Tissue-engineered bone grafts for osteoplasty in patients with cleft alveolus.

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Alveolar bone grafting is an integral part of the treatment concept in cleft palate patients. As an alternative to autogenous bone, tissue-engineered grafts have found some clinical application. The aim of the present study has been to compare ossification in the cleft area using tissue-engineered grafts in a case series of patients with ossification after transplantation of autogenous spongy bone as the gold standard in alveoloplasty. Eight children with complete cleft lips and cleft palates were included in the study. In four children (group A), the cleft defect was filled with tissue-engineered bone (autogenous osteoblasts cultured on demineralized bone matrix Osteovit®); as control in another 4 children (group B), the alveoloplasty was performed using spongy iliac bone. Preoperative and 6 months postoperative cone-beam computed tomography was performed, and volumes of the remaining cleft defects were calculated using 3D navigation software. Wound healing was uneventful in both groups. Six months postoperatively the mean volume of the cleft was 0.55±0.24cm³ after grafting of tissue-engineered bone (group A) and 0.59±0.23cm³ after transplantation of autogenous spongiosa. In group A, 40.9% of the cleft defect was ossified; in the control group (group B), 36.6%. Tissue-engineered bone is a promising alternative in alveolar bone grafting and no disadvantages were observed in comparison to the gold standard.

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Bone regeneration after enucleation of mandibular cysts: Comparing autogenous grafts from tissue-engineered bone and iliac bone
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Objective. The aim of this study was to compare bone regeneration after grafting enucleated mandibular cyst cavities using either autogenous osteoblasts cultured on a biomaterial or autogenous spongiose iliac bone.

Study design. Twenty patients with 22 mandibular cysts were assessed. Eleven cysts were filled in with tissue-engineered bone (autogenous osteoblasts cultured on demineralized bone matrix Osteovit) and 11 with spongiose iliac bone as controls. Panoramic radiographs were taken preoperatively, immediately postoperatively, and 3, 6, and 12 months after surgery. Radiolucency was computer analyzed using gray-level histograms.

Results. In both groups bone regeneration took place in a similar fashion. After 3 and 6 months there were few differences in bone density between the groups. However, in radiographic controls after 12 months ossification was considerably stronger in cysts grafted with tissue-engineered bone.

Conclusion. These results advocate for the clinical application of tissue-engineered bone as an alternative viable filling material for cysts.

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The aim of this study was to analyse the clinical application of some bone filling materials (DFDBA, Osteovit, ATR-24) during the treatment of limited postsurgical defects of jaw bones in 108 patients. The results indicated a significant decrease of the mean time needed for bone regeneration within the area of the defect as assessed by Ro-densitometry and videodensitometry during the follow-up period.

PMID: 10462944  [PubMed – indexed for MEDLINE]
Biomaterials in orthopaedic surgery: effects of different hydroxyapatites and demineralized bone matrix on proliferation rate and bone matrix synthesis by human osteoblasts.

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The effects of different biomaterials, used in orthopaedic surgery for bone substitution and/or prosthesis coating to improve fixation and durability of prosthetic implants, have been studied in vitro on cell growth and bone matrix synthesis by human osteoblasts. The materials were a bovine collagen matrix (Osteovit, B. Braun Melsungen AG, Melsungen, Germany) and two hydroxyapatite (Ceros 80, Robert Mathys Co, Instrumentenfabrik Bettlach, Germany and Ostilit, Howmedica International, Staines House, UK). Cell proliferation and bone matrix synthesis were assessed by incorporation of [3H]thymidine and [3H]proline, respectively. Cell viability in the presence of the materials was also morphologically controlled using phase-contrast microscopy. Exposure to Osteovit caused increased proliferation of human osteoblasts, whereas both Ostilit and Ceros 80 induced a decreased cell growth. Osteoblast bone matrix synthesis was increased by all the materials tested.

PMID: 7662825  [PubMed – indexed for MEDLINE]

[Application of collagen matrix (Osteovit) for correction of defects on maxillofacial region].

[Article in Korean]

Lee SC, Ryu DM, Jung YS, Lee BS.

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