

Bilateral Superior Oblique Tenectomy for Exotropia with Vertical and Lateral Incomitance

Manasvini Sharma, Soveeta Rath, Suma Ganesh

Dr Shroff's Charity Eye Hospital, New Delhi, India

Abstract

Bilateral superior oblique overaction is usually associated with A pattern strabismus and in some cases, a compensatory head tilt can be present. We report a case of a 9 year old girl who presented to our outpatient department with complaints of outward deviation of eyes since 2 years. On examination, she had a compensatory face turn to the right. Her visual acuity was 6/6 in both eyes. Cover test showed exotropia with A pattern, lateral incomitance and an asymmetric superior oblique overaction (SOOA) in both eyes. Fundus examination showed intorsion in both eyes. Bilateral asymmetric superior oblique tenectomy was performed which corrected the compensatory head posture and incomitant exotropia along with collapse of A pattern. Hence, bilateral superior oblique tenectomy is an effective tool for SOOA presenting with A pattern.

Delhi J Ophthalmol 2019;29;74-76; Doi <http://dx.doi.org/10.7869/djo.449>

Keywords: A pattern, Exotropia, Lateral incomitance, Superior oblique overaction, Tenectomy

Introduction

Bilateral superior oblique overaction is usually associated with A pattern strabismus and in some cases, a compensatory head tilt can be present.^{1,2} Various techniques to weaken the superior oblique include: superior oblique tenotomy or tenectomy, recession, graduated recession, posterior tenectomy, and elongation of the tendon with a prosthetic spacer.^{3,4,5,6} Superior oblique overaction with A pattern exotropia has been reported to be corrected by posterior tenotomy of superior oblique or superior oblique tenectomy without the need of horizontal muscle surgery.^{7,8}

We present a case of A pattern exotropia with asymmetrical superior oblique overaction which presented with lateral incomitance and a face turn rather than a chin depression or head tilt and was managed with an asymmetric bilateral tenectomy of the superior obliques. This procedure, resulted in correction of the A pattern exotropia and significant improvement of the face turn.

Case Report

A 9 year old female presented to us with an outward deviation of the left eye and a compensatory right face turn for the last 4 years. The deviation was constant in nature. Birth history, family history and developmental history was unremarkable. On examination, her uncorrected visual acuity was 20/20 (LogMAR 0) for distance and N6 for near in both eyes. Cycloplegic retinoscopy revealed a refractive error of +0.5 D in both eyes. Anterior segment examination was within normal limits in both eyes. On orthoptic evaluation, a right face turn of 15 degrees was noted (Figure 1). Hirschberg's corneal reflex test showed left exotropia of 15 degrees. Extraocular movements demonstrated increased depression in adduction, suggestive of an asymmetrical superior oblique overaction (SOOA) of 1+ in the right eye and 2+ in the left eye. Cover test showed left exotropia with left hypotropia in primary gaze for both distance and near (Figure 2). Prism alternate cover test demonstrated an exotropia of 20 prism diopters (PD) with a left hypotropia of 5 PD. On evaluation in 15 degrees

up and downgaze, 25 PD of A pattern was noted. Lateral incomitance of 10 PD was also noticed between right and left gaze (right gaze 20 PDXT and left gaze 10 PD XT). There was an alternating hypotropia on adduction in side gazes. For near, left exotropia of 16 PD with 6 PD left hypotropia was measured. The sensory evaluation demonstrated a stereoacuity of 400 seconds of arc using Randot stereoacuity



Figure 1: Compensatory head posture showing face turn to right side which got corrected postoperatively

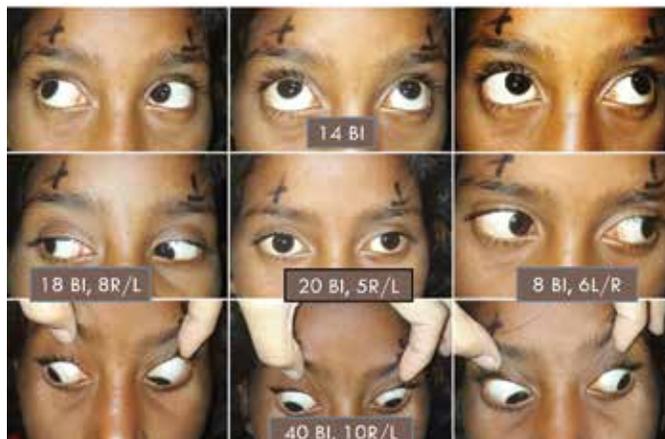


Figure 2: Preoperative nine gaze pictures

test. Fusion was present on Bagolini and Worth four dot test. Anterior segment examination was unremarkable in both eyes. Fundus examination revealed grade 1 intorsion in the right eye and grade 2 intorsion in the left eye (Figure 3). A diagnosis of A pattern exotropia with bilateral superior oblique overaction with intorsion was established. Asymmetric superior oblique tenectomy without horizontal muscle surgery was planned. Intraoperatively, forced traction test for superior oblique was negative in both the eyes. Using a superotemporal approach, a fornix incision was made and the superior rectus muscle was hooked. The fibers of the superior oblique were identified under direct visualization and hooked. We performed a bilateral asymmetrical tenectomy of 9 mm of the right SO and 13 mm of the left SO. At 6 weeks postoperative follow up, the compensatory face turn got corrected (Figure 1). There was a collapse of the A pattern and no oblique overaction was noticed in either eye (Figure 4). However on cover test, a residual exotropia of 8 PD was noticed. On side gazes, no lateral incomitance was noted (8 PD XT in right gaze and 6 PD XT in left gaze).

Discussion

A pattern exotropia is an exodeviation which increases in downgaze and reduces in upgaze with a difference of at least 10 PD.⁹ A pattern can present with or without superior oblique overaction and with or without medial rectus insufficiency.¹⁰ In our case, superior oblique overaction was the cause of the A pattern. A pattern exotropia can present with a chin down posture and intorsion can be evident on fundus examination. In our case although there was an increase of the exotropia in downgaze, there was no compensatory chin down, rather a face turn to the right. We hypothesize that the face turn was due to the lateral incomitance. We assume that as the child was having lesser exotropia in left gaze, she preferred the right face turn.

The generally accepted surgical correction of A pattern strabismus includes oblique muscle weakening when there is evidence of oblique muscle overaction, and horizontal muscle transposition when there is not.¹¹ Hughes and Bogart first described weakening of the superior oblique muscle through recession of the trochlea in 1942.¹⁴ Since then, bilateral superior oblique tenotomy has been performed for large pattern deviations with varying results. Harley et al reported bilateral superior oblique tenectomy as an effective procedure for the correction of the A pattern in the presence SOOA.⁷ As reported by multiple authors, about 20-25 PD A pattern with exotropia in primary position can be corrected without any effect on upgaze.^{7,14} Similar findings were seen in a study by Pollard et al in which up to 20 PD of A pattern exotropia was corrected by bilateral superior oblique tenectomy.⁸ For exotropia more than 25 PD, a combined horizontal muscle surgery with bilateral superior oblique tenectomy was performed. In our case, we planned to perform an asymmetric bilateral superior oblique tenectomy in view of the differential SOOA. Though presence of lateral incomitance was of concern, we chose to defer any additional horizontal muscle surgery in the first stage.

Vempali et al, in their study on posterior tenectomy of

superior oblique summarized that this procedure, by leaving the anterior fibers intact, results in selective weakening of the vertical action superior oblique, preserving its intorsion.¹³ Sharma et al concluded that posterior tenectomy of bilateral superior oblique muscle results in collapse of A pattern with insignificant effect on ocular torsion.¹⁴ Superior oblique overaction correlating with fundus intorsion was noted in our case. Ducca et al found that superior oblique tenectomy has an extorter effect ranging from 2 to 4 degrees which

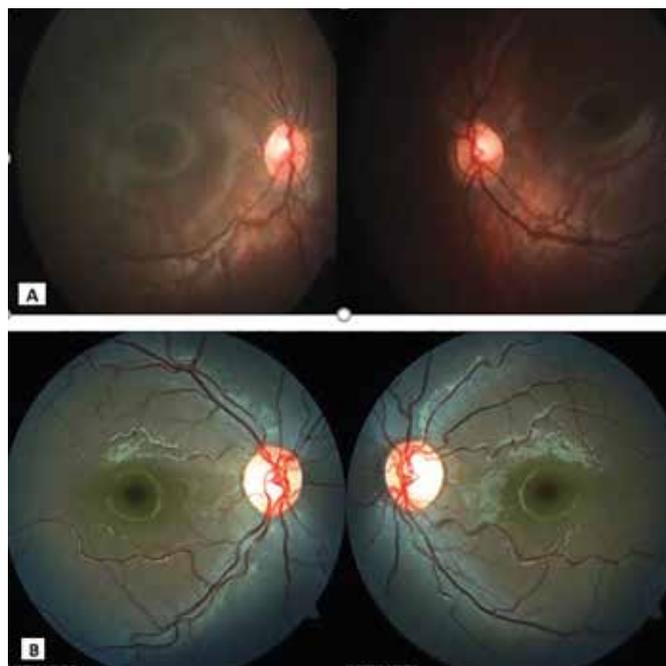


Figure 3: (A) Preoperative fundus pictures showing intorsion of both eyes (B) Postoperative change in fundus torsion in both eyes



Figure 4: Postoperative nine gaze pictures



Figure 5: (A) Intraoperative marking at 12 and 6 o'clock on surgical drape and limbus (arrowheads), (B) Postoperative change in torsion noted

decreases the intorsion noticed due to superior oblique overaction.¹⁵ Thus, we preferred a complete tenectomy rather than posterior tenectomy, which would correct both the A pattern and associated torsion (Figure 3). This worked to our advantage since apart from correcting the A pattern exotropia and intorsion as anticipated, it also corrected the right face turn. We hypothesize that asymmetrical bilateral superior oblique tenectomy would correct the exotropia in primary position and the lateral incomitance in side gazes. Thus, the compensatory face turn to right which was not explained by either the A pattern or SOOA and was coincidentally corrected by the superior oblique tenectomy. In this report, we would also like to highlight the use of the technique described by Holmes et al to monitor the change of torsion following tenectomy intraoperatively.¹⁶ We marked two limbal dots at 6 and 12 o'clock. Corresponding marks were also made on the surgical drape at 6 and 12 o'clock to note torsion post operatively (Figure 5). Following SO tenectomy, change in torsion by 2 clock hours was noted in both eyes.

This case highlights and describes the alleviation of compensatory face turn due to lateral incomitant exotropia and collapse of A pattern and intorsion with bilateral asymmetrical superior oblique tenectomy. On subsequent follow up, there was no consecutive esotropia, vertical deviation or abnormal head posture.

Conclusion

Bilateral asymmetrical superior oblique tenectomy without horizontal muscle surgery is an effective procedure for the correction of the A pattern exotropia in the presence of superior oblique overaction, compensatory face turn and fundus intorsion.

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Cite This Article as: Sharma M, Rath S, Ganesh S. Bilateral Superior Oblique Tenectomy for Exotropia with Vertical and Lateral Incomitance.

Acknowledgments: Nil

Conflict of interest: None declared

Source of Funding: None

Date of Submission: 21 November 2018

Date of Acceptance: 04 February 2019

Address for correspondence

Manasvini Sharma

Fellow, Pediatric Ophthalmology, Strabismus and Neuro-ophthalmology
Dr. Shroff's Charity Eye Hospital, Kedarnath Road, Daryaganj, New Delhi - 110002, India
Email id: drmanasvini.sharma@gmail.com



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