Treatment of Progressive Esotropia Caused By High Myopia
A New Surgical Procedure Based on Its Pathogenesis

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Definition of Progressive Esotropia Caused by High Myopia

- Presence of high myopia with an axial length sometimes greater than 30 mm.
- Abduction and sursumduction are limited, and the forced duction test is positive.
- Leads to esotropia fixus in some cases.
Coronal MRI Scans of Case 2
3-D Reconstruction from MRI

Right Eye of Case 2

Frontal view

Temporal view

Dorsal view

Nasal view

SR

MR

IR

ON

LR
# Summary of Patients

<table>
<thead>
<tr>
<th>Case No.</th>
<th>Sex</th>
<th>Age at Surgery (years)</th>
<th>Onset (years)</th>
<th>Previous Surgeries*</th>
<th>Axial Length (mm)</th>
<th>Maximum Angle of Abduction (deg.)</th>
<th>Angle of Deviation (deg.)</th>
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<tbody>
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<td></td>
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<td>MRR, Tr</td>
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<td>+5</td>
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</table>

* RR: recession and resection, Tr: transposition of SR & IR, MRR: medial rectus recession
Possible Surgical Procedures

1. Recession and Resection
2. Recession of the MR
3. Transposition of the LR and MR
4. Superior Fixation of the LR
5. Junction of the SR and LR
Case 4: Joining the SR and LR
After Splitting (into halves)

17 Sep 1999
Variables to Evaluate the Results of Surgery

1. The degree of dislocation of the eyeball out of the muscle cone (angle of dislocation)

2. The maximum angle of abduction

3. The angle of ocular deviation
Measuring the Angle of Dislocation of the Eyeball

Preoperative

181.1 deg.

Postoperative

103.6 deg.

The center positions were measured with Scion Image® software.
Decrease of the Angle of Dislocation

Preoperative

Postoperative

Mean 216.7 deg.

Mean 136.4 deg.
Measuring the Maximum Angle of Abduction

Red circles illustrate the range of abduction movements for normal subjects.
Improvement of the Max. Angle of Abduction

<table>
<thead>
<tr>
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<th>Preoperative</th>
<th>Postoperative</th>
</tr>
</thead>
<tbody>
<tr>
<td>Mean</td>
<td>–46.3 deg.</td>
<td>+34.0 deg.</td>
</tr>
</tbody>
</table>

Mean –46.3 deg.
Mean +34.0 deg.
Case 1

Preoperative

Postoperative (52 days after surgery)
Case 2

Preoperative

Postoperative OS (69 days after surgery)
Case 6

Preoperative

Postoperative OD (52 days after surgery)
Case 5: Photographic History of Surgery

5 Feb 1999
- 5 Feb 1999 MR recession OU

8 Feb 1999
- 5 Feb 1999 MR recession OU

20 Sep 1999
- 21 Sep 1999 SR-LR (split) OD
- Junction of split muscles

21 Oct 1999
- 5 Nov 1999 SR-LR (whole) OS
- (whole): Junction of whole muscles

25 Nov 1999
- (split): Junction of split muscles
Case 5: Changes of Ocular Deviation over Time

Esotropia reappeared 3 months after bilateral MR recession
Improvement of the Angle of Deviation

Mean 75.5 degrees

Mean 15.8 degrees

Preoperative  Postoperative
Conclusions

■ A surgical procedure to bind the superior and lateral rectus muscles was effective in improving the ocular motility and deviation in esotropia caused by high myopia.

■ This procedure worked by restoring the dislocated eyeball back into the muscle cone.
Conclusions

- Recession of the medial rectus muscle may not always be necessary for treating esotropia caused by high myopia.

- Resection of the lateral rectus muscle is best avoided, because it can facilitate dislocation of the eyeball out of the muscle cone.