Slot- versus round-shaped lateral windows for maxillary sinus floor augmentation: a 2-year clinical and radiographic study

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Abstract

Lateral bone window size for sinus access. (a-b) Test group, slot-shaped, the apicocoronal height was about 3-4 mm. (c-d) Control group, oval-shaped, the apicocoronal height was about 5-6 mm.

Background and Aim

- Very few clinical studies have investigated the influence of lateral window dimensions and appearance on the maturation and consolidation of graft in respect of maxillary sinus floor augmentation (MSFA). From a biological aspect, the residual bone wall represents a source of osteoblast cells; Mechanically, it helps the stability of blood clotting and protects the graft from possible mechanical stress. Previous experimental histological studies in animal have justified that bone formation and osteogenic process start from the sinus walls and septa, and then sprout into the elevated space along the implant surface, determining the maturation of central part of graft itself. Hence, we deemed approximate window dimensions and appearance may have an important influence on the maturation and consolidation of graft in the maxillary sinus.

Methods and Materials

Of 106 patients enrolled in the study, each underwent MSFA using deproteinized bovine bone mineral (DBBM) based on two different lateral window access flaps to maxillary sinus (Test group: slot-shaped access window; Control group: oval-shaped access window). Bone dimension and graft remodeling were measured at pre-op, immediately after the procedure (baseline), 6-month (T1), 1-year (T2) and 2-year (T3) post-op Cone-beam computed tomograph (CBCT) and panoramic radiographic imaging (OPT). CBCT scan data were analyzed with image processing software to evaluate the volume of grafted material throughout follow-up period. A life-table analysis was used to assess the implant survival. Intra-op and post-op complications were recorded.

Results

A prominent augmented bone height (ABH) was obtained in both groups (Test group: 10.53±2.83 mm, Control group: 9.23±3.24 mm) with significant intergroup difference (P=0.001), whereas no significant intergroup difference was found in augmented bone volume (ABV) (P=0.359). Neither any significant intergroup difference emerged in data concerning the cumulative survival rate (CSR) nor the sinus membrane perforation rate. The augmented height loss (Δ ABH) of Test group was significantly lower than of Control group during the first 6 months (P=0.020) and the second year (P=0.037). Furthermore, both ABH and ABV resorption rate of Test group was significantly lower than of Control group during the first 6 months after surgery (P=0.022, P=0.017).

Conclusions

The slot-shaped lateral technique is a simple and predictable surgical method for MSFA and simultaneous placement of dental implants. The technique facilitated to reduce apical augmented bone resorption during the first 6 months after surgery.

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