Youth Sports Through a Public Health Lens

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Public Health Grand Rounds
Disclosures

• US Lacrosse Sports Science and Safety Committee
• NFL Cardiovascular Health Subcommittee
• Arena Football League Concussion Task Force

May 21, 2014

Knowledge and Compassion Focused on You
It was the best of times, it was the worst of times, it was the age of wisdom, it was the age of foolishness, it was the epoch of belief, it was the epoch of incredulity, it was the season of Light, it was the season of Darkness, it was the spring of hope, it was the winter of despair, we had everything before us, we had nothing before us, we were all going direct to Heaven, we were all going direct the other way...

Charles Dickens, A Tale of Two Cities, 1859
“Winning isn’t everything; it’s the only thing.”

Vince Lombardi
BENEFITS OF YOUTH SPORTS

A lot of research has examined the impact of sports on physical and psychosocial health in children and adolescents. Overall, the research has shown youth sport participants have higher levels of physical activity that positively influence physical and psychological health in adolescence and later in life.

**PHYSICAL HEALTH**
Youth athletes have:
- Higher levels of physical activity and they expend more energy daily
- Less body fat
- A reduced risk of becoming overweight or obese
- Higher levels of cardiorespiratory fitness
- Stronger bones and muscles
- An increased likelihood of being physically active later in life

**PSYCHOLOGICAL HEALTH**
Youth athletes have:
- Higher levels of self-esteem and social connectedness
- Lower levels of depression
- Lower levels of suicidal ideation, thoughts, and attempts
- Lower levels of problem behaviors (aggression problems, social problems, and delinquency problems)

**SOCIAL WELL-BEING**
Sports can provide:
- Opportunities to make new friends
- Exposure to positive role models
- Opportunities to travel

**ACADEMIC PERFORMANCE**
- Middle and high school athletes have higher grade point averages than nonathletes
- Grade point average increases as the number of sports teams participated on increases
- High school sports participation is associated with higher graduation rates and lower dropout rates
- Youth athletes miss less school and are more likely to attend college

**HEALTH BEHAVIORS**
Sports participation has also been shown to be associated with positive health behaviors. Youth athletes report:
- Consuming more fruits and vegetables
- Being less likely to smoke cigarettes
- Watching less television
- Being more satisfied with their weight
1. Injury & Disease Surveillance
   Problem identification and scope

2. Risk Factor Identification
   Demographics, etiology and mechanisms of injury

3. Develop Potential Interventions
   Engineering, administrative, behavioral, or equipment

4. Assess Effectiveness
   Pilot study

5. Implementation & Evaluation
   Full scale policy implementation & evaluation

Feedback
## Sports Injury Surveillance Systems

<table>
<thead>
<tr>
<th>System</th>
<th>Administrator</th>
<th>Pros</th>
<th>Cons</th>
<th>Example study</th>
</tr>
</thead>
<tbody>
<tr>
<td>NCAA Injury Surveillance System (ISS)</td>
<td>Datalys Center</td>
<td>• Web-based</td>
<td>• Variability in data coding(?)</td>
<td>Validity of Soccer Injury Data in NCAA (2011)</td>
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<tr>
<td></td>
<td></td>
<td>• High capture rate</td>
<td>• Limited # of participating colleges</td>
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<tr>
<td></td>
<td></td>
<td>• National sample</td>
<td></td>
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<tr>
<td>Injury Treatment &amp; Tracking System (ITTS)</td>
<td>Fairfax County (VA) Public Schools</td>
<td>• Daily electronic capture of 25 high schools &amp; 27 sports</td>
<td>• Representative of a single geographic area/school district</td>
<td>Trends in concussion incidence in high school sports (2011)</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• Includes time-loss and no time loss injuries</td>
<td></td>
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<tr>
<td>Reporting Information Online (RIO)</td>
<td>Nationwide Children’s Hospital</td>
<td>• Web-based</td>
<td>• Variability in data coding(?)</td>
<td>Sex Differences in Concussion Symptoms of High School Athletes (2011)</td>
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<tr>
<td></td>
<td></td>
<td>• 100 participating high schools with AT</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>• National sample of 12 sports</td>
<td></td>
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<tr>
<td>National Center for Catastrophic Sport Injury Research</td>
<td>University of North Carolina at Chapel Hill</td>
<td>• Death and permanent disability sports injury data that involve brain and/ or spinal cord injuries</td>
<td>• Based on reports of catastrophic/ fatal injuries</td>
<td>Catastrophic Football Injuries Annual Report (2011)</td>
</tr>
</tbody>
</table>
State Laws Concerning Sport-Related Concussions among Youth

By the beginning of 2013, a total of 49 states and the District of Columbia had legislation to prevent concussions and to limit further injury to student athletes who sustain concussions, with most of these laws mandating that student athletes who experience a concussion be removed from play and obtain a health care provider’s permission before returning to play.

Public Health Campaigns
Heads Up in 10 Years

The Anniversary Viewbook of CDC’s Heads Up

Heads Up is a series of educational initiatives, developed by the Centers for Disease Control and Prevention (CDC), which share a common goal: to help protect people of all ages, especially children and teens, from concussions and other serious brain injuries and their potentially devastating effects.
Launch of the CDC Foundation Heads Up app for parents. Created through a grant to the CDC Foundation from the National Operating Committee on Standards for Athletic Equipment (NOCSAE), the app teaches parents how to spot a concussion and what to do if a parent thinks their child has a concussion or other serious brain injury. Other key features include a helmet selector that helps parents find the right helmet for their child’s or teen’s activity, including information on what to look for, how to fit the helmet, and what to avoid. Some helmet companies now include a QR code for the app directly on their helmets to provide parents with easy access to brain injury and helmet safety information.

First Heads Up info-graphic posters focusing on helping to keep kids and teens safe from concussion and other serious brain injuries are launched. The posters include the signs and symptoms of concussion, what to do if you think your child has a concussion, and safety tips to help keep kids and teens safe from concussion and other injuries on and off the sports field.

For the first time, CDC launches customizable print materials for schools and sports teams to tailor with their logo and colors. These materials include Heads Up fact sheets for athletes, parents, coaches, and school professionals.

Heads Up in 10 Videos launched on CDCs YouTube channel. The Heads Up in 10 videos include 10 short video segments that can be watched separately or as one video. The videos explore how to recognize a concussion appropriately respond to it, be on the alert for other serious brain injuries, and help keep kids and teens safe from this injury. Viewers can also get pointers from professional athletes, tips from concussion experts, and stories from real-life teens and their parents.

Launch of the CDC/YMCA of the USA co-branded Heads Up concussion education materials (including fact sheets, clipboards, stickers, etc.). Anchored in more than 10,000 communities, the Y has helped get concussion education out to communities that may not have otherwise received the Heads Up messaging on preventing recognizing, and responding to a concussion.
Evidence, Best Practices & Consensus Statements (examples)

- ACL injury
- Commotio cordis
- Head injury
Efficacy of the FIFA 11+ Warm-Up Programme in Male Youth Football: A Cluster Randomised Controlled Trial

Oluwatoyosi B. A. Owoeye 1, Sunday R. A. Akinbo 1, Bosede A. Tella 1 and Olajide A. Olawale 2
1 Orthopaedic/Sports Physiotherapy and 2 Neuro-Physiotherapy Units, Department of Physiotherapy, Faculty of Clinical Sciences, College of Medicine, University of Lagos, Nigeria

Table 3. Effects of FIFA 11+ intervention on injury risk in players based on primary outcomes.

<table>
<thead>
<tr>
<th></th>
<th>INT Group</th>
<th>CON Group</th>
<th>z-test</th>
<th>Rate Ratio (95% CI)</th>
<th>P-value</th>
</tr>
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<tr>
<td></td>
<td>n</td>
<td>Incidence (x1000 hrs)</td>
<td>n</td>
<td>Incidence (x1000 hrs)</td>
<td></td>
</tr>
<tr>
<td>All injuries</td>
<td>36</td>
<td>0.8</td>
<td>94</td>
<td>1.5</td>
<td>-2.72</td>
</tr>
<tr>
<td>Match injuries</td>
<td>23</td>
<td>7.5</td>
<td>73</td>
<td>20.3</td>
<td>-4.50</td>
</tr>
<tr>
<td>Training injuries</td>
<td>12</td>
<td>0.3</td>
<td>22</td>
<td>0.4</td>
<td>-0.20</td>
</tr>
<tr>
<td>All lower extremity injuries</td>
<td>26</td>
<td>0.6</td>
<td>76</td>
<td>1.2</td>
<td>-2.87</td>
</tr>
</tbody>
</table>

* Significant at p < 0.05. CI – Confidence Interval; INT – Intervention; CON – Control.
Pathophysiology, Prevention, and Treatment of Commotio Cordis

Mark S. Link

Fig. 1 The confluence of variables and a proposed mechanism necessary for commotio cordis to occur. Important impact object variables are shape, hardness, diameter, and velocity. Human characteristics are the pliability of the chest wall, impact timing, location and orientation of blow, and individual susceptibility, likely carried in ion channels involved in repolarization. (With permission from: Link MS, Estes NA. Athletes and arrhythmias. J Cardiovasc Electrophysiol 2010;21:1184–9) [6]
Table 1 - Prevention of commotio cordis may be accomplished by the following methods in the various sports

<table>
<thead>
<tr>
<th></th>
<th>Lacrosse</th>
<th>Baseball</th>
<th>Hockey, etc.</th>
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<tbody>
<tr>
<td>Avoidance of chest wall impact</td>
<td>Coaching, rules changes</td>
<td>Coaching, rules changes</td>
<td>Coaching</td>
</tr>
<tr>
<td>Chest protectors</td>
<td>Modification of current lacrosse chest protectors</td>
<td>Appropriately sized and age appropriate</td>
<td>Appropriately sized and age appropriate</td>
</tr>
<tr>
<td>Safety Equipment</td>
<td>AEDs</td>
<td>AEDs, Safety baseballs</td>
<td>AEDs</td>
</tr>
<tr>
<td>Projectile/Ball</td>
<td>Possible safety lacrosse ball</td>
<td>Safety baseballs</td>
<td></td>
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</tbody>
</table>
The relative risk of sustaining a concussion in a Revolution helmet compared with a VSR4 helmet was 46.1% (95% CI 28.1%–75.8%).
TABLE 1: Comparison of 99th percentile head accelerations for each helmet type by player position*

*All data given as 99th percentile head accelerations (g) and 95% CIs (in parentheses).

†For every player position, the VSR4 helmet group had a greater 99th percentile head acceleration value than the Revolution helmet group. This is a result of the Revolution helmet better modulating impact energy to reduce head acceleration relative to the VSR4 helmet.

<table>
<thead>
<tr>
<th>Position†</th>
<th>VSR4 Helmets</th>
<th>Revolution Helmets</th>
</tr>
</thead>
<tbody>
<tr>
<td>defensive back</td>
<td>101.6 (100.3–103.3)</td>
<td>99.1 (97.2–101.5)</td>
</tr>
<tr>
<td>defensive lineman</td>
<td>97.3 (95.2–99.2)</td>
<td>89.3 (88.5–89.8)</td>
</tr>
<tr>
<td>linebacker</td>
<td>99.4 (97.5–101.1)</td>
<td>96.2 (95.0–97.3)</td>
</tr>
<tr>
<td>offensive lineman</td>
<td>103.3 (101.4–105.2)</td>
<td>90.1 (89.5–90.7)</td>
</tr>
<tr>
<td>quarterback</td>
<td>122.7 (119.5–125.3)</td>
<td>112.5 (107.5–121.2)</td>
</tr>
<tr>
<td>running back</td>
<td>110.1 (107.8–112.2)</td>
<td>105.2 (103.4–107.0)</td>
</tr>
<tr>
<td>wide receiver</td>
<td>106.0 (104.3–108.4)</td>
<td>101.0 (98.7–103.5)</td>
</tr>
</tbody>
</table>
• Charting the unknowns
  – Frequency in youth sports

• Understanding diagnosis, recovery, and health effects
  – Changes to brain following concussion

• Improving safety standards and equipment design
  – Effectiveness of age-appropriate techniques, rules, and playing and practice standards

• Changing the culture
  – Self-sacrifice vs. Self-reporting
May 7, 2014

Tom Frieden, MD, MPH
Director
Centers for Disease Control and Prevention
1600 Clifton Road
Atlanta, GA 30333

Dear Director Frieden:

We are writing to request that the Centers for Disease Control and Prevention (CDC) develop a plan to implement a national injury surveillance system to accurately determine the incidence of concussions, including sports-related concussions in youth.

We have heard from parents, players, coaches, and doctors about the dangers associated with...
*** MEDIA ADVISORY ***

4/29/14

Contact: Andy Warner, MPSSAA Assistant Director, 410/767-0555
Steve Alic, USA Football, 317/489-4417
Rwarner@msde.state.md.us
salic@usafootball.com

twitter.com/@mpssaa_org
twitter.com/usafootball

MARYLAND PUBLIC SECONDARY SCHOOLS ATHLETIC ASSOCIATION OFFICIALLY SUPPORTS USA FOOTBALL’S HEADS UP FOOTBALL™ PROGRAM

MPSSAA endorsement of USA Football’s Heads Up Football program marks a significant first in the sport
ReQRuitme boys’ recruit: Boys’ Latin (MD) 2017 attackman Shilling commits to Johns Hopkins

By Chris Goldberg
TopLaxRecruits.com, Posted 12/24/13

Boys’ Latin (MD) freshman attackman Luke Shilling has made a verbal commitment to play Division I lacrosse at Johns Hopkins University.

Luke Shilling ledger:

High school: The Boys’ Latin School of Maryland

Year of graduation:
Class of 2017

Position: Attack

College choice: Johns
Mental health aspects of sport participation

- Positive experience?
- Fostering healthy competition?
- Parenting quandary