

Research Article

Comparative Study of the Faden Technique versus the Y split recession in management of Esotropia with Near- Distance disparity

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Abstract

Purpose: to compare the results of Faden Technique de Deker's (Modified Cuppers) Versus the Y split recession Technique of the medial rectus muscle in the management of Esotropia with Far Near disparity. **Patients and Methods:** 40 patients with Esotropia who had been diagnosed with convergence excess or near far disparity after wearing their full cycloplegia refraction for 3 months and still have Near- Distance Disparity Esotropia .The Patients were divided into two groups Group (A) underwent de Deker's Faden technique and Group (B) underwent Y split recession technique. **Results:** The age distribution for Group ranged from 2.3 to 8.5 year, with a mean of 3.8 year (SD 7±7) and for Group B ranged from 2.5 to 11 year, with a mean of 3.8 year (SD 7.3±7.2). (P=0.833). The Study Included 40 patients with a mean angle of Near Esotropia with glasses 49.3±11 in Group A and 49.7±11.8 in Group B. The mean angle of Distance Esotropia was 13.2±11 in Group A and 29.3±11 in Group B (P <0.001). Immediately postoperatively both groups showed comparable satisfactory results in correction of distance esotropia; Group A showed (90%) and Group (B) showed (85%) correction of the distance angle Esotropia (P = 0.819). And for the Near angle Esotropia Group A showed Satisfactory results in (75%) and Group (B) showed (70%) success rate; (P = 0.749). As for the unsatisfactory results, Group A showed one case residual ET at distance (5%), one consecutive XT (5%) at distance But for Near Angle Group A showed residual ET in 5 cases (25%) and Group B showed Residual ET in 6 cases (30%) **Conclusion:** both techniques Showed comparable satisfactory results in correction of ET with Near-Distance Disparity. with the Y Split recession slightly more effective 85% than Faden technique 80% on near Esotropia with long term satisfactory stable results from both techniques.

Keywords: Faden Technique, Esotropia, Near- Distance disparity

Introduction

The convergence excess Esotropia or the Near-Distance Esotropia is a condition characterized by an esotropia which is greater for near fixation than for distance fixation. It was first described by Donders.^[1]

The difference between near and distance fixation should be greater than 8 prism diopters (8 PD) and that this difference remains after full hypermetropic correction with single focus lenses. An acceptable definition of convergence excess esotropia would therefore be a convergent squint which is more than 8 PD greater for near fixation than distance fixation after full hypermetropic correction.^[2]

The Excessive convergence occurred with accommodative Esotropia is due to the high accommodative convergence/accommodation (AC/A) ratio. However, some patients with normal, and even low, AC/A ratio may have this type of esotropia.^[3]

The surgical Management of this type of Esotropia is a challenging problem and many surgical techniques had been described to correct the Near distant disparity; Augmented medial rectus recession^[4,8], slanted rectus recession^[5] and Combined Resection Recession Technique of the medial rectus.^[6]

The medial rectus faden or the retroequatorial myopexy with or without medial rectus recession had been described Also in surgical correction of Esotropia with Near-Distant Disparity or convergence excess.^[6,7,8,9]

The Y split recession technique of the medial rectus muscle also was found to decrease torque of muscle and decreasing Near distant disparity as the Cuppers Faden (Retro-equatorial Myopexy technique).^[10] and was especially described in surgical management of Partially accommodative Esotropia with convergence excess.^[11]

The aim of the study is to compare the efficacy of Cuppers Faden technique (Retroequatorial Myopexy) without medial rectus recession and the Y splitting of the medial rectus muscle in management of Accomodative Esotropia with convergence excess or Near Distant Disparity.

Patients and Methods

This Prospective Comparative Study included 40 patients during the period January 2015 to April 2016. The study was approved by the Institutional Review Board of General Organization of Teaching Hospitals and Institutes, Egypt. The guardians of all patients enrolled in this study signed a written consent prior to the beginning of the study.

All the 40 patients subjected to complete ophthalmic examination and they all had Partially Accommodative Esotropia with convergence excess and had worn Spectacles with full cycloplegic refraction for 3 months. All patients had Near Esotropia 10 PD or more greater than distance Esotropia. with all patients had High levels of AC/A ratio > 5 PD/D. Measurement of

angle were determined using Hirschberg, Krimsky, or prism alternate cover test for distance and near.

Exclusion criteria was Normal or low AC/A ratio (normal 2–5 Δ/D) or (low <2 Δ/D), oblique muscle dysfunction, neurologic problems, previous squint surgery, amblyopia at the time of surgery or ocular Structure.

Refraction measurements were performed with cyclopentolate 1% instilled 30–40 minutes before retinoscopy and verified by autorefractometer. and AC/A ratio was measured for all patients by gradient method, which is the difference between angle with and without +3 lenses divided by +3 while wearing full cycloplegic refraction and the 40 patients were randomly divided into 2 groups **Group A** (20 Patients) who underwent Faden technique on the medial rectus muscle (modified de decker Cuppers technique) and **Group B** (20 patients) who underwent Y splitting of both medial recti muscles.

All operations done under General Anesthesia

Surgical Procedures

Group A: de Decker's Faden technique

All patients underwent a retroequatorial strapping of both MR 14 mm posteriorly from their scleral insertion with a nonabsorbable 5/0 polyester suture with a spatulated needle (Ethicon). This was performed after careful dissection of connective tissues around the muscle body as far as the site of suturing the muscle. Two sutures were used at the muscle edge. The sutures were simply fixed to the sclera on both sides of the muscle fixing its margins in a triple loop fashion to prevent its sliding through the suture .

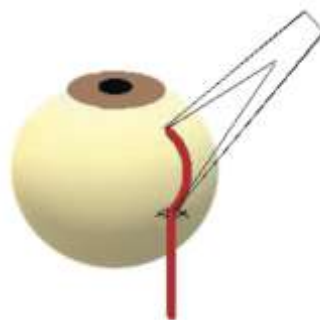


Figure 1 : A sketch of de Decker's Faden technique, side view.



Figure 2: A sketch of Y-split recession, side view. (a) The first orientation point (“A”) is given by the middle of the natural muscle insertion. The second orientation point (“B”) is located 6 mm straight behind A. With a compass, the distance rA is marked with color on the globe. The same procedure is repeated from B, with the distance rB . The intersection of the two marked lines indicates the new insertion points for the split-muscle halves. (b) The “control distance” (“C”) ensures correct placement of the new insertion points

Group A: Y splitting of Medial rectus muscle technique

All patients underwent split of MR muscles for a length of 15 mm and sutured the two split-halves to the sclera using non absorbable sutures. The two split-halves formed an angle of 62.8 ± 5.7 degrees. The muscle was, first, split for a distance of 15 mm, to detect the new accurate insertion for the split-muscle halves, and surgeon performed the following: the first point, labeled “A,” was located in the middle of the original insertion. The second point, labeled “B,” was located 6 mm straight behind A. With the compass centered at A, the distance “ rA ” was marked on the globe with methylene blue (Figure 1).^[10,12,13] Similarly with the compass centered at B, the distance “ rB ” was marked on the globe. The crossing points of the methylene blue lines locate the new insertion of the split-muscle halves. Both muscle halves were secured using 5/0 polyester suture with a spatulated needle (Ethicon®).

All patients were followed for one year postoperatively, follow up visits were conducted 1 week, 1 month, 3 months, 6 months and 1 year postoperative. Esotropia was measured for near and for far postoperative while wearing spectacle with full cycloplegic refraction.

Statistical analysis was done using mean analysis, correlation Mann–Whitney test, and Chi-square test. A value lower than 0.05 was considered statistically significant.

Results

The age distribution for Group A (de Decker’s Faden technique) ranged from 2.3 to 8.5 year, with a mean of 3.8 year (SD 7 ± 7) and for Group B (Y Split recession technique) ranged from 2.5 to 11 year, with a mean of 3.8 year (SD 7.3 ± 7.2). There was a statistically non significant difference in age distribution between both groups ($P=0.833$). This is shown by patients’ distribution by age (Figure 3). Table 1

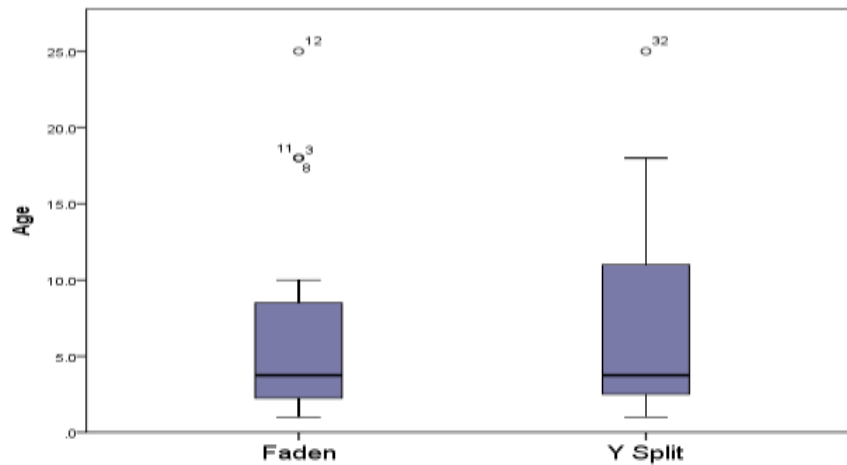


Figure 3: Patient’s distribution by age .

Table 1 : Patient’s distribution by age

	Faden		Y Split		p value
	Mean±SD	Median (IQR)	Mean±SD	Median (IQR)	
Age	7±7	3.8(2.3:8.5)	7.3±7.2	3.8(2.5:11)	0.833
Sex					
Male	11	55.00	10	50.00	0.752
Female	9	45.00	10	50.00	

The Study Included 40 patients with a mean angle of Near Esotropia with glasses 49.3±11 in Group A and 49.7±11.8 in Group B . The mean angle of Distance Esotropia was 13.2±11 in Group A and 29.3±11 in Group B (P <0.001) . Table 2

Table 2 : Preoperative angle of Esotropia for distance and near .

	Faden		Y Split		P value
	Mean± SD	Median (IQR)	Mean± SD	Median (IQR)	
Age	7±7	3.8(2.3:8.5)	7.3±7.2	3.8(2.5:11)	0.883
DSC	30.3±11.2	30(20:40)	30.3±11.2	30(20:40)	1
NSC	30.3±11.2	30(20:40)	13.2±11	10(4:25)	<0.001
DCC	13.2±11	10(4:25)	29.3±11	50(40:57.5)	<0.001
NCC	49.3±11	50(40:57.5)	49.7±11.8	34.5(19:39)	<0.001

The criteria of Satisfactory results were determined; the satisfactory surgical outcome within 10 degrees of orthorhopia and the unsatisfactory surgical outcome when postoperative residual ET or XT more than 10 PD occurred.

The postoperative follow up was one year duration .

Immediately postoperatively both groups showed comparable satisfactory results in correction of distance esotropia; Group A showed (90%) and Group (B) showed (85%) correction of the distance angle Esotropia this difference was not statistically significant ($P = 0.819$). And for the Near angle Esotropia Group A showed Satisfactory results in (75%) and Group (B) showed (70%) success rate; this difference was not statistically significant ($P = 0.749$). As for the unsatisfactory results, Group A showed one case residual ET at distance (5%), one consecutive XT (5%) at distance But for Near Angle Group A showed residual ET in 5 cases (25%) And Group B showed Residual ET in 6 cases (30%)

By the end of the follow up period , one case of Group A with residual ET at near improved to the satisfactory range, increasing the number of satisfactory cases to be (80%) of cases On the

contrary, 3 cases of residual ET at near in Group B improved to the satisfactory range increasing the number of satisfactory cases to be (85 %) of cases .Table 3

the incidence of consecutive XT at distance was slightly larger with the Y split technique 10 % than Faden technique 5 % .

Patients whose results were unsatisfactory and showed Residual Esotropia more than 15 PD underwent a second intervention by the end of the postoperative third month. Intervention was in the form of lateral rectus (LR) resection in Group B and adding Medial rectus recession in Group A . One patient of the consecutive XT was managed by downsizing hypermetropic glasses and the other two cases end up to Secondary intervention with lateral rectus muscle recession . All patients remained within the satisfactory range during the rest of follow-up period.

The mean surgical time for Group A (de Decker's Faden) was 40 minutes (SD 13.50) and for Group B Y-split recession technique was 50 minutes (SD 10.05) that means that Group B consuming more operative time by 20% than Group A. It should be noted that the technique of Y-split recession included more steps.

Table 3: Postoperative angle in both techniques for distance and near

	Faden		Y Split		P value
	N	%	N	%	
Previous Surgeries					
None	20	100.00	20	100.00	
Fixation Preference					
OD	7	35.00	7	35.00	1
OS	9	45.00	9	45.00	
alterante fixation	3	15.00	3	15.00	
Cross fixation	1	5.00	1	5.00	
Immediate Post oP DCC					
Orhto	18	90.00	17	85.00	0.819
Residual	1	5.00	1	5.00	
Consquitive	1	5.00	2	10.00	
Immediate Post oP NCC					
Orhto	15	75.00	14	70.00	0.749
Residual	5	25.00	6	30.00	
6 months post op DCC					
Orhto	18	90.00	17	85.00	0.819
Residual	1	5.00	1	5.00	
Consquitive	1	5.00	2	10.00	
6 Months post op NCC					
Orhto	15	75.00	15	75.00	0.749
Residual	5	25.00	5	25.00	
1 year post op DCC					
Orhto	18	90.00	17	85.00	0.819
Residual	1	5.00	1	5.00	
Consquitive	1	5.00	2	10.00	
1 yearpost op NCC					
Orhto	16	80.00	17	85.00	0.749
Residual	4	20.00	3	15.00	

Discussion

In Esotropia with convergence excess; Conventional Surgeries that are based on the level of deviation measured at distance fixation often result in unacceptably high degrees of undercorrection.^[14]

There is an old debate about The effectiveness of a posterior fixation suture with or without MR muscle recession in the treatment of convergence excess-type esotropia.^[15,16,17]

Bagolini et al., suggested that in patients with varying angles of esotropia, splitting of the medial rectus is an alternative treatment option to the posterior Faden fixation surgery propagated by Cüppers 18. Since then, other authors have supported the applicability of the Y-splitting procedure in the treatment of esotropia with a larger angle at near than at distance^[10,13,19]. While both surgical procedures reduce the lever arm of the muscle and thus the torque, in the “Fadenoperation,” the medial rectus muscle is fixed to the globe by a fixation suture placed behind the equator of the eye.

In Group A (faden technique). Our results were comparable to other studies done to evaluate the faden technique only in treatment of convergence excess Esotropia^[15,16,17] but Surprisingly the results were comparable also to the results of Akar et al., who combined the faden technique with the medial rectus recession in part of his cases as he ended up to 78.4% success rate and out results with fade technique only was 80%.^[7]

In our study we didn't find also decline of the effect of faden with time as mentioned in other studies.^[7,16]

Other studies compare also the effect of Faden technique and Y split recession technique of the medial rectus muscles in correction of Infantile Onset ET with variable angle as a technique to decrease

torque of the muscle and they found that both techniques are effective in 88% of cases.^[20] But in our study we compared both techniques in Partially accommodative ET with Near Distance disparity or the convergence excess we found satisfactory results in both techniques with the Y split technique slightly more effective in correction of near angle 85% than Faden technique 80% the incidence of consecutive XT at distance was slightly larger with the Y split technique 10% than Faden technique 5% .

Conclusion

Both techniques Showed comparable satisfactory results in correction of ET with Near-Distance Disparity. with the Y Split recession slightly more effective 85% than Faden technique 80% on near Esotropia with long term satisfactory stable results from both techniques.

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