

Management of Alveolar Cleft Defect by Iliac Crest Secondary Bone Grafting: A Case Report

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ABSTRACT

Aim and objective: This case report aims to describe the management of alveolar cleft defect by iliac crest secondary bone grafting.

Background: The secondary alveolar bone grafting performed during the mixed dentition period is an essential module of modern-day rehabilitation of cleft lip and palate patients with alveolar defects. Iliac crest bone graft is a frequent secondary graft used and is technique sensitive.

Case description: A 12-year-old girl with alveolar cleft defect having problems with speech and regurgitation of fluids from nostril was presented and its management by a combination of iliac crest bone grafting and platelet-rich fibrin (PRF) was described.

Conclusion: One year recall radiograph showed successful bone augmentation with this secondary alveolar bone grafting along with application of platelet rich plasma (PRP).

Clinical significance: Osseous integration can be enhanced by PRP application over the graft which gives greater clinical outcome with less invasiveness.

Keywords: Iliac crestal bone, Osteogenesis, Secondary alveolar bone grafting.

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BACKGROUND

Alveolar cleft extending posteriorly unilaterally or bilaterally is continually seen in association with blended cleft lip and palate and least with isolated cleft palate.¹ Repair of such bony defects should aim at balancing the functional and esthetic outcomes of the patient.

Numerous autogenous and allogenic materials have been on the market for maxillofacial reconstruction. However, autogenous grafts like cancellous marrow of iliac crest bone, tibia, rib, mandibular symphysis, and calvarium are favored in alveolar clefts.²

Cancellous marrow of ilium is the most chosen autogenous bone graft in view that a feasible quantity of cancellous bone may be acquired from this site.³ Furthermore, issues concerning the morbidity and undesirable alteration in the hip by surgical intervention related to this anatomic site can be avoided by the modification in the techniques and surgical experience.⁴

Besides, no surgical experience which will be able to improve the results of cleft surgery is yet documented.⁵ Hence, a case of clefted alveolar defect managed with combined iliac crestal bone graft along with PRP was presented.

CASE DESCRIPTION

A 12-year-old female patient reported to the pediatric and preventive dentistry department and was provided with a whinge of an issue in speech and regurgitation of fluids from nostril when taken. Extraorally, the cupid's bow appeared less apparent and upwardly turned around closer to the cleft side along with a shorter philtral column (Fig. 1). The patient had a history of surgical correction for cleft lip and palate. On intraoral examination, a deficiency in the left canine region was also evident (Fig. 2A). The preoperative bitewing radiograph confirms the diagnostic radiolucency in the alveolus at the canine region, certifying the alveolar defect (Fig. 2B). History exposed no other medical complications were present. After acquiring consent,

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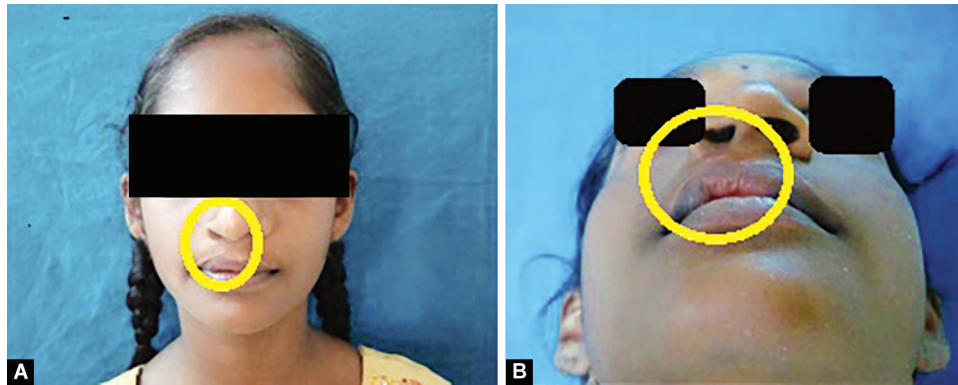
Conflict of interest: None

photographs were taken, and an intraoral approach of SABG under general anesthesia was carried out. The alveolar defect was uncovered by incision; concurrently, the graft was secured from the iliac crest region. This corticocancellous graft was crumpled and blended with autologous blood before placing it at the defect site (Figs 3A to C). After the placement of the graft at the host site, PRP was injected over the graft and sutured. Upon recall, postoperative healing was observed to be uneventful and satisfactory, with an adequate amount of bone formation (Figs 4A and B).

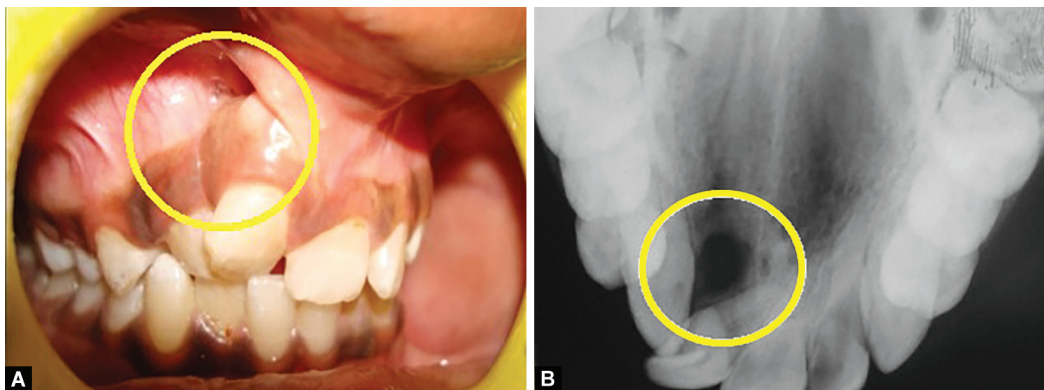
DISCUSSION

Clinicians encounter various functional and esthetic problems while treating cleft lip and palate patients with one of the most common complaints includes speech difficulty and fluids or food coming out of the nose; the same was observed in the present patient.

Alveolar cleft healing, if goals are met, gives super development of oral characteristics and esthetics for a cleft-affected person. Osseous augmentation of such alveolar cleft defects has taken a



Figs 1A and B: Extraoral clinical pictures showing alveolar defect



Figs 2A and B: Preoperative pictures. (A) Intraoral clinical picture showing alveolar defect; (B) Bitewing radiograph with bony defect



Figs 3A to C: Intraoperative surgical pictures. (A) After incision and elevation of flap; (B) Harvested iliac crestal bone graft; (C) After placement of crushed graft

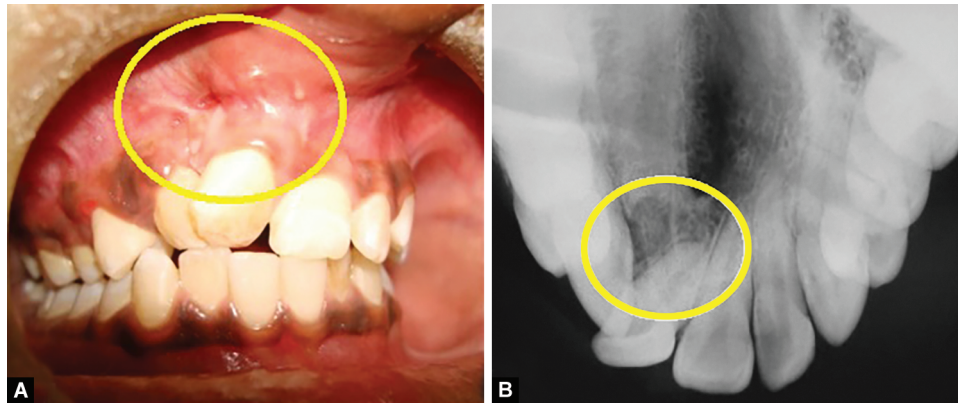
new leap with advanced improvements and refinement in surgical techniques globally.⁴

Taking the properties of graft and quality of recipient site into contemplation, autologous bone grafts are considered the gold standard for alveolar cleft repair, especially when bone height and width are to be increased.³ But early bone defect repair named primary bone grafting during the period of lip overhaul yielded poor outcomes. Furthermore, literature states that primary bone grafting consequences in resistance to anterior and inferior growth of the maxilla and altered angulations of the teeth and the premaxilla; hence this practice is now outmoded.^{4,6}

To combat this, SABG is brought through Boyne and Sands, which involves the grafting of autogenous cancellous bone to residual alveolar defect prior to permanent canine eruption

between 6 and 13 years.^{3,7} SABG stabilizes the maxillary segments, enhances the vestibular soft tissue relationship and alveolar contour, closes an oronasal fistula subsequently favorably affects speech. It rejuvenates bone, facilitating the canine and adjacent teeth spontaneous eruption or their orthodontic movement and restores the canine eminence, thus providing a bony aid for the alar base and probably helping to remove nasal asymmetry and discharge obstructed airways.⁷ Owing to the benefits of SABG, age and previous history of the child into consideration, SABG was planned and performed on the present patient.

Bone graft material of choice for SABG is fresh autogenous cancellous bone because it comprises vital immune-compatible bone cells crucial to osteogenesis and becomes in unison with the maxilla. Moreover, it can be readily harvested and shaped to fit. Even



Figs 4A and B: Postoperative pictures. (A) Intraoral clinical picture after bone augmentation; (B) 1-year recall bitewing radiograph showing filled bony defect

though several donor sites for autogenous cancellous bone-like iliac crest, calvarium, mandibular symphysis, and tibia are available, the iliac crest is preferred for SABG due to its availability, richness of cancellous bone, relative ease of bone harvest, and also the same was used as a bone graft in the present case report.^{7,8}

However, patient demographic details like age and sex, cleft width and height, the amount of bone harvested, influence of functional stress, and the surgical technique used might hinder sufficient osteo-regeneration of iliac bone graft.^{2,4} Hence, PRP extracted from autologous whole blood was utilized in the present patient to augment the osteoinductive property of iliac crest graft. PRP enriches the graft with more factors which in turn increases the progenitor cell transformation into osteoblasts, thereby producing positive results when used for alveolar bone grafting.⁴

Fresh autogenous bone, though stands ideal for SABG, bone substitutes like tissue-engineered bone and recombinant human one morphogenetic protein-2 (rh BMP-2) are also being tried in alveolar ridge augmentation. However, documented literature on their properties is sparse, and further scientific trials are needed with respect to both materials and techniques before they can be an ancillary for autogenous bone.

CONCLUSION

Secondary alveolar bone grafting, along with the application of PRP over the graft material, yields successful results in terms of ridge augmentation of alveolar cleft bony defects. But the translational research with allogenic bone grafts can extrude and enhance alveolar cleft repair as these procedures are less invasive for the patients.

Clinical Significance

Even though iliac crest bone graft is a widely used secondary alveolar graft, its disadvantages can be reduced, and its osseous

integration can be enhanced by the application of PRP, which yields a greater clinical outcome.

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