

Purposeful Undercorrection in Surgical Management on Adult Intermittent Exotropia

Apatsa Lekskul, M.D.

Taweekit Nimworapun, M.D.

Orn Charuratana, M.D.

Jirakul Tungsakul, BS.c.

ABSTRACT : **Purpose :** To study the surgical results of purposeful undercorrection of intermittent exotropia in adults.

Methods : A retrospective chart review was conducted of all adult patients with intermittent exotropia greater than 15 prism diopter (PD) examined and treated by one ophthalmologist between January 2000 and January 2004 at Ramathibodi Hospital. The inclusion criteria were (1) corrected visual acuity not worse than 20/40 in either eye, (2) ability to fuse at distance or near fixation, (3) a near deviation less than 10 PD different from distance, (4) absence of A or V pattern, oblique muscle dysfunction or vertical deviation, (5) MR resection and LR recession in one eye (6) at least 6 months of postoperative follow-up. The surgical numbers for the deviation was aimed at slight undercorrection.

Results : Sixty patients met the inclusion criteria. Their average age at the time of surgery was 24 years (ranged from 14 to 42 years) and the average follow-up time was 23 months. (ranged from 6 to 44 months). Forty-two (70%) had postoperative exodeviation under 10 PD and fifteen (25%) had postoperative exodeviation between 10 and 15 PD. Fifty-seven (95%) patients with postoperative exodeviation under 15 PD had acceptable cosmesis and complete resolution of symptoms including headache, difficulty with reading and ocular fatigue or pain. Three (15%) who had postoperative exodeviation over 15 PD were the patients with initial deviation more than 40 PD and all had reoperation. No patient with postoperative esodeviation was found in this study.

Conclusion : Purposeful undercorrection in surgical management on adult intermittent exotropia showed good results. Because adult patients with consecutive esodeviation tended to experience persistent diplopia, then slight undercorrection was the way to avoid this complication from overcorrection. Furthermore, under correction with 15 PD seemed to work well. We recommended slight undercorrection on intermittent exodeviation that less than or equal to 40 PD and regular correction if the deviation was more than 40 PD. **Thai J Ophthalmol 2004 ; July-December 18(2) : 129-134.**

Keyword : *intermittent exotropia, adult, undercorrection*

Intermittent exotropia is common in all age groups but the presenting complaints in teenagers and adults are different from those in children. Children are brought to ophthalmologist by their parents chiefly because one eye

appears to turn out or because they have a habit of closing one eye in bright sunlight. In contrast, adults seek relief of symptoms including headache, difficulty with reading, ocular fatigue or pain and cosmetic improvement. Fur-

thermore, in the surgical management of intermittent exotropia, widespread agreement advocates that an initial overcorrection is required because of a tendency toward postoperative exotropia, especially in children. Initial overcorrection yields satisfactory results in children under 10 years of age because they adapt readily to the new position of the eyes ; areas that previously did not suppress seem to quickly make the adjustment. Therefore, they do not suffer from permanent diplopia even when overcorrected to postoperative esotropia. Adults do not have as a labile neurosensory mechanism, so they maintain postoperative diplopia indefinitely unless reoperation is performed.¹

Burian and Spivey² evaluated the surgical results of 98 patients with intermittent exotropia and concluded that a good functional result was obtained although the deviation was reduced to within 12 PD of exophoria. For the reason that undercorrection within 12 PD of exophoria seemed to work well and postoperative diplopia might occur even a small consecutive esotropia, we intended to undercorrect in surgical management on adult intermittent exotropia. This study also proposed a guideline in surgical undercorrection and analyzed the surgical intervention outcomes.

Subjects and methods

Records of 75 adult patients who underwent surgery for intermittent exotropia at Ramathibodi Hospital between January 2000 and January 2004 were reviewed and 60 patients met all the following criteria : (1) corrected visual acuity not worse than 20/40 in either eye, (2) ability to fuse at distance or near fixation, (3) a near

deviation less than 10 PD different from distance, (4) absence of A or V pattern, oblique muscle dysfunction or vertical deviation, (5) MR resection and LR recession in one eye performed by only one of the authors (Lekskul A.) as the initial surgical procedure and (6) at least 6 months of postoperative follow-up.

Sixty patients who fulfilled these criteria all underwent complete ophthalmologic and orthoptic examination before the operation. Ocular deviation was measured by prism and cover test technique at both near and distance. Patients refractive error were treated with glasses before a final surgical decision was made. All operations were performed with the patients under local anesthesia. The muscle were operated on a standard technique with the surgical numbers that were aimed at slight undercorrection. Each patient was seen one week after the operation, at which time we recorded the initial alignment at distance fixation. The final alignment at distance fixation was recorded at the most recent postoperative visit, which was at least 6 months after the operation.

Surgical outcomes after one operation were classified as good, undercorrected, or overcorrected. The outcome was judged to be good if no more than 10 PD of exodeviation or 5 PD of esodeviation (no complain with diplopia). The outcome was considered undercorrection if more than 10 PD of exodeviation existed and overcorrected if more than 5 PD of esodeviation existed, even if symptoms were absent.

Results

Sixty patients who underwent surgical correction for intermittent exotropia were identified. The patients

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ranged in age at surgery from 14 to 42 years and the number of cases are shown in table 1. The average age was 24 years old. There were 25 females and 35 males. The refractive error was adjusted to spherical equivalent. Eight patients were hyperopic (+1.25 diopters (D) or less), twenty were emmetropic, and thirty-two were myopic (-5.0 D or less, with the vast majority between -0.50 and -2.50 D).

Preoperative measurement are shown in table 2. The majority of patients had deviations of 30 PD or less, although the deviations ranged from 15 PD to 45 PD.

Surgical procedures were similar for all patients. Surgical numbers are shown in table 3. There were no intraoperative surgical complications.

Follow-up ranged from 6 months to 44 months, with an average follow-up of 23 months. No patient lost any lines of visual acuity and ability to fuse on follow-up. Postoperatively, two patients developed corneal dellen, one had pyogenic granuloma.

The surgical outcomes are shown in table 4. Forty-two patients (70%) had postoperative exodevia-

Table 1 Age at time of surgery

Age (year)	Number of cases
14-20	18
21-30	25
31-40	10
41-45	7

tion less than 10 PD. Fifteen patients (25%) had postoperative exodeviation between 10 PD and 15 PD. Fifty-seven (95%) patients with postoperative exodeviation under 15 PD had acceptable cosmesis and complete resolution of symptoms including headache, difficulty with reading and ocular fatigue and pain. Three patients (5%) who had postoperative exodeviation over 15 PD were the patients with initial deviation more than 40 PD and all had reoperation. No patient with postoperative esodeviation was found in this study.

Table 2 Preoperative measurements

Distance		Near	
Deviation (PD)	Number of cases	Deviation (PD)	Number of cases
15-20	20	15-20	18
21-30	22	21-30	22
31-40	15	31-40	17
41-50	3	41-50	3

Table 3 Surgical numbers in this study compared to Parks' guideline

Monocular surgery for XT			Monocular surgery for XT		
Deviation (PD)	LR recession (mm)	MR resection (mm)	LR recession (mm)	MR resection (mm)	
15	4	3	3.5	2.5	
20	5	4	4.5	3.0	
25	6	5	5.5	4.0	
30	7	6	6.5	5.0	
40	8	6	7.5	5.5	
50	9	7	8.5	6.0	
60	10	8	9.0	7.0	
70	10	9	9.5	8.0	
80	10	10	10.0	9.0	
Parks' guideline			Surgical numbers in this study		

Table 4 Postoperative results

Deviation at distance (PD) at latest follow-up	Number of cases
Orthophoria	4
Exodeviation	
X or X (T) less than 10	38
X or X (T) between 10 and 15	15
X or X (T) > 15	3
Esodeviation	
E or E (T)	none

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Discussion

Most authorities advocated overcorrecting intermittent exotropes by 10 PD to 20 PD. This may be the best option in children. Overcorrection in adults may produce intolerable diplopia even a small consecutive esodeviation as previously mentioned.

Schlossman et al³ reported a high rate of success that yielded 93.18% with surgery on adult intermittent exotropia even with undercorrection as great as 14 PD but they did not show the surgical numbers that they used. In this study, we proposed the surgical numbers guideline compare to Parks' and the result showed high percentage of success as high as Schlossman's and this was achieved in the group with preoperative deviation less than 40 PD. Furthermore, Ruttum⁴ reported that his results showed representation on both sides of desired outcome in surgery for intermittent exotropia. Of the 60 patients in his study, 38 (63%) had good outcomes, 15 (25%) had undercorrection and 7 (12%) had overcorrection. All patients with overcorrection, required one additional operation despite the postoperative use of patching, prisms and time. Patients with undercorrection needed significantly fewer reoperations. Hardesty⁵, a strong ad-

vocate of postoperative patching and prisms therapy for patients with undercorrection, reported a one-third cure rate with base-in prisms for patients with recurrent, intermittent exotropia. Adult patients with intermittent exotropia may therefore be served well by slightly small or amounts of correction followed by aggressive postoperative therapy when necessary.

In conclusion, we recommended undercorrection in adult intermittent exotropia, which less than or equal to 40 PD and regular correction if the deviation was more than 40 PD.

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การผ่าตัดแก้ไขภาวะตาเขออกเป็นครั้งคราวในผู้ใหญ่ โดยจงใจ Undercorrection

อาภัสรา เล็กสกุล, พ.บ.

ทวีกิจ นิมวรพันธุ์, พ.บ.

อร จารุรัตน์, พ.บ.

จิรกุล ตั้งสกุล, วท.บ.

บทคัดย่อ **วัตถุประสงค์** : เพื่อศึกษาผลของการผ่าตัดแก้ไขภาวะตาเขออกเป็นครั้งคราวในผู้ใหญ่ โดยจงใจ undercorrection

วิธีการวิจัย : เป็นการศึกษาย้อนหลังจากเวชระเบียนผู้ป่วยตาเขออกเป็นครั้งคราวในผู้ใหญ่ อายุตั้งแต่ 14 ปี มีตาเขออกอย่างน้อย 15 PD ได้รับการตรวจและผ่าตัดแก้ไขโดยจักษุแพทย์คนเดียว ระหว่างเดือนมกราคม พ.ศ. 2543 ถึงมกราคม พ.ศ. 2547 ที่โรงพยาบาลรามาริบัติ เกณฑ์ที่ใช้ในการตัดสินใจเพื่อเข้าศึกษาวิจัยในครั้งนี้ คือ 1. ความสามารถในการอ่านเมื่อได้รับการแก้ไขภาวะสายตาคิดปกติแล้วไม่ต่ำกว่า 20/40 ในแต่ละตา 2. สามารถใช้ตาสองข้างรวมภาพได้เมื่อมองไกลหรือใกล้ 3. ตาเขออกที่ระยะใกล้และไกลแตกต่างกันไม่เกิน 10 PD 4. ไม่มีภาวะ A หรือ V pattern ไม่พบความผิดปกติของกล้ามเนื้อ oblique 5. ได้รับการผ่าตัด MR resection และ LR recession ในตาข้างเดียว โดยเป็นการผ่าตัดแก้ไขที่จงใจ undercorrection 6. ได้รับการตรวจติดตามผลอย่างน้อย 6 เดือน

ผลการวิจัย : ผู้ป่วยทั้งหมด 60 คน เข้าเกณฑ์ที่ต้องการ มีอายุระหว่าง 14 ถึง 42 ปี โดยอายุเฉลี่ยขณะทำผ่าตัดอยู่ที่ 24 ปี และได้รับการตรวจติดตามผลในช่วง 6 ถึง 44 เดือน โดยมีการตรวจติดตามผลเฉลี่ย 23 เดือน ผู้ป่วย 42 คน คิดเป็นร้อยละ 70 มีตาเขออกหลังผ่าตัดน้อยกว่า 10 PD ผู้ป่วย 15 คน คิดเป็นร้อยละ 25 มีตาเขออกหลังผ่าตัดระหว่าง 10 ถึง 15 PD โดยผู้ป่วย 57 คน คิดเป็นร้อยละ 95 ที่มีตาเขออกหลังการผ่าตัดน้อยกว่า 15 PD แต่มีการผ่าตัดเป็นที่ยอมรับของผู้ป่วยในเรื่องความสวยงาม รวมทั้งอาการปวดศีรษะ ปวดตาเวลาอ่านหนังสือก็หายไปด้วย ผู้ป่วย 3 ราย คิดเป็นร้อยละ 15 มีตาเขออกหลังการผ่าตัดมากกว่า 15 PD ซึ่งผู้ป่วยเหล่านี้มีตาเขออกก่อนผ่าตัดมากกว่า 40 PD และทั้ง 3 คนต้องรับการผ่าตัดใหม่ ไม่พบผู้ป่วยมีตาเขเข้าหลังการผ่าตัด

สรุป : การจงใจ undercorrection ในการผ่าตัดแก้ไขตาเขออกเป็นครั้งคราวในผู้ใหญ่ให้ผลดี เนื่องจากผู้ใหญ่ที่มีตาเขเข้าหลังการผ่าตัดแก้ไขตาเขออก ส่วนใหญ่จะมีภาพซ้อนที่ไม่หายไป การ undercorrection เล็กน้อยเป็นการหลีกเลี่ยงปัญหา นี้ นอกจากนี้การยังเหลือตาเขออกหลังผ่าตัดไม่เกิน 15 PD เป็นที่ยอมรับได้ของผู้ป่วย โดยแนะนำให้ทำในกรณีที่ตาเขออกน้อยกว่าหรือเท่ากับ 40 PD ถ้ามากกว่า 40 PD ให้ทำตามปกติ จักษุเวชสาร 2547 ; กรกฎาคม-ธันวาคม 18(2) : 129-134.