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Surgery for superior oblique tendon anteriorization and entrapment following scleral buckle

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Strabismus is a common complication after scleral buckle surgery for retinal detachment, occurring in up to 57% of cases.¹ The mechanisms of strabismus after scleral buckling procedures include restrictive adhesions, direct muscle injury or disinsertion, myotoxicity from local anesthetics, malrepositioning of a detached muscle, change in extraocular muscle vector force by a scleral buckle, decompensation of childhood strabismus, and sensory disturbances including image distortion, aniseikonia, anisometropia, and reduced visual acuity.^{1–4}

Anteriorization of the superior oblique by the scleral buckling element has rarely been reported.^{2,5,6} The abnormal position causes adherence of the superior oblique to either the sclera anterior to the buckle or the nasal aspect of the superior rectus insertion. In the few reported cases of this condition, patients presented with hypertropia, restriction to downgaze, and either incyclotropia or excyclotropia.⁵ Strabismus surgery with release of adhesions and restoration of the normal anatomic position of the superior oblique improved alignment in these patients.^{5,6} Segmental removal of the scleral buckling element to facilitate repositioning of the superior oblique has been reported.⁵

We present a case of restrictive hypertropia and excyclotropia due to superior oblique anteriorization and entrapment by a scleral buckle. The patient underwent strabismus surgery with repositioning of the superior oblique tendon. The ipsilateral superior rectus was also recessed, but was advanced back to its original insertion during postoperative adjustment due to hypotropia. The operated eye remained hypotropic postoperatively after the superior rectus was advanced to the insertion, suggesting that the cause of the initial hypertropia was entrapment of the superior oblique rather than restriction of the superior rectus. This video demonstrates the surgical technique of superior oblique repositioning to its normal anatomic position without removal of the scleral buckle.

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This video article may be viewed at jaapos.org.

Supplementary Material

Refer to Web version on PubMed Central for supplementary material.

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Appendix

Voiceover transcript

- 00:10 A 73-year-old man presented to the strabismus clinic. He had a history of a macula involving retinal detachment in the left eye, treated by scleral buckling surgery 1 year prior to presentation. Five months prior to presentation, he underwent combined vitrectomy and cataract surgery in the left eye for visually significant cataract and macular pucker. He reported binocular diagonal diplopia starting immediately after the scleral buckling surgery.
- 00:45 The best-corrected visual acuity in his left eye was 20/30. There was restriction to ocular rotations in all directions in the left eye, particularly in down gaze and abduction.
- 00:51 The deviation in the primary position was 16 prism diopters of left esotropia and 6 of left hypertropia. He also had 5° of excyclotorsion in the left eye on double Maddox rod testing.
- 01:04 The patient decided to undergo strabismus surgery in the left eye. The surgical plan was to recess the medial rectus and explore the superior rectus and superior oblique, with possible recession of the superior rectus.
- 01:16 The medial rectus was recessed on an adjustable suture.
- 01:19 Forced duction testing on vertical ductions was performed. There was restriction to depression and mild restriction to elevation.
- 01:27 The superior rectus and superior oblique were then explored. The superior oblique was identified just nasal to the superior rectus insertion. It was noted to be markedly hypertrophied.
- 01:43 The superior rectus was disinserted.
- 01:48 The superior oblique was found to be dragged forward anteriorly by the scleral buckle. A new insertion of the superior oblique was created anterior to the scleral buckle by abnormal adhesions of the superior oblique to the sclera. Because the new insertion was

Voiceover transcript

- anterior to the equator, the superior oblique was acting as an anti-depressor, elevating the eye and restricting depression, leading to hypertropia of the left eye.
- 02:12 The nasal portion of the superior oblique tendon was above the scleral buckle, while the temporal part of the tendon was wrapped around and under the scleral buckle. Therefore, there were two options to restore the normal anatomic position of the superior oblique. The first option was to remove part of the scleral buckle to release the entrapment of the superior oblique. The second option was to disinsert the superior oblique, disentwine it from the scleral buckle, and reinsert it under the buckle at its original insertion. We chose the second option in order to avoid removal of the scleral buckle and potential retinal redetachment.
- 02:49 The adhesions between the superior oblique and the sclera were released.
- 02:54 The superior oblique was secured with the Apt clamp.
- 02:57 The insertion was identified and the muscle was disinserted.
- 03:03 The ends were secured with 6-0 Vicryl (Ethicon, Somerville, NJ) suture.
- 03:06 The Apt clamp was removed.
- 03:09 The muscle was disentwined from the buckle then passed under the buckle.
- 03:13 The superior oblique was then sutured back to its original insertion.
- 03:20 Finally, the superior rectus was passed under the scleral buckle, over the superior oblique, and recessed on an adjustable suture.
- 03:33 On postoperative day 1, the patient had 8 prism diopters of left hypotropia. The superior rectus was advanced to the insertion and the adjustable suture was tied permanently. After superior rectus advancement, the patient had a residual left hypotropia of 6 .
- 03:48 Three weeks postoperatively, the patient had markedly improved infraduction of the left eye. Abduction was also improved, while upgaze remained limited.
- 04:00 The patient was now able to fuse in downgaze and at near. Stereopsis improved to 100 seconds of arc.
- 04:08 In primary gaze, esotropia was reduced to 4 and excyclotorsion was reduced to 2°. The left hypertropia had resolved and the patient now had a left hypotropia, likely due to hypertrophy of the superior oblique and restriction of the inferior rectus, which was not recessed in order to avoid anterior segment ischemia. The patient was able to fuse in primary gaze with Fresnel prisms, and he was happy with the improved ocular rotations postoperatively.
- 04:37 In summary, in patients with a scleral buckle and strabismus, it is important to consider superior oblique anteriorization and entrapment when there is hypertropia, restriction to infraduction and supraduction, excyclotorsion, and esotropia. In contrast, superior rectus restriction would present with hypertropia, restriction to infraduction only, and incyclotorsion.