Placement of implants in an ossifying fibroma defect obliterated with demineralized, freeze-dried bone allograft and Plasma-rich growth factor

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Abstract

There has been considerable clinical interest in combining the grafts, particularly bone allografts for support for dental implants, soft-tissue support, periodontal maintenance, and ovate pontic formation. The use of demineralized, freeze-dried bone allograft (DFDBA) offers certain advantages over other graft materials and can avoid the need for a second-site surgery for autogenous donor bone. The advantages of DFDBA include handling properties, osteoinductivity, membrane tenting, and less susceptibility to migration after placement. This article will review available grafting materials and demonstrate a case of ossifying fibroma of the mandible, which was treated by curettage and hollow cavity filled with DFDBA. Six months follow-up period showed successful graft result and this grafted bone form was utilized for implant supported prosthesis.

Keywords: Bone graft, dental implant, ossifying fibroma

Introduction

As the opportunities for implant surgery have expanded, use of implants in compromised clinical sites has increased. Relatively limited data are available for implants placed in alloplastic bone grafts material. We aimed to provide more clinical information on stability of implants in bone grafts.

Fibro-osseous lesions of the cranial and facial bones are usually benign and tend to grow slowly. Benign fibro-osseous lesions have similar histopathological features as in fibrous dysplasia, ossifying fibroma, and cemento-ossifying dysplasia. Ossifying fibroma, a rare tumor entity, is a well-demarcated benign fibro-osseous tumor with capsule composed of metaplastic bone, fibrous tissue and varying amounts of osteoid. The ossifying fibromas are subdivided into conventional and juvenile clinicopathologic subtypes. Conventional ossifying fibromas are usually slow growing and generally seen in the third and fourth decades of life. They are treated with simple curettage and the recurrence is rare.

Most benign fibro-osseous lesions of jaws are asymptomatic and slowly progressing. Moreover, an unusual clinical presentation with apparent aggressive and destructive growth may be expected when the lesion is encountered in a younger patient, especially below the age of 15 years.

Authors herein presented a case of ossifying fibroma of the mandible which caused expansion and destruction of mandibular cortex, which was treated by curettage and hollow cavity filled with Bio-oss graft (Osteohealth Co., Shirley, NY). Six-month follow-up period was uneventful and we rehabilitated patient with implant supported prosthesis.

Case Report

A 3-year-old lady patient appeared to the Department of Oral and Maxillofacial Surgery, FODS CSMMU, Lucknow. The patient’s chief complaint was an asymptomatic slowly progressive growth in the right mandible. The exact date, when swelling was first observed, was not clear. She also felt pain in this area. She had no noteworthy family history and her medical history was negative for trauma, pain, paresis, paresthesia, or lymphadenopathy. No symptoms, signs, or laboratory findings suggestive of parathyroid disturbances were detected.

Clinical examination revealed a swelling about 3 × 2 cm in size, causing slight facial asymmetry in the region of submandibular area, including parasympysis region of the mandible. Assessment with palpation showed a hard, non-tender mass with smooth surface adhered to the mandible. The mouth opening of the patient was normal and there were no decayed teeth in the lesion area, and there

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was no malocclusion. Intraoral examination showed that permanent teeth were correctly erupted. An expansion of the buccal cortex was visible in the lower vestibular sulcus between the right canine and left first molar. We observed neither tooth mobility nor inflammation in this area. The oral mucosa was intact with normal color. The mass was firm and non-tender to palpation and was non-adherent to the overlying mucosa. No enlarged regional lymph nodes were found on palpation. Oral hygiene was good. There were no assessed pathological changes of the mucous membrane in the tumor region.

A panoramic radiograph showed a large well demarcated radiolucency surrounded by radiopaque line in the right body region of the mandible [Figure 1]. The radiograph did not detect any evidence of calcification within the lesion. In the absence of any symptoms, signs, or laboratory findings suggestive of a systemic disease, the differential diagnosis included central osteoma, ameloblastic fibroma, ameloblastoma, odontogenic cyst, vascular lesion, and giant cell lesion. These differential diagnoses were discussed with the patient and her parents, and subsequently after getting normal blood investigation we planned for excisional biopsy.

During surgical removal, the lesions showed delimitation and separation from the surrounding bone and were entirely enucleated. The excisional biopsy was taken from the lesion. Because a radical en bloc resection of the lesion could result in damage to the mandibular nerve, a more conservative excision of the mass (tumor curettage and removal of the permanent right first and second premolar) under local anesthesia was performed. And the defect was filled with biocompatible Bio-Oss bone graft material [Figure 2]. Histological examination of the excised tissue showed dense, cellular, fibrous connective tissue stroma containing areas of immature bone formation and cementum-like tissue consistent with a diagnosis of juvenile ossifying fibroma.

There was no recurrence of the lesion at 2-month follow-up [Figure 3]. During follow up after 6 months a panoramic radiograph was taken. Radiograph shown that there was amazing regeneration of bone with all symptoms totally reduced [Figure 4]. Sufficient bone volume was available to achieve the primary implant stability and satisfy both functional and esthetic demands. After that, the edentulous region of the mandible was planned to be rehabilitated by an implant-supported fixed prosthesis and two implants were placed at the diseased site. Implant success was defined by clinical and radiographic evaluation [Figure 5]. There was no evidence of implant mobility. No adverse soft-tissue reactions or signs of infection or pain were observed. Three months after the placement of implant, a fixed prosthesis was given.

**Discussion**

Central ossifying fibroma is the most common benign...
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fibro-osseous lesion of the jaw, but considerable confusion exists over the nomenclature of this lesion, and several terms are used to describe its variable histopathologic features. Because of the presence of both bone and cementum-like products, this lesion is often designated as ossifying fibroma, cemento-ossifying fibroma, or cementifying fibroma. It is agreed that these three terms describe the same lesion. A diagnosis of early-onset ossifying fibroma is very important because this form can have a locally aggressive growth. Some lesions can enlarge rapidly causing extensive destruction of bone. In these cases, the tumor may cause facial asymmetry, local pain, teeth loss, root displacement, dental occlusion alterations, cortical thinning, and perforation.\(^6\text{-}^8\)

A conservative surgical excision (enucleation or curettage) has been described by other authors as the treatment of choice for small lesions.\(^7\) Local recurrence is probable if the tumor is not removed completely, so small lesions can be treated with conservative excision, in contrast to larger lesions that require more radical surgery. The clinical management and prognosis of the juvenile ossifying fibroma is unclear. Although many authors suggest radical en bloc resection rather than conservative surgery,\(^9\) in the present case, a conservative procedure was performed because a radical en bloc resection of the mass could cause damage to the mandibular nerve. After long follow in our case we decided for the reconstructive surgery.

The construction of prostheses for patients in whom the original bone has been lost to trauma, infection or malignancy is fraught with frustration. Surgical reconstruction can restore facial contour and integrity of the oral cavity. Immediate implantation into fresh extraction sockets is often associated with a residual bone defect between the implant neck and the residual bone walls. As has been previously reported,\(^10\text{-}12\) large gaps may jeopardize the success of immediate implant procedures. Such gaps may cause cell migration from the connective and epithelial tissue into the gap, possibly preventing osseointegration. Various techniques, including the use of barrier membranes and grafting material, have been proposed for the management of these defects.\(^12\)

The predictability of implant procedures and the maintenance of long-term stability of implants in function are directly related to quality and quantity of the available osseous tissues for implant placement. When the alveolar ridges lack the appropriate bone volume, additional surgical procedures are necessary to reconstruct and augment the deficiency. A variety of augmentation procedures, dependent on location and size of defect, have been introduced to provide the osseous support necessary to permit the placement of implants. The introduction of new graft materials, (i.e., allografts, xenografts, and alloplastic materials), as well as various dimensions of these graft materials, have provided alternatives to an allogeneous bone. The clinician must make the appropriate selection of graft material and technique based on the size, shape and dimension of the defect and its location in the mouth. Thus, it is important for the clinician to review the literature to understand which graft material and which surgical technique will provide the best reconstructed osseous ridge to successfully support dental implant placement and long-term function.

Classically, higher implant failure rates have been reported when implants are placed into grafted sites. More recently, very high implant success rates have been reported when bone augmentation procedures have been performed. Other studies have not indicated significant differences in implant success rates between implant placed into graft sites compared to implant placed into native bone. The variations in published outcomes suggest that making decisions based on the evidence to provide appropriate treatment for the dental implant patient is a very complex and difficult process.

Implants have several advantages over fixed bridgework or partial dentures in patients with gaps in their dentition. Unlike dentures, implant-stabilized teeth are integrated into the patient’s natural bone, meaning that there is no slipping or movement. This can greatly improve confidence and function. Implant-secured teeth can also prevent further bone loss around edentulous areas and prevent excess forces being applied to abutment teeth. For successful implant placement, a sufficient amount and quality of bone is essential around the site of insertion. However, many patients seeking implant treatment are deficient in bone volume, and hence bone grafting has become an integral part of implant surgery.

In an attempt to preserve alveolar bone and avoid the necessity of residual ridge augmentation before implant placement, several particulate grafting materials have been used immediately after tooth extraction to fill the socket, including bioactive glasses.\(^13\text{-}15\) Bio-Oss® is a xenograft consisting of deproteinized, sterilized bovine bone with 75-80% porosity and a crystal size of approximately 10 µm in the form of cortical granules; it has a natural, non-antigenic porous matrix and is chemically and physically identical to the mineral phase of human bone; it has been reported to be highly osteoconductive and to show a very low resorption rate.\(^16\text{-}17\) The organic material is completely removed to leave the mineralized bone architecture, which renders it non-immunogenic and presumably safe from possibility of infection. A more recent study\(^17\) demonstrated a favorable long-term tissue response to Bio-Oss® particles with mainly woven immature bone shown at 20 months, which was replaced with lamellar bone with time. Bio-Oss® induced more bone deposition. Bio-Oss® exhibited increased osteoblastic activity. Bio-Oss® grafted sites had significantly less fibrous connective tissue.

**Summary**

Dental implants have provided an additional treatment option for patients who have lost one or more teeth. They have several advantages over the alternatives of fixed or
removable prosthesis, and their use is widely growing. Osseointegrated implants may be placed with predictable results in grafted bone as a secondary procedure. In our case, patient was diagnosed as a case of ossifying fibroma, and undergone surgical curettage and surgical defect was filled with Bio-Oss bone graft. After 6 months follow-up patient was rehabilitated with dental implant. Use of bone graft reduced the time period for rehabilitation of patient.

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