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Influence of a collagen membrane positioned subjacent the sinus mucosa following the elevation of the maxillary sinus. A histomorphometric study in rabbits

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ABSTRACT

In order to allow implant placement in the posterior maxillary regions, it is necessary to increase bone volume by means of sinus floor elevation. This procedure is widely applied and various biomaterials have been recommended to fill the elevated space. In case of a perforation of the sinus mucosa, it has been suggested to apply resorbable collagen membranes so protect the perforation. In order to have further information about the role of a collagen membrane placed subjacent the sinus mucosa, this study aimed to evaluate the healing after elevation of the sinus mucosa when a collagen membrane was placed between the sinus mucosa and a xenograft used as filler. In this study, 18 rabbits were used. Sinus mucosa elevation was performed bilaterally. After elevation of the sinus mucosa, a small piece of equine collagen membrane (OsteoBiol® *Evolution*, Tecnoss®, Giaveno, Italy) was placed subjacent the sinus mucosa at one site (test site), while no membranes were placed within the sinus at the control sites. At both sites, a collagenated cortico-cancellous porcine bone (OsteoBiol® *Gen-Os*®, Tecnoss®) was placed within the elevated space. The subsequent analysis showed that the elevated area was reduced between 2 and 8 weeks of healing by about 25% at the test and 47% at the control sites. After 8 weeks of healing, the mineralized new bone within the elevated space was 18.2±5.5% at the test and 26.7±7.7% at the control sites. Within the available space at the test site, the percentage was 27.3±7.0% after 8 weeks of healing. At 2 and 8 weeks of healing, within the elevated space, the xenograft proportion was 30.9±4.4% and 6.9±2.8% at the test, and 35.2±7.3% and 9.6±4.9% at the control sites, respectively. When the marrow spaces were counted together with the mineralized bone, the total bone formed within the available space after 8 weeks was 46.71% and 55.14% at the test and control sites, respectively.

CONCLUSIONS

From the results of the present study, new bone appeared to form from the native bone of the sinus walls and then propagated toward the middle and the submucosa regions. The collagen membrane contributed to maintain the available area, but the morphometric analyses of the healing in the elevated region after sinus membrane elevation were very similar when an internal collagenous membrane was placed as without the membrane placement. Likewise, the healing process in the elevated region appeared to be largely unaffected by the application of an internal collagenous membrane.

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