COMPARISON OF CHANGE IN MMPI PERFORMANCE FOLLOWING INDOKLON AND ELECTROCONVULSIVE THERAPY

APPROVED:

Jack R. Haym
Major Professor

Merl E. Bonney
Minor Professor

Dwane Lingey
Dean of the School of Education

Robert B. Toulous
Dean of the Graduate School
COMPARISON OF CHANGE IN MMPI PERFORMANCE FOLLOWING INDOKLON AND ELECTROCONVULSIVE THERAPY

THESIS

Presented to the Graduate Council of the North Texas State University in Partial Fulfillment of the Requirements

For the Degree of

MASTER OF SCIENCE

By

Davis W. Taylor, Jr., B.S.
Denton, Texas
June, 1967
# TABLE OF CONTENTS

<table>
<thead>
<tr>
<th>LIST OF TABLES</th>
<th>iv</th>
</tr>
</thead>
<tbody>
<tr>
<td>Chapter</td>
<td></td>
</tr>
<tr>
<td>I. INTRODUCTION</td>
<td>1</td>
</tr>
<tr>
<td>Hypotheses</td>
<td></td>
</tr>
<tr>
<td>II. RELATED RESEARCH</td>
<td>9</td>
</tr>
<tr>
<td>III. METHODOLOGY</td>
<td>15</td>
</tr>
<tr>
<td>Subjects</td>
<td></td>
</tr>
<tr>
<td>Description and Administration of MMPI</td>
<td></td>
</tr>
<tr>
<td>Method of Electroconvulsive Therapy</td>
<td></td>
</tr>
<tr>
<td>Method of Indoklon Consulsive Therapy</td>
<td></td>
</tr>
<tr>
<td>Statistical Treatment of Data</td>
<td></td>
</tr>
<tr>
<td>IV. RESULTS</td>
<td>22</td>
</tr>
<tr>
<td>V. DISCUSSION</td>
<td>25</td>
</tr>
<tr>
<td>VI. SUMMARY, CONCLUSIONS, AND RECOMMENDATIONS</td>
<td>29</td>
</tr>
<tr>
<td>BIBLIOGRAPHY</td>
<td>32</td>
</tr>
</tbody>
</table>

iii
# LIST OF TABLES

<table>
<thead>
<tr>
<th>Table</th>
<th>Page</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. Comparison of ECT and Indoklon Groups in Mean Number of MMPI Points Changed After Treatment</td>
<td>22</td>
</tr>
<tr>
<td>II. Changes on MMPI Within ECT and Indoklon Group After Treatment</td>
<td>23</td>
</tr>
</tbody>
</table>
CHAPTER I

INTRODUCTION

The artificial provocation of convulsive seizures as a therapeutic technique in the treatment of mental disorders is not something new. Oliver (9) published a paper entitled "Fits Caused by Camphor as a Cure" in the London Medical Journal in 1785. Since that time various convulsive agents have been used, largely in the treatment of depression and schizophrenia, and most have been discarded due to various complications and side effects. Electroconvulsive therapy, however, has been retained and has widespread usage today (2).

In 1933 Von Meduna reintroduced the use of camphor as a convulsive agent (5). Von Meduna's initial interest in convulsive therapy stemmed from his observation that schizophrenia and epilepsy were rarely found in the same person. If the spontaneous convulsion of an epileptic was antagonistic to schizophrenia then, perhaps an artificially induced convulsion would have much the same effect. The standard procedure for the use of camphor was the injection intramuscularly of ten to forty cubic centimeters of a 25 per cent camphor in oil solution. Camphor had the side effects of causing
nausea, vomiting, and multiple seizures. Some patients failed to convulse at all, and in others the onset of the seizure might be as long as three hours after the injection of the camphor. This lack of predictability of the time of onset of the seizure made the use of muscle relaxants impossible.

As a result of the undesirable side effects of camphor, Von Meduna began using Metrazol as a convulsive agent in 1934 (5). The standard treatment was a five cubic centimeter injection of a 10 per cent aqueous solution of Metrazol. Therapeutic results with Metrazol were encouraging, but side effects of thrombosis, skeletal muscular complications, nausea, failure to convulse, and extremely poor patient acceptance with Metrazol have been attributed to the fact that the patient does not lose consciousness in the period between the injection and the onset of the seizure. Patients reported a feeling of "impending doom" which was so frightening as to cause many to refuse further treatment with the drug.

In 1937 Blackwenn introduced the use of Picrotoxin and Coriamytrin as convulsants (3). Both of these drugs had the effects of causing delayed seizures, excessive salivation, musculoskeletal complications, nausea, and vomiting.
Mayer (8) began to use cyclohexyl-ethyl-triazol in 1938. Triazol produced no thrombosis and had good patient acceptance but was excreted poorly and often caused multiple convulsions. Fatalities were reported with the use of Triazol, and its use was discontinued.

Berg and Robbins (1) introduced the use of PM-1090 at Bellevue Hospital in 1959. PM-1090 could be administered either orally or intravenously, but it had a 13 per cent rate of failure to seizure, and patients developed a tolerance with increasing treatments, necessitating increased amounts of dosage. Nausea and vomiting were undesirable side effects.

Electroconvulsive therapy was first introduced in 1938 by two Italians, Cerletti and Bini (2). Since that time electroconvulsive therapy has been the major convulsive treatment in use for psychiatric patients. The primary uses of electroconvulsive therapy have been in the treatment of neurotic and psychotic depressions, involutional psychotic reactions, and certain types of acute schizophrenia.

A more recent discovery was Indoklon. Indoklon (chemical name, bis 2,2,2-trifluoroethyl ether) was first synthesized by Speers (7) while working with fluorinated ethers in an attempt to find a non-flammable ether for anesthetic purposes. Fluorine was used since it has the property of making flammable
organic compounds non-flammable when present in sufficient quantity in the molecule. Indoklon proved to be non-flammable at room temperature.

Krantz (6), while carrying out a pharmacological evaluation of Indoklon, found that along with its anesthetic properties Indoklon also had the property of producing convulsions with great rapidity and consistency in animals. Krantz found that Indoklon produced seizures when administered in solutions of water and Carbowax 300 containing only .0032 percent Indoklon. Krantz also found no toxic effects of Indoklon as revealed by hematologic studies, blood chemistry, urine analysis, liver function tests, sedimentation rate, and post mortem examinations of animals receiving numerous administrations of Indoklon. Further work revealed that Indoklon was compatible in use with atropine sulfate, thiopental sodium, and succinylcholine chloride, and the safety of Indoklon, as revealed in the animal studies, prompted its use in 1956 as a shock treatment for four psychiatric patients. The results were highly consistent, for all of the patients convulsed successfully without complications.

With the establishment of the safety of the use of Indoklon with humans, investigators turned their efforts toward an evaluation of its therapeutic efficacy. It was postulated
that if Indoklon proved to be tantamount to electroconvulsive therapy in effectiveness, it might emerge as an alternate form of treatment.

As stated earlier, the original interest in convulsive therapies grew out of the observation that epilepsy and schizophrenia seemed to be antagonistic. This assumption was later found to be not completely valid; however, investigators did note with interest that a spontaneous convulsion in a patient sometimes seemed to effect a complete remission of pathological symptoms.

The advent of electroconvulsive therapy proved to be of great benefit in the treatment of psychiatric patients. Various investigators have reported recovery rates of up to 90 per cent in certain disorders that were treated with electroconvulsive therapy (2, 5). The primary indications for the use of electroconvulsive therapy are in the treatment of retarded and agitated depressions, acute schizophrenia, involutional psychoses, and manic-depressive psychoses (5). As to the use of electroconvulsive therapy in treating psychoneurotic disorders Kalinowsky states:

Electroconvulsive therapy in most types of psychoneuroses is symptomatic at best, and only few treatments will be applied except in obsessive-compulsives in whom intensive treatments often lead to a temporary disappearance
of symptoms. There have never been many indications for ECT in the neurotic patient, and modern pharmacotherapy restricted its applications in this group further (5, p. 203).

The reasons for the beneficial effects of convulsive therapies are not known. Ewalt and others in discussing electroconvulsive therapy stated:

> We do not know why ECT works. Apparently somehow a combination of physiologic and psychologic reactions to the convulsive treatment produce profound changes in the ego's defense system. Whether these changes are primarily chemical, physiologic, or psychologic is by no means clear. One leans to the physiologic theories, but this is based on rationalization and not facts (4, p. 347).

Many theories have been advanced in an attempt to explain the results of convulsive therapy. Kalinowsky (5) states that one investigator has found over sixty theories dealing with this phenomena. In discussing various theories about electroconvulsive therapy Lewis states: "At the present time there is no theory as to the nature of the shock treatments sufficiently comprehensible to be taken very seriously (7, p.227)."

The majority of the evaluative studies of the therapeutic results of Indoklon have been of a subjective nature. Patients have been rated by therapists as recovered, improved, no change, etc. after Indoklon treatment, but there have been few attempts to evaluate Indoklon in a more quantitative-objective manner.
The purpose of the present study is to compare the effects of Indoklon and electroconvulsive therapy by administering the Minnesota Multiphasic Personality Inventory (hereafter referred to as the MMPI) before and after a course of treatments to a group of patients receiving Indoklon and a group receiving electroconvulsive therapy. By comparing differences between the two groups in the amount of change on the various MMPI scales, a more objective understanding of the effects of the two treatments may be obtained.

Hypotheses

1. It is hypothesized that there will be significant differences between the two groups in the amount of change on MMPI scales.

2. It is further hypothesized that within each group there will be significant downward changes in MMPI scores on scales D, Pa, Pt, Sc, and Ma.
CHAPTER BIBLIOGRAPHY


CHAPTER II

RELATED RESEARCH

The standard criterion for the evaluation of a new convulsive agent has been a comparison of the therapeutic effects of the agent with those of electroconvulsive therapy. Kurland states:

The introduction of electroconvulsive therapy in 1938 by Cerletti and Bini with its advantages led to its rapid acceptance as the mode of treatment and against which all subsequent pharmacological agents introduced from time to time to elicit a convolution were compared. However, none of these previous compounds was able to compete with the electroconvulsive technique. The reasons for the greater preference for ECT were easily seen. These were the complete control that the therapist had over the treatment seizure, namely, the almost instantaneous production of the convolution, the absence of delayed reactions, and the lack of concern relative to the possible problems of complications which might be associated with the sensitivity to a drug or its metabolites (8, p. 174).

A pharmacological evaluation of Indoklon by Krantz (6) found it to be free of undesirable complications and incompatibilities with other commonly used drugs. Dolenz states, "It seems to be a consensus of all the investigators who have utilized Indoklon that there is a tremendous margin of safety. No toxic conditions have been reported to date, and there have been no fatalities (3, p. 202)."
In the area of safety, Indoklon compared favorably with electroconvulsive therapy. Investigations of the therapeutic effects of Indoklon proved to be encouraging. Dolenz (3) treated forty-five psychotic patients, thirty-one of whom had received prior somatic treatment, with Indoklon. Results were observed to be excellent in twenty-seven of the patients, good in sixteen, and poor or no change in only two. Moreover, it was found that patient acceptance of Indoklon was excellent, a real advantage in the treatment of paranoid and other resistant patients. Krantz and others (7) studied twenty-five psychotic patients receiving Indoklon treatment. Results were judged to be excellent in nine cases, good in fifteen cases, and poor in one case.

Karliner (5) studied thirty psychotic patients whose diagnoses were broken down as follows: fourteen schizoaffective disorders, six paranoid schizophrenics, and ten manic-depressives. Patients were rated after treatment as follows: much improved if the patient returned to his premorbid personality in all aspects of interpersonal relations; improved if a patient appeared better but did not return completely to his previous level of functioning; no change. Seven of the schizoaffective patients were much improved, six improved, and one not improved. All six of the paranoid
schizophrenics were judged improved. Of the ten manic patients, five were considered improved and five much improved. Karliner's results led him to state that "Indoklon is equally as effective as electroshock in depressive states and superior in schizo-affective disorders and paranoid states (5, p. 185)."

Similar findings were also reported by Buckman and others (1), for they found a 58 per cent rate of much improvement and a 20 per cent rate of improvement in their subjects.

Kurland and others (9) studied sixty-six patients receiving Indoklon and sixty-six receiving electroconvulsive therapy. Although there was no significant difference found between the groups at the conclusion of treatment, each group was significantly improved (.001 level) on the Interview Section of the Multidimensional Scale for Rating Psychiatric Patients.

Sprehe (12) found no significant differences between a group of Indoklon patients and a group of electroconvulsive therapy patients on scales L, F, and D of the MMPI from before and after treatment administrations. Patient acceptance of Indoklon was found to be greater than that of electroconvulsive therapy.

Rosenberg (11) reported the case of a patient diagnosed as paranoid state, who failed to respond to thirteen electroconvulsive treatments but who had a complete remission with
three Indoklon treatments. Results such as these are difficult to evaluate. In the case cited, the patient might have been responding to the three additional convulsive treatments, regardless of how they were evoked.

Pacella and others (10) found decreases in all clinical scales of the MMPI in a group of schizophrenic patients judged improved after a series of electroconvulsive treatments. Dana (2) found significantly lower scores on MMPI scales Sc and Ma in a random group of patients of varying diagnoses who had received electroconvulsive therapy. In a somewhat related study of patients receiving insulin shock therapy, Hales and Werner (4) found decreases in all MMPI scales except K, Hy, and Mf.
CHAPTER BIBLIOGRAPHY


CHAPTER III

METHODOLOGY

Subjects.--The subjects utilized in the study were twenty psychiatric patients of varying diagnoses (primarily some type of psychotic disorder) who were hospitalized at the Fort Worth Neuropsychiatry Center and Hospital. Subjects were selected from patients who were scheduled to receive either Indoklon convulsive therapy or electroconvulsive therapy. A total of thirteen females and seven males made up the sample. Five males and five females comprised the electroconvulsive therapy group. The Indoklon group consisted of two males and eight females. Due to the relatively small patient population it was not possible to select patients as subjects on the basis of diagnosis or past psychiatric history.

Description and administration of MMPI.--The Minnesota Multiphasic Personality Inventory is a self-rating personality scale which was designed for use primarily in a clinical population. The inventory contains 566 items which are to be answered either true, false, or can't say. Responses are
recorded on an answer sheet which may be scored by hand or by machine. A brief description of each of the thirteen MMPI scales follows.

**Lie Scale (L)**--This validity scale is composed of items which reflect common patterns of behavior which most persons would have to admit to engaging in. A high score on this scale signals for caution in evaluating the remaining scales.

**Validity Scale (F)**--The items on this scale are designed to reflect the subject's care in answering the items and his ability to comprehend the content of the items. A high score on this scale suggests that the other scales may be invalid.

**Correction Scale (K)**--This scale is primarily used as a correction factor but is considered by some clinicians to be a measure of defensiveness. A percentage of the score on the K scale is added to certain of the clinical scales to correct for denial.

**Hypochondriasis Scale (Hs)**--This scale is composed of items to measure abnormal concern over bodily functions while being free of the influence of hysterical complaints and organic illness.

**Depression Scale (D)**--This scale measures the depth of depression whether endogenous or reactive. The D scale is
sensitive to mood changes of a substantial magnitude and must be evaluated accordingly.

**Hysteria Scale (Hy)**--This scale measures the extent to which a patient's responses are like those of patients who have developed conversion reactions or functional disorders.

**Psychopathic Deviate Scale (Pd)**--This scale measures the extent to which an individual is lacking in ability to enter into emotional relationships with others and the extent to which he has a disregard for social mores.

**Interest Scale (Mf)**--This scale measures the extent of which an individual's interests are masculine or feminine. The Mf scale has not proven to be particularly useful in practice.

**Paranoia Scale (Pa)**--This scale was designed to detect characteristics of suspiciousness, oversensitivity, and delusions of persecution and grandeur.

**Psychasthenia Scale (Pt)**--This scale measures characteristics of compulsive and phobic behavior. It is frequently high on the profile of a typical obsessive-compulsive neurotic, but it also correlates highly with the Schizophrenic Scale and may be elevated in psychotic disorders.

**Schizophrenic Scale (Sc)**--This scale measures the similarity of a patient's responses to those of patients who
are characterized by unusual or bizarre thoughts and behavior. The Sc scale is used by some clinicians as an indicator of schizo-affective disorders as well as schizophrenia.

**Hypomania Scale (Ma)**--This scale measures overproduction in thought and action. The disorder often called manic-depressive psychosis and cyclothymic personality may be indicated by high scores on this scale.

**Social Introversion Scale (Sc)**--This scale attempts to measure introversion or tendency to withdraw from others. It is used with normal as well as with hospital populations.

Each subject was administered an **MMPI** as part of his pre-treatment psychological evaluation. A second **MMPI** was administered to each subject after the termination of treatment. Sufficient time was allowed (in most cases five to seven days) for each patient to become relatively free of post-treatment confusion and memory disturbances before the second **MMPI** administration.

**Method of electroconvulsive therapy.**--Thirty minutes prior to treatment each patient was given an intramuscular injection of 1.2 to 1.8 milligrams of atropine sulfate and twenty-five milligrams of Benadryl. Immediately prior to treatment each patient was given an intravenous injection of six to eight cubic centimeters of Brevital (methohexital) and
1.5 to 2.5 cubic centimeters of Anectine (succinylcholine). In the unilateral type electroconvulsive therapy utilized for these patients the electrical current was applied to only the non-dominant lobe of the brain. A rubber oral pharyngeal airway was inserted into the patient's mouth, and the current was applied. The ensuing convolution consisted of a short tonic phase followed by a clonic phase of ten to twenty seconds with generalized convulsions and jerking of the extremities. Patients generally slept for about thirty minutes following the treatments.

Method of Indoklon convulsive therapy.--Twenty to thirty minutes before treatment each patient was given intramuscularly 1.2 to 1.8 milligrams of atropine sulfate. At the time of treatment each patient was given intravenously eight to fifteen cubic centimeters of Brivital (methohexital) and 1.5 to 2.5 cubic centimeters of Anectine (succinylcholine). An airway was then inserted into the mouth. A positive breathing apparatus with a five liter bag attached to an oxygen supply was connected to a vaporizer which in turn was connected to a face mask. The face mask was placed on the patient's face, and half a cubic centimeter of liquid Indoklon was introduced into the vaporizing chamber. The Indoklon and oxygen mixture was squeezed into the patient's lungs every five seconds. The
number of inflations required to produce a convulsion varied from two to six. The convulsion consisted of myoclonic twitches followed by a clonic phase of one to two minutes.

Both Indoklon and electroconvulsive therapy treatments were generally administered three times per week. The total number of treatments received by each patient varied according to the judgment of the administering physician. Treatments were terminated when, in the opinion of the patient's physician, the patient had received the maximum therapeutic benefit from the treatments.

Statistical treatment of data.--For each group of ten patients, the ten individual raw scores for each MMPI scale were averaged to obtain a group mean for each of the thirteen scales. This procedure was followed for both the before and after treatment administrations of the MMPI. Each of the thirteen after-treatment mean scores was subtracted from its corresponding before-treatment mean scores to obtain thirteen mean change scores for each group. The two-tailed t test for testing the significance of the difference between means was used to test for significant differences between the two groups in amount of change on each scale (1). Within each group, the difference between before- and after-treatment mean scores was evaluated by means of a one-tailed t test (2).
CHAPTER BIBLIOGRAPHY


CHAPTER IV

RESULTS

The expected differences between the Indoklon group and the electroconvulsive therapy group were not obtained. Table I presents the mean change per patient in MMPI points for each of the thirteen scales and the respective t's for testing the significance of the difference between these means. As will

TABLE I

COMPARISON OF ECT AND INDOKLON GROUPS IN MEAN NUMBER OF MMPI POINTS CHANGED AFTER TREATMENT

<table>
<thead>
<tr>
<th>MMPI Scale</th>
<th>Mean Change Indoklon</th>
<th>Mean Change ECT</th>
<th>t</th>
</tr>
</thead>
<tbody>
<tr>
<td>L</td>
<td>1.4</td>
<td>- .1</td>
<td>1.5</td>
</tr>
<tr>
<td>F</td>
<td>-2.9</td>
<td>- 6.0</td>
<td>1.04</td>
</tr>
<tr>
<td>K</td>
<td>3.0</td>
<td>1.9</td>
<td>.38</td>
</tr>
<tr>
<td>Hs</td>
<td>.1</td>
<td>3.4</td>
<td>1.24</td>
</tr>
<tr>
<td>D</td>
<td>-3.5</td>
<td>- 6.1</td>
<td>.38</td>
</tr>
<tr>
<td>Hy</td>
<td>-.5</td>
<td>- 5.2</td>
<td>1.27</td>
</tr>
<tr>
<td>Pd</td>
<td>-.9</td>
<td>- 4.1</td>
<td>1.03</td>
</tr>
<tr>
<td>Mf</td>
<td>-.2</td>
<td>- 2.3</td>
<td>1.07</td>
</tr>
<tr>
<td>Pa</td>
<td>-2.0</td>
<td>- 5.1</td>
<td>1.51</td>
</tr>
<tr>
<td>Pt</td>
<td>-2.7</td>
<td>- 9.9</td>
<td>1.92*</td>
</tr>
<tr>
<td>Sc</td>
<td>-4.5</td>
<td>-13.1</td>
<td>1.94*</td>
</tr>
<tr>
<td>Ma</td>
<td>-1.6</td>
<td>- 1.5</td>
<td>.03</td>
</tr>
<tr>
<td>Si</td>
<td>-5.0</td>
<td>- 6.2</td>
<td>.25</td>
</tr>
</tbody>
</table>

*p less than .1, two-tailed test, df=18
be noted, none of these differences reached the .05 level of significance, but two of the scales, Pt and Sc, approached significance, thus indicating the possibility of a trend in this direction.

It was hypothesized that within each group there would be significant decreases on sales D, Pa, Pt, Sc, and Ma after treatment. Table II presents the results of the statistical analyses of these changes.

### TABLE II

**CHANGES ON MMPI WITHIN ECT AND INDOKLON GROUP AFTER TREATMENT**

<table>
<thead>
<tr>
<th>MMPI Scale</th>
<th>Group and Mean Change</th>
<th>Significance</th>
</tr>
</thead>
<tbody>
<tr>
<td>D</td>
<td>Indoklon, -3.5</td>
<td>NS*</td>
</tr>
<tr>
<td>Pa</td>
<td>Indoklon, -2.0</td>
<td>.05**</td>
</tr>
<tr>
<td>Pt</td>
<td>Indoklon, -2.7</td>
<td>NS</td>
</tr>
<tr>
<td>Sc</td>
<td>Indoklon, -4.5</td>
<td>NS</td>
</tr>
<tr>
<td>Ma</td>
<td>Indoklon, -1.6</td>
<td>NS</td>
</tr>
<tr>
<td>D</td>
<td>ECT, -6.1</td>
<td>.01**</td>
</tr>
<tr>
<td>Pa</td>
<td>ECT, -5.1</td>
<td>.01**</td>
</tr>
<tr>
<td>Pt</td>
<td>ECT, -9.9</td>
<td>.0005**</td>
</tr>
<tr>
<td>Sc</td>
<td>ECT, -13.1</td>
<td>.005**</td>
</tr>
<tr>
<td>Ma</td>
<td>ECT, -1.5</td>
<td>NS</td>
</tr>
</tbody>
</table>

*not significant.

**One-tailed test, df=9.

All changes were in the expected direction, but not all reached significance. In the Indoklon group only scale Pa
was significantly lower after treatment. Four of the five scales were significantly lower in the electroconvulsive therapy group.
The results obtained yield little basis for inferring that one treatment has any more therapeutic benefit than the other when the criteria of improvement is change in scores on MMPI scales. Patients in the electroconvulsive therapy group had significant downward changes on four of the five psychotic indicator scales, whereas Indoklon patients were significantly lower on only one. It is important to note, however, that none of the differences between the two groups in the amount of change were significant.

Karliner (1) came to the conclusion by way of subjective evaluation that Indoklon is superior to electroconvulsive therapy in the treatment of schizo-affective disorders. The present results clearly fail to bear out his conclusion, inasmuch as the Sc scale approached significance in favor of the electroconvulsive therapy group. This finding emphasizes the hazard of relying upon subjective evaluations as instruments of measurement in psychological research.

The finding of a $t$ that approached significance on scales Pt and Sc suggests that further comparisons using
larger samples might be more fruitful in yielding conclusive results. As McNemar (2) points out, the use of small samples is never conducive to finding significant differences. The use of only ten subjects in each group is clearly a limiting factor in drawing any strong inferences from the recent research. The necessity of basing the present study on a small sample was dictated by several factors. The patient population at the institution where the study was carried out was relatively small at the time of the study, thus limiting the total number of possible subjects. Secondly, Indoklon treatment was generally used with much less frequency than was electroconvulsive therapy. Thus, the non-availability of patients receiving Indoklon treatment necessarily limited the number of subjects in that group.

Some of the patients in the study had received previous hospitalization and, in some cases, previous convulsive types of therapy. This uncontrolled variable could possibly have had some pronounced effects on the results obtained. Another source of variation may have been severity of disorder. No attempt was made to match patients in the two groups on either degree of severity or psychiatric diagnosis. Since Indoklon is frequently reserved for the treatment of patients who have failed to respond to past treatment and who are
characterized as being treatment problems, the finding of the present study that electroconvulsive therapy was not superior to Indoklon could be taken as a positive finding in favor of Indoklon, inasmuch as the subjects receiving Indoklon may have had a more severe degree of disorder than the patients in the electroconvulsive therapy group.

One finding of some importance was that individual patient acceptance of Indoklon was greater than that of electroconvulsive therapy. The misuses of the words "electric" and "shock" have created serious problems in persuading some patients to consent to electroconvulsive therapy. On this point Indoklon has a definite advantage.

Due to the small number of subjects utilized and the uncontrolled variables which may have had an influence on the results, it is difficult to draw any decisive conclusions other than trends from the present study. Further research in this area should be useful in clarifying and substantiating the findings of the present research.
CHAPTER BIBLIOGRAPHY


Various pharmacological convulsive agents have been used from time to time in psychiatric treatment, and most have been unsatisfactory due to undesirable side effects. The most extensively used convulsive treatment at the present time is electroconvulsive therapy. A more recent discovery was Indoklon, a fluorinated ether, which has been used without complications by several investigators in the convulsive treatment of depressive and psychotic disorders.

The purpose of the present study was to compare the therapeutic efficacy of Indoklon with that of electroconvulsive therapy. Twenty hospitalized psychiatric patients who were scheduled to receive convulsive therapy served as subjects. Ten subjects received a course of Indoklon treatments, and ten received a series of electroconvulsive therapy. An MMPI was administered to each patient before and after the respective treatments. It was hypothesized that there would be differences between the two groups in amount of MMPI change and that within each treatment group there would be significant downward changes on MMPI scales D, Pa, Pt, Sc, and Ma.
No significant differences were found between the two groups on any of the MMPI scales, but on scales Pt and Sc the difference approached significance, with patients in the electroconvulsive therapy group showing greater downward change.

On the five scales for which a decrease within each group was predicted, all changes were in the predicted direction; however, patients in the electroconvulsive therapy group were significantly lower on four of the five hypothesized scales, whereas the Indoklon patients were significantly lower on only one of the five scales. Patient acceptance of Indoklon treatment was notably better than acceptance of electroconvulsive therapy.

The failure to find the expected differences between the two groups in amount of change may have been due to the relatively small number of subjects in each group. Other possible sources of uncontrolled variation were severity of disorder, number of treatments, and, for some patients, previous convulsive therapy.

Previous studies using subjective rather than objective rating methods have found results consistent with the idea that Indoklon is superior to electroconvulsive therapy in treating certain types of disorders. The results obtained in
the present research give no support to the contention that either Indoklon or electroconvulsive therapy is more benef-

cial therapeutically than the other.

Further research utilizing larger samples and more stringent control of patient selection should be helpful in arriving at more definite conclusions as to which if either of these two methods of treatment is more desirable. For the present time, the only conclusions that can be drawn are that both forms of treatment have therapeutic effects and that there appear to be no striking differences between their respective effects.
BIBLIOGRAPHY

Books


Articles


Unpublished Materials

Sprehe, Daniel J., "A Quantitative Comparison of ECT with Hexafluorodiethyl Ether," unpublished report, Department of Psychiatry and Neurology, Tulane University School of Medicine, New Orleans, Louisiana.