Sinus Floor Elevation Using Osteotomes: A Systematic Review and Meta-Analysis

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Background

Various techniques of sinus floor elevation (SFE) are described. The elevation with osteotomes (OSFE) from a crestal approach is a relatively new technique (Summers 1994). The aim of this systematic review and meta-analysis was to evaluate the clinical outcome of implants placed into the maxillary sinus augmented with an OSFE technique.

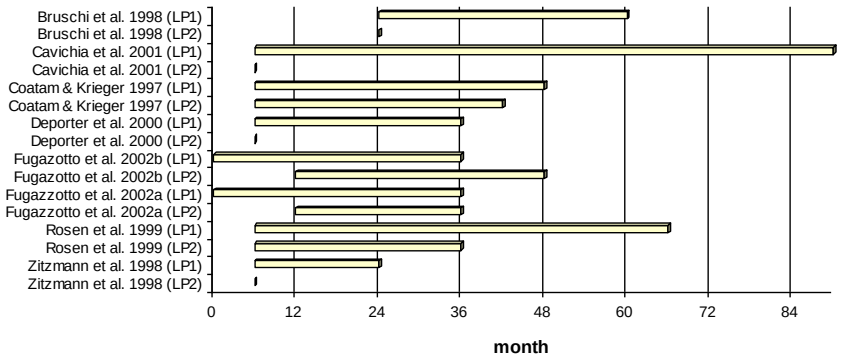

Figure 1. Loading periods of the implants as reported in the eight included studies (loading period 1 = LP1) and as used for meta-analysis (loading period 2 = LP2).

Materials & Methods

A systematic online and manual review of the literature identified articles dealing with OSFE. Applying rigid inclusion criteria, screening and data abstraction were performed independently by two reviewers. The follow-up of loaded implants had to be at least 6 months and at least 10 patients had to be treated. The identified articles were analyzed in regards to implant outcome and defined surgical aspects. Survival and success rates were estimated by Kaplan-Meier curves. To be included into the meta-analysis of implant success/survival, the follow-up period had to be exactly described for each implant or set of implants. If this information was less accurate, the worst case scenario was utilized for the meta-analysis; that is, the reported follow-up periods were reduced to the shortest time (see figure 1).

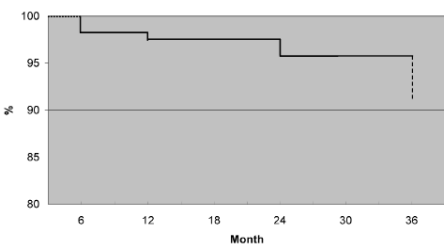

Figure 2. Implant survival as estimated with Kaplan-Meier curves (eight studies). The slope of the success rate at 36 months is due to the loss of one implant.

Results

Eight out of 44 articles dealing with osteotome sinus floor elevation (OSFE) met the inclusion criteria (see figure 1). Five of the 8 selected studies met established success criteria (Albrektsson et al. 1986). The survival and success rates were 95.7% and 96.0% after 24 and 36 months, respectively (see figure 2 and 3). The median and mean follow-up periods were 24 and 18.73 months for the survival rate and 24 and 19.7 months for the success rate. Regarding different surgical elements, i.e. osteotome techniques, implant types, augmentation materials, the database was multivariate. Thus, no statistical analysis could be performed on these parameters.

Discussion & Conclusion

Short-term clinical success/survival (3 ≤ years) of implants placed with an OSFE technique seem to be similar to that of implants conventionally placed in the partially edentulous maxilla (Goodacre 2003). OSFE and implant placement with the osteotome technique seem to perform better than conventional sinus floor elevation (CSFE) and implant placement. Concerning the latter technique, predominantly survival rates are available in studies with pooled data, but no success rates (Jensen et al. 1998, Wallace & Froum 2003, Del Fabbro et al. 2004). Controlled prospective clinical studies are needed to evaluate the long-term outcome and various surgical modifications of OSFE.

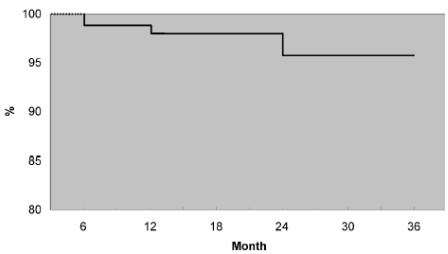

Figure 3. Implant success (according to Albrektsson et al. 1986) as estimated with Kaplan-Meier curves (five studies).

Literature

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