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study

Short vs long implants combined with osteotome sinus-floor elevation: three-year results

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Background

Short implants can be an alternative to vertical bone-augmentation procedures when the vertical dimension in the maxilla is reduced. Today, a 6mm implant is commonly considered a short implant. It has been suggested that short implants are associated with less treatment time and lower initial costs.

Previous studies have shown comparable clinical and radiological results between short implants and longer implants in combination with OSFE (osteotome sinus-floor elevation). No significant difference has been found in terms of survival rate, marginal bone loss, and post-surgical complications.

Treatment and post-treatment costs are important factors for both patients and clinicians and could influence treatment decisions. It is therefore of interest to assess clinical efficacy and cost-effectiveness.

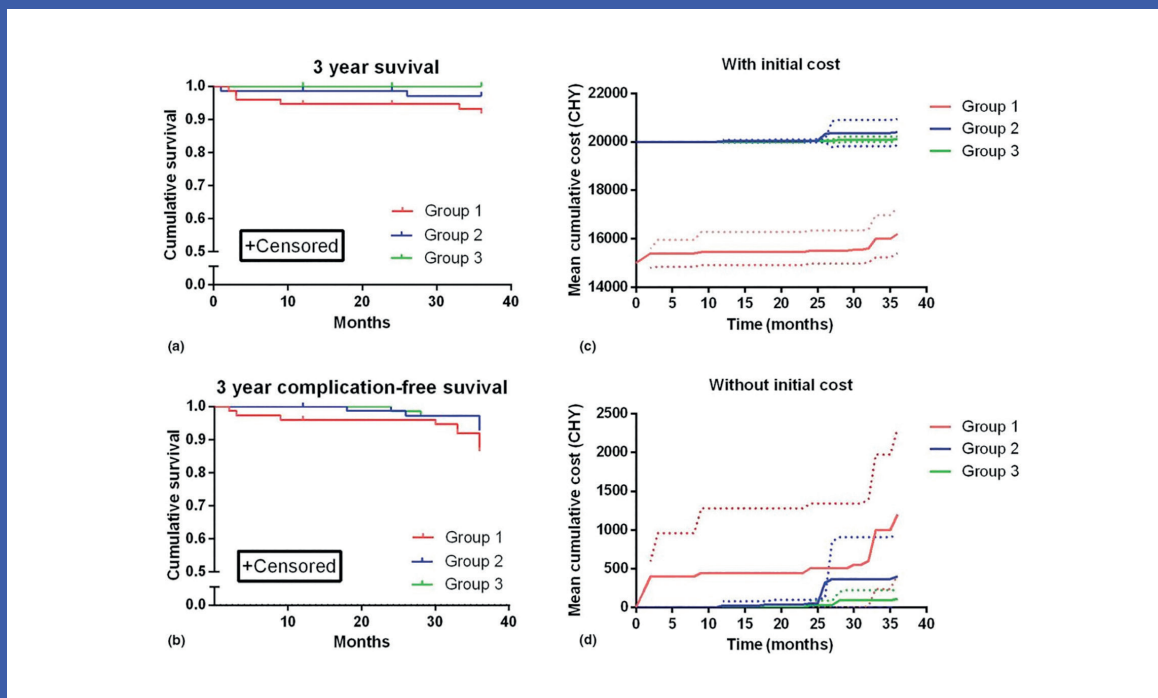
Aims

To compare the three-year clinical, radiographic, and economic outcomes of short and longer implants combined with OSFE in the moderately atrophic posterior maxilla.

Materials & methods

- A study reporting a three-year follow-up of a previously published randomised controlled trial (Shi et al, 2015).
- A total of 225 patients with 225 implants, placed in posterior maxillary areas with a residual bone height (RBH) of 6-8mm and a ridge width of ≥ 6 mm.
- Periodontal treatment was performed before the start of the trial and inclusion criteria were bleeding on probing (BOP) $< 10\%$ and periodontal probing depth (PPD) ≤ 4 mm.
- Medically compromised patients, heavy smoking, uncontrolled diabetes, and complete edentulism were reasons for exclusion.
- The patients were randomly assigned into three groups: (1) 6mm implants with standard surgical procedure; (2) 8mm implants combined with OSFE; (3) 10mm implants combined with OSFE.
- The baseline assessment was performed at crown delivery. Patients were then recalled at least once a year.
- Implant system: Straumann Standard Plus.
- Implant survival rate was the primary outcome and peri-implant condition, radiographic assessment, complications, and treatment costs were secondary outcomes.
- PPD, BOP, and modified plaque index (mPI) were measured at follow-up visits using a Williams PQW probe and the marginal bone-level change between baseline and recall visits at one and three years was measured on periapical radiographs using the parallel technique.
- Complications such as peri-implant mucositis, peri-implantitis, and technical complications – e.g., abutment/screw loosening, fractures, ceramic veneer chipping – were recorded.
- The included costs were initial treatment and additional treatment resulting from complications.

Figure: Implant survival and cost



Kaplan–Meier survival (a) and complication free-analysis (b) in group 1 (6mm implant), group 2 (8mm implant with OSFE), and group 3 (10mm implant with OSFE). The mean cumulative cost (CNY) of treatment cost (c, with initial cost; d, without initial cost) during the three-year observation period. Dashed lines represent the 95% confidence intervals. Amounts do not include the regular maintenance cost.

Results

- The drop-out rate was 11.6%. The main reasons were the pandemic situation, or that the patient could not be contacted or had moved from the area.
- In terms of marginal bone loss, no significant difference was found between the three groups.
- The implant-survival rate was: group 1; 91.8%, group 2; 97.08%, and group 3; 100%.
- Short implants had a significantly lower survival rate compared to longer implants in combination with OSFE.
- Short implants with a larger diameter (4.8mm) had a better survival rate compared to implants with a diameter of 4.1mm.
- No difference was detected between the three groups in terms of clinical outcomes and complication-free survival.
- Complication-free survival was respectively 83.3%, 86.9%, and 90.2% in groups 1, 2, and 3.
- The total costs for the shorter implants were significantly lower.
- Retreatment costs were higher in the shorter-implants group.

Limitations

- The short follow-up time of three years is a limitation and long-term studies are needed to confirm the results.
- The study was performed by a single surgeon in a well-controlled specialist university clinic, using a single brand of implants. Multicenter studies and studies of other implant systems are needed to confirm the results and to evaluate the long-term costs for the different treatment alternatives.
- For 8mm and 10mm implants, the available bone height was between 6-8mm, while the 6mm implants could benefit from a maximum 6mm of bone height.

Conclusions & impact

- Longer implants in combination with OSFE are more predictable in terms of three-year survival rates.
- The total cost after three years for short implants was lower than for longer implants.
- No differences in complication rates were found between the three groups.



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