

TASK
FORCE
REPORT

14

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Middle District of Florida
PLAINTIFFS EXHIBIT

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JEFFREY THELEN v. SOMATICS, LLC

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ELECTROCONVULSIVE
THERAPY

Task Force Reports

This is the fourteenth in a series of reports approved by the Board of Trustees of the American Psychiatric Association to give wider dissemination to the findings of APA's many commissions, committees, and task forces that are called upon to evaluate the state of the art in a problem area of current concern to the profession, to related disciplines, and to the public.

The findings, opinions, and conclusions of the report do not necessarily represent the views of the officers, trustees, or all members of the Association. Each report, however, does represent the thoughtful judgment and findings of the task force of experts who composed it. These reports are considered a substantive contribution to the ongoing analysis and evaluation of problems, programs, issues, and practices in a given area of concern.

Jules H. Masserman, M.D.
President, APA, 1978-79

September 1978

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ELECTROCONVULSIVE THERAPY

**Report of the Task Force on Electroconvulsive Therapy
of the American Psychiatric Association**

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Non-Users on all the attitude items listed above, in each case in the direction that would be expected. Thus, for example, Users agreed less often than did Non-Users that "ECT should be used only when all else has failed."

Techniques of Administration

The questionnaire contained items dealing with the use of anesthesia, muscle-relaxant drugs, type of machine, current used, and several other technique-related issues. Of the Users, 95% reported generally using a short acting anesthetic drug before administering ECT; 60% of these reported having had formal training in such administration. Sixteen percent reported never using the services of an anesthesiologist or nurse anesthetist, while 59% always used such services. Ninety-six percent reported that all of their ECT patients (during the preceding six months) had been given a muscle-relaxant drug before ECT was administered.

In response to a question about the type of machine generally used (Medcraft, Reiter, Mecta, other), 62% indicated Medcraft; 33% Reiter; and 1% Mecta. Type of current generally administered was distributed as follows:

Bipolar sine wave	69%
Unidirectional	16%
Pulsed unidirectional	4%
Pulsed bipolar	9%
Other	2%

Bilateral electrode placement was the most common technique used; 75% of the Users reported using it with all of their patients, followed in frequency by right unilateral, combined bilateral and unilateral, and left unilateral.

In regard to number of seizures per treatment session, 71% reported administering only one; 25% occasionally administered more than one; and 4% often or always administered more than one. For those who used more than one seizure per session, by far the most common number was two. The most common treatment schedule was three times per week (reported by 82% of the Users). In response to a question about the optimal number of treatments in a single course, the average recommendation for schizophrenic patients was 12; for major depressions, ten; and for minor depressions, four.

Over a third (35%) of respondents indicated they used mainte-

	Schizo- phrenia	Major Depression	Minor Depression
Excellent response	24%	62%	32%
Good response	42%	37%	29%
Fair response	31%	13%	24%
Poor response	13%	6%	7%
Very poor response	1%	1%	<1%

(Note: Percentages need not sum to 100%)

Adverse Effects

Users were asked to indicate the percentages of their ECT patients who had complained of various types of memory loss three months after treatment. The average percentages reported were as follows:

Temporary loss of memory for period of ECT course	46%
Temporary loss of memory for period immediately prior to ECT	34%
Permanent loss of memory for period of ECT course	27%
Slight confusion	18%
Spotty memory loss	16%
Permanent loss of memory for period immediately prior to ECT	15%
Temporary loss of distant memories	13%
Marked confusion	4%
Permanent loss of distant memories	1%

Ninety-two percent reported that *none* of their patients, as far as they knew, had been permanently prevented from performing specific vocational tasks after receiving ECT. Ninety-eight percent said that *none* of their patients had experienced spontaneous seizures shortly after ECT (who had not experienced them before). Ninety-seven percent reported that, over a period of five years, *no* deaths had occurred among their patients during or within 24 hours of the administration of ECT.

These findings are further referred to and discussed in the chapters which follow.

CHAPTER IV

ADVERSE EFFECTS OF ECT

- Section I. Memory and ECT
Section II. CNS Sequelae of ECT:
 Risks of Therapy and
 Their Prophylaxis
Section III. ECT: Possible Neurological Side-Effects

Section I. *Memory and ECT*

1. Anterograde amnesia: bilateral vs. right unilateral ECT
2. Retrograde amnesia for remote events: information about public events
3. Retrograde amnesia for remote events: information about autobiographical material
4. Issues of test sensitivity
5. Memory loss in patients receiving extended ECT
6. Reinstatement
7. Long-term effects of ECT on memory
8. Summary

Memory loss has long been recognized to be a prominent effect of electroconvulsive therapy (ECT). For a decade or two after the introduction of ECT, loss of memory was believed to contribute to ECT's therapeutic effect (1). Today the view is considerably different. First, several investigators have demonstrated that the extent of memory impairment is not correlated with clinical improvement (2, 3, 4). Second, following the development of right unilateral ECT (5), it became clear that this mode of convulsive therapy results in markedly less memory impairment than conventional bilateral ECT (6, 7, 8, 9). Yet right unilateral ECT is clinically as effective, or nearly as effective, as bilateral ECT (10). Accordingly, all available evidence supports the contention that memory loss is an undesirable side effect of ECT, not related to therapeutic efficacy.

Like the organic amnesias that result from head trauma (11), Korsakoff psychosis (12), diencephalic tumor (13), or temporal lobe dysfunction (14), the amnesia associated with ECT is both antero-

grade and retrograde. Amnesia occurs for the events prior to each seizure and an impairment in the ability to commit new events to long term memory is evident following each seizure. This impairment in learning new material diminishes gradually following each seizure (15) and is cumulative with successive treatments.

Several general reviews of the amnesic effects of ECT are available (16, 17, 18). This review will summarize the current evidence regarding the nature and extent of memory impairment. First, the anterograde amnesic effects of bilateral ECT will be compared to the effects of right unilateral ECT. Second, retrograde effects of ECT on remote memory will be reviewed. Third, the effects of extended treatments of ECT on memory will be summarized. Fourth, recent findings involving the reinstatement procedure will be described. Results with this procedure in animal studies suggested that learned material not ordinarily affected by electroconvulsive shock (ECS) may be forgotten if a reminder of the material is presented just prior to ECS (19, 20, 21). These reports raised the possibility that eliciting depressive ideation just prior to ECT could be therapeutically advantageous since ECT might produce amnesia for such ideation. Finally, memory capacity many months after ECT will be considered, in terms of objective and subjective estimates of ability.

Anterograde amnesia: bilateral vs. right unilateral ECT

It has been demonstrated that bilateral ECT produces a greater impairment of new learning capacity than right unilateral ECT (6, 7, 8, 9). Typically, however, learning ability has been assessed with verbal memory tests of the type particularly sensitive to dysfunction of the left cerebral hemisphere. The possibility has therefore remained that, if memory were assessed with nonverbal tests designed specifically to detect dysfunction of the right hemisphere, the amnesic effects of right unilateral ECT might be similar to or greater than the amnesic effects of bilateral ECT. In two studies of patients receiving bilateral or unilateral ECT (6, 22), impairment of "nonverbal" memory associated with bilateral ECT was slightly greater than the impairment associated with right unilateral ECT. However, in the absence of information about how patients with identified unilateral cerebral lesions would perform on these "nonverbal" tests, it is difficult to be sure how specifically sensitive these tests are to right unilateral hemispheric dysfunction.

Recently, verbal and nonverbal memory before and after ECT has been assessed in patients receiving bilateral or right unilateral treatment (23). To assess verbal memory, patients were read a short story and immediately thereafter were asked to recall as much of it as

possible. Delayed recall was tested on a second occasion 16 to 19 hours later. Patients with identified dysfunction of the left temporal lobe are known to perform more poorly on this test than patients with similar dysfunction of the frontal, parietal, or right temporal regions (24). To assess nonverbal memory, patients were asked to copy a complex geometric design (25, 26). Sixteen to 19 hours later, without forewarning, they were asked to copy it from memory. Patients with right temporal lesions are known to be deficient on this memory task, whereas patients with left temporal lesions exhibit no impairment (27). Tests were administered one to two days before ECT and again with equivalent forms six to 10 hours after the fifth treatment of the series.

Figure 1 indicates that patients about to begin a course of bilateral or unilateral ECT were nearly identical in delayed recall of the story and in delayed reproduction of the geometric figure. After ECT, bilateral ECT caused a greater impairment in both verbal and nonverbal memory than unilateral ECT. Delayed recall of the story was markedly impaired by bilateral ECT ($p < .01$), but not affected by right

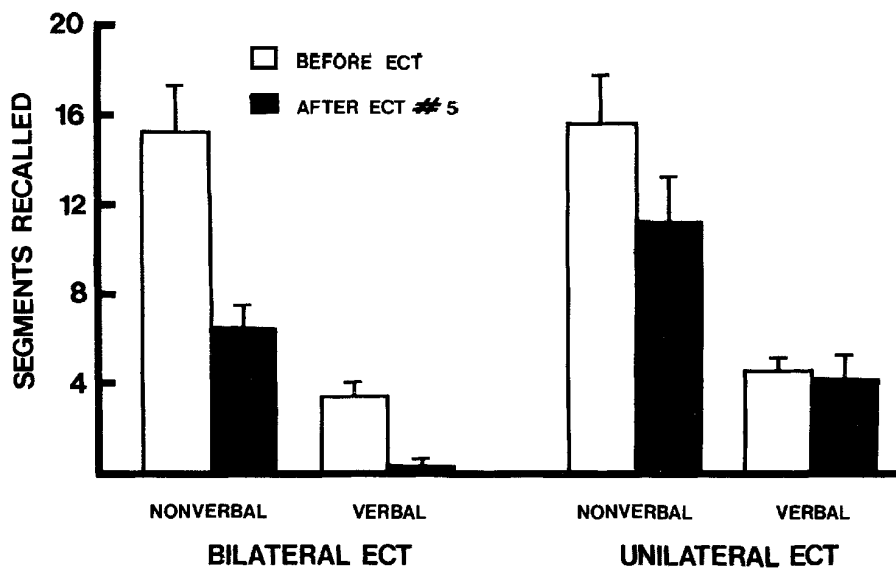


Figure 1. ECT and Memory Loss

Delayed retention scores on verbal and nonverbal memory tests for patients receiving bilateral ECT ($N = 15$) or right unilateral ECT ($N = 9$). Brackets indicate S.E.

unilateral ECT ($p > .3$). Scores of the bilateral and unilateral groups were significantly different ($p < .01$). Delayed reproduction of the geometric figure was significantly impaired by bilateral ECT ($p < .01$). In this case, the difference between the scores of bilateral and right unilateral groups was short of significance ($p < .09$).

It has sometimes been assumed that right unilateral ECT causes as much memory impairment as bilateral ECT on those aspects of memory function identified with the right hemisphere. The present results clearly indicate that bilateral ECT impairs memory to a greater extent than right unilateral ECT, regardless of whether the tests used to assess memory are more sensitive to left or right hemispheric dysfunction. This finding may mean that following unilateral ECT the unaffected hemisphere can always contribute to some extent to performance. This notion is supported by the observation that bilateral medial temporal surgery affects both verbal and nonverbal memory to a greater extent than left or right unilateral temporal surgery (27).

Retrograde amnesia for remote events: Information about public events

It has been reported frequently that convulsive therapy can cause retrograde amnesia for events that occurred close to the time of treatment (16, 17, 18). It is now clear that retrograde amnesia can also extend to events that occurred many years previously (8, 28, 29, 30). In such studies, remote memory is assessed with objective tests that ask about relatively familiar past events. In one test (29) patients were asked to recognize the names of former television programs that were broadcast for a single season from 1957 to 1972 (31). The programs selected from different time periods were apparently exposed to national audiences to about the same extent, and memory for these programs was acquired close to the time the programs were on the air (31). Patients prescribed a course of bilateral ECT took one form of this test before ECT and another form one hour after the fifth ECT. Figure 2 indicates that ECT caused a temporal gradient of impairment in long-term memory. Programs broadcast one to three years previously were forgotten; programs broadcast four to 17 years previously were remembered as well after ECT as before. The memory loss associated with bilateral ECT largely recovered by one to two weeks after the completion of treatment. Further work indicated that right unilateral ECT caused no deficit in remote memory, as measured by this test (29).

Other tests have confirmed the clinical impression that ECT produces a greater loss of temporal order information than other

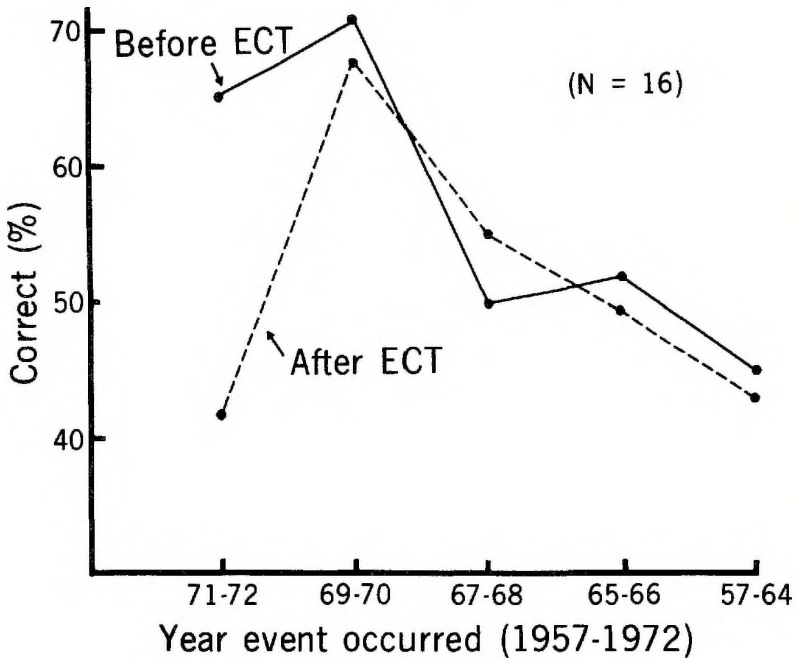


Figure 2. ECT and Memory Loss

A remote memory test was given before bilateral ECT and one hour after the fifth treatment. ECT selectively impaired performance on questions covering the 1971-1972 period. The test was given in early 1974.

aspects of memory (30). Patients saw sets of three television program names and were asked to choose which was broadcast most recently. In each set of three the correct program name was broadcast for one season from 1962 to 1973 and the other two (incorrect) program names were broadcast five years previously, from 1957 to 1968. Following five bilateral treatments, patients developed a marked impairment in their ability to make temporal judgements about this material. The impairment was temporally graded, extending to events that occurred four to seven years before treatment, but not to events that occurred eight to 16 years before treatment. The deficit for temporal order information was more persistent than the deficit for recognition of program names, and remained unchanged at one to two weeks after the completion of treatment. Work is in progress to determine how long this deficit remains.

The clinical relevance of these findings is twofold. First, these results indicate clearly that the amnesia associated with bilateral ECT affects not only recent events, but can also extend to events that

occurred many years previously. Second, they indicate that bilateral ECT produces greater retrograde amnesia than right unilateral ECT. Right unilateral ECT caused no measurable loss of memory for remote events; by contrast, following a standard course of bilateral ECT, an impairment in memory for remote events persisted for at least two weeks.

Retrograde amnesia for remote events: Information about autobiographical material

The formal tests described above provide information about the effect of ECT on the ability to recognize public events that occurred from one to 16 years prior to treatment. There have also been some investigations of the effect of ECT on the ability to recall autobiographical material. In 1950, Janis (32) reported the results of a study frequently quoted by persons interested in and concerned about the effects of ECT on memory. Nineteen psychiatric patients who had been prescribed bilateral ECT, and 11 control patients not receiving ECT, were given a series of probing autobiographical interviews. These interviews concerned events relating to early schooling, job history, travel, the history of their mental problems, and other life experiences. The interviews were scheduled prior to ECT, four weeks after the completion of ECT (mean of 17 treatments), and again for five of the patients at 14 to 18 weeks after ECT. During the second interview, all patients who had received ECT exhibited amnesia for some of the material they produced in the first interview. Control patients exhibited virtually no amnesia. Finally, the five patients interviewed 14 to 18 weeks after ECT exhibited some recovery, but remained amnesic for some experiences (i.e., eight to nine experiences out of an unspecified number that had been produced during the initial interview). Since it has long been recognized that patients receiving ECT have persistent and probably permanent amnesia for much of the time period immediately surrounding the hospitalization period, it is important to ask to what time period did the memories belong that could not be recalled by Janis' patients. Unfortunately, because of limitations in this methodology and because of the design of the study, no general answer to this critical question is available. However, Janis did include five protocols as samples of persistent amnesia for pre-ECT events. An examination of these protocols indicates that for four out of five, the lost memories belonged to the time period just prior to hospitalization. For the remaining example, the lost memory seemed to relate to events that occurred sometime during the year preceding hospitalization. Accordingly, the

results of this study provide no evidence that memories acquired many years before ECT can be permanently lost as a result of ECT. The critical question remaining then is: How far back in time before ECT can the permanent amnesic effects of ECT extend? This question will be considered in the next section: Issues of test sensitivity.

Issues of test sensitivity

Studies with objective memory tests for remote events (28, 29, 30) show that ECT can cause a temporal gradient of retrograde amnesia covering the past one to seven years and that, where information is available about recovery, this effect can reverse spontaneously (with no reason to suspect relearning) within a few weeks after the completion of treatment. However, the multiple-choice tests on which these conclusions about recovery are based are not as sensitive to amnesia as tests that ask subjects to recall as much as possible about a past event (33). Tests are needed that ask subjects to recall specific, time-dated memories before and after ECT. Studies of this type now in progress confirm (1) that memory for more recent events (one to three years prior to ECT) are much more affected by ECT than memory for more remote events; (2) memory for remote events can be affected by ECT but clearly recover; (3) memory loss for very recent events may be permanent.

All the studies on retrograde amnesia for remote events following a conventional course of bilateral ECT can be summarized in the following way:

1. ECT can affect memories acquired many years prior to treatment;
2. the effect on memory is greater for recent memories and less for more remote memories;
3. very remote memories appear to recover fully following ECT in a manner that suggests that recovery is spontaneous and does not require relearning;
4. memories acquired during the days prior to a course of ECT may be permanently lost;
5. there is as yet no evidence to suggest that ECT produces permanent loss of memory for events occurring during the one or two years preceding ECT; indeed, there is some evidence to indicate that memories acquired during this period do recover. Nevertheless, a fully satisfactory study of this issue with maximally sensitive tests has not yet been accomplished.

Memory loss in patients receiving extended ECT

Most modern studies of ECT and memory loss concern patients receiving a conventional course of eight to 12 treatments. Accordingly, such studies do not speak to possible long-term effects on memory of an extended course of ECT (e.g., more than 50 treatments). Three studies have been reported that do assess memory capacity and other cognitive functions in patients who have received an extended course of ECT (34, 35, 36). These studies are retrospective investigations of patients who have in previous years received a total of more than 50 treatments. Such patients were compared to other patients matched as closely as possible for age, sex, and psychiatric diagnosis. The results indicated that those patients who had received ECT performed worse on a variety of memory tests and other cognitive tests than the control group. However, these patients were either chronic schizophrenic inpatients who had been long-term inpatients or severely ill patients who had received cingulotomy in addition to ECT. In retrospective studies of this type, it is always difficult to know if differences between groups are attributable to ECT, or if those patients selected for extensive ECT were different from control patients before ECT in ways that affected their subsequent performance on neuropsychological tests. Accordingly, these studies cannot provide a conclusive answer to questions concerning possible permanent effects of extensive ECT.

Reinstatement

Normally, the severity of retrograde amnesia is inversely related to the time interval between learning and amnesic treatment. Several animal studies have suggested, however, that material not ordinarily affected by convulsive stimulation may be forgotten if a reminder of previously learned material is presented just prior to treatment (19, 20, 21).

To assess the reinstatement phenomenon with human subjects (37), inpatients receiving bilateral ECT learned material 18 hours before ECT or about ten minutes prior to ECT. Alternatively, they learned 18 hours before ECT and then were given a reminder a few minutes before ECT. Retention was always tested six to ten hours after ECT. Figure 3A presents results for a 32-item recognition task, and Figure 3B presents results for 18 paired associates. Patients learning 18 hours before ECT consistently exhibited better retention than patients learning only a few minutes before ECT ($p < .05$). Patients

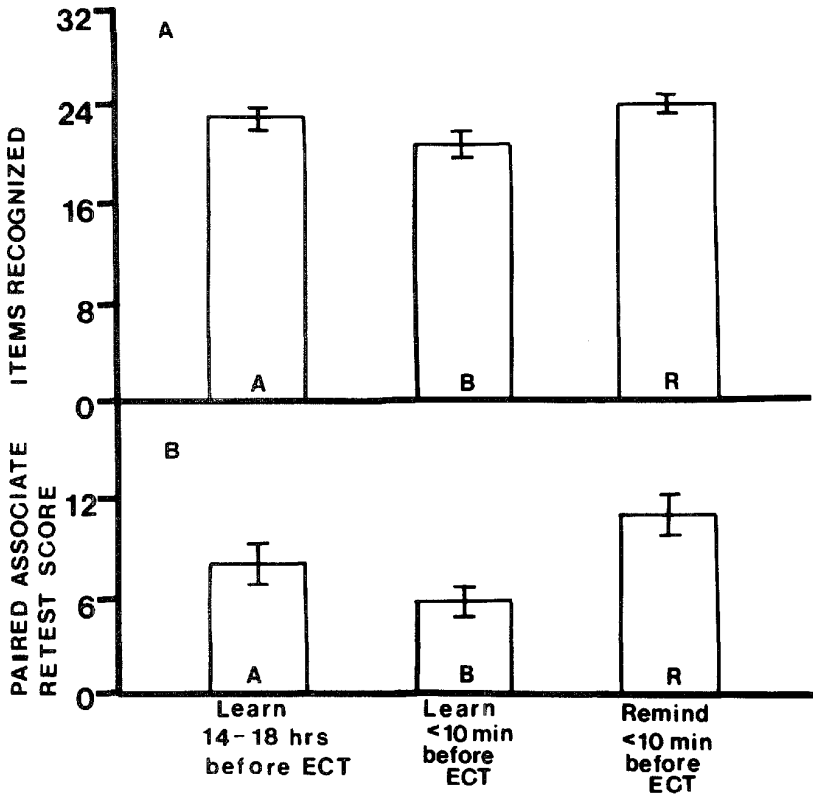


Figure 3. ECT and Memory Loss

Retention scores for 12 patients taking a recognition memory test (A) and a paired associate learning test (B). Learning occurred 14-18 hours before bilateral ECT (Conditions A and R) or just prior to ECT (Condition B). In Condition R, a reminder was given just prior to ECT. Retention was tested 6-10 hours after ECT.

given a reminder of previously learned material just prior to ECT retained this material as well or better than patients not given a reminder. Thus, recalling material from memory just prior to ECT did not produce amnesia. If anything, the reminder procedure improved retention. The results cannot rule out the possibility that amnesia might have been demonstrated if the interval between the reminder and ECT had been shorter than the three minutes required for administration of medications. Nevertheless, it is clear that amnesia need not occur even when a reminder is given at a time before ECT when memory for newly learned material is disrupted. This finding is of clinical interest because of the possibility that the reminder

procedure might be used advantageously with depressed psychiatric patients to improve the effectiveness of electroconvulsive therapy. The results of the present study provide no evidence that such a procedure would be effective in a clinical population.

Long-term effects of ECT on memory

A recent study reviewed the available literature on follow-up studies of ECT and memory and reported the results of a long-term follow-up study of patients who had received bilateral ECT, right unilateral ECT, or hospitalization without ECT six to nine months previously (38). Memory functions were assessed with six different tests of learning and remote memory capacity, and self-ratings of memory functions were obtained from all subjects. A group of inpatients was also included, who at the time of testing were receiving a course of bilateral ECT. This study can be summarized by stating that the three follow-up groups did not differ from each other on any of the memory tests. However, the group tested a few hours after the fifth bilateral treatment was consistently impaired. Figure 4 presents results for one of the memory tests. As might be expected, the inpatients performed more poorly than the other groups. Considerable forgetting occurred in all groups at one day and two weeks after learning, but there was no measurable difference between the retention scores of the three follow-up groups ($p > .3$).

Although no objective evidence could be obtained for persistent memory impairment long after ECT, subjects who had received bilateral ECT frequently felt that their memory was not as good as it used to be (38). Figure 5 presents additional data on memory complaints for a larger sample of subjects who had received bilateral ECT or right unilateral ECT six to nine months before. Of 55 persons who had received bilateral ECT (mean number of treatments = 9.9), 37 (67%) indicated that their memory was not as good as it used to be. By contrast, of 15 persons who had received right unilateral ECT (mean number of treatments = 9.4), only four (27%) felt that their memory was impaired. Such an asymmetry in the distribution of memory complaints of bilateral and right unilateral groups could have occurred by chance less than one in fifty times. Most persons with complaints felt that ECT was the cause of their memory problems. Eleven of the 37 persons who had complaints after bilateral ECT selected from four statements the one they felt best described their circumstances. None felt that they had "severe memory problems that interfere with almost everything I do"; two felt that they had "many memory problems that

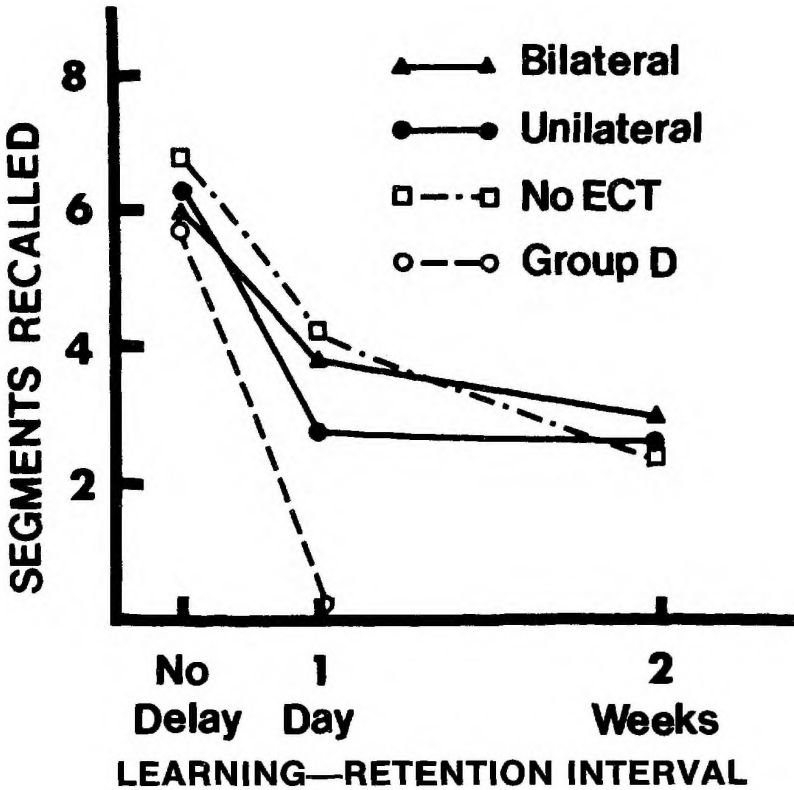


Figure 4. ECT and Memory Loss

Immediate and delayed recall of a short paragraph learned six to nine months after bilateral ($N = 16$), right unilateral ($N = 10$), or no ECT ($N = 12$). A group of inpatients, group D, ($N = 15$) was also tested 6-10 hours after their fifth bilateral treatment.

	Impairment	No Impairment
Bilateral ECT	37	18
Unilateral ECT	4	11

Figure 5. ECT and Memory Loss

Self-ratings of memory function six to nine months after bilateral or right unilateral ECT. Patients with memory complaints related only to the period of hospitalization were not scored as having perceived memory impairment.

are disturbing and that occur frequently”; six felt that they had “minor memory problems that occur frequently”; and three indicated that they had “only an occasional minor problem”.

Unfortunately, the discrepancy between subjective and objective measures of memory function cannot be conclusively resolved. Three possible explanations of this discrepancy will be considered here. (1) The possibility cannot be ruled out that failures of recall persist after ECT that are not detected by conventional memory tests. (2) The possibility also cannot be ruled out that patients receiving bilateral ECT were different from patients receiving unilateral ECT in some way that favored the development of memory complaints. For example, patients receiving bilateral ECT might have initially been more depressed than patients receiving unilateral ECT, or they might initially have had different expectations about memory impairment. Thus, it should not be concluded that bilateral ECT will cause persistent memory complaints in any depressed patient. Whichever explanation is correct it seems clear that memory complaints long after ECT are common in persons judged clinically appropriate for bilateral treatments. (3) Finally, bilateral ECT might itself lead to a lingering sense of memory impairment. Thus, the marked impairment of recent and remote memory initially associated with bilateral ECT might cause some individuals to be more sensitive to subsequent failures in recall, even if they occur at a normal frequency. By this hypothesis, unilateral ECT, which causes less memory impairment than bilateral ECT, would not be expected to lead to memory complaints. Put in its strongest form, this explanation of memory complaints supposes that bilateral ECT might lead many individuals (with or without psychiatric illness) to have persistent illusion of memory impairment.

Summary

The findings reviewed above lead to the following general conclusions about ECT and memory loss:

1. bilateral ECT is associated with greater anterograde amnesia than right unilateral ECT, even when memory is assessed with tests known to be particularly sensitive to dysfunction of the right cerebral hemisphere;
2. bilateral ECT also produces more extensive retrograde amnesia for remote events than right unilateral ECT;
3. extensive ECT (e.g., more than 50 treatments) may lead to long-lasting or permanent impairment in memory capacity or

- cognitive function, but a definitive conclusion is not yet possible;
4. the activation of previously learned material just prior to ECT does not cause amnesia for that material;
 5. new learning capacity substantially recovers by six to nine months after the completion of bilateral or right unilateral ECT, but persisting memory complaints are common in individuals who receive bilateral treatment;
 6. memory for events that occurred long prior to ECT substantially recovers by six to nine months after ECT; memory for events that occurred days prior to ECT may be permanently lost.

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APPENDICES

APPENDIX I. DESCRIPTION OF ECT FOR INFORMED CONSENT

The following might be helpful to those interested in an example of how the information necessary for informed consent can be presented to patients, relatives, or guardians. It is not offered as a rigid prescription and should be modified, when necessary, to meet the needs of those who must understand its contents.

Procedures of Electroconvulsive Therapy

Electrotherapy, also known as electroconvulsive therapy (ECT) or electroshock therapy (EST), is an accepted form of treatment for certain types of psychiatric disorders. It has been used successfully in thousands of cases in this country and abroad since its introduction in 1938. It is one of the most effective ways of treating depression and certain other conditions in patients who might otherwise require lengthy hospitalization as well as the prolonged use of high doses of medication.

The psychiatrist and his/her skilled and experienced team give the treatment in a specially equipped treatment room. Treatments are usually given in the morning before breakfast. The treatment consists of passing a small, carefully controlled electric current between two electrodes applied to the head. In bilateral treatment, one electrode is applied to the right side of the head, the other to the left. In unilateral treatment, both electrodes are applied to the same side of the head, usually on the right side. Prior to each treatment the patient receives an injection to reduce secretions in the mouth. No special dress or gown is required.

Once in the treatment room, the patient is given an anesthetic in the vein which leads to sleep within a matter of a minute. He/she is then given a second medication in the vein which produces muscular relaxation. The patient should experience no discomfort or pain during the treatment; he/she does not feel the electric current and most individuals have no memory of the treatment. When the treatment is

given, the patient, who is already asleep, has generalized muscular contractions of a convulsive nature. These contractions, which have been modified and "softened" by the second medication in the vein, last approximately 60 seconds. Minutes later, the patient slowly awakens and may experience temporary confusion similar to that seen in patients emerging from any type of brief anesthesia. When the patient is ready, he/she is then returned to the room. Following this, he/she is given breakfast and is permitted to be up and about. Headache, mild muscle soreness, or nausea sometimes occur but these are infrequent and usually respond to simple treatment.

The number of treatments in any given case will vary with the condition being treated, the individual response to treatment, and the medical judgment of the psychiatrist giving the treatments. A typical course of therapy may consist of four to ten treatments. In some cases more treatments may be required. Although the treatments are usually given every other day or three times a week, the frequency of treatment will also vary with each case. As the treatments progress (usually after the fourth or fifth treatment), haziness of memory may develop. This memory impairment is usually temporary and will be described in detail in the section below titled "risks, side-effects, or adverse effects."

Convalescence

After the last scheduled treatment the patient begins a "convalescent period" the duration of which varies with each individual. During this period (usually one to three weeks) he/she must either remain in the hospital or be discharged under the supervision of a family member or some responsible person selected by the family. This precaution is necessary because of the impairment of memory, largely temporary, which is an expected side-effect of the treatment. During the convalescent period, the patient should not drive an automobile, transact business or carry on usual employment until *so advised* by his/her doctor. Alcoholic beverages are prohibited. A responsible person should remain with the patient until such time as convalescence is completed. The duration of the convalescent period is determined by the patient's progress.

Outpatient Treatments

In some instances outpatient treatment may be recommended; this generally consists of a full course of treatment over a two to four week

period without the patient having to enter the hospital as an inpatient. A member of the family or a designated responsible person accepts the responsibility for:

- (1) seeing that the patient does not take any food or drink after midnight preceding each treatment;
- (2) escorting the patient to the hospital for the appointed treatment; and
- (3) escorting him/her home after the treatment has been completed.

During the period of treatment, and for at least two to four weeks following termination of treatment, the patient should be under the close supervision and constant companionship of the family.

Results

Now a word about the results of treatment. Although the results in most cases are gratifying, not all cases will respond equally well. As in all forms of medical treatment, some patients will recover promptly; others will recover only to relapse again and require further treatment; still others may fail to respond at all.

Risks, Side Effects, or Adverse Effects

ECT, like any other medical or surgical procedure, involves a certain element of risk. Careful medical evaluation is carried out in each case to insure that there are no over-riding medical contraindications to the treatment.

Fatalities are very rare.

Complications, although infrequent, may include fractures and/or dislocations or adverse reactions to the medication. These may sometimes occur in spite of all precautions and must be looked upon as a recognized hazard of the treatment. The patient should be assured, however, that every effort will be made by his/her doctors to minimize the possibility of such complications; should they occur, appropriate treatment will be instituted immediately and the family notified.

Memory Changes

The haziness of memory, or poor memory function referred to above, is a frequent side effect of the treatment and one that has

received wide publicity in recent years. From careful studies we now believe that small numbers of treatments are less likely to produce marked memory changes than large numbers. We now also believe that right unilateral treatments (both electrodes applied to the right side of the head in right-handed persons) lead to milder and shorter lived memory changes than those following the use of bilateral treatment (one electrode on each side of the head) or left unilateral treatment (both electrodes on the left side of the head). However, the doctor makes the decision about electrode placement in each case.

This section is intended primarily for patients, relatives, and guardians who are interested in the details.

Bilateral ECT or left unilateral ECT might be associated with:

(a) memory loss for some *past events* lasting from a few hours after one treatment to a few months or, possibly though rarely, even for years after a series of treatments. This memory loss is largely reversible though permanent loss can occur for the days and weeks close to the time the treatments are given. Spotty loss may remain for events that occurred during the months prior to treatment and some spotty memory loss may possibly remain for events that occurred during one or two years prior to treatment; and

(b) memory loss for *ongoing events* lasting from a few hours after one treatment to several months after a series of 5-15 treatments.

Right unilateral ECT might be associated with:

(a) spotty memory loss for *past events* lasting from an hour after one treatment to several months after a series of treatments. The memory loss is largely reversible though permanent memory loss may occur for the days and weeks close to the time the treatments are given; and

(b) spotty memory loss for *ongoing events* lasting from a few hours after one treatment to several months after a series of treatments.

The great majority of patients treated with ECT do not find these memory changes of major importance and countless individuals in the professions, in high academic positions, and in responsible executive jobs in commerce and industry, have returned to fill their former occupations effectively. Their colleagues and co-workers, unless informed of the memory changes, have paid little attention to them. Other patients, for reasons that are not yet fully understood, have continued to complain about their poor memory function for prolonged periods of time. Further studies are needed to explain the differences.

If you have any other questions about the treatment, we will do our best to answer them.