

Fish Skin to Reconstruct Orbit Following Resection of Anterior Skull Base Tumor

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Introduction

- Orbital involvement is common during the resection of anterior skull base tumor removal – requiring the removal of one or more of the orbital walls.
- Adequate orbital reconstruction is essential to avoid **complications such as enophthalmos, diplopia, and pulsatile exophthalmos**.
- Reconstruction options include autologous grafts and alloplastic materials; however, these have disadvantages, such as increased risk of infection, biocompatibility, and long-term stability.

A Novel Solution

- A novel option for orbital reconstruction is **intact fish skin xenograft (FSG)**
- Derived from wild Atlantic cod, FSG provides a **biologically active, acellular dermal matrix**.
- Previous uses have included the treatment of burn wounds, necrotizing fasciitis, and skin regeneration.
- Advantages of using FSG include high biocompatibility, resistance to infection, and rapid integration with host tissue.

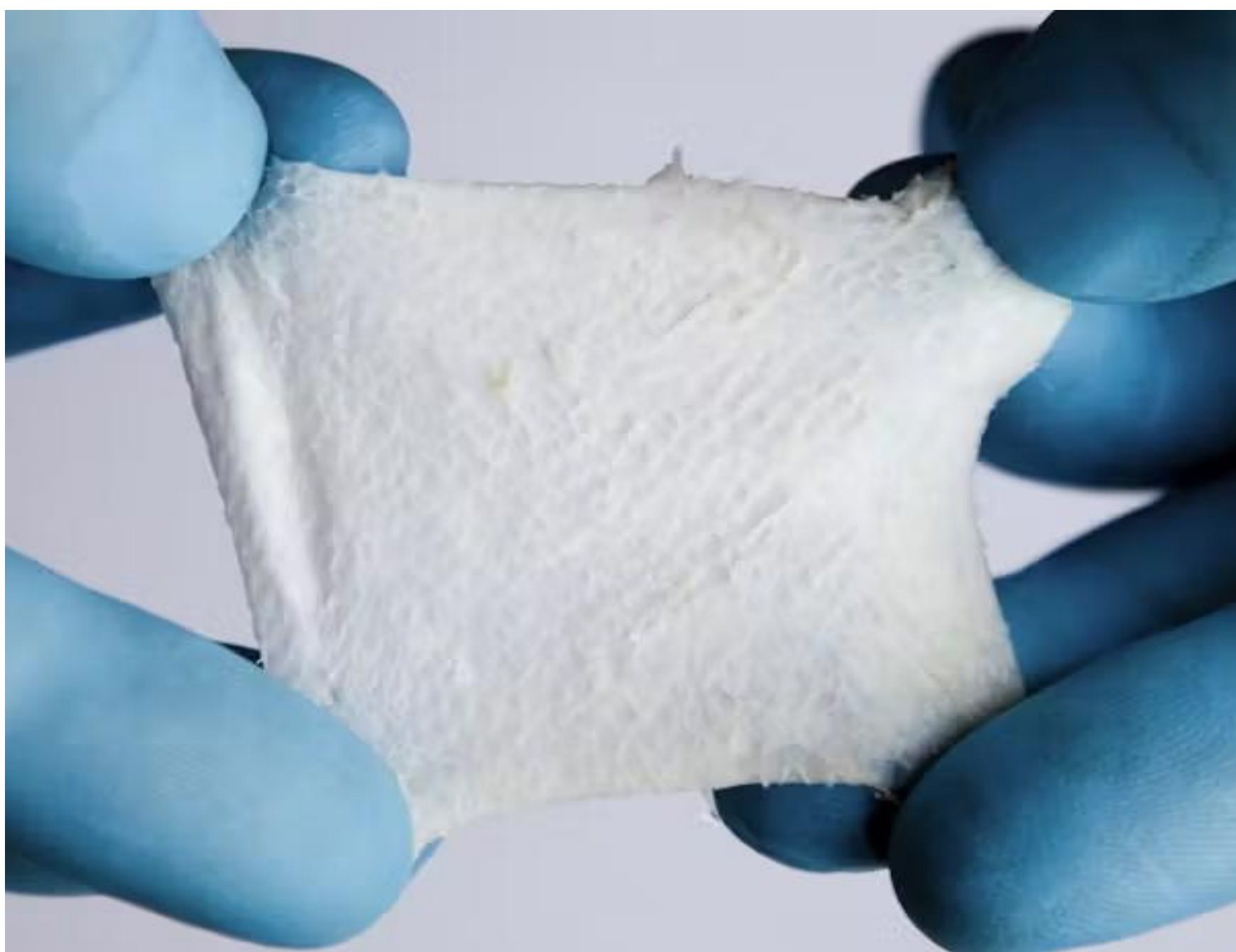


Figure 1. Fish Skin Xenograft

Case Description

- The patient is a 62-year-old woman who was found to have a **large (7 cm x 4.5 cm x 7 cm), left-sided, extra-axial mass** arising from the cribriform plate and olfactory groove with extension to frontal, ethmoid, left sphenoid sinus, and left orbit.
- Ophthalmic evaluation revealed **significant proptosis** of the left eye and **-3 vertical gaze deficit**.
- A multidisciplinary tumor board consisting of neurosurgery, otolaryngology, and ophthalmology decided on an up-front surgical resection of the tumor.

Orbital Reconstruction

- Following surgical resection by neurosurgery, otolaryngology, and oculoplastics gross total tumor was removed.
- Ophthalmic dissection involved the removal of the majority of the orbital roof, total medial wall, and orbital floor up to the infraorbital nerve. The posterior nasolacrimal sac fossa was taken with the tumor dissection, and the lacrimal sac was stripped as margin.
- Soft tissue dissection was performed to remove abnormal periosteum until normal periorbital fat was encountered.
- Globe was severely enophthalmic, nasally deviated, and esotropic following dissection due to nearly 270 degrees of loss of orbital support and barrier.
- Reconstruction included split-thickness graft of inner table of the calvarial bone flap to serve as orbital roof for rigid barrier.
- Double layer FSG was suture anchored to the nasal edge of the bone graft and wrapped around the medial orbital wall and was tucked to pressure-place the FSG along the remnant of the anterior orbital floor.
- Crawford stent was placed in the nasolacrimal system to attempt to maintain patency through the resultant partial dacryocystectomy defect.

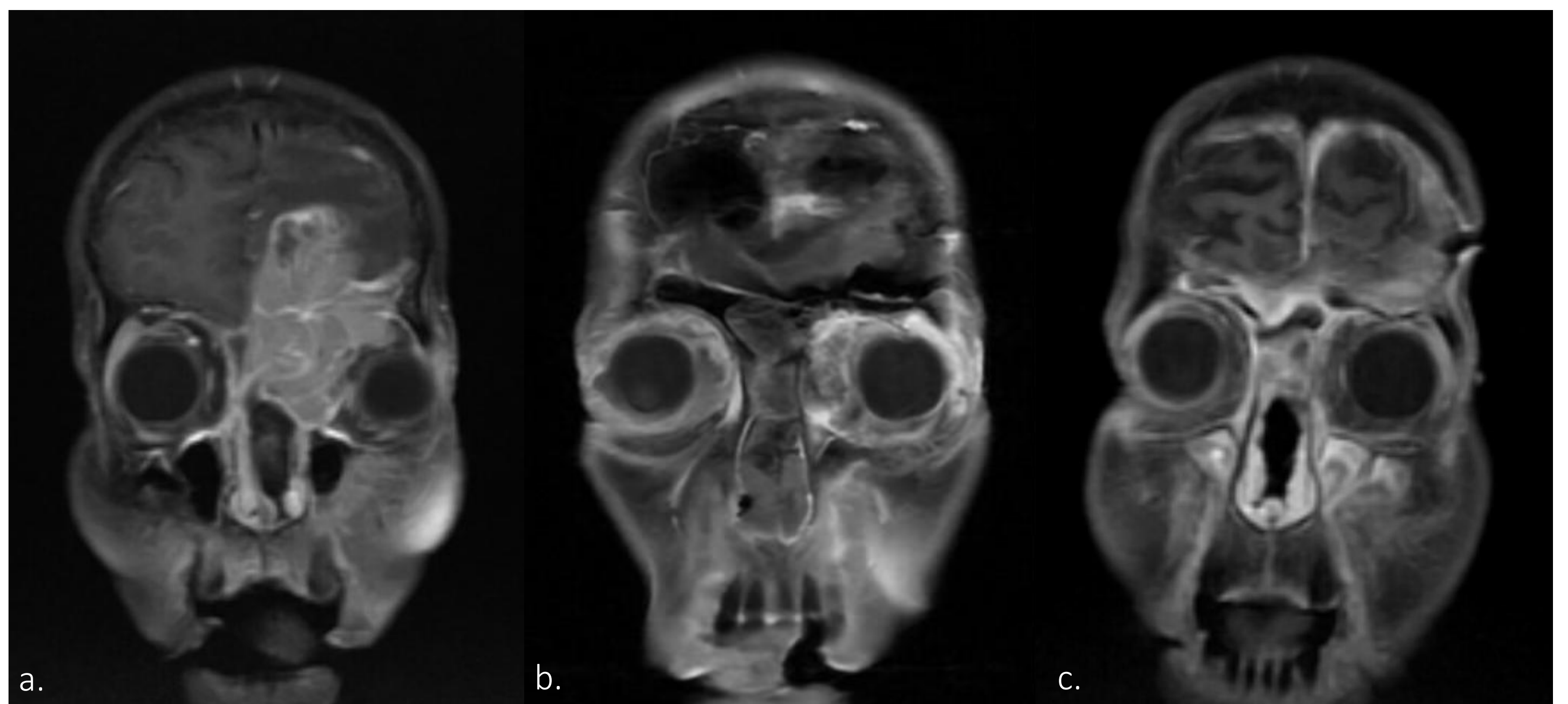


Figure 2. **a.** Pre-operative coronal T1 magnetic resonance image (MRI) fat-suppressed (FS); **b.** Same day post-op coronal T1 MRI FS; **c.** Five-month post-op coronal T1 MRI FS

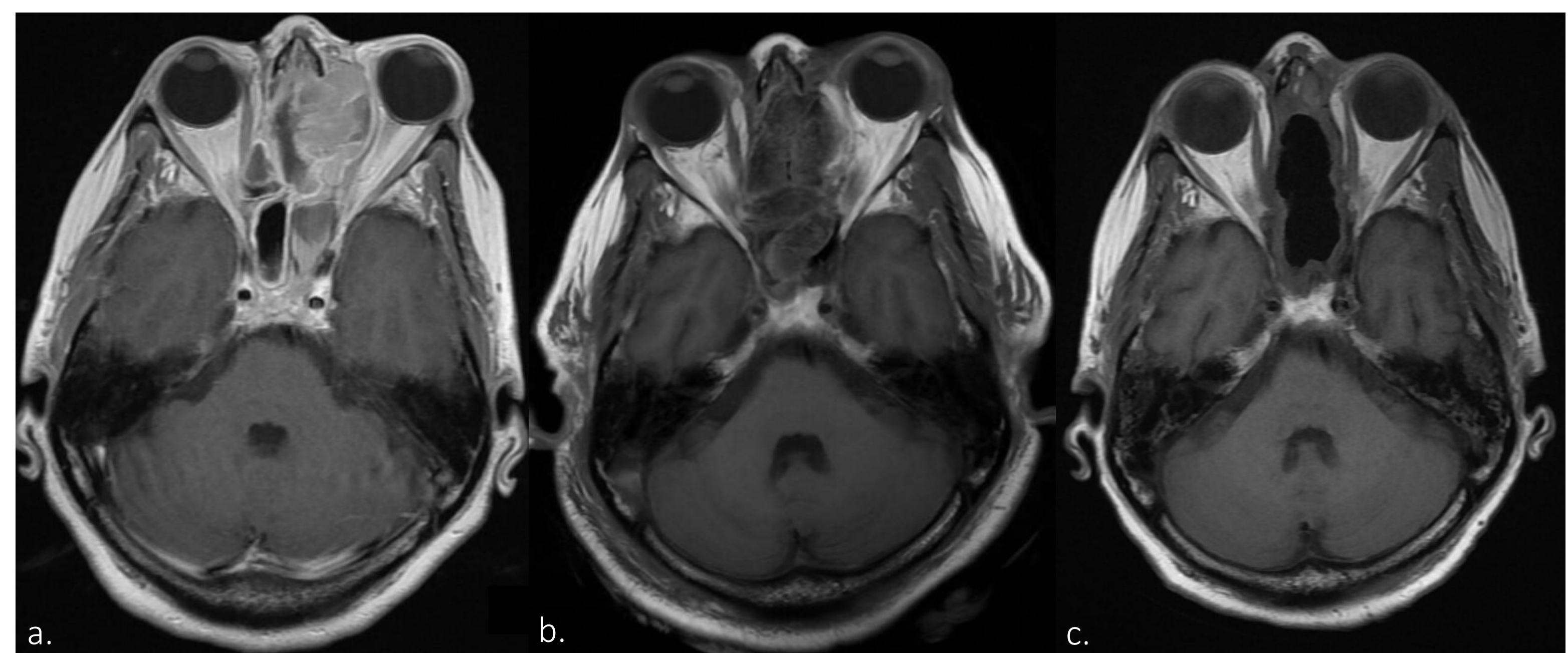


Figure 3. **a.** Pre-operative axial T1 MRI; **b.** Same day post-op coronal T1 MRI; **c.** Five-month post-op axial T1 MRI

Conclusions

- At the most recent ophthalmology post-op visit, the patient's left eye has 20/25 vision (baseline) and **full motility** with **Hertel measurements of 15/18/93 mm**.
- Since resection, the patient has undergone a formal DCR procedure; biopsies performed revealed fibrotic tissue without any tumor recurrence.
- FSG can be used to successfully reconstruct the orbit following extensive resection of the anterior skull base tumor.

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