Understanding Electroconvulsive Therapy

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1100-1200

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LIVE ZOOM

Objectives

- At the conclusion of this lecture, students will have a better understanding of ECT including:
- 1. Some myths about ECT?
- 2. Medical Student attitudes regarding ECT
- 3. General thoughts regarding ECT
- 4. Historical overview of ECT and its recent trends.
- 5. Diagnostic indications
- 6. Pretreatment work-up
- 7. Absolute and relative contraindications
- 8. Informed consent
- 9. Role of Anesthesia
- 10. Electrode Placement
- 11. Complications, and mortality statistics
- 12. Repetitive Transcranial Magnetic Stimulation (rTMS)
  - Compared to ECT

Note: This lecture and or the video(s) that accompany it contain content that may elicit uncomfortable feelings in some students.

Think ECT!

Myths about ECT

- 1. It is a barbaric treatment
- 2. It causes brain damage
- 3. It causes permanent brain damage
- 4. It is a treatment of last resort
- 5. It only works for depression
- 6. It is not safe
- 7. It cannot be given to patients with epilepsy
- 8. It will change one's personality
- 9. It has a low success rate
- 10. It is a permanent cure

Electroconvulsive Therapy

Medical Student Attitudes and Knowledge
(2001 Study of 2nd year medical students)

1. Showed negative bias to ECT
   a. 40% felt it was often misused by psychiatrists
   b. 31% felt ECT was used to punish violent or uncooperative patients
2. Displayed a lack of knowledge about ECT
   a. Few knew typical frequency or duration of treatment
   b. Few knew it was done under general anesthesia
   c. Many thought it was outmoded
   d. Many thought it was unsafe and and could be fatal
3. Their primary sources of information were:
   a. College classes
   b. Movies

Journal of ECT , 2001, Clothier, et. al. U. Arkansas

Electroconvulsive Therapy

General Thoughts

- ECT is a safe and efficacious treatment modality, yet sadly it remains:
  - Controversial and Stigmatized due to:
    - Misinformation
    - Outmoded perception(s) about how treatment is performed

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General Thoughts (continued)

- ECT use declined from 1950s-1970s, but has seen a marked increase in its use in past 25-30 years due to:
  - Excellent safety profile
  - Superior efficacy for 15-20% non-responders
  - Lower costs due to decreased hospitalization
  - Decreased societal stigmatization

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General Thoughts (continued)

100,000 patients have ECT annually in the US.

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- **Historical Overview**
  - Idea that convulsions could be beneficial for mental illness dates back to Hippocrates
  - 1500s: Paracelsus induces seizures using camphor orally to treat psychiatric illness
  - Meduna (1934) injected camphor I.M.
    - Seizures were of some benefit for catatonic schizophrenia
    - Considered start of modern era of Convulsive Therapy
  - Cerletti & Bini (1938)
    - First to apply current to head to produce a seizure.
  - **1940: ECT introduced to the US (Treat schizophrenia)**
  - 1940: Curare developed for use as muscle relaxant for ECT
  - 1951: Succinylcholine (Anectine) Introduced as muscle relaxant (replaced Curare)

Curare Blow Darts in the Amazon

Famous People Who Have Had ECT

- Dick Cavett, American television talk show host
- Clementine Churchill, wife of Sir Winston Churchill
- Paulo Coelho, author of *The Alchemist*
- Thomas Eagleton, US senator and vice presidential candidate (1972)
- Carrie Fisher, American actress and novelist
- Judy Garland, Singer, dancer, actress.
- Ernest Hemingway, American Pulitzer Prize–winning novelist
- Tammy Wynette, country singer

Famous People Who Have Had ECT

- Vladimir Horowitz, Russian-American classical pianist
- Vivien Leigh, English actress and second wife of Laurence Olivier
- Oscar Levant, American pianist, composer,
- Sylvia Plath, American writer/poet (Bell Jar)
- Yves Saint-Laurent, French fashion designer
- Kitty Dukakis, wife of Michael Dukakis, Mass. Gov. and Presidential candidate.

Electroconvulsive Therapy

- Historical Overview
  - Anesthesia
    - Without Anesthesia there were bone fractures
    - Physical and Mental Discomfort
    - 1940 Curare was used as muscle relaxant
      - Patient totally paralyzed
    - 1950s Short Acting Barbiturates allow rapid induction of sedation and amnesia for procedure

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- **Mechanisms of Action**
  - No One Really Knows for Sure!
- **Proposed Theories: Old/refuted**
  - Psychodynamic
    - Fulfilled need for punishment
    - Regression to a more infantile state
  - Placebo Effect
  - Amnesia- Erased “bad Memories”

Electroconvulsive Therapy

- Mechanisms of Action: Current Thoughts
  - Seizure as Curative Agent
  - ECT causes neurochemical changes
    - Alters concentration of norepinephrine and serotonin
    - Neuroendocrine release
    - Anticonvulsant effects (GABA? , endogenous opioids)
    - Changes in functional connectivity

Electroconvulsive Therapy

Timing of ECT

- Studies have shown it should not be reserved as a treatment of last resort.
  - Delaying its use may:
    - Deprive patients of an effective treatment
    - Delay response and thus prolong suffering
    - Possibly contribute to treatment resistance

- Speed and efficacy are factors that influence its use. So, consider early in cases of:
- Severe major depression with psychotic features
- Catatonia

Electroconvulsive Therapy

- Indications
  - A. Major Depressive Disorder
    - Fastest and most effective treatment
    - Consider if individual has:
      - failed medication trials
      - Has not tolerated medications
      - Severe or psychotic symptoms
      - Acute suicidal or homicidal ideation/plans
      - Marked symptoms of agitation or stupor
      - Only 60-70% respond fully to antidepressants
      - Up to 70% who do not respond to medications, do respond to ECT
      - 80-90% of US use of ECT is for major depression

Electroconvulsive Therapy

- Indications (continued)
  - B. Bipolar Disorder
    - Mania - 80% response, even for those not responsive to medications
      - At least equal to lithium in treatment of Manic episodes. But, due to excellent response of medications, ECT is reserved for limited use.
      - Note : Do not use ECT in a patient taking Lithium
        - chance of reduced seizure threshold and
        - a prolonged seizure and
        - May predispose to delirium
    - Bipolar Depression: tend to show more rapid improvement with ECT than do people with unipolar depression.

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- **Indications (continued)**
  - C. **Schizophrenia**
    - Nor typically a first option due to use of antipsychotic medications where were found to be as useful as ECT
    - May be indicated in combination with antipsychotic medications:
      - With a past history of a positive response to ECT,
      - Symptoms have not responded to antipsychotic medications (including Clozapine)
      - Symptoms are extremely severe (danger to self or others) driven by delusions or hallucinations
      - Only 5-10% improve significantly
    - In US only 5-10% receive ECT for this disorder

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- Indications (continued)
  - D. Catatonia
    - Characterized by waxy flexibility, Mutism, negativism, and, echopraxia and echolalia.
    - Usually noted in advanced primary mood or psychotic illnesses.
    - In in-patients with catatonia, 25-50% are related to mood disorders (e.g., major depressive episode, recurrent with catatonic features) and approximately 10% are associated with schizophrenia.
    - May also in some cases be due to a general medical condition

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- **Indications (continued)**
  - **E. Depressed suicidal pregnant women**
    - **Those unable to take medication**
  - **F. Geriatric and medically ill individuals who cannot take antidepressant drugs safely**

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NOT indicated for:

- Personality Disorders,
- Somatic symptom and related disorders, and
- Anxiety Disorders

Electroconvulsive Therapy

- Contraindications
  - No Absolute Contraindications
- Relative Contraindications
  - Cardiovascular Conditions
    - Recent M.I. (risk decreases by 2 weeks and more so by 3 months
    - Aneurysms
    - Arrhythmias
  - Cerebrovascular Conditions
    - Increased Intracranial Pressure (CNS lesions)
    - Recent strokes
  - Other
    - Pregnancy: ECT has NO effect on fetus; can cause gastric reflux in last trimester. (No need for fetal monitoring unless high risk pregnancy)

Electroconvulsive Therapy

- **Pretreatment Evaluation**
  - Psychiatric /MSE Examination (including past response to ECT and other treatments
  - Complete medical history and Physical examination.
  - Neurologic examination
  - Dental exam for elderly, or those with poor dental care.
  - Lab Tests
    - CBC
    - Blood Chemistry panel
    - Urine analysis
  - Assure all medical conditions are treated as well as possible, prior to starting ECT.
  - ECG for those > 40 years
  - ECT consultation (CA state requirement) Should be done by the attending psychiatrist administering the ECT
  - Anesthesia Evaluation (Including any effects of prior anesthesia)

Electroconvulsive Therapy

- **Pretreatment Evaluation (continued)**
  - Review all current medications
  - Spinal X-Ray (some centers do not do this) if indicated
  - CT or MRI recommended if seizure disorder or space occupying lesion suspected. (Procedure should be done only by expert)
  - **Informed Consent**
  - **Situations where additional consults may be warranted**
    - Pregnancy
    - Serious cardiac, or pulmonary disease.
    - Recent myocardial infection (within last 6 months)

Electroconvulsive Therapy

- Consent for Electroconvulsive Therapy
  Informed Consent
  - Discussion concerning ECT must be documented in the patient's records.
  - Cover information about what is being treated as well as risks/benefits
  - Be sure patient (or legal surrogate) is capable of understanding they are consenting to ECT
  - Must consent without coercion.
  - Consent includes the number of treatments or for maintenance ECT
  - In CA even with a voluntary, consenting patient, it is required that three (3) physicians must agree that ECT is indicated.
  - If at any time a patent expresses reluctance to continue they should be reminded of the right to accept or refuse treatment and to withdraw consent for future treatments at any time.

  - If patient is felt not to have the capacity to consent to treatment, psychiatrist must go to court to obtain court approval for treatment. The judge then determines if the patient is or is not competent to refuse the treatment.

  - Note: In CA State Hospitals the following is required:
    - Must go to Superior Court, and get approval from a judge, even if patient has the capacity to make a decision.
    - Aside from the requesting doctor, need 2 consultants to agree ECT is best treatment

Electroconvulsive Therapy

- **Pretreatment Management of the ECT Patient**
- **Psychiatric and Medical Drugs to assess prior to treatment.**
  - 1. Must assess how drugs might affect seizure threshold (positively or negatively)
  - 2. Most antidepressants are OK
  - 3. MAOIs: should be stopped (phenelzine)
  - 4. Antipsychotics are OK
  - 5. Clozapine: Should be stopped, as 16% of patients have increased seizure duration; also higher risk of spontaneous seizures post treatment.
  - 6. Benzodiazepines should be stopped due to anticonvulsant activity
  - 7. Lithium: stopped as it can prolong seizure activity, prolongs succinylcholine
  - 8. Reserpine is contraindicated as it can compromise the respiratory and cardiovascular system during ECT. (Note: no longer available in US)
  - 9. Lidocaine contraindicated during ECT as it markedly increases the seizure threshold
  - Theophylline contraindicated as it increased duration of seizures
  - L-dopa withheld till after treatment to decrease chance of delirium

Electroconvulsive Therapy

- **Pretreatment Management of the ECT Patient**
  - NPO for 6 hours before treatment
  - Just before treatment an IV line should be inserted
  - Bite block inserted prior to treatment to protect teeth during procedure
  - 100% oxygen is administered at 5 Liters / minute during the procedure by anesthesiologist **(hyperventilated)**
  - Emergency equipment for establishing an airway must be immediately available in case it is needed.

Electroconvulsive Therapy

- **Pretreatment Management of the ECT Patient**
  - **Muscarinic Anticholinergic Drugs**
    - Administered IV just before the treatment to:
      - minimize oral and respiratory secretions and
      - Prevent bradycardia and asystole.
      - Meds utilized: Atropine typically
  - **General Anesthesia**
    - Depth of anesthesia kept as light as possible to avoid elevating seizure threshold

Electroconvulsive Therapy

- Practical Management of the ECT Patient
  - 1. Anesthesia During ECT
    - Methohexital (Brevital): (Barbiturate) (given IV)
      - rapid induction
      - Short Duration of Action with amnesia
      - Low incidence of postictal arrhythmias
      - Of interest is that it lowers the seizure threshold, (i.e., thus very useful for ECT)
      - Note: Propofol (Diprivan) is an alternative but has more potent anticonvulsant activity and can thus reduce seizure

Electroconvulsive Therapy

- **Practical Management of the ECT Patient**
  - **2. Muscle Relaxation During ECT**
    - **Succinylcholine (Anectine) (Paralyzing agent)**
      - **Given IV about 1 minute after Brevital administered (Why not give it first?)**
      - **Rapid onset: Max. effect 3-5 min.**
      - **Effect ends rapidly: 3-5 min (1/2 life: 47 seconds)**
      - **Must breathe for the patient**
      - **Minimizes risk of fractures**

Note: In the rare case of a patient with pseudocholinesterase deficiency, the metabolism of succinylcholine is disrupted and prolonged apnea may necessitate emergency airway management.

Electroconvulsive Therapy

- Practical Management of the ECT Patient
  - 3. Seizure Induction
    - Unilateral (R) or bilateral placement
    - Must obtain generalized seizure > 25 seconds
  - 4. Placement of electrodes
    - A. Bilateral
      - Best if more rapid response needed:
        - Acutely suicidal patient
        - Catatonic patient refusing to eat, or
        - Prior positive response to bilateral placement
      - May work when unilateral treatment unsuccessful.

Electroconvulsive Therapy

- **Practical Management of the ECT Patient**
  - **4. Placement of electrodes**
    - **B. Unilateral (Placement of choice due to:**
      - **Less cognitive adverse effects in first week or weeks after treatment .**
        - **This difference is usually absent by 2-6 months after treatment**
      - **Used routinely in:**
        - **Elderly**
        - **Patients with dementia**
        - **Patients severely confused in prior treatments**
        - **Patients concerned about memory function.**

Electroconvulsive Therapy

- Practical Management of the ECT Patient
  - 5. Number and Spacing of Treatments
    - Typically done 2-3 times per week (M/W/F)
    - Twice weekly treatments have less memory loss, but longer time to achieve similar beneficial result
    - Major Depressive Disorder typically 6-12 treatments
    - Manic: 8-20 treatments
    - Schizophrenia: 15+ treatments
    - Catatonia: 1-4 treatments
    - All treatment continued till patient achieves full therapeutic response
    - Maximal improvement is felt to be when a patient fails to continue to improve after 2 consecutive treatments

Electroconvulsive Therapy

- **Practical Management of the ECT Patient**
  - **6. Continuation and Maintenance Treatment**
    - Short-term ECT induces a remission but does not in itself prevent a relapse
      - Post ECT treatment is usually pharmacologic
    - A. Continuation ECT: is the practice of providing a single ECT treatment, at an interval of one to eight weeks, up to six months after remission. Continuation and maintenance ECT are usually provided on an outpatient basis to prevent relapse or recurrence of the mood or psychotic episode that prompted the acute course of ECT

Electroconvulsive Therapy

- Practical Management of the ECT Patient
  - 6. Continuation and Maintenance Treatment.

    - B. Maintenance ECT: ECT which is given beyond continuation ECT.
      - Indications:
        - Rapid relapse after initial ECT treatment
        - Severe symptoms
        - Psychotic symptoms
        - Inability to tolerate medications or lack or response
      - Timing: weekly, biweekly or monthly

Electroconvulsive Therapy

- **Practical Management of the ECT Patient**
  - **7. Complications of ECT**
    - **A. Mortality:** The mortality rate of ECT is at most **2 -4 deaths per 100,000 treatments**, making it one of the safest procedures performed under general anesthesia.
      - Note these numbers compare favorably with general anesthesia and childbirth.
      - Those who die typically already have a cardiac condition.
      - Longitudinal studies have shown mortality rates following hospitalization are lower among depressed patients who received ECT than among patients receiving other treatment modalities or no treatment

Electroconvulsive Therapy

- Practical Management of the ECT Patient
  - 7. Complications of ECT
    - B. CNS Effects
      - 1. Confusion (Acute Post Treatment)
        - 10% of patients for 15-30 min after the treatment.
        - Delirium while patient coming out of the anesthesia.
          - Greater incidence with bilateral ECT
          - Greater with preexisting neurologic disorders

Electroconvulsive Therapy

- Practical Management of the ECT Patient
  - 7. Complications of ECT
    - B. CNS Effects
      - 2. Memory Loss:
        - 75% of patients say this is worst adverse effect.
        - Almost all patients are back to cognitive baseline within 6 months.
        - For those who complain memory not back to normal it typically is for memories just before and around the treatment
        - It appears that those who do not respond to ECT tend to have more memory complaints
        - Despite memory complaints studies have shown no brain damage from ECT.
        - Increased risk with Bilateral Placement use.

Electroconvulsive Therapy

- Practical Management of the ECT Patient
  - 7. Complications of ECT
    - B. CNS Effects
      - 2. Memory Loss:

a. Anterograde Amnesia:

- Disrupted learning and rapid forgetting of new verbal and/or visuospatial information which tends to resolve within a week to a few months
- May last 2-6 months

b. Retrograde Amnesia: forgetting recent memories

- May include difficulties in recalling personal (autobiographical) and public information and which is greatest in magnitude immediately after completion of an ECT course .
- Most anxiety producing cognitive effect of ECT.
- Worst for events occurring during ECT course and weeks to months before that
- Effects knowledge of public and world events > knowledge of self.
- May disturb memory for event from 6 mos. –2 years. (For some, memory never fully returns). This finding is extremely rare and warrants exploration of other causes for the cognitive decline.

Electroconvulsive Therapy

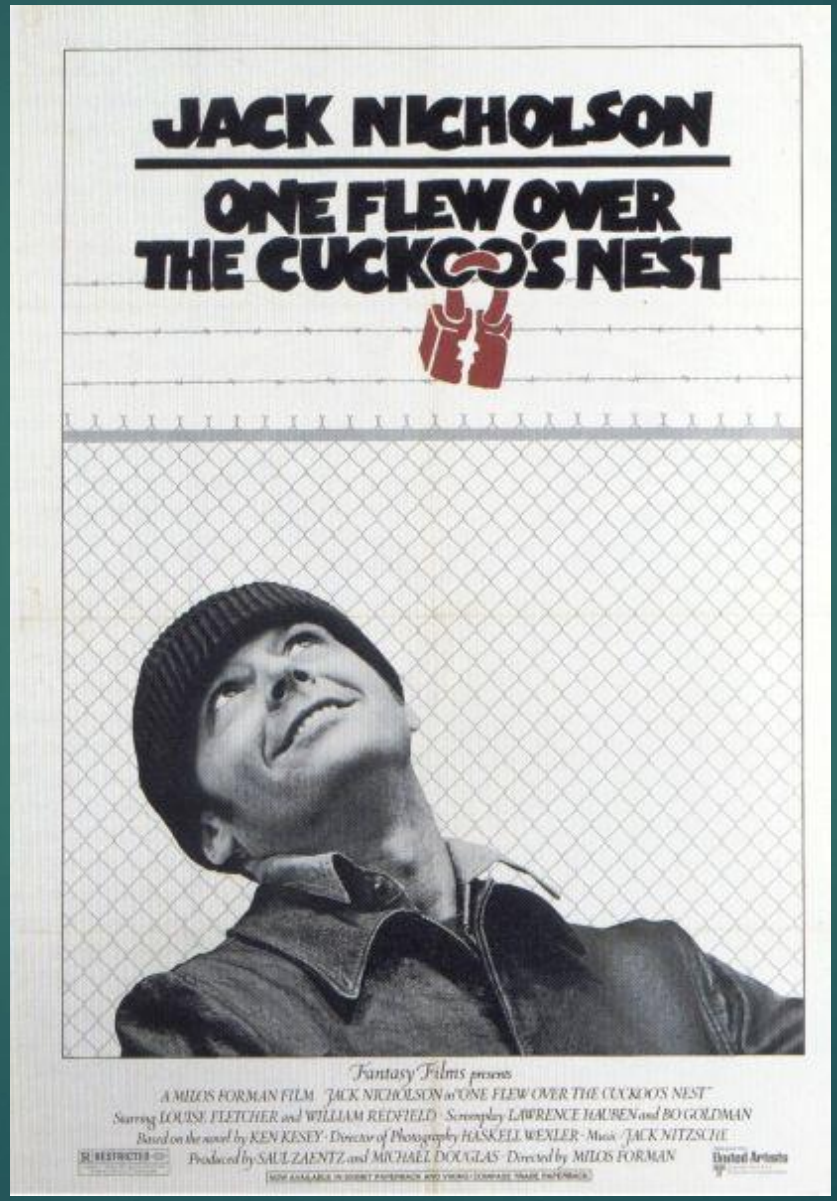
- Practical Management of the ECT Patient
  - 7. Complications of ECT
    - C. Delirium
      - Appears more often in elderly or with
      - Preexisting dementia or
      - Higher incidence with bilateral treatment

ECT

Now you have the knowledge.

However this is what Hollywood makes you believe is really happening .

Hollywood & ECT



What is wrong with this picture?

Depicted as Behavioral Control

What is right??

What problem does this nurse face?

No Anesthesia

No anesthesiologist

No informed consent

No Exam

No IV,

No oxygen

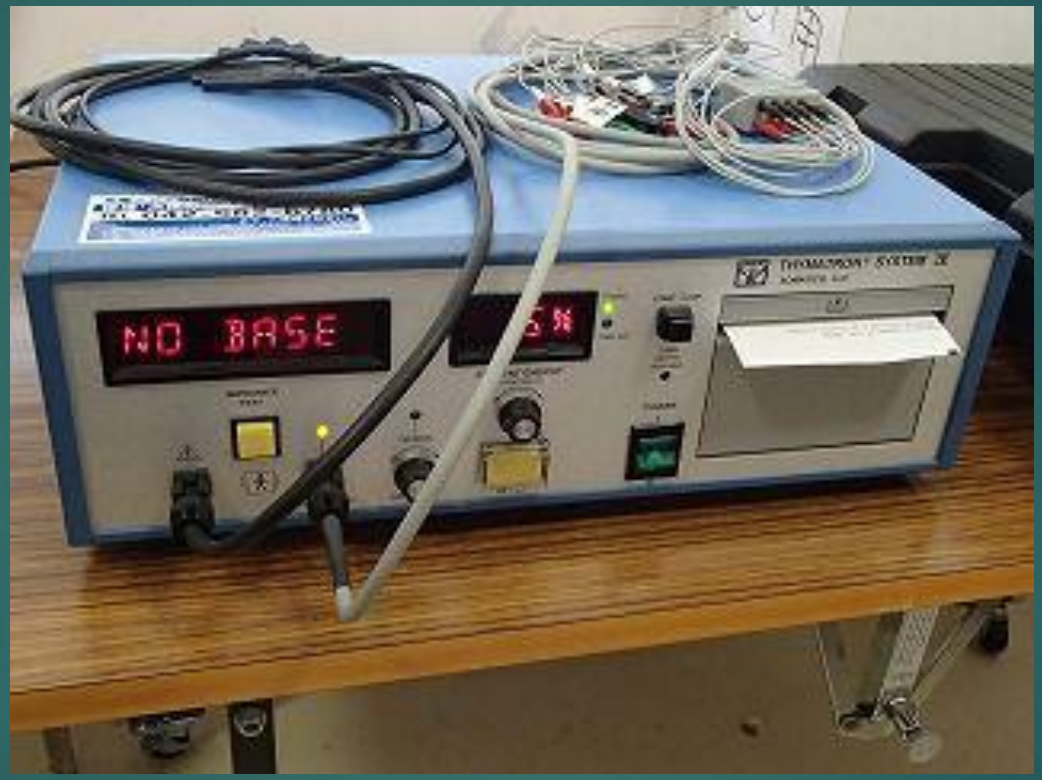
No indication for its use..


VOLUME 237
ORIGINAL MOTION PICTURE SOUNDTRACKS
INTRADA SPECIAL COLLECTION
SHOCK TREATMENT
COMPOSED AND CONDUCTED BY
JERRY GOLDSMITH

1964
Movie

What is ECT really Like?

ECT Equipment



A Very Well Controlled Procedure: Anesthesiologist, EEG, oxygen saturation monitoring, Ventilation, IV line, BP monitoring, etc.

Right Unipolar Electrode Placement

Video Clips

(A comparison)

"One Flew Over the Cuckoo's Nest" (1.1)

vs.

Current ECT Treatment

1.1 (14.20) +

1.2

Transcranial Magnetic Stimulation

An Alternative to Traditional ECT

Transcranial Magnetic Stimulation

Transcranial Magnetic Stimulation (TMS)

- **Advantages of TMS vs. ECT**
- 1. No anesthesia
- 2. No seizure
- 3. Come and go on your own. Able to drive.
- 4. No preop medication
- 5. No amnesia
- 6. Very relaxing environment
- **Disadvantages of TMS vs. ECT**
- 1. Not nearly as effective (At best ~50% as effective)
- 2. More sessions needed (~30) (5 days/week)
- 3. Some reports say barely better than placebo/sham
- 4. Some patients report scalp discomfort or headache
- 5. Rarely an unintended seizure occurs.

Investigational Psychedelic Drugs

Investigational Psychedelic Drugs

1. Psilocybin: Magic Mushrooms

   Being assessed as treatment for depression and cancer related stress and forms of addiction. One study found it showed promise in depression if used in conjunction with psychological support. Another recent small study found it helped those with cancer to have relief of major depression in 50% of cases.

2. LSD (Acid) : Studied as treatment for depression, cancer related distress and addiction. Small study of 12 people found it decreased anxiety somewhat regarding having cancer. Other studies show it may have value in treating alcohol use disorder.

3. MDMA (Ecstasy" or "molly") is a stimulant and hallucinogen Now being looked at as a treatment for PTSD. (Please note: Recently the FDA turned down the application for use of MDMA as a treatment for PTSD)

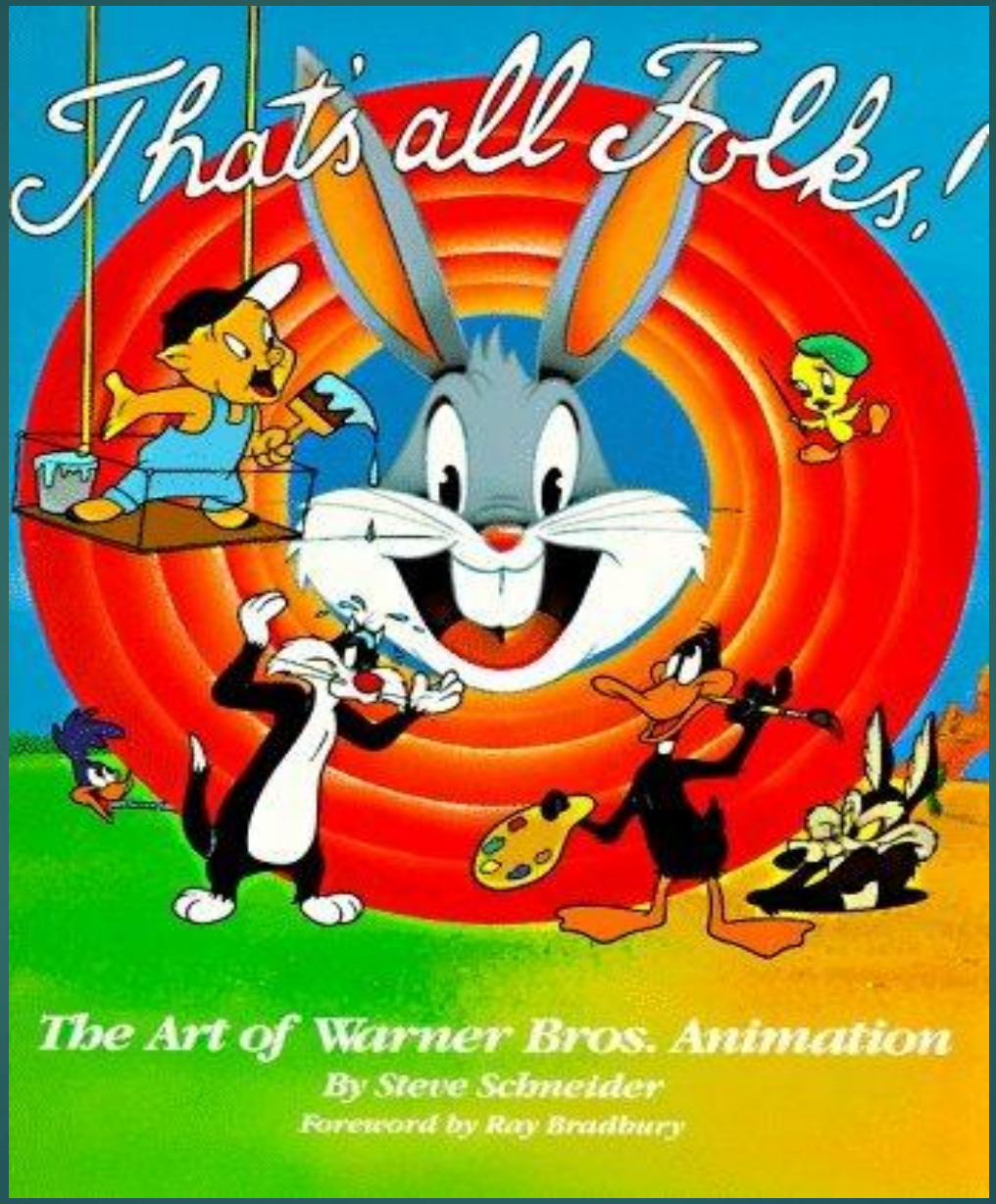
4. Mescaline (Peyote) : Being investigated as treatment for depression, anxiety, etc.

Final Thoughts:

A. Researchers say more extensive, rigorous studies need to be done before psychedelic drugs can be considered a mainstream therapy.

B. Although studies are showing some positive results, there are still many unknowns, such as the ways these drugs will be administered if they become FDA-approved.

C. Do no harm!!


That's all Folks!
The Art of Warner Bros. Animation
By Steve Schneider
Foreword by Ray Bradbury