



Heterotopic Bone Formation After Free Fibula Flap for Pediatric Maxillary Reconstruction: A Rare Complication

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Introduction

- Pediatric hemimaxillectomy defects are exceedingly rare (<0.1 per 100,000 children annually).
- The free fibula flap (FFF) is the preferred reconstructive option, offering reliable vascularity, adequate bone stock, potential for dental rehabilitation, and composite tissue for complex three-dimensional defects.
- Long-term complications following pediatric maxillary FFF reconstruction remain poorly characterized. While trismus has been reported and is typically attributed to ankylosis or pedicle ossification, heterotopic bone formation in this setting has not been previously described.

Objective

Aim 1: To report a case of heterotopic bone formation causing recurrent trismus following right hemimaxillectomy with FFF reconstruction and custom endoprosthesis in a pediatric patient

Aim 2: To review the relevant literature on postoperative complications.

Methods

- A single-patient case review was conducted at a tertiary pediatric center. Clinical data, imaging, and operative findings were analyzed.
- A focused PubMed search was performed to identify studies reporting pediatric FFF reconstructions for maxillary defects, outcomes, and long-term complications.

Results: Case Report

A 10-year-old girl was referred to a tertiary pediatric center with a 2.8 x3.1 x 2.5cm right maxillary mass. Biopsy revealed a giant cell-rich lesion with aggressive local behavior.

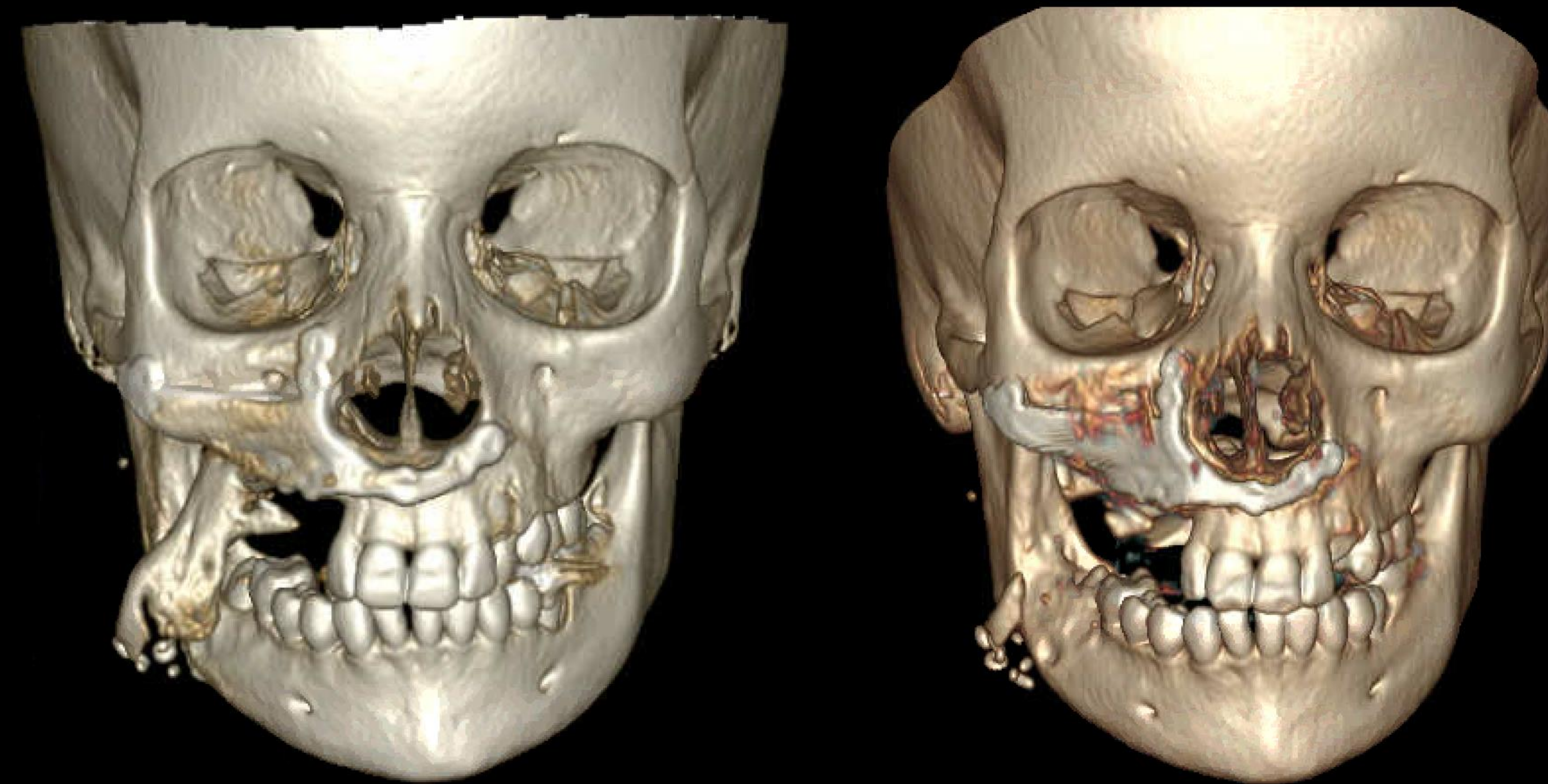


Fig A. (Left) Preoperative 3D CT reconstruction of heterotopic bone bridging from the maxilla to the mandible, resulting in MIO of 0 mm. (Right) Immediate postoperative 3D CT reconstruction after heterotopic bone extirpation, resulting in MIO of 30 mm.



Fig B. Clinical photograph demonstrating MIO of 20 mm.

Results: Case Report, cont.

Given the extent of bony destruction, she underwent right hemimaxillectomy with immediate FFF reconstruction and custom endoprosthesis. Three months postoperatively, she developed progressive trismus (maximal incisal opening [MIO] decreased from 20 mm to 7 mm). Exploration revealed heterotopic bone bridging the reconstructed maxilla and mandible. This was subsequently resected, improving the MIO to ~30 mm. Within five months, complete trismus (MIO 0 mm) recurred (Image A). Repeat exploration confirmed heterotopic ossification (HO), which was excised. Reconstruction was then performed with maxillary and mandibular osteoplasty. A buccal fat pad flap was mobilized for soft tissue coverage, and immediate postoperative MIO improved to ~30 mm.

Results: Literature Review

In a focused literature review, no prior cases of heterotopic ossification following pediatric maxillary reconstruction with FFF were identified. In the largest multi-institutional review of 87 pediatric patients undergoing maxillomandibular reconstruction with FFF (Slijepcevic et al.), long-term craniofacial growth abnormalities were reported in 23%, while postoperative trismus occurred in only two patients (2.3%)—both after mandibular reconstructions. In a large single-institution series of 68 maxillary FFF reconstructions in pediatric patients (Baserga et al.), only pedicle ossification was observed in 4.4% of cases.

Conclusions

Heterotopic bone formation is a previously unreported cause of trismus following pediatric maxillary FFF reconstruction, distinct from ankylosis and pedicle ossification. Clinicians should maintain a high index of suspicion for this complication, as early recognition has important implications for surveillance and functional rehabilitation in this population.