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The effectiveness of oxidized regenerated cellulose as a graft material in transalveolar osteotome sinus lift procedure: A clinical comparative study

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Abstract

Background: Post-extraction alveolar bone resorption is inevitable, mainly in width anteriorly and in height posteriorly that consequently jeopardizes dental implant placement and primary stability. To compensate such atrophy in the posterior maxilla together with inherent poor bone quality, a sinus lift procedure was introduced which aims to increase vertical height for implant installation. This requires elevation of *Schneiderian* membrane without perforation and surgical void augmentation with lateral or crestal approach according to subantral distance. A balloon elevator could be used for greater atraumatic elevation. Various augmentation materials have been utilized like autogenous bone, allograft and alloplast, recently surgicel (oxidized regenerated cellulose) was used as a graft biomaterial to serve as a scaffolding for new bone generation. Cone beam computed tomography was recommended for pre and post-grafting assessment in maxillary sinuses.

Aims: To evaluate performance of oxidized regenerated cellulose as a graft biomaterial in enlarged sinuses by measuring postimplantation neoformed bone height and density in comparison to osteon II sinus and to assess implants survival 24 weeks postoperatively.

Materials and methods: This clinical prospective study, conducted between November 2015 and December 2016, included 20 healthy eligible patients (24 sinus lift cases) with age ranged from 20-65 years with deficient alveolar ridge height (i.e. ≤8 mm) indicated for transalveolar osteotome sinus augmentation and simultaneous dental implant placement. Following preoperative clinical and radiographical evaluation, those patients underwent sinus membrane elevation with the aid of balloon elevator and augmentation with either surgicel in 17 sites (study group) or osteon II plus collagen membrane in 16 sites (control group), received 33 dental implants. Cone beam computed tomography and orthopantomography taken before surgery and after 24 weeks of healing period

for both groups to measure height and density of the new bone formed and any associated complications. Independent *t*-test and pearson correlation were the analytical tools to test these data.

Results: Twenty consecutive patients with mean age of 47.4 years received 33 sinusal implants and completed follow up period for 6 months. Total height of neoformed bone attained was 12.04 mm with mean and standard deviation 6.88±1.63 mm which is highly significant, baseline subantral distance was 5.16 mm, total bone height at 2nd CBCT for the study and control groups reached to 12.29 mm and 11.76 mm respectively. Highly significant bone gain in the control group and positive significant correlation with the amount of material grafted intraoperatively, while there was non-significant bone gain in the study group with non-significant correlation with number of surgicel graft sheets. The total density of new bone was 489.62±190.91 HU. For the control group was 561.75 HU with statistical significant difference between the study which was 417.5 HU and control groups. Thirty out of 33 dental implants survived after 6 months with total survival rate 90.91%, three dental implants failed early in the study group. Non-significant association was found between new bone and implant dimensions. Apart from *Schneiderian* membrane thickening (2 cases in the control and none in the study group), no major complications were reported.

Conclusion: Within the limitations of this short-term clinical study, oxidized regenerated cellulose could be considered as an alternative reasonable grafting material with comparable outcomes to osteon II with less postoperative complications.