

# ECT May Cause Three Types of Memory Disturbance

## ■ Acute Confusional State

- Lasting up to an hour after each treatment and varies with age
- Consequence of both the seizure and the anesthetic agents

## ■ Retrograde Amnesia

- Affects memories of events from the period of illness and treatment
- Greater for public events than for personal information
- A small subset of patients will complain of more severe symptoms not matched by objective cognitive testing

## ■ Anterograde Amnesia

- Anterograde amnesia refers to the impairment in retaining new memories after ECT
- This deficit typically resolves within 1 to 3 weeks after a course of ECT

*1,250 Electroconvulsive Treatments without  
Evidence of Brain Injury*

# Technique

- Bilateral ECT remains the “gold standard”
  - Associated with more short-term and long-term cognitive side effects than right-unilateral ECT
- Historical debate as to the relative effectiveness of unilateral vs. bilateral ECT
  - Literature confounded by less-than-optimal electrode placement or dosing strategies for unilateral ECT

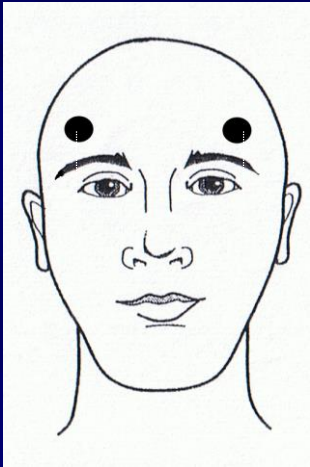


Thymatron

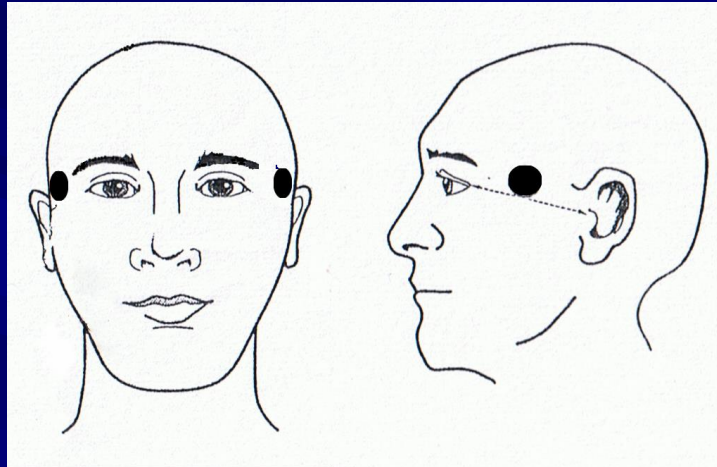


Mecta Spectra 5000

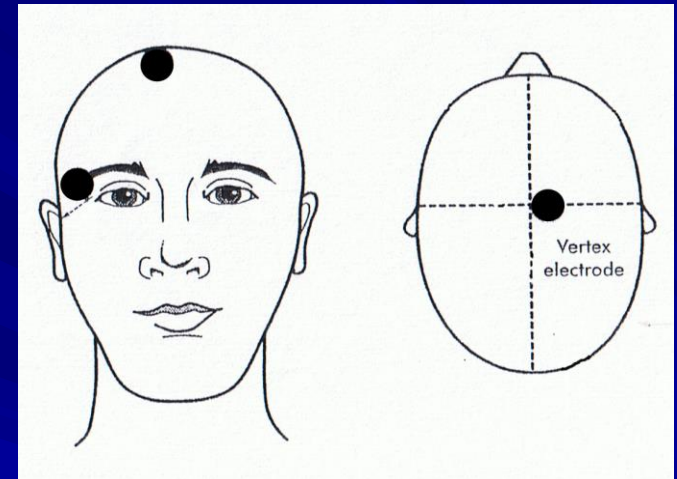
# Electrode Placement



Bi-Frontal



Bi-Temporal



Right Unilateral

# Drugs for Anesthesia

## ■ Anesthetic Agents

- Rapid onset of action and short duration preferable
- Methohexital (*0.75 – 1 mg/kg*)
  - Short-acting barbiturate
  - Most commonly used
  - Low anticonvulsant effect
  - Low cost
- Thiopental (*2 – 5 mg/kg*)
  - Greater risk of cardiac side effects
- Ketamine (*0.5 – 1 mg/kg*)
  - Proconvulsant
  - Tends to worsen ECT induced HR and BP changes
- Propofol (*2 – 3 mg/kg*)
  - Anticonvulsant effects
- Etomidate (*0.2 – 0.3 mg/kg*)
  - Few cardiac effects

## ■ Muscle Relaxants

- Succinylcholine (*0.5 – 1.5 mg/kg*)
  - Depolarizing agent - leads to visible fasciculations
  - Rapid onset (1- 2 minutes)
  - Duration of action less than 10 minutes
  - Easy to use and low cost
  - Agent of choice

## ■ Anticholinergics

- Used to blunt asystole associated with electrical shock and to control excessive salivation
- Atropine (*0.4 – 1 mg*)
  - Centrally acting leading to CNS effects
- Glycopyrrolate (*0.1 – 0.4 mg*)
  - Peripherally acting

# Technique

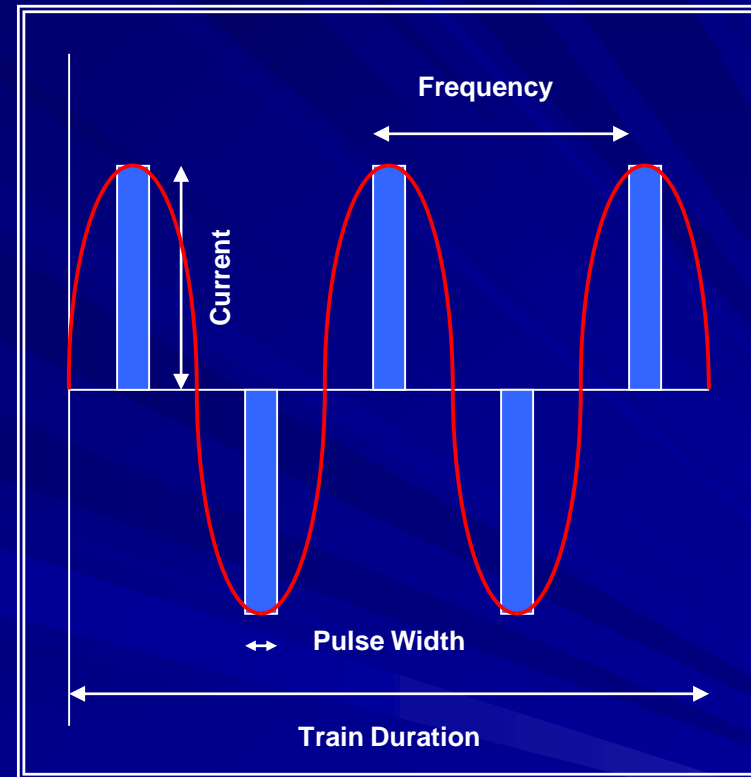
- For many years, it was assumed that all seizures were equally efficacious
- Stimulus dose affects efficacy
  - Especially in RUL ECT
  - The degree to which stimulus intensity exceeds seizure threshold, and not the absolute stimulus dose administered, is critical in determining outcome

# Technique

- Changes in seizure threshold occur in less than 20% of patients during the treatment course
- Seizure should be monitored during every treatment
  - Motor and EEG
- Stimulus dosing must be adjusted when an inadequate seizure is induced

# Stimulus and Dosing Recommendations

- Constant Current
- Waveform
  - Brief-pulse
    - Sine-wave considered obsolete
- Dose
  - Maximum Outputs in USA limited to 504-576 mC
    - Higher in rest of the world
  - Bitemporal/Bifrontal
    - Minimally Dose Sensitive
  - Unilateral
    - Strong dose-response relationship



*Parameters in a bidirectional brief pulse stimulation  
(overlapping sine-wave)*



# Treatment

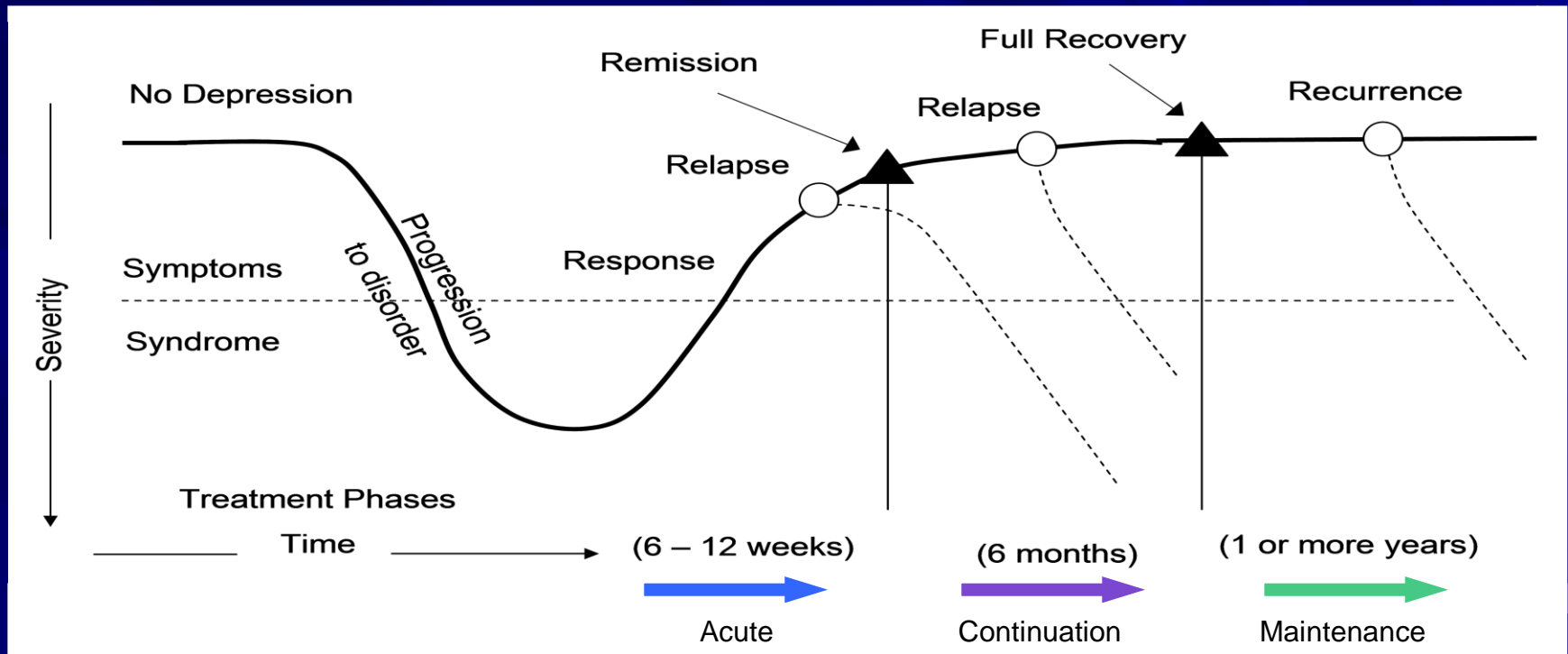
## Number of Treatments

- No fixed number of treatments in a “Course”
- 6-12 treatments are *usually* needed for a response to occur
- Treat until the patient is well
  - Or no further improvement over two treatments
- Continuation treatment is necessary

## Twice a week ECT

- An effective schedule
- Therapeutic outcome not different from three times a week ECT
- Slower onset of action
- Less cognitive effects
- ECT three times a week specifically indicated when early onset of clinical effect is of primary importance

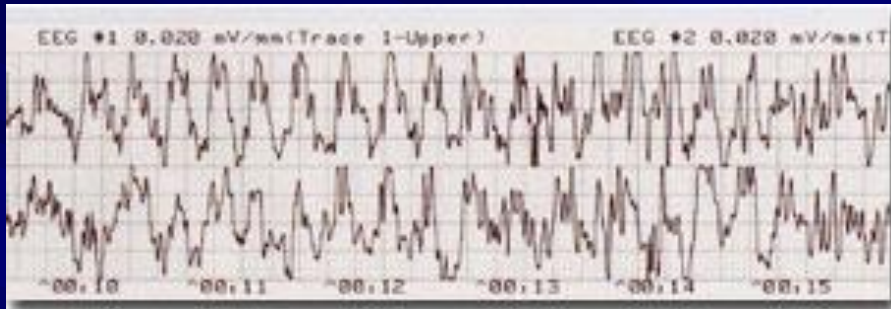
# Three Phases of Treatment



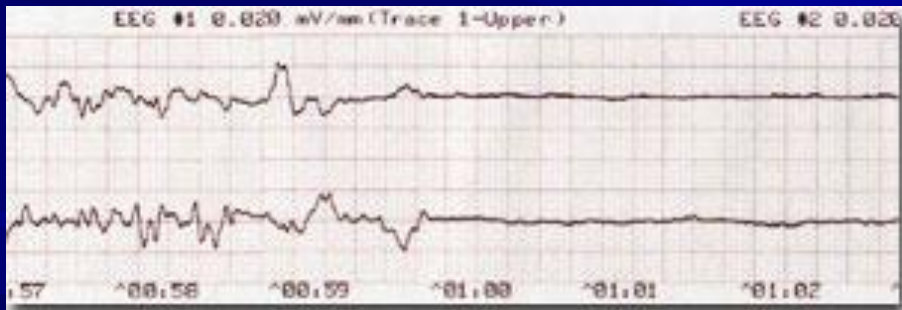
- Continuation treatment is necessary to sustain remission
- Relapse rates after ECT
  - Placebo: 84%
  - Nortriptyline: 60%; Nortriptyline and Lithium: 32 – 39%
  - Continuation ECT: 32%

# EEG Monitoring

Beginning of Seizure



End of Seizure



- Post-ictal suppression
  - The fall in EEG amplitude at the end of the seizure
  - Has emerged as the only significant predictor of therapeutic outcome
- Seizure duration *per se* does not correlate with ECT outcome
  - Although seizures greater than 25 seconds are associated with better outcomes

# Pre-ECT Evaluation

- No “routine” pre-ECT medical evaluation should be required for all patients
- Detailed physical exam and neurological exam
  - Assess for presence of medical conditions or medications that increase risk of procedure
  - A collaborative approach between the ECT psychiatrist, medical consultants, and anesthesia providers is more meaningful than simply asking for “clearance” before ECT
  - Recommendations should be sought to optimize the patient’s medical status and/or to modify the treatment procedure to minimize medical risk

# Pre-ECT Evaluation

- Spine x-rays are not routinely required
- EEG or neuroimaging should be considered when other clinical information suggests that a relevant neurological disorder might be present
- The pre-ECT evaluation should document
  - Cognitive status
    - Evaluation of orientation and memory
    - More detailed neuropsychological assessment is useful in patients with pre-existing cognitive impairment or dementia
  - Capacity to engage in an informed consent process

# Informed Consent

- Full explanation of procedure in layman's terms
- Presentation of risks and potential benefits of treatment offered and alternatives
- Statement that patient may withdraw consent at any time and for any reason
- Patient and family are fully informed
- Written valid informed consent is signed
  - By patient
  - “Significant family member”
- Consent should be obtained before the beginning of each phase of treatment and periodically afterwards

# Informed Consent

- Ideally patient and family can see an ECT video
  - For education and unambiguous documentation of information presented

## Informed ECT for Patients and Families

with



**Dr. Max Fink**

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# Mechanism of Action

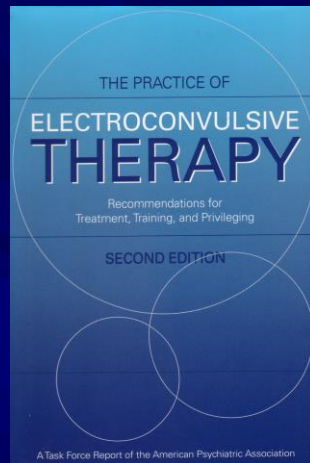
- Still largely unknown
- Two demonstrated neurobiological effects are the basis for interest
  - Hypercortisolemia
    - Accompanies melancholia and catatonia
      - Melancholia responsive to ECT > 90%
    - Reverses with effective ECT
    - Demonstrated using the Dexamethasone Suppression Test (DST) or Dexamethasone-CRH Test
      - Normal DST follows remission
      - Abnormal DST predicts relapse
  - Anatomic changes in animal trials using ECS
    - Neuronal sprouting without cell loss
    - Enhanced neurogenesis in the dentate gyrus



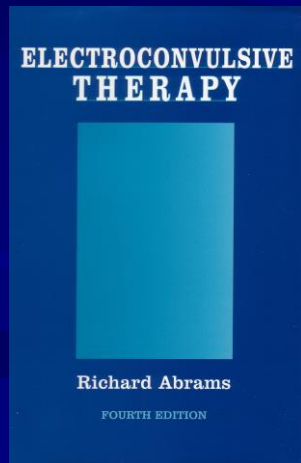
# ECT in Britain: *A Shameful State of Affairs*

*“If ECT is ever legislated against or falls into disuse it will not be because it is an ineffective or dangerous treatment; it will be because psychiatrists have failed to supervise and monitor its use adequately. It is not ECT which has brought psychiatry into disrepute. Psychiatry has done just that for ECT.”*

# Reference Texts



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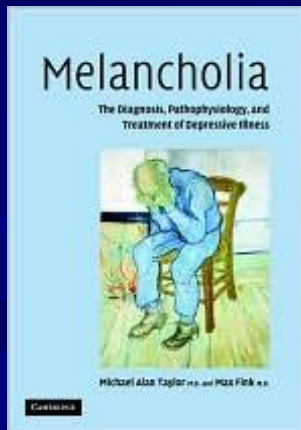
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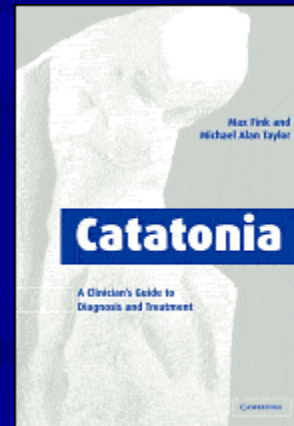
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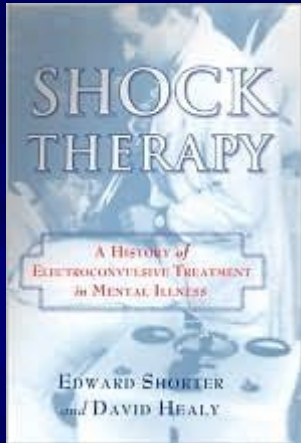


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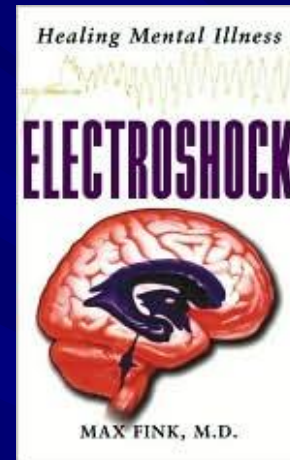


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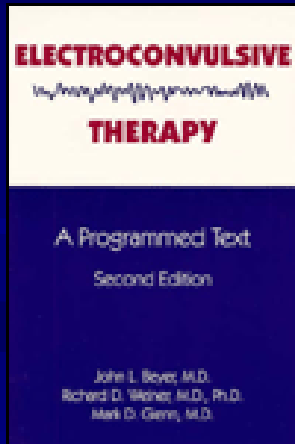
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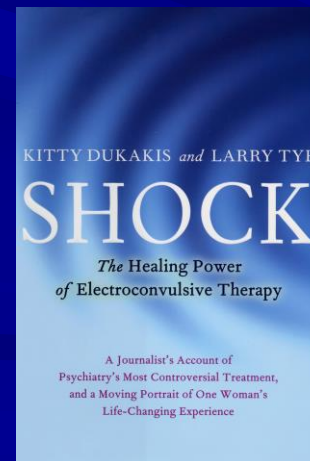
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# Posttest Question 1

ECT has demonstrated efficacy in the treatment of:

- A. Depressive Episodes
- B. Manic Episodes
- C. Catatonia
- D. Acute Psychotic Episodes
- E. All of the above

## Posttest Question 2

Methohexital is the preferred anesthetic agent for ECT because:

- A. It is relatively inexpensive
- B. It is only moderately anticonvulsant
- C. It has quick onset of action
- D. It has brief duration of action
- E. All of the above

## Posttest Question 3

Which best describes the role of the medical consultant in the pre-ECT evaluation?

- A. To provide clearance to undergo ECT
- B. To help optimize the patient's medical condition prior to ECT
- C. To tell the psychiatrist if ECT is appropriate for the patient
- D. To identify contraindications to ECT

# Posttest Question 4

Which is NOT true concerning the seizure during ECT?

- A. Should be monitored with EEG
- B. Should be monitored with EMG
- C. Cumulative seizure length during a course of ECT is closely correlated with clinical outcome
- D. Failure to elicit a seizure is associated with lack of efficacy
- E. Seizure threshold increases during the treatment course



# Posttest Question 5

Discovery of which of the following medical conditions in a patient being evaluated for ECT is most concerning?

- A. Type II Diabetes
- B. Recent Myocardial Infarction
- C. HIV/AIDS
- D. Psoriasis
- E. Epilepsy

# Posttest Answers

1. E
2. E
3. B
4. C
5. B