Pediatric Cranial Intraosseous Lipoma: Literature Review and Craniofacial Treatment Approach

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Craniofacial Intraosseous Lipomas (CIOLs) account for about 4% of all Intraosseous Lipoma diagnoses. Fewer than 50 cases ofpediatric CIOLs (PCIOLs) have been reported in literature to date and thus, there is no effective diagnostic approach and standardized treatment for this patient population. This study aims to formulate a multidisciplinary approach to the diagnosis and treatment of PCIOL and review the potential reconstructive options.

We conducted a literature review on diagnostics and current surgical techniques for PCIOL.

The proposed diagnostic procedure includes MRI, CT and CT venogram to delineate the sinus anatomy in relation to the mass, and an initial biopsy. The multidisciplinary treatment team should include a pediatric craniofacial surgeon, pediatric neurosurgeon, and medical oncology. Virtual surgical planning is an indispensable to plan the resection of the mass and the reconstruction. Reconstructive options include autologous bone grafts or an alloplast (Medpor or PEEK implants). The unpredictable bone resorption as well as large cranial defects that may require reconstruction are critical limitations for autologous cranioplasties. Medpor provides adequate cerebral neuroprotection, allows for vascular tissue ingrowth and incorporation, and is easy to modify intraoperatively. These features render it to be a useful reconstructive option for patients with PCIOL.

A comprehensive diagnostic and treatment approach is presented for patients with PCIOL, including multidisciplinary work-up. This abstract addresses the need for a standardized multidisciplinary approach to the diagnosis and treatment of PCIOL and review the potential reconstructive options; and influences the diagnosis and surgical treatment of pediatric intraosseous lipoma, with emphasis on a multidisciplinary approach, virtual surgical planning, and various implant types.

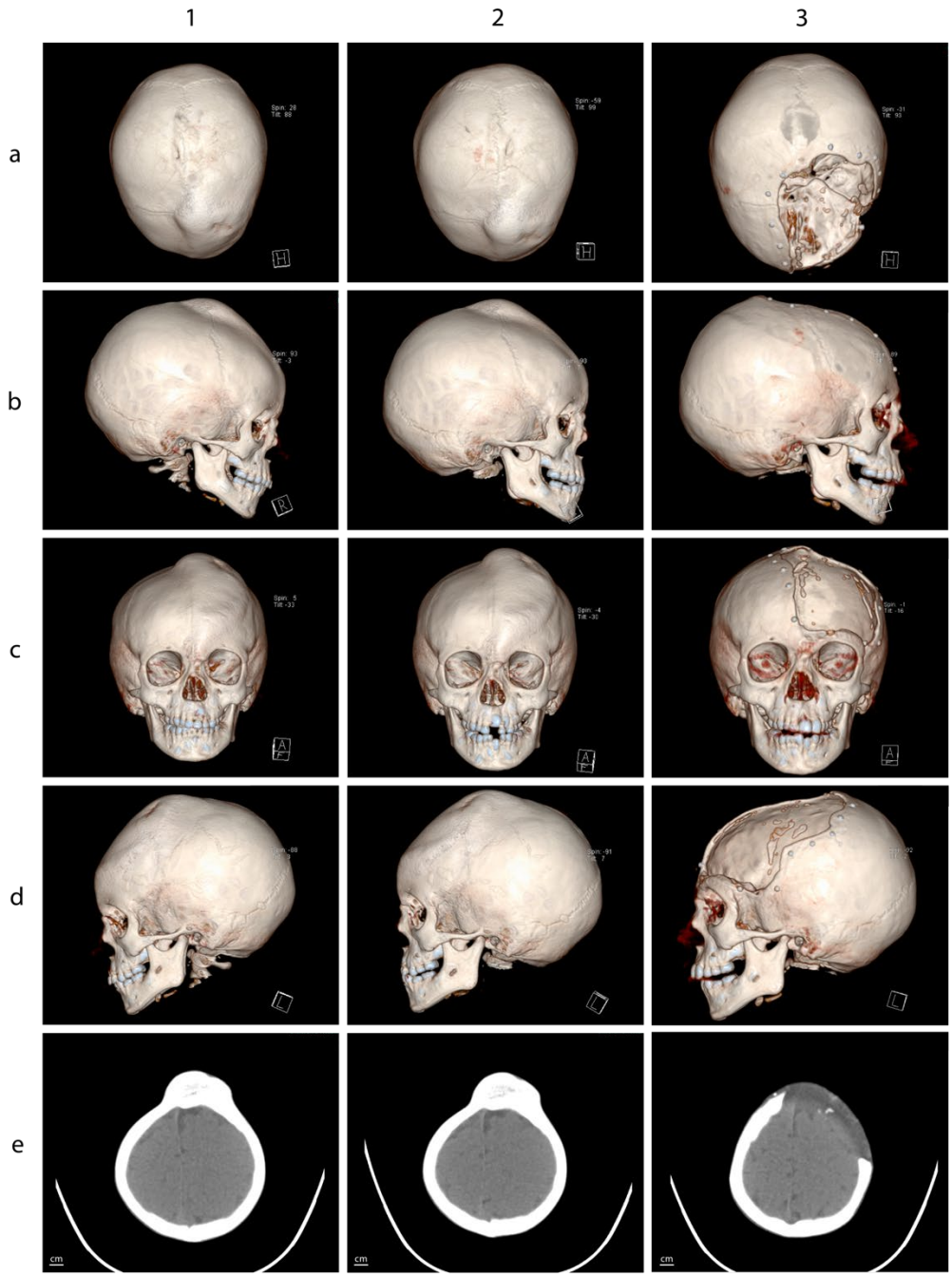

Fig. 1 3D craniosynostosis of the patient before and after surgery. Depicted are the patient's 3D reconstructions in the **(1-3a)** top-down, **(1-3b)** right-sided, **(1-3c)** frontal, and **(1-3d)** left-sided views **(1a-e)** eight months before surgery, **(2a-e)** two months before surgery, and **(3a-e)** seven months post-surgery. Axial cuts of the **(1e, 2e)** lesion and **(3e)** MedPor implant are also shown for their respective time points.

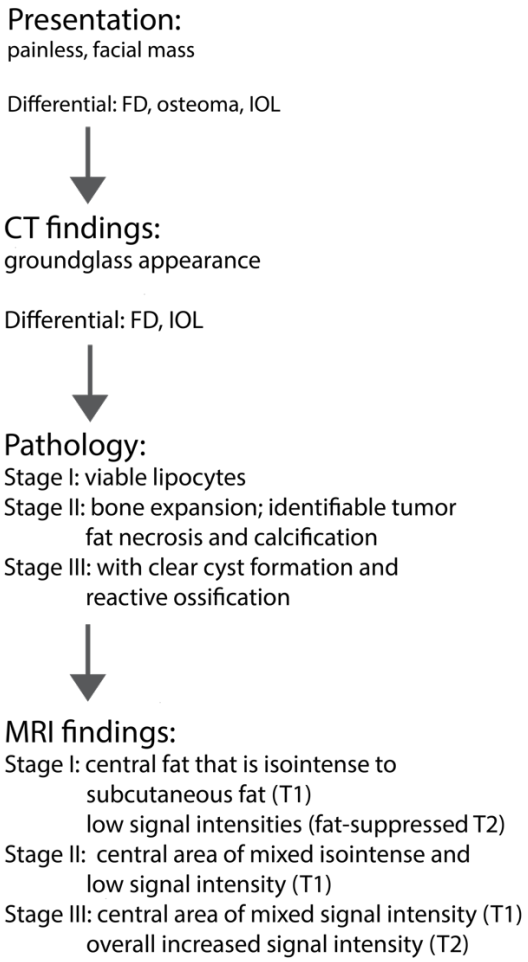

Fig. 2 Recommended diagnostic procedure for a pediatric patient who presents with a painless facial mass. Pathology and MRI are crucial to accurately diagnose intracranial IOL. FD fibrous dysplasia, IOL intraosseous lipoma

	Material	Benefits	Limitations
Autograft	cranial autograft	primarily used for congenital calvarial defects; biologically identical to patient; ideal vascularization post-procedure	limited material, increase operative time; potential bone resportion; donor-site morbidity
MedPor	porous polyethylene glycol	no donor site necessary; increased neuroprotection; effective tissue ingrowth and vascularization into implant	expensive; possible restriction of normal calvarial growth if done before age 5; need 3+ weeks to plan and print; potential calvarial growth around implant with larger defect over time
PEEK	polyethylene ether ketone	no donor site; increased neuroprotection; effective for multistep procedures where implant removal is necessary	expensive; restriction of normal calvarium growth; no tissue ingrowth; potential need to replace as calvarium grows

Fig. 3 Cost-benefit analysis of the three common implants used for craniofacial reconstruction in a pediatric IOL.