INTERMITTENT EXOTROPIA
SURGICAL CONTROVERSY:
UNILATERAL RR OR BLR RECESSION

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INTERMITTENT EXOTROPIA

- IXT is a common form of childhood exotropia, accounting for about 50–90% of all the exotropia and affecting about 1% of the general population.

- IX(T) is characterized by intermittent divergence which is usually present initially on distance fixation or when the child is tired, but later at near fixation as well.

- The ocular misalignment may worsen or deteriorate into constant exotropia, which adversely affects stereo vision and may cause amblyopia.
CLASSIFICATION SYSTEMS

Classic - Burian 4 groups
1. Basic pattern
2. Divergence excess
3. Pseudodivergence excess
4. Convergence insufficiency

Kushners Classification
1. Basic
2. Tenacious proximal fusion
3. High AC/A ratio
4. Proximal convergence
5. Low AC/A ratio
6. Convergence insufficiency
7. Pseudoconvergence insufficiency
INDICATIONS FOR SURGERY

- Reduction or loss of stereoacuity for distance and near
- Constant/Manifest exodeviation
- Large angle deviation
- Deteriorating fusional control

**Intermittent exotropia: Surgical treatment strategies**
Jai Kelkar, Santhan Gopal, RachansB Shah and Aditya kelkar. *IJO 2015*

**Surgical management of intermittent exotropia: do we have an answer for all?**
CASE 1.. BASIC EXOTROPIA

EOM : Full
No AHP
W4DT:
Distance: Alt supp
Near: Alt supp
Stereopsis: 800 sec of arc

Right Tilt : 30 PD XT
Near : 35 PD XT
Left Tilt: 30 PD XT
TREATMENT: B/L LR RECESSION 8 MM

Post op 6 weeks

PBCT Distance: 4 X'

PBCT Near: 4 X'

EOM: Full

W4DT: Distance and Near: BSV Stereopsis: 200 sec of arc
CASE 2:

VA RE 20/20 p
LE 20/20

W4DT:
Distance: Alt supp
Near: Alt supp
Stereopsis: 800 sec of arc

NEAR 25 PD XT

25 PD XT
35 PD XT
25 PD XT
30 PD XT
25 PD XT
30 PD XT
Postop ---6 weeks later
S/P BE LR RECESSION 7.5 mm

VA RE 20/20 p
LE 20/30

W4DT:
Distance Suppression and Near :BSV
Stereopsis: 400 sec of arc

Distance and Near 8 PD ET
CASE 3

12 year old female
IDS phase 4: pseudodivergence excess

Right tilt: 40 PD XT       Near: 35 PD XT       Left tilt: 45 PD XT

EOM: Full
W4DT: Distance and Near: Alt supp
Stereopsis: Absent

Post patch test  Distance: 50 PD XT  Near: 50 PD XT  with +3 Dsp: 60 XT  AC/A: 3.33
TREATMENT: R/E LE RECESSION 9MM + MR RESECTION 6MM

Post op 2 mths

EOM: Full

W4DT: Distance and Near: BSV
Stereopsis: 400 sec of arc

Near: 4 PD X(T)
Case 4

20 years male
UAVA RE 6/6 LE6/6

IDS phase 4: Basic exotropia
Near: 50 PD

Sensory: WFDT-Alternate suppression
Stereopsis: absent

LE IR recession 9mm + MR resection 6mm
POSTOPERATIVE 1 MONTH

BSG- Fusion for distance and near Stereopsis 400 AS

After exercises 4XT

12 PD XT
The goals of the surgery for IXT are to restore alignment and preserve or restore binocular function.

Which is more effective in terms of:

- Long term success rate
- Overcorrection rate
- Recurrence rate or drift
The evidence for the comparative effectiveness of both two kinds of surgeries is limited by the few randomized controlled trials.

Which surgical approach is the best for treating IX(T) is still to be argued?

**Success rate for each procedure**
(Recurrence, over correction, under-correction)

**Factors affecting outcome:**
1. Age of onset and surgery,
2. Duration of deviation,
3. Amount of pre op deviation and post op deviation
4. Presence of amblyopia,
5. Anisometropia,

**Patient / parents preference**
Comparison of bilateral/unilateral lateral rectus recession and unilateral recession-resection for intermittent exotropia:

A Meta-Analysis.


- **AIM:** To compare the effectiveness of unilateral recession-resection (R&R) and bilateral/unilateral recession (BLR/ULR) for treatment of basic type of intermittent exotropia [IX(T)].

- **METHODS:** A comprehensive literature search was performed using PubMed, EMBASE, and the Cochrane Library, to identify randomized controlled trials and comparative studies regarding the effectiveness of R&R and BLR/ULR for IX(T).

  Based on which, a Meta-analysis was then performed in terms of **long-term success rate, overcorrection rate, and recurrence rate.**
Selection criteria:

1) Basic type of IX(T) [the difference of deviation angle between distance fixation and near fixation less than 10 prism diopter (PD)] with patients younger than 18y
2) Surgical intervention includes BLR and R&R and/or include ULR and R&R;
3) At least one of the primary outcome measures (success rate, overcorrection rate and undercorrection rate) can be extracted or calculated with data provided by the literature;
4) At least with a six-months follow-up;
5) The change of deviation angle was selected as one of the criteria to assess the success of surgery;
6) The definition of a success is definite.
<table>
<thead>
<tr>
<th>First author, year, country</th>
<th>Study design/follow-up</th>
<th>Type /Age</th>
<th>Final sample size</th>
<th>Preoperative deviation, PD</th>
<th>Postoperative outcomes</th>
<th>Definition of surgical success</th>
</tr>
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<tbody>
<tr>
<td>Wang L, 2013, China</td>
<td>Retrospective study/</td>
<td>Basic type INT/</td>
<td>BLR: 38; R&amp;R: 47</td>
<td>BLR: D. 33.5±7.1; N: 34±8.8; R&amp;R: D: 22.9±9.2; N: 36.4±6.7</td>
<td>Exceeding of 55 PD to excedance of 58 PD at distance and near in primary position</td>
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<td>BLR: 16±6.9y; R&amp;R: 13.5±2.1y</td>
<td>Basic type INT/</td>
<td>BLR: 7.39±3.1y; R&amp;R: 8.12±2.47y</td>
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<td>Yang X, 2014, China</td>
<td>Retrospective study/</td>
<td>Basic type INT/</td>
<td>BLR: 107; R&amp;R: 106</td>
<td>BLR: D. 41.68±17.03; N: 44.89±15.26; R&amp;R: D: 28.82±27.66; N: 68.21±23.04</td>
<td>Exceeding of 55 PD to excedance of 510 PD at distance in primary position</td>
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<td>BLR: Mean:3.7y; R&amp;R: Mean:3.7y</td>
<td>Basic type INT/</td>
<td>BLR: 13.8±7.81y; R&amp;R: 14.25±7.81y</td>
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<tr>
<td>Lee S, 2001, Korea</td>
<td>Retrospective study/1y</td>
<td>Basic type INT/</td>
<td>BLR: 46; R&amp;R: 57</td>
<td>BLR: O.3±0.6; U: 17; R&amp;R: O.6±0.45; U: 17</td>
<td>Exceeding of 55 PD to excedance of 510 PD at distance in primary position on each follow-up visit.</td>
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<td>BLR: mean age of 7.1y</td>
<td>Basic type INT/</td>
<td>BLR: 26; R&amp;R: 11</td>
<td>BLR: D. 38.7±6.9; N: 18.5±17; R&amp;R; D: 28.4±6.5; N: 7.7±4.5</td>
<td>Exceeding of 55 PD to excedance of 510 PD at distance in primary position</td>
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<td>under 16y</td>
<td>Basic type INT/</td>
<td>BLR: 55; R&amp;R: 73</td>
<td>BLR: D. 40.5±8.5; N: 40.5±8.5; R&amp;R: D: 29.4±3.8; N: 30.5±6.4</td>
<td>Exceeding of 55 PD to excedance of 510 PD at distance in primary position</td>
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<td>Chia A, 2001, Singapore</td>
<td>Retrospective study/</td>
<td>Basic type INT/</td>
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<td>BLR: D. 38.7±6.9; N: 18.5±17; R&amp;R; D: 28.4±6.5; N: 7.7±4.5</td>
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<td>BLR: 44±15.9mo; R&amp;R: 47±16.9mo</td>
<td>Basic type INT/</td>
<td>BLR: 6.8±1.4y; R&amp;R: 7.2±2.3y</td>
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<tr>
<td>Burton J, 1999, America</td>
<td>RCT/1y follow-up</td>
<td>Basic type INT/</td>
<td>R&amp;R: 17, BLR: 87</td>
<td>BLR: D. 29.8±6.3; R&amp;R: D. 28.1±4.7</td>
<td>Success as defined as exophoria-tropia 55 PD to exophoria-tropia 510 PD</td>
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<td>(range: 12-15mo)</td>
<td>Basic type INT/</td>
<td>R&amp;R: 17, BLR: 87</td>
<td>BLR: D. 29.8±6.3; R&amp;R: D. 28.1±4.7</td>
<td>Success as defined as exophoria-tropia 55 PD to exophoria-tropia 510 PD</td>
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<tr>
<td>Kim H, 2016, Korea</td>
<td>Retrospective study/</td>
<td>Basic and true divergence</td>
<td>ULR: 69; R&amp;R: 61</td>
<td>ULR: D. 19.2±1.4; R&amp;R: D. 18±2.5; N: 18±2.5</td>
<td>Exceeding of 55 PD to excedance of 510 PD at distance in primary position</td>
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<td>ULR: 3.6±1.6y; R&amp;R: 3.1±1.9y</td>
<td>Basic and true divergence</td>
<td>ULR: 69; R&amp;R: 61</td>
<td>ULR: D. 19.2±1.4; R&amp;R: D. 18±2.5; N: 18±2.5</td>
<td>Exceeding of 55 PD to excedance of 510 PD at distance in primary position</td>
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<td>Sul S, 2015, America</td>
<td>Retrospective study/</td>
<td>Basic and true divergence</td>
<td>ULR: 37; R&amp;R: 33</td>
<td>ULR: D. 22.2±2.1; N: 22.2±2.1; R&amp;R: D: 18±2.5; N: 18±2.5</td>
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<td>(range: 24-78mo)</td>
<td>Basic and true divergence</td>
<td>ULR: 78±22.2mo; R&amp;R: 78±22.2mo</td>
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<tr>
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<td>ULR: 37; R&amp;R: 33</td>
<td>Basic and true divergence</td>
<td>ULR: 78±22.2mo; R&amp;R: 78±22.2mo</td>
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<td>Kim H, 2014, Korea</td>
<td>Retrospective study/</td>
<td>Basic type INT/</td>
<td>ULR: 82, R&amp;R: 98</td>
<td>ULR: D. 22.0±3.4; R&amp;R: D. 22.7±3.4;</td>
<td>Exceeding of 510 PD to excedance of 510 PD at distance in primary position</td>
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<td></td>
<td>ULR: 53.6±26.4mo; R&amp;R: 52.5±27.4mo</td>
<td>Basic type INT/</td>
<td>ULR: 5.9±2.3y; R&amp;R: 6.76±2.31y</td>
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</table>
1. **The success rate of two kinds of surgeries:**

Seven studies compared the success rate of BLR versus R&R, and found that the difference was not statistically significant between two groups (pooled OR=0.96, 95%CI 0.43, 2.10), In all six papers, the definition of success was that the alignment should lie between 10 PD of exophoria/tropia and 5 PD of esophoria/tropia at distance in the primary position. The pooled result of two compared groups was comparable (OR=1.16, 95%CI 0.49, 2.77),

2. **Overcorrection rate**

Six studies showed that in both two groups overcorrection rate were much the same with statistically insignificant difference for the overcorrection (OR=0.85, 95%CI 0.41, 1.75),
RESULTS --- FACTORS AFFECTING OUTCOME

1. Follow up time – affecting outcome of surgery – recurrence rate
   a. Follow up more than 2 years ---- BLR higher success rate and lower recurrence rate
   b. Follow up less than 2 years -- R&R has a better cure rate and lower under-correction rate

2. Exotropic drift

   R&R surgery show a higher exotropic drift than BLR in the long term.

3. Age of surgery onset, preoperative angle of deviation

   These two factors had no effect on the reduction of heterogeneity.

   Small angle IX(T), R&R has a better long-term outcome than ULR (mean duration of follow-up >3y)
The long-term survival analysis of bilateral lateral rectus recession versus unilateral recession-resection for intermittent exotropia.


- Non randomized, retrospective study

- 128 patients: 55 BLR; 73 R/R

Surgical outcomes – compared between BLR and RR group postoperative 1 day, 1 month, 6 months, 1 year, and 2 years, and at the final examination.

1. Overcorrection (E'/ET >5 PD)
2. Success (E'/ET ≤5 to X'/XT ≤10PD)
3. Under-correction/recurrence (X'/XT >10PD)
Surgical dosage was based on the angle of distant deviation.

The selection of surgical procedure was made by the operating surgeon, who had no preference for BLR or RR in basic-type exotropia.

However, there was a tendency that BLR was performed in patients with large-angle (≥40 A) exotropia to avoid severe incomitance on horizontal gaze at early postoperative period, and RR in patients with dominant fixing eye.

In moderate-angle (from 20 A to 40 A) exotropia without fixation preference, BLR or RR was performed after discussion about 1-eye vs 2-eye surgery with the patient and his or her parents.
1. At 1 day, 1 month, 6 months, 1 year, and 2 years after surgery, surgical outcomes in each group were not different ($P > .05$)

2. However, the final outcome at a mean of 3.8 years was significantly different between the groups, demonstrating a higher success rate in the BLR group than in the RR group (58.2% vs 27.4%, $P < .01$).

3. Overcorrection showed a decrease and proportions of recurrence showed an increase in each group with passage of time after surgery in both groups.

4. Age at deviation onset, duration from deviation, onset to surgery, age at surgery, presence of amblyopia, presence of anisometropia, presence of fixation preference, presence of lateral incomitance, preoperative angle of deviation, and immediate postoperative angle of deviation at day 1 were not significantly associated with recurrence.
- Kaplan-Meier survival analysis: better survival probability in the BLR group


- Retrospective study
- 48 patients BLR; 38 patients R/R
- One surgeon performed surgery

Surgical outcome:
- Satisfactory (<10 PD of X'/XT, 5 E'/ET)
- Recurrence (> 10 PD of X'/XT)
- Overcorrection (> 5 PD of E'/ET)
Exodeviation of ≥ 45 PD, RR group showed higher rates of successful alignment compared to BLR group at the final examination (P = .006)
Postoperative sensory outcomes were similar between both groups.

Preoperative exodeviation of 40 PD
Rates of recurrence per person-year
BLR = 7.2%
R/R = 12.5%

Preoperative exodeviation of ≥ 45 PD,
Rates of recurrence per person-year
BLR = 35.6%
R/R = 4.0%
The mean preoperative angle of deviation was 21.95±2.92 (14–35) PD

Surgical success rate in this study was 72.6%

Recurrence rate decreased with increased age at surgery (odds ratio: 0.733, 95% CI ¼ 0.626B0.858, Po0.001),

Recurrence rate increased with increased deviation of immediate postoperation (odds ratio: 1.106, 95% CI ¼ 1.045B1.171, Po0.001, respectively).

Differences in gender, photophobia, SE refractive error, astigmatism, SE anisometropia, and preoperative deviation between the groups were not significant
The success rate of the surgery in this study was 42.7%.

Mean age at operation was 8.9±6.5 years, mean preoperative distant X(T) size was 32.9±6.0 PD

On the basis of the survival analysis in which survival represented time of recurrence, the mean duration was 31.2±1.7 months.

Older the age of either at onset (odds ratio: 0.870, P ¼ 0.000) or at surgery (odds ratio: 0.920, P ¼ 0.000), the larger the decrease in recurrence rate.

Larger the measures of immediate postoperative deviation, the higher the increase in the recurrence rate.

**TAKE HOME MESSAGE**

- Moderate angle deviation: Bilateral lateral rectus recession

- Deviation > 45 prism diopters: Unilateral LR recession + MR resection

- Better survival probability in the BLR group – long term

- BLR higher success rate and lower recurrence rate

- Recurrence rate increased with increased residual deviation of immediate postoperation
Thank you
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