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**RESEARCH ARTICLE**

# Comparison of Motor Outcome of Exotropia in Adult Patients: Adjustable Versus Non-Adjustable Suture Strabismus Surgery

***Manthan Trivedi[1], Meenakshi S[2]**

**1.** Senior Resident, Department of Ophthalmology, GMERS Medical College, Junagadh, Gujarat

**2.** Senior Consultant, Department of Paediatric Ophthalmology & Squint, Medical Research Foundation, Sankara Nethralaya, Chennai, Tamil Nadu

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***Corresponding Author***

**Manthan Trivedi**

## *Abstract*

165 Adult patients (more than 16 years of age) of various types of Exotropia were treated surgically by a single surgeon, were analyzed retrospectively in Indian Population. The patients were managed by single surgery to achieve the best possible surgical outcome. Surgery was divided here into adjustable suture and non – adjustable suture surgery for comparison. Surgical success was defined as postoperative horizontal deviation within ± 10 Prism Dioptre of Orthotropia and vertical deviation within ± 5 Prism Dioptre of Orthotropia at 1 month follow up. The surgical outcome in term of postoperative ocular drift among various types of Exotropia was compared according to adjustable and non adjustable suture surgery.



## INTRODUCTION

Motor alignment of eyes is the crucial thing to correct both cosmetically and symptomatically. The first description of adjustable suture strabismus surgery was published by Bielschowsky[1] in the German literature in 1907 which was introduced to afford the surgeon the opportunity to place the eye in a desired position within a few hours of surgery.[2-6] Jampolsky[5-9] described a two stage adjustable technique with surgery under general anaesthesia and later adjustment of the ocular position under local anaesthesia. It can reduce immediate over or under corrections after surgery and is recommended in cases for which unpredictable surgical results are expected.[6] It is a two stage procedure, however, which prolongs the surgical time and can be uncomfortable and even painful for patients.[7, 8, 10] From this study, we sought to determine whether different types of Exotropia were associated with different motor outcomes in Indian population. Surgical outcomes of adjustable suture surgery and benefits of it were compared with non – adjustable suture surgery. Sharma et al[12] evaluated the feasibility and stability of ocular alignment after single stage adjustable strabismus surgery (SSASS) performed under topical anaesthesia and concluded that topical anaesthesia was safe and had better outcomes than conventional recession-resection surgery for concomitant exodeviation. Szmyd et al[13] recommended retrobulbar anesthesia and Brown et al[14] recommend adjustment of sutures 6 or more hours after peribulbar or retrobulbar injection in all adult patients undergoing monocular strabismus surgery, but more patients had discomfort during muscle traction than with peribulbar anesthesia. Cogen et al[11] stated that intra-operative adjustment offers many practical benefits to both the surgeon and patient. Spierer[15] concluded that muscle adjustments performed 8 hours versus 24 hours after surgery did not produce significantly different results. Velez et al[16] found no difference between performing adjustment on the same day of surgery or the next day with respect to pain before, during, or after adjustment, to the ease of performing the adjustment, and to the final alignment. Yi et al[17] found that intra-operative adjustment was useful for comitant horizontal strabismus

surgery and provided the opportunity to avoid a large overcorrection. Debert et al[18] evaluated retrospectively the effect of intra-operative adjustable suture technique for horizontal strabismus and concluded that intra-operative adjustment was beneficial technique for those patients who do not co-operate in other adjustable techniques. Wygnanski – Jaffe et al[19] concluded that strabismic patients have tendency to drift toward their original deviation post-operatively, therefore, mild over correction in the early postoperative period will result in better long term results. Schwartz and Calhoun[20] described 22 patients who had two-muscle procedures for large angle exotropia. Overall surgical success rate to within 15 Prism Dioptre of orthotropia was 77%. Velez et al[21] reported a 40 % success rate (within 15 Prism Dioptre) for correction of large angle (50 Prism Dioptre or greater) exotropia in amblyopic eyes using a unilateral recess / resect procedure. Tripathi et al[10] reported that strabismus surgery with adjustable sutures had significant better final results and less reoperation rates than surgery without adjustable sutures in sensory exotropia.

## Material and Methods

Retrospective analysis of case records of 165 adult patients was done. Only those adult patients were included who were operated for exotropia after 16 years of age. Paralytic, restrictive, consecutive exotropia, previous history of strabismus surgery and less than a month follow up patients were excluded from the study. Data collection was started with demography details, history, chief complaints, birth, past, family and medical histories. On refraction, best corrected visual acuity, fixation, amblyopia, anisometropia were noted. Squint motor evaluation with prism cover test and modified Krimsky test was done. Ocular motility and oblique muscle overaction were noted. Squint sensory evaluation done for fusion and stereopsis. Patients were operated for medial rectus resection and lateral rectus recession, some had adjustable surgery, horizontal transposition and some were combined with oblique muscle surgery. Adjustment was done within 2 to 6 hours after the surgery for exotropia in adult patients under topical anaesthesia. Postoperatively only motor criterion was used to define surgical success. Horizontal deviation within ± 10 Prism Dioptre of orthotropia and vertical deviation within ± 5 Prism Dioptre of orthotropia was considered as surgical success.

## Results

Total 42 patients underwent adjustable suture surgery and were compared with the rest of 123 patients who underwent non-adjustable surgery.

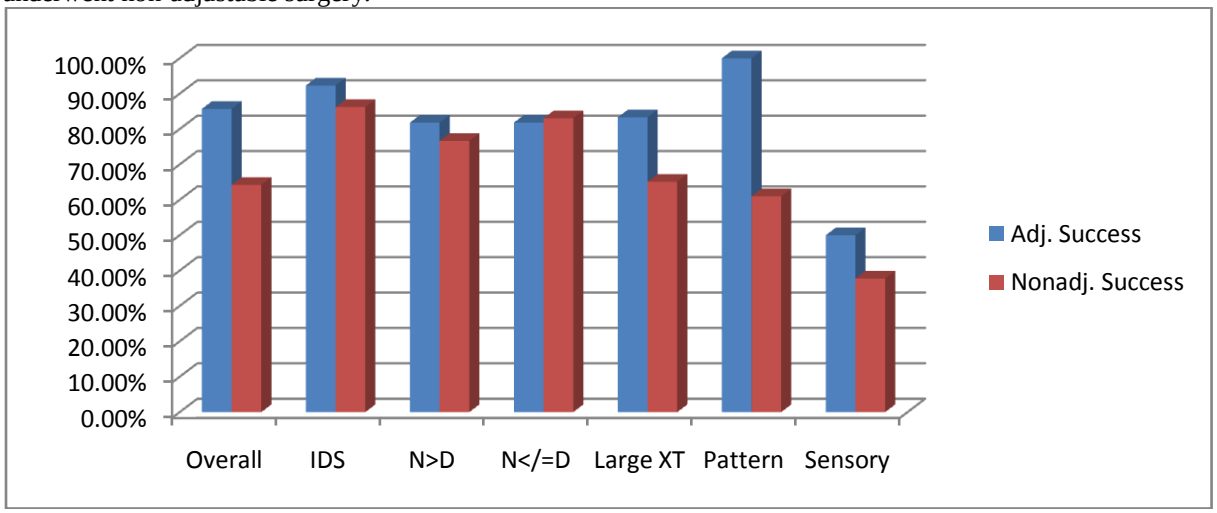


**Fig. 1: Surgical success in Adjustable and Non – Adjustable surgery in various exotropia**

(IDS – Intermittent Divergent Squint, N –Near, D –Distant, > - more than, < - less than, = - equal to, XT –Exotropia)

**Table – 1: Motor success comparison of adjustable versus non – adjustable suture surgery**

| **Parameters** | | **Adjustable** | | **Non – adjustable** | |
|---|---|---|---|---|---|
| No. | Exotropia | Success (n) | % | Success (n) | % |
| 1 | Overall | 36(42) | 85.71% | 79(123) | 64.23% |
| 2 | Intermittent Exotropia | 12(13) | 92.31% | 25(29) | 86.21% |
| 3 | Greater deviation at Near | 9(11) | 81.82% | 23(30) | 76.67% |
| 4 | Greater/Equal deviation at Distance | 18(22) | 81.82% | 49(59) | 83.05% |
| 5 | Large Angle Exotropia (> 50 Prism Dioptre) | 15(18) | 83.33% | 28(43) | 65.12% |

| | | | | | |
|---|---|---|---|---|---|
| 6 | Small Exotropia (< 50 Prism Dioptre) | 21(24) | 87.50% | 51(80) | 63.75% |
| 7 | Pattern Exotropia | 18(18) | 100% | 25(41) | 60.98% |
| 8 | Sensory Exotropia | 5(10) | 50.00% | 17(45) | 37.78% |
| 9 | Non – Sensory Exotropia | 31(37) | 83.78% | 62(78) | 79.49% |
| 10 | Exotropia with Lateral Incomitance | 15(17) | 88.24% | 16(27) | 59.26% |

Adjustable suture surgery was found to have more motor alignment success rate when compared with non – adjustable surgery. (p=0.009) Adjustable surgery had best success rates when pattern exotropia was concerned. (p=0.002) Adjustable suture surgery had slightly higher motor alignment success rate in intermittent exotropia compared to non – adjustable surgery, but that difference was statistically not significant. (p=0.307) Adjustable suture surgery in sensory exotropia when compared to non – adjustable suture surgery had slightly more motor alignment success rates, but the difference was statistically not significant. (p=0.475) When large angle exotropia is concerned, adjustable surgery had more motor alignment success rate compared to non – adjustable surgery, but the difference was statistically not significant. (p=0.155) Adjustable suture surgery had more success rate than non – adjustable suture surgery when exotropia with lateral gaze incomitance was concerned. (p=0.040).

## Discussion

Total 42 patients underwent adjustable suture surgery and it was found to have more motor alignment success rate when compared with non – adjustable surgery. (p=0.009) For large angle exotropia (more than 50 Prism Dioptre), 18 patients had adjustable suture surgery and rest 43 patients had non – adjustable suture surgery. Overall 43 (70.49%) patients out of 61 had successful motor alignment and 15 (83.33%) out of 18 patients had successful motor alignment with adjustable suture surgery. Currie et al[22] found successful motor alignment to be 20 (77%) out of 26 patients. Berland et al[23] reported on a series of 30 patients with large angle exotropia (35 Prism Dioptre or more) where they noted a motor alignment success rate of 43%. Sharma et al[12] concluded that single stage adjustable suture surgery, performed under topical anaesthesia, is safe and has better outcomes than conventional recession-resection surgery for concomitant exodeviation. Velez et al[16, 24] found no difference between performing adjustment on the same day of surgery or the next day with respect to pain before, during, or after adjustment, to the ease of performing the adjustment, and to the final alignment. In this study, adjustable suture surgery in sensory exotropia when compared to non – adjustable surgery had almost similar motor alignment success rates. (p=0.5)

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