Colorado Vision Summit
Amblyopia and Strabismus – 2 hours
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• 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
• Model of Vision
• Keys to Success
Periperal
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.”
  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 isoametropia
  • Significant unilateral or bilateral astigmatism
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. Adaptations made by the patient via neural inhibition and suppression cause abnormalities in ocular motility, 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.

Function of the amblyopic eye is generally worse in multiple areas
Accommodation
Oculomotor abilities
Visual perception/spatial awareness
In fact, the non-amblyopic eye performs worse than “normal” eyes of peers on these same evaluations

- 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 biocular 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).

Some patching can be helpful
However, active vision therapy is the best treatment
Find a doctor at covid.org
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
- Types:
  - 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
- Dr. Bob Sanet’s lecture changed my approach to strabismus

Road #2 treatment
- 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
  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
  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
  • 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.)
  For esotropia, they are often moving their anomalous point so drastic cosmetic changes can happen quickly
  Demo and tips for application