Collaboration Between Developmental Optometry and Pediatric Ophthalmology
• Alderwood Vision Therapy Center
  • Nancy Torgerson, OD, FCOVD and team
  • Transforming lives through vision
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• The Children’s Eye Doctor and Family Eye Doctors
  • Thomas Lenart, MD, PhD and associates
  • Improving visual outcomes through a multi-faceted approach
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Course Goals

• To learn that cooperation between developmental optometry and pediatric ophthalmology enhances patient care
• To learn that cooperation between pediatric ophthalmology and developmental optometry enhances patient care
• To learn how to enhance patient care for those with developmental delays
• To learn how care for children and adults with strabismus can be enhanced
• To review cases
• To learn how to build a team approach in your community
Traditionally there has been a lack of synergy in patient care between developmental/behavior optometrists and pediatric ophthalmologists. However, it is our aim to show that the collaborative efforts between a developmental optometrist and pediatric ophthalmologist can, in many cases, provide a far superior level of patient care than either could offer without the other. In our two practices, we believe that our successful professional relationship can serve as a template for similar successful collaboration among our pediatric ophthalmologic and developmental optometric practices around the country.
Synergy Between Optometry and Pediatric Ophthalmology

“The whole is greater than the sum of its parts.”  Aristotle

“Synergy and serendipity often play a big part in medical and scientific advances.”  Julie Bishop
Developmental Optometry and Pediatric Ophthalmology Collaboration

Introduction

I. There are a million excuses why this could never happen
II. Passion
III. Journey
IV. Lessons from Andy
V. How occupational therapists, physical therapists and speech and language therapists built a bridge
Developmental/Functional/Behavioral Care

- Lenses
- Prisms
- Yoked prisms
- Vision therapy
  - Much more than 20/20
Vision Leads Motor – A Demonstration

• Yoked prisms

• Look directly at your hand and feel corner of wall. Is it straight? Base right or left yoked prisms are put on.

• What does the corner of the wall look like?

• Look directly at your hand and feel the corner of the wall. What does it look like? What does it feel like?

• Intellectually you know that it is straight but your eyes now tell you and your touch agrees, that the wall is curved.

• Visual input overrides the kinesthetic, proprioceptive, cognitive and tactile information at hand.

• Vision guides motor.
Developmental/Functional/Behavioral Care

• Investigates the relationship between vision and
  – Balance       Posture       Movement
  – Coordination  Orientation   Localization
  – Awareness     Perceptual Style Identification
  – Central/peripheral organization

• Prescribes lenses and prisms
  • Clarity and comfort  Relieve visual stress
  • Enhance performance  Guide visual potential
Crucial Conversations

• Discover each other’s professional strengths and challenges
• Same word, different meaning
• Help each other
• Build mutual respect
• Foundation: really want to help people
• Presented together at an optometric society meeting
Goal

• To help others develop collaboration in their own community
• Myriad of cases to show the endless possibilities of collaboration
BN: Intermittent Exotropia

• History:
  – 15 months old.
  – Mom reports X(t); percent of time of strabismus > 10%
• Exam:
  – Cycloplegic refraction: +0.50 OU; Va Central Steady Maintained (CSM) OU
  – Orthophoric distance and 2 X’ near.
  – Near Point Convergence: To nose.
• Follow-up after 3 months.
  – 20 X(t)’ near only; Good control, with only briefly X(t)’.
• Over next 9 mos develops ~30X(t) distance and near with moderate control.
• Referred to Dr. Torgerson for Vision Therapy @ 1 year follow up or child 2 years old.
• Discussion: Comanagement of X(T) in childhood.
BN: Exotropia

- Referral from Dr. Lenart: “Vision without glasses is central, steady and maintained at near and is unable at distance, secondary to age. She has a $30^\Delta$ intermittent exotropia at distance and that is comitant in up and down gaze and has a $25^\Delta$ intermittent exotropia at near. Fuses well on Worth 4 Dot at near and is unable at distance, secondary to age. Near point of convergence is to the nose. Cycloplegic refraction – reveals just a touch of hyperopia.

- Plan: Vision therapy with Nancy Torgerson. Return to clinic in 3 months for recheck of vision and motility.”
• Vision Therapy: every other week
• Progress evaluation 6/1/12
  – Has become more aware of when her eye is turning out and being able to bring it back in
  – Her body awareness and spatial awareness have also improved significantly
• Under extreme circumstances, sees X(t)
• Fructose malabsorption
• Stereopsis: 50"
• Ranges near: BO 10/8, BI 12/8
ES “D”: Intermittent Exotropia
2 Years Old

• History
  – 2 year old, with history of X(T) for about 1 year.
  – Percent of time of strabismus: 20-30%

• Exam:
  – Cycloplegic refraction: +1.50 Sphere OU
  – 35 X(t) distance and 25 X(t)’ near.
  – W4D fusion at near, unable at distance
  – Stereo: 100”

• Refer to Dr. Torgerson for Vision Therapy.
• Discussion: Comanagement of X(T) in childhood.
ES “D”: Intermittent Exotropia  
2 Years Old  

• X(t) noted at 1 yr., saw an ophthalmologist 3times. He did not see eye turn. No other symptoms/concerns.  
• Dr. Lenart: 35 \( \Delta \) X(t)  
• Consult Dr. T: Stereo: < 400”; W4D: N fusion, D alt; NPC 4”  
• VT started 5/29/12.  
  – Gains despite home activities not being consistent  
  – Parents added swimming and dance
ES “D”: Intermittent Exotropia

2 Years Old

• Parents begin to note a great deal of gross motor difficulty relative to age matched peers.

• VT: stereo targets, bi-temporal patching, oculomotor, and accommodative activities in free space, vestibular, reflexes/movement

• Came home from school last week very happy b/c she had learned how to make the perfect isosceles triangle
ES “D”: Intermittent Exotropia
2 Years Old

- Weekly Office VT visits
- 1st progress 8/20/12
  - “My eye takes vacation sometimes”
  - 25-30 POTS
  - Less blinking and asking for sunglasses
  - Stereopsis: 200”
- Ranges of BO/BI with prism bar
  - D: BO 18/10, BI 8/2
  - N: BO 25/14, BI 12/8
ES “D”: Intermittent Exotropia
2 Years Old

First 3 vision therapy visits:
  Goal Directed Rolling
  White Balloon
  E/H Coordinator
  Mental Map of Body
  Marble Roll
  Vecto Quoits
  JND – yoked prism
  Rotating Pegboard
  Sanet Vision Integrator – saccades
  Frog Hide ‘n Seek: NPC
BM

History - 2 year old

- Parent notes: in the last week and a half, BM’s eye hurts
- When focuses, right eye bounces or shakes
- No health concerns

Evaluation: left eye covered, not happy

- Right eye covered, okay
- VA OD 20/400  OS 20/20
- Monocular nystagmus OD

• Called Dr. Lenart’s office: needs MRI
BM: Brain Tumor

- History:
  - Referred by Dr. Torgerson for rotary nystagmus OD only (?MRI).
  - 2 year old with rotary nystagmus OD only
  - Cycloplegic refraction: +4.50 OU
  - Va: OD non-central, non-steady, non-maintained (nCnSnM) OD, CSM OS
  - Fundus: OD optic nerve pallor and large cup to disc.
BM: Brain Tumor

• Management:
  – Called Pediatrician and confirm need for head MRI
  – Head MRI performed in 2 days and “+” for 3.7x3.6x3.1 suprasellar mass.
  – Neurosurgery performed a craniotomy and brain tumor resection next day with pathology confirmed Pilocytic Astrocytoma.
  – VEP 14 days after resection showed 50% reduction in amplitudes OD.

• Discussion: Utilization of Pediatric Ophthalmologist for neuro-imaging and severe systemic diseases/disorders.
JL: Early Onset Accommodative Esotropia

• History:
  – Referred in by local optometrist for comanagement of early onset accommodative ET
  – Discussed on phone prior to seeing patient that the child probably would need surgery, but would like to start with 6-12 weeks of vision therapy first.
  – 4 month old crossing eyes since birth
  – Right eye shaking for 1-2 weeks

• Exam:
  – Va: nCnSnM OD, CSM OS.
  – Cycloplegic refraction: +3.00 sphere OD; +5.00 sphere OS
  – Prescribed glasses
JL: Early Onset Accommodative Esotropia

• 2\textsuperscript{nd} Visit 3 weeks later:
  – Wearing Rx full time
  – Va (n)CS(n)M OD, (n)CS(n)M OS prefers OS fixate, but alternates.
  – 25 AET’ near cc and 35 AET’ near sc.

• Refer back to local optometrist who goes on maternity leave and patient referred to Dr. Torgerson for 3-4 months of Vision Therapy.
JL: Early Onset Accommodative Esotropia

• **Third Visit 3 months later:**
  – **Exam:**
    • 30 ET distance & near with glasses on.
    • Glasses prescription: +3.50 Sphere OD; +3.00 Sphere OS)
  – **Management:**
    • Discussed the different treatment options with Mom and Dad who decided to do strabismus surgery.

• **Strabismus surgery:** *Bimedial rectus recession 4.5 mm.*
  – Post-operative day 3: orthophoric distance and near.
  – referred back to Dr. Torgerson for *Vision Therapy.*

• **9th visit 1 year after 1st visit now orthophoric (age 16 months.)**

• **Discussion:** Comanagement of Infantile Esotropia in childhood.
JL: Early Onset Accommodative ET
4 Months Old

- Consultation
- 7 Vision Therapy visits prior to surgery
- 1 Vision therapy visit after surgery
- Return to initial optometrist
JL: Early Onset Accommodative ET
4 Months Old

Vision Therapy

• Monocular:
  – Fixations
  – Pursuits
  – Saccades

• Spinning in chair
• Bi-nasals
• Developmental Movement
  – Enhance Your Baby’s Development, Etta Rowley, OEPF
• Yoga Ball Roll
• Tactile/Auditory Visual Match
• JND: prisms
JP(L): Infantile Esotropia

• **History:**
  – 8 month old boy with “left turned in since birth.”
  – Just moved from Florida, saw ophthalmologist there who dx’d infantile ET and recommended surgery.
  – Parent waited on surgery in Florida because they knew they were moving soon and wanted to establish care in the Seattle area for any procedures.

• **Exam:**
  – Cycloplegic refraction: +1.50 ou
  – 30 LET distance and near.
  – Near Point Convergence: To nose.
JP(L): Infantile Esotropia

• **Management**
  – Recommended Surgery: performed **Bimedial rectus recession of 4.5 mm; Left inferior oblique recess to 10.0 mm limbus**.

• **Does well initially but over the course of a year develops 20 E(t).**
  – Second surgery: **Left lateral rectus resection of 8.0 mm**.

• **Does well over next 2 months, but mom notices X(t) intermittently**
  – Refer to Dr. Torgerson for **Vision Therapy**.

• **Remains relatively orthophic over next 9 months when family moves back to Orlando.**

• **Discussion:** Comanagement of infantile Esotropia in childhood.
JP (L): Infantile ET
11 VT Visits

• After 11 VT sessions, changes noted by mom: eyes straighter, balance better, can walk up and down stairs, stacking better, looking at toys and can actually follow. Ball tap and now can catch!

• Vision therapy activities
  – Ball Roll
  – Balloon Bat: R/G – luster?
  – Balance Board
  – Step up/down
  – Bears on rotator
JP (L): Infantile ET

Vision Therapy Activities

– Sit ‘n Spin
– Keystone – reaches for 3-D!
– Yoked prisms – loves 15 Base Up
– Bear Walk
– Tracking Tube
– Balance beam
– Ball pursuits
– Guided Rolling
CS: Craniosynostosis with Strabismus

• **History:**
  – 18 month old history of craniosynostosis surgery.
  – Mom “not sure if vision is good.”
  – Squinting right eye intermittently for several months
  – Mom has myopic Astigmatism.

• **Exam:**
  – -0.25+4.25x120 OD; +0.75+1.25X120 used minus lenses.
  – 15 X(t) distance and good control 6 x’ near.
  – Near Point Convergence: To nose.

• **Management:**
  – Put in glasses overminused by 0.75 with full astigmatism correction.
CS: Craniosynostosis with Strabismus

• **Follow-up**
  - With glasses on 18 RX(T) good control distance and 12 X’ near.
  - Continue wearing overminused lenses.
  - Follow-up every 3 months with orthoptist.

• **Follow-up at 2 & 1/2 years old.**
  - now X(t) increasing in POTS and amplitude.
  - Exam:
    • +1.00+3.50x95 OD 20/70 (Allen); +2.00+1.75X166 OS 20/40
    • 30 X(t) distance and 20 RX(t)’ near with moderate control.
    • Motility: Right inferior oblique over action +2; Left inferior oblique over action +1
    • Worth 4 Dot: touches 4 at near, unable at distance.
    • Near Point Convergence: 1 cm
  - Management
    • Began patching OS 4 hrs a day.
    • Follow-up every 3 months with my orthoptist.
CS: Craniosynostosis with Strabismus

- **Follow-up 3 & 1/2 years old.**
  - Exam:
    - Better Va ou, 20/40-² OD & 20/25- OS distance and 20/30 OU near.
    - Rx becoming more myopic less astigmatism: -0.25+3.25X102 OD; +0.75+1.75X140 OS.
    - X(t) stable at 25 RX(T) distance and 10 RX(T)’ near.
    - Motility: Bilateral inferior oblique over action (odd for X(T)).
    - Worth 4 Dot: Touches 4 at near (unable at distance secondary to age)
    - Near Point Convergence: 1 cm.
  - Management:
    - Continue to patch 2 hours per day.
    - Continue overminused lenses.
CS: Craniosynostosis with Strabismus

• **Follow up at ~5 years old**
  – **History:**
    • Newly diagnosed diabetes type 1.
  – **Exam:**
    • -0.25 +2.25x102 OD 20/30; -0.25+2.75x155 20/20;  
    • 25 X(T) distance and 20 X(T’) with poor control.  
    • Motility: Bilateral inferior oblique over action.  
    • Worth 4 Dot: fusion distance and suppress OD near.  
    • Stereopsis: Negative  
    • Near Point Convergence: 6 cm  
  – **Management:**
    • Over minused lenses: -2.00 OU
CS: Craniosynostosis with Strabismus

- Follow up at ~6 years old.
  - History:
    - Diabetes under better control: $A_1 C: 7.8$, & Fasting Blood Sugars: 90-200.
  - Exam
    - Cycloplegic refraction: Plano+2.75X105 OD, 20/30; +1.25+2.00X145, OS 20/20-2.
    - 35 X(t) & 4 RHO(T) distance and near.
    - Motility: Bilateral inferior oblique over action.
    - Worth 4 Dot: Suppresses OD distance and near.
    - Stereopsis: negative
    - Near Point Convergence: 6 cm.
  - Management:
    - Discussed the different treatment options including overminused lenses, vision therapy, and strabismus surgery.
    - Mom opted for surgery.
    - Strabismus surgery: **Bilateral rectus recession of 7.5 mm & Bilateral inferior oblique recess to 10.0 mm limbus.**
CS: Craniosynostosis with Strabismus

- **Over next year stable small angle strabismus. Referred to Dr. Torgerson for Vision Therapy.**
  - Great progress with Vision Therapy at Dr. Torgerson’s office, but family having difficulty with commute to Dr. Torgerson’s office and doing the homework.
- **Follow up at age 7 years old.**
  - **Exam:**
    - Cycloplegic refraction: +0.75+2.75X110 OD, 20/25; +1.50+2.00X145 OS, 20/15.
    - 12 XT & 16 RHOT distance & 4 XT’ & 10 RHOT’ near.
    - Adopts a 10º Right head tilt
    - Motility: Right inferior oblique over action.
    - Worth 4 Dot: Suppresses the right eye distance and near.
    - Stereopsis: 400”.
    - Near Point Convergence: 3 cm
  - **Management:**
    - Overminused lenses (-1.25+2.75X105 OD; -0.50+2.00X150)
    - Continue Vision Therapy with Dr. Torgerson.
CS: Craniosynostosis with Strabismus

- Follow up at age 8 years old.
  - Exam:
    - +0.25+2.75X99 OD, 20/25⁻²; +1.25+1.50X150 OS; 20/20.
    - 10XT & 10 RHOT distance and 12 RHOT’ & 2 XT’ near.
    - Motility: Right inferior oblique overaction.
    - Worth 4 Dot: Fusion near but alternate suppression distance
    - Stereopsis: 800”
    - Near Point Convergence: 4 cm.
  - Management:
    - Discussed the different treatment options with Mom including over minused lenses, vision therapy and strabismus surgery.
    - Mom opted for strabismus surgery and no over minused lenses with vision therapy to follow surgery.
  - Surgery: **Right medial rectus resect of 3.0 mm & Right inferior rectus recess of 4.0 mm.**
CS: Craniosynostosis with Strabismus

• 1 week post-operatively
  – Exam:
    • 2 LHT distance and near.
    • Motility: Right inferior oblique over action +1.
    • Worth 4 Dot: Suppression OD distance and fusion at near.
    • Stereopsis: negative (monocular clues)
    • Near Point Convergence: 5 cm.
  – Management:
    • Full time glasses wear
    • Continue drops and ointment for 2 weeks from the date of the surgery
    • Follow up with Dr. Torgerson for Vision Therapy.
CS: Craniosynostosis with Strabismus

• Follow up 5 months post-operatively
  – Exam:
    • Va: 20/20⁻² OD & 20/20 OS distance and 20/20 OU near.
    • 2 LHT distance and 4 LHT’ near.
    • Worth 4 Dot: fuses distance and near.
    • Stereopsis: 400”
    • Motility: Right inferior oblique over action.
    • Near Point Convergence: 6 cm.
CS: Craniosynostosis with Strabismus

– Management:

• Mom leaning towards prism in glasses and stop vision therapy with Dr. Torgerson (commute [time, distance and money], difficult with vision therapy homework, etc.).

• Called Dr. Torgerson and discussed, Dr. Torgerson not in agreement with prism glasses but under consideration of the stress Mom and patient were under regarding vision therapy, agreed to try prism glasses.

• Prescribed 1 base up OD and 2 base down OS
CS: Craniosynostosis with Strabismus

• 10 weeks of wearing prism glasses and no vision therapy:
  – Exam:
    • Va: 20/20 OU distance and near.
    • Orthophoric distance & 2XT’ & 1 LHT’ near
    • Worth 4 Dot: Fuses distance and near
    • Stereopsis: negative (monocular clues)
    • Motility: Right inferior oblique over action.
    • Near Point Convergence: 4 cm.
  – Discussion: Craniosynostosis, diabetes, strabismus in childhood.
CS: Craniosynostosis with Strabismus

- VT Visits:
  - 2010: 21
  - 2011: 14
  - 2012: 11

- Last PE: great gains
  - Stereopsis: 20”
  - Fused Worth 4 Dot at distance
  - BO and BI Ranges at distance and near

- Continue monitoring
• **History:**
  
  – Orbital dermoid removed (lateral canthal area) by California Oculoplastic surgeon 2 months prior to patient’s visit with me.
  
  – Resulted in *“Right sixth cranial nerve palsy,”* type picture.
  
  – Horizontal and vertical binocular diplopia for 3-4 months and worse since orbital surgery.
    
    • Prior to surgery diplopia in right gaze, after surgery diplopia in all fields of gaze except primary.
  
  – Known myopic.
M.R.: ORBITAL DERMOID RIGHT LATERAL RECTUS

• Exam:
  – Va: 20/20 ou with correction
  – Cyclo: -2.50 Sph OD; -4.00 Sph OS
  – Orthophoric in primary, 45 ET right gaze, 30 XT left gaze, 2 LH up gaze and orthophoric in down gaze at distance & orthophoric at near.
  – Motility: -4 abduction deficit, -2 depression deficit, -1 adduction deficit OD.
  – Worth 4 Dot: Fusion with intermittent uncrossed diplopia at distance and fusion at near.
  – Stereopsis: 3000”
  – Near Point Convergence: To nose.
M.R.: ORBITAL DERMOID RIGHT LATERAL RECTUS

• **Management:**
  – Mom wanted me to discuss surgery with the oculoplastic surgeon.
  – Spoke to Oculoplastic surgeon and he informed me that the resection of the orbital dermoid was difficult and had intercalated between the fibers of the right lateral rectus muscle.
  – Oculoplastic surgeon assured me a strabismus surgery would have to be performed if patient ever wanted to have normal alignment/motility again.
  – Referred to Dr. Torgerson for Vision Therapy.
M.R.: ORBITAL DERMOID RIGHT LATERAL RECTUS

• **Follow up 4 months after initial visit:**
  – Va 20/20 OU distance and near
  – 12 ET R gaze; 10 XT L gaze distance; orthophoric primary, up & down gaze at distance and orthophoric at near.
  – Motility: Right eye -2 Abduction deficit, -1 depression deficit and -1/2 adduction deficit.
  – Worth 4 Dot: Fusion distance and near.
  – Stereopsis: 100”
  – Near Point Convergence: To nose.

• **Discussion:** Role of *Vision Therapy* in restrictive/paralytic strabismus.
M.R.: ORBITAL DERMOMID RIGHT LATERAL RECTUS

Vision therapy

• 1st progress evaluation
  – Increase in stereopsis
  – Increase of BO and BI ranges at distance and near
  – Plan: 6 more VT visits without home activities
    • Follow up with Dr. Lenart
    • Without home activities would she be stable or backslide?
    • At progress showed continued to make gains
    • Continued in office vision therapy
EK: L Duane Syndrome

• **History:**
  – 1 year old with Left Duane Syndrome
  – Va: CSM OU
  – Cycloplegic refraction +1.50 OU
  – 15 degree face turn.
  – Motility: -4 abduction deficit OS, ortho primary distance & near
  – Narrowing of palpebral fissures on adduction.

• **Management:**
  – No glasses.
  – Discussed different treatment options, and parents chose to do strabismus surgery.

• **Strabismus Surgery:**
  – Transposition of Left superior rectus and Left inferior rectus to the left lateral rectus with Posterior Fixation Sutures.
EK: L Duane Syndrome

• Follow up Immediately post-operatively
  – Exam:
    • Orthophoric distance and 20 LXT’ near.
    • 5-10° L face turn
    • Motility: -2 abduction deficit.
  – Management:
    • No glasses.
    • Continue with drops and ointment for 2 weeks from the date of the surgery.
    • Return to clinic in one week.
EK: L Duane Syndrome

- Follow-up 4 months after first surgery
  - Exam:
    - 25 LXT, 20-25 LXT right gaze, 10 ET left gaze at distance and 20 LXT’ near.
    - 10º left face turn.
  - Management:
    - Proposed second surgery which parents opted to have for patient.
  - Surgery: **Right Lateral Rectus recess 10.0 mm.**
EK: L Duane Syndrome

• Follow up immediately post-operatively after second surgery:
  – Exam:
    • Orthophoric in primary distance & near.
    • Motility: -2 abduction deficit
    • no head turn.
  – Management:
    • Followed several months and alignment was good and stable.
• Follow up at 2 & ½ years old (7 months after 2\textsuperscript{nd} Surgery)
  – Exam:
    • Va: CSM OU
    • Cycloplegic refraction: -1.00 Sphere OU
    • 2 X distance and orthophoric near. 20 ET left gaze and 4 X right gaze (distance).
    • Motility: -1/2 Adduction deficit & -2 Abduction deficit OS
    • Near Point Convergence: 5 cm.
    • 10\textdegree Right face turn
  – Management:
    • No Glasses
    • Continue orthoptics clinic every 3-4 months.
EK: L Duane Syndrome

- Patient seen every 3-4 months and had a dilated exam every year for the next 5 years.
- Follow up 5 yrs later:
  - Exam:
    - Distance: 4 X primary, 14 LXT right gaze and 20 ET left gaze; near: 14 X(t) primary.
    - Motility: -1 abd def right eye and -2 abd def left eye
    - W4D: Fusion distance and suppress left eye near.
    - Stereopsis: negative
    - Near point convergence: 5 cm.
  - Referred to Dr. Torgerson for Vision Therapy.
- 2 years after Vision Therapy
  - Alignment/motility similar but Stereopsis 100” and fuses near and distance with Worth 4 Dot.
- Discussion: Role of vision therapy in paralytic strabismus.
EK: L Duane Syndrome

• Before VT, reading was difficult, difficulty remember things on tests, rubs eyes, etc.
  – No BO/BI ranges, suppression, low stereopsis

• 10 months of VT
  – Stereopsis: 70”
  – Ranges BI/BO distance and near in spite of a small vertical deviation
  – Reading comprehension increased
  – Reading stamina increased
  – Spelling easier to remember
  – Writing easier to align on lines and pages
  – Parents bought a 3-D TV for him to practice!
MJ: Infantile ET

• History:
  – 49 y/o female,
  – infantile ET with strabismus surgery @ 3 years old
  – History of patching.

• Exam:
  – Minor hyperopic astigmatic refractive error.
  – 14 ET DVD distance and 20 ET’ DVD near (relatively commitant).
  – W4D: Suppression OS distance, but fuses at near.
  – Negative Stereopsis;

• Management: Interested in strabismus surgery
  – Strabismus Surgery: Left lateral resection of 8.0 mm.
MJ: Infantile ET

• 6 wks post-op
  – Exam:
    • 4 ET & DVD distance and 6 ET’ & DVD near.
    • Negative stereopsis.
    • Fusion W4D distance and fusion at near with intermittent suppression OS.
  – Management:
    • Referred to Dr. Torgerson for Vision Therapy.

• 6 mos. Post-op
  – 2 ET & DVD distance and near
  – Fusion W4D distance and near!

• Discussion: Adult with infantile esotropia with multiple strabismus surgeries.
MJ: Infantile ET

• Her goals: to get her eyes to aim together and have less headaches
• 5/7/10 – 3/24/11 VT
• Gained BO/BI ranges
• Increased awareness of when using both eyes
• Decreased headaches
• Happy with what she had gained
• May want to do more VT in the future
RB: Thyroid Ophthalmopathy with Large Angle ET

• History:
  – 66 y/o male
  – Thyroid ophthalmopathy treated with steroids (no decompression)

• Exam:
  – -4.00 +1.00X121 OD; -4.00+1.00X40 OS add +2.75.
  – 20/25 OU distance and 20/30 OU near.
  – 60 LET & 10 L HOT distance and 55 LET’ & 10 L HOT’ near.
  – Motility: -1 to -2 elevation and depression deficit; -3 Right abduction deficit & -4 Left abduction deficit.
RB: Thyroid Ophthalmopathy with Large Angle ET

• **Strabismus surgery:**
  – *Bimedial rectus recession of 5.0 mm* (medial recti now 10.5 mm posterior from limbus).

• **Follow up 4 months post-operatively:**
  – Exam:
    • 40 RET & 6 RHT distance and 35 RET’ & 8 RHT’ near.
    • W4D: unx’d diplopia near and distance.
    • Negative Stereo
    • Motility: -2 abduction deficit OU; -1 elevation deficit OD & -2 elevation deficit OS

• **Strabismus surgery**
  – *Bimedial rectus recession of 3.0 mm, Left inferior rectus recession of 2.5 mm* (Now medial recti are 13.5 mm posterior to limbus).
RB: Thyroid Ophthalmopathy with Large Angle ET

• **3 months Post-operatively from 2\textsuperscript{nd} surgery:**
  
  – Exam:
    
    • 20 ET & 4LHT distance and near
    • Negative stereo.
    • W4D: Unx’d diplopia with intermittent LHT -1 Elevation and depression deficit OU
    • Motility: -1 Abduction & Adduction deficit OD; -2 Abduction & Adduction deficit OS

• **Strabismus Surgery:**
  
  – *Bimedial rectus recession of 2.5 mm* (now medial recti 16.0 mm posterior to limbus).
RB: Thyroid Ophthalmopathy with Large Angle ET

• 3 weeks post-operatively after 3rd strabismus surgery:
  – Exam:
    • 2 ET & 2 LHT distance and 6X’ & 1-2 LH’ near.
    • W4D: distance unx’d diplopia & LHT diplopia, near fusion!!
    • Stereopsis: 100”
  – Management:
    • Referred to Dr. Torgerson for Vision Therapy.
  – Discussion: role of Vision Therapy in restrictive strabismus.
RB: Thyroid Ophthalmopathy with Large Angle ET, 3 Surgeries

- Retired school psychologist
- Double vision at distance, seems to be decreasing with surgery, uses eye patch to drive
- After 12 visits, great gains in VT
  - “Vision is improving. No more double. Sometime images overlap. Driving more now. There are still areas that can continue to improve. But feels like he could graduate.”
- Before VT: no fusional ranges at near
- Now: BO: 18/14, BI 12/0
  - Distance: 2 eso, BO: 20/20, BI 4/-3
  - 20” stereopsis!
RB: Thyroid Ophthalmopathy with Large Angle ET, 3 Surgeries

• Prior had intermittent suppression at distance and 14 BO for single at near
• Goal 6 more VT visits to achieve BO/BI balance and endurance
• Loves the book, “Fixing My Gaze,” Susan Barry
• Fascinated with the Brock String
• Wears a baseball hat to VT.
  – When reading a distant chart, he would use his brim as a level and use it to guide vertically
  – Must be careful in VT to monitor. Help people to not rely on “crutches” for the visual system.
KW: Orbital Trauma, L 4\textsuperscript{th} Cranial Nerve Palsy

• History:
  – 30 year old male,
  – Trauma to right orbit referred by Dr. Torgerson.

• Exam:
  – Plano refractive error 20/20 OU distance & near.
  – 20 LHT distance & 10 RHT’ near and maps to Left fourth Cranial Nerve palsy.
  – W4D: LHT diplopia distance and LHT & X’d diplopia near.
  – Negative stereo

• Management: Strabismus surgery:
  – Left superior rectus recession of 8.0 mm.
KW: Orbital Trauma, L 4th Cranial Nerve Palsy

• 6 wks Post-operatively:
  – Exam:
    • Ortho near and distance, but 10 RHT up gaze.
  – Motility: -2 elevation deficit in adduction OS
  – W4D: fusion distance and near.
  – Stereopsis: 40”

• Management:
  – Referred back to Dr. Torgerson for post-operatively for Vision Therapy (Orthopedic PT paradigm).
KW: Orbital Trauma, OS 4th Cranial Nerve Palsy

• Referred to initially by an OD
  – KW had long-term visual issues, strabismus surgery at 5 years old. As a teen had significant vertical heterotropia and esophoria. Able to fuse at times and suppressed at others.
  – Summer 2011 had a concussion at work
  – Significant double vision, balance and dizziness issues. Has seen a neurologist. Had PT and S/L.
KW: Orbital Trauma, OS 4th Cranial Nerve Palsy

• Consultation:
  – Seeing double I-Pad and phone
  – Very fatiguing
  – Because of the large vertical deviation gave option of diagnostic VT for 8 sessions and then a progress evaluation to assess next steps
  – OR surgical consult: recommended 2 surgeons
  – Book: Fixing My Gaze by Susan Barry, PhD

• Best fit for his life: surgery and then VT
  – Surgery with Dr. Lenart and then 14 VT sessions
Progress evaluation:

- “Can fuse now when double,” “3-D movies are different,” “Still has headaches with visual activities,” and double with lack of sleep.

- With VT gained 50” stereopsis
- BO ranges at distance and near, BI ranges at near
- Phoric on cover test with slight head tilt to the right
- Moving to Oregon – referred to VT practice, will continue
- Happy with results
Hello Dr. Torgerson, First I want to thank you for the incredible visit before I left for Alaska! It was incredibly encouraging to have you confirm that I am not seeing normally and to give me hope that I will get better... I am tired of double-vision, walking with a head tilt to level things out and the fatigue and headaches that follow my vision. I am willing to do the work but if I work for months and then still need surgery I would rather have the surgery and then do the therapy in my recovery. ...My physical therapist hopes that my neck will improve if my sight doesn't cause me to tilt my head all day. I know that no matter what avenue we take there will be considerable work. I am concerned about pushing that work too far into the summer as this is when my work load really increases. ....Once again, thank you so much for giving me hope!!!
MM: Infantile ET (early onset accommodative ET?)
No Surgery

• History:
  – 38 y/o female (pre-presbyopic) for Third opinion
  – Early onset ET, treated with patching, glasses as child, no strabismus surgery.
  – In childhood treated with drops for one year (we think it is phosphline Iodine) & went XT spontaneously, POTS ~90% will alternate.
  – Vision Therapy during childhood.
  – Now a professional Pianist.
  – Brother with ET strab. Sx. X 2
  – Mom X(T).
MM: Infantile ET (early onset accommodative ET?)
No Surgery

• Exam:
  – Refractive error -2.25+0.25X20 OD; -2.25+0.25X78 OS Va 20/20 OU.
  – Smallest over minus causes severe asthenopia.
  – 10 XT & 4LHT distance and 12 XT & 2 LHT near.
  – W4D: supp os distance and near.
  – Stereopsis: negative.
  – Near Point Convergence: > 12 cm.

• Referred to Dr. Torgerson for Vision Therapy.
MM

• Consultation
  – Showed how 2 pair of glasses could be of help
    • Distance
    • Near
  – Loaned book, “Fixing My Gaze”
  – Vision therapy an option in the future
MC: Accommodative ET with high AC/A

• History:
  – 12 year old with a history of accommodative esotropia with high ac/a in glasses with bifocal.
  – **Vision Therapy** with Dr. Torgerson
  – Would prefer to lose bifocal and reduce amount of Vision Therapy visits.

• Exam:
  – -0.75+1.00X15 OD; -1.00+0.75X165 OS BF+2.50
  – Cc: 2E distance and near: 20 ET’/2E’
  – W4D: Fusion distance and near
  – Stereopsis: 100”
  – Motility: Full range of motion of her extraocular muscles.
MC: Accommodative ET with high AC/A

• Discussed different treatment options and she wanted to have surgery:
  – **Bimedial rectus recess -4.0 with Posterior Fixation Sutures 10.0 mm limbus.**

• Immediately post-operatively had excellent alignment, fusion and stereo.

• 2 months post-operatively:
  – 25 XT distance and near
  – Put her in overminused lenses -1.00 OU
MC: Accommodative ET with high AC/A

- 8 months Post-operatively was going to perform another surgery for consecutive XT
  - Pre-op exam results:
    - 14 X(t) distance and 2X’ near.
    - **Cancelled second surgery.**
- 1 yrs post-operatively
  - 20/20 ou; over-minused lenses -1.00 ou; 4X distance and orthophoric at near.
  - Fusion near and distance with 100” stereo.
  - -1/2 abduction deficit ou.
MC: Accommodative ET With High AC/A

First exam with us: 6 years old

• Intermittent esotropia with accommodative component

• Since young, followed by pediatric ophthalmologist in large medical facility: glasses and patching

• I prescribed bifocals and suggested VT
  – Chose annual evaluation next 6 years
  – Mom didn’t want daughter to have bifocals anymore so elected to have strabismus surgery

• Referred to Dr. Lenart for surgery. He prescribed VT

• Family followed through with only 2 VT visits. Wants contacts. Referred to local optometrist.
JW: Accommodative ET with high AC/A ratio

• History:
  – 4 year old with Accomodative Esotropia with high AC/A
  – Status post Strabismus Surgery Bimedial rectus recess -3.5 mm @ 1 year old by another doctor.
  – Previous doctor did surgery and said everything is fine for 3 years, then all of a sudden said Jacob needed another surgery without much explanation or counseling.
  – Mom wigged out and sought another opinion with Dr. Torgerson, who referred to Dr. Lenart prior to beginning Vision Therapy.
JW: Accommodative ET with high AC/A ratio

• Exam results:
  – +2.50+3.50X90 OD 20/30; +2.50+3.50X90 OS 20/40-2; 20/20 OU near; +3.00 Add.
  – 20 ET DVD OU Distance and 25 ET’/16 ET’ near.
  – Motility: Bilateral inferior oblique overaction +3.

• 2nd strabismus surgery: Bilateral rectus resect +5.0 mm & Bilateral inferior oblique recess to 10.0 mm limbus.
  – Immediate Post-operatively had results good. Well aligned and referred back to Dr. Torgerson @ 2 weeks after surgery for Vision Therapy.
JW: Accommodative ET with high AC/A ratio

- 4 months post-operatively.
  - Exam results:
    - 20/40 OU distance and 20/20 OU near.
    - 14 ET distance and 14 ET’ near.
    - **Vision therapy** expensive and only have limited benefit left.
    - Mom decided for Jacob having another surgery.
  - 3rd surgery: **Bimedial rectus recess -2.0 mm.**
    - Immediately post-operatively good alignment and referred back to Dr. Torgerson within 6 wks. of the surgery for **Vision Therapy.**
JW: Accommodative ET with high AC/A ratio

• 18 months after 3rd surgery:
  – 20/20 OD, 20/25° OS distance and 20/20 OU near.
  – DVD OU distance and near.
  – Worth 4 Dot: Alternate suppression distance and fusion at near.
  – Continues with vision therapy.
JW: Accommodative ET With High AC/A ratio

• 9 VT visits then a took a break
  – Gained start of stereopsis 200”
  – Eyes look a lot straighter, grandma noted
  – Esotropia at near: bifocals for the accommodative issues

• Surgery

• Returned for 10 VT visits then a break
  – 3-D puzzles can see town popping out!
  – Eye hand coordination improved
  – Worth 4 Dot: OS suppression at distance
    • Fusion at 12 inches
KB: Infantile ET

• History:
  – 4 year old female with accommodative Esotropia.
  – Noticed Esotropia at 17 months.
  – Saw another local Pediatric Ophthalmologist who recommended glasses and surgery.
  – Bimedial rectus recess and Bilateral inferior oblique recess at 3 years old.
  – Local Pediatric Ophthalmologist recommended another surgery but parents sought Dr. Torgerson first before doing the surgery.
  – Dr. Torgerson referred patient to Dr. Lenart before beginning Vision Therapy.

• Exam:
  – Wearing +6.50 OU with +2.75 Add
  – 20/40⁻² OD, 20/50 OS distance and 20/20 OU near.
  – Cycloplegic refraction: +5.50+2.50X90 OD; +5.00+3.00X90
  – 16 ET distance and 18 ET'/12 ET' near.
  – Worth 4 Dot: fusion at near, but unable distance.
  – Stereopsis: negative
KB: Infantile ET

• Suggested another surgery: **Left lateral rectus resect +8.0 mm.**

• 4 months post-operatively
  – Co-managed with another Optometrist and his associate put the child in over-minused glasses
  – +2.00+2.00X90 OD; +2.50+1.50X90 OS
  – 12 ET distance and near.
  – With +2.00 in front of her eyes 2E distance and near.
  – Recommended the stronger original glasses prescription.

• 5 months post-operatively:
  – 6 ET distance and 8 ET’ near.
  – Recommended continue **Vision Therapy** and in a stable monofixation esotropia state now.
KB: Infantile ET

- 9 VT visits then continued VT with optometrist closer to home
- $5-9^\Delta$ esotropia at 20’
- $5^\Delta$ esotropia at 16”
- Randot stereopsis: 400”
- Far stereopsis: OD suppression
- Pursuits: uneven visual tracking, no motor field restrictions
SN: ET with Schizo-Affective Disorder

• History:
  – 39 year old Australian Female referred by Dr. Torgerson
  – Known acquired esotropia status post strabismus surgery at age 25 years old in Australia.
  – Diplopia for 20 years.
  – Lasik at age 30 years old.
  – Past Medical History: **Schizoaffective disorder (manic/depressive syndrome)**, Irritable Bowl Syndrome and migraines.
  – Medications: Ambien, Oxycodone, Seraquil (for Schizoaffective disorder), Cetrizine, Creodon, Alprazalam.
SN: ET with Schizo-Affective Disorder

• Exam:
  – Plano OD, 20/20; +0.25 Sph OS, 20/20 & 20/20 OU near.
  – 16ET & 2LHT distance and 14 ET near.
  – Motility: -1elevation deficit in adduction.
  – Worth 4 Dot: Supp OD distance, Alt supp OS.
  – Stereopsis: negative.

• Discussed the different treatment options and patient wanted to have surgery: Right medial rectus recession -6.0 mm.
SN: ET with Schizo-Affective Disorder

• 1 month post-operatively
  – 20/25 OD; 20/20 OS; 20/20 OU near.
  – 12 ET distance and 6 E(T)’ near.
  – W4D Supp OD distance and Fusion near.
  – Stereo 100”
  – Referred back to Dr. Torgerson for **Vision Therapy**.

• 2 years post-operatively
  – -1.75+0.75X135 20/20 OD; -1.00 Sph 20/20 OS; near 20/20 OU
  – Ortho distance and 4 E’ near
  – Worth 4 Dot: Fusion near and distance.
  – Stereopsis: 40”.
SN: ET with Schizo-Affective Disorder

Quality of life decreasing
• Grading papers is difficult
• Driving distance is difficult
• Dizziness

Evaluation: strabismus with diplopia, RIO
• Refer Dr. Langman, ENT: dizziness
• Refer Dr. Lenart for strabismus opinion
• SN elected to have strabismus surgery
• Post surgery said had 3-D for 3 days and then lost 3-D
SN: ET with Schizo-Affective Disorder

• Consultation regarding VT
  – Anomalous correspondence
• We had seen her son for VT
• With deeply embedded AC and diplopia, she was not in a place mentally/emotionally that she could do the required work to see if we could make change.
• May have VT in the future
  • Read, “Fixing My Gaze”
SB: Infantile ET with 4 Surgeries

• History:
  – 48 year old male referred by Dr. Torgerson
  – 4 previous strabismus surgeries (no Vision Therapy yet)
  – Last surgery ~20 years ago.
  – Recently given prism reading glasses by local Pediatric Ophthalmologist
  – Complain of diplopia
  – Mostly wears reading glasses w/o prisms
SB: Infantile ET with 4 Surgeries

• Exam:
  – +0.25 sph OD 20/20; +0.50 sph OS 20/20 +2.25 Add 20/20 OU
  – 18 LE(T) distance and 16 LE(T)’ near.
  – Worth 4 Dot: Suppression OS with intermittent uncrossed diplopia distance and Fusion with intermittend uncrossed diplopia near.
  – Stereopsis: 800”

• Discussed different treatment options and patient wanted to have surgery: **Left medial rectus recession -5.0 mm**
SB: Infantile ET with 4 Surgeries

• 1 Month post-operatively:
  – 20/20 OU distance and near (near cc)
  – 4 E distance and ortho near.
  – Worth 4 Dot: Fusion distance and near.
  – Stereopsis: 100”
  – Referred back to Dr. Torgerson for Vision Therapy.
SB: Infantile ET with 4 Surgeries

Initially SB e-mailed: he was strabismic and hyperopic

- Had 4 surgeries
- Oncoming headlights were difficult at night lately
- Closes eye more often
- Double vision biggest challenge
- Rides bike to work.
- Works in graphics
- Detail person

Evaluation: esotropia with anomalous correspondence
SB: Infantile ET with 4 Surgeries

Plan: 6 sessions of diagnostic vision therapy and assess if we should continue or do surgery

• After 4 visits, SB saw progress
  – Driving was better at night
  – Conversation at a distance difficult, eye crosses
  – Decreased power needed in glasses for reading
  – Visually less strain with his computer work

• Scheduled a consultation with Dr. Lenart
HM: Acquired Esotropia

• History
  – 32 year old female Pharmacist
  – Diplopia 18 months after getting sick on trip to India.
  – Saw local Neuro-ophthalmologist who referred to Dr. Torgerson for Vision Therapy.
  – Vision Therapy for 6 months but diplopia now constant (progressive loss of control despite Vision Therapy)
  – Dr. Torgerson referred to Dr. Lenart
  – Diplopia worse at distance and in morning.
  – Has prism glasses 3 Base out OU & wears for driving only.
HM: Acquired Esotropia

• Exam
  – -5.00+0.50X146 (3 BO) OD, 20/20; -4.25 Sph (3 BO) OS, 20/20.
  – With glasses: 8E(t) distance and 2 E’ near.
  – Worth 4 Dot: Fusion distance and near.
  – Stereopsis: 40”
  – Prism Adaptation Test (PAT) completed over course of 1 month and adapted to 40 Base Out.

• Management:
  – Did surgery **Bimedial rectus recession -5.5 mm.**
HM: Acquired Esotropia

• Post-Operatively 1 yr.
  – Orthophoric distance and 2 E’ near.
  – Worth 4 Dot: Fusion distance and near.
  – Stereopsis: 40”

• Post-operatively 4 years.
  – Same result as above.
  – Unfortunately, unable to convince patient to return to Vision Therapy to complete the loop of the paradigm Vision Therapy-Surgery-Vision Therapy.
HM: Acquired Et

- Neuro-ophthalmologist reported: HM became ill when in India for vacation. Developed double vision at distance, 2 days after return.
- Initially intermittent. Then constant right eye inward. Previously had a wandering eye with too much alcohol. History unremarkable.
- Concomitant right esotropia. MRI negative. Prism glasses and referral to an orthoptist.
HM: Acquired Et

- Ophthalmologist’s orthoptist’s office referred to AVTC
- We saw HM for 10 VT visits
- Frustrated as double continued
- Referred to Dr. Lenart
RS: Intermittent Exotropia

• History:
  – 44 year old female geriatric Physical Therapist (home hospice)
  – Intermittent Exotropia as child, patched until ~11 years old.
  – Status Post strabismus surgery at ~14 year old at University of Washington.
  – Straight until age 33 years old when had stroke.
  – ROS: Stoke, Arthritis, Depression, HBP
  – Medications: Lortab, Celexa, Benicar.
  – Now difficult to control intermittent exotropia
  – Evaluation with Dr. Torgerson revealed it was difficult for patient to fuse because of the large angle exotropia so she referred to Dr. Lenart.
RS: Intermittent Exotropia

- **Exam:**
  - -4.00+0.5X67 OD, 20/20; -2.25+1.75X77 OS, 20/20.
  - 50XT & 18 LHT distance and 70 XT & 5 LHT near.
  - Motility: -1 adduction deficit OD; +2 LIOOA
  - Worth 4 Dot: Alternate suppression distance and near.
  - Stereopsis: negative.
  - Near Point Convergence: > 12cm.
RS: Intermittent Exotropia

• Discussed different treatment options and patient wanted to go forward with surgery.
  – Did Bimedial rectus resection +9.0 mm & Left inferior oblique recess and transpose to 6 mm limbus (now acts like depressor).
  – Post-operative day 3
    • 20/20 OU
    • 18 LHT distance and 25 LHT’ & 14 XT’ near.
    • Motility: -1 abduction deficit OU
    • Worth 4 Dot: Alternate supp distance and near.
    • Stereopsis: Negative.
    • Near Point Convergence: 6 cm.
RS: Intermittent Exotropia

- Post-operatively 3 months:
  - 20/20 OU
  - 30 XT & 16 LHT distance & 40 XT’ & 18 LHT’ near.
  - Motility: -1/2 Abduction deficit OS
  - Worth 4 Dot: Alternate suppression Distance and near.
  - Near Point Convergence: > 12 inches.

- Second surgery: **Bimedial rectus resection +7.0 mm; Right inferior rectus recession -6.0 mm with advancement of Capsulopalpebral fascia of Right lower lid to 13.5 mm limbus**
RS: Intermittent Exotropia

- Post operatively 3 months from second surgery performed by Dr. Lenart:
  - 20/20 OU
  - 16 XT & 6 LHT distance and 30 XT’ & 12 LHT’ near.
  - Motility: Full range of motions EOM
  - Worth 4 Dot: Alternate Suppression distance and near.
  - Near Point Convergence: 10 CM
  - Referred back to Vision Therapy with Dr. Torgerson.
- Post operatively 3 years:
  - 20/20 OU
  - 20 XT & 6 LHT distance and 30 XT’ & 6LHT’
  - Motility: Full range of motions extra-ocular muscles.
  - Worth 4 Dot: Alternate suppression distance and near.
  - Near Point Convergence: > 12 cm.
RS: X(T)

• Initial consultation: gave options for surgery and/or vision therapy. Premature as infant, XT since birth. Surgery at 10 year old.
• Referred to Dr. Lenart: had 2 surgeries
• Luster: no luster with red/green, no luster with +10.00
• Unilateral cover test: XT but measures eso, anomalous correspondence
• Chose not to do vision therapy
• Happy eyes looked aligned
RS: X(T)

<table>
<thead>
<tr>
<th>Post surgical Muscle</th>
<th>Imbalance Measurement</th>
<th>Test</th>
</tr>
</thead>
<tbody>
<tr>
<td>Left Field</td>
<td>Near: Lateral/Vertical</td>
<td>Right Field</td>
</tr>
<tr>
<td>6 EP/Ø</td>
<td>4 EP/Ø</td>
<td>4 EP/4LHP</td>
</tr>
<tr>
<td>8 EP/Ø</td>
<td>4EP/Ø</td>
<td>4EP/3LHP</td>
</tr>
<tr>
<td>14EP/Ø</td>
<td>4EP/Ø</td>
<td>4EP/Ø</td>
</tr>
<tr>
<td>Left Field</td>
<td>Distance: Lateral/Vertical</td>
<td>Right Field</td>
</tr>
<tr>
<td>3 EP/2 RHP</td>
<td>1 EP/Ø (moves)</td>
<td>2 EP/0.5 LHP</td>
</tr>
<tr>
<td>4.5 EP/0.5 LHP</td>
<td>2EP/Ø</td>
<td>Ø EP/0.5 LHP</td>
</tr>
<tr>
<td>4.5 EP/0.5 LHP</td>
<td>1EP/0.5 RHP</td>
<td>2EP/0.5 LHP</td>
</tr>
</tbody>
</table>
KC: Traumatic Brain Injury Strabismus

• History:
  – 49 year old female status post Motor vehicle accident 1 year ago.
    • Subdural Hematoma
    • Coma 10 days
    • Sustained complete Left third Cranial Nerve Palsy
    • Vitreous hemorrhage OS after accident.
    • Referred by the Retinologist.
  – Seen by local Developmental Optometrist for Vision Therapy at 6 months after accident.
  – Seizure week before exam and started on Dilantin.
KC: Traumatic Brain Injury Strabismus

• Exam:
  – Distance VA 20/20 OU, near: 20/80 OU
  – 80 LXT & 30 LHOT in primary
    • 20º Chin up & 10º Left tilt
    • Nystagmus OD
    • Up Gaze: 50 LXT & 60 LHOT
    • Down Gaze: 80 LXT & 30 LHT
    • Right Gaze: 60 LXT & 25 LHOT
    • Left Gaze: 60 LXT & 50 LHOT
    • Motility: -4 elevation deficit & -3 depression deficit OS
  – Referred to Dr. Torgerson for Vision Therapy for 2 months.
KC: Traumatic Brain Injury Strabismus

• **1st Strabismus Surgery:**
  – Counseled that many strabismus surgeries to get her to use her eyes together.
  – Right superior rectus recession -10.0 mm; Right inferior rectus resection +4.0 mm; Left medial rectus resection +10.0 mm; Left lateral rectus recession -12.0 mm.
    • Post-operatively three months:
      – 30 LHOT & 15 LET distance and 30 LHOT’ near.
      – Motility: -4 elevation deficit, -3 depression deficit, -3 abduction deficit.
  – **2nd Strabismus surgery:**
    • Left medial rectus recession -6.0 mm; Left inferior rectus recession -5.0 mm; Right lower lid capsulopalpebral fascia 16 mm from the limbus.
KC: Traumatic Brain Injury Strabismus

- 3 months after second surgery:
  - 12 L HOT distance and 16 L HOT’ & 6 XT’ near.
  - Worth 4 Dot: Fusion distance and near with AHP
  - Stereopsis: 50” with AHP
  - Abnormal head position: Variable Chin up, L face turn
  - Motility: -4 Elevation deficit, -3 depression deficit and -1 abduction deficit OS.
- Switching around seizure medications
  - Very frustrated about having to relearn her world every time has another strabismus surgery
  - Strabismus and motility changing spontaneously and slowly, indicating a slow monotonic recover of the Left third Cranial nerve palsy.
KC: Traumatic Brain Injury Strabismus

• 1 year after second surgery:
  – 25 LHOT distance and 12 LHOT’ & 8 LXT’ near.
  – Motility: -4 Elevation and depression deficit; -2 abduction deficit; -1 adduction deficit OS
  – Worth 4 Dot: Right hypertropia diplopia distance and near.
  – Stereopsis: 80”

• 3\textsuperscript{rd} Strabismus surgery:
  – Left superior rectus resection +4.0 mm; Left inferior rectus recession -5.0 mm.
KC: Traumatic Brain Injury Strabismus

• 1 year after third strabismus surgery:
  – Va 20/20 OD; 20/25 OS distance and 20/40 OU near.
  – 6 LHOT distance and 25 X(T)’ & 6 LHOT’ near.
    • Up gaze: 30 LHOT
    • Down gaze: 40 LHOT & 10 XT
  – Abnormal Head Position: 5º Chin up
  – Worth 4 Dot: Fusion distance and suppresses OD near.
  – Stereopsis: 100”
  – Near Point Convergence: 12 cm
  – Motility: -2 elevation deficit OD; -3 to -4 elevation deficit, -4 depression deficit, -1 abduction deficit and -2 adduction deficit OS

• Referred on to Oculoplastics for eyelid ptosis.
• Referred back to Dr. Torgerson for Vision Therapy.
KC: Traumatic Brain Injury Strabismus

- Post TBI, high exo, referred by Dr. Lenart
- Had already experienced VT with another local optometrist
- 2 month diagnostic VT. Increasingly frustrated, she wanted changes quicker. Didn’t want to do home activities. Knows it is brain re-training but chose surgery.
- Frustrated TBI and wants the world to be as it used to be
AC – 4 Months Old

- Referred by Dr. Lenart @ 4mos.
- Began 8/31/10 trial VT: could we get increased attention on R side, fixation and following.
- VT: initially used yoked prisms, lights, tints, r/g for stimulation
  - Home: musical toys, gentle visual/vestibular activities. Lay on back for fixations/pursuits/saccades to take out gravitational/motoric demands. Emphasized pursuits and saccades across midline and bilateral reach/grasp/release. Began to roll and make global development increases.
AC – 4 Month Old

- Started VT every other week in 2/11; weekly in 5/11
  - While tracking, eye hand, motor coordination, movement all increased, but no significant change to esotropia, even with binasals occlusion, red/green, and visual/vestibular work. At times, hyper OD noted.

- Bilateral strabismus surgery with Dr. E. 9/11.
  - OD XT noted after, increased in following 2 months. Occasional patching and -1.00 RX (Dr. E. Rx'd -2.00) in the evenings.
AC – 4 Month Old

• In VT: added +/- lenses, cover-uncover-recover
• By August 2012, Dr. E said that 2nd surgery did not need to be done!
  – Therapy continues to stabilize XT/Hyper OD and increase developmentally appropriate visual information processing and support global development
• AC is walking, running, talking, counting, accurately identifying shapes/colors, and working on understanding/communicating concepts such as "in/out" to be ready for stereoscopic targets (e.g., "tell me when the dog is out of the circle.")