# Silicone oil migration into periorbital space surrounding an extraocular muscle after sutureless 23-gauge vitrectomy in a child

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**We report the case of an 11-year-old girl with a rare finding of silicone oil migration into the periorbital space surrounding an extraocular muscle, discovered during strabismus surgery for a sensory exotropia that had developed after retinal detachment repair by pars plana vitrectomy with intraocular silicone oil.**

Silicone oil is used to repair complex retinal detachments. Reports exist of intraocular silicone oil migration into the subconjunctival space,[1,2] orbit,[3] eyelid,[4] and central nervous system.[5] We report the case of a child who developed sensory strabismus after retinal detachment repair with pars plana vitrectomy (PPV) and intraocular silicone oil, with migration of the silicone oil into the periocular space around an extraocular muscle.

## Case Report

A white girl born at 27 weeks' gestational age weighing 756 g, with reported "stage 2 ROP with mild plus, nasal vessel straightening, slight nasal drag and foveal ectopia OU" (not requiring laser treatment), was followed for high myopic astigmatism and nasal changes of regressed ROP (in contrast to more commonly described temporal macular dragging), bilateral negative angle kappa, and glial ridges nasally and temporally in the right eye and superiorly in the left eye. At 11 years of age she was examined at Hotel Dieu Hospital, Queen's Department of Ophthalmology in Kingston, Canada. She was developmentally normal, with no visual complaints. Best-corrected visual acuity was 20/20 in the right eye and 20/30 in the left eye, wearing −7.75 +2.25 ×075 in the right eye and −9.25 +3.25 ×090 in the left eye. Extraocular movements were full, with a well-controlled distance alternating, comitant intermittent exotropia of 20$^{\Delta}$ and near exophoria of 10$^{\Delta}$. Fundus examination demonstrated unchanged marked nasal traction with foveal ectopia bilaterally (Figure 1). Scleral depressed peripheral retinal examination was not tolerated; however, undepressed examination did not reveal retinal lattice degeneration, tears, or detachments. Two months later she presented with a 5-day history of floaters and visual field defect left eye, with no inciting trauma. Best-corrected visual acuity was 20/20 −2 in the right eye and counting fingers in the left eye, with a macula-off retinal detachment and a large retinal tear temporally. A small retinal tear with an inferonasal retinal detachment was discovered in the right eye.

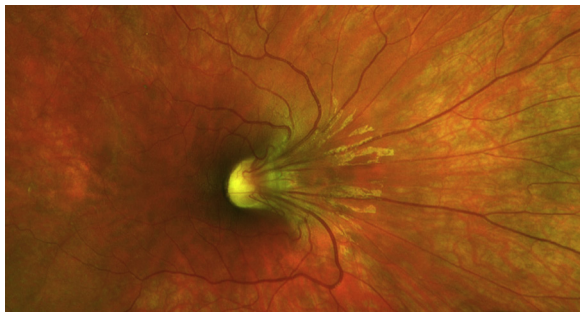

**FIG 1.** Fundus photograph of the right eye showing the patient's marked nasal traction, with straightening of the vessels nasally, noted since infancy and related to her retinopathy of prematurity (the left eye had a similar appearance).

The right eye received peripheral laser retinopexy; the left eye, a pneumatic retinopexy, which failed to completely reattach the retina. An urgent PPV was performed, with endolaser retinopexy to surround the retinal breaks. The eye was filled with 1000 centistokes of silicone oil. Beveled sclerotomies were made inferonasally, inferotemporally, and superoteporally with a 23-gauge trochar cannula; the conjunctiva was displaced to deliberately separate the conjunctival and scleral openings. At the end of surgery, the incisions were massaged with a cotton-tipped applicator to ensure no oil leakage. Intraoperatively, peripheral avascular retina and regressed fibrovascular ridges were noted bilaterally.

The macula was successfully reattached but, a persistent, stable inferotemporal retinal detachment remained, and therefore the silicone oil was not removed. Vision in the left eye only recovered to 20/200 postoperatively. However, a year-and-a-half after her vitrectomy, best-corrected visual acuity was 20/25 +2 in the right eye and light perception in the left eye; the poor vision in the left eye was due to the retinal detachment, intraocular silicone oil, and dense posterior subcapsular cataract. She had a constant left sensory exotropia of 35$^{\Delta}$, full extraocular

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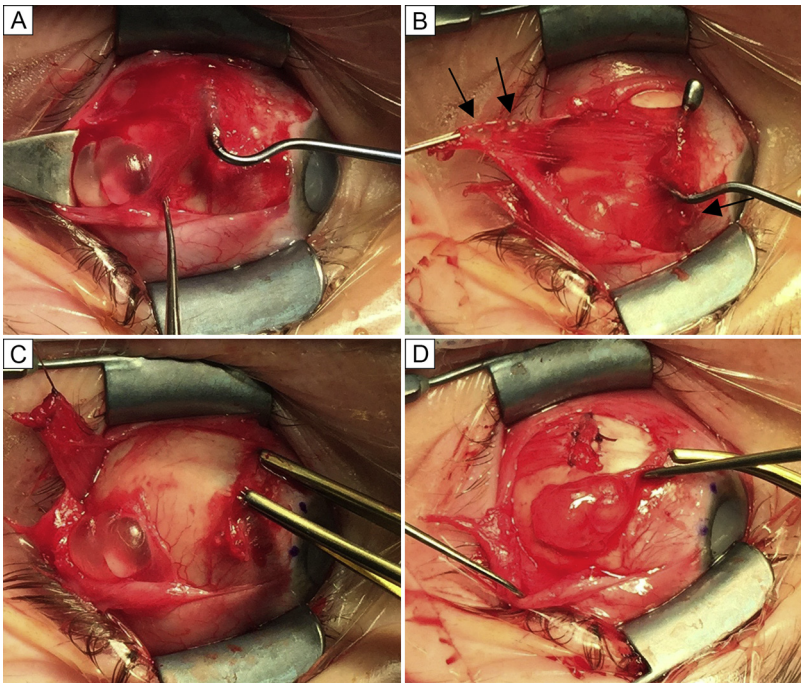


**FIG 2.** Intraoperative photographs of silicone oil embedded in the left lateral rectus muscle and surrounding tissue in our patient (surgeon's view from the head of the patient). A, Two large silicone oil globules are seen posterior to the hooking of the lateral rectus muscle. B, Silicone oil embedded within the check ligaments overlying the lateral rectus, the anterior belly of the lateral rectus, and at the lateral rectus insertion (arrows). C, Lateral rectus muscle disinserted from the globe, with 2 large, firm, encapsulated cysts adherent to the globe and not contiguous with the lateral rectus muscle, located 20 mm posterior from the limbus. D, Lateral rectus recession complete, with the silicone oil cysts removed (grasped with forceps in photograph, measuring 8 mm in length).

movements, and no diplopia, but complained of left eye discomfort. Anterior segment examination was normal including intraocular pressures. Left eye strabismus surgery was planned for cosmesis and to evaluate the cause of the ocular discomfort.

Intraoperative forced ductions unexpectedly revealed slight limitation of abduction in the left eye despite the exotropia. Surgical exploration revealed cyst-like material scattered throughout her conjunctiva, especially superotemporally. On hooking the lateral rectus muscle, significant scarring was revealed, with tiny beads of silicone oil throughout the scarred tissue embedded within the check ligaments and most apparent on the lateral rectus muscle superior edge (Figure 2A-B). Once free of adhesions and oil, the lateral rectus muscle appeared normal and was recessed. Conjunctival dissection superotemporally revealed two large, hard encapsulated cysts of silicone oil adherent to the globe (Figure 2C). The medial rectus muscle had conjunctival scarring anterior to the medial rectus insertion, with silicone beading. The restriction from medial scarring and physical obstruction from the temporal oil may have contributed to the limitation to abduction and the patient's ocular discomfort. A left medial rectus plication was performed. The superotemporal encapsulated silicone oil was removed intact, with no leakage (Figure 2D); subsequent repeated forced ductions were normal. Histopathology demonstrated numerous oil-filled vacuolated spaces surrounded by fibrous septae (Figure 3).

Our patient had an excellent aesthetic outcome postoperatively. She later underwent uneventful cataract extraction and intraocular lens implant left eye. Her visual acuity, however, did not improve, because dense posterior capsular opacification secondary to the intraocular silicone oil developed, not cleared by YAG capsulotomy, and the family declined further surgery. Two years after strabismus surgery, at age 15 years, best-correct visual acuity was 20/25 +3 in the right eye and counting fingers in the left eye, with good cosmetic alignment and a small recurrent left exotropia of $6^{\Delta}$ at both near and distance. Fine collections of silicone oil droplets were detected superolaterally in the left eye conjunctiva, with no associated discomfort or poor cosmesis, and were therefore left for observation.

## Discussion

Silicone oil is used as an internal tamponade in complex vitreoretinal surgery.[3,6] The oil allows prolonged tamponade because it is not absorbed[5]; it is usually removed as early as 3 months after PPV to prevent intraocular complications, such as glaucoma and cataract.[1,3] However, if the risk of redetachment is too great, the oil may be left in place.[1]

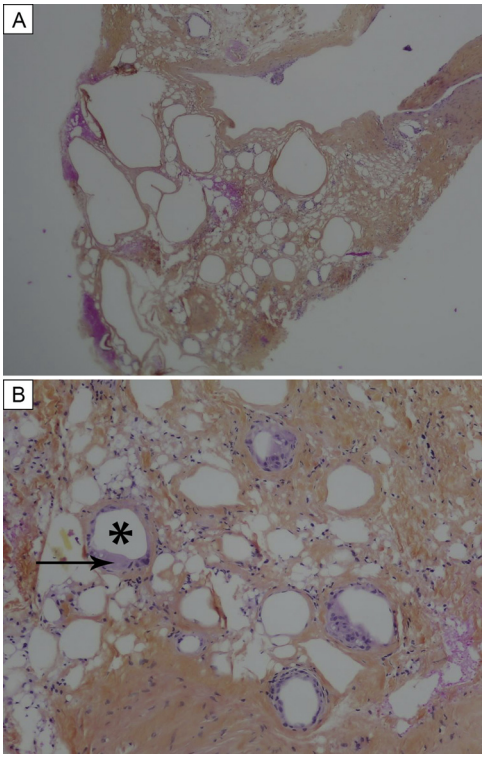


**FIG 3.** Orbital soft tissue histopathology slides. A, Microscopic examination showing a lipogranulomatous inflammatory reaction in the orbital soft tissue secondary to a reaction to silicone oil (hematoxylin, phyloxine, saffron [HPS], original magnification ×50). B, High-power view showing the multinucleated foreign body giant cells (arrow) that have engulfed the silicone oil (star; HPS, original magnification ×200).

Silicone oil migration out of the vitreous cavity has been reported previously. Proposed mechanisms of oil extrusion include migration through incompletely healed sclerotomy sites[2,3] and direct trans-scleral passage (especially if local scleromalacia with coinciding increased intraocular pressure)[2] or via the trabecular meshwork and episcleral veins.[2] These mechanisms would be more likely in cases of direct ocular trauma postoperatively. With the introduction of small-gauge mostly sutureless transconjunctival vitrectomy surgery,[7,8] silicone oil migration has become more common. Even if the sclerotomy is presumed "watertight," it is common for a small volume of silicone to escape as it is withdrawn and become trapped by overlying conjunctiva.

To our knowledge, this is the first report of silicone oil migration from the vitreous space into the periorbital space surrounding an extraocular muscle, after otherwise uncomplicated 23-gauge vitrectomy with intraocular silicone oil injection. Although the exotropia was unlikely secondary to silicone oil migration, the ocular discomfort may have been related to its presence, because the discomfort was relieved after strabismus surgery. The silicone oil migration was presumably due to sclerotomy site leakage, despite no other signs of leakage. Our case highlights the importance of meticulous sclerotomy site closure and the importance of a low threshold for suturing sclerotomies, especially in pediatric vitrectomy surgery.

## Literature Search

PubMed was searched on September 9, 2018, for English-language results using the following terms in combination: *silicone oil*, *extrusion*, *migration*, *complications*, *extraocular muscles*, *strabismus*, *sclerotomies*, *leakage*, *23-gauge vitrectomy*, and *pediatric*.

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# Episcleral racemose hemangioma

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**Racemose hemangioma is a rare, benign vascular malformation. In the episclera, it appears as dilated, tortuous blood vessels that pass from the fornix over the globe surface to the limbal area, without capillary architecture, and then loop backward into the fornix.**

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