Think Outside the Box

• Goals of today’s lecture:
  – Define success in treatment
  – Determine the best path to get there
    • Spoiler: it may not be what you think
  – Provide specific hands-on examples of techniques

Strabismus & Amblyopia
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Model of Vision

Keys to Success

• Peripheral
• Movement
  – Gross Motor
  – Balance
  – Primitive Reflexes

Prescribing

• Foundation of beginning good therapy is having the best functional prescription
• Lots of different opinions and schools of thought on what to prescribe
• Consider:
  – Anisometropia/Aniseikonia
  – Astigmatism
  – Near point prescription
  – Prism
  – Contact lenses vs. spectacle correction
• Lenses are important and powerful! Never underestimate your ability to help a patient with lenses

Amblyopia

• Standard definition varies
  – Griffin & Borsting – “Reduced VA not correctable by refractive means and not attributable to ophthalmoscopically apparent structural or pathological anomalies or proven afferent pathway disorders…Best correctable acuity is worse than 20/30.”
  – Burian – “Strictly speaking, any difference in acuity between two eyes represents an amblyopia of the eye with the poorer vision…From a practical, clinical standpoint a difference in vision of two lines on a visual acuity chart is frequently used as a criterion for amblyopia.”
### Amblyopia

- Ciuffreda – “Functional amblyopia is a unilateral (or infrequently bilateral) condition in which the best corrected visual acuity in poorer than 20/20 in the absence of any obvious structural or pathologic anomalies, but with one or more of the following conditions occurring before the age of six years:
  - Significant anisometropia
  - Constant unilateral esotropia or exotropia
  - Significant isometropia
  - Significant unilateral or bilateral astigmatism
  - Image degradation

- Sherman – Amblyopia is a binocular condition manifested monocularly. The reduction of visual acuity is merely the presenting symptom. Amblyopia is a dysfunction that restricts an individual’s ability to gather, process, analyze, and respond to visual information. Amblyopia is a problem primarily of binocular competition.

### Amblyopia (cont’d)

- Adaptations made by the patient via neural inhibition and suppression cause abnormalities in oculomotor, fixation, accommodation, spatial localization, speed of perception, etc. The purpose of therapy is to maximize the patient’s performance in visually related tasks such as academics, sports, and driving. Treatment can be expeditiously accomplished, and a long-term cure sustained, if the emphasis is on developing high degrees of binocular function. The conventional approach of occlusion and full optical correction is rarely needed.

### Types of Amblyopia

- Refractive
  - Anisometropia
  - Isoametropia (high prescription)
- Strabismic
  - Must be constant
  - Usually esotropia
- Image degradation/Form deprivation
  - Ex: congenital cataract

### Eccentric Fixation

- Key: this is a binocular problem affecting monocular function
  - You must measure EF with one eye occluded
- Fixation with some point other than the fovea
- Occlude the “good” eye and the amblyopic eye will fixate with a non-foveal point
- Note: refractive amblyopes normally have centric fixation while strabismic amblyopes normally have eccentric fixation
Evaluating EF

- Visuoscopy
- MIT – Haidinger’s brush
- After image transfer
- Monocular corneal reflex (angle kappa)

- Note: Be careful when refracting someone with EF, if you complete refraction monocularly, you will provide prescription for the eccentric point
  - Consider Humphriss refraction (fog other eye)

Patching

- First, think of the goal of treatment
  - Should be normal binocular function (in most cases)
- Does it make sense to patch with end goal in mind?
- Fitzgerald & Krumholtz showed that vision therapy significantly improved maintenance of acuity gains. (They did use patching with therapy).

Patching

- Some patching can be helpful
- However, active vision therapy is the best treatment
  - Find a doctor at covd.org

Patching

- If you don’t patch, what DO you do?
- Biocular/Binocular tasks!
- Our goal is to improve binocular function, why not address that from the beginning?
- If you choose to patch, consider a spot patch so patient maintains peripheral function of the occluded eye

Binocular Amblyopic Activities

- Polarized activities – Vectograms
- Red/Green activities
- Dissociated prism activities

Strabismus

- Esotropia, exotropia, hypertropia
- Constant vs. intermittent
- Comitant vs. noncomitant
- Monocular vs. alternating
- Post-surgical vs. no history of surgery
- Double vision vs. suppression
- Recent onset vs. long-standing
- Anomalous correspondance vs. normal correspondance
- Presence of: amblyopia, nystagmus, DVD, head turn/tilt
Strabismus

- Infantile Esotropia (not congenital)
  - Usually presents 2-6 months of age
  - Latent nystagmus and DVD common
- Accommodative Esotropia
  - Usually presents 2-3 years of age
  - Can be intermittent
- Note: Constant exotropia in a child is rare – suspect ocular disease until proven otherwise

Strabismus – Goal Setting

- First step is to determine what success is for the patient/parent
- Specific goals
  - Straighter eyes
  - Less clumsy
  - Better depth perception
    - Better baseball performance
  - Equal vision/acuity
  - Stereopsis
- If you don’t involve the patient in goal setting, they may not define success the same way you do!

Anomalous Correspondence

- We must define this to continue our discussion
- Occurs when two foveas do not form corresponding points
  - This is a brain adaptation (cortical) – not retinal/ocular in origin
  - The anomalous point does not have to remain constant

Case Report – J.W.

Testing for ARC

- Luster Color Fusion Testing
- Bagolini lenses
- Hering-Bielschowsky After Image Test
- Amblyoscope

- Note: can show ARC on some tests and NC on others
How is that different than Eccentric Fixation?

• Anomalous correspondence is a binocular/biocular phenomena/adaptation
• AC and EF can coexist
• You must first evaluate presence or absence of EF before evaluating AC
  — Some methods (After Image Test) won’t work if patient also has EF

Quiz Time

• Combine After Image transfer with MIT

Goals determine treatment plan

• While sensory adaptations such as AC can impact likelihood of achieving binocular fusion, it does not impact ability to achieve improved cosmesis

Road #2

• In contrast to Road #1 that breaks AC and can cause double vision (which may or may not be short lived)
• Goals include:
  — Improve cosmetic appearance by enhancing AC
  — Improve performance in daily life

Treatment Activities for Road #2

• Syntonics
• Vestibular/VOR
• Primitive Reflexes
• Bilateral Integration
• Peripheral Fusion
• Key: Avoid all central and monocular tasks
  — Exception: eye stretches

Binasal Occlusion

• Two reasons:
  — Esotropia (especially cross-fixation)
  — Symptom relief (TBI, CI, etc.)
  • Works especially well for VMS (Visual Motion Sensitivity) symptoms
    — This is an imbalance between central/peripheral systems
• For esotropia, they are often moving their anomalous point so drastic cosmetic changes can happen quickly
Binasal Occlusion

How to Apply Binasal Occlusion

• Materials: translucent scotch tape, black electrical tape, stippled clear nail polish, Bangerter foils
• Typically placed nasal to the pupillary-limbal margin
• Typically tilted approximately 15 degrees to allow better near viewing with convergence (less occlusion in lower portion of glasses)
  – Use Streff wedge to measure or watch for improvement as you slide it
• Can apply to back/front of lenses or both

Questions?

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Sources