

Original Research Article

Long-term results of inferior oblique muscle recession in superior oblique palsy

Shinji Makino¹, Kozue Hozawa¹, Reiko Kondo¹, Mika Kanai¹, Haruko Suto¹, Kanako Ito¹, Go Mawatari¹

¹Department of Ophthalmology, Jichi Medical University, Shimotsuke, Tochigi, Japan

*Corresponding author

Shinji Makino

Email: makichan@jichi.ac.jp

Abstract: To evaluate the long-term surgical outcomes of inferior oblique muscle recession (IO Rec) for the treatment of superior oblique palsy (SOP). We retrospectively studied 18 consecutive patients who had undergone IO Rec for the treatment of SOP. A follow-up of at least five years after the operation was required to be included in the study. In results the preoperative vertical deviation was 10.6 ± 5.3 degrees in the primary position and 10.2 ± 4.7 degrees in the field of maximum action movement of the inferior oblique muscle. The final postoperative vertical deviation improved to 2.1 ± 3.9 degrees and 1.1 ± 3.5 degrees, respectively. In addition, the improvement in the vertical deviations was stable during the follow-up period. In conclusion our study results suggested that the surgical outcomes of IO Rec for the treatment of SOP had been maintained during the long-term follow up period.

Keywords: superior oblique palsy, inferior oblique muscle recession

INTRODUCTION

Superior oblique palsy (SOP) is the most common cause of isolated vertical muscle palsies. Inferior oblique muscle weakening, superior oblique muscle strengthening, contralateral inferior rectus muscle recession and ipsilateral superior rectus muscle recession have been proposed for the treatment of SOP. Inferior oblique muscle weakening procedures include myectomy, recession, denervation and extirpation, disinsertion, and anterior transposition of the inferior oblique muscle [1-3]. Several reports have described the surgical outcomes of inferior oblique muscle recession (IO Rec) [3-7]. However, there are few reports regarding long-term surgical results of IO REC. Herein, we report long-term results of IO Rec in SOP.

MATERIALS AND METHODS

We retrospectively studied 18 consecutive patients who had undergone IO Rec for the treatment of SOP. The mean operative age of the patients was 6.8 ± 3.7 years (range: 2-15 years). The inferior oblique muscle was recessed inferiorly to the lateral border of the inferior rectus muscle (Figure 1 arrow). The major amblyoscope was used to measure vertical deviations. Postoperative examinations were performed routinely between one day and one week, and then at one month and six month intervals. A follow-up of at least five years after the operation was required to be included in the study group. The mean postoperative follow-up period was 11.3 ± 5.4 years (range: 5-22 years).

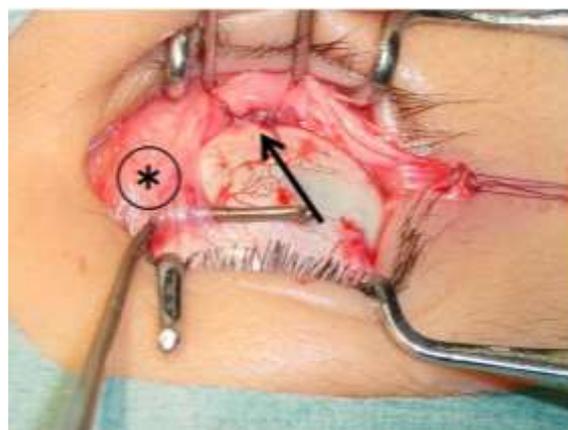


Fig. 1: The site of inferior oblique muscle in IO Rec.

The inferior oblique muscle (arrow) was recessed inferiorly to the lateral border of the inferior rectus muscle (asterisk).

RESULTS

Vertical deviations in primary position preoperatively and during postoperative follow-up are shown in Figure 2 using box plot. Similarly, vertical deviations in the fields of maximum action movement of the inferior oblique muscle (upgaze) and the superior oblique muscle (downgaze) are shown in Figure 3 and Figure 4, respectively.

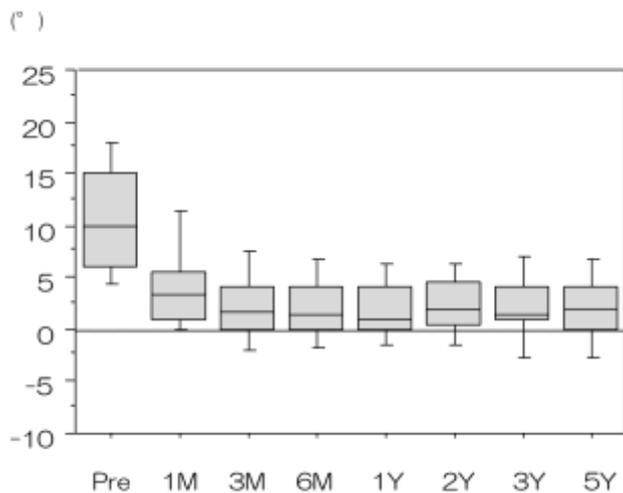


Fig. 2: Preoperative and postoperative vertical deviations in the primary position (box plot)

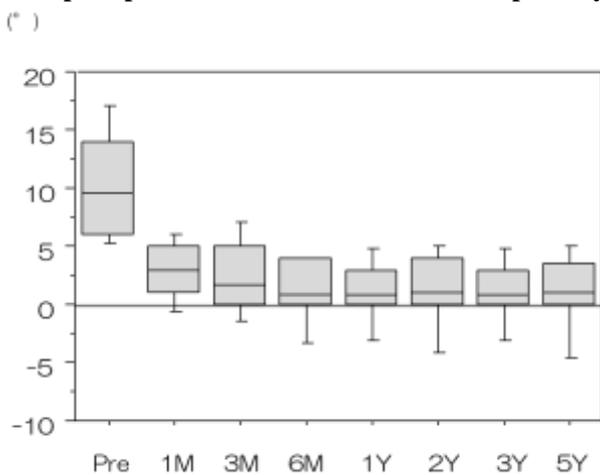


Fig. 3: Preoperative and postoperative vertical deviations in the upgaze (box plot)

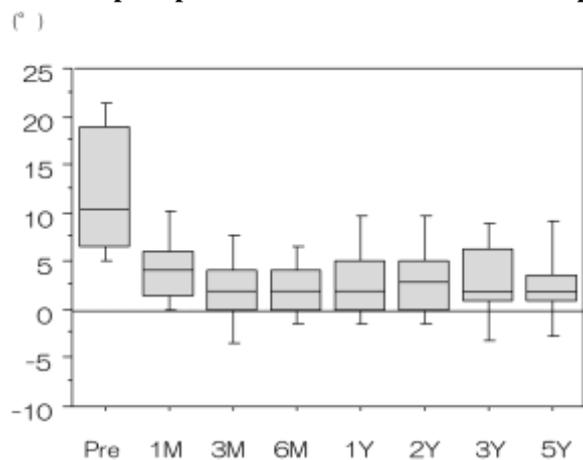


Fig. 4: Preoperative and postoperative vertical deviations in the downgaze (box plot)

In addition, the preoperative and final postoperative vertical deviations are shown in Table 1.

Surgical effects at two and five years postoperatively are also shown in Table 2.

Table 1: Preoperative and final vertical deviations

| | primary position mean±SD (range) | upgaze mean±SD (range) | downgaze mean±SD (range) |
|-------------------------|-------------------------------------|---------------------------|-----------------------------|
| preoperative deviations | 10.6± 5.3° (4~21°) | 10.2± 4.7° (3~18°) | 12.1± 6.7° (4~24°) |
| final deviations | 2.1± 3.9° (-5~10°) | 1.1± 3.5° (-8~5.5°) | 2.6± 4.4° (-7~15°) |

Table 2: Surgical effects of IO Rec

| | primary position mean±SD (range) | upgaze mean±SD (range) | downgaze mean±SD (range) |
|----------------------------|-------------------------------------|---------------------------|-----------------------------|
| surgical effect 2 years | 8.5± 3.9° (3~14.5°) | 9.1± 4.3° (0.5~17°) | 8.8± 5.6° (2~22°) |
| surgical effect 5 years | 8.7± 4.1° (2~14.5°) | 9.1± 4.5° (0.5~17°) | 8.9± 5.6° (0~21°) |

DISCUSSION

In the treatment of SOP, when there is secondary over action of the inferior oblique muscle, myectomy, recession, disinsertion or ATIO have been recommended to weaken the inferior oblique muscle [1, 3]. Several reports have described the surgical outcomes of IO Rec [3-7]. Duranoglu [4] reported that mean vertical deviation was 15.9 prism diopters (PD) (range, 12–17 PD) preoperatively and 25 patients (80.6%) had no vertical deviation postoperatively. In their report, the mean follow-up was 29.7 months (range, 4–82 months). Bahl *et al.*; [5] compared the outcomes of IO Rec or IO myectomy. According to their report, the mean preoperative and postoperative vertical deviations in the primary position were 12.14± 7.86 PD, 2.74± 4.73 PD, respectively. In their report, the mean follow-up was 25.4± 29.7 months. In addition, Yanyali *et al.*; [6] reported the mean reduction of vertical deviation in IO Rec was 13.3± 1.9 PD. In their report, the mean follow-up was 18.8± 10.2 months (range: 6–40 months). In our present study, the mean postoperative follow-up period was 11.3± 5.4 years. The improvement in the vertical deviation was stable during the follow-up period.

CONCLUSION

We emphasized that IO Rec for the treatment of SOP had been maintained good surgical result. Further investigation in a larger cohort of patients is needed to confirm our results.

Disclosure:

The authors declare no conflicts of interest.

REFERENCES

1. Helveston EM, Mora JS, Lipsky SN, Plager DA, Ellis FD, Sprunger DT, *et al.*; Surgical treatment of superior oblique palsy. *Trans Am Ophthalmol Soc.* 1996; 94: 315-328.
2. Apt L, Call NB; Inferior oblique muscle recession. *Am J Ophthalmol.* 1978; 85(1): 95-100.
3. Nejad M, Thacker N, Velez FG, Rosenbaum AL, Pineles SL; Surgical results of patients with

unilateral superior oblique palsy presenting with large hypertropias. *J Pediatr Ophthalmol Strabismus.* 2013; 50(1): 44-52.

4. Duranoglu Y; Effectiveness of disinsertion-resection and tucking of the inferior oblique muscle in patients with unilateral long-standing superior oblique muscle palsy. *J Pediatr Ophthalmol Strabismus.* 2007; 44(5): 283-287.
5. Bahl RS, Marcotty A, Rychwalski PJ, Traboulsi EI; Comparison of inferior oblique myectomy to recession for the treatment of superior oblique palsy. *Br J Ophthalmol.* 2013; 97(2): 184-188.
6. Yanyali A, Elibol O, Talu H, Karabas L, Alp B, Caglar Y; A comparative study of the effectiveness of disinsertion and anterior transposition of the inferior oblique in the treatment of unilateral superior oblique palsy. *Strabismus.* 2001; 9(2): 83-90.
7. Ohtsuki H, Konishi H, Hasebe S, Tadokoro Y, Watanabe S, Okano M; Measurement of incomitance patterns of vertical deviation in superior oblique palsy with a synoptometer. *Nippon Ganka Gakkai Zasshi.* 1990; 94(9): 833-838.