

Surgery for Exotropia

Which muscles and how much?

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Surgical Options

Unilat LR recession (ULR)

Bil LR recession (BLR)

Unilat Recess-resect (R-R)

Bil MR resection (BM resection)

3 Muscles (R-R-R)

4 Muscles (BLR + BM resection)

Intermittent Exotropia

3-10 years
15 – 40 PD



Bil LR recession (BLR)

Unilat Recess-resect (R-R)

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Review

A systematic review of the effectiveness of treatments in altering the natural history of intermittent exotropia

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ABSTRACT

Evidence of effectiveness of interventions for treatment of childhood intermittent exotropia, X(T), is unclear. We conducted a systematic review to locate, appraise and synthesise evidence of effectiveness, including twelve electronic databases, supplemented with hand searches and expert contact. We included randomised controlled trials, quasi-experimental and cohort studies with a comparison group examining interventions for divergence excess, simulated divergence excess or basic type X(T) in children, up to and including 18 years of age, followed for at least 6 months. Dual data extraction and critical appraisal were conducted and a narrative synthesis undertaken. Eleven studies satisfied the eligibility criteria. Seven examined the comparative effectiveness of two surgical procedures, four compared surgery with other interventions, including botulinum toxin A therapy, orthoptic exercises, occlusion, binocular vision training and watchful waiting. The evidence retrieved was of limited extent and quality with differences across studies in terms of outcome assessment and most appropriate time point for measuring long-term outcomes. There were mixed outcomes when comparing unilateral recession/insertion (R-R) with bilateral lateral rectus recession (BLR) on improving angle of deviation, which makes it difficult to recommend either surgical option with confidence. While non-surgical interventions appear less effective in terms of improving angle of deviation, they are rarely associated with adverse outcomes. Grant

problems⁴ which can impact into adult life with effects on self-image, work and personal relationships.⁵

A range of conservative and surgical treatment options is available, and includes observation (watchful waiting), orthoptic exercises/vision therapy, occlusion therapy (patching), minus lens therapy (glasses) and surgery.⁶ However, surgery is associated with important adverse effects including a risk of overcorrection, which may also adversely impact on nearsightedness. Evidence for the comparative effectiveness of treatment options is limited by the absence of randomised controlled trial data,⁷ but there is a much larger literature of observational studies for various interventions.

The updated Cochrane review of randomised trials of surgical and non-surgical interventions for X(T) found only one study which compared unilateral and bilateral surgery with results favouring unilateral surgery for basic type X(T).⁸ Likewise, a review of conservative interventions concluded that there is a role for conservative management interventions, such as preoperative exercises and occlusion therapy post-surgery, but there is a need for further exploration of what works, for whom, and under what circumstances.⁹ The review excluded surgical options, so comparative effectiveness between surgery and more conservative options could not be examined.

AMERICAN ACADEMY OF OPHTHALMOLOGISTS

A Randomized Trial Comparing Bilateral Lateral Rectus Recession versus Unilateral Recess and Resect for Basic-Type Intermittent Exotropia

Abstract

Background: To compare long-term outcomes after bilateral lateral rectus recession (BLRc) or unilateral lateral rectus recession combined with medial rectus resection in the same eye (R&R) for primary treatment of childhood intermittent exotropia (IXT).

Design: Multicenter, randomized clinical trial.

Participants: One hundred ninety-seven children 3 to younger than 11 years of age with basic-type IXT, a target strabismic angle of 16 to 40 prism diopters (PD), and one eye of the head in a position of exotropia.

Conclusions: We did not find a statistically significant difference in suboptimal surgical outcome by 3 years between children with IXT treated with BLRc compared with those treated with R&R. Based on these findings, we are unable to recommend one surgical approach over the other for childhood IXT. *Ophthalmology* 2019;126:305-312

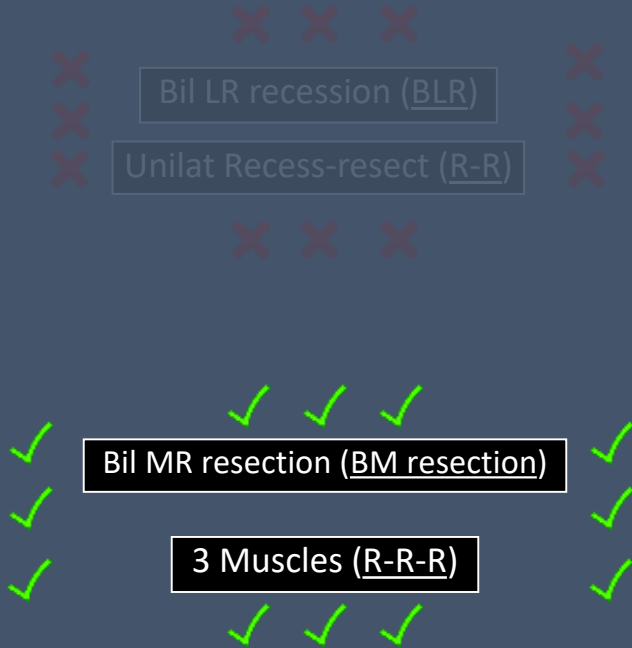
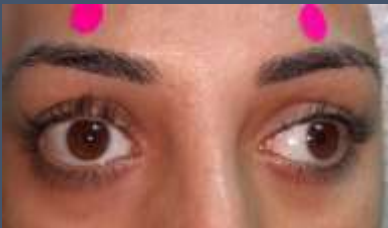
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Introduction: Intermittent exotropia (IXT) is the most common form of childhood strabismic amblyopia. If untreated, IXT rarely can lead to loss of binocular vision and can have a grave psychosocial consequence.^{1,2} When there is poor binocular vision of an amblyopic category, surgery is often the treatment of choice.^{3,4} The 2 most common surgical procedures are bilateral lateral rectus recession (BLRc) and unilateral lateral rectus recession combined with medial rectus resection in the same eye (R&R). However, there is no agreement as to which procedure provides the greatest likelihood of strabismic and long-term success. We report herein the results of a large multicenter randomized trial comparing the effectiveness of BLRc with that of R&R for the surgical treatment of basic-type IXT in children who are 3 to younger than 11 years of age with 3 years of postoperative follow-up.

Methods: The study was supported through a cooperative agreement with the National Eye Institute, National Institute of Health, Bethesda, Maryland, and was conducted according to the terms of the Declaration of Helsinki by the Pediatric Eye Disease Investigator

Large angle exotropia

60 PD or more



Very large angle exotropia

90 PD or more



Bil LR recession (BLR)

Unilat Recess-resect (R-R)

3 Muscles (R-R-R)

Bil MR resection (BM resection)

4 Muscles (BLR + BM resection)

Surgical Results in Large-Angle Exotropia

Gerasimos Livir-Ballatos, MD, Kammi B. Gunton, MD, and Joseph H. Calhoun, MD

Purpose: This study examines the surgical results of correcting large angle exodeviations in adults who may lack bifixation. The expected results in adults are not to achieve improved fusion but, rather, to construct the alignment.
Methods: A retrospective chart review was conducted of all patients with constant exodeviation greater than 35 Δ examined and treated by 1 pediatric ophthalmologist between January 1994 and May 1999. Any patients with large A or V patterns, nystagmus, history of botulinum toxin injections for strabismus, paralytic or mechanical cause for strabismus, or use of adjustable sutures were excluded. Charts were reviewed for postoperative alignment. Postoperative results were separated into 3 categories: exodeviation greater than 10 Δ, successful outcome (esotropia <10 Δ, orthotropia, or exodeviation <10 Δ), or esotropia greater than 10 Δ. **Results:** Sixty-three patients met the inclusion criteria. Their median age at the time of surgery was 18, with a standard deviation of 20. The majority of them had intermittent exotropia that had deteriorated into constant exotropia. Fifty-two patients had bilateral lateral rectus recessions, and 11 patients had recess/resect procedures. Sixty-two percent (39 of 63) had successful outcomes overall. Only 2 patients had overcorrection (esotropia >10 Δ). In patients with deviations greater than 50 Δ, 82% (8 of 11) were undercorrected (exodeviation >10 Δ). **Conclusions:** Large angle exodeviations can be successfully approached with bilateral lateral rectus recessions or recess/resect procedures in preoperative deviations up to and including 50 Δ with a success rate of 71%. In larger deviations, 2-muscle surgery was not as successful (18%, or 2 of 11). (J AAPOS 2002;6:77-80)

INTRODUCTION

Large-angle exodeviations present many challenges to parents and physicians. Patients often suffer professional difficulties from their exodeviations. Patients may feel their confidence, attractiveness, sociality, and self-esteem are diminished by their strabismus,¹ making them seek surgical solutions. Surgeons are challenged to correct the strabismus with 1 surgical procedure. Surgical treatment options have been debated in the past. Guidelines based on the preoperative deviation are well established for angles of deviation up to 35 Δ. In the past, 7 mm was set as the maximum recession allowable on the lateral rectus muscle.^{2,3} It was feared that larger recessions would drastically limit abduction of the operated eye.

METHODS

All records of patients having surgical correction of exodeviation greater than 35 Δ seen by 1 surgeon (J.H.C.) over a 7-year period from January 1994 to May 1999 were reviewed. Patients were included in the study group if they had either intermittent or constant constant exodeviation, normal rotation, and follow-up of at least 1 week postoperatively. Patients were excluded if they had cranial abnormalities on assessment, A or V patterns larger than 10 or 15 Δ, respectively, restricted eye movements, Duane's syndrome, or an adjustable suture during surgery, or if the surgical plan involved resection on a muscle. The following data were collected from all charts: patient age and sex, visual acuity, near and distance strabismic manifesta-

Zero success rate for BLR for angles > 50 PD



Zero success rate for BLR for angles > 50 PD

Int XT 20-40

Bil LR recession (BLR)

Unilat Recess-resect (R-R)

Constant XT 40
 Int or constant XT 45-60

Unilat Recess-resect (R-R)

XT 60-90

3 Muscles (R-R-R)

Bil MR resection (BM resection)

XT >90

4 Muscles (BLR + BM resection)

Bil MR resection (BM resection)

Decisions that most strabismologist will advise you NOT to do:



Exotropia 60 PD or more



- Bilateral LR recession ❌

- Unilateral R-R ❌

Refine your work...

Early over-correction (esotropia) is a good sign

Refine your own tables

Table of surgical numbers in books

Exotropia

LR OU Recession	MR OU Resection
15 ^Δ —4.0 mm	15 ^Δ —3.0 mm
20 ^Δ —5.0 mm	20 ^Δ —4.0 mm
25 ^Δ —6.0 mm	25 ^Δ —5.0 mm
30 ^Δ —7.0 mm	30 ^Δ —5.5 mm
35 ^Δ —7.5 mm	35 ^Δ —6.0 mm
40 ^Δ —8.0 mm	40 ^Δ —6.5 mm
50 ^Δ —9.0 mm	

Exotropia

LR Recession	MR Resection
15 ^Δ —4.0 mm	3.0 mm
20 ^Δ —5.0 mm	4.0 mm
25 ^Δ —6.0 mm	4.5 mm
30 ^Δ —6.5 mm	5.0 mm
35 ^Δ —7.0 mm	5.5 mm
40 ^Δ —7.5 mm	6.0 mm
50 ^Δ —8.5 mm	6.5 mm

Angle only..!!!

Factors that influence surgical dosage

- Angle
- Age
- Type of strabismus
- Intermittent - Constant
- Tightness of the muscle

Refine your work...

Think of step 2 while choosing your step 1

3 muscle surgery



Bil MR resection



Pre-operative

2w post after surgery

Bilateral medial rectus resection for primary large-angle exotropia

Amr A. Elkamhoushy, MD



BACKGROUND Surgical treatments for large-angle exotropia include bilateral lateral rectus recession, recession-resection procedures, and three- and four-muscle surgery. Undercorrection and limitation of abduction are common complications of these procedures. This study reports the results of bilateral medial rectus resection as a first procedure for primary large-angle exotropia.

METHODS The medical records of patients who underwent bilateral medial rectus resection for angles $\geq 60^\circ$ in the period from 2006 till 2016 with a minimum follow-up period of 6 months were reviewed retrospectively. The amount of resection ranged from 8 mm to 12 mm according to the preoperative angle. Success was defined as a final outcome within the range of 8° of exotropia to 10° of esotropia.

RESULTS A total of 64 patients were included, in whom angles ranged from 60° to 140° . The overall success rate was 77%, and there was no significant difference in success rate between classes of smaller and larger angles. Limitation of abduction was seen in first postoperative week. At 6 months' follow-up 64% of eyes had no limitation of abduction.

CONCLUSIONS In our patient cohort bilateral medial rectus resection successfully corrected large-angle exotropia of up to 140° , with results comparable to three- and four-muscle procedures. It has the advantage of not causing significant abduction deficits, even with resections up to 12 mm. (J AAPOS 2017;21(1):2-8)

Although large-angle exotropia has been defined differently,^{1,2} most authors agree that large-angle exotropia requires greater amounts of surgery and often surgery on a greater number of extraocular muscles to avoid undercorrections. Many surgical techniques have been described to address this problem, including bilateral lateral rectus (BLR) recession of 12–15 mm, medial rectus recession with lateral rectus recession,^{3,4} three-muscle procedures,^{5,6} and horizontal trans resection

bilateral medial rectus resection as a first procedure for large-angle exotropia can correct the deviation without causing a limitation. The purpose of this study was to present the results of a single approach using this procedure as a single institution as the first procedure to treat primary large-angle exotropia.

Subjects and Methods

Digital Research Article



Outcomes of bilateral lateral rectus recession in treatment of recurrent exotropia after bilateral medial rectus resection

Amr Elkamhoushy¹ and Michael A Lange²

Abstract
Purpose: To report the results of bilateral lateral rectus muscle resection for recurrent exotropia in cases where the primary surgery was a bilateral medial rectus resection.
Methods: Retrospective chart review of 12 subjects who completed 6 months of follow-up. Data collected included patients' demographics and pre- and post-operative measurements of ocular alignment and motility. Surgical nomenclature used was the same nomenclature we use for primary cases of exotropia.
Results: At 6-month follow-up, 71.3% of eyes had a successful surgical outcome (defined as IPD of exotropia to IPD of esotropia). In addition, recession of lateral rectus muscles against the previously resected medial recti did not result in a significant increase in the limitation of abduction.
Conclusions: Bilateral lateral rectus resection using standard surgical tables is a safe and effective method for treating recurrent exotropia following bilateral medial rectus resection. Even large primary resections up to 12 mm do not seem to affect the results of bilateral lateral rectus recession.

Keywords: Ophthalmology, strabismus, ophthalmic surgery, exotropia

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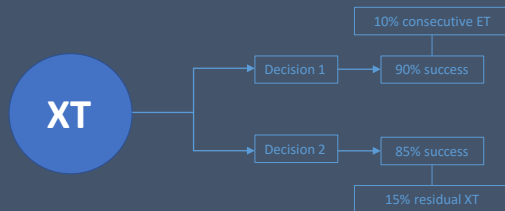
Introduction

Recession of exotropia following primary repair is not an uncommon outcome with estimates ranging between 40%–80%.¹ Surgical planning for recurrent cases is influenced by the original approach of the primary surgery, as well as other factors such as angle of deviation and restriction. Published articles have reported outcomes of residual or recurrent exotropia treated with a unilateral medial

BLR recession as a primary surgery for large-angle exotropia had a success rate of 77% with no significant limitation of abduction despite large resections up to 12 mm.² Our review of literature for recurrent exotropia surgery did not show any studies where the primary surgery was BLR recession. In such recession, BLR recession may be a preferred option to avoid surgery on the already resected medial rectus muscles. In this study, we retrospectively reviewed the results of BLR recession for recurrent exotropia after

Refine your work...

Err on the under-correction side



☹️ Consecutive Esotropia ☹️

- Diplopia
- Loss of binocularity in children
- More patient dissatisfaction
- More difficult to treat



Consecutive ET post BLR for intermittent XT

Thank you

Amr Elkamshoushy