

Université   
de Montréal

  
CHUM



# La chirurgie de strabisme pour les paralysies des nerfs craniens VI et IV

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# **Sixth nerve palsy**

## **Objectives**

- **Primary and Secondary deviation (Fixation duress (sous contrainte), Hering's law)**
- **Saccades, Muscle Force Generation Test (MFGT), Forced Duction Test (FDT).**
- **Surgery: partial vs complete palsy; Supramax. Recess/Resect vs Transposition; Botox; Anterior segment ischemia (ASI)**

# Isolated VIth CN palsy

- **Diplopia and compensatory head posture**
- **Head turn to side of lesion**
- **Incomitant ET:**
  - **Distance > Near**
  - **Gaze to side of lesion > Gaze away from lesion**
- **Slow saccades**
- **Contracture of antagonist MR**

## **Etiology: VIth Cranial Nerve Palsy**

- **Congenital**
- **Microvascular, “viral”**
- **Migrainous**
- **Pseudotumor, Hydrocephalus**
- **Demyelinating**
- **Neoplastic**
- **Traumatic**
- **Thromboembolic**

# Moebius syndrome



Facial diplegia  
Bilateral VIth nerve palsy



# Duane Syndrome - Bilateral

**Chin-up**



**- 3.5**



**ET 35**



**-4**





**52 yr old man**  
**Horizontal diplopia x 6 wks**  
**Diabetes x 29 years**

**“Microvascular” VIth N palsy**

**Jan 2009**



**Apr 2009**



**36 yr old woman with  
persistent headaches  
Recent onset of diplopia  
MRI normal**



**? Migraine-related VIth nerve palsy**



# Tumour - Brainstem



**Bilateral VIth nerve palsy**

# Examination (VIth palsy)

- Fixation “duress” (sous contrainte)
- Hering & Sherrington
- Primary and secondary deviation
- Head position
- Ductions/Versions/Saccades
- PCT
- MFGT & FDT

## Primary Deviation



## Secondary Deviation



**(L) VIth Nerve Palsy: ABD OS - 4 1/2**



# VIDEO



# **Rx strategies: Vith CN palsy**

- **Waiting period: Botox, ipsilateral MR**
- **Partial palsy: Ipsilateral Supramaximal MR recess, LR resect; Contralateral MR Recess**
- **Complete palsy: SR/IR transposition + Botox ipsilateral MR; +/- Ipsilateral MR recess later**

# Botox injection RMR

## Pre-Rx



## Post-Rx



# Partial paralysis

- **Large medial rectus recess 8 - 12mm**
- **Large lateral rectus resect 7 - 12mm**
- **? Recess contralateral medial rectus**

**32 yr old women  
Post-traumatic  
VIth nerve palsy**



**RLR Resect 9, RMR Recess 8, LMR Recess 5**



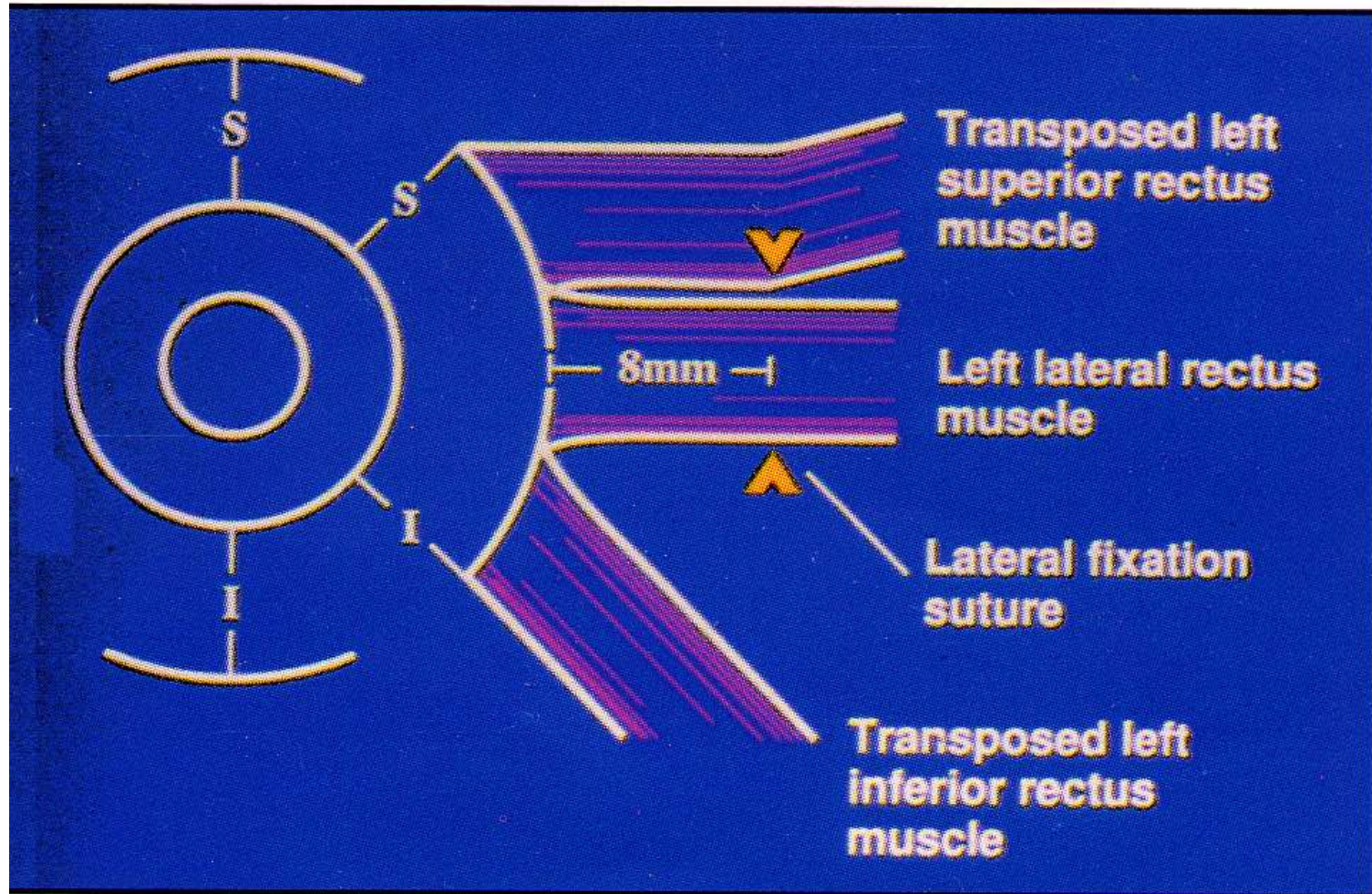


# Complete palsy

- **SR/IR transposition + Botox ipsilateral MR**
- **+/- Ipsilateral MR recess later**

# IR-SR Temporal Transposition

Foster- JAAPOS 1997;1:20-30



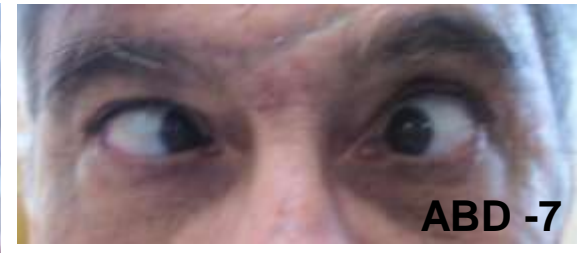


**68 yr old man  
MVA – Head trauma  
Horizontal diplopia**



**VIDEO**

**Head turn (R) +++**



## PRE-OP



## 1 WEEK POST-OP



**RLR resect 9  
RMR recess 8**

**LSR/LIR temp transp  
LMR Botox**

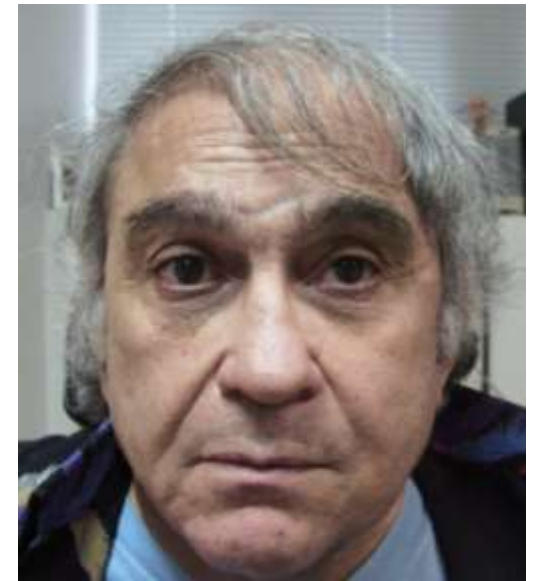
## 3 MONTHS POST-OP



# PRE-OP



# POST-OP



**Head straight**



**39 yr old woman  
MVA – Head trauma  
Horizontal diplopia**



**ABD -5**



**ABD -6**

**Post-op:**

**1) Horizontal transp of  
Vertical recti + Botox  
Medial recti**

**2) Bimedial recession**





# **Sixth nerve palsy**

## **Summary**

- **Primary and Secondary deviation (Fixation duress, Hering's law)**
- **Saccades, Muscle Force Generation Test (MFGT), Forced Duction Test (FDT).**
- **Surgery: partial vs complete palsy; Supramax. Recess/Resect vs Transposition; Botox; Anterior segment ischemia (ASI)**

# **Fourth nerve palsy**

## **Objectives**

- **Clinical concepts: spread of comitance, 3-step test, occult + manifest bilateral SOP, excyclotorsion**
- **Differential: DVD, IOP palsy, Skew, Partial IIIrd, Brown syndrome**
- **Treatment modalities: IO weakening, SO tuck, Harada-Ito, and adjustable recession**



**1<sup>st</sup> Visit:  
Vertical diplopia**



**LHT 10**

**70 yr old diabetic man**



**2 months later:  
Diplopia resolved**



**LHT 0**

# Spread of Comitance

4)



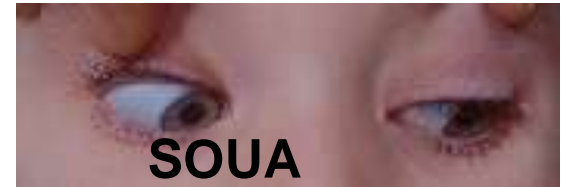
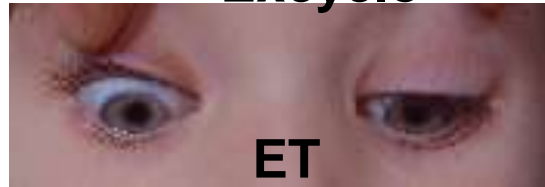
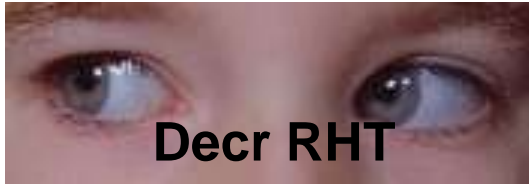
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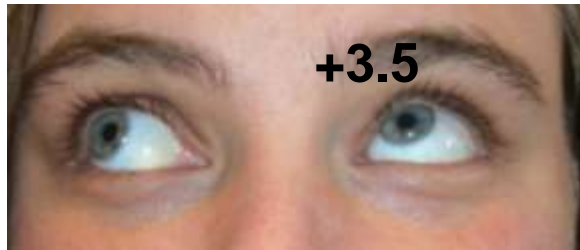
3)

1)

# Typical SOP – 3-step test



# Typical surgical approach Inferior oblique weakening

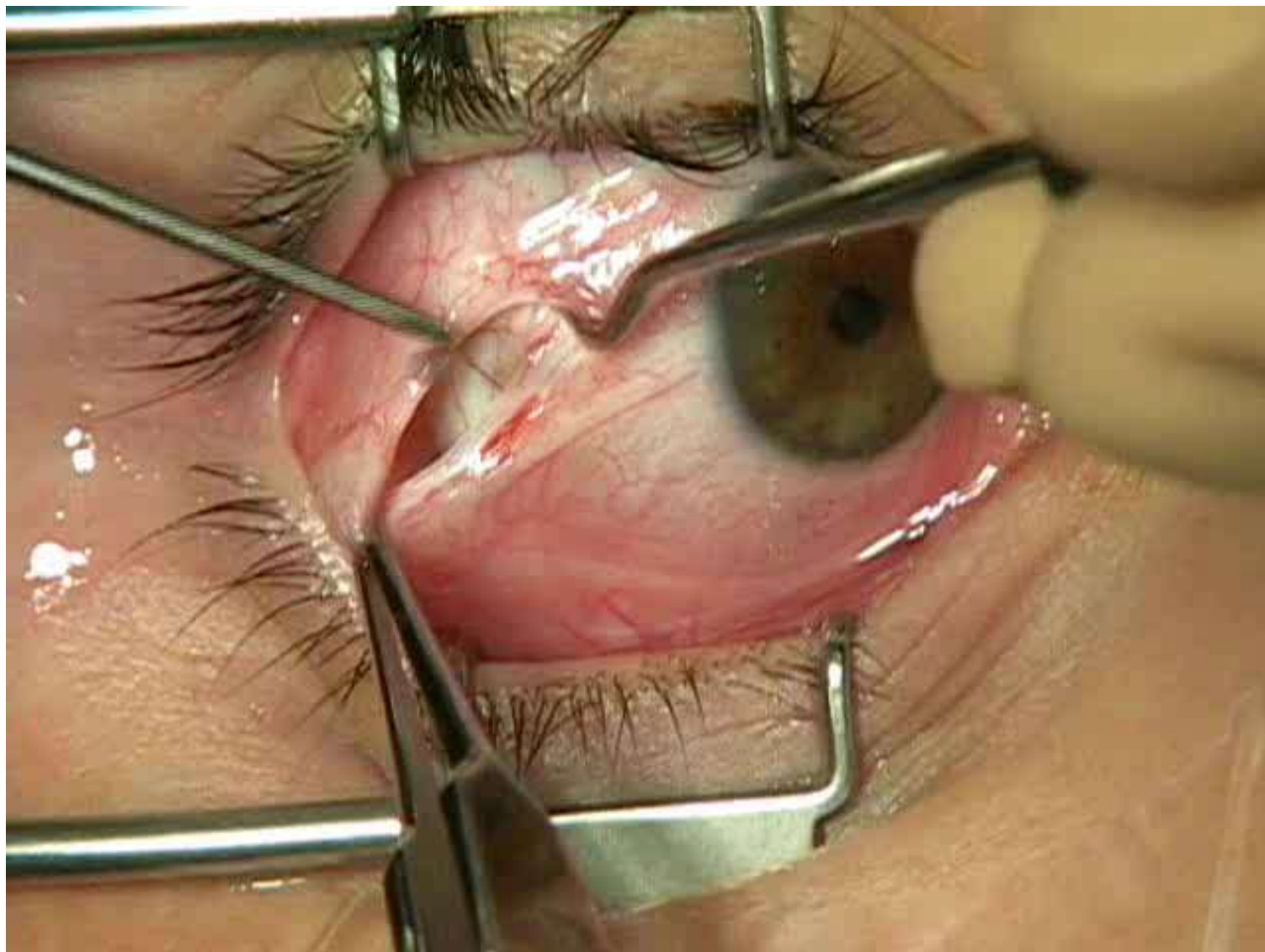


Post-op LIO weaken



Ortho

# VIDEO

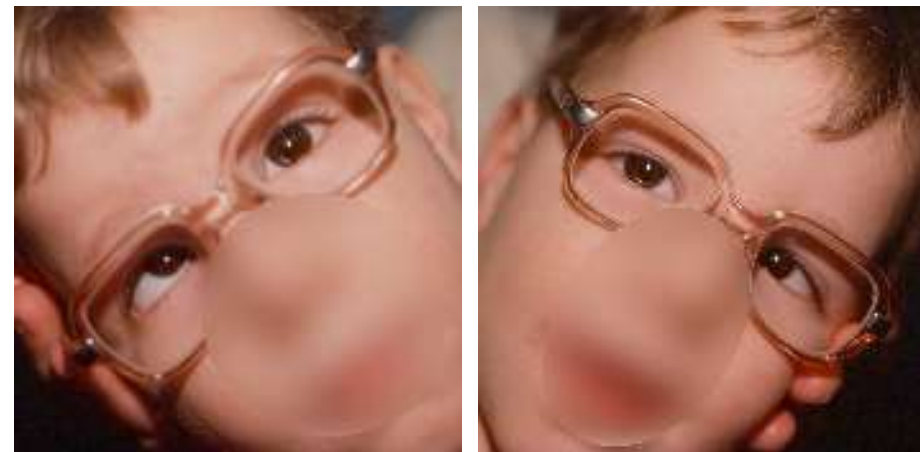


# Differential diagnosis

- **DVD**
- **IO palsy**
- **Skew deviation**
- **Brown syndrome**
- **DEP**
- **Blow-out #**
- **IIIrd nerve palsy**
- **Myasthenia**



# DVD c +ve HTT





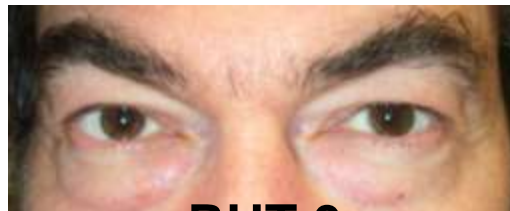
50 yr old man: (L) IOP  
Head tilt since childhood  
Oblique diplopia; **Incyclo 10**





# Post-op LSO Tenotomy

Head straight



RHT 0  
InCyclo 0



LSO N



# VIDEO



41 yr old man c **Skew deviation**  
Vertical diplopia x 5 years; **no cyclo**



Tilt (R)



8



20



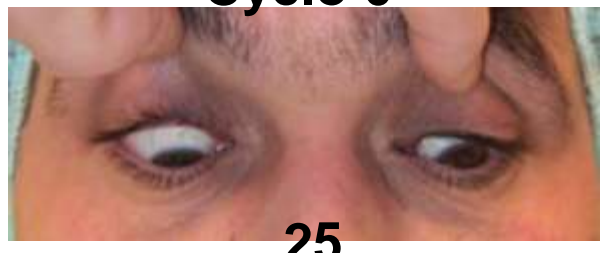
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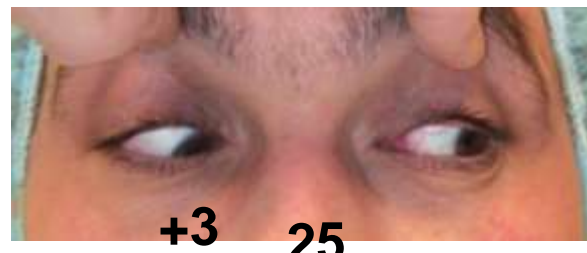
LHT 15  
Cyclo 0



20



25



+3 25

# LSR Recess 5





**Chin down**

# **Bilateral SOP**

**37 yr old man**

**Head trauma c LOC**

**Twisted and crossed images  
in down gaze**



**Ortho**



**LHT 3**



**E 2, ExCyclo 10**



**RHT 8**



**ET 12, ExCyclo 20**



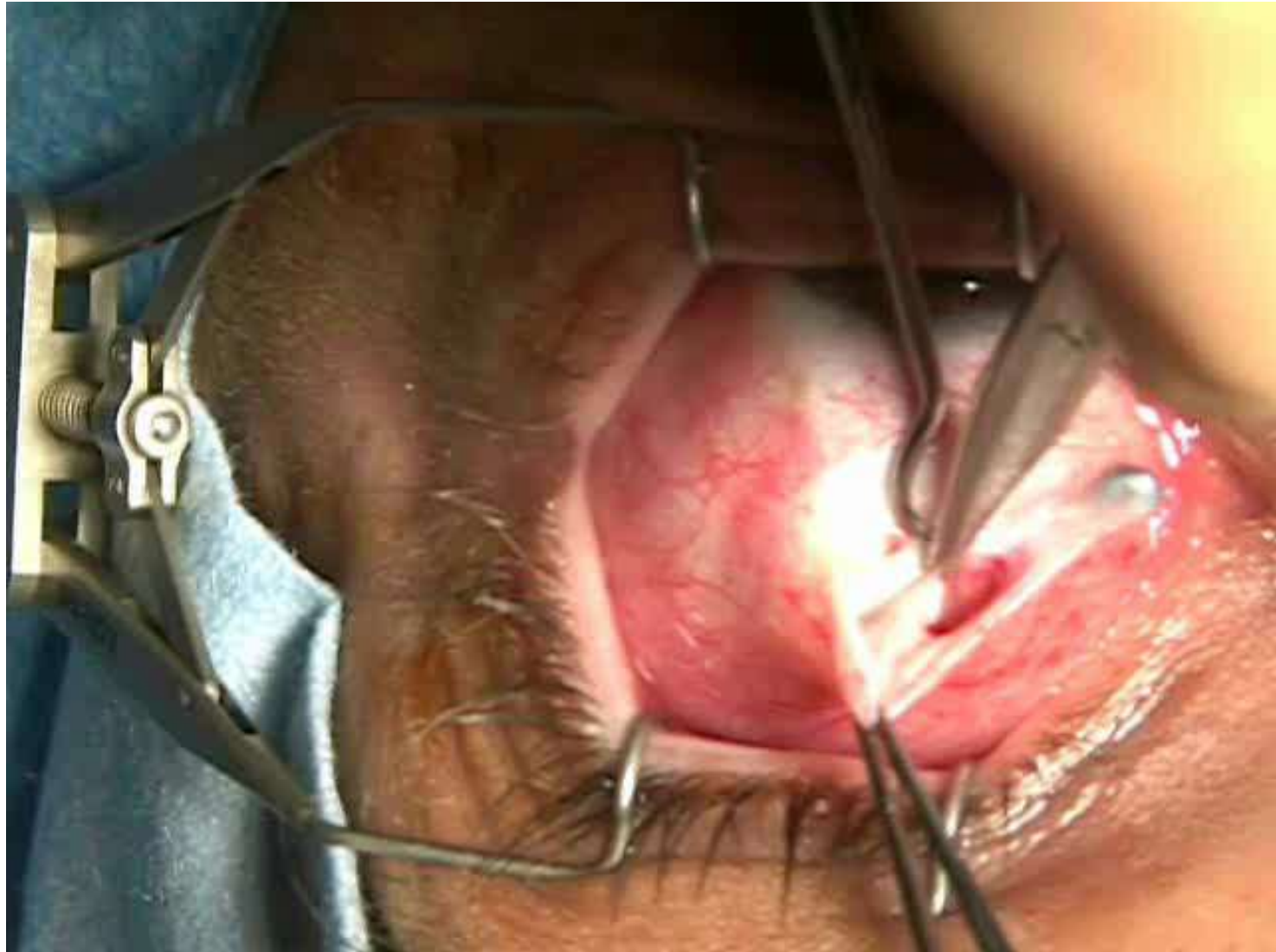
# Post-op: Bilateral Superior Oblique tuck

Head straight





# VIDEO



# SOP with torsional diplopia – → Harada-Ito

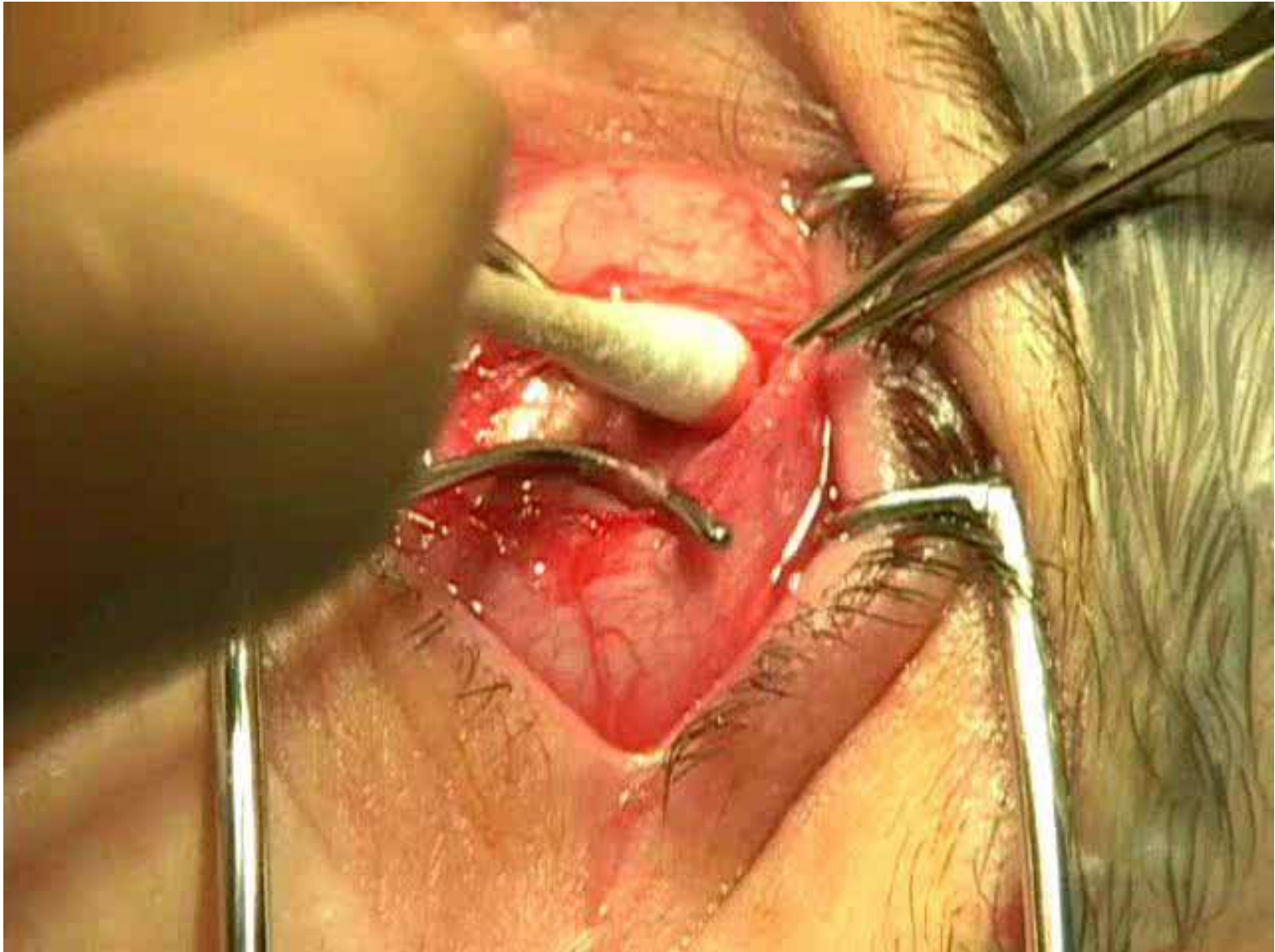


**PRE-OP**



**POST-OP**

# VIDEO



# Treatment of bilateral SOP

- **Bilateral IO weakening**
- **Bilateral superior oblique tuck**
- **BMR c infraplacement**
- **Unilateral inferior rectus recess (adjustable)**
- **Harada-Ito procedure**

# **Fourth nerve palsy**

## **Summary**

- **Spread of comitance, 3-step test, occult + manifest bilateral SOP, excyclotorsion**
- **Differential: DVD, IOP palsy, Skew**
- **IO weakening, SO tuck, Harada-Ito, and adjustable recession**