An interdisciplinary approach for the management and rehabilitation of a fibro-osseous neoplasm using platelet-rich gel and an implant-supported hybrid prosthesis

ABSTRACT
Fibro-osseous neoplasms such as central ossifying fibroma (COF) can lead to destructive expansile lesions involving the maxilla or the mandible. Management of such lesions usually involves surgical intervention in the form of enucleation or resection. Platelet-rich gel (PRG) has been known to expedite bone regeneration due to its osteoconductive property. PRG initiates a greater and faster initial cellular response in comparison to platelet-rich plasma and has better handling characteristics. The challenge in rehabilitation often occurs due to the size of the osseous defects postsurgery. Fixed prosthodontic rehabilitation with endosteal implants is a viable treatment approach in such cases, improving the oral health quality of life and masticatory efficiency, when compared to a removable partial denture. This case report describes the management of an extensive lesion of COF using PRG and rehabilitation with a screw-retained, implant-supported hybrid prosthesis.

Keywords: Central ossifying fibroma, dental implant, hybrid denture, platelet-rich gel

INTRODUCTION
Central ossifying fibroma (COF), a benign fibro-osseous neoplasm of the oral cavity, has its origin from the mesenchymal blast cells of the periodontal ligament usually resulting in asymptomatic, well-circumscribed lesions composed of fibrous tissue, bone, and cementum.[1] The neoplasm has a female gender predilection of around 5:1, with the affected patients commonly between the third and fourth decades.[2] Although COF is commonly observed to be associated with the mandible, with an incidence of around 70%-90%,[3] there have been reports of extensive lesions involving the maxilla,[3,4] Clinical presentation usually involves an ovoid or spherical intraosseous expansile mass which is usually asymptomatic but sometimes may result in pain and paresthesia.[5] Obstruction of the maxillary sinus, facial deformity, proptosis, and intracranial complications are sequelae if progression of the lesion occurs.[5] Radiographically, the lesion may appear radiolucent in the nascent period, followed by a mixed radiolucent-radiopaque phase with an “eggshell appearance” on maturation.[6] COFs generally have a good prognosis and can be treated by surgical techniques such as enucleation, curettage, and excision.[4]

Prosthetic rehabilitation for such defects can range from a removable partial denture to an implant-supported prosthesis. This report describes the surgical management...
and rehabilitation of a patient with COF of the maxilla using platelet-rich gel (PRG) and a hybrid denture.

**CASE REPORT**

A 14 year old teenager was brought, by her parents, to the Department of Oral and Maxillofacial Surgery with the chief complaint of a swelling on the right side of the face near the upper jaw for 2 months. Examination revealed a bony mass in the maxillary premolar-molar region, which was nontender on palpation [Figure 1]. A “mixed” radiolucent-radiopaque lesion [Figure 2] was observed radiographically with an expansion of the cortical plates. Informed consent for surgical intervention was obtained from her parents and pre-anesthetic clearance acquired. Enucleation was performed under general anesthesia, with extraction of the retained deciduous maxillary first and second molars and the maxillary first premolar and permanent first molar, due
to the extent of the lesion and the mobility of the teeth involved. After raising the mucoperiosteal flap, the surgical site was exposed [Figure 3], and surgical extirpation of the lesion was carried out. Several mixes of recently prepared PRG were added to the surgical defect to fill it completely [Figure 4a and b]. The PRG was formulated by activating autologous platelet-rich plasma (PRP) (0.5 ml) using 1 ml of bovine thrombin (30 U) and 30 μL of 10% calcium chloride.\textsuperscript{[7]} Primary wound closure was obtained using 3–0 silk sutures (Ethicon). Histopathology confirmed the diagnosis of COF [Figure 5].

Following suture removal, an interim removable prosthesis was fabricated at the Department of Prosthodontics to obturate the defect and facilitate healing. A 12th-week postoperative computed tomographic scan revealed a 30% volumetric decrease in the size of the lesion along with bone regeneration along the buccal cortical plate [Figure 6].

The patient reported after 4 years with a desire for a fixed denture. An implant-retained prosthesis was planned for prosthodontic rehabilitation. Three endosseous implants (Osstem Implant India Pvt. Ltd.) were placed, following cone-beam computed tomography evaluation, to engage the maxilla at the region of the maxillary lateral (4.5 mm × 11.5 mm), second premolar (4.0 mm × 8.5 mm), and molar regions (5.0 mm × 10 mm). The anterior implant engaged the cortical bone near the inferior border of the nose, while the distal implant was in proximity to the distal wall of the maxillary sinus. Due to the decreased amount of the bone, the distal implant was tilted to reduce peri-implant stress on the bone and the framework [Figure 7]. Healing abutments were placed after 5 months after visualization of osseointegration radiographically. Multi-unit abutments (Osstem TS Multi Angle Abutment and Osstem Implant India Pvt. Ltd.) were delivered after a 2-week period. Two straight 5-mm multi-unit abutments were placed on the lateral and molar implants, whereas a 30° multi-unit abutment with a 5-mm collar was placed on the molar implant. Impressions were made using polyvinyl siloxane putty (Flexceed, GC India) for the fabrication of polymethylmethacrylate custom tray. A verification jig was fabricated using Pattern Resin™ LS (GC America) by splinting the impression copings. Putty-wash technique (Flexceed PVS, GC India) was used to obtain the definitive impressions [Figure 8]. This was followed by bite registration using hard modeling wax on a record base fabricated using autopolymerizing resin. The cobalt–chromium alloy framework for hybrid prosthesis was fabricated using computer-aided design/computer-aided manufacturing, and the fit was verified with a digital orthopantomogram [Figure 9]. Try-in of the waxed up prosthesis was done with the verification of esthetics, phonetics, and occlusion. The screw-retained hybrid denture was then delivered with an...
immediate follow-up, scheduled after a week [Figure 10a]. The patient was satisfied with her new denture in terms of both esthetics and function [Figure 10b].

DISCUSSION

PRP has been actively researched for use in reconstructive surgery as it affects the delivery of various growth factors along with matrix elements to the defect site. The activation of PRP to PRG using bovine thrombin and calcium chloride has been documented. No adverse reactions were observed in this case as less than 200 U of thrombin was used. The polymerized PRG from autologous PRP enabled the surgeon to easily pack the defect. A quantitative decrease in the size and volume of the lesion was observed postoperatively.

Declaration of patient consent
The authors certify that they have obtained all appropriate patient consent forms. In the form the patient(s) has/have given his/her/their consent for his/her/their images and other clinical information to be reported in the journal. The patients understand that their names and initials will not be published and due efforts will be made to conceal their identity, but anonymity cannot be guaranteed.

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Conflicts of interest
There are no conflicts of interest.

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