

Results of 70 Patients with Recessing-Resecting Muscles in Strabismus Surgery

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Abstract

There are many ways to measure the angle of strabismus and many methods to calculate the amount of muscle recess-resect in a pair of opposing muscles. The Hirschberg method for measuring the kappa angle and a simple formula for calculating the amount of muscle to recess-resect for the surgical correction of strabismus in 70 patients aged 15-year-old and over with either esotropia or exotropia. Some details of surgical techniques and results are reported hereinafter ten years follow-up.

Key words: *esotropic or exotropic strabismus, strabismus surgery, recess-resect muscle, strabismus surgery, techniques*

1. Introduction:

In Vietnam, strabismus is present in 0.53% of the population and is responsible for 2% of all cases of blindness (Ngo Nhu Hoa. *Some consideration on the epidemiology of cataract in Hochiminh City*) [1]. For the purposes of treatment, strabismus is classified into two categories: paralytic and functional. Before surgical intervention is considered, correction of strabismus should be attempted by 1) the use of spectacles in patients with refractive errors (myopia in exotropic patients, hyperopia in esotropic patients); and 2) total or partial occlusion of the deviated eye in children aged 7 to 14 years. Strabismus may cause a lack of binocular vision, loss of useful vision, psychologic manifestations, and social and economic problems. For these reasons, a child with strabismus should be examined as soon as possible. In many cases, treatment can be initiated in infancy (Sugar HS. *The extrinsic of orthoptic instruction*; Burian HM. *Syllabus of orthoptic instruction*; Saraux H *et al.* Ophthalmologica) [2,3,4, 5]

There are many ways to measure the angle of strabismus and many methods to calculate the amount of muscle recess-resect in a pair of opposing muscles. The Hirschberg method was used for measuring the kappa angle. (Miller S. *Clinical Ophthalmology*; Von Noordon G. *Main causes of failure in strabismus surgery*)[6,7,8, 9]. A simple formula for calculating the amount of muscle to recess-resect for the surgical correction of strabismus in 70 patients aged 15-year-old and over with either esotropia or exotropia was applied for surgery [10, 11,12]. Some details of surgical techniques were discussed and the results of surgical correction on 70 patients are reported hereinafter ten years follow-up.

2. Methods:

Design: Clinical trial on consecutive 70 patients. Self-control: Pre-surgery and post-surgery.

Patients:

Inclusion: All patients with esotropic and exotropic strabismus signed an agreement for his or her surgery after ophthalmologist' diagnosis and advice. In the case of the patients under 18 years old are signed by their father or mother.

Exclusion: yperotropic and hypotropic strabismus patients and those with an A or V syndrome are excluded (Duong Dieu, *Strabismus and surgical correction*) [10]

For diagnosis: The Hirschberg method was used to measure the kappa angle. Normally, when light strikes the cornea, a reflex occurs in the center of the cornea of each eye. In cases of strabismus, the corneal reflex falls at some other position than at the center and thus the related deviation can be assessed

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in degrees of arc as in the following examples of corneal reflex position: central reflex = 0 degree; reflex at the pupillary margin = 15 degrees; half-way to the limbus reflex = 30 degrees; at the limbus reflex = 45 degrees; and 1 mm beyond the limbus = 60 degrees (Miller S. Clinical Ophthalmology) [7].

For surgical treatment:

Formula was used [11, 12]: $d1 = d2 = \frac{1}{2} \times D/2 = D/4$

$d1 = d2$: resect = recess muscle (mm), where

D = Deviation degree calculated by the Hirschberg method:

Reflex at the pupillary margin = 15 degrees, $d1=d2=15/4=3.75$ mm.

Reflex at the half-way to the limbus = 30 degrees, $d1=d2=30/4=7.5$ mm;

Reflex at the limbus = 45 degrees, $d1=d2=45/4=11.25$ mm.

Surgery was done with local anesthesia and follow-up by one ophthalmologist at the private patient office

3. Results and Discussion:

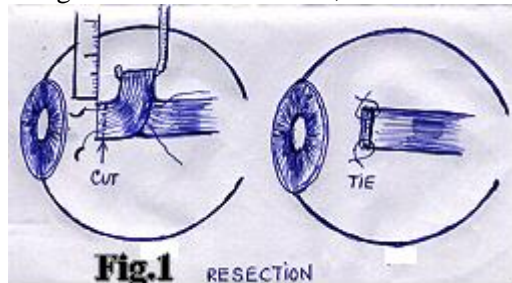
Table 1->Table7 (at the bottom)

1. The goals of surgery:

The goals of surgery were: 1) to change the position of the eyeball in order to alter the alignment of the eye as soon as possible; 2) to reduce (weaken, lengthen, recess) or to enhance (shorten, strengthen, advance, resect) the action of individual muscles; and 3) to create and maintain normal rotation of the eyeball and concomitance (Sugar HS. *The extrinsic of orthoptic instruction*; Burian HM. *Syllabus of orthoptic instruction*; Saraux H, et al. *Ophthalmologica*) [2, 3, 5].

2. Some surgical techniques in recessing-resecting of muscles:

For resection, the Lancaster procedure was used: free and expose the muscle as much as possible by using a strabismus book, tie the suture over the muscle, and then cut the excess muscle.



For recession, the Jameson procedure was used: expose the muscle, tie a chromic single-armed suture at each edge of the tendon near its scleral insertion, cut the muscle at the insertion and pass the suture through a superficial layer of the sclera. (Fig.2)

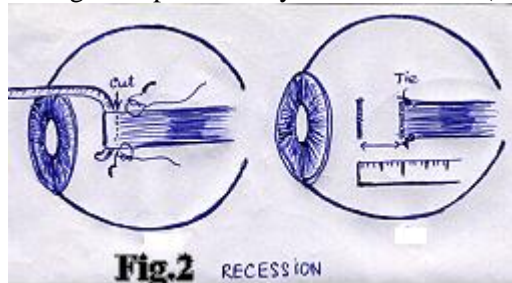


Figure 2: Techniques of surgery in muscle recession

In the case of the thin sclera or in children, expose the muscle, a triple of two lateral muscle was cut and tied together after prolong enough for recession. Did not tie muscle on the sclera (Fig 3)

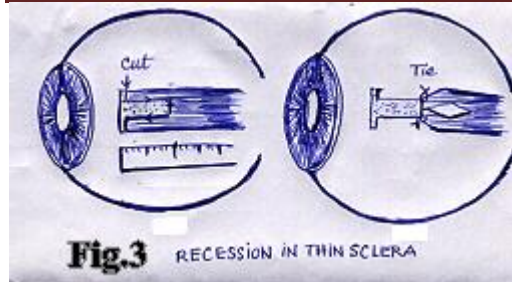


Figure 3: Techniques of surgery in muscle recession in case of thin sclera or children

The agonist muscle causing the deviation was firstly done before the antagonist's muscle. For example, in the esotropic cases, we started by recessing the medial rectus muscle and then resected the lateral rectus muscle. In the exotropic cases, the recession of the lateral rectus muscle was performed prior to the resection of the medial rectus muscle. [2, 3]

In the esotropic cases, because the medial rectus muscle is stronger than the lateral rectus muscle, in order to achieve undercorrection was used. In the exotropic cases, in order to achieve exact correction was performed [2, 3]. If the deviation was greater than 40° to 45° in both eyes, surgery was performed to accomplish both the correction of deviation and the width of the eyelid in both eyes (Miller S. Clinical Ophthalmology; Von Noorden G. *Main causes of failure in strabismus surgery*) [7, 9]

At the third postoperative month, in group III (with 30° to 50° deviation) of patients with exotropia, 8 were operated and 1 was re-operated; of patients with esotropia, 11 were operated and 1 was re-operated. Two of the re-operated patients in group III had an angle of deviation $> 40^\circ$. In the first operation, one eye (2 muscles) was operated on and the fellow eye had to be operated on in the second operation in order to correct hypocorrection. Two of the 70 patients (2.8%) required a second operation.

There were no cases of hypercorrection. The average postoperative follow-up was 6 months (50 patients, 71.42%). The longest postoperative follow-up period was 10 years (2 patients). There was no postoperative diplopia. (Table 8) (Duong Dieu, *Strabismus and surgical correction*) [10, 11].



Figure 4 Up= Preoperation: Reflex at the near limbus-deviation calculated by the Hirschberg method=

Esotropia 40 degrees- Operation: recession = resection =40/4=10mm. Down=Post operation: 12 months.
Central reflex = 0 degree



Figure 5 Up= Preoperation: Esotropia 30 degrees- Deviation calculated by the Hirschberg method. Operation: recession = resection=30/4= 7, 5 mm. Down=Post operation: 9 months.

4. Conclusion

Effect of surgery on the extraocular muscles depends on many factors, including the age at onset of the squint, the age of the patient at the time of surgery, the stability of the angle of squint, the size of the angle of squint, and the technique used. In most cases, surgical treatment should be considered only as a supplement to optical and orthoptic treatment. The diagnosis was based on the Hirschberg method and the simple formula, which was easy calculated in recessing-resecting muscles with patients' satisfying results as well as no complication post-surgery.

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