

Bilateral lateral rectus recession versus unilateral recession/resection for basic intermittent exotropia

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Abstract

Introduction

Intermittent exotropia requires surgical resolution under some clinical circumstances. The main techniques are bilateral lateral rectus recession and unilateral recess/resection. Although bilateral recession is the most widely used, it is not clear whether it leads to better results.

Methods

To answer this question we used Epistemonikos, the largest database of systematic reviews in health, which is maintained by screening multiple information sources, including MEDLINE, EMBASE, Cochrane, among others. We extracted data from the systematic reviews, reanalyzed data of primary studies, conducted a meta-analysis and generated a summary of findings table using the GRADE approach.

Results and conclusions

We identified five systematic reviews including seven studies overall, of which three were randomized trials. We concluded unilateral recess/resection might achieve greater surgical success and probably decrease the rate of undercorrection/recurrence when compared to bilateral lateral rectus recession.

Problem

Intermittent exotropia is the most frequent exo-deviation in childhood and is characterized by the deviation from one eye to lateral, typically during distance fixation or periods of inattention¹. When this exo-deviation also occurs in the near fixation, in such way that the difference of the angle of deviation between the gaze fixation for distance and for near does not exceed 10 prism diopters, it is called basic intermittent exotropia. This condition can sometimes lead to stereopsis and alteration of binocular vision (fusion), negatively affecting the vision, even though only a small proportion develop amblyopia.

In this sense, the main objective of the treatment (medical, surgical, or a combination of both) is to normalize or improve the ocular alignment while maintaining or improving binocular vision and stereopsis. However, the success and risks associated with each type of treatment varies, so the surgical option is indicated mainly in the event of failure of medical treatment, large angle of exodeviation, or by decision of parents. There are two main surgical techniques, whose common objective is to adjust position or length of the

extraocular muscles on the horizontal axis: unilateral recession/resection, which consists of unilateral lateral rectus muscle recession and medial rectus muscle resection, and bilateral lateral rectus recession. Even though the latter is most commonly performed, it is not clear whether this technique is superior to the unilateral recession/resection in terms of success and/or complications.

Key messages

- Unilateral recess/resection might achieve greater surgical success and probably decreases the rate of undercorrection/recurrence compared to bilateral lateral rectus recession.
- Unilateral recess/resection could be a better surgical option than bilateral lateral rectus recession in the management of basic intermittent exotropia. However, it is important to keep in mind the limitations of the existing evidence for decision-making.

Methods

To answer the question, we used Epistemonikos, the largest database of systematic reviews in health, which is maintained by screening multiple information sources, including MEDLINE, EMBASE, Cochrane, among others, to identify systematic reviews and their included primary studies. We extracted data from the identified reviews and reanalyzed data from primary studies included in those reviews. With this information, we generated a structured summary denominated FRISBEE (Friendly Summary of Body of Evidence using Epistemonikos) using a pre-established format, which includes key messages, a summary of the body of evidence (presented as an evidence matrix in Epistemonikos), meta-analysis of the total of studies when it is possible, a summary of findings table following the GRADE approach and a table of other considerations for decision-making.

About the body of evidence for this question

<p>What is the evidence. See evidence matrix in Epistemonikos later</p>	<p>We found five systematic reviews¹⁻⁵ including seven primary studies⁶⁻¹², of which three were randomized trials⁶⁻⁸.</p> <p>One systematic review⁴ did not find studies meeting its inclusion criteria and another systematic review⁵ did not mention which studies were included (authors were contacted via e-mail, with no response).</p> <p>This table and the summary in general are based on the three randomized trials identified^{6,7,8}, since the observational studies⁹⁻¹² did not increase the certainty of the existing evidence, nor did they provide relevant additional information.</p>
<p>What types of patients were included*</p>	<p>All the trials included patients with a diagnosis of basic intermittent exotropia with an exodeviation angle ranging between 22 and 50 diopters **.</p> <p>The age at the time of surgery was between 3 and 37 years.</p>
<p>What types of interventions were included*</p>	<p>All trials compared both types of surgeries, unilateral recess/resection versus bilateral lateral rectus recession.</p> <p>The surgical correction formula used by the trials, or the equivalence between them, was not reported by the included reviews.</p>
<p>What types of outcomes were measured</p>	<p>The trials measured multiple outcomes, but the identified systematic reviews pooled them as follows:</p> <ul style="list-style-type: none"> • Surgical success: defined as <5 diopters endophoria and <10 diopters exophoria or as <10 diopters endophoria and <10 diopters exophoria. • Overcorrection • Subcorrection/ recurrence. <p>The minimum follow-up of the studies was 12 months, with a range from 12 to 15 months. All the results reported here correspond to the last follow-up consultation.</p>

* The information about primary studies is extracted from the systematic reviews identified, unless otherwise specified.

Summary of Findings

The information on the effects of unilateral recess/resection versus bilateral lateral rectus recession for the treatment of the basic intermittent exotropia is based on three randomized trials that included 201 patients.

Three trials measured surgical success (201 patients)^{6,8}, two trials measured undercorrection/recurrence (154 patients)^{6,8} and two trials measured overcorrection (154 patients)^{6,8}.

The summary of findings is as follows:

- Unilateral recess/resection might achieve greater surgical success than bilateral lateral rectus recession, but the certainty of the evidence is low.
- Unilateral recess/resection probably decreases the rate of undercorrection/recurrence compared with bilateral lateral rectus recession. The certainty of the evidence is moderate.
- It is not clear if there are differences in overcorrection between both techniques because the certainty of the evidence is very low.
- Improvement in stereopsis, need for reoperation, development of incomitance, postoperative discomfort and quality of life were not reported by the systematic reviews.

Bilateral lateral rectus recession versus unilateral recession/resection for basic intermittent exotropia.				
Patients	Patients with a specific diagnosis of basic intermittent exotropia			
Intervention	Bilateral lateral rectus recession			
Comparison	Unilateral recess/resection			
Outcome	Absolute effect*		Relative effect (95% CI)	Certainty of evidence (GRADE)
	WITH unilateral recession/resection	WITH bilateral lateral rectus recession		
	Difference: patients per 1000			
Surgical success	869 per 1000	673 per 1000	RR 1.29 (1.01 to 1.65)	⊕⊕○○ ^{1,2} Low
	Difference: 196 patients less (Margin of error: 7 to 438 less)			
Subcorrection/Recurrence	57 per 1000	247 per 1000	RR 0.23 (0.08 to 0.64)	⊕⊕⊕○ ¹ Moderate
	Difference: 190 patients more (Margin of error: 89 to 227 more)			
Overcorrection	50 per 1000	26 per 1000	RR 1.94 (0.13 to 29.16)	⊕○○○ ^{1,3,4} Very low
	Difference: 24 patients less (Margin of error: 23 less to 731 more)			
Improvement in stereopsis	Not reported by the systematic reviews		--	--
Need for reoperation	Not reported by the systematic reviews		--	--
Development of incomitance	Not reported by the systematic reviews		--	--
Quality of life	Not reported by the systematic reviews		--	--

Margin of error: 95% confidence interval (CI).
 RR: Risk ratio.
 GRADE: Evidence grades of the GRADE Working Group (see later).
 *The risk WITHOUT unilateral recess/resection is based on the risk in the control group of the trials. The risk WITH bilateral lateral rectus recession (and its margin of error) is calculated from relative effect (and its margin of error).
¹ The certainty of the evidence was downgraded in one level for risk of bias, because it is not clear the trials were blinded.
² The certainty of the evidence was downgraded in one level due to imprecision, since the confidence interval includes the possibility of benefit or no effect.
³ The certainty of the evidence was downgraded in one level for inconsistency, because some trials reported different conclusions.
⁴ The certainty of the evidence was downgraded in two levels for imprecision, since the decisions at each end of the confidence interval would be opposite.

Follow the link to access the interactive version of this table ([Interactive Summary of Findings – iSoF](#))

About the certainty of the evidence

(GRADE)*

⊕⊕⊕⊕

High: This research provides a very good indication of the likely effect. The likelihood that the effect will be substantially different† is low.

⊕⊕⊕○

Moderate: This research provides a good indication of the likely effect. The likelihood that the effect will be substantially different† is moderate.

⊕⊕○○

Low: This research provides some indication of the likely effect. However, the likelihood that it will be substantially different† is high.

⊕○○○

Very low: This research does not provide a reliable indication of the likely effect. The likelihood that the effect will be substantially different† is very high.

* This concept is also called 'quality of the evidence' or 'confidence in effect estimates'.

† Substantially different = a large enough difference that it might affect a decision

Other considerations for decision-making

To whom this evidence does and does not apply

The evidence reported in this summary applies to patients diagnosed with basic intermittent exotropia. These data cannot be extrapolated to other types of intermittent exotropia, due to their different physiopathological mechanism.

This information is applicable to both children and adults.

About the outcomes included in this summary

The outcomes selected were those considered critical for decision-making according to the authors of this summary.

The definition of surgical success in intermittent exotropia is not yet standardized, which may explain the differences found between the studies: one study reported what most experts currently accept as optimal correction (less than 10 diopters of exophoria)⁸ and the other two applied a stricter criterion (less than 5 diopters of exophoria)^{6,7}. This could result in an increase in the rate of undercorrection/recurrence and overcorrection in the latter, since the definition of these outcomes is dependent on the definition of surgical success used.

No evidence was found for the outcomes improvement in stereopsis, need for reoperation, development of incomitance, postoperative discomfort and quality of life, notwithstanding they were considered critical for the surgical indication and decision-making

Balance between benefits and risks, and certainty of the evidence

Current evidence suggests unilateral recess/resection technique could lead to greater surgical success and probably decrease the rate of undercorrection/recurrence of basic intermittent exotropia compared to bilateral lateral rectus recession. However, its effect on overcorrection outcome is not clear, because the certainty of the evidence is very low.

Furthermore, unilateral recess/resection could be the best surgical option in the management of basic intermittent exotropia, with greater benefit and lower risks than the bilateral lateral rectus recession. However, it is important to take into account the limitations of the existing evidence, especially considering the lack of information on critical outcomes.

Resource considerations

No systematic reviews or primary studies were found that considered economic analysis within their outcomes. However, both interventions have similar costs.

What would patients and their doctors think about this intervention

The most used surgical technique is bilateral lateral rectus recession. It is believed unilateral recess/resection could lead to more overcorrection and development of incomitance, which could lead to major complications, such as suppression and subsequent amblyopia. These beliefs arise from the fear of generating an important asymmetry in the tone of the extraocular musculature when only one eye is operated and that would be avoided when operating both.

Based on the evidence presented in this summary, most clinicians should lean in favor of the unilateral recess/resection surgical technique as it could achieve greater surgical success.

However, because bilateral lateral rectus recession technique has been used preferentially in recent years, there is little knowledge and lack of expertise in the unilateral recess/resection technique, which could tip the balance towards bilateral surgery despite the existing evidence. The limitation of the evidence regarding some critical outcomes would also lead to variation in decision-making.

Unilateral recess/resection may be a better surgical option for patients, since many are reluctant and do not understand why both eyes have to be operated, when they notice that the deviation mainly occurs in one eye.

Differences between this summary and other sources

The systematic reviews identified, including the most complete and updated¹, reached to similar conclusions to those presented here, being cautious about the results due to the limitations of the primary studies and their risk of bias.

The conclusions of this summary reveal new evidence that is currently not used by the American Academy of Ophthalmology in its main clinical guideline of strabismus¹³, which indiscriminately recommends both surgeries as options to be performed in intermittent exotropia, mentioning that there are no established results of proven superiority of one over the other, leaving the decision to the doctor. In this sense, it only suggests to perform bilateral lateral rectus recession over unilateral recess/resection in cases in which intermittent exotropia is concomitant with anisotropies, a situation not evaluated in this summary.

Could this evidence change in the future?

The probability that future research changes the conclusions of this summary is high, due to the uncertainty of the existing evidence.

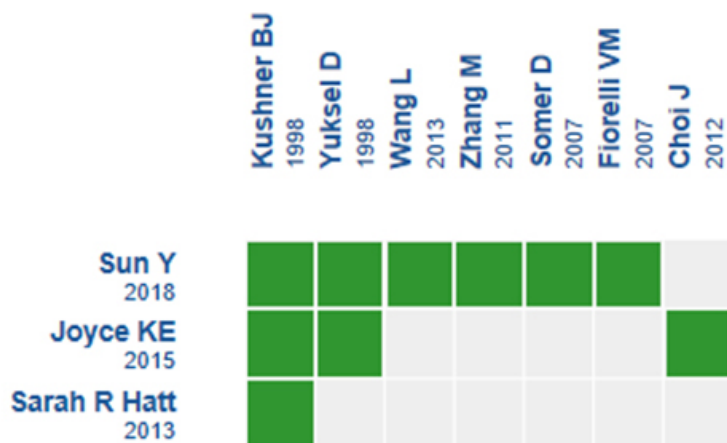
There is one randomized trial published in 2017¹⁴ that until the publication of this summary had not been included in any systematic review.

We identified one ongoing trial¹⁵ in the International Clinical Trials Registry Platform of the World Health Organization evaluating this question.

We identified one systematic review in progress¹⁶ in the International Prospective Register of Systematic Reviews (PROSPERO), which could provide new information on unreported outcomes and include the new randomized trial identified¹⁴.

How we conducted this summary

Using automated and collaborative means, we compiled all the relevant evidence for the question of interest and we present it as a matrix of evidence.



An evidence matrix is a table that compares systematic reviews that answer the same question.

Rows represent systematic reviews, and columns show primary studies.

The boxes in green correspond to studies included in the respective revisions.

The system automatically detects new systematic reviews including any of the primary studies in the matrix, which will be added if they actually answer the same question.

Notes

The upper portion of the matrix of evidence will display a warning of “new evidence” if new systematic reviews are published after the publication of this summary. Even though the project considers the periodical update of these summaries, users are invited to comment in *Medwave* or to contact the authors through email if they find new evidence and the summary should be updated earlier.

After creating an account in Epistemonikos, users will be able to save the matrixes and to receive automated notifications any time new evidence potentially relevant for the question appears.

This article is part of the Epistemonikos Evidence Synthesis project. It is elaborated with a pre-established methodology, following rigorous methodological standards and internal peer review process. Each of these articles corresponds to a summary, denominated FRISBEE (Friendly Summary of Body of Evidence using Epistemonikos), whose main objective is to synthesize the body of evidence for a specific question, with a friendly format to clinical professionals. Its main resources are based on the evidence matrix of Epistemonikos and analysis of results using GRADE methodology. Further details of the methods for developing this FRISBEE are described here (<http://dx.doi.org/10.5867/medwave.2014.06.5997>)

Epistemonikos foundation is a non-for-profit organization aiming to bring information closer to health decision-makers with technology. Its main development is Epistemonikos database

www.epistemonikos.org.

Follow the link to access the **interactive version**: [Bilateral lateral rectus recessions versus unilateral recession/resection for basic intermittent exotropia.](#)

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