Long-Standing, Large-Angle Exotropia in Adults

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ABSTRACT

Introduction and Purpose: This study examines the sensory and motor results in adult patients with large-angle exotropia treated with nonadjustable bilateral recess-resect procedures.

Methods: A consecutive series of adult patients undergoing four-muscle surgery for exotropia \( \geq 50^\Delta \) with no previous surgery were identified by retrospective medical record review. All patients had nonadjustable symmetric bilateral medial rectus resections and bilateral lateral rectus recessions performed between 1995 and 2006. Data on postoperative alignment, stereoacuity, and the presence or absence of diplopia were collected.

Results: Eight patients met the inclusion criteria. Seven of eight patients required only one surgical procedure for correction of the exotropia with final postoperative deviations within \( 10^\Delta \) of orthophoria. One patient required reoperation resulting in a final postoperative measurement of \( 10^\Delta \) of esotropia. At final examination, no patient reported diplopia. Four of eight patients had postoperative stereoacuity ranging from 200 to 40 seconds of arc.

Conclusions: Long-standing, presumably constant, large-angle exotropia does not preclude the recovery of stereopsis after surgical alignment. Permanent postoperative diplopia did not occur in our series. In spite of the large deviations, nonadjustable surgery produces good alignment in most cases, possibly because these patients retain some fusion ability.

INTRODUCTION

The surgical treatment for large-angle exotropia has been a subject of significant debate. A variety of surgical plans have been described including two, three, and four horizontal rectus muscle recessions and resections, with or without adjustable suture technique.

Earlier studies have demonstrated the safety of large lateral rectus recessions with less abduction deficits than had been expected.\(^1,2\) Studies of two muscle surgeries, bilateral lateral rectus recessions compared to recess-resect procedures, have
shown only modest success, with the presence of under- and over-corrections.\textsuperscript{3,4,5} Adjustable suture technique along with three and four rectus muscle surgery have established improved success,\textsuperscript{6} although no prior study has examined the fixed suture four horizontal rectus muscle technique employed in this study.

In this study, we focus not only on structural outcomes but on the sensory outcomes that are often neglected.

**MATERIALS AND METHODS**

This study is a retrospective analysis of adult patients with large-angle exotropia $\geq 50^\Delta$. All patients had symmetric bilateral medial rectus resections and symmetric bilateral lateral rectus recessions performed by a single pediatric ophthalmologist between 1995 and 2006 (SMA). Patients were excluded if they had previous eye muscle surgery or if an adjustable suture technique was employed.

Eight patients met the inclusion criteria, with an average age of 45 years. Average total follow-up time was 179 days.

The preoperative distance deviation ranged from 50–70$^\Delta$ of exotropia, with an average of 63$^\Delta$ of exotropia. Preoperative near deviation ranged from 60–80$^\Delta$ of exotropia, with an average of 75$^\Delta$ of exotropia. The average near-distance disparity was 12$^\Delta$, ranging from 5–25$^\Delta$. Preoperatively, lateral gaze measurements were performed on seven of the eight patients. There was no significant lateral incomitance, with all lateral gaze measurements being within 10$^\Delta$ of the distance measurement.

All patients had symmetric bilateral lateral rectus resections with symmetric bilateral medial rectus resections. The lateral rectus resections ranged from 6–8 mm, and the medial rectus resections ranged from 5–8 mm. Two patients had concurrent inferior oblique surgery. One patient required reoperation, consisting of a medial rectus recession and inferior oblique myotomy.

All patients were examined postoperatively according to standard procedures at the authors’ institution. Distance and near deviations were measured at each postoperative visit. Right and left gaze measurements were measured in most patients as well. Presence or absence of diplopia was ascertained and stereoacuity testing was performed.

**RESULTS**

All eight patients were aligned within 10$^\Delta$ of orthophoria at distance. Seven of eight (87.5%) patients were within 10$^\Delta$ of orthophoria at near. Near postoperative measurements ranged from 7$^\Delta$ of esotropia to 18$^\Delta$ of exotropia. Postoperative lateral gaze measurements were performed on five of the eight patients on the final postoperative visit. Right and left gaze measurements were all within 10$^\Delta$ of orthophoria.

No patient reported diplopia on the final postoperative evaluation. Four of eight patients had stereoacuity ranging from 200–40 seconds of arc postoperatively. One patient had no stereo and three patients were not tested on the final examination.

Seven of eight patients required only one surgery for satisfactory results. One patient did require reoperation with a medial rectus recession and bilateral inferior oblique myotomy for secondary esotropia and hypertropia. Final postoperative evaluation measurement in this patient was 8$^\Delta$ of esotropia with no diplopia.

**DISCUSSION**

The treatment of large-angle exotropia can be approached in many ways. This study examined the structural and functional outcomes of patients treated with symmetric bilateral horizontal recess-resect surgery. It is generally believed that surgery on the lateral rectus muscles has
more effect on distance deviation. Conversely, it is believed that medial rectus surgery has more effect on the near deviation. As demonstrated in this study, the near deviation tends to be greater than the distance deviation in adults with long-standing exotropia. This provides reason to include medial rectus resections in the surgical plan along with lateral rectus resections.

Sensory adaptation to long-standing, large-angle exotropia has led to a fear of intractable diplopia when surgically correcting adults with this problem. In this study, all patients were corrected to within 10° of orthophoria and no patient reported any more than transient diplopia. The long periods without fusion, additionally, did not preclude stereopsis. Fifty percent of patients had definite stereopsis at final postoperative visit. Fusing patients—as opposed to suppressing patients—in our experience are more apt to complain of diplopia in lateral gaze if they have postoperative incomitance. This surgical approach may be less likely to produce lateral incomitance than asymmetric surgery, thereby reducing the risk of diplopia in side-gaze.

This study incorporated only a fixed suture technique, as opposed to adjustable suture. Our results demonstrate that patients with long-standing exotropia can do well with fixed sutures, likely secondary to the fact that they have the ability to fuse. Of the studies on large-angle exotropia, only Currie\(^6\) discusses a bilateral horizontal recess-resect surgery. However, the majority of these patients had an adjustable suture technique. Seventy-seven percent of their patients, with two, three, or four muscle adjustable surgery were aligned within 10° of orthophoria. Despite the success of Currie, the fixed suture technique performed in this study has distinctive benefits. These include the surgical ease for the patient and the overall structural and sensory success.

CONCLUSION

Bilateral symmetric horizontal recess-resect surgery provides satisfactory correction of long-standing, large-angle exotropia in adults. Adequate alignment with, in some cases, good recovery of stereopsis without bothersome diplopia or incomitance is a reasonable expectation for the outcome in these cases.

REFERENCES


**Key words:** large-angle exotropia, adult strabismus, horizontal recess-resect surgery