

STRABISMUS & AMBLYOPIA

why do they happen?

How to fix them

LIONEL KOWAL

What do they mean?

- STRABISMUS:
- Any ocular misalignment
- AMBLYOPIA
- Reduced vision due to abn visual development in childhood. Potentially reversible.

In childhood:

- Strabismus often causes amblyopia
- Amblyopia predisposes to strabismus

ASYMMETRY OF NASAL SCLERA RESEMBLES STRABISMUS



SYMMETRY OF LIGHT REFLEXES MORE
RELIABLE INDICATOR OF ALIGNMENT
THAN FIRST IMPRESSION =
PSEUDOSTRABISMUS

**ESOTROPIA = convergent strabismus
: turns IN**

Onset < 6mo = Infantile Esotropia

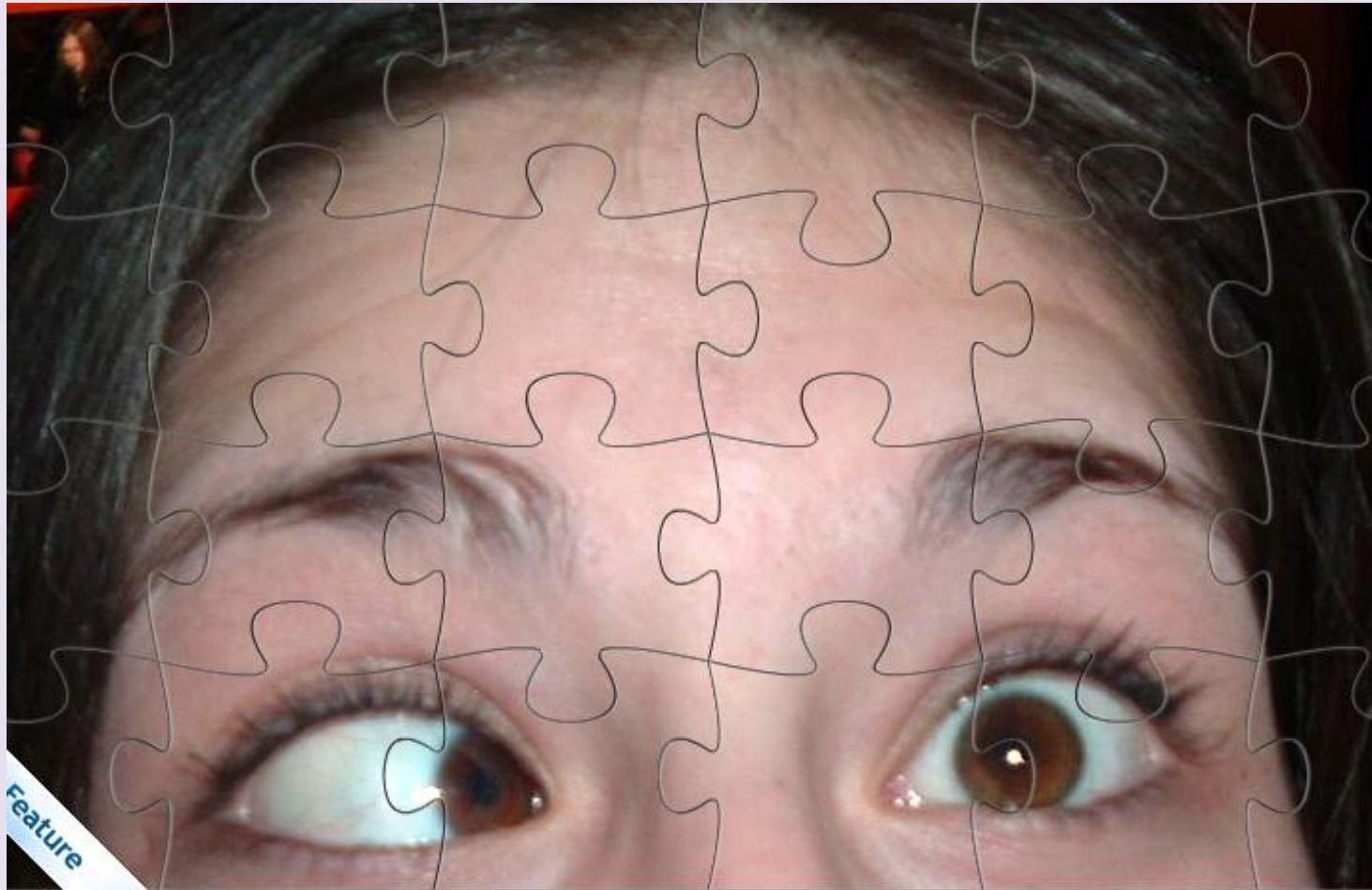


CONGENITAL ESOTROPIA

- Before / after surgery



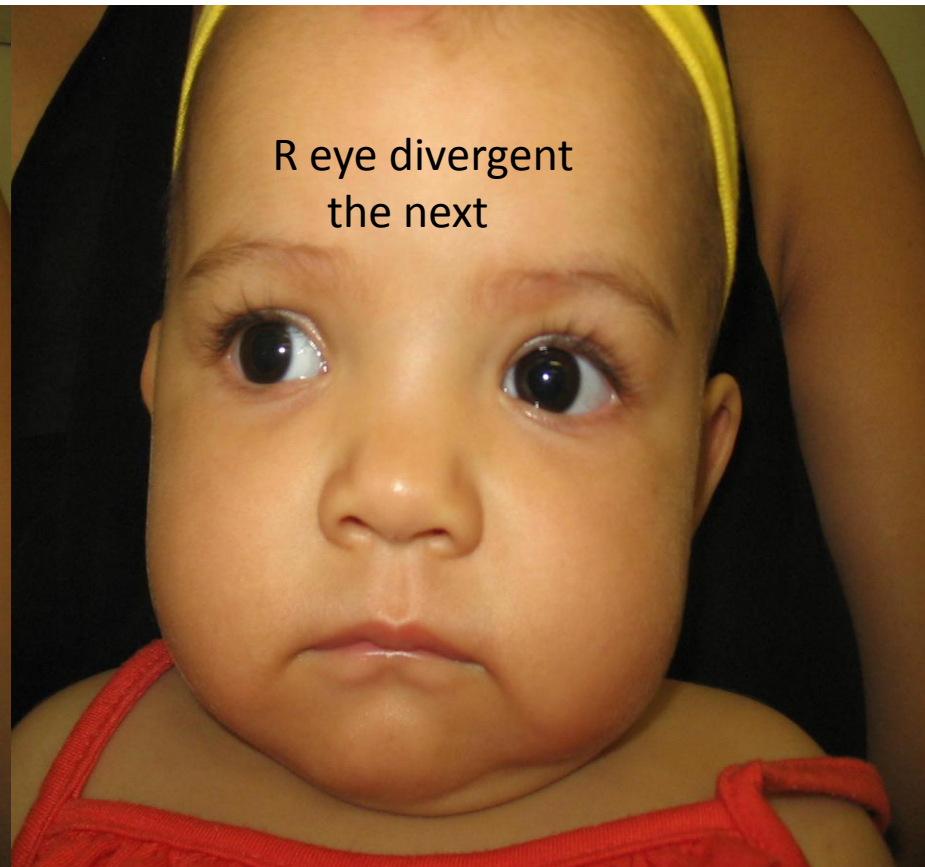
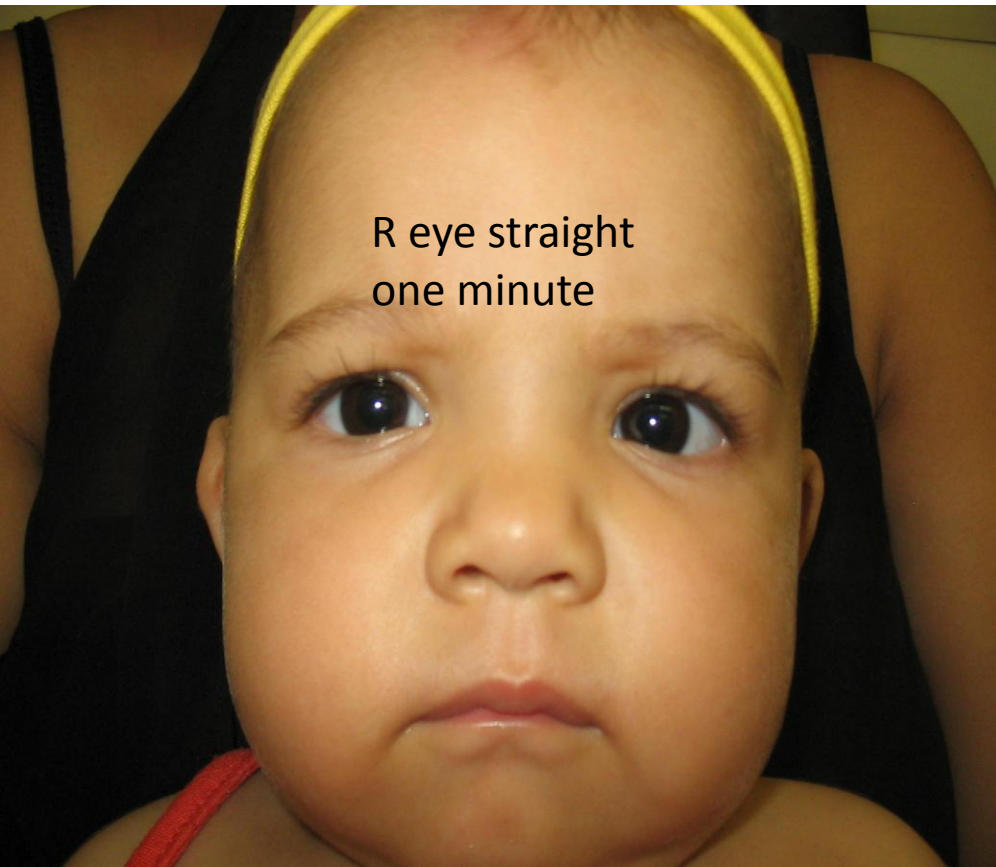
ESOTROPIA = convergent strabismus
Adult onset OR adult presentation of
childhood esotropia



EXOTROPIA = Divergent strabismus :
eyes turn OUT
can be childhood or adult



Exotropia – in childhood often intermittent



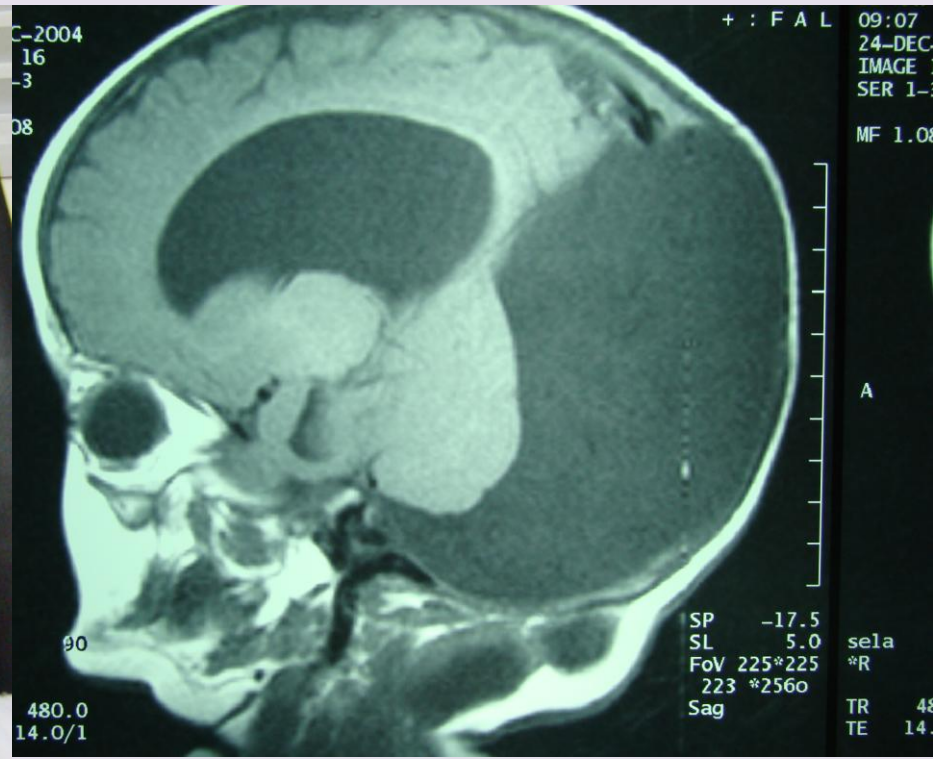
ESOTROPIA vs. EXOTROPIA

Comitant Horizontal Strabismus: an Asian perspective. [Chia A, et al](#) . [BJO](#). 2007 May 2; Singapore.

2x as many Singaporean children present with Exotropia than Esotropia

Caucasian Esotropia MUCH more common

Childhood strabismus can be caused by CNS problems



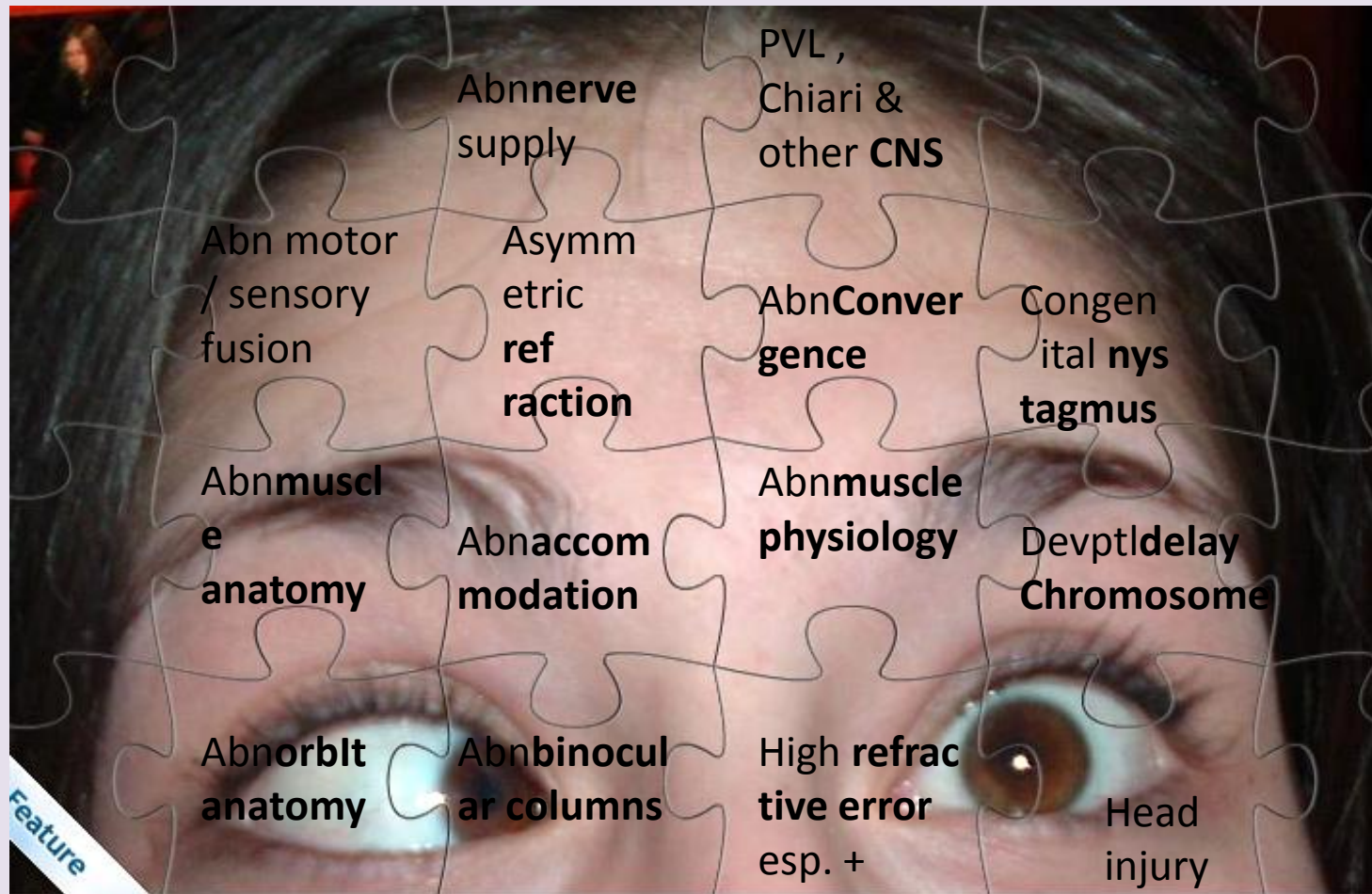
Similar problems in 'delayed devpt' and chromosomal disorders groups of patients

CRANIOFACIAL ANOMALIES CAN CAUSE EYES TO BE MISALIGNED



Sometimes muscles are missing in this group of patients

CAUSES OF CHILDHOOD STRABISMUS



VERY COMPLEX JIGSAW PUZZLE

STRABISMUS: IN ANY ONE PATIENT, IS THE END RESULT OF A COMPLEX JIGSAW PUZZLE

Abnormalities in one / more of...

- Sensory development
 - Refraction
 - Orbital anatomy
 - Abn eye muscle anatomy / physiology
 - Abn CNS anatomy, function and development
 - Accommodation / convergence
- ..either cause or are caused by strabismus

**Abn refraction very important
cause of caucasian strabismus**

Hyperopia = 'long
sightedness' is present in a
small proportion of children
age 6-12 mo...

**20% of hyperopic infants
⇒ esotropia**

'OPTOMETRIC' ESOTROPIA



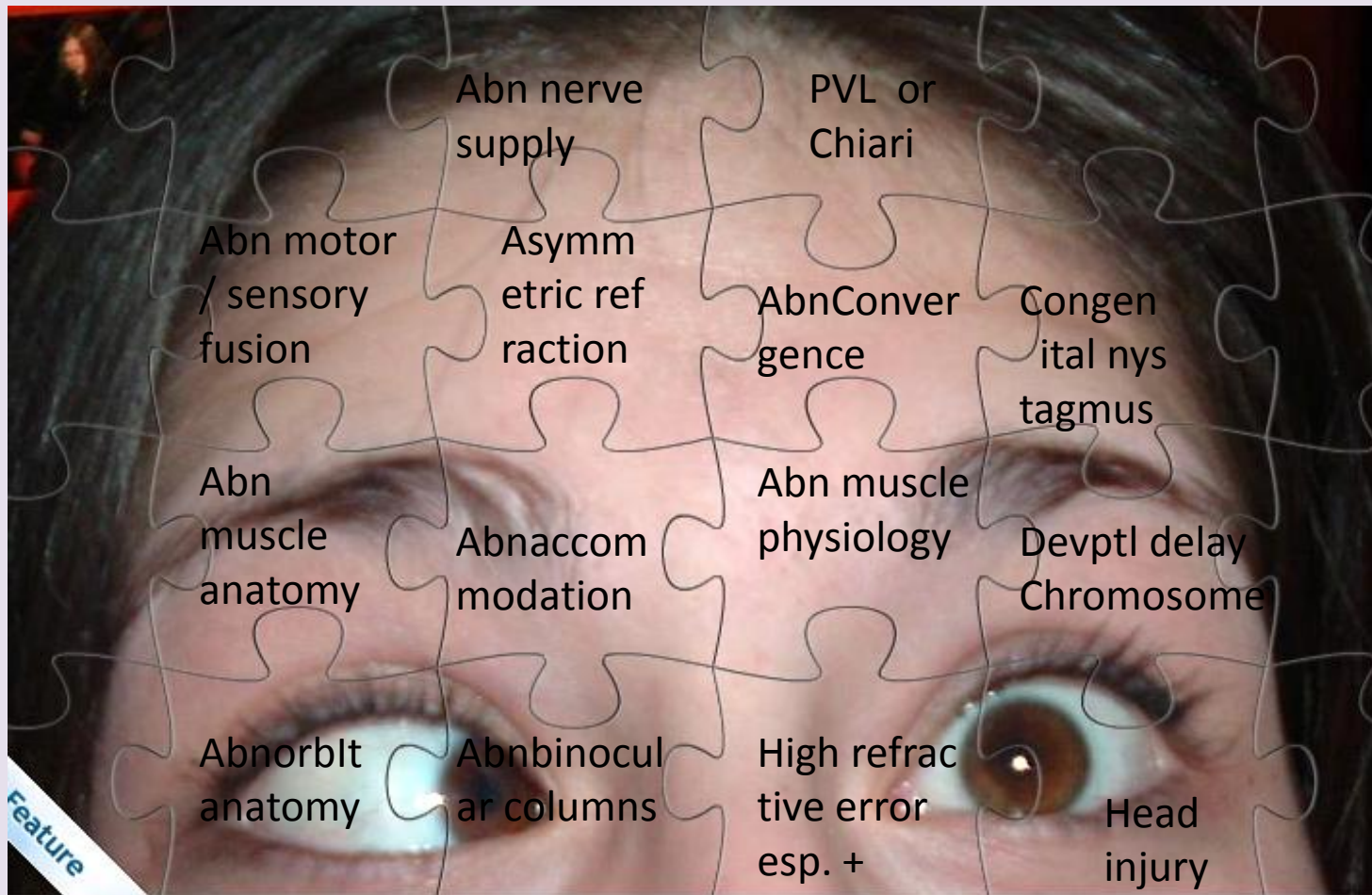
- Bad focussing [long sighted = hyperopia] causes eyes to converge inappropriately
- Fixed with glasses

COMMON VARIANTS



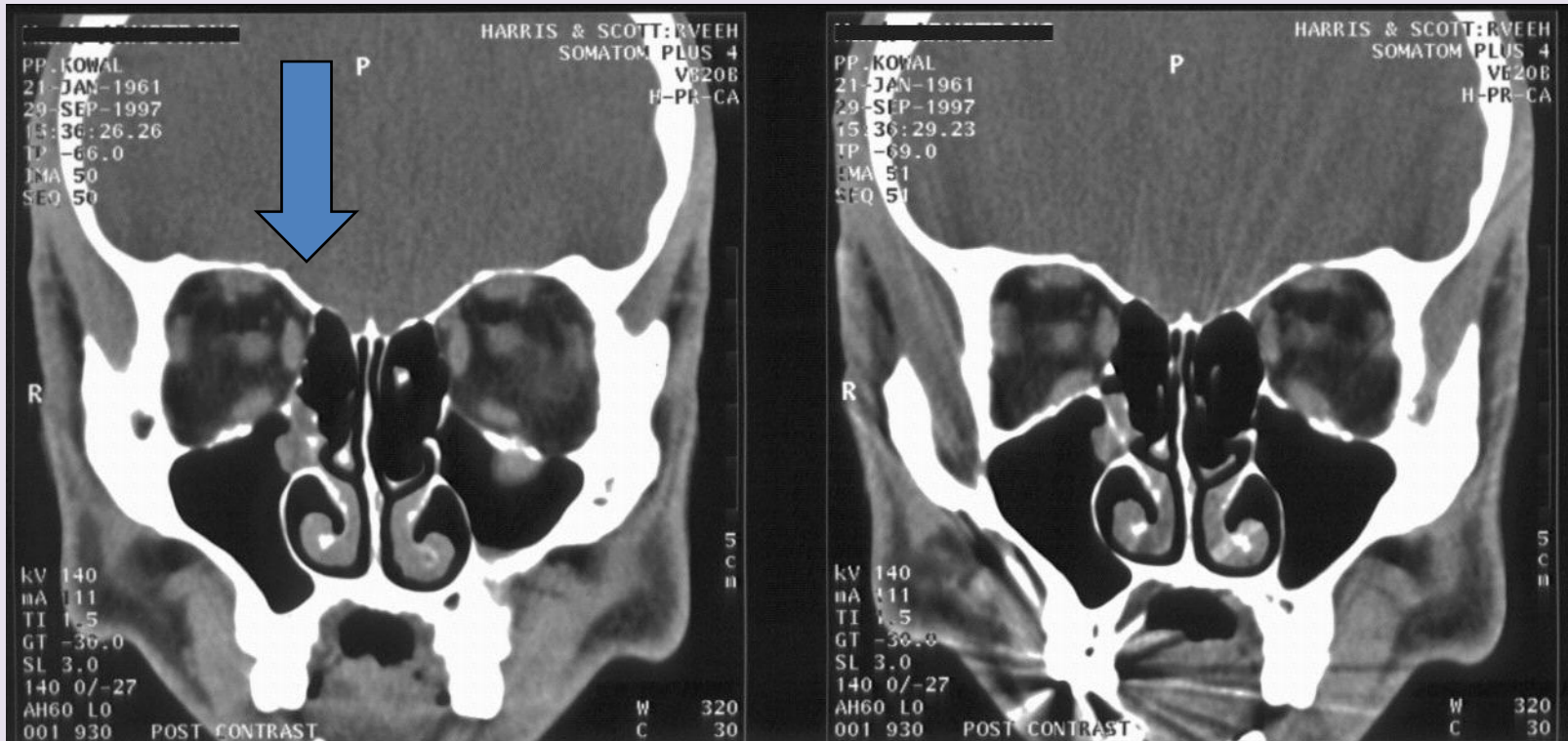
- Glasses not good enough – need surgery as well
- Some children need bifocals

CAUSES OF CHILDHOOD STRABISMUS



VERY COMPLEX JIGSAW PUZZLE

Abninnervation



LSO OK RSO ?absent



R IO OA

3



R SO UA

4



TIGHT RSR RIR 'UA'

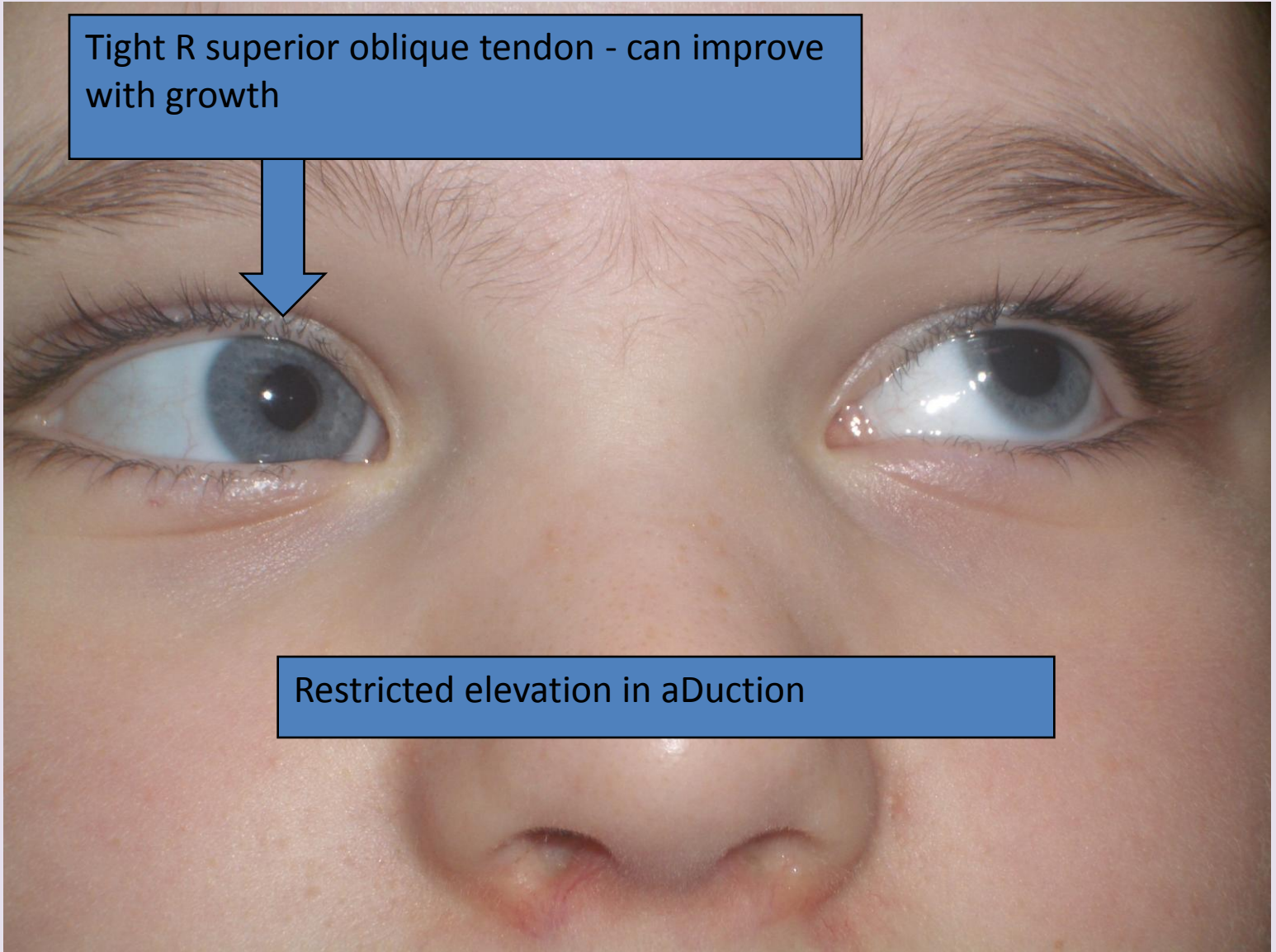
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Abn tendon

Tight R superior oblique tendon - can improve with growth

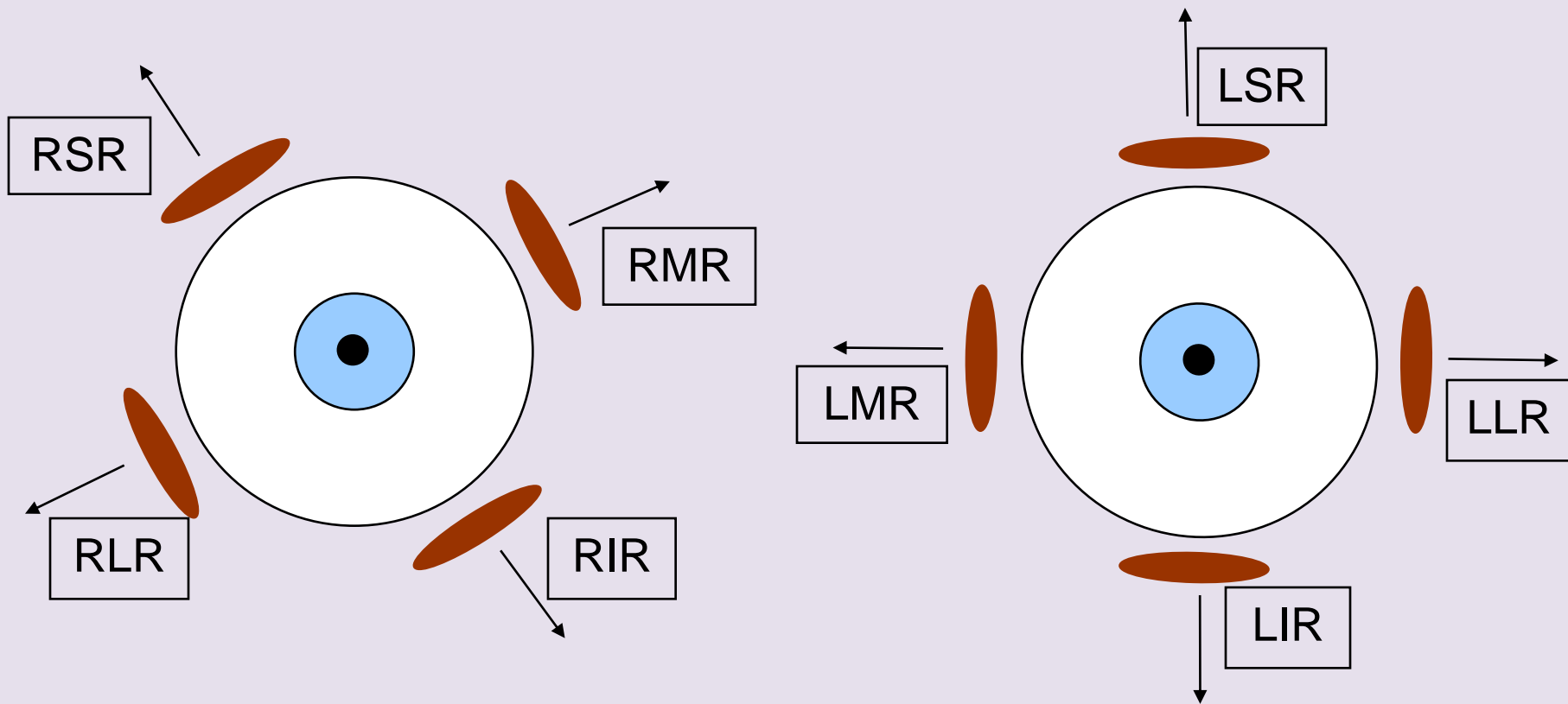


Restricted elevation in aDuction

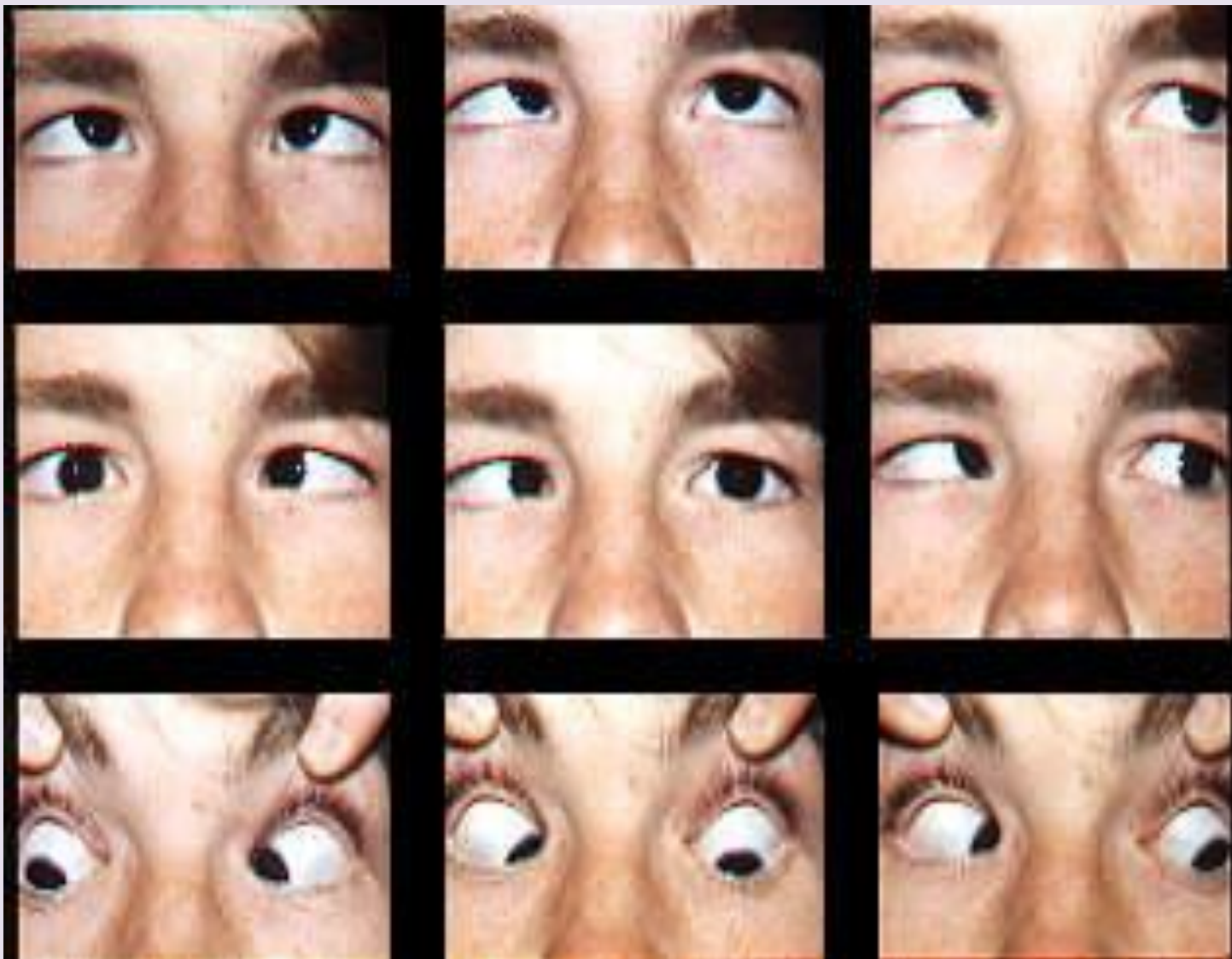


Tilted orbit

- Exorted right orbit and globe will cause the muscles to work differently



UPGAZE \neq DOWNGAZE
LEFT GAZE \neq RIGHT GAZE



Duane's - nerves go to the wrong muscles

Retraction R on L gaze
Restricted aDduction R
Restricted aBduction L



Retraction L on R gaze
Restricted aDduction L



Co-firing Lateral rectus on aDuction

VERTICALS : DVD

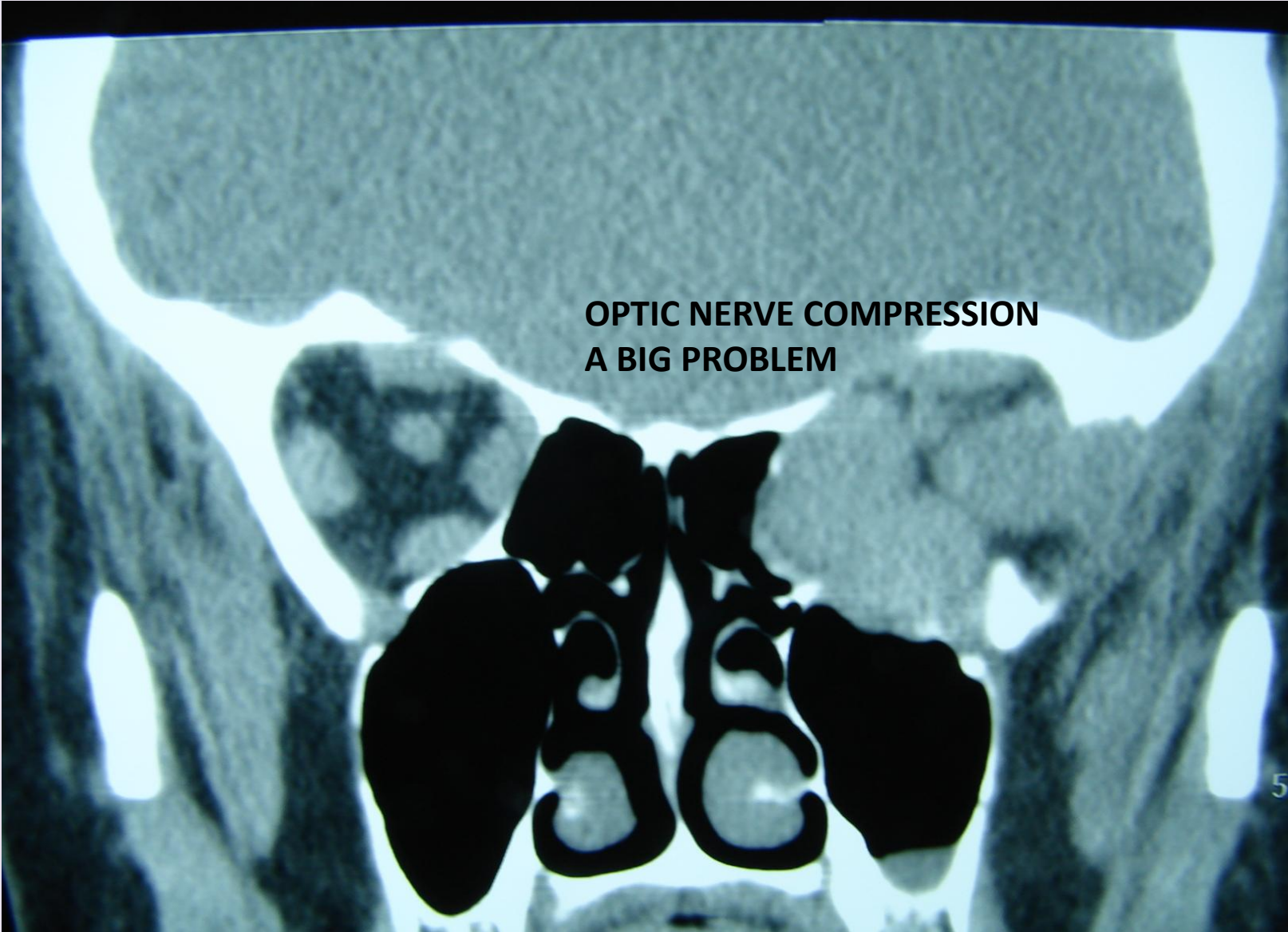


..a manifestation of a subtle type of nystagmus

THYROID EYE DISEASE – TERRIBLE MUSCLES



SMOKING AND ABN THYROID IMMUNOLOGY THE MAIN RISK FACTORS



**OPTIC NERVE COMPRESSION
A BIG PROBLEM**

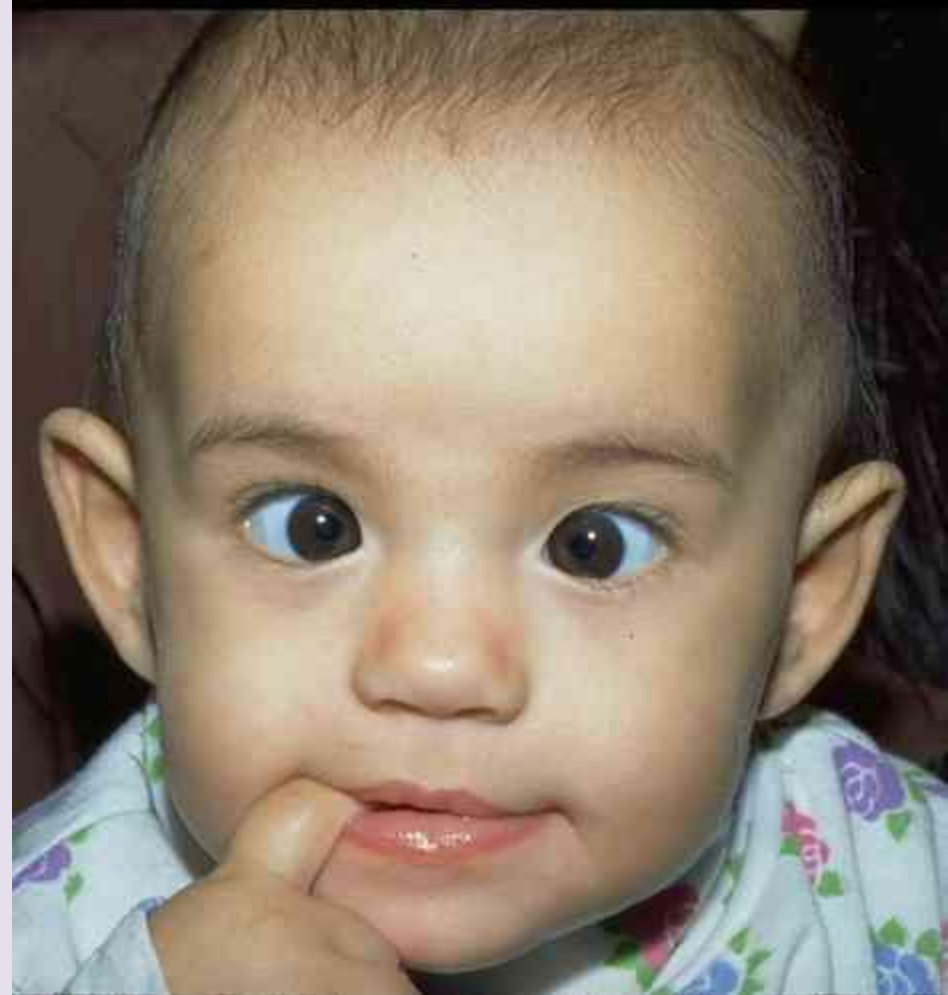
LOOKING STRAIGHT AHEAD



LOOKING UP – LEFT EYE CAN'T



- **WHY
STRAIGHTEN
IN THESE
EYES?**



WHY Straighten the eyes?

Age < 6mo:

- Best chance for using the 2 eyes together = depth perception
- Normal appearance
- ↓↓ risk of amblyopia

WHY Straighten the eyes?

Age 3-7:

- Best chance for depth perception
- Normal appearance & psychosocial devtpt
- Better motor skills – catching small balls
- ↓↓ risk of amblyopia
- Better maximum reading speed
- Better peripheral vision

Psychological benefits

- **Social and emotional impact of strabismus surgery on quality of life in children** J AAPOS. 2005.[Archer et al](#)
- A modified version of the RAND Health Insurance Study quality of life instrument was administered to parents or guardians of children with strabismus. The questionnaire was administered by telephone interviews conducted by trained staff before and 2 months after corrective surgery.
- 98 children with a mean age of 4.5 (+/-3.3) years were studied.

Psychological benefits #2

- Significant improvements were noted after surgery in perceptions ($P < 0.01$), and developmental satisfaction ($P < 0.01$) subscales.
- psychosocial benefits afforded by strabismus surgery contribute to an improvement in quality of life for children.

WHY Straighten the eyes?

Age >10:

- Best chance to regain some sensory fusion
- Normal appearance / social interactions
- Better field of vision [if ET; worse if XT]

See AAPOS website www.aapos.org

‘Adult Strabismus’

Opinions of dating agents about strabismic subjects' ability to find a partner

S M Mojon-Azzi,¹ W Potnik,² D S Mojon³

2008;92;765-769

Br. J. Ophthalmol.

ABSTRACT

Aims: To determine the influence of strabismus on the ability to find a partner.

Methods: We interviewed Swiss dating agents retrieved from two Swiss online telephone directories using a validated questionnaire to determine whether strabismus has any impact on the ability to find a partner. During the interviews, subjects with internet access could view downloadable, digitally altered photographs of a strabismic man and women, as well as images of other computer-generated facial anomalies.

Results: Of the 40 dating agents, 92.5% judged that strabismic subjects have more difficulty finding a partner ($p < 0.001$). Such difficulty was not associated with either gender or age but was perceived as being greater in exotropic than in esotropic persons ($p < 0.001$). Among the seven facial disfigurements, strabismus was believed to have the third largest negative impact on finding a partner, after strong acne and a visible missing tooth. Dating agents also believed that potential partners perceive persons with strabismus as significantly less attractive ($p < 0.001$), erotic ($p < 0.001$), likeable ($p < 0.001$), interesting ($p < 0.001$), successful ($p < 0.001$), intelligent ($p = 0.001$) and sporty ($p = 0.01$).

Conclusions: Visible strabismus negatively influences the ability to find a partner. Because strabismus surgery in adults restores a normal functioning condition and reduces not only physical but also psychosocial difficulties, it cannot be considered a cosmetic procedure.

distress, particularly during social interactions that expose the disfigurement to others' gaze and can result in displays of ignorance and negative comments.

The psychosocial problems experienced by strabismic individuals are similar to those of persons with other craniofacial anomalies. Jackson *et al*⁶ measured anxiety and depression, social anxiety and QoL 6 weeks before and 3 months after strabismus surgery. The researchers found not only that strabismic individuals experience greater social anxiety and use more social avoidance strategies but that these subject's scores reduce to normal levels following surgery. This finding of strabismus negative impact was confirmed by Satterfield *et al*,⁷ who found evidence of problems related to strabismus during school, work, play or sports in subjects over age 14. Nonetheless, the authors identified no difference in the amount of psychosocial impairment between esotropic and exotropic subjects. In a similar study, Menon *et al*⁸ showed that patients aged 15–25 who had had a constant squint since childhood had difficulties with self-image and interpersonal relationships, faced ridicule at school and work, and generally avoided activities that brought attention to their defect. Burke *et al*⁹ showed that strabismus surgery reduced the psychosocial difficulties reported before surgery and improved the quality of psychosocial functioning. Beauchamp *et al*¹⁰ also

Figure 1. Photographs of a man and woman with and without seven computer-generated facial anomalies. Subject consent has been obtained for publication of this figure.



Personell agencies – similar results

BENEFITS OF REALIGNMENT

All ages:

- Normal appearance
- Better peripheral field
- Chance for sensory fusion = depth perception

Younger:

- Better chance to treat resistant amblyopia

2 STEP MANAGEMENT OF STRABISMUS

1. Straighten the eyes

- Optically
- Botox
- Surgically

2. Improve /equalize acuity

TECHNIQUES FOR REALIGNMENT OF ESOTROPIA / CONVERGENT STRABISMUS

MEDIAL RECTUS BOTOX

- >20 yr experience in strabismus
- 50+% success for 10 -20 Δ ET
- 15% temporary ptosis
- 1% permanent acquired vertical

Small number of Drs get GREAT result

MEDIAL RECTUS BOTOX

TECHNIQUES FOR REALIGNMENT OF ET

SURGERY

BIMEDIAL RECESSION or
RECESS / RESECT ONE EYE

Conv Xs: BMR

Amblyopia: R-R

$<35\Delta$ same results

Exotropia – in childhood often intermittent



Exotropia XT

- XT: core problem is usually **subtle anomaly in orbital anatomy** [not a tight lateral rectus]
- Fixing the lateral rectus length & tension tries to compensate for the XT and improve the alignment & mechanics, but will not return the mechanics of this abnormal orbit to normal

Basics of treatment of XT

- < 4y: patching
- 4-8: minus lenses
- > 6: surgery

SURGICAL RESULTS

- Success from one surgery 75 – 90+% depending on problem
- Successful childhood surgery doesn't always 'grow' with the pt e.g. successful surgery <12 mo for congenital surgery: 25-30% incidence of late surgery [to age 25y] = price to pay for optimal early visual development

SURGERY

- WMV