# Superior Rectus Transposition and Medial Rectus Recession for Duane Syndrome and Sixth Nerve Palsy

Mehendale et al. Arch Ophth Feb 2012

# Background

- Multiple techniques described for improving eye position in Duane's and 6th nerve palsy --> horizontal muscle procedures don't address the abduction deficit
- E.g. Vertical muscle transposition (partial and full)
- Concerns are vertical deviations and anterior segment ischaemia

# Methods

- Retrospective review of patients undergoing superior rectus transposition
- Children's Hospital Boston
- Between 2006-2010
- Followed up for ≥ 6 weeks
- Exclusion
  - < 1 year old
  - Previous transposition surgery

# Surgical Technique

1. medial rectus recession with adjustable "short tag noose"
2. Superotemporal incision, superior rectus isolated
3. Muscle cleared of surrounding attachments including levator
4. Muscle secured with double armed 6.0 polyglactin suture and detached

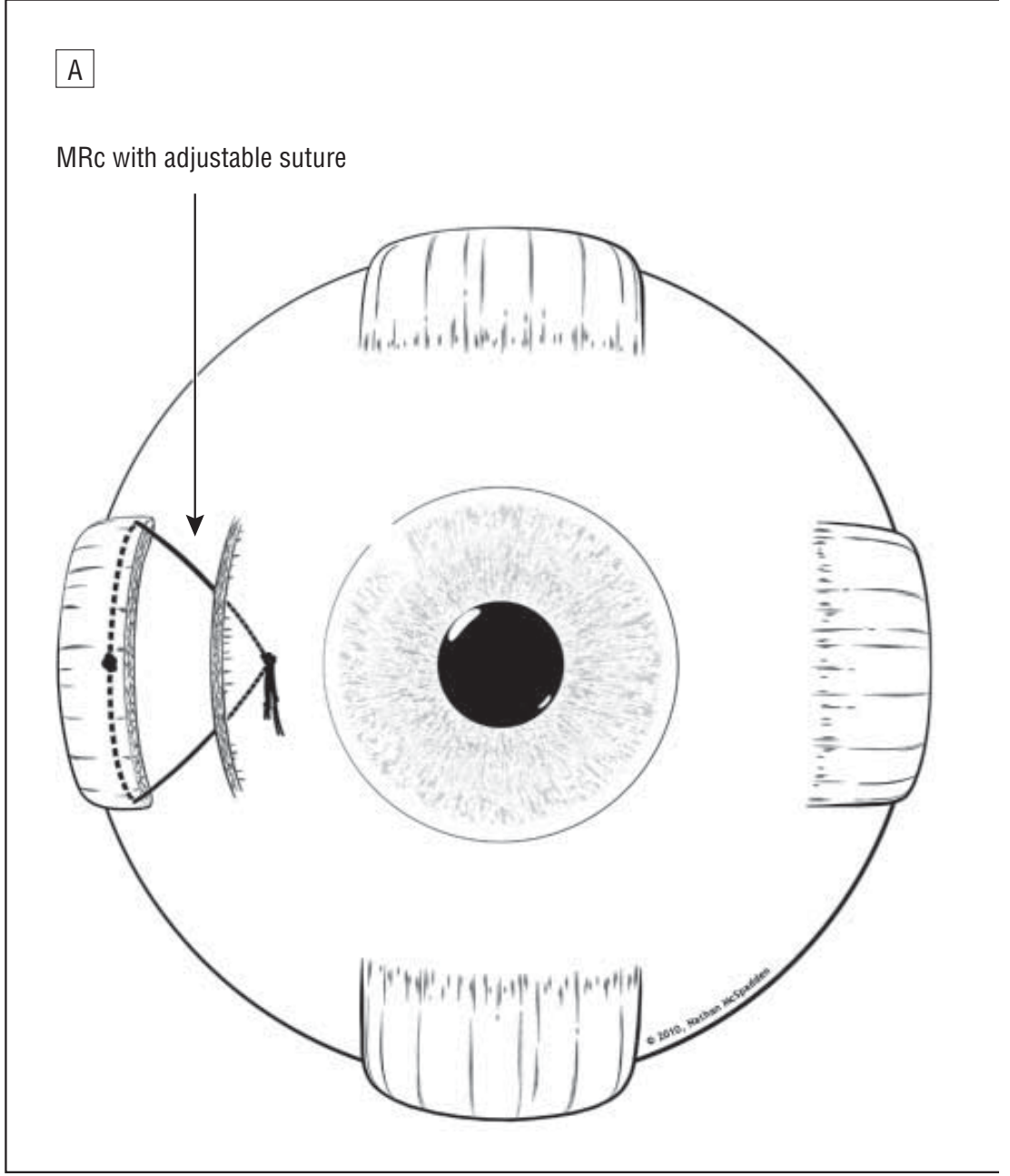
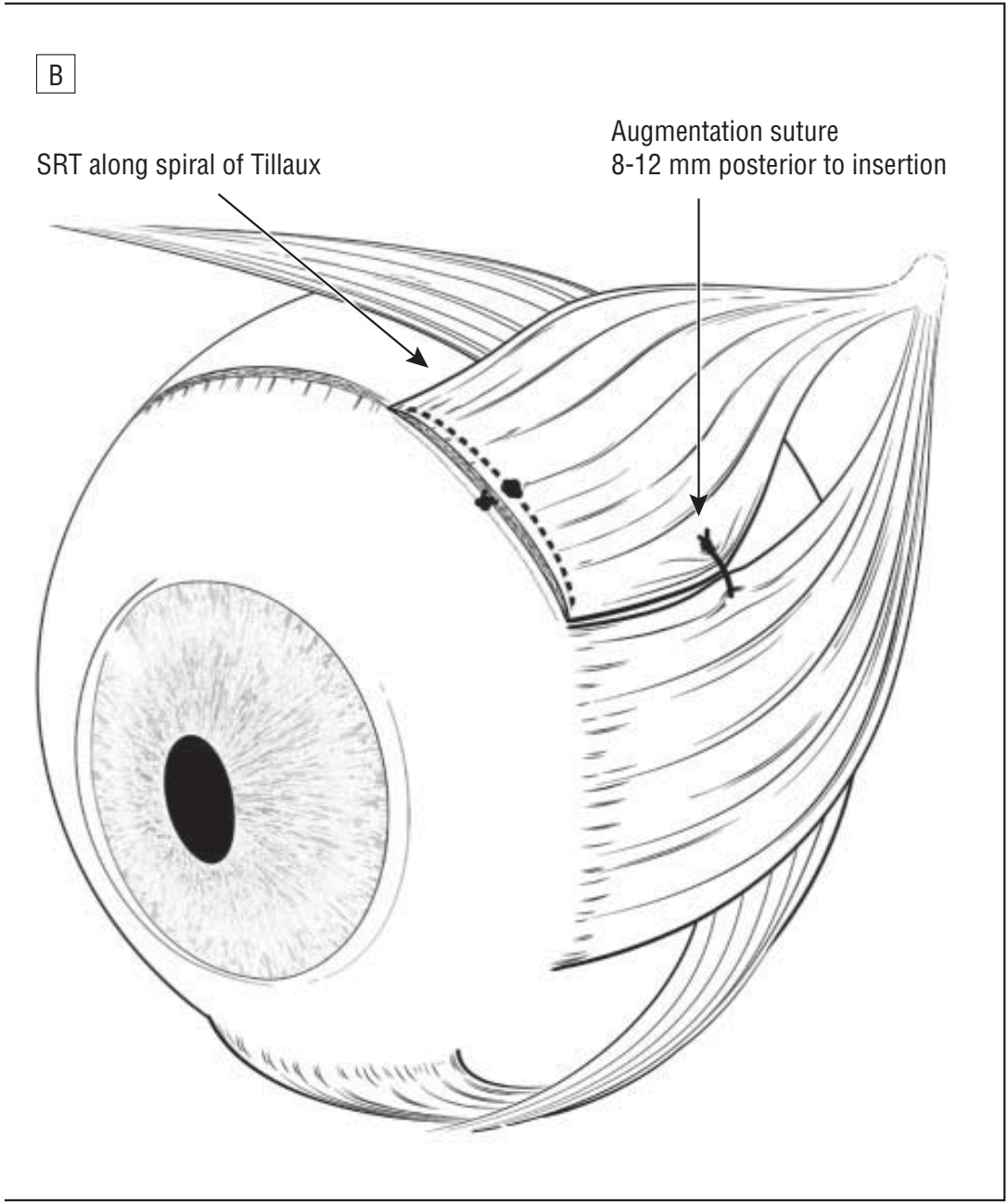



**Figure 1.** Diagram representation of the superior rectus transposition (SRT) plus sutures. B, The SRT technique with augmentation suture. The amount of muscle i one-quarter of the muscle width after tying the knot.

5. Temporal pole of muscle reattached adjacent to the superior pole of lateral rectus
6. Nasal pole reattached to the superior pole of the lateral rectus insertion following the spiral of Tillax
7. Most cases also used an augmentation suture – double armed polyester suture placed through the lateral ¼ of SR, and superior ¼ of medial rectus; 8-12mm posterior to muscle insertion




ıedial rectus recession (MRc) procedure. A, The MRc procedure with adjustable
cluded in the augmentation suture appears in the rendering to be less than

# Results

- Good stuff
- Bad stuff

**Table 1. Patient Demographics and Distribution**

| | Patient Groups | |
|---|---|---|
| | Duane Syndrome (n = 10) | Sixth Nerve Palsy (n = 7) |
| Age range, mo | 1 to 33 | 6 to 60 |
| Sex, No. of patients | | |
| Male | 6 | 1 |
| Female | 4 | 6 |
| Follow-up, mo | 2 to 32 | 2 to 16 |
| Abduction deficit, U | –3 to –5 | –4 to –5 |
| Head turn >20°, No. (%)[a] | 10/10 (100) | 7/7 (100) |

Change in alignment in primary position (from 44PD to 9PD)

Change in head turn (Mean 21' improvement)

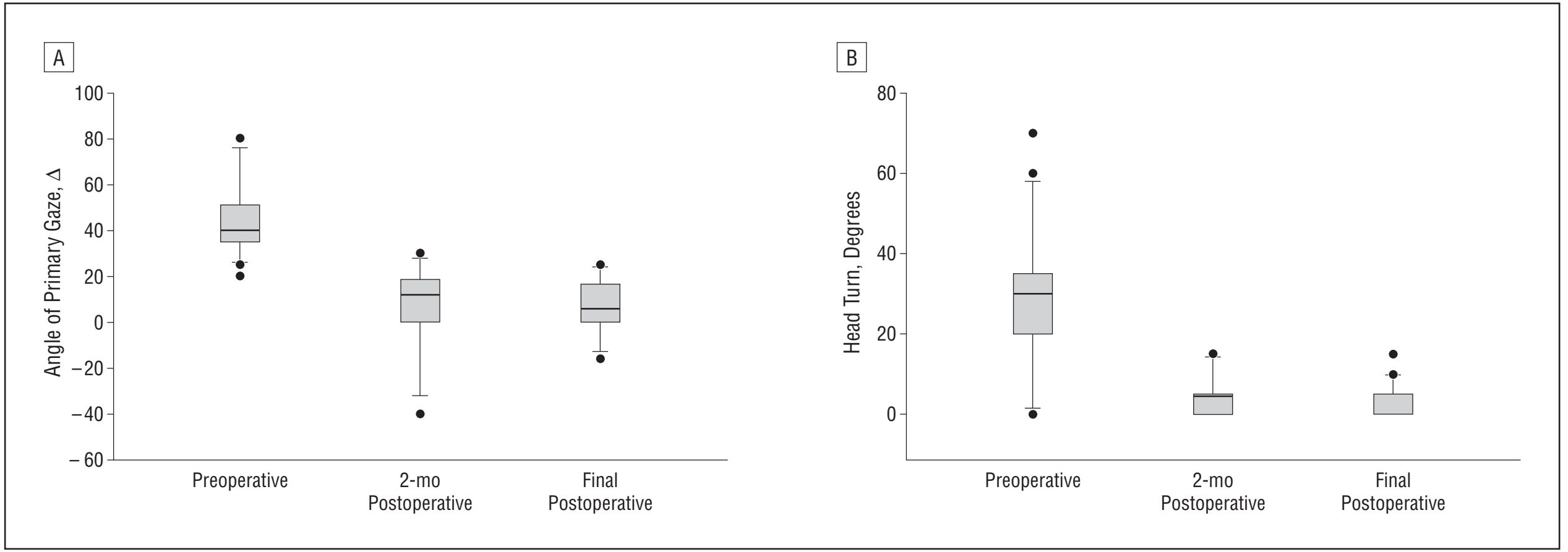



**Figure 2.** Surgical results. A, Change in alignment in primary gaze position (n=17). Positive values represent esotropia. B, Change in head turn (n=16). Head turn was not assessed in 1 patient who did not demonstrate fusion. Final postoperative visit represents a mean follow-up of 8 (range, 2-32) months. The bottom and top of each box represent the 25th and 75th percentiles (the lower and upper quartiles, respectively); the band near the middle of the box is the 50th percentile (the median). The ends of the whiskers represent the minimum and maximum of all the data. Any data not included within the whisker are plotted as outliers (dots). For preoperative vs final findings, $P<.001$ (paired *t* test). Δ indicates prism diopters.

Improvement in abduction
(mean 1.6 unit)

Reduction in adduction
(mean 0.6 unit)

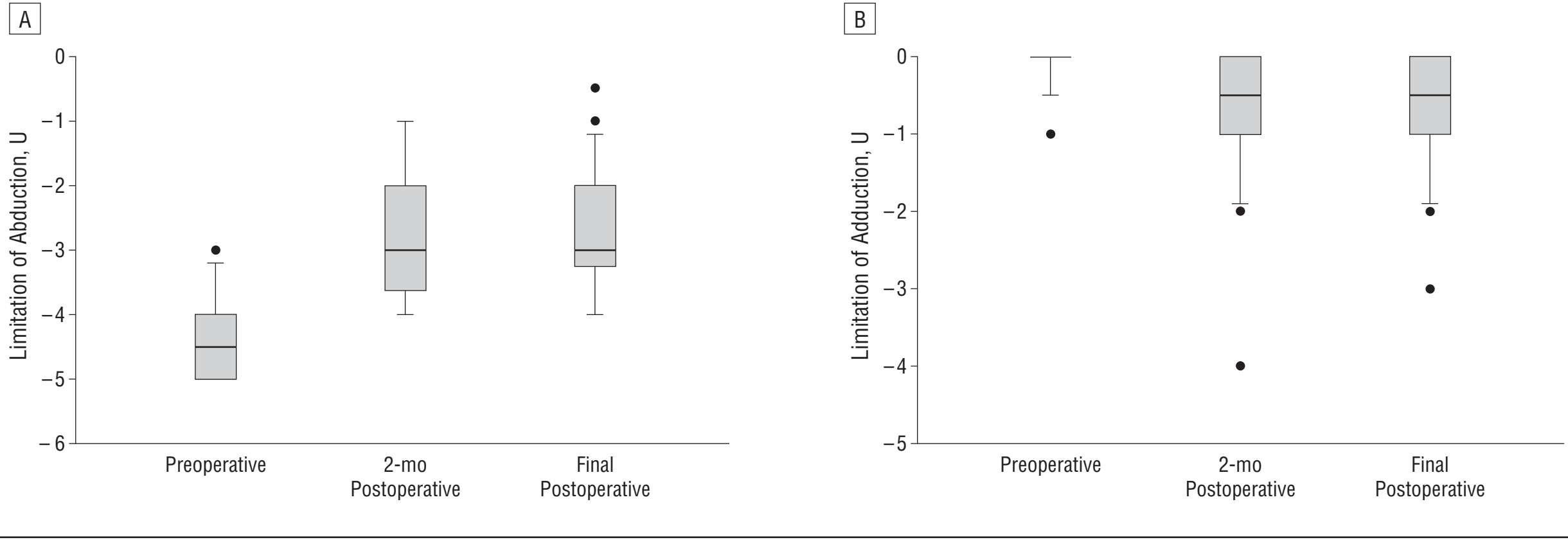



**Figure 3.** Ductions before and after surgery (n=17). A, Abduction limitation ($P<.001$ for preoperative vs final values [paired *t* test]). B, Adduction limitation ($P=.01$ for preoperative vs final values [paired *t* test]). Final postoperative visit represents a mean follow-up of 8 (range, 2-32) months. To prevent the measurements of 1 patient with overcorrection from confounding postoperative averages, we reanalyzed the values after excluding that patient and found no substantive change in the calculated means or *P* values. The bottom and top of each box represent the 25th and 75th percentiles (the lower and upper quartiles, respectively); the band near the middle of the box is the 50th percentile (the median). The ends of the whiskers represent the minimum and maximum of all the data. Any data not included within the whisker are plotted as outliers (dots).

# Improvement in stereopsis
# p=0.03

| | Duane | 6th nerve palsy |
|---|---|---|
| Stereopsis, No. (%)[b] | | |
| Preoperative | 4/9 (44) | 1/6 (17) |
| Postoperative | 8/9 (89) | 5/6 (83) |

# Bad stuff

No torsional diplopia induced except 1case

- Unusual - Scleral fixation of augmentation suture
- Suture removed due to distressing torsional diplopia

# New-onset vertical deviation

- 2 out of 17
- Mean, SD = 10 PD, 2.8 PD
- Both had chronic 6$^{th}$
- No new-onset symptomatic hypotropia

# Repeat procedure - 3 cases

- 2 undercorrections
  - 4-year-old boy with a residual esotropia of 20 who responded to full hyperopic correction and a 7.5-mm recession of the contralateral medial rectus muscle.
  - 16-year-old boy with a 6$^{th}$ secondary to irradiation for pilocytic astrocytoma who developed a recurrence (with a 14 hypotropia).
    - Retreated with an augmented inferior rectus transposition which reduced the head turn and improved the esotropia from 25 to 10 but with a persistent hypotropia
- 1 overcorrection
  - 1 year old girl with Duane's who developed a consecutive XT and adduction limitation
  - treated with reversal of the transposition, recession of the lat- eral rectus muscle, and advancement of the medial rectus muscle

# Limitations

- Retrospective
- Limited follow-up [<6 months for 8 patients (47%)]
- No comparison

# Conclusion

- Authors recommend SRT + MRc for patients with profound abduction limitation in which there is no reasonable chance that a horizontal rectus muscle procedure alone will be satisfactory

- Results - markedly reduced esotropia in the primary position, increased abduction, and improved head position with minimal effect on adduction

- Theoretically less risk of anterior segment ischaemia