Concussion Management Efforts for At-Risk Athletes in Low SES School Districts

Webinar
April 30, 2013

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Course Description
• Despite the implementation of concussion management programs in many states, there is a suspected difference in the quality of these efforts, depending on the socioeconomic status of the district or a particular school.
• This workshop will highlight these suspected differences, discuss why these differences are important, and outline the implications for safe return-to-play and post concussion efforts. To address these differences, a model of care targeted to the lower socioeconomic school district athletes will be explored.
Parents’ Educational Level and Children’s Health

- http://www.scpr.org/blogs/southla/2013/03/28/13085/parents-education-level-can-affect-how-healthy-the/
- Mapping South LA

Ethnic Mix and Income

- Many studies have shown that children from lower SES have a higher rate of injuries that require a hospital visit (Pearce, 2012).
- Lower SES may be strongly associated with level of perceived health (Reinhardt, 2012).

SES and Injuries
SES and General Mortality

- A large amount of research shows that SES and mortality are linked and that SES itself is a major cause of variations in health and mortality (Link, 1995).
- Spinal cord study:
  - Linked: Education, income, smoking, drinking, weight, physical activity and self rated-health
  - Not linked: Gender, race and residence location (Krause, 2012).

Head Injuries and Compensation

- People seeking compensation for their head injury had more symptoms than those not seeking compensation.
- However, SES did NOT correlate with whether or not compensation was sought.

SES and Brain Injuries

- Studies back to 1998, have shown that SES is a significant predictor of family burden and distress following TBI (Wade, 1998).
- More recently, studies show SES and premorbid family functioning are significant predictors of family burden following TBI.
- MTBI shows less of a difference than moderate or severe (Ganesalingam, 2008).
Outcome Data

First 18 Months (TBI)

- Emergence of clinically significant problems in behavioral, EF, social competence
  - TBI (severe, moderate) and OI groups
  - Ages 3 – 7, hospitalized
  - Evaluated @ 3, 6, and 18 months post-injury
- TBI developed more externalizing behaviors and EF difficulties (relative to OI)
- Factors associated problems:
  - Permissive parenting, family dysfunction, low SES

Chapman et al. (2010)

PCS in Children with mTBI

- Children (186) with mTBI; uncomplicated OI (99)
- Parent and child ratings of PCS, Sx counts
  - 3 wks (BL), 1, 3, and 12 months PI
  - Used growth modeling, controlled for age (@ injury), SES, pre-injury symptoms, sex
- mTBI higher Sx of somatic PCS and parent PCS counts (initial assessment)
- Higher parent counts for cognitive PCS, child counts PCS @ follow-ups
- MVA-related trauma, LOC, neuroimaging findings, and hospitalization
  - Higher levels PCS in mTBI group

Taylor et al. (2010)
Incidence, Clinical Course, Predictors of Prolonged Recovery Time

- Looked at SRC in high school and college athletes
  - Concussed (570) and non-concussed/controls (166)
  - Pre-injury BL, 3 hr, 1, 2, 3, 5, 7 and 45/90 days post concussion
    - Typical (within 7 days)
    - Prolonged (> 7 days)
- 10% (57, prolonged)
  - Longer recovery on NC testing
  - @ 45/90 >’r Sx report, but no deficits on cognitive or balance testing

McCrea et al. (2013)

- Prolonged recovery associated with
  - Unconsciousness
  - PTA
  - More severe acute Sx’s
- Small % of athletes have Sx’s and fx impairments beyond typical window of SRC recovery
  - Associated with acute indicators of more severe injury

McCrea et al. (2013)

LT Outcome from Childhood TBI

- Looked at intellectual ability, personality and quality of life
  - Focused on fx abilities (education, employment, and QOL)
  - Predictors
    - Injury severity
    - Age at injury
    - SES
    - Intelligence
    - Personality

Anderson et al. (2011)
Anderson, Brown, Newitt, and Hoile (2011)

• Those with more severe TBI (GCS < 9, LOC > 24 hrs, + CT/MRI, and/or neurological signs)
  – Educational and employment problems
  – Reduced QOL (Work/Leisure, Relationships, Living Skills)
  • Lower IQ and personality factors (NEO) predict outcome
  – Problems evident many years later
• Mild and moderate TBI better outcome

Saunders, et. al (2009)

• Private insurance status is significantly inversely associated with recurrent TBI
• Medicare, Medicaid and uninsured individuals all had higher rates (P-value <0.0001)
• Suggests that TBIs disproportionally affect those of lower SES

Basic Mechanisms of Recovery from Acquired Developmental Brain Injury

• General principles
  – Injury types vary by age and contribute to age-dependent, post-injury pathophysiology
  – Ongoing neural processes that mediate normal brain development
  • Associated with different cellular and physiological mechanistic properties (to acquired injury)
  – Effects of environment on normal development and recovery are complex, but crucial to understand
Giza, Kolb, Harris, Asarnow, and Prins (2009)
Neurocognitive Functioning @ 1 Month and 1 Year Post Injury

- UCLA longitudinal, mild, uncomplicated pediatric TBI study
  - Looked at minority of children with mTBI with persistent neurocognitive deficits
  - Compared to matched group of children with injury to other body part/area (OI)
  - Investigating potential predictors of those that show persistent deficits

Babikian, McArthur, and Asarnow (2013)

Typical Predictors

- Severity of brain injury
  - Glasgow Coma Scale (GCS)
  - Length of impaired consciousness
  - Number of observable lesions

Other Predictors

- Premorbid symptoms and behavioral adjustment
  - Predicts post-injury concussion-based symptoms
- Other factors
  - Lower cognitive ability
  - Retrospective reports of pre-injury symptoms by parents
    - Predicted post-concussive symptoms at 3 months
Findings

• Best predictor at 1 month, post-injury
  — None of injury severity indicators, or type of injury
  — Premorbid variables
    • School achievement
    • Parent education
    • Premorbid behavioral and academic problems
• Best predictor @ 1 year
  — 1 month impairment classification
    • Those deemed to be cognitively impaired

Babikian et al. (2013)

Consistent with McNally et al (2013)

• Demographic variables important and predictive of PCS symptoms, post-mTBI in children
  — Retrospective ratings of premorbid symptoms
  — Family factors (parent adjustment) predict parental ratings of PCS
• Injury factors predict PCS in first months post TBI
  — Non-injury factors consistently related to PCS over longer period

McNally et al. (2013)

Performance Monitoring

• SES may predict neurocognitive outcome after brain injury (Yeates, 1997)
  — May be independent of injury severity (Max, 1999).
• Deficient performance monitoring can be related to SES for at least 6 months post-injury (Ornstein, 2008).
Race/Ethnicity Differences Post-TBI

- Looked at life satisfaction @ 1 year, post TBI
  - Satisfaction with Life Scale (SWLS)
  - Longitudinal data set of TBI Model Systems National Data Base
    - 3,368 with mod to severe TBI
    - 2478 Caucasians, 630 African Americans, 180 Hispanics, 81 Pacific Islanders (1989 to 2005)
  - AA 3.21 units lower SWLS scores vs. API, 1.99 units lower SWLS scores vs. Caucasians
  - Not due to pre-injury marital, employment status, cause of injury, injury severity, functional status

Arango-Lasprilla et al. (2009)

Differences in Computerized NP Testing (Ethnicity)

- BL and Post-Injury
- Interesting results:
  - No difference at BL and PI on memory, RT and total Sx’s reported
  - But AA were 2.4 x more likely to have at least one clinically significant decline
  - 7 days post-concussion
  - Scored lower on processing speed at 7 days PI

Kontos et al. (2010)

Anxiety, Depression, and Social Support as Risk Factors and Comorbidities

- Syndrome approach to understanding PC disorder (DSM-IV)
- Looked at risk factors for developing PCD @ 3 months post
  - Female gender, poor social support, elevated depression sx’s, @ one month
  - Co-morbidities
    - MDD, PTSD
  - Underscored use of data to ID those at >r risk

McCauley et al. (2001)
Base Rates of PCS in Non-Concussed, Multi-cultural Sample

- No difference in PCS symptoms in general
  - Differences between groups in BR of individual sx endorsement
- Cultural and linguistic background may play moderating role in endorsement of PCS symptomatology
  - Careful about false positives
- African descent (more frequent and severe HA), higher cognitive difficulties (poor concentration)
- Caucasians (higher sleep disturbance)

Zakzanis and Yeung (2011)

Base Rates

- Sleep disturbance
  - Asians had fewest complaints
  - African descent less than Caucasians
- Non-Caucasians
  - Higher PCS sx’s
- Caution
  - False positives

Current Issues

- Lower SES schools access to athletic trainers
- Lower SES schools access to computerized baseline testing
- Insurance issues
- Athletes not being taken to the emergency department
  - Recent incident (HS football player, concussed, no ER consent given; parental fear of attracting attention, illegal immigrant status)
Current Issues, cont.

- High level athletes believing they have to “prove” their toughness
- Parents’ inability to make appointments/miss work
- Lack of education (school and/or district)
- Limited education of parent, lower reading level
  - Lack of access to material (print, internet, etc.)
  - Not in primary language

So What is Missing in Current Approaches?

- Greater risk for more complex PI course with certain factors
- Intuitively, fewer resources in lower SES areas may increase morbidity
  - Includes professional expertise, funds to support concussion management program
- Lower level of awareness probable factor

Higher SES

- Access to and interest in healthcare information (concussion and prevention)
- A working vocabulary
  - Concussion
  - Concussion management
  - Return to play
  - Return to baseline
  - Sports medicine
  - Neuropsychologist
  - Basic neuroscience
Public Health Component

- Knowledge about healthy practices
  - Improving
  - Concussion management specialized information
    - Less likely to be know, versus management of HTN, prevention type 2 diabetes, obesity, lung and other cancers
- Mentors and Role Models
  - Lacking

Suggestions

- Culturally relevant sources of information
  - Religious entities/churches
  - Schools
  - Television ads
    - Soccer
    - Baseball
    - Basketball
    - Boxing/MMA

Prevention Theme

- Education
  - Parents, players, teachers, coaches, religious leaders, physicians, NP’s, PA’s, nurses, counselors, school psychologists, politicians
- Prevention
  - Best practices (Zurich Consensus)
    - Sx-free at rest and exertion
Puerto Rican and Mexican American

Latino (Abroad)

African American
Asian American

Caucasian

Being Bold: Commitment

- Test publishers of concussion management
- Clinical expertise
  - Neuropsychologists, sports medicine physicians
  - Athletic trainers, physical therapists
- Student involvement
- Legislators
- Athletes
- Media support
**Being Smart: Efficacy of Efforts**

- Clinical research to document effectiveness
  - Meaningful outcome variables
  - Rapid dissemination of findings and recommendations
- Quick adjustments of interventional efforts
- Pursuit of money for ongoing research
  - Involving academic community/scholars
- Focused educational strategies (public health approach)
  in culturally and linguistically appropriate manager
  - Consideration of deportation and other fears

**Being Realistic: Start Small**

- Select area of intervention
- Know rapport with resources
- Study efforts in manageable way
- Don’t romanticize or idealize efforts
  - Humble approach
  - Acknowledge might be going in wrong direction
- Keep in mind the goal
  - Reduce morbidity on the premise that this is the right thing to do
- Involve those from the community as part of any change effort
  - Mentoring efforts (partner with schools in area)

**Considering the Obvious**
Thanks!