Objective: To determine if the osteoconductive material ChronOS beta-tricalcium phosphate block (beta-TCP) made by Synthes is a viable choice for bone grafting.

Methods: We prospectively evaluated the use of the beta TCP in a 50-year-old male with a T4N1M0 stage IV squamous cell carcinoma of the right alveolar ridge who underwent wide local excision with segmental mandibulectomy, leaving him with a 2.0 cm anterior defect at the mandible. A beta TCP block was utilized to fill the bony gap in the anterior mandible from the fibula to the native mandible.

Results: The patient healed well postoperatively and was started on a soft diet 1 week post op. He started chemoradiation 4 weeks post op. He is now 20 months post op without any evidence of disease, and has maintained his preoperative occlusion. His postoperative CT scan shows bony fusion at the reconstructed site.

Conclusions: The beta TCP block is a useful adjunct for the reconstructive surgeon in small mandibular defects <2.0 cm, and osseous growth is still possible even with postoperative chemoradiation therapy.

Introduction

Many choices are available today for filling bony defects including autologous bone grafts, allografts, demineralized bone matrices, and various synthetic bone substitutes. Factors such as site, size, and function of the defect help guide the decision of what material to use to fill the defect. While autologous bone grafts remain the gold standard for the filling of bone defects, these come with risks and morbidity. We report on the use of a beta-tricalcium phosphate (beta-TCP) material, chronOS block produced by Synthes, as a bone filler for a mandibular defect in a patient with squamous cell carcinoma of the mandible.

Discussion

At the time of the second surgery, a 2-cm defect existed between the fibula bony free flap and the native mandible. Reconstructive options at this point include iliac crest bone graft, a second bony free flap, or autogenous cancellous bone graft. We chose to use a calcium phosphate synthetic material as a substitute to minimize patient morbidity and to allow for osteointegration to fill the bony defect. This requires 6-18 months with small sized defects <2 cm.

Both animal and laboratory studies that have shown good proliferation, attachment, and differentiation of osteoblasts with complete osteogenesis with beta-TCP materials for intrabony defects. Beta-TCP has been used with success in filling other defects in humans particularly in spinal fusion surgeries.

While no studies in the literature search have used calcium phosphate grafts for mandibular defects, beta-TCP has been used as grafts for sinus floor augmentation with clinical success and histological evidence of bone integration.

Our patient had return of jaw function and radiographic evidence of bone integration 6 months post op.

Case Report

50-year-old male with pT4N1M0 stage IV squamous cell carcinoma of his right alveolar ridge.

Past Medical History: arthritis

Social History: no prior smoking or drinking history

Clinical Course: The patient underwent wide local excision with segmental mandibulectomy, leaving him with an anterior parasympyseal bone margin was positive. The patient was taken back to the operating room 2 weeks post first operation for resection of the parasympyseal bone to clear the bony margin. A defect involving the symphysis was created 2-cm in length. ChronOS beta-tricalcium phosphate block manufactured by Synthes (West Chester, PA) was used to fill the bony defect between the fibula and the native mandible. This was fixed by physical compression between the fibula bone and native mandible, as well as 2-0 Silk sutures securing it to the titanium plate. The final pathology on the new mandible resection came back negative for malignancy.

The patient subsequently underwent 6 weeks of chemoradiation 4 weeks post-op. A CT scan was taken 6 months post op showed no evidence of recurrence, and the ChronOS block in good position between the fibula and native mandible.

The patient did well clinically and is eating solid foods. His only complication was a loose tooth adjacent to the osteotomy which required bracing. The patient is 20 months post-op with no signs of recurrence.

Conclusions

We report our success in filling a segmental mandibular defect and recommend the utility of calcium matrix blocks, such as ChronOS, for bridging small bony defects and allowing osteointegration in place of bone grafting. This type of graft material is a useful option even with subsequent chemoradiation to the graft site.

References