

# Intermittent exotropia: comparative surgical results of lateral recti-recession and monocular recess-resect

*Exotropia intermitente: comparação dos resultados cirúrgicos entre retrocesso dos retos laterais e retrocesso-ressecção monocular*

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## ABSTRACT

**Purpose:** To compare the results between recession of the lateral recti and monocular recess-resect procedure for the correction of the basic type of intermittent exotropia. **Methods:** 115 patients with intermittent exotropia were submitted to surgery. The patients were divided into 4 groups, according to the magnitude of preoperative deviation and the surgical procedure was subsequently performed. Well compensated orthophoria or exo-or esophoria were considered surgical success, with minimum of 1 year follow-up after the operation. **Results:** Success was obtained in 69% of the patients submitted to recession of the lateral recti, and in 77% submitted to monocular recess-resect. In the groups with deviations between 12 PD and 25 PD, surgical success was observed in 74% of the patients submitted to recession of the lateral recti and in 78% of the patients submitted to monocular recess-resect. ( $p=0.564$ ). In the group with deviations between 26 PD and 35 PD, surgical success was observed in 65% out of the patients submitted to recession of the lateral recti and in 75% of the patients submitted to monocular recess-resect. ( $p=0.266$ ). **Conclusion:** recession of lateral recti and monocular recess-resect were equally effective in correcting basic type intermittent exotropia according to its preoperative deviation in primary position.

**Keywords:** Exotropia/surgery; Oculomotor muscles; Ophthalmologic surgical procedures; Visual acuity; Comparative study

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## INTRODUCTION

Intermittent exotropia [X(T)] is a disorder of the oculomotor system, characterized by intermittent divergence deviation of the visual axes, with normal retinal correspondence and good surgical prognosis<sup>(1)</sup>.

Surgery gives satisfactory results, but quite frequently, more than one operation is needed to obtain stable orthophoria<sup>(1-4)</sup>. In spite of the disagreement regarding the best surgical approach, the two basic types are: recession of both lateral recti muscles and the monocular recess-resect procedure<sup>(1)</sup>.

The advantages of monocular surgery include low incidence of overcorrections and less risk of complications<sup>(5-6)</sup>, however, it may cause a larger number of undercorrections<sup>(7)</sup>. Some authors state that isolated recession of the lateral recti provides more stable surgical results<sup>(2,8)</sup>.

In different studies, the success rate using the monocular recess-resect procedure varies from 55% - 82%<sup>(7,9-10)</sup> and with recession of lateral recti it varies from 52% - 69%<sup>(4,7,11-14)</sup>.

In the literature, there are few comparative studies between the two

procedures. Valenzuela performed the monocular recess-resect procedure in 47 patients obtaining a 55% success rate and recession of the lateral recti in 78 patients, obtaining 54% success rate, after a 2 year follow up<sup>(8)</sup>. Orthotropia, exophoria  $\pm 10$  DP or esophoria  $\pm 5$  DP was considered to be a satisfactory result and significant differences were not observed between the two procedures.

One author obtained success in 10 (52%) out of the 19 patients who had recession of the lateral recti, and success in 14 (82%) out of the 17 patients submitted to the monocular recess-resect procedure<sup>(10)</sup>. Orthophoria  $\pm 10$  DP, basic deviations with 1 year post operative follow up was considered to be a satisfactory result. He concluded that monocular surgery gave better results in the basic type of X(T) in comparison with bilateral surgery, in spite of having obtained a non-significant difference between the results of the surgical procedures performed.

Other authors<sup>(10)</sup>, in 2001, compared 103 cases of X(T) of the basic type and pseudo-divergence excess, considering orthotropia  $\pm 10$  DP as surgical success, after a 1 year follow-up period<sup>(11)</sup>. They obtained success in 26 (56%) out of the 46 patients submitted to recession of the lateral recti, and in 34 (60%) out of the 57 patients submitted to monocular recess-resect procedure. There was no statistically significant difference between the surgical results in either of the procedures.

Recent systematic review lead to the conclusion that recession of the lateral recti produces better results for the correction of the divergence excess type of X(T), and there was no conclusion regarding which procedure was best for correction X(T) of the basic type<sup>(12)</sup>.

Due to the large variability of the results achieved with identical surgical procedures in patients with X(T), with the same angle of deviation, the aim of this study was to compare the surgical results between recession of the lateral recti (LR recession) and the monocular recess-resect procedure, for the correction of X(T) of the basic type.

## METHODS

Charts of 115 patients with X(T) operated on between 1991 and 2001 were retrospectively reviewed. Data of age, sex, refraction, duration and preoperative deviation and follow-up are presented in chart 1. The inclusion criteria were: basic type X(T) up to 35PD with normal stereopsis (Titmus or Lang test),

follow up  $\geq 1$  year, minimum age at surgery of 5 years, visual acuity  $\geq 20/25$ , no previous surgery, absence of vertical incomitance and no previous history of surgery and/or associated eye diseases. This study was approved by the Medical Ethics Committee of "Santa Casa of São Paulo" (number: 018/03).

Deviations were measured, for distance and nearness, with the alternate prism and cover test.

Surgical planning, according to the preoperative angle in primary position, for LR recession, ranged from 5 to 8 mm ( $6.2 \pm 0.9$ ) and for monocular operation, lateral rectus recession ranged from 4 to 8 mm ( $5.9 \pm 1.0$ ) and medial rectus resection from 4 to 6 mm ( $4.7 \pm 0.6$ ). Monocular recess-resect was performed in 66 (57.4%) patients and recession of lateral recti in 49 (42.6%)

The patients were divided into 4 groups:

- Group 1A (n=23): X(T) 12 PD - 25 PD, submitted to LR recession.
- Group 1B (n=46): X(T) 12 PD - 25 PD, submitted to monocular recess-resect.
- Group 2A (n=26): X(T) 26 PD - 35 PD, submitted to LR recession.
- Group 2B (n=20): X(T) 26 PD and 35 PD, submitted to monocular recess-resect.

Orthophoria or well compensated exo- or esophoria were considered surgical success.

The Mann-Whitney test was applied to compare the corrections obtained between the groups 1A and 1B, and between the groups 2A and 2B, and with the purpose of studying the association between surgical success, post-operative under-correction and overcorrection. The level of rejection of the null hypothesis was set at 0.05 or 5% ( $\alpha \leq 0.05$ ).

## RESULTS

Among the total patients included in this study, thirty four (69%) of the 49 patients submitted to LR recession, and 51 (77%) of the 66 patients submitted to monocular recess-resect obtained results considered to be success.

The results are shown in tables I, II and III.

## DISCUSSION

The surgical success obtained in this study in patients with X(T) submitted to LR recession was 69%, similar to other

**Chart 1. Number of patients, gender, age, refractometry, duration and magnitude of the pre-operative deviation and time of post-operative follow-up, according to the surgical planning of the patients with basic type of intermittent exotropia, submitted to recession of the lateral recti or monocular recess-resect**

	Recession of lateral recti (n=49)	Monocular recess-resect (n=66)
Gender F/M (%)	67/33	60/40
Age (years)	12.7 $\pm$ 8.9 (5 to 43)	13.7 $\pm$ 10.6 (5 to 55)
Refractometry (spherical equivalent)	+1.86 $\pm$ 0.81 (1 to 3)	+1.41 $\pm$ 0.66 (1 to 3)
Duration of deviation (years)	7.3 $\pm$ 7.1 (1 to 52)	9.9 $\pm$ 9.6 (1 to 33)
Deviation (PD)	23.84 $\pm$ 5.74 (18 to 35)	26.34 $\pm$ 5.23 (12 to 35)
Follow up (months)	15.1 $\pm$ 2.5 (12.2 to 18.1)	14.6 $\pm$ 2.0 (12.3 to 17.1)

studies<sup>(4,7-8,10,12-14)</sup>. Due to the tendency in X(T) for the eyes to progress towards divergence reoperations are not indicated within the first year<sup>(1,15)</sup>. In our study reoperation was indicated in 15 (31%) patients.

In the monocular recess-resect group, success was observed in 51 (77%) patients, similar to Kushner's series<sup>(9)</sup> (82%) but higher than Valenzuela's<sup>(7)</sup> (55%) and Lee, Lee's<sup>(10)</sup> (60%) series. In this group, 15 (23%) cases had indication for reoperation.

In agreement with another study<sup>(10)</sup>, our statistical analysis demonstrated that the differences were not significant between the two procedures, although other publications considered recess-resect a better procedure for basic X(T)<sup>(4,8,12,15-16)</sup>.

Some authors<sup>(7)</sup>, considering both monocular and bilateral surgery together, observed 42 (32%) undercorrections and 15 (11%) overcorrections in the 131 patients operated on, after 2 years of follow-up. Other authors<sup>(10)</sup>, however, after 1 year of follow-up, observed that of the 46 patients submitted to LR recession, 17 (37%) presented with undercorrection and 3 (6%) presented overcorrection, while of the 57 patients submitted to monocular recess-resect, 17 (30%) presented with undercorrection and 6 (10%) with overcorrection, with no statistically significant difference between these results.

In the present study, in the group of patients with deviations between 12 PD and 25 PD, submitted to LR recession, 5 (22%) undercorrections and 1 (4%) overcorrection were ob-

served, and in the group submitted to monocular recess-resect, there were 9 (20%) undercorrections and 1 (2%) overcorrection (Table I). For the deviations between 26 PD e 35 PD, no overcorrections were observed, but 9 (35%) undercorrections were observed in the group submitted to LR recession and 5 (25%) in the monocular recess-resect group (Table II). Fewer overcorrections than in the literature were found<sup>(7-8,14,16-17)</sup>. The occurrence of undercorrections, when groups 1A and 1B are compared (deviations between 12 PD and 25 PD) with 2A and 2B (deviations between 26 PD and 35 PD), was shown to be higher in this group, however, there are no comparative studies in the literature, relative to surgical success for different magnitudes of deviation.

Some authors<sup>(4,8,10-11,13-14)</sup> considered orthotropia  $\pm 10$  PD, as the criterion for assessing surgical success. However, this criterion may be considered valid only for surgeries with cosmetic purposes. The main purpose of surgery for the correction of X(T) is to obtain stable binocular vision. Taking this into consideration, well compensated orthophoria or exo-or esophoria were considered to be surgical success in this study, after minimum follow-up of 1 post-operative year.

Lateral incomitance was considered to be an important factor of persistent overcorrection<sup>(18)</sup>. Some authors disagree and believe that, although a certain esotropia to lateroversion may remain after surgery, it generally tends to reduce over the course of time. For this reason, the authors planned these surgeries, based on the magnitude of the deviation for distant fixation in primary position<sup>(3,16)</sup>.

**CONCLUSION**

It was concluded that in patients with the basic type of X(T), for both preoperative deviations between 12 PD and 25 PD and between 26 PD and 35 PD, submitted to LR recession or monocular recess-resect, the two procedures can be considered to be equally effective, there being no difference between the magnitude of the pre-operative exotropia and the correction obtained.

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**Table 1. Patients with the basic type of intermittent exotropia, with deviations between 12 PD and 25 PD, submitted to LR recession (Group 1A) and monocular recess-resect (Group 1B)**

	Group 1A	Group 1B	Total
Success	17 (74%)	36 (78%)	53
Undercorrection	5 (22%)	9 (20%)	14
Overcorrection	1 ( 4%)	1 ( 2%)	2
Total	23	46	69
Mann-Whitney test (success: group 1A x group 1B <b>p=0.564</b> )			

**Table 2. Patients with basic type of intermittent exotropia, with deviations between 26 PD and 35 PD, submitted to LR recession (Group 2A) and monocular recess-resect (Group 2B)**

	Group 2A	Group 2B	Total
Success	17 (65%)	15 (75%)	32
Undercorrection	9 (35%)	5 (25%)	14
Overcorrection	0	0	0
Total	26	20	46
Mann-Whitney test (success: group 2A x group 2B <b>p=0.266</b> )			

**Table 3. Patients with the basic type of intermittent exotropia, with deviations between 12 PD - 25 PD and 26 - 35 PD, submitted to LR recession surgery and monocular recess-resect according to absolute correction obtained between the pre- and post-operative deviations**

Deviation	LR recession			Monocular recess-resect		
	Pré-	Pós-	Correction	Pre-	Post-	Correction
12 - 25 PD	M=21.56 $\pm$ 2.64	M=8.20 $\pm$ 6.63	M=14.86 $\pm$ 8.72	M=20.93 $\pm$ 3.86	M=6.13 $\pm$ 6.2	M=16.45 $\pm$ 7.09
26 - 35 PD	M=30.57 $\pm$ 2.61	M=10.70 $\pm$ 7.70	M=21.11 $\pm$ 9.00	M=30.55 $\pm$ 3.03	M=9.00 $\pm$ 6.5	M=21.70 $\pm$ 9.23
Mann-Whitney Test (correction group 12-25 PD): LR recession x monocular recess-resect ( <b>p=0.372</b> ); (correction group 26-35 PD): LR recession x monocular recess-resect ( <b>p=0.713</b> ). LR Recession= bilateral lateral recti recession. M= mean $\pm$ standard deviation.						

## RESUMO

**Objetivo:** Comparar os resultados entre o retrocesso dos retos laterais e retrocesso-resseção monocular, para correção de exotropia intermitente do tipo básico. **Métodos:** Foram selecionados 115 prontuários de pacientes portadores de exotropia intermitente do tipo básico submetidos a cirurgia no período entre janeiro de 1991 e dezembro de 2001. Os planejamentos cirúrgicos seguiram orientação do setor de Motilidade Extrínseca Ocular da Clínica Oftalmológica da Santa Casa de São Paulo e basearam-se na magnitude do desvio na posição primária do olhar. Os pacientes foram divididos em 4 grupos, de acordo com a magnitude de desvio pré-operatório (desvios entre 12<sup>Δ</sup> e 25<sup>Δ</sup> ou entre 26<sup>Δ</sup> e 35<sup>Δ</sup>) e o procedimento cirúrgico realizado. Considerou-se como sucesso cirúrgico a ortoforia ou exo ou esoforia bem compensada, no mínimo 1 ano após a operação. **Resultados:** Dos 115 pacientes estudados, 34 (69%) dos 49 pacientes submetidos ao retrocesso dos retos laterais e 51 (77%), dos 66 pacientes submetidos ao retrocesso-resseção monocular, obtiveram sucesso cirúrgico. Em relação aos grupos com desvios entre 12<sup>Δ</sup> e 25<sup>Δ</sup>, observou-se sucesso em 17 (74%) dos 23 pacientes submetidos ao retrocesso dos retos laterais (1A) e em 36 (78%) dos 46 submetidos ao retrocesso-resseção monocular (1B) (p=0,564). No segundo grupo (desvios entre 26<sup>Δ</sup> e 35<sup>Δ</sup>), observou-se sucesso de 17 (65%) dos 26 pacientes submetidos ao retrocesso dos retos laterais (2A) e em 15 (75%) dos 20 submetidos ao retrocesso-resseção monocular (2B) (p=0,266). **Conclusão:** Concluiu-se que, nos pacientes com exotropia intermitente do tipo básico, tanto para desvios entre 12<sup>Δ</sup> e 25<sup>Δ</sup> quanto para desvios entre 26<sup>Δ</sup> e 35<sup>Δ</sup>, submetidos ao retrocesso dos retos laterais ou retrocesso-resseção monocular, ambos os procedimentos podem ser considerados igualmente efetivos, não havendo diferença significativa entre a magnitude da exotropia pré-operatória e a correção obtida.

**Descritores:** Exotropia/cirurgia; Músculos oculomotores; Procedimentos cirúrgicos oftalmológicos; Estudo comparativo

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