Mental Health Outcomes of Concussion in Children and Adolescents

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Workshop on Sports-Related Concussion in Youth
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New Disorders

- Severe TBI - 54%-63%
- Mild/Moderate TBI - 10-21%
- Orthopedic injury - 4-14%
Mild TBI

- The annual TBI incidence: 180 per 100,000 with mild traumatic brain injury (MTBI) accounting for about 90% of cases
- Even if only a small percentage of these children develop negative outcomes, this would represent a major public health problem
Mild TBI Previous Studies

- 20 studies (including 7 from our group) in the past 80 years that focused on psychiatric outcome in children with TBI of all severities
- Rate of psychiatric disorder in mild TBI: 10-100% depending on study design
- Subset of studies of consecutively treated children with mild TBI is narrower (10-40%) with larger studies generally finding higher rates
Mild TBI New Onset Psychiatric Disorders

- *mild TBI versus injured controls:* Similar in one study (Brown 1981) Higher (ns) in 2 small underpowered studies (Max 1998; Luis 2002)

- *mild TBI versus uninjured controls:* non-significantly higher (Lemkuhl 1990) marginally higher (Rune 1970) significantly higher (Massaglia 2004)
Study Limitations

• Definition of mild TBI
• Use of a control group of children who sustained an injury not involving the head
• Outcome measured with a structured or semi-structured psychiatric interview
• Prospective longitudinal design
Study Limitations

- Recruitment from consecutively treated patients
- Consideration of psychosocial and injury risk factors
- Adequately powered to test the hypotheses
Mild TBI New Onset Psychiatric Disorders (Max, in press)

- NPD at 6 months was surprisingly common after mild TBI (25/70; 36%)
- NPD was associated with frontal white matter lesions
- NPD were heterogeneous
- NPD was associated with decrements in intellectual function, processing speed, expressive language, and possibly preinjury reading
Mild TBI New Onset Psychiatric Disorders (Max, in press)

- NPD at 12 months after mild TBI (17/60; 28%)
- NPD significantly associated with socioeconomic status, psychosocial adversity, estimated pre-injury academic function, and concurrent deficits in adaptive function, academic performance, processing speed, memory, and expressive language.
- NPD was not significantly associated with pre-injury adaptive function, injury severity, family psychiatric history, pre-injury psychiatric disorder, lesion location, gender, or age at injury
Mild TBI versus Orthopedic Injury (Max, Ongoing NIH study)

1. 1-year Prospective Controlled Study
2. TBI=220; OI=110
3. Raters blind to group
4. Assessments at Baseline, 3, 6 (incl MRI), 12 months
5. Enrolled 92 subjects; 24/92 (26%) Sports-related
6. Latest findings at 3 month follow up 57/61 (93%)
7. NPD in TBI group 7/41 (17%); 4 ADHD; 2 Personality Change; 2 anxiety disorder; 1 adjustment disorder
8. NPD in OI group 1/16 (6%); needle phobia
## TBI and OI from Sports

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<th>Basketball</th>
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<th>Rugby</th>
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Mild TBI New Onset Psychiatric Disorders Implications

- Screen for NPD – not only academic difficulties
- Focus on higher risk children: frontal white matter injury, marginal preinjury academic function, or decline in school function
- Pending results for a large psychiatric study of consecutively treated inpatients and outpatients with MTBI and age, gender, and SES matched injured controls
Jack and Jill

Jack and Jill
grew up the hill
to fetch a pail of water.
Jack fell down
and broke his crown
and Jill came tumbling after.

Up Jack got
and home did trot
as fast as he could caper.
Went to bed
and plastered his head
with vinegar and brown paper.
Jack and Jill

When Jill came in, how she did grin to Jack’s paper plaster. Her mother, vexed, did whip her next for laughing at Jack’s disaster.

Now Jack did laugh and Jill did cry, but her tears did soon abate. Then Jill did say that they should play at see-saw across the gate.