



AOTA Evidence Briefs

Stroke: Focused Questions

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

SFQ #8

What therapeutic interventions are effective in remediating psychological impairments, especially depression, after stroke?

A search covering 1997–2002 retrieved no studies that tested occupational therapy interventions aimed at remediating depression, *anosognosia* (lack of awareness of motor deficit, ranging from underestimation to explicit denial), or other cognitive **impairments** (see *Glossary*). Following are discussions of studies that tangentially address this question and that may offer some guidance for practice.

Depression

Findings of Selected Studies

A search by Ma & Trombly (2002) covering 1980–2000 found four studies—(Corr and Bayer (1995—[Level I]), Drummond and Walker (1996— [Level I]), Smedley et al. (1986— [Level II]), and Walker, Drummond, and Lincoln (1996— [Level I])—that tested the effects of occupational therapy on depression as an “adjunct” outcome. That is, the researchers directed treatment at goals other than decreasing depression, but they measured mood as an outcome. Three of these studies (Drummond & Walker, 1996; Smedley et al., 1986; and Walker et al., 1996) showed small to medium effects on depression or psychological well-being from occupational therapy that was directed at increasing leisure skills, using leisure skills as therapy to improve motor skills, or teaching activities of daily living (ADL) skills at home. The fourth study (Corr & Bayer, 1995), found that home-based ADL treatment did not affect depression, probably because of low intensity of treatment.

A search that encompassed 1997–2002 did yield one similar study (Parker et al., 2001), which tested the secondary effects of occupational therapy (practice of leisure tasks or ADL) or no treatment on emotional distress as measured by the General Health Questionnaire (GHQ). The researchers found **no significant** (see *Glossary*) differences among groups, probably because of **attrition** (see *Glossary*) and loss of control over experimental manipulation. Only 69% of participants in the leisure group and 62% of those in the ADL group received full treatment as per the protocol, and some control participants received experimental treatment. Before the study, the researchers estimated that they would have to have 450 participants to detect a significant difference between groups on the GHQ and the Extended Activities of Daily Living Scale (EADL). Because they lost more than 20% of the participants, the count was too small to detect significant differences.

Although significant differences could not be detected, the size of the effect of the intervention could still be estimated. This calculation indicated that the mood of those in the leisure task group was strongly affected, compared with those in the no-treatment group, but the mood of those in the ADL task group was little affected. One year after the study began, however, this difference had disappeared.

One other study (Walker, Hawkins, Gladman, & Lincoln, 2001) reported a similar long-term outcome for a study previously reported by Walker, Gladman, Lincoln, Siemonsma, and Whitely (1999). The Walker, Gladman, et al. study was previously reported (Trombly & Ma, 2002). There was no significant difference on the GHQ between groups (ADL training vs. no treatment) at 1 year. This is the same finding that Walker et al. (1996— Level I) had reported when

they tested the participants immediately after the intervention. The failure to detect a significant difference could have been because of low intensity (a range of 1–15 visits over 5 months, an average of 6 altogether).

Depression is a major problem after stroke because of its prevalence and consequences. Jonkman, de Weerd, and Vrijens (1998) analyzed the contribution of many factors to quality of life, measured by the Sickness Impact Profile (SIP), 3 to 12 months after compared to a group of healthy people who were similar in age, last occupation, and educational level. One of their findings was that a decreased quality of life was most associated with depression. They recommended that antidepressive treatment be considered for most patients.

Murata, Kimura, and Robinson (2000) studied 41 patients who experienced major depression after stroke and 135 patients who did not. They found that in patients with major depression whose mood improved, **cognition** (see *Glossary*) also improved. They concluded that depression produces a dementia of depression.

Kimura, Robinson, and Kosier (2000—Level I) studied participants' change in depression, assessed by the Hamilton Rating Scale for Depression, and cognitive impairment, assessed by the Mini-Mental State Examination, in response to treatment with nortriptyline or a placebo. The participants in their study were 33 patients who had experienced major depression after stroke and 14 who had experienced minor depression. Those whose depression diminished (in both the treatment and the **control group** (see *Glossary*) had **significantly** (see *Glossary*) greater recovery of cognitive functions than those whose mood disorder did not diminish. The researchers concluded that treating depression may be one of the major methods of promoting cognitive recovery after stroke.

Chemerinski, Robinson, Arndt, and Kosier (2001—Level II), after repeatedly studying 23 stroke patients over 6 to 12 weeks, concluded that improvement in ADL was due not to treatment with the drug nortriptyline but to diminishment of depression, regardless of how that came about.

Because ADL improvement was associated with less depression, whether treated with nortriptyline or not, occupational therapists might conclude the opposite: that improved ADL caused diminishment of depression. Some of the studies cited earlier support such a conclusion. Walker et al. (1996) found a significant improvement in psychological well-being in the experimental group, which underwent training in adapted dressing techniques and energy conservation in the home, compared with the control group, which received no treatment. Drummond and Walker (1996) also found significant improvements in psychological well-being after practice of ADL or practice of leisure activities.

Summary

In summary, no studies examined the effect of occupational therapy interventions to remediate depression after stroke directly. Studies in which depression and ADL and cognitive abilities were measured secondarily suggest a relationship between improvement of ADL (including leisure activities) and cognitive impairment and also diminishment of depression. Whether this is a cause–effect relationship is not known. Research to determine such a relationship is needed.

In the meantime, because it fits with the basic philosophy of occupational therapy and because it is not harmful, therapy to improve a person's ability to do valued tasks and activities may be effective in relieving depression and promoting clear thinking. The key is probably the value the person places on the task, but that too is not yet known from research. It can be surmised from the findings of studies like Parker et al. (2001) and Walker et al. (2001), if one considers leisure activities to be more valued than ADL. Those researchers measured psychological well-being secondarily and found no impact on mood after ADL training, but did after leisure task training.

Cognitive–Emotional Problems

Findings of Selected Studies

Ellis-Hill and Horn (2000) found that self-concept significantly declines after stroke, even in high functioning people. The participants in this study perceived themselves as less-capable, less-independent, less in control, less-satisfied, less-interested, less-active, less-confident, and of less value than before the stroke. However, they perceived themselves as more caring, and they believed that they were as friendly, calm, and hopeful as before.

Through narrative analysis, Ellis-Hill, Payne, and Ward (2000) did an in-depth exploration of self-concept after stroke in 8 patients. In 3 separate visits, they asked the patients to narrate their past, present, and future lives. The participants concentrated on the fundamental life change wrought by the stroke and their feeling of a split between mind and body (their believing that they could do something, but their body failing when they tried to do it). The researchers concluded,

It appears that following a stroke an individual enters a completely new world, experiencing fundamental psychological as well as physical challenges. The body becomes something foreign and separate from the self . . . [Stroke patients] gradually built up a working relationship with their bodies, but even by one year this relationship could break down. (p. 731).

Ellis-Hill and Horn (2000) stated that, although rehabilitation specialists and payers define recovery in terms of physical and task-oriented improvement, patients see recovery as a return to the life they had before the stroke. The researchers concluded that, although physical improvement has been thought to stop 6 or so months after stroke, psychological and emotional recovery continues and should be supported by some form of rehabilitation or follow-up services.

Indeed, new studies on brain reorganization after stroke (e.g., Carey et al., 2002—Level I) demonstrate that with training, improved motor abilities, accompanied by brain reorganization occur years after the onset of stroke. Therefore, some form of long-term rehabilitation may be needed to foster not only psychological and emotional recovery but also continued recovery from all disabilities that occur after stroke.

According to Johnston, Morrison, MacWalter, and Partridge, (1999), who studied 71 patients from 3 weeks after stroke to 6 months following discharge, increased perception of control predicts recovery from disability after stroke (as measured by the Barthel Index and Observer Assessed Disability). However, neither exercise nor improved mood mediates this effect. Rather, the researchers concluded that interventions to increase perception of control had a small (10%) but singularly potential benefit for recovery. The interventions that they suggested (not tested) were as follows:

- a. Influence the probability of a patient's successfully performing critical activities in the early stage following stroke by enhancing skills that are required to undertake activities rather than performing exercises. Enabling a patient to experience success promotes beliefs concerning perceived control associated with further recovery.
- b. Have the patients recall instances of high control after stroke.
- c. Suggest to the patient that interventions directed at altering what he or she spontaneously believes about disability after stroke might be beneficial; that is, suggest to the patient that successes are expected.

The suggested interventions make sense and would not be harmful if applied. However, there is no research evidence on their effectiveness or on the effectiveness of any other intervention to remediate cognitive–emotional impairments after stroke.

Cognitive Function

Findings of Selected Studies

Hartman-Maeir, Soroker, and Katz (2001) studied the prevalence of anosognosia and its impact on functional outcome. Of 46 patients with hemiplegic stroke, 28% of the 29 with right-hemispheric damage and 24% of the 17 with left-hemispheric damage evidenced anosognosia at 1 month after stroke. The researchers concluded that the extent of brain damage and the difference in accompanying symptoms suggest different mechanisms of anosognosia for right- and left-hemisphere **lesions** (see *Glossary*), requiring different treatment (none suggested). The anosognosia significantly affected the patients' ability to retain safety measures at discharge from rehabilitation, and they needed assistance with basic ADL and instrumental ADL at follow-up (approximately 1 year after onset). There is no research evidence for occupational therapy treatment of anosognosia at this time.

The 1980–2000 search (Ma & Trombly, 2002) found one study that addressed occupational therapy to improve cognitive abilities. This search included only studies in which treatment was administered or researched by occupational therapists. Söderback (1988—Level I) found that homemaking tasks used as therapeutic intervention resulted in 36%–46% greater improvement rate of cognitive functions such as verbal skill, memory, and logic than did paper-and-pencil exercises or arts and crafts. This is the best evidence available at this time; it supports treatment involving tasks and activities that require problem-solving and memory, as homemaking skills can.

Glossary

attrition—loss of participants.

cognition—“the act or process of knowing, including both awareness and judgment” (*Merriam-Webster’s Collegiate Dictionary*, 10th ed., s.v.).

control group—a group that received special attention similar to that which the treatment group received but did not receive the treatment.

impairments—“abnormalities of body structure and appearance and with organ or system function, resulting from any cause” (*International Classification of Impairments, Disabilities, and Handicaps*, 1980, p. 14).

lesion—“an abnormal change in structure of an organ or part due to injury or disease” (*Merriam-Webster Medical Dictionary*, s.v.).

nonsignificant (or no significance)—A statistical term that refers to study findings that are likely to be due to chance differences between the groups rather than to other factors (e.g., the treatment of interest). A nonsignificant result is not generalizable outside the study. Like significance, a nonsignificant result does not indicate the clinical effect. Often studies will show nonsignificant results, yet the treatment group’s mean will be better than the control group’s. This is usually referred to as a *trend in the right direction*. Because significance is closely determined by sample size, nonsignificant results would often become significant if the sample size were increased.

significance (or significant)—a statistical term; refers to the probability that the results obtained in the study are not due to chance but to some other factor (such as the treatment of interest). A significant result is one that is likely to be generalizable to populations outside the study.

Significance should not be confused with *clinical effect*. A study can be statistically significant without having a very large clinical effect on the sample. For example, a study that examines the effect of a treatment on a client’s ability to walk may report that the participants in the treatment group were able to walk significantly longer distances than the control. However, if you read the study you may find that the treatment group was able to walk, on average, 6 feet, while the control group was able to walk, on average, 5 feet. While the outcome may be statistically significant, a clinician may not feel that a 1-foot increase will make his or her client functional.

References

Articles Ranked for Level of Evidence

Kimura, M., Robinson, R. G., & Kosier, J. T. (2000). Treatment of cognitive impairment after poststroke depression: A double-blind treatment trial. *Stroke*, *31*, 1482–1486.

Level IB1b: Randomized controlled trial, 20 or more participants per condition, high internal validity, moderate external validity.

Walker, M. F., Drummond, A. E. R., & Lincoln, N. B. (1996). Evaluation of dressing practice for stroke patients after discharge from hospital: A crossover design. *Clinical Rehabilitation*, *10*, 223–231.

Level IC1b: Randomized controlled trial, less than 20 participants per condition, high internal validity, moderate external validity.

Corr, S., & Bayer, A. (1995). Occupational therapy for stroke patients after hospital discharge: A randomized controlled trial. *Clinical Rehabilitation*, *9*, 291–296.

Level IA2a: Randomized controlled trial, 50 or more participants per condition, moderate internal validity, high external validity.

Walker, M. F., Hawkins, K., Gladman, J. R. F., & Lincoln, N. B. (2001). Randomized controlled trial of occupational therapy at home: Results at 1 year. *Journal of Neurology, Neurosurgery, and Psychiatry*, *70*, 267.

Level IA2b: Randomized controlled trial, 50 or more participants per condition, moderate internal validity, moderate external validity.

- Drummond, A., & Walker, M. (1996). Generalization of the effects of leisure rehabilitation for stroke patients. *British Journal of Occupational Therapy*, *59*, 330–334.
Level IB2a: Randomized controlled trial, 20 or more participants per condition, moderate internal validity, high external validity.
- Söderback, I. (1988). The effectiveness of training intellectual functions in adults with acquired brain damage: An evaluation of occupational therapy methods. *Scandinavian Journal of Rehabilitation Medicine*, *20*, 47–56.
Level IC2b: Randomized controlled trial, less than 20 participants per condition, moderate internal validity, moderate external validity.
- Carey, J. R., Kimberley, T. J., Lewis, S. M., Auerbach, E. J., Dorsey, L., Rundquist, P., et al. (2002). Analysis of fMRI and finger tracking training in subjects with chronic stroke. *Brain*, *125*, 773–788.
Level IC2c: Randomized controlled trial, less than 20 participants per condition, moderate internal validity, low external validity.
- Parker, C. J., Gladman, J. R. F., Drummond, A. E. R., Dewey, M. E., Lincoln, N. B., Barer, D., et al. (2001). A multicentre randomized controlled trial of leisure therapy and conventional occupational therapy after stroke. *Clinical Rehabilitation*, *15*, 42–52.
Level IA3a: Randomized controlled trial, 50 or more participants per condition, low internal validity, high external validity.
- Chemerinski, E., Robinson, R. G., Arndt, S., & Kosier, J. T. (2001). The effect of remission of poststroke depression on activities of daily living in a double-blind randomized treatment study. *Journal of Nervous and Mental Disease*, *189*, 421–425.
Level IIC1b: Nonrandomized controlled trial—two groups, less than 20 participants per condition, high internal validity, moderate external validity.
- Smedley, R. R., Fiorino, A. J., Soucar, E., Reynolds, D., Smedley, W. P., & Aronica, M. J. (1986). Slot machines: Their use in rehabilitation after stroke. *Archives of Physical Medicine and Rehabilitation*, *67*, 546–549.
Level IIB3b: Nonrandomized controlled trial—two groups, 20 or more participants per condition, low internal validity, moderate external validity.

Articles for Focused Questions (not ranked)

- Ellis-Hill, C. S., & Horn, S. (2000). Change in identity and self-concept: A new theoretical approach to recovery following a stroke. *Clinical Rehabilitation*, *14*, 279–287.
- Ellis-Hill, C. S., Payne, S., & Ward, C. (2000). Self-body split: Issues of identity in physical recovery following a stroke. *Disability and Rehabilitation*, *22*, 725–733.
- Hartman-Maeir, A., Soroker, N., & Katz, N. (2001). Anosognosia for hemiplegia in stroke rehabilitation. *Neurorehabilitation and Neural Repair*, *15*, 213–222.
- Johnston, M., Morrison, V., MacWalter, R., & Partridge, C. (1999). Perceived control, coping, and recovery from disability following stroke. *Psychology and Health*, *14*, 181–192.
- Jonkman, E. J., de Weerd, A. W., & Vrijens, N. L. H. (1998). Quality of life after first ischemic stroke: Long-term developments and correlations with changes in neurological deficit, mood, and cognitive impairment. *Acta Neurologica Scandinavica*, *98*, 169–175.
- Ma, H-I., & Trombly, C. A. (2002). A synthesis of the effects of occupational therapy for persons with stroke, Part II: Remediation of impairments. *American Journal of Occupational Therapy*, *56*, 260–274.
- Murata, Y., Kimura, M., & Robinson, R. G. (2000). Does cognitive impairment cause poststroke depression? *American Journal of Geriatric Psychiatry*, *8*, 310–317.
- Trombly, C. A., & Ma, H-I. (2002). A synthesis of the effects of occupational therapy for persons with stroke, Part I: Restoration of roles, tasks, and activities. *American Journal of Occupational Therapy*, *56*, 250–259.

Walker, M. F., Gladman, J. R. F., Lincoln, N. B., Siemonsma, P., & Whiteley, T. (1999). Occupational therapy for stroke patients not admitted to hospital: A randomized controlled trial. *Lancet*, *354*, 278–280.

Further Reading

Sisson, R. A. (1998). Life after stroke: Coping with change. *Rehabilitation Nursing*, *23*, 198–203.

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

For more information about the Evidence-Based Literature Review Project, contact the Practice Department at the American Occupational Therapy Association, 301-652-6611, x 2040.



Copyright 2005 American Occupational Therapy Association, Inc. All rights reserved.

This material may be reproduced and distributed without prior written consent.