Extended Glasgow Outcome Scale (GOSE):
Comprehensive Training on the Use of the GOS-E Required for the Assessment of Criterion 4, Assessment and Scoring/ Rating Strategies
Case examples

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OVERVIEW
- SABS changes, new Catastrophic Impairment and Criterion 4
- The Importance of Neuropsychology and Occupational Therapy
- SABS 3.1.4 (Catastrophic Impairment)
  - What is the GOS
  - What is the GOS-E
  - Structured Interview for the GOS-E
  - Scoring, Definitions and rating rules
  - Case Law
- The Role of Neuropsychology and Occupational Therapy
- Case Examples
- Discussion
SABS Changes

- Prior to June 1, 2016, GCS was recognized in the SABS as a measure for determining brain injury severity and CAT designation
- A GCS of 9 or less was an automatic determination of catastrophic impairment
- As of June 1, 2016, GCS has been replaced with the GOS-E

3.1.4: 18 years and older:
If the insured person was 18 years of age or older at the time of the accident, a traumatic brain injury must meet the following criteria:

i. The injury shows positive findings on a computerized axial tomography scan, a magnetic resonance imaging or any other medically recognized brain diagnostic technology indicating intracranial pathology that is a result of the accident, including, but not limited to, intracranial contusions or haemorrhages, diffuse axonal injury, cerebral edema, midline shift or pneumocephaly.

ii. When assessed in accordance with Wilson, J., Pettigrew, L. and Teasdale, G., Structured Interviews for the Glasgow Outcome Scale and the Extended Glasgow Outcome Scale: Guidelines for Their Use, Journal of Neurotrauma, Volume 15, Number 8, 1998, the injury results in a rating of,

A. Vegetative State (VS or VS*), one month or more after the accident,
B. Upper Severe Disability (Upper SD or Upper SD*) or Lower Severe Disability (Lower SD or Lower SD*), six months or more after the accident, or
C. Lower Moderate Disability (Lower MD or Lower MD*), one year or more after the accident.

("* denotes patient was not fully independent before injury)
Review SABS Changes

For CAT designation, for brain injury for adults, TWO criteria must be met:

- There must be positive findings on imaging, on CT or MRI or other “medically recognized brain diagnostic technology indicating intracranial pathology”
- Plus GOS-E of vegetative state (1 month post-MVA), upper or lower severe disability (6 months post-MVA), or lower moderate disability (1 year post-MVA)

What is the Glasgow Outcome Scale?

- Originally developed in 1975 by Teasdale and Jennett.
- 5-point standardized method for assessing the severity of injury and predicting long-term outcomes following traumatic brain injury.
- Valid and reliable (in clinical settings), but some concerns with inter-rater reliability
- Good predictor of long term outcome in TBI.
Glasgow Outcome Scale (GOS) Prior to June 1, 2016

- 5-Point Rating Scale:

1. Death (ascribable to primary brain damage)
2. Persistent vegetative state (“alive but unresponsive”)
3. Severe disability (“conscious but disabled/dependent”)
4. Moderate disability (“disabled but independent”)
5. Good recovery (“resumption of normal life”)

Extended Glasgow Outcome Scale -Extended Post June 1, 2016

- Extended Glasgow Outcome Scale (GOS-E) was developed to address limitations of the original GOS:
  - Use of broad categories that are insensitive to change
  - Difficulties with reliability due to lack of a structured interview format.

- The GOS-E extends the original 5 GOS categories to 8.
- A structured interview has been provided to improve reliability of rating. Good interrater reliability and content validity have been demonstrated for the GOS-E
- GOS-E has been shown to be more sensitive to change in mild to moderate TBI

Glasgow Outcome Scale - Extended
Post June 1, 2016

- 8-Point Rating Scale:
  1. Dead
  2. Vegetative State (VS)
  3. Low Severe Disability (SD-)
  4. Upper Severe Disability (SD+)
  5. Low Moderate Disability (MD-)
  6. Upper Moderate Disability (MD+)
  7. Low Good Recovery (GR-)
  8. Upper Good Recovery (GR+)

After June 1, 2016, and for those 18 years of age or older at the time of the accident:

<table>
<thead>
<tr>
<th>GOS-E Rating</th>
<th>Time after MVA</th>
</tr>
</thead>
<tbody>
<tr>
<td>Vegetative State</td>
<td>one month or more after the accident</td>
</tr>
<tr>
<td>Severe Disability (Upper or Lower)</td>
<td>six months or more after the accident</td>
</tr>
<tr>
<td>Moderate Disability (Lower)</td>
<td>one year or more after the accident</td>
</tr>
</tbody>
</table>
GOS-E

- Can assess 1-month post-accident for individual in persistent vegetative state
- Can assess as early at 6-months post-accident (or any time thereafter) for Severe Disability. Focus would be on Independence in the Home and Independence Outside the Home.
- If no Severe Disability at or after 6 months, can reassess at 1-year for Lower Moderate Disability. Focus would be on resumption of work. If client was unemployed pre-MVA, not seeking work or retired, focus would be on social and leisure functioning and relationships

GOS-E

- The GOS-E is a global scale that rates clients based on their level of disability through the use of a structured interview
- Structured Interview: Permits the assignment of an individual to an outcome category and should be focused on social and personal functional ability. The final rating is based on the lowest category of outcome indication in the interview (Wilson et al. 2000)
- It looks at CURRENT functioning
- It considers CAPABILITY (not necessarily what the individual is actually doing at that time)
- One MUST Administer the complete questionnaire, not just selected parts
- Inconsistencies need to be explored in greater detail
- Return to work criteria is unclear
GOS-E

- **Four Rules to Consider:**
  - Disability due to head injury is identified by a change from pre-injury status. Look at pre-injury status to be able to properly assess outcomes following TBI
  - Only pre-injury and current status should be considered. Initial state after injury and future goals are not relevant
  - Disability must be the result of physical and/or mental impairment stemming from TBI
  - Use the best sources of information available. If client lacks insight, a caregiver and/or member of rehab team should be consulted. Denial of psychological changes? Over-reporting?

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**Structured Interview for the GOS-E**

**Q1 - Consciousness**

Is the head injured person able to obey simple commands?

- No = VS (CAT at 1 Month)

**Q2 - Independence in the Home**

a) Is the assistance of another person at home essential every day for some activities of daily living?

- No = Go to Q 3A

Independence includes the ability to plan for and carry out such activities: getting washed and putting on clean clothes without prompting, preparing food for themselves, dealing with callers and handling minor domestic crises. The person should be able to carry out activities without needing prompting or reminding and should be capable of being left alone overnight.

b) Do they need frequent help or someone to be around at home most of the day?

- Yes = Lower SD (CAT at 6 Months) - Must be able to look after self for 24 hrs. if necessary.
- No = Upper SD (CAT at 6 Months) - must be able to look after themselves for up to 8 hrs./day if necessary
Structured Interview for the GOS-E (Cont’d)

Q3 - Independence Outside the Home
Able to Shop without assistance?
Ability to plan purchase, money management, behave appropriate in public.
No = Upper SD (CAT at 6 Months)

Q4 - Independence Outside the Home
Able to Travel locally without assistance (drive, public transit, taxi)?
Must be able to phone for a taxi and/or instruct the driver.
No = Upper SD (CAT at 6 Months)

Q5 - Work
Able to Work to previous capacity?
Current capacity for work (or ability to look after others) should be at the same level as prior to accident. For students, their capacity for study should not have been adversely affected.
Only in a sheltered workshop/non competitive job/unable to work = Lower MD (CAT at 1 Year)
Reduced work capacity = Upper MD (Not CAT)

Structured Interview for the GOS-E (Cont’d)

Q6 - Social and Leisure Activities
Able to resume regular social and leisure activities outside the home? If they have stopped the majority of activities because of loss of interest or motivation, then this is also considered a disability.
Unable to participate (rarely if ever) = Lower MD (CAT at 1 year)
Participate less than half as often = Upper MD (Not CAT)
Participate at least half as often = Lower GR (Not CAT)

Q7 - Family and Friendships
Psychological problems that resulted in ongoing disruption to family and/or friendships?
(e.g., quick temper, irritability, anxiety, insensitivity to others, mood swings, depression, and unreasonable or childish behaviour)
Constant - daily and intolerable = Lower MD (CAT at 1 year)
Frequent - once per week or more, but tolerable - Upper MD (Not CAT)
Occasional less than weekly = Lower GR (Not CAT)
Structured Interview for the GOS-E
(Cont’d)

Q8 - Return to Normal Life

Other current problems which affect daily life?
(e.g., Headache, dizziness, tiredness, sensitivity to noise or light, slowness, memory failures, concentration problems)

Yes = Lower GR (Not CAT)
No = Upper GR (Not CAT)

- If the person was fully independent before the injury and the answers to one or more of the dependence questions indicates that this is no longer the case, then they are Severely Disabled (Questions 2 - 4).
- If the person had no prior problems before the injury and the answers to one or more of the questions concerning current difficulties indicates that this is no longer the case, then they are Moderately Disabled (Questions 5 - 7).
- If the person does not fulfill the criteria for any of the lower outcome categories, then they are considered to be in Good Recovery, even if they have a minor disability.
- If pre-existing problems worsen as a result of injury, this change can be used in the rating.
- If the person suffers from a post-TBI seizure disorder, one must consider the restrictions imposed by the risk of a seizure.

Glasgow Outcome Scale-Extended (GOS-E)

<table>
<thead>
<tr>
<th>1 - Dead</th>
<th>Condition of unawereness with only reflex responses but with periods of spontaneous eye opening.</th>
</tr>
</thead>
<tbody>
<tr>
<td>2 - Vegetative State (VS)</td>
<td>Patient who is dependent for daily support for mental or physical disability, usually a combination of both. If the patient can be left alone for more than 8h at home it is upper level of SD, if not then it is low level of SD.</td>
</tr>
<tr>
<td>3 - Low Severe Disability (SD-)</td>
<td>Patients have some disability such as aphasia, hemiparesis or epilepsy and/or deficits of memory or personality but are able to look after themselves. They are independent at home but dependent outside. If they are able to return to work even with special arrangement it is upper level of MD, if not then it is low level of MD.</td>
</tr>
<tr>
<td>4 - Upper Severe Disability (SD+)</td>
<td>Resumption of normal life with the capacity to work even if pre-Injury status has not been achieved. Some patients have minor neurological or psychological deficits. If these deficits are not disabling then it is upper level of GR, if disabling then it is lower level of GR.</td>
</tr>
</tbody>
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Situational GOS-E Assessment

- Consists of:
  - Detailed client interview
  - Collateral interviews (in person or questionnaires)
  - Functional Testing
  - Synthesis of Data

It is a functional assessment
- Closely linked to an assessment of attendant care needs
- Should be a comprehensive functional assessment looking at the level of assistance and supervision needed by the individual for the routine completion of daily and weekly activities based on the sequela of the brain injury
- Can include standardized, informal, qualitative and quantitative methodologies
Situational GOS-E Assessment

- The GOS-E does not directly distinguish between disability due to brain injury and disability due to other bodily injuries. However, in the spirit of the SABS, the assessor should rate according ONLY to the functional impact of the brain injury.

Brain Injury sequela can be cognitive and/or mental and/or physical in nature. E.g.
- Hemiparesis
- Increased tone or spasticity
- Hemianopsia / visual neglect
- Anosmia / loss of smell
- Personality Changes and Mental Disruption (aggression, poor self-regulation, low mood/apathy/amotivation, oppositional behaviors)
- Cognitive Changes (reduced memory and attention, poor reasoning/judgment, decreased planning and organization, poor task initiation and follow-through)
Situational GOS-E Assessment

- Client and Collateral Interviews:
  - Gather information about pre-accident and current functioning in the areas outlined in the structured interview (Independence in the Home; Independence Outside the Home; Work; Social and Leisure; Family and Friendships)
  - Ask about what the individual is capable / not capable of doing and try to determine the underlying reasons for poor task performance
  - Consider whether tasks are carried out independently, routinely and without cueing, prompting or supervision

Situational GOS-E Assessment

- Functional Testing - Independence In the Home
  - Consider client’s personal hygiene and the state of the home
  - Pill or Coin Sorting Tests
    - Grade the level of complexity as appropriate
    - Assess planning, organization, sequencing, ability to follow instructions, working memory, persistence
    - Consider implications for medication & money management
Situational GOS-E Assessment

- Functional Testing - Independence In the Home

- Cooking / Baking Activities
  - Grade the level of complexity as appropriate (preparing one dish vs multiple; number of ingredients)
  - Can build in distractions and ones that lead the client out of the kitchen
  - Assess planning, organization, attention, sequencing, multi-tasking, working memory, persistence, safety**

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Situational GOS-E Assessment

- Functional Testing - Independence In the Home

- Scenarios - Can present challenging scenarios or emergency situations and have individual demonstrate the steps they would take to address the situation

- Complex Scheduling Activities

- Meal and Grocery Planning - Can plan for the family, or for an event. Can build in parameters, like allergies to consider, research that is needed and/or time constraints. Can change or modify information in the middle to assess mental flexibility and ability to switch focus

**Note: **Safety assessments should be conducted in a controlled environment and with appropriate supervision.
Situational GOS-E Assessment

- Functional Testing - Independence Outside the Home

- Research and Plan a bus route to get to a given destination by a specific time
- Consider awareness of and adherence to road safety
- At the destination, engage client in a functional community assessment (e.g. shop for the groceries you planned earlier; design an activity in a large store where the client must “shop” for different people of different ages, with different preferences)
- Can set rules and parameters to add complexity (time constraints, budget constraints); Can make changes during the outing to assess mental flexibility and ability to switch the plan and the focus
- Use clinical judgment regarding client’s safety before embarking on a community assessment

Scoring and Rating

- Independence in the Home:
  - If patient CANNOT be safely left alone for 8-hours or more, they have a Lower Severe Disability (SD-) = CAT
  - If patient CANNOT be safely left alone for more than 24 hours, they have an Upper Severe Disability (SD+) = CAT

- Independence Outside the Home:
  - If the patient CANNOT grocery shop, handle money or travel in community independently and without assistance, they have an Upper Severe Disability (SD+) = CAT
Situational GOS-E Assessment

- Functional Testing - Work

- Capacity for work is assessed 1-year or more post-accident
- Consider attempts to return to work - successful/not successful; were modified hours and/or duties needed; was client able to attend work regularly, sustain and maintain productivity levels; were errors made, etc...
- To assess, can simulate work-like tasks. Need to consider previous job and simulate accordingly (e.g. filing, phone calls, data entry for office administrative positions; use of coloured paper or plastic food and mock orders to simulate someone working at a fast food restaurant)

Scoring and Rating

- Work:
  - At 1 year or more post-accident, if patient is able to return to work, even at a reduced capacity or with special accommodations, they have an Upper Moderate Disability (MD+) = NON CAT
  - If the patient can return only to a “sheltered workshop, non-competitive employment or are current unable to work”, they have a Lower Moderate Disability (MD-) = CAT

- “Just above the rating on the structured interview it states, “If they were working before, then their current capacity for work should be at the same level.” This seems to contradict the second bullet point above."
Situational GOS-E Assessment

- Functional Testing - Social and Leisure
  - Can be assessed 1-year or more post-accident
  - Consider what leisure tasks the individual has resumed and how regularly they participate, as well as barriers to sustained and continued participation
  - Can design tests/activities to assess performance in pre-accident leisure activities (building/tinkering tasks, sports, yoga, playing instrument)

Scoring and Rating

- Social and Leisure Activities
  - If patient can participate a bit less (at least half as often as before injury), they have a Lower Good Recovery (GR-) = NON CAT
  - If patient can participate much less (less than half as often), they have an Upper Moderate Disability (MD+) = NON CAT
  - If patient is unable to participate (or rarely, if ever), they have a Lower Moderate Disability (MD-) = CAT
Situational GOS-E Assessment

- Functional Testing - Family and Friendships
- Can be assessed 1 year or more post-accident
- Consider quality of relationships and changes in personality and mood affecting regular, positive and meaningful interactions
- Consider any post-accident history of negative encounters and interactions (altercations, fights, firings) in relation to pre-accident social functioning
- Assess client's interactions with assessor and members of broader community (create tests/activities that involve sustained communication and interaction with others)

Scoring and Rating

- Family and Friendships
  - Consider the extent of disruption or strain on relationships
  - If there is occasional (less than weekly) disruption, they have a Lower Good Recovery (GR-) = NON CAT
  - If there is frequent (once a week or more but tolerable) disruption, they have an Upper Moderate Disability (MD+) = NON CAT
  - If there is constant (daily and intolerable) disruption, a Lower Moderate Disability (MD-) = CAT
THINGS YOU SHOULD BE SURE TO KNOW AND DO

Recommendations:

• Be familiar with the 1975, 1981, and 1998 articles regarding the GOS/GOSE
• Document the individual’s functioning in all spheres of life over time.
  • Obtain up-to-date in-home assessment/situational assessment.
  • Collateral interview with family members or caregivers
  • Careful review of the medical file to look at consistencies/inconsistencies
• Factors to consider include one’s ability to organize, initiate and complete daily activities, the ability to initiate and respond to opportunities for social interaction and the ability to return to work and to participate in pre-accident leisure activities.

CASE LAW ON GOS – WATTERS AND STATE FARM

Important case that considered whether an individual sustained a brain injury resulting in a score of 2 or 3 on the Glasgow Outcome Scale.

Background:

• 40 yr. old female struck by a pick-up truck in Sept. 2011 while crossing the street.
• GCS 12 - confused and disoriented.
• Multiple skull fractures and right frontal lobe contusion, subdural and subarachnoid hemorrhages identified on MRI.
Sequelae of MVA:

- **Cognitive:** poor attention, memory, and processing speed, perseverative, difficulty adapting to changes and task demands, distractible.
- **Physical:** Symptoms of post-concussion syndrome (headaches, fatigue, anosmia).
- **Psychological:** Adjustment disorder with mixed anxiety and depressed mood; Personality change.

Arbitrator’s Findings:

1. The Applicant’s family members adjusted their schedules to ensure that the Applicant was rarely home alone for longer than a few hours;
2. The Applicant required constant cuing to initiate and remain on task and her husband and daughter were communicating with her (by telephone and text messages) throughout the day (up to 20 times per hour) whenever they were not physically present to assist her;
3. The Applicant’s husband assisted her in managing her medications throughout the day and she was not doing this independently;
4. Applicant experienced several mishaps where she has burned food and her clothing while attempting to assist in meal preparation; and
5. All of the evidence demonstrates that the Applicant is incapable of using public transportation independently or shopping independently.
CASE LAW ON GOS - WATTERS AND STATE FARM

- This decision is still important after GOS has been replaced by GOS-E as many of the conclusions also apply to GOS-E analysis of CAT impairment.

- **Independence** is the key factor in distinguishing between “severe” and “moderate” disability.

CONSIDERATIONS

There is no Established or set way of conducting CAT assessments under the new rules (yet), but this is an opportunity to open a conversation regarding how we best do this. In our view every CAT should include (not exclusively) Neuropsychology and Occupational Therapy:

- Neuropsychology helps establish the presence of brain injury and identifies domains of impairment for further query in different life situations.
- Occupational Therapy can address the functional impact of the impairment identified by the Neuropsychologist and complete the situational assessment.
- The Sequence is important.
- Collaboration is important.
- Thoroughness is important.

The definition of “neuropsychologist” in subsection 3 (1) of the Regulation is amended by adding “who has been registered to practice as a neuropsychologist in Canada for a **minimum of five years**” at the end.
NEXT STEPS?

If you have any additional questions following the information reviewed today, do not hesitate to contact us at:

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