The Ohio State University Traumatic Brain Injury Identification Method

The Ohio State University (OSU) Traumatic Brain Injury (TBI) Identification Method (OSU TBI-ID) is a standardized procedure for eliciting a person's lifetime history of TBI via a 3-5 minute structured interview. While recall by an individual, parent or significant other is not ideal for determining lifetime exposure to potentially damaging brain injury, self-report remains the gold standard for research and clinical use. Physicians, nurses and mental health professionals working with military personnel need this tool to elicit a complete history of TBI.

There are better and worse techniques for eliciting self-reported TBI, with some single question approaches missing the vast majority of injuries to the head. The OSU TBI-ID was designed to optimize what can be learned from self-report. The Center for Disease Control and Prevention's (CDC) recommendations for TBI surveillance are incorporated into the instrument. Reliability was established via test/re-test and inter-rater methodologies. From a study of 2,700 adults contacted via random digit dialing, 200 were called back 6-12 months later and found to have consistent responses for most aspects of their history.

The results of the OSU TBI-ID provide potentially useful information about an individual. Based on studies using prediction models, a person's previous history of TBI is useful for judging current cognitive and emotional states, particularly behavior associated with frontal lobe functioning (e.g., impulsivity, substance abuse, interpersonal abilities). In a general population survey conducted in one state, adults with a prior history of at least one TBI that resulted in loss of consciousness, when compared to adults without head injuries, were:

- 1.5 times more likely to be misusing alcohol;
- almost 2 times more likely to be in fair or poor health;
- greater than 2 times more likely to have a work-related limitation;
- greater than 2 times more likely to have any limitation due to physical, mental or emotional problems;
- 2.5 times more likely to be dissatisfied with their life;
- almost 3 times more likely to have problems with learning or memory; and
- greater than 3 times more likely to have a disability.

Consistent with the pathophysiology of TBI, it can be expected that greater history of these injuries will increase the likelihood that an individual will struggle with current life stressors, whatever they are. A person who has compromised functioning in the frontal areas of the brain will adapt less well in new or stressful situations, have greater problems following through on recommendations from healthcare providers and have more difficulty making lifestyle changes, particularly when the rewards for doing so are in the future versus being more immediate. As a result, it is important that professionals be aware of a person's history of TBI and the potential that current functioning is being affected. The OSU TBI-ID has proven useful in medical settings as well as mental health, substance abuse, domestic violence, corrections and aging.

The OSU TBI-ID has been recommended or adopted for a variety of research uses:

- NIH Common Data Elements <www.commontdataelements.ninds.nih.gov>;
- PhenX Toolkit <www.phenxtoolkit.org> for use with the Human Genome Project;
- CDC-funded study of prisoners conducted by the Medical University of South Carolina <www.cdc.gov/injury/erpo/awards/grants/2007/1-U49-CE001318-01.html>;
- VA-funded studies of returning service members and veterans <www.mirecc.va.gov/visn19/VISN_19_Current_Research.asp>;
- NIDRR-funded Dartmouth-Howard Collaboration studying persons with severe mental illness and substance use disorders.
The validity of the OSU TBI-ID is not based on elicitation of a veridical accounting of a person’s lifetime history of TBI. Instead, the OSU TBI-ID provides data for calculating summary indices reflecting the likelihood that consequences have resulted from lifetime exposure to TBI. Initial validation research has supported the psychometric qualities of these summary indices. Reliability has been demonstrated by both inter-rater and test/re-test reliability (Corrigan & Bogner, 2007; Bogner & Corrigan, 2009). Predictive validity has been shown by the relationship between indices of lifetime history and measures of cognitive performance, affective status, interpersonal functioning and aggression (Corrigan & Bogner, 2007; Bogner & Corrigan, 2009). Summary indices from the OSU TBI-ID can be used in both research and clinical care.

For more information on the OSU TBI-ID visit www.ohiovalley.org and view the “SynapShot” on “Screening for TBI”; or contact John D. Corrigan, PhD; Professor; Department of Physical Medicine and Rehabilitation, Ohio State University Medical Center; corrigan.1@osu.edu or (614) 293-3830.

References


Administration

It is essential to spend time helping a respondent recall injuries throughout their lifetime. The OSU TBI-ID is administered via interview, either by telephone or face-to-face. The instructions for administration and scoring are incorporated into the form and are summarized below.

Step 1
First, several questions are asked about different kinds of injuries experienced or treatment received. The goal in this step is to help the person recall any injuries that involve the head or neck that have occurred over their lifetime. Each injury recalled by the respondent involving the head or neck is recorded in the table by noting the cause in the first column. Don’t ask for more details about each injury in this step. Once all injuries have been recorded, proceed to Step 2. If no injuries are recorded, skip Step 2 and proceed to Step 3.

Step 2
Next, more information is obtained about each injury recorded in the table. Starting with the first injury, ask if the respondent was knocked out or lost consciousness (LOC) from the impact. If yes, ask how long and place a checkmark in the appropriate column of that row (LOC/knocked out: No LOC, <30 min, 30 min-24 hrs, >24 hrs). If no, ask if they were dazed or had a gap in memory from the injury and check the appropriate column of that row (Dazed/Mem Gap: yes/no). Ask how old they were at the time of the injury and record the age in the right most column. Repeat this procedure for each injury recorded in the table. (If there are more than nine injuries focus on those in which they were knocked out and determine the longest they were knocked out, how many injuries they were knocked out ≥30 minutes, and youngest age at which they were knocked out.)
Some people have experienced times in their life when they were injured many times and thus have difficulty recalling details about any one injury. This is common among athletes in contact sports and people who have been abused during childhood or via intimate partner violence. Do not press people for individual events; instead, determine what kind of injury was typical and the age range the exposure occurred. Ask if there was one incident that stood out due to being more severely injured. Record information about the typical injury and the age at which the epoch began. If one or more incidents stand out, record these as separate entries.

**Step 3**
Finally, you will ask if they have ever lost consciousness from a drug overdose or from being choked. Record the total number of overdose incidents and the total number of choking incidents.

**Interpretation of Screening Results**

The following are useful summary indices of a person’s lifetime exposure:

- Number of TBIs in which Loss of Consciousness (LOC) occurred
- Number of moderate or severe TBIs (number of TBIs with LOC≥30 minutes)
- Age at first Injury with LOC
- Worst Injury (none, TBI with altered consciousness [but no LOC], TBI with LOC < 30 minutes, TBI with LOC ≥ 30 minutes)
- Whether they had a period of closely spaced TBIs
- Number of anoxic Injuries (number of times LOC occurred due to drug overdose or oxygen deprivation)

Several aspects of a person’s lifetime history of TBI are associated with the likelihood of experiencing current cognitive and behavioral consequences.

- Moderate and severe TBI's (≥ 30 minutes LOC) are nearly certain to leave some permanent effects, even if the person recovered remarkably.
- Mild TBI’s, especially those that cause more than momentary loss of consciousness may also have long-term effects.
- If there was a time when injuries occurred close enough together that the brain had not healed from the first when the next one happened can cause consequences typical of moderate or severe TBIs. There may also be a delayed onset of cognitive behavioral symptoms.
- Injuries with LOC occurring before 15 years of age are associated with greater cognitive and behavioral difficulties.
- Multiple anoxic injuries or a single more severe incident are associated with cognitive and behavioral difficulties, especially problems with memory and concentration.
Ohio State University TBI Identification Method—Short Form  
(Version 4/11/12-Lifetime: to be used when querying about lifetime history of TBI)

I am going to ask you about injuries to your head or neck that you may have had anytime in your life.  
*Interviewer instruction:* Record cause and any details provided spontaneously in the box at the bottom of the page.  You do not need to ask further about loss of consciousness or other details during this step.

1. In your lifetime, have you ever been hospitalized or treated in an emergency room following an injury to your head or neck?  Think about any childhood injuries you remember or were told about.  
   - Yes—Record cause in table below
   - No

2. In your lifetime, have you ever injured your head or neck in a car accident or from crashing some other moving vehicle like a bicycle, motorcycle or ATV?  
   - Yes—Record cause in table below
   - No

3. In your lifetime, have you ever injured your head or neck in a fall or from being hit by something  (for example, falling from a bike or horse, rollerblading, falling on ice, being hit by a rock)?  Have you ever injured your head or neck playing sports or on the playground?  
   - Yes—Record cause in table below
   - No

4. In your lifetime, have you ever injured your head or neck in a fight, from being hit by someone, or from being shaken violently?  Have you ever been shot in the head?  
   - Yes—Record cause in table below
   - No

5. In your lifetime, have you ever been nearby when an explosion or a blast occurred?  If you served in the military, think about any combat- or training-related incidents.  
   - Yes—Record cause in table below
   - No

6. If all above are “no” then proceed to question 7.  If answered “yes” to any of the questions above, ask the following for each injury:  *Were you knocked out or did you lose consciousness (LOC)?  If yes, how long?  If no, were you dazed or did you have a gap in your memory from the injury?  How old were you?*

<table>
<thead>
<tr>
<th>Cause</th>
<th>Loss of consciousness (LOC)/knocked out</th>
<th>Dazed/Mem Gap</th>
<th>Age</th>
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<tbody>
<tr>
<td></td>
<td>No LOC  &lt; 30 min 30 min-24 hrs &gt; 24 hrs.</td>
<td>Yes  No</td>
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*If more injuries with *LOC*: How many more? ___ Longest knocked out? ___ How many ≥ 30 mins.? ___ Youngest age? ___

7. Have you ever lost consciousness from a drug overdose or being choked?  ___ # overdose  ___ # choked


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SCORING

_____  # TBI-LOC (number of TBI’s with loss of consciousness from #6)

_____  # TBI-LOC ≥ 30 (number of TBI’s with loss of consciousness ≥ 30 minutes from #6)

_____  age at first TBI-LOC (youngest age from #6)

_____  TBI-LOC before age 15 (if youngest age from #6 < 15 then =1, if ≥ 15 then = 0)

_____  Worst Injury (1-5):
   If responses to #1-5 are “no” classify as 1 “improbable TBI”.
   If in response to #6 reports never having LOC, being dazed or having memory lapses classify as 1 “improbable TBI”.
   If in response to #6 reports being dazed or having a memory lapse classify as 2 “possible mild TBI (no LOC)”.
   If in response to #6 loss of consciousness (LOC) does not exceed 30 minutes for any injury classify as 3 “mild TBI (with LOC)”.
   If in response to #6 LOC for any one injury is between 30 minutes and 24 hours classify as 4 “moderate TBI”.
   If in response to #6 LOC for any one injury exceeds 24 hours classify as 5 “severe TBI”.

_____  # anoxic injuries (sum of incidents reported in #7)