



**AOTA Critically Appraised Topics and Papers Series**  
**Traumatic Brain Injury**

*\*A product of the American Occupational Therapy Association's  
Evidence-Based Literature Review Project*

**CRITICALLY APPRAISED PAPER (CAP)**

***Focused Question***

**What is the evidence for the effect of interventions (published between 2000-2004) to enable persons with traumatic brain injury (TBI) to participate in areas of occupation (activities of daily living [ADL], instrumental activities of daily living [IADL], work, leisure, social participation, and education)?**

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Goranson, T. E., Graves, R. E., Allison, D., & LaFreniere, R. (2003). Community integration following multidisciplinary rehabilitation for traumatic brain injury. *Brain Injury*, 17, 759–774.

**PROBLEM STATEMENT (JUSTIFICATION OF THE NEED FOR THE STUDY)**

Third-party payers are demanding accountability of cognitive rehabilitation programs. Large scale reviews of outcome evaluation studies reveal problems that limit utilization of this research as evidence of efficacy:

- Poor research methodology (small samples, lack of control group)
- Noncomparability of outcome measures and lack of evidence of generalizability of gains in cognition to everyday life
- Lack of multidimensional analysis to determine “what improves”

State the problem the authors are investigating in this study.

To address the methodological limitations of much previous research by using a pretest posttest no-rehabilitation control group design to evaluate whether patients with TBI benefit from participating in a rehabilitation program.

**RESEARCH OBJECTIVE(S)**

List study objectives.

To determine the extent to which participation in a multidisciplinary rehabilitation program and patient characteristics predict improvement in community integration following mild-to-moderate traumatic brain injury.

Describe how the research objectives address the focused question.

The research objective partially addresses the focused question in that occupational therapy is included in the multidisciplinary program and the results are measured in terms of achievement of home IADL, social participation, and productive roles.

**DESIGN TYPE:**

Retrospective nonrandomized two-group pretest-posttest case control. Groups were matched on age, education, and time since injury.

**Level of Evidence:**

Level II

Limitations (appropriateness of study design):

Was the study design type appropriate for the knowledge level about this topic? *If no, explain.*

Yes

No

**SAMPLE SELECTION**

How were subjects selected to participate? Please describe.

Archival data of patients with mild (PTA<sup>1</sup> < 12 hours) to moderate (PTA < 24 hours) TBI seen in an outpatient clinic between 1994 and 1998, for whom there was follow-up data.

**Inclusion Criteria**

- 6–18 months pretest to posttest interval
- PTA < 24 hours
- Admission to rehab program, the criteria for which were:
  - Sustained a TBI
  - Lived close enough to be able to commute
  - No current drug or alcohol abuse
  - Not physically violent
  - Not suffering from current chronic psychiatric illness or behavioral problem severe enough to preclude participation
  - Had a fixed address and able to provide own transportation to and from the program
  - Required 3 of the following services: physiatry, psychology, social work, physiotherapy, occupational therapy, recreation therapy, and/or speech therapy
  - Wanted to and had time to participate

**Exclusion Criteria**

The pretest-posttest interval was outside of the 6- to 18-month time limits

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<sup>1</sup> PTA = posttrauma amnesia

Sample Selection Biases: If yes, explain.

Volunteers/Referrals

Yes

No

Attention

Yes

No

Others (list and explain):

People not accepted for rehabilitation served as the control group; these people were different from those accepted for rehabilitation even though the groups were similar on 3 matching variables.

**SAMPLE CHARACTERISTICS**

N= 42

% Dropouts 0. There were no dropouts, but 21 potential participants failed to qualify or chose not to participate.

#/ (%) Male 43% rehab;  
38% control

#/ (%) Female 57% rehab;  
62% control

Ethnicity Caucasian

Disease/disability diagnosis Mild to moderate TBI

Check appropriate group:

|                 |   |                    |                     |                     |
|-----------------|---|--------------------|---------------------|---------------------|
| <20/study group | 20–50/study group <input checked="" type="checkbox"/> | 51–100/study group | 101–149/study group | 150–200/study group |
|-----------------|---|--------------------|---------------------|---------------------|

Sample Characteristics Bias: If no, explain.

If there is more than one study group, was there a similarity between the groups?

Yes  Similar demographics, but not all met qualifications for inclusion in a rehab program. Education:  $t(40) = 0.94, p > 0.3$ ; gender:  $\chi^2 = 1.5, p > 0.3$ ; nonsignificant differences in age, legal case pending, length of PTA, pretest CIQ scores. The authors present an argument against the two groups being different (p.771) (i.e. the groups are similar).

No

Were the reasons for the dropouts reported?

Yes

No

N/A

**INTERVENTION(S)**—Included are only those interventions relevant to answering the evidence-based question

*Add groups if necessary*

Group 1: Rehabilitation

|                   |   |
|-------------------|---|
| Brief Description | Intensive outpatient rehabilitation, multimodal interventions. The goal of treatment was: to assist individuals with TBI to maximize their functional abilities by remediating and/or teaching compensatory strategies for cognitive, physical or emotional difficulties incurred as a result of the TBI.. Mutual goal-setting; individual and group therapy including Attention Process Training |
| Setting           | Clinic and community locations  |
| Who Delivered?    | Recreational therapy, physical therapy, occupational therapy, speech language pathology, social work, neuropsychology, psychiatry   |
| Frequency?        | 5.5 hours/day, 4 days/week  |
| Duration?         | Varied as per need from 1 to 7 months (mean = 4 months)   |

Group 2: Control

|                   |              |
|-------------------|--------------|
| Brief Description | No treatment |
| Setting           |              |
| Who Delivered?    |              |
| Frequency?        |              |
| Duration?         |              |

Intervention Biases: *Explain, if needed.*

Contamination

Yes

No

Co-intervention

Yes

No

Timing

Yes

No

Site

Yes

No

Use of different therapists to provide intervention

Yes

No

NR  Some patients may or may not have received services from all disciplines.

NR = Not reported.

**MEASURES AND OUTCOMES**—Included are measures relevant to answering the focused question

Name of measure:

CIQ (Community Integration Questionnaire)

Outcome(s) measured (what was measured?):

Community integration: home management and IADLs; social integration; productive use of time (work or school)

Is the measure reliable (as reported in article)?

Yes   $r = 0.91, 0.93, 0.86.,$  and  $0.83$  for total and 3 subtests, respectively

No

NR

Is the measure valid (as reported in article)?

Yes

No

NR

How frequently was the measure used for each group in the study?

Intake and 6–18 months after discharge (a follow-up measure)

### Measurement Biases

Were the evaluators blinded to treatment status? *If no, explain.*

Yes

No  The CIQ is a self-report instrument

Recall or memory bias *If yes, explain.*

Yes

No

Others (list and explain):

The CIQ is a self-report instrument. Patients with brain injury may exaggerate their abilities and performance; therefore, the scores may not reflect actual performance.

Limitations (appropriateness of outcomes and measures) *If no, explain.*

Did the measures adequately measure the outcome(s)?

Yes

No  The CIQ is insensitive to qualitative gains in integration (e.g., whether one needed to have work responsibilities reduced, needs more supervision). The productivity section scores for work, volunteering, or school, without qualification.

## **RESULTS**

List results of outcomes relevant to answering the focused question

Include statistical significance where appropriate ( $p < 0.05$ )

Include effect size if reported

The data were analyzed using a MANCOVA, using the pretest as a covariate. The group main effect was significant ( $F(1,37) = 4.193, P = 0.024, 1 \text{ tail}$ ), with the rehabilitation group improving significantly more than the no-treatment group. There was also a significant group by scale interaction ( $F(2,36) = 4.144, p = 0.024$ ), with the rehabilitation group's improvement superior to the no-treatment group. This varied across scales:

- Home Integration: Participation in rehabilitation accounted for 14.4% of the variance (effect size) of this scale, which measures ability to care for a home, cook, do shopping, manage finances, etc.
- Social Integration: Participants in rehabilitation showed a nonsignificant improvement on this scale, which measures leisure activity participation, frequency of visiting family and friends, etc.

- Productivity: Participants in rehabilitation showed a nonsignificant improvement on this scale, which measures involvement in education, work, and volunteer activities.

38% of the variance was unexplained and 27% of the variance was explained by the pretest. Gender explained 20.6% of the variance, with females scoring higher.

Was this study adequately powered (large enough to show a difference)? *If no, explain.*

Yes  A sample size of 42 provides a power of .80 to detect an r of .45 (20% variance) with a one-tailed level of 0.01 and a power of .50 to detect an r of .35 (12% variance).

No

Were appropriate analytic methods used? *If no, explain.*

Yes

No

Were statistics appropriately reported (in written or table format)? *If no, explain.*

Yes

No

## CONCLUSIONS

State the authors' conclusions that are applicable to answering the evidence-based question.

Patients who participated in the multidisciplinary rehabilitation program achieved greater improvement on the community integration outcome measure than patients who did not participate. The amount of improvement varied across CIQ scales: The home independence outcome score could be predicted by participation in the multidisciplinary rehabilitation program (14% of the variance), by female gender (21%), and by initial postinjury status (27%). As a group, patients with TBI did not improve on the Community Socialization scale or the Productivity scale over the study interval.

Were the conclusions appropriate for the study design (level of evidence)? *If no, explain.*

Yes

No

Were the conclusions appropriate for the statistical results? *If no, explain.*

Yes

No

Were the conclusions appropriate given the study limitation and biases? *If no, explain.*

Yes

No

## IMPLICATIONS FOR OCCUPATIONAL THERAPY

This section provides guidance about clinical practice, program development, and other implications of the study findings as they relate to the focused question.

As the authors stated, “While this study obtained evidence that patients with TBI who participated in rehabilitation became better integrated in the home, the results do not allow one to determine which aspect of the multidisciplinary rehabilitation program was most efficacious” (p. 772). The outcome could have been due to any one of the parts of the program or to the cumulative or interactive effects of the various interventions offered by the various disciplines. Therefore, this study offers no specific guidance to occupational therapy practice, other than to say that occupational therapy’s involvement in the multidisciplinary rehabilitation program offered to patients postinjury may have contributed to the improvement seen in home independence.

This work is based on the evidence-based literature review completed by Catherine Trombly, ScD, OTR/L, FAOTA.

CAP Worksheet adapted from: Critical Review Form – Quantitative Studies ©Law, M., Stewart, D., Pollack, N., Letts, L., Bosch, J., & Westmorland, M., 1998, McMaster University. Used with permission.

For more information about the Evidence-Based Literature Review Project, contact the American Occupational Therapy Association, 301-652-6611, x 2052.



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