TITLE: The management of refractive error in complex paediatric disability
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Abstract
RR who has quadriplegic cerebral palsy, first attended a paediatric low vision clinic as an uncorrected, uncooperative severely sight impaired 5 year old. "Musical" objective cycloplegic refraction unveiled 12 dioptres of myopia which when corrected, and managed, over a 15 year period has transformed RRs educational and social interactions.

Case History
• 22 year old female with quadriplegic cerebral palsy
• First comprehensive ophthalmic assessment age 5yrs
• History of learning disability
• Complex behavioural challenges
• Mobility restrictions

Pertinent Findings
Clinical
• High Myopia (Rt -10.00/-3.00 x 10, Lt -9.00/-2.00 x 10)
• Moderate vision impairment (0.50 LogMAR Rt/Lt)
• Right Convergent Strabismus
• Intermittent gaze palsy
• Accommodative lag
• Rt sided homonymous field defect

Physical
• Wheelchair user, severe mobility restrictions
• Severe motor function disability (Level 1)
• Requires care 24/7

Differential Diagnosis
• Quadriplegic cerebral palsy (Mixed)

Discussion
• RR was first referred to the paediatric low vision service at the Royal Victoria Hospital Belfast Northern Ireland as a 5 year old child with severe quadriplegic cerebral palsy. Previous ophthalmic assessments had been attempted with inconclusive results. She was noted to be visually unresponsive, uncommunicative, have severe motor
disability and had very significant behavioural problems. Referral was to seek reassurance that there were no underlying ocular problems that would be amenable to optometric or ophthalmological management.

**Treatment/Management**

- Utilizing a creative approach to refraction *(Musical Cycloplegic Retinoscopy)*, it became clear that there was at least 10 dioptres of bilateral uncorrected myopia present. Once corrected using a step wise process it became possible over a number of years to quantify a broad range of visual functions. Clinical findings when shared with those responsible for educational and social care, resulted in a quality of life transformation.

**Conclusion**

- This case demonstrates how utilizing a creative approach to refraction and visual function assessment can reveal undiagnosed refractive error which when managed over a prolonged period of time can result in a dramatic improvement in quality of life for patients with complex disability.
Owoeye Outline
Title: ARC Smackdown!

Abstract: Microtropia is a small angle strabismus with very unique characteristics. Anomalous correspondence (AC) is a well known feature of microtropia that can be very difficult to eliminate. This case reviews these entities.

I. Case History
a. 5 year old Asian male
b. Failed recent school screening. Mom also concerned because he sits too close to the TV.
c. Mom has not seen any eye turns or head turns.
d. Ocular History: Never had an eye exam.
e. Medical and family history: unremarkable. No medications and no known drug allergies.

II. Pertinent Findings (from a few visits)
   a. Initial visit: Uncorrected VA: 20/50 OD, 20/30 OS @ D; VA: 20/40 OD, 20/30 OS @ N. Stereoacuity: none. Uncorrected CT: Esophoria 12 @ D & N. EOMs: full and unrestricted OU. No APD. Cycloplegic refraction +5.00-1.00 x 170 OD and +5.50-1.50 x 180 OS. Anterior and posterior segments were unremarkable OU.
   b. Visit 2: Reported compliance with his glasses. Corrected VA 20/40 OD, 20/20 OS @ D. Stereoacuity: none. Corrected CT: CRET 3 @ D & N. EOMs full. No APD.
   c. At age 8 (after multiple follow ups): Still very compliant with glasses and treatment. Corrected VA 20/25 OD, 20/20 OS @ D, but skips the middle letter on acuity chart. Stereoacuity: none. Corrected unilateral CT: CRET 3 @ D & N. On alternating CT: ET 4. Worth-4-dot: suppression OD @ D, but fusion @ N. Bagolini: central scotoma OD. EOMs full. No APD. Accommodative amplitude: 13D OU. Step vergences @ N: BO -/-30/25; BI -/-16/12. No change in refraction. Anterior and posterior segments were unremarkable OU.
III. Differential Diagnosis  
   a. Uncorrected refractive error  
   b. Accommodative esotropia  
   c. Strabismic amblyopia  
   d. Microtropia  
   e. Anisometropic amblyopia  
   f. Deprivational amblyopia  
   g. Eye disease  
   h. Malingering  

IV. Diagnosis and Discussion  
   a. Discuss this patient and why some differentials were eliminated.  
   b. Discuss Microtropia and AC.  

V. Treatment/Management  
   a. Glasses issued. Recommended a follow up in 16 weeks – glasses were to improve VA and stabilize the angle.  
   b. Started patching at 16 weeks because there was no improvement in VA.  
   c. Vision therapy (VT) is indicated for children with poor vergence ranges.  
   d. VT may be needed in some children to further embed a relatively steady AC or disrupt an unsteady AC to promote NRC.  
   e. Surgery was contraindicated in this case, because it could lead to diplopia.  

VI. Conclusion/Pearls  
   a. Consider microtropia as a differential in unilateral decreased vision; this prevents misdiagnosis and unnecessary tests.  
   b. If eyes appear aligned with very little or no stereopsis after proper correction, think of microtropia and AC.  
   c. Just remember, AC can be helpful because it tries to provide some level of fusion.  
   d. Not all microtropes will present the same. It could resolve in some patients after correction. It did not resolve in this case, however the amblyopia improved.
e. Promote treatment is necessary; maybe the stereo outcome would have been better if patching was initiated earlier – if he had been screened earlier.

f. Simple tools can help with the diagnosis – Cover test, Worth-4-dot, Bagolini lens, direct ophthalmoscope for visuoscropy, after image test.

g. A child presenting like this must be cyclopleged.

h. Can work with a pediatric OD or eye MD on a case like this, but surgery is contraindicated.

i. Work with area schools and pediatricians to get these children in sooner.

References
A 14 year old female presents with unilateral ptosis following a concussion. Further investigation finds associated abnormal hormone levels. The concussive event may have impacted the endocrine system and caused ocular manifestations.

I. Case History

- Patient demographics
  - 14 year old Caucasian female as of 10/2012
- Chief complaint
  - Droopy upper eyelid OS following concussion, worsens throughout the day
- Ocular, medical history
  - Myopia, contact lens wearer, history of giant papillary conjunctivitis
  - Exercise induced asthma
- Medications
  - Ibuprofen prn, albuterol inhaler prn
- Other salient information
  - Followed by Concussion clinic, released from care based on results of ImPACT testing on 6/2012

II. Pertinent findings

- Clinical
  - No ptosis noted during exam in 8/2011
  - 2 mm ptosis upper eyelid OS 10/2012
  - 1 mm ptosis upper eyelid OD 11/2012
- Laboratory studies
  - Anti-acetylcholine receptor antibody: binding, blocking, modulating- within normal limits
  - Thyroid panel- T3 Uptake high, T4 and TSH within normal limits
- Radiology studies
  - MRI of brain and orbits- within normal limits
- Others
• Review of photos- No ptosis present in photographs prior to 4/2011, since then variable ptosis present.

III. Differential diagnosis

• Primary/leading
  • Traumatic ptosis
• Others
  • Ocular myasthenia gravis
  • Traumatic Horner's syndrome
  • Thyroid dysfunction

IV. Diagnosis and discussion

• This patient was seen by another optometrist, who told her mother that the ptosis was benign and did not need any further evaluation. Mom was still very concerned and saw me for a second opinion. While the scan was normal, blood work revealed no concern for ocular myasthenia but potential thyroid dysfunction.
• The patient is currently seeking her pediatrician’s advice for further testing and treatment. I will have this information before the Grand Rounds lecture at the Academy meeting.
• This case is unique in that the ptosis was not present prior to the patient’s concussion by photographic and patient history. A literature review did not find any similar occurrences.

V. Treatment, management

• The treatment plan is to treat the underlying thyroid disorder and evaluate the ptosis during treatment. More details will be available prior to the Academy meeting.
• A literature review did not find any associations between concussion and ptosis.
• A Russian study shows increased T3 levels within the first 12 days post-concussive event, while a Hungarian study showed increased T3 levels during the first 7 days in males. The literature shows hypothyroidism following a traumatic brain injury not hyperthyroidism in the long term studies (1 year post TBI).

VI. Conclusion
Concussive events can have varying affects on individuals. The prudent practitioner should not forget that concussions can affect the endocrine system resulting in ocular manifestations.