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## study

## Short dental implants (6mm) versus long dental implants (11–15mm) in combination with sinus-floor elevation procedures: Three-year results from a multicentre, randomised, controlled clinical trial

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**RELEVANT BACKGROUND**

Short implants are frequently used in the posterior maxilla in order to avoid complementary surgical procedures. While some authors have described a similar success rate with short implants as with those with a length of 10mm or more, others have reported an increased failure rate after five years with 6mm implants compared with those of a longer length.

**AIMS**

This three-year, multicentre, randomised clinical trial (RCT) sought to compare the survival rate of short implants versus longer implants placed concomitantly with lateral-window sinus augmentation.

**MATERIALS AND METHODS**

One hundred and one patients with partial edentulism, in need of replacing their missing posterior teeth, were enrolled in this study. These patients had residual bone height of 5-7mm and were randomly allocated into: group short (GS), receiving 6mm-length implants with 4mm diameter, or group graft (GG), receiving longer implants (11mm, 13mm, or 15mm with 4mm diameter) in combination with simultaneous lateral-window sinus augmentation.

Implants were left for transmucosal healing and, six months later, the implants received the final crowns. Periapical radiographs were taken at the time of implant placement, at the prosthetic restoration, and then yearly up to three years. The primary outcome was the implant survival rate, while secondary outcome variables included pocket probing depth (PPD), bleeding on probing (BoP), marginal bone-level changes (MBL), plaque-control record (PCR), and adverse events.

# results

- Ninety-four patients and 129 implants were re-evaluated at the three-year follow-up (FU-3).
- The cumulative implant survival rate (CSR) was equal and 100% in both groups.
- At FU-3, mean PPD for group short (GS) of  $2.8 \pm 0.9$  mm was lower compared with group graft (GG),  $3.0 \pm 0.76$  mm ( $p=0.035$ ).
- PCR and BoP recorded at FU-3 were similar between the groups.
- MBL at FU-3 was 0.44 mm for GS and 0.45 mm for GG ( $p>0.05$ ). When measured from implant placement to FU-3, MBL showed statistically significant bone loss for both GS ( $-0.44 \pm 0.56$  mm) and GG ( $-0.43 \pm 0.58$  mm). When measured from final prosthetic reconstruction (PR) to FU-3, MBL showed statistically significant loss only for GG ( $0.25 \pm 0.58$  mm) but not for GS ( $-0.1 \pm 0.54$  mm).
- Adverse events had no statistically significant difference between the groups ( $p=0.654$ ).



## LIMITATIONS

- Following drop-outs, 21% of all patients were smokers, but their relative percentage was different in each group (16% in GS, 26% in GG). This data may explain higher MBL in the grafted group (GG). The same is true for former smokers, who constituted 25% of all patients (20% in GS, 29% in GG).
- The implants used were Astra Tech Implant System's OseoSpeed, which are characterised by moderately rough titanium surfaces. This means that any comparison with other implant surfaces may be biased.
- One single diameter (4mm) was used in the study, which may limit the conclusions regarding cases of narrow ridges.
- The follow-up period (three years) is short in terms of implant therapy and does not allow for any conclusions regarding long-term treatment outcomes.



## CONCLUSIONS

- The study presents a 100% implant survival rate for both groups investigated. These data are consistent with implant survival rates of 97-100% reported after mean observation periods of eight to 18 months and significantly better than survival rates of 80-90% reported for implants  $\leq 7$  mm in a recent systematic review (Karthikeyan et al., 2012).
- Unlike other studies, reported short-implant losses occurred predominantly during the healing phase, before prosthetic loading; no implant losses were seen either in GS or in GG. This can be explained by strict patient selection and clinician experience.
- At the three-year follow-up, there was a drop-out rate of 6% (GS 8%, GG 4%), which is comparable to that found with other RCTs.
- Regarding the peri-implant parameters recorded, PPD measurements at FU-3 were significantly lower in GS ( $2.8 \pm 0.9$  mm) versus GG ( $3.0 \pm 0.76$ ). However, the overall PPD in both groups was acceptable for successful implants.
- For atrophied posterior maxilla with a residual ridge height of 5-7mm, a possible treatment option is to install short implants (6mm) instead of using longer implants with simultaneous maxillary sinus augmentation.



## IMPACT

- In cases of 5-7mm residual bone height, using short (6 mm) implants could be a good alternative solution to maxillary sinus augmentation with subsequent placement of longer implants.
- The advantages of using short implants in these cases are numerous and include: faster, simpler, and cheaper treatment that is associated with less morbidity.
- Short implants can be a solution for patients with sinus pathologies where it would be difficult to perform lateral-window sinus augmentation.



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