TBI Across the Lifespan: The Challenge of Change

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MORE SURVIVORS

- 30 years ago, 50% of individuals with TBI died, the number today is 22%
- Improved medical technology and automotive safety features, e.g. seatbelts, child safety seats and airbags
- Average Lifespan shortened about 8 years; to about 70, correlated to physical impairments.
Distribution of TBI Severity: 2.5 million ER Visits

- Mild (Concussion) = 80%
  (LOC < 30 min, PTA 1 hour)
- Moderate = 10 - 13%
  (LOC 30 min-24 hours, PTA 1-24 hours)
- Severe = 7 - 10%
  (LOC >24 hours, PTA >24 hours)

<table>
<thead>
<tr>
<th>Age Group</th>
<th>MVA</th>
<th>Falls</th>
<th>Assault</th>
<th>Struck</th>
<th>All Other</th>
<th>Unknown</th>
</tr>
</thead>
<tbody>
<tr>
<td>0–4</td>
<td>14,655</td>
<td>250,413</td>
<td>1,513</td>
<td>53,761</td>
<td>13,222</td>
<td>10,225</td>
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<tr>
<td>5–14</td>
<td>18,110</td>
<td>101,790</td>
<td>16,612</td>
<td>101,112</td>
<td>31,355</td>
<td>20,763</td>
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<td>15–24</td>
<td>76,602</td>
<td>77,951</td>
<td>81,822</td>
<td>71,031</td>
<td>34,486</td>
<td>22,722</td>
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<td>25–44</td>
<td>75,122</td>
<td>80,867</td>
<td>75,527</td>
<td>49,505</td>
<td>36,933</td>
<td>22,855</td>
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<tr>
<td>45–64</td>
<td>46,923</td>
<td>95,824</td>
<td>28,206</td>
<td>36,925</td>
<td>15,843</td>
<td>18,804</td>
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<tr>
<td>≥ 65</td>
<td>10,359</td>
<td>174,544</td>
<td>4,068</td>
<td>12,815</td>
<td>6,285</td>
<td>5,216</td>
</tr>
</tbody>
</table>
Pediatric TBI
Challenges of Childhood

- Trust vs Mistrust
- Autonomy vs Shame
- Initiative vs Guilt
- Industry vs Inferiority

HOPE: Fundamental -- safety, predictability.
WILL: Freedom to explore and welcoming of failure
PURPOSE: Peers, independent decisions, sense of burden
COMPETENCE: Peer comparison of self-worth, recognition of disparities
FACTORS AFFECTING OUTCOME IN PEDIATRIC TBI

Graph showing the outcome of pediatric TBI based on different ages and types of TBI.
Lower IQ – More ADHD More ODD
123 children, Avg 11.6 (ages 6 – 17)

![Graph showing IQ scores for different groups]

Parenting After TBI

Today's Parenting Tip: Treat a difficult child the way you would your boss at work. Praise his achievements, ignore his tantrums and resist the urge to sit him down and explain to him how his brain is not yet fully developed.

— Robert Breeault —

AZ QUOTES
Significant group by authoritarian parenting interaction ($F_{3,73} = 3.14; P = .03$). Children with traumatic brain injury (TBI) revealed greater functional...
Challenges of Adolescence

- **Identity v Role Confusion** (Identity Crisis)

- **Intimacy v Isolation** (continued)
  - Love: Dating, exploring capacity for intimacy.

Significant group by home environment interaction ($F_{3,74} = 3.28; P = .02$)
Initial recoveries may be followed by plateaus and apparent declines.

- Initial knowledge “reserves” no longer adequate
- Peers developing at a faster pace, pulling ahead
- Environmental Demands more complex
  - (Dating, work entry, expectations for responsibility)
- Social isolation, lack of dating success
- Experimentation with substances and alcohol
- Psychiatric Disorders, behavioral and emotional
A student with a TBI could be eligible as a “child with a disability” as that term is defined by ADA Rehabilitation Act of 1973 (Amended 1990; 2010) Section 504.

The determination of eligibility under Section 504 requires an evaluation of whether the student has a physical or mental impairment that substantially limits a major life activity, without regard to mitigating measures, such as a health care plan, medication.

The list of major life activities includes the operation of major bodily functions, including neurological function and brain function.

Challenges of Adulthood

- Intimacy v Isolation

LOVE: Dating, marriage, family, parenting. Safety, care and commitment.
Marriage & Divorce
(2008, N=977, multicenter)

50% ALL Marriages end in divorce

- 85% still married (only two year follow)
- More serious injury, more likely divorce
- Older more likely to stay married
- Length of Marriage mattered
- TBI males more likely divorced than women
- TBI related to violence more divorced
- Minorities w/ Severe TBI more likely married

Limitations: short follow-up

Sexuality

- Poorly studied, especially in women
- Difficulties of both sexual functioning and desire
- Hypersexuality relatively rare but distressing

- Loss of intimacy and connection separate
- Partners described as childlike and self-oriented.

- Medication effects, distractibility, pain, impulsivity, spasticity
Reproductive Health

- 68% of women 5-10 years post TBI reported their cycles were irregular after injury
- 46% experienced amenorrhea
- No significant differences in conception but more post partum difficulties
- Significantly more mental health issues
  - Colantonio et al., 2010

Parenting Skills: No differences Over Time

SELF-PERCEPTION
Less accepting, Less encouraging
Less positive, Less disciplined
*Non-injured spouse as well

Both Parents more Depressed (20% Clinical Depression)

Children more Depressed and see parents as:
- Less involved
- Less caring
- Inconsistent
Challenges of Adulthood

Generativity v Stagnation

CARE: Finding a sense of purpose -- career, life goals, provider

CONTRIBUTION
Failure leads to regret, stagnation, remorse for past decisions.

Oklahoma Vocational Rehabilitation Training
(curriculum for State VR)

- 35% to 71% of persons with TBI return to some level of employment
- The presence of neurobehavioral symptoms, memory deficits, and the severity of physical limitations are general predictors of work outcome
- Work outcome is otherwise difficult to predict as outcome depends on motivation to succeed and the ability to match job demands and employer understanding and compassion with residual skills.
Chronic Traumatic Encephalopathy

Dementia Pugilistica

First described in boxers by Martland in 1928
23 cases reported to him by a single boxing promoter
5 cases ‘personally examined’
1 case with clinical details


Harrison S. Martland
(1883-1954)
First full time paid pathologist
Newark city Hospital, 1909-1927
Chief Medical examiner Essex county
NFL and CONCUSSIONS

- 61% of the former players sustained at least one concussion in their career
- 24% sustained 3 or more concussions
- Retired players with 3 or more concussions had 5 times reported significant memory problems compared to players with no concussion
- Researchers also observed an earlier onset of Alzheimer's disease in retirees than in general male population.
“Mild Traumatic Brain Injury in U.S. Soldiers Returning from Iraq”

- 1 in 6 returning troops have had at least one concussion
- 4.9% reported injuries with LOC
- 10.3% reported altered mental status, of those, 27.3% met criteria for PTSD
- TBI with LOC also associated with major depression

Normal 65 y/o       NFL Linebacker (45 y/o, 8 Concuss) 73 y/o boxer extreme dement
TBI Challenges of Old Age

- Ego Integrity v Despair

- Wisdom: accepting victories, defeats, accomplishments and shortfalls. Guilt or regret leads to despair.

The older you get, the more quiet you become. Life humbles you so deeply as you age. You realize how much nonsense you’ve wasted time on.
Physical Decline with Aging

Cognitive Changes With Age
Other Factors Affecting Health

- Economic and Social Status
- Limited Resources/Insurance
- Reduced Health Literacy
- Poor Health Practices due to Cognitive Problems

Increased Rates of Obesity, Hypertension, Depression and Diabetes
TBI Elevates Risk of Neurodegenerative Disease In General

Alzheimer’s – Elevates risk in Dose Dependent Fashion and lowers age of onset.

Parkinsons – Increased risk, lower age of onset

Frontotemporal Dementia – increased risk

Multiple Sclerosis – Risk Factor

ALS – Possible risk factor, more likely with CTE

In non-progressive neurological disability (mainly traumatic brain injury, spinal cord injury and cerebral palsy) it is the disability itself that determines life expectancy rather than the underlying cause.

1. Mobility
2. Continence
3. Swallowing
4. Epilepsy
5. Severity of Cognitive Deficits
TBI reduces life expectancy by about 8 years -- to age 70

<table>
<thead>
<tr>
<th>Cause of Death</th>
<th>Increased Risk for Coloradans with TBI</th>
</tr>
</thead>
<tbody>
<tr>
<td>Seizures</td>
<td>15 times</td>
</tr>
<tr>
<td>Mental Conditions (includes unspecified dementia)</td>
<td>5 times</td>
</tr>
<tr>
<td>Pneumonias</td>
<td>3 times</td>
</tr>
<tr>
<td>Nervous System Conditions (includes Alzheimer’s)</td>
<td>3 times</td>
</tr>
<tr>
<td>Infections</td>
<td>3 times</td>
</tr>
<tr>
<td>Digestive Conditions</td>
<td>3 times</td>
</tr>
<tr>
<td>Assaults</td>
<td>3 times</td>
</tr>
<tr>
<td>Suicide</td>
<td>2 times</td>
</tr>
<tr>
<td>Cardiovascular</td>
<td>2 times</td>
</tr>
<tr>
<td>Injuries</td>
<td>2 times</td>
</tr>
</tbody>
</table>

"FIGHT ME IF YOU WISH"
Hope is the most indispensable virtue in being alive...even where confidence is wounded, trust impaired.

Erik Erikson

Questions?

Thank You