

# Agitation Following TBI

During the early phase of recovery from brain injury, many people undergo a period of agitation. Level IV of the Rancho Los Amigos Levels of Cognitive Functioning corresponds to the confused-agitated stage. This stage has been described as a time when a patient is in a heightened state of activity and has diminished capability for processing new information and responding to events in the environment (Malkmus et al., 1980). Based on studies of agitation following traumatic brain injury and other conditions, the following definition of agitation has been proposed:

Agitation is an excess of one or more behaviors that occurs during an altered state of consciousness (Bogner & Corrigan, 1995).

This definition emphasizes the importance of “excessiveness” over the type of behavior manifested. “Excessiveness” is defined as the degree to which the behavior interferes with functional activities and the extent to which the behavior can be inhibited. No one type of behavior comprises agitation, though some component behaviors may be more dominant at times. The definition also requires that the behavior occur during an altered state of consciousness, which, for traumatic brain injury, includes the diminished arousal present from time of injury through the clearing of post-traumatic amnesia.

The [Agitated Behavior Scale](#) (ABS; Corrigan, 1989) was developed to assess the nature and extent of agitation during the acute phase of recovery from acquired brain injury. Its primary purpose is to allow serial assessment of agitation by treatment professionals who want objective feedback about the course of a patient's agitation. Serial assessments are particularly important when treatment interventions are being attempted. The ABS has been used in multiple intervention studies across a variety of populations, including persons with brain injury, Alzheimer's dementia, schizophrenia, and bipolar disorder, and patients receiving emergency medical transport (Tabloski et al., 1995; Meehan et al., 2001; Beaulieu, et al., 2008; Allen et al., 2011; Weiss et al., 2011). Corrigan et al. (1996) demonstrated the utility of the ABS for measuring agitation in nursing home residents with progressive dementias, primarily Alzheimer's disease.

## Reliability of the ABS

The initial validation studies (Corrigan, 1989) showed correlations between ratings conducted on the same day that exceeded .70 for the Total score (subscale scores were not available at that time). Inter-rater reliability was re-examined (Bogner et al., 1999) due to the instrument's increased use with different populations, rated by individuals from various disciplines, based on a variety of observation periods. With a sample of persons receiving acute rehabilitation for acquired brain injury, research assistants (psychology interns and a rehabilitation nurse) rated behavior based on 10-minute observation periods. The research assistants' ratings yielded a correlation coefficient for the Total score of .92. The correlation coefficients for the factors Disinhibition, Aggression, and Lability were .90, .91, and .73, respectively. The reliability of the Lability score was likely reduced by the small number of items used in its calculation. When comparisons were made between the ratings made of the research assistants based on 10-minute

observation periods and the ratings made by nurses based on an 8-hour shift, the correlation coefficients for the Total and subscale scores were much lower (.36 to .60). The lower correlation was likely due to different behaviors being measured in the varied conditions and time intervals. Agitation has been known to change in intensity throughout the day, and in response to the regulation of stimulation. When serial monitoring is the goal, it is important that comparisons be made under comparable conditions.

Inter-rater reliability was also examined with a sample of individuals residing in a long-term care facility whose primary diagnosis was dementia. Research assistants completed the ratings based on 10-minute observation periods. The correlation coefficient for the Total score was .91, while the coefficients for the factor scores were .87 for Disinhibition, .89 for Aggression, and .86 for Lability.

Examination of the internal consistency of the scale found Cronbach's alphas ranging from .83 to .92 in the original validation study (Corrigan, 1989). With the two samples examined by Bogner et al (1999), Cronbach's alphas ranged from .74 to .92. A subsequent study using rating scale analysis yielded a person separation reliability statistic of .81 for the Total score (Bogner et al., 2000). The relatively high internal consistency of the scale suggests that agitation, as measured by the ABS, is a unitary construct, with three facets being individually prominent at times.

## **Validity**

The original development of the ABS demonstrated the content validity of items and concurrent validity of the Total Score. Subsequent studies have shown the ABS scores to be associated with change in cognitive status (Corrigan & Mysiw, 1988; Nott et al., 2010) and able to differentiate confusion and inattention (Corrigan & Mysiw, 1988; Corrigan et al., 1992). Construct validity has been further substantiated by the identification of underlying factors (Corrigan & Bogner, 1994) and through rating scale analysis (Bogner et al., 2000). The factor and rating scale analyses indicated that agitation is represented by one general construct with three underlying, correlated factors: Aggression, Disinhibition, and Lability. While the Total Score is the best measure of agitation, the subscale scores may provide important additional clinical and research data. The Total Score and three underlying subscales have proven stable over multiple samples (Corrigan & Bogner, 1994; Corrigan et al., 1996).

## **Training in administration**

Training should provide basic background on the nature of agitation, as well as description of and examples for rating each item. New users should practice rating actual patients, comparing their results to that of experienced users. Written scenarios are available to provide a test standard for assessing competency in administration.

[The Agitated Behavior Scale \(ABS\) Form](#)

[Rating Example](#)

[Written Scenario 1: Jack](#)

[Written Scenario 2: Sally](#)

## **Raters**

The ABS is an observational as opposed to a self-report measure. Original validation studies showed that nursing staff, physical therapists and occupational therapists can use the scale reliably and validly after receiving appropriate training. At Ohio State University, the ABS is completed by the primary nurse at the end of each shift. Novak and Penrod (1993) report its use at the end of each session by therapy staff.

## **Observational Units**

The ABS has been shown to be reliable and valid when based on therapists' 30-minute observation periods, or primary nurses' perceptions based upon an 8-hour shift (Corrigan, 1989). Ratings based on 10-minute observation periods by psychology assistants or rehabilitation nurses have also been found to be reliable. However, serial monitoring must be done with comparable observations, as it has been found that ratings during 10-minute observation periods are not comparable to ratings based on 8-hour shifts.

## **Administration**

Observers rate each of the fourteen items according to a 4-point rating scale. A rating of "1" is ascribed when the behavior in the item is not present. Ratings of "2," "3," and "4" indicate the behavior is present and differentiate the degree or severity. Degree can be a function of either the frequency with which the behavior occurs or the intensity of individual occurrences.

Raters should be instructed that the basis for determining the score is the extent to which the occurrence of the behavior described in the item interferes with functional behavior that would be appropriate to the situation:

- We suggest a rating of "2" or "slight" be ascribed when the behavior is present but does not prevent the conduct of other, contextually appropriate behavior. Patients may redirect themselves spontaneously or the continuation of the agitated behavior does not preclude the conduct of the appropriate behavior.
- A rating of "3" or "moderate" indicates the individual may need to be redirected from an agitated to an appropriate behavior, but is able to benefit from such cueing.
- A rating of "4" or "extreme" is ascribed when the individual is not able to engage in appropriate behavior due to the interference of the agitated behavior, even when external cueing or redirection is provided.

## **Scoring**

The Total Score is calculated by adding the ratings (from one to four) on each of the fourteen items. Raters are instructed to leave no blanks; but, if a blank is left, the average rating for the other fourteen items should be inserted such that the Total Score reflects the appropriate possible range of values. The Total Score is the best overall measure of the course of agitation (Corrigan, 1989; Corrigan & Bogner, 1994).

Subscale scores are calculated by adding ratings from the component items:

- Disinhibition is the sum of items 1, 2, 3, 6, 7, 8, 9 and 10.
- Aggression is the sum of items 3, 4, 5 and 14. (It is not an error that Item #3 is in both scores.)
- Lability is the sum of items 11, 12 and 13.

In order to allow subscale scores to be compared to each other and to the Total Score, it is recommended that an average item score for each factor be calculated and multiplied by fourteen. This procedure provides subscale scores with the same range as each other and the Total Score, which is useful for graphic presentation (sample graph).

## **Normative data**

The means and standard deviations for the Total Score and subscale scores are based on samples of persons with traumatic brain injury treated during the acute phases of recovery on an inpatient, rehabilitation unit. A prospective sample of all patients with brain injuries, regardless whether they were demonstrating agitation, revealed an overall mean ABS score of 21.01 and standard deviation of 7.35 for day shift nursing observations (Corrigan, 1989). For clinical purposes, we consider any scores (Total or converted subscale) 21 or below to be within normal limits; from 22 through 28 to indicate mild occurrence; 29 through 35 to indicate moderate; and more than 35 to be severe.

While norms based on a broader sampling of patients from other institutions are desirable, the ABS remains quite usable for ipsative comparisons of the same individual from shift to shift, therapy to therapy, and/or day to day.

## **Interpretation of scores**

Graphical representation of the scores allows for ease in interpretation. Comparisons can be made across time, shift, interventions, factor scores, or other variables.

# **Treatment of Agitation**

Because of its disruption of therapeutic goals, significant agitation during rehabilitation has to be addressed, and various behavioral, environmental and pharmacological interventions have been used. Effective treatment requires the involvement of the entire interdisciplinary rehabilitation team. The identification and elimination of antecedents or triggers of agitation is often the most effective behavioral approach. Possible antecedents include: medical problems that reduce cognition or increase discomfort; the presence of environmental demands that exceed the person's cognitive abilities at the time; and/or a chaotic, unstructured environment (Flanagan et al., 2009). Agitation can be reduced through the provision of structured rehabilitation and supports to maximize cognitive functioning.

With regard to the pharmacological interventions, the research literature is sprinkled with studies of the effectiveness of various medications in improving agitation. While there is not clinical consensus about which medications are effective in what circumstances

(Fugate et al., 1997; Francisco et al., 2007), there is an understanding that those pharmacologic interventions which reduce agitation through sedation can delay, if not prevent, patients' cognitive and functional improvement during the acute phase of recovery (Mysiw & Sandel, 1997). Studies have shown that an improvement in cognition was a prerequisite to improved agitation (Corrigan and Mysiw, 1988; Nott et al., 2010).

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