Surgical Repair of a Mandibular Angle Fracture with Fibrous Union Using ViviGen® Cellular Bone Matrix

Case performed by: Brian Smith DMD, MD; Kaushik H. Sharma, BDS, DMD; Weronika Bluma, DMD, Camden, NJ, USA

CASE STUDY

Fracture of the mandibular angle is among the most common types of fracture of the mandible (as high as 30%) and is associated with the highest post-operative complication rate.[1,2] Because of this, treatment of mandibular angle fractures presents a challenge to surgeons and remains controversial. One bone-grafting option for managing mandibular angle fractures is autograft bone. Autograft bone can provide the osteoconductive, osteoinductive and osteogenic properties needed for successful bone fusion; however, the retrieval of the autograft can cause pain and donor-site morbidity to patients, as well as increased operative time and cost of the procedure.[3,4] An allograft alternative, ViviGen, also provides all three of these properties while avoiding donor-site morbidity and potentially reducing operative time and cost. ViviGen is processed from donated human tissue and is intended for repair or reconstruction of musculoskeletal defects. ViviGen contains viable lineage-committed bone cells within an osteoconductive scaffold along with osteoinductive demineralized bone matrix. Preclinical studies suggest bone cells improve fusion over mesenchymal stem cells by providing better bone deposition[5] while remaining in the defect site longer.[6]

The following describes the use of ViviGen to treat a mandibular angle fracture with fibrous union.

Patient

- 24-year-old male
- Presented with a right mandibular angle fracture with non-union following trauma to the face.
- Radiographic imaging demonstrated significant malalignment of right mandibular angle fracture with significant continuity defect (Fig. 1). Diagnosis confirmed a fibrous union of the right mandibular angle region.

Procedure

- Debridement and washout of the fibrous union of the right mandibular angle fracture, followed by reconstruction/open reduction internal fixation (ORIF) with a DePuy Synthes Patient Specific Plate Contour (PSPC) reconstruction plate and bicortical screws.
- Tooth #31 was surgically extracted.
- 6cc ViviGen was used to augment and reconstruct the right mandible, followed by maxillomandibular fixation using intermaxillary fixation (IMF) screws and 24 gauge wires.

Results

- Radiographic images demonstrated consolidating ViviGen cellular bone matrix as early as 2 weeks post-operative (Fig. 2) and as long as 6 months post-operative (Figs. 3 & 4).

Conclusion

- Repair of a right mandibular angle fracture with fibrous union using ViviGen was successful in inducing consolidation within 6 months.

Surgical Repair of a Mandibular Angle Fracture with Fibrous Union Using ViviGen® Cellular Bone Matrix

CASE STUDY

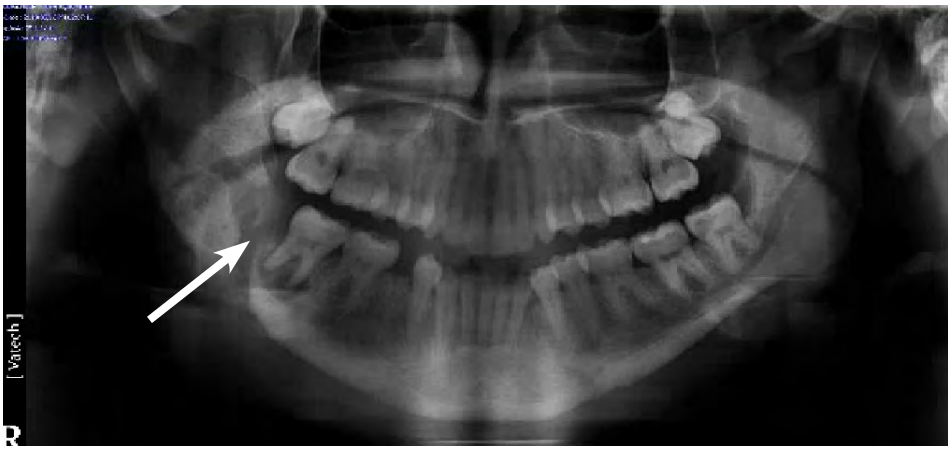

Figure 1.
Pre-operative radiographic image demonstrating significant malalignment of right mandibular angle fracture with significant continuity defect of the mandible in the area of the fracture (indicated by white arrow). Also noted is tooth #31 with periapical radiolucency.

Figure 2.
Radiographic image taken at 2 weeks post-operative showing stable maxillomandibular fixation.

DePuy Synthes
COMPANIES OF Johnson & Johnson

LifeNet Health®
Saving Lives. Restoring Health. Giving Hope.

Surgical Repair of a Mandibular Angle Fracture with Fibrous Union Using ViviGen® Cellular Bone Matrix

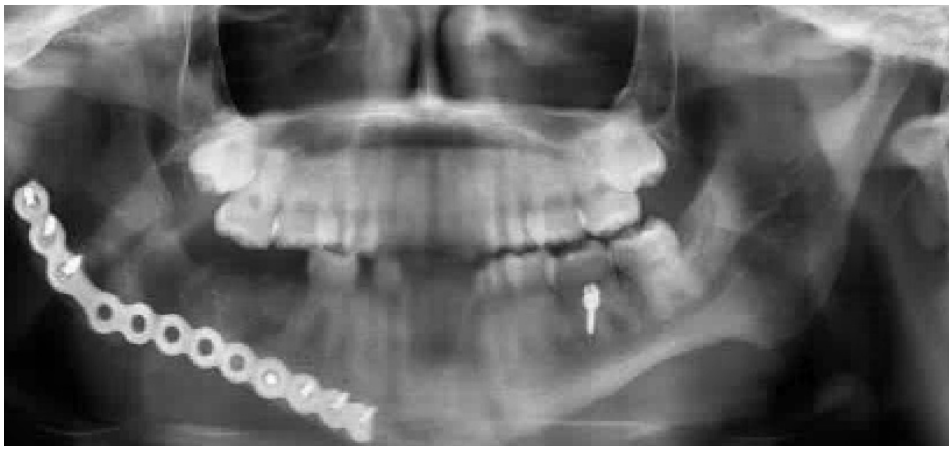

Figure 3.
Radiographic image taken at 3 months post-operative.

Figure 4.
Radiographic image taken at 6 months post-operative demonstrating intact and consolidated bone in the area where ViviGen was implanted (white arrow).

Surgical Repair of a Mandibular Angle Fracture with Fibrous Union Using ViviGen® Cellular Bone Matrix

CASE STUDY

References

1. Lee JH. Treatment of Mandibular Angle Fractures. Arch Craniofac Surg 2017;18(2):73-75.
2. Perez R, Oeltjen JC, Thaller, SR. A Review of Mandibular Angle Fractures. Craniomaxillofac Trauma Reconstr 2011;4(2):69-72.
3. Khan WS, Rayan F, Dhinsa BS, Marsh D. An osteoconductive, osteoinductive, and osteogenic tissue-engineered product for trauma and orthopaedic surgery: how far are we? Stem Cells Int. 2012;2012:236231.
4. Russell JL, Block JE. Surgical harvesting of bone graft from the ilium: point of view. Med Hypotheses 2000;55(6):474-9.
5. Reichert JC, Quent VM, Noth U, Hutmacher DW. Ovine cortical osteoblasts outperform bone marrow cells in an ectopic bone assay. J Tissue Eng Regen Med. 2011;5(10):831-844.
6. Tortelli F, Tasso R, Loiacono F, Cancedda R. The development of tissue-engineered bone of different origin through endochondral and intramembranous ossification following the implantation of mesenchymal stem cells and osteoblasts in a murine model. Biomaterials. 2010;31(2):242-249.

Results from case studies are not predictive of results in other cases. Results in other cases may vary.

LifeNet Health helps to save lives, restore health and give hope to thousands of patients each year. We are the world's most trusted provider of transplant solutions, from organ procurement to new innovations in bio-implant technologies and cellular therapies—a leader in the field of regenerative medicine, while always honoring the donors and healthcare professionals that allow the healing process.

LifeNetHealth.org

68-20-272.00

123030-190911 DSUS