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*intermittent
exotropia:
Recession-resection*

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Rational



Intermittent exotropia X(T) is a disorder of the **oculomotor system**, characterized by intermittent divergence deviation of the visual axes (1).

Intermittent exotropia (X(T)) is one of the most common form of strabismus with surgery being the mainstay of treatment.

1. Prieto-Diaz J, Souza-Dias C. Estrabismo. 4ª ed. São Paulo: Roca; 2002

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• **Etiology**

- **Innervational factors:** **Duane** innervational imbalance between **active convergence** and divergence mechanisms.
- **Mechanical factors:** **Bielschowsky** as the orientation, shape, and size of orbits and globes, and functioning of the eye muscles, length, elasticity, the anatomical and structural arrangement of fascias and ligaments of the orbits.
- **Fusion faculty:** An **inadequate fusion** faculty of eyes lead to an unstable state of equilibrium.
- **AC/A ratio:** **Cooper and Medow, Kushner** later found that close to 60% of patients with **true divergence exotropias** had a **high AC/A** ratio, and 40% had a normal AC/A ratio.
- **Refractive errors:** myopes. —→ **Hypoaccomodation** for near
high hyperopes. —→ clear vision is unattainable even with maximum accommodative effort.
an **underactive convergence** mechanism that causes a **low AC/A** ratio.
Anisomyopia and anisometropia —→ unclear retinal images, which function as an **obstacle** to binocular **fusion** and thus facilitate suppression.
- **Hemiretinal suppression:** Knapp and Jampolsky postulated bilateral, bitemporal hemiretinal suppression

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The different surgical approaches include:

- Unilateral lateral rectus recession with medial rectus resection for basic and pseudodivergence excess type.
- Bilateral lateral rectus muscle recession for divergence excess.
- Bimedial resection for convergence insufficiency types of X(T).

The study by Kushner showed that BLR might be equally effective in the pseudo-divergence excess type and the basic type of exotropia.



Causes of disagreement

- There is no consensus over the relative efficacy of the two procedures in terms of postoperative alignment, residual or recurrent exotropia and consecutive esotropia with widely variable results, which can be attributed to poor understanding of the natural course of the disease.
- It is difficult to compare between different studies directly due to significant differences in the study populations, variable surgical doses used, different definitions of successful outcomes and varied duration of follow-up.



When to add resection?



Basic Type

Two randomised trials with one year follow-up have stated that R&R results in **better alignment and lower chances of recurrence** of exotropia compared with BLRc, especially in the presence of ocular dominance

A recent meta-analysis concluded that R&R resulted in better alignment, **lower recurrence and similar overcorrection as that of BLRc**, possibly be due to the leash effect of the resected medial rectus. The follow-up period in most studies was short.

However, R&R resulted in a **higher incidence of overcorrection**, which may induce diplopia or suppression and amblyopia.

R&R shows a greater exotropic drift after one year, with **no significant difference between the two procedures over long term**.





Overcorrection

Undercorrection



**Lateral incomitance
on lt gaze**

Pros and Cons

- Unilateral R&R is an asymmetrical procedure → lateral incomitance which is 10 times more compared with the symmetrical surgery in preoperative comitant strabismus.
- In a study by Graeber *et al*, 90% of patients having postoperative lateral incomitance had undergone asymmetrical surgery.
- While another study in children undergoing asymmetrical surgery, reported that 30% of cases with postoperative induced incomitance, had diplopia in side gazes, while 30% had concerns regarding their cosmetic appearance in side gazes even after 6 months.
- On the contrary, unilateral surgery reduced the preoperative lateral incomitance in half of the cases. However, the evidence to show that unilateral surgery can induce lateral incomitance is scarce with only a couple of studies reporting the phenomenon, and more evidence is needed .



Divergence excess X(T)

- In cases of large angle IXT especially with strong preference to the dominant eye or amblyopia or preoperative lateral incomitance.



Large angle X(T) with Lt lateral incomitance



Improvement of Lt incomitance post operative



Divergence excess but LT amblyopic eye large angle at distance



Disadvantage

Large angle X(T) Alternating



Post operative after 1 month of BLR combined with Rt MR resection (Rt narrow palpebral fissure)



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Divergence excess but large angle with Lt eye non dominant



Lt lateral incomitance after 3 month



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Convergence insufficiency Type

- **WHAT IS CONVERGENCE INSUFFICIENCY?**

- Convergence insufficiency is when it is not possible to keep the two eyes working together. Typically, one eye will turn outward ([intermittent exotropia](#)) when focusing on a word or object at near



- **WHAT ARE THE SYMPTOMS OF CONVERGENCE INSUFFICIENCY?**

- Symptoms of convergence insufficiency include diplopia (double vision), headaches and eye strain while reading. Symptoms can vary with convergence insufficiency and not all symptoms are present in every patient.



Unable to maintain convergence at near and sense of asthenopia in near work



• CAN GLASSES OR PATCHING BE USED TO TREAT CONVERGENCE INSUFFICIENCY?

- One form of treatment for convergence insufficiency is **base-out prism** glasses which force the eyes to work harder to converge (pull inward). Exercising prism
- **Base-in prism** glasses (prisms in the opposite direction to what was just described) can be used to help keep the eyes in good position for reading. However, use of base-in prism glasses can make it less likely that the patient will get stronger convergence and less symptoms when not wearing glasses.
- **Patching is not a good** option to strengthen convergence because wearing a patch will have the patient use one eye at a time and not use the two eyes together.



Conservative treatment



Surgical treatment

- Bimedial resection
- Recent studies advocate slanted lateral rectus recession

High recurrence rate for both and vertical offset in slanted recession



Near angle of X(T) > Distant angle



1month post operative



6 month post operative



Recurrence after 2 previous surgeries for convergence insufficiency X(T)



Take home message

Adding resection of medial rectus muscle is done if

- There is large angle X(T) and we aim for within 10 PD consecutive ET to prevent recurrence.
- Strong dominance to one eye in manifest episodes, add resection to the non dominant to prevent recurrence.
- Adding MR resection in the amblyopic eye with X(T) to avoid recurrence.
- If there is incomitance (leash) at one side → it improves post operative.
- Surgery of choice in convergence insufficiency X(T) → tackling the pathology (weak convergence at near).



Take home message

Disadvantage
of adding MR
resection

Lateral
incomitance

Narrowing of
palpebral
fissure

Overcorrection
(leash effect)

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THANK YOU

See you next year

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