The Optometrists Role in Concussion Management (2hrs) 58139-NO

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Course Description

An overview of concussion, including its pathophysiology, diagnosis and treatment. We will discuss the challenge of diagnosis, and the various roles of the multidisciplinary team. We will discuss Optometry's role in the diagnosis and management of concussion, with attention to primary care objectives as well as vision therapy specialty. Current research on vision and concussion, diagnosis of Concussion Related Vision Problems, the importance of vision professionals being involved in concussion management, and therapy protocols for treatment of concussion will also be discussed.

Learning Objectives

-Get a working definition of concussion, understand its diagnosis, and its prevalence
-Understand symptoms of a concussion and their relation to the visual system
-Identify who is involved in the multidisciplinary team
-Understand the role of Optometry in this multidisciplinary team
-Understand testing protocols that can help identify visual sequelae of concussion
-Identify treatment options for acute visual symptoms
-Understand post-concussion syndrome and treatment of persistent visual symptoms

I. Introduction – Why do we hear so much about concussions?
  A. mTBI – not so mild
    i. Can lead to lifelong impairment
  B. Concussion in the news
  C. Concussion Statistics
    i. Highest risk is military and athletics
    ii. In 2013, falls were the leading cause of TBI (47% of ED visits)
    iii. In 2012, 329,290 children were treated in ED for sports and recreation related injuries that included a diagnosis of concussion or TBI
    iv. Estimated that 1.6 to 3.8 million sports-related concussions per year
    v. 65% occur between 5 and 18 years of age
      a) Developing brain more susceptible to neurochemical and metabolic changes
      b) Axons are not as myelinated
      c) Physical structure of neck and upper body
    vi. Post Concussion Syndrome occurs in 5-8% of patients
    vii. 50% have visual symptoms
      a) Convergence insufficiency in 30-49%
      b) Accommodative dysfunctions in 21.7-51% of patients
      c) Saccadic Dysfunction 29%
      d) Almost half have more than one visual diagnosis
    viii. Local Statistics
  D. What are people saying about vision?
    i. AOA promotion
    ii. Studies mentioning vision related symptoms
    iii. Eric Singh, MD, John Hopkins
II. What is a Concussion?

A. Definition
   i. No universally accepted definition
      a) mTBI vs concussion, are they the same?
   ii. Concussion in Sports Group Consensus Statement
      a) Complex pathophysiological process affecting the brain, induced by traumatic biomechanical forces
   iii. Structural or functional? Both?
      a) Does not normally show up on standard imaging tests
         - Possibility of new imaging tests?
B. How it happens
   i. Translational, rotational or angular forces to the head
      a) Coupe and contra coupe
      b) Helmets and Limitations
   ii. Neurometabolic Cascade of Concussion
      a) Generally self-correcting with time
      b) More vulnerable during this process
   iii. Microscopic Axonal Dysfunction
   iv. Primary Damage and secondary damage
   v. Multiple impacts, post-concussion syndrome, CTE
C. How is it diagnosed?
   i. Problems with diagnosis
      a) If you have seen one mTBI, you have seen one mTBI
   ii. Movement away from Grading Systems
      a) Glasgow Coma Scale 13-15
   iii. Signs and Symptoms
      a) Somatic – Headache, Dizziness, Balance Disruption, Nausea/Vomiting, Visual Disturbances (photophobia, blurry/double vision), Phonophobia
      b) Cognitive – Confusion, Anterograde amnesia, retrograde amnesia, Loss of consciousness, disorientation, feeling "mentally foggy", vacant stare, inability to focus, delayed verbal and motor responses, Slurred/incoherent speech, excessive drowsiness
      c) Affective – Emotional lability, Irritability, Fatigue, Anxiety, Sadness
      d) Sleep -Trouble falling asleep, Sleeping more than usual, Sleeping less than usual
D. Evolving injury
   i. Can change over time for better or worse
   ii. Should be monitored for 24-48 hours for signs of change
   iii. Symptoms should resolve after 10-14 days
      a) Graduated return to regular activities
E. Post Concussion Syndrome
F. CTE

III. General Assessment of concussion
A. Removal from play/sideline concussion
   i. Neuropsychological and cognitive tests
   ii. Visual tests (does optometry have a role?)
   iii. Balance Tests
B. Office Setting
   i. Neuro Imaging
   ii. Cognitive Assessments
   iii. Neuropsychological testing
   iv. Balance exam

v. VOMS
vi. Vision testing by other professionals

C. Discussion of possible biomarkers of discussion

IV. Optometry's Role Post Concussion

i. The Visual Examination

a) Complete History
- How Many concussions have they had?
- Personal and Family History (Depression/mood disorders, anxiety, learning disabilities, developmental disorders, vision problems?)
- Ask how current concussion occurred
- Type and location of force
- Document loss of consciousness
- Symptoms and severity
- Does Exertion change things?
- Visual Symptoms Checklists
  - BIVSS
  - CITT Symptom Survey

b) Acuity
- VOR and Dynamic Acuity

c) Anterior and posterior segment evaluation
- Injury?
- Dry Eye Syndrome (may just be more noticeable post concussion)

d) Visual Fields
- FDT constriction?
- Constriction of Kinetic Fields

e) Pupil Assessment
- Flash vs sustained response
- Possible pathways for explanation of abnormalities in light sensitive patients

f) Light Sensitivity
- Lens considerations
- Adaptation
- Other accommodatations

g) Contrast Sensitivity

h) Textual Visual Aliasing and problems with patterns

i) Refraction
- Possible changes post concussion
- Perceptual changes change visual needs
- Photosensitivity and treatment with lenses
- Anti Fatigue Lenses?
- Micro Prism or low plus

j) Accommodation (21.7-41% of patients)
- Asymmetric Accommodative amplitudes
- Accommodative Facility
- Near Retinoscopy

k) Vergence
- Near Point of Convergence
- Phoria (distance phoria abnormal in 26% of patients)
- Fusional Ranges (distance fusional vergence low in 37% Hellerstein et al)

- Vergence Facility
- Motor Field

l) Stereopsis
- Near
- Distance

m) Oculomotor
- Pursuits, Saccades and Fixations
- DEM
- King Devick
- NSUCO Oculomotor Test
- Monitoring Fixation
- Eye Tracking Systems

n) Evaluating Motion Sensitivity
o) Coherent Motion as a possible diagnostic
p) Critical Flicker Frequency
q) Visual Evoked Potentials
- Binasal application?
- Changes with therapy treatment

ii. Management of persistent post-concussion syndrome and symptoms
a) Accommodations for school/work
- More frequent breaks
- Increased time to complete work

b) Vision Therapy Referral

iii. Prevention of Concussions

V. Vision therapy Treatment Protocols
A. CITT?
B. Duration of Therapy
C. How do we treat it?

VI. Case Studies

VII. Clinical Pearls
A. Asking about concussions in a general exam
B. Referrals from other practitioners
C. Educating Patients

VIII. Conclusions and Review
A. Questions?