Focusing on the role of eye care in concussion
Fraser C. Horn, OD, FAAO
Interim Dean – Pacific University College of Optometry

Disclosures

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• Nike Vision
• Sanofi-Genzyme

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What is Sports Vision?

The Truth

• Sports Vision is meeting the demanding visual needs of all persons in your community, young and old, recreational and professional, that would like to perform their sport of choice at their peak!
Why is Sports vision critical?

• Injury prevention
• Injury management
• Concussion management
• Vision Enhancement

Today

• Quick discussion on…
  – Role of vision in…
    • Interprofessional collaboration
    • Vision Basics
    • Concussion assessment
    • Concussion prevention
    • Concussion Rehab
    • and more…if time :)
Sports Vision

- Interprofessional Team
  - We work closely with...
    - Athletic Trainers
    - Sports Medicine MDs
    - Neuro
    - Ophthalmology
    - Chiropractor
    - OT & PT
    - Pharmacy
    - Strength & Conditioning
    - And more

Vision

- Estimated that ~80% of our perception, cognition, and activities are modulated by vision

- Complex activity that takes place in the brain
Vision

• When the visual system works well, we are able to...

  – See clearly and single
    • Visual Acuity, Contrast Sensitivity, Eye Alignment, Fixation

  – Judge depth and speed
    • Alignment, Versions, Retinal properties

  – Read
    • Accommodation, Fixation, saccades, saccadic suppression

https://emedicine.medscape.com/article/1189759-overview

Vision

• When the visual system works well, we are able to...

  – Awareness of periphery
    • Retinal function, lateral inhibition

  – Maintain Balance
    • Peripheral awareness, Vestibular integration

  – Plan movement

  – So much more

https://emedicine.medscape.com/article/1189759-overview
Baseline Assessment

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• Vision Check-in
  – Not much time
  – Foundational functions
  – Assessing for success on field, in classroom, and baseline for concussion
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• Vision Check-in Components
  – Case History
    • Include Concussion hx
    • Glasses and Contact Lens wear
    • Last Eye Exam

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• Vision Check-in Components
  – Visual Acuity
    • Right eye, left eye, and both eyes
    • With whatever correction they use for sport

  – Gross Peripheral Vision – Confrontational Visual Field

  – Ocular Alignment – Cover Test at distance and near
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• Vision Check-in Components
  – Extra-Ocular motilities – pursuits (VOMS)
    – NPC (VOMS)
  – Pupils
    – Consult with doc

VOMS

  – Pursuits: Horizontal & Vertical
  – Saccades: Horizontal & Vertical
  – NPC (x3)
  – Vestibular Ocular Reflex: H&V
  – Visual Motion Sensitivity

“A combination of VOR, VMS & NPC scores resulted in a positive prediction rate of 0.89 for identifying concussions”
Baseline Assessment

• Comprehensive Vision Exam
  – Additional tests to a standard exam
    • History
      – Prior concussions?
      – Anxiety / Depression
    • Entrance skills
      – Contrast Sensitivity
    • Binocular function
      – Horizontal and vertical
  • And more

Courtesy of Todd Daniels, ATC
Other Evaluation Tools

• King-Devick Test
  – **Subjective**, physical method of evaluating visual tracking and saccadic eye movements.
  – Based on the time to perform rapid number naming

http://kingdevicktest.com/about/

Other Evaluation Tools

• Right Eye System
  – Objective
  – Eye Tracking

https://righteye.com/product-overview/
After Baseline

• Inclusion of Vision Training

• 2016 Consensus Statement:
  – There is minimal evidence to support individual injury-prevention strategies addressing intrinsic risk factors for SRC in sport. However, there is some promise that vision training in collegiate American football players may reduce SRC.

Vision and Concussion

• University of Cincinnati Studies
  – Utilized D2, Strobes, and tracking drills

    – Training cohort → 1.4 concussions per 100 player seasons

    – No training cohort → 9.2 concussions per 100 player seasons

    – Reduction of concussion rate with team-wide sports vision training
Post-Concussion

Most common vision related signs and symptoms
Including, but not limited to:

- Blur
- Asthenopia
- Photophobia
- Accommodation
  » Spasm
  » Infacility
- Vergence
- EOMs
  » Saccades
  » Pursuits
- Pupils
- Visual Fields
- Possible traumatic effects on the eye
A Typical Post-Concussion exam may include…

• Seen within 7 days post concussion
• Case History
  – Include discussion on…
    • Headaches
    • Fogginess
    • Overwhelmed in crowded environments
    • photophobia
    • Mental health
    • And more

A Typical Post-Concussion exam may include…

• Entrance Skills
  – VA

  – Contrast Sensitivity

  – Cover Test – distance and near
    • Versus fixation disparity

  – Confrontational fields
A Typical Post-Concussion exam may include...

- Entrance Skills
  - EOMs (extended time)
    - Pursuits
    - Saccades – horizontal and vertical (diagonal?)
  - NPC x 3
  - Pupils
  - Stereo acuity?

A Typical Post-Concussion exam may include...

- Refraction
  - Pay attention to small amounts of cylinder and axis
  - Cycloplegic

- Binocular work-up
  - Distance and near
  - Phorias, ranges, accommodation ability, etc.
A Typical Post-Concussion exam may include…

• Slit lamp exam

• Dilated exam

Post-Concussion Intervention

• Glasses / Contact lenses
  – Distance
  – Reading
  – Prism?
  – Bi-Nasal Occlusion?
Post-Concussion Intervention

• Vision Training
• Keep a training log
  – Near-Far Rock
    • Initially
      – Large letters
      – Primary Gaze
  – Brock String

From Dr. Graham Erickson

Post-Concussion

• Hat for photophobia
• Turn down screen brightness and slowly increase
• VMS
  – With consistent background
  – Increase distraction with movement
Post-Concussion

• More in-depth
  – Refer for vision therapy, especially vision rehab or Neuro-optom

Post-Concussion

• More in-depth
  – “Light the Candle”
  – Working on depth and localization.
Post-Concussion

• More in-depth
  – Working on visual motion sensitivity

Opportunity

• Vision is critical to what we all do

• Most patients will have some sort of visual related symptom post-concussion

• Opportunity to help our patients through interprofessional collaboration
Thank you

• hornfc@pacificu.edu