

Complex Bone Augmentation in Alveolar Ridge Defects



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KEYWORDS

- Alveolar bone • Bone augmentation • Bone graft • Implants • Onlay block graft
- Distraction osteogenesis • Guided bone regeneration • Osteoperiosteal flap split ridge procedure

KEY POINTS

- The current gold standard for bone grafting is autogenous bone, due to its biocompatibility, lack of antigenicity, osteoconductive, and osteoinductive properties.
- Radiography using cone-beam computed tomography for complex defects is useful in determining the amount of bone available and what bone augmentation technique will be needed.
- Many options for treatment of alveolar ridge defects are available, including varying surgical techniques as well as bone graft options.

INTRODUCTION

With the advancement of reconstructive techniques, implants have become an increasingly available option for replacing missing dentition in patients. One of the challenges with implant placement is an unfavorable local condition of the alveolar ridge due to atrophy, which may cause insufficient bone volume in the horizontal and/or vertical dimensions. Many options for treatment of alveolar ridge defects are available, including varying surgical techniques as well as bone graft options. The technique and type of material used depend on the geometry and location of the defect.

On the loss of dentition, there is significant change in the alveolar bone due to the activity of osteoclasts during bone remodeling. The most significant change occurs during the 3 months after loss of dentition and can continue over time with an additional loss of 11% of volumetric bone.¹ A study by Ashman showed that there is an average loss of 40% to 60% of the total bone

height and width within the first 2 to 3 years.² The greatest bone resorption occurs in the horizontal plane, which leads to a considerable loss of alveolar width.¹

Various factors can lead to a complex or challenging defect. These characteristics include the location of the defect as well as the size and shape of the defect. Close proximity of anatomic structures such as the inferior alveolar nerve or maxillary sinus may increase the complexity of the reconstruction. Patient factors such as poor healing states or unsuccessful previous surgeries can transform a relatively straightforward defect to a more challenging one.

EVIDENCE

Multiple extensive reviews of the literature have been performed in an attempt to provide a more evidence-based approach for grafting of defects.^{2–6} One such review by Aghaloo and Moy⁷ looked at which hard tissue augmentation techniques are the most successful in furnishing bony

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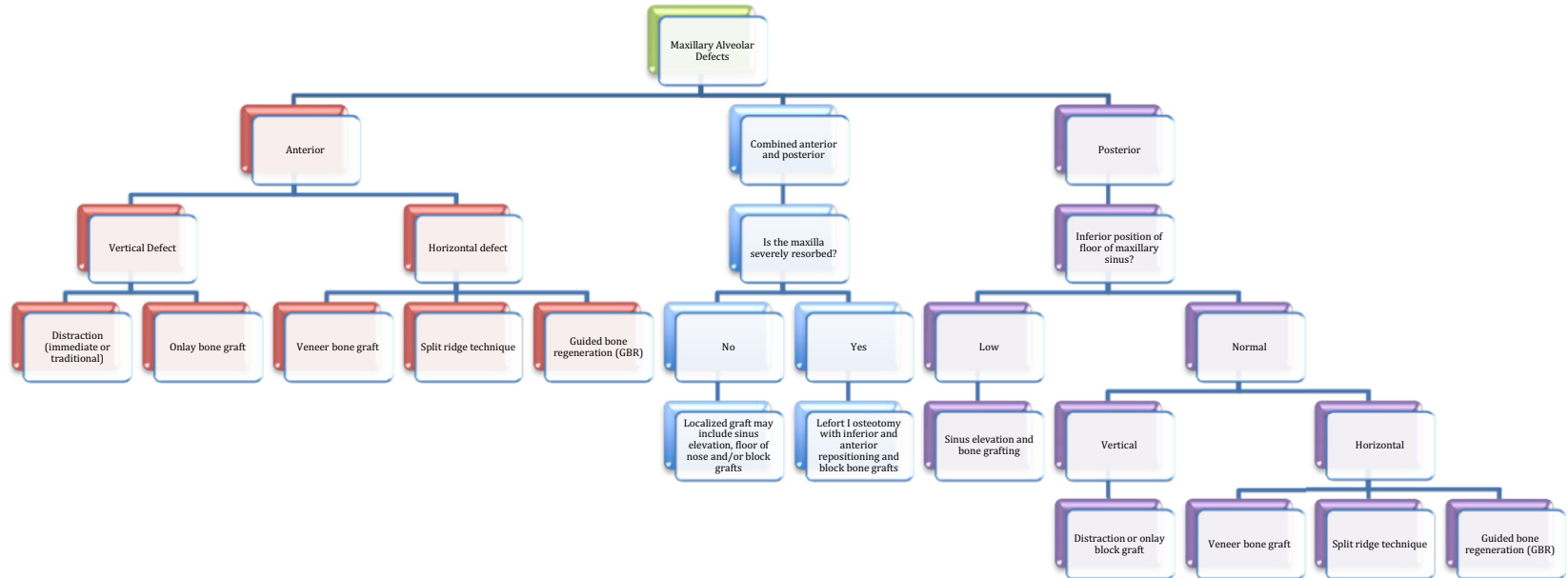


Fig. 1. Maxillary bone augmentation algorithm.

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