



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 to address cognitive/perceptual functions (attention, memory, executive functions) on the occupational performance for persons with traumatic brain injury (TBI)?

Cicerone, K. D., Mott, T., Azulay, J., & Friel, J. C. (2004). Community integration and satisfaction with functioning after intensive cognitive rehabilitation for traumatic brain injury. *Archives of Physical Medicine and Rehabilitation*, 85, 943–950.

PROBLEM STATEMENT (JUSTIFICATION OF THE NEED FOR THE STUDY)

State the problem the authors are investigating in this study.

It is generally well recognized that the cognitive and psychosocial impairments after traumatic brain injury (TBI) contribute to chronic disability, and therefore rehabilitation must address these aspects of a person's functioning to be effective. Neuropsychological rehabilitation is best achieved through a comprehensive, holistic approach. Treatment starts with increasing the patient's awareness and progresses to emphasize compensatory behavior and environmental restructuring. Improvement in functioning occurs due to the effective use of residual abilities rather than restoration of the underlying cognitive deficits per se. Few studies of comprehensive integrated TBI rehabilitation have assessed treatment effectiveness at the level of community integration and social participation. No study has directly assessed life satisfaction as an outcome of TBI rehabilitation.

RESEARCH OBJECTIVE(S)

List study objectives.

Compare the effectiveness relative to community integration of a program of holistic, intensive, cognitive rehabilitation with conventional rehabilitation for persons with TBI. Assess participants' satisfaction with their functioning after treatment.

Describe how the research objectives address the focused question.

This study directly relates to the focused question because the researchers use a measure of reintegration to home, community, and productive activity as the outcome of a cognitive rehabilitation program.

DESIGN TYPE:

Nonrandomized controlled intervention trial (Two group, pretest–posttest design)

Level of Evidence:

II

Limitations (appropriateness of study design):

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

Yes

No randomized trial would have been better

SAMPLE SELECTION

How were subjects selected to participate? Please describe.

Participants were screened and selected for the experimental treatment on the basis of significant cognitive limitations (especially impairments of self-awareness) and who were unable to resume preinjury activity levels and/or employment. Participants in the acute recovery stage received control treatment.

Inclusion Criteria

Medically stable; independent in basic self-care; cognitive ability to participate in treatment; medical documentation of TBI; aged 18 years or older; adequate English language expression and comprehension to participate in a verbally-based intervention; have a family member or person who could participate in treatment conferences and support implementation of the treatment plan.

Exclusion Criteria

Current substance use or psychiatric disturbance.

Sample Selection Biases: If yes, explain.

Volunteers/Referrals

Yes

No

Attention

Yes

No

Others (list and explain):

SAMPLE CHARACTERISTICS

N = 56, admitted between January 1997 and December 1998. Mean age = 37; mean years of education = 13; 89% competitively employed before injury

% Dropouts

(%) Male

(%) Female

Ethnicity

Disease/disability diagnosis

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
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Sample Characteristics Bias: If no, explain.

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

Yes

No

Were the reasons for the dropouts reported?

Yes but participant returned to complete planned intervention after 2-week hiatus

No

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

Add groups if necessary

Group 1 Experimental: Intensive Cognitive Rehabilitation Program (ICRP). $N = 27$

Brief Description	Integrated cognitive and psychosocial interventions based on principles of holistic neuropsychological rehabilitation. Highly structured. Provided to groups of 5 to 8 persons at a time. Consisted of individual (1 hour, 3 days/week) and group cognitive remediation (2 hours, 3 days/week), with an emphasis on increasing awareness and developing compensations for cognitive deficits (functional activities with emphasis on executive functioning [planning, organizing, etc.]); group interpersonal and pragmatic communication skills (3 hours/week); group treatment to facilitate application of therapeutic gains to daily life (1 hour/week); individual or group psychotherapy, family support; therapeutic work trials and placement to facilitate educational or vocational readiness (1 day/week). Some participants received limited amounts of physical therapy and occupational therapy for sensorimotor deficits. Participants were expected to accept and provide feedback to others. Cognitive group treatment for 2 hours/day, 3 days/week, followed by 1 hour of individual cognitive remediation.
Setting	Community-based, postacute outpatient brain injury rehabilitation program
Who Delivered?	Work trials: vocational therapist; other NR, probably psychologists
Frequency?	4 days/week, 5 hours/day
Duration?	4 months

Group 2 Control: Standard Rehabilitation Program (SRP). $N = 29$

Brief Description	Comprehensive neurorehabilitation consisting primarily of physical therapy, occupational therapy, speech therapy, and neuropsychological treatment. Individual treatment. Specific interventions directed at cognitive deficits were included. Participants could also receive recreation therapy, vocational or educational interventions, and psychological counseling based on individual needs.
Setting	Community based-post-acute outpatient brain injury rehabilitation program
Who Delivered?	Physical therapist, occupational therapist, speech pathologist, neuropsychologist
Frequency?	12–24 hours/week
Duration?	4 months

Intervention Biases: Explain, if needed.

Contamination

Yes Possibly; both groups in the same rehabilitation facility with no controls reported to prevent comparison of programs.

No

Co-intervention

Yes

No

Timing

Yes

No

Site

Yes

No

Use of different therapists to provide intervention

Yes psychologist and vocational therapist versus physical therapist, occupational therapist, speech therapist, neuropsychologist, recreational therapist, vocational therapist and ad hoc others.

No

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

Name of measure:

Community Integration Questionnaire (CIQ)

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

Total integration score, with subscales for home integration, social integration, and productivity

Is the measure reliable (as reported in article)?

Yes	<input type="checkbox"/>
No	<input type="checkbox"/>
NR	<input checked="" type="checkbox"/> for CIQ, but derived a 90% reliable change index for the total score, which classified people as achieving no change, positive change, or negative change. A change score of 4.2 in the total CIQ score indicated change.

Is the measure valid (as reported in article)?

Yes	<input type="checkbox"/>
No	<input type="checkbox"/>
NR	<input checked="" type="checkbox"/>

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

Before and after treatment

Name of measure:

Quality of Community Integration Questionnaire
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Outcome(s) measured (what was measured?):

Satisfaction with functioning: <ul style="list-style-type: none">• Individuals' subjective satisfaction with level of community integration (QCI)• Individuals' satisfaction with current level of cognitive functioning as it affects their ability to function in specific areas of their lives (QCOG)

Is the measure reliable (as reported in article)?

Yes	<input checked="" type="checkbox"/> internal reliability = Cronbach $\alpha = .85$ for part 1 and $\alpha = .93$ for part 2. Test-retest reliability not reported.
No	<input type="checkbox"/>
NR	<input type="checkbox"/>

Is the measure valid (as reported in article)?

Yes principle components analysis supported interpretation of the QCI and QCOG as separate scales. Correlation to gold standard satisfaction scale not reported.

No

NR

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

Pre- and posttreatment

Measurement Biases

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

Yes

No

NR

Recall or memory bias *If yes, explain.*

Yes

No

Others (list and explain):

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

Did the measures adequately measure the outcome(s)?

Yes

No

RESULTS

List results of outcomes relevant to answering the focused question

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

Include effect size if reported

Both groups showed significant improvement on the CIQ ($F_{1,54} = 40.49, P = .000, \eta^2 = .43$), with the ICRP group exhibiting a significant treatment effect compared to the SRP group ($F_{1,54} = 5.66, P = .021, \eta^2 = .10$). Among the participants receiving ICRP, 52% showed clinically significant improvement on the CIQ compared with 31% of those receiving SRP. Among SRP participants, 7% showed clinically significant decline on the CIQ, whereas none of the ICRP participants showed decline. Analysis of clinically significant improvement indicated that members of the ICRP group were over twice as likely to show clinical benefits on the CIQ (odds ratio = 2.41, 95% confidence interval = 0.8–7.2).

SRP participants expressed greater satisfaction with their community functioning than did the ICRP group. The overall difference between groups was significant (Mann-Whitney $U = 240, p = .03, ES [d] = .57$). The SRP group also reported greater satisfaction with their cognitive functioning, but the overall difference between groups on the QCOG was not significant ($ES[d] = .38$).

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

Yes

No Probably not. No power analysis included, but an effect size d of .38 indicates that there was a relationship between the intervention and the outcome. There were too few subjects to reach statistical significance.

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.

Although both groups improved with treatment, the participants receiving ICRP showed significantly greater improvements in community integration than participants receiving standard rehabilitation. Over half of the ICRP participants showed clinically significant improvement in community functioning, compared with about one-third of those who received standard neurorehabilitation. Those receiving ICRP were over twice as likely to exhibit clinically significant improvement as those receiving SRP. Intensive, holistic, cognitive rehabilitation is an effective form of rehabilitation, particularly for persons with TBI who previously have been unable to resume community functioning.

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

Yes

No the sampling bias offers a viable alternate explanation for the outcome

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 see above.

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.

Because the sampling bias provides an alternate explanation for the outcome, this study does not offer clear direction for therapy for patients post-TBI. Neither program presented in this study was ineffective; each had a different goal (one community reintegration and the other neurorehabilitation). Patients in both groups improved significantly on the CIQ, whereas only those in the ICRP program were reported to have received actual training in applying their therapeutic gains to everyday community living. Other outcomes expected from the neurorehabilitation program were not measured. Although the participants in the SRP group were significantly more satisfied with their community integration and cognitive skills applied to daily life, this probably reflects the recency of their injury and lack of time living with the disability. A randomized controlled study of two different rehabilitation programs with the same outcome goal is needed to measure the relative effectiveness of the intensive cognitive rehabilitation program.

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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