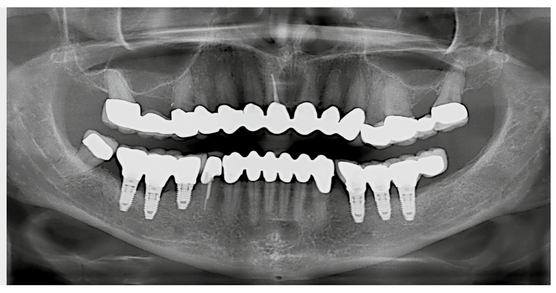


Figure 4b: Final prosthesis delivery, occlusal view

Figure 4c: Radiological evaluation (panoramic view) 5 years post-implant insertion



CONCLUSIONS

– High survival rates were observed for short implants 5 years post-implantation.
– After initial marginal bone remodeling in the first 6 months post-implant insertion, the marginal bone levels remained stable with no significant change from 6 months to 5 years post-implant insertion.
– Soft tissue remained healthy during the study period.
– The use of short implants provides a safe treatment option with excellent medium-term bone response under the demanding immediate loading treatment protocol.

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