

Electroconvulsive Therapy

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Context of ECT

- Oldest biological treatment in psychiatry in continuous use
- Usage varies markedly among countries; world-wide ECT is widely administered
- Highly-regulated legally
- Efficacy and limitations of ECT (relapse and cognitive outcomes) are well characterized

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Indications for ECT

- Treatment Resistance — leading reason for use of ECT is lack of adequate response to alternatives
- Primary Use of ECT is also common
 - Severity of symptomatology (eg, suicidality, psychosis) compel rapid, effective intervention
 - Intolerance of alternative treatments
 - Patient preference
- ECT samples have high representation of chronic, severe, and resistant depression

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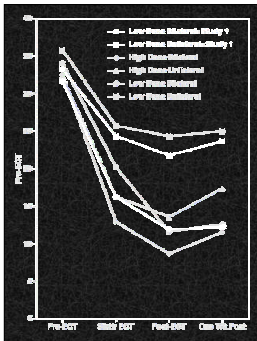
ECT Efficacy in Major Depression

- ECT efficacy unequivocally established:
 - Sham vs. real ECT trials
 - ECT vs. pharmacotherapies
 - Technical modifications of ECT administration
- Short-term efficacy in major depression is profound, and unmatched by any alternative treatment

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Generalized Seizures Can Be Reliably Produced that Lack Efficacy (Study 1 & 2)



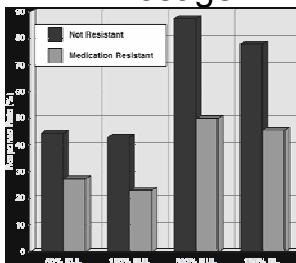
- At low stimulus intensity, RUL ECT lacks efficacy
- Antidepressant effects of RUL ECT increase linearly with dosage relative to ST
- Efficacy of BL ECT can also be undone

Sackeim et al. *Am J Psychiatry* (1987)
Sackeim et al. *N Eng J Med* (1993)

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Electrode Placement and Dosage: Efficacy



Dosage and the Efficacy of RUL ECT

Sackeim et al. *Arch Gen Psychiatry* (2000)

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Response rates are dependent on electrical dosage of RUL ECT

Medication resistance also mediates response

Limitations of ECT: Relapse

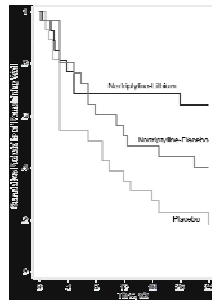
- Durability of benefit
 - Without continuation therapy virtually all patients relapse within 6 months
 - Relapse rate is contingent on the type of pharmacotherapy administered
 - Relapse rates are substantial despite aggressive continuation therapy (ECT or medication)

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Continuation Pharmacotherapy Following ECT

- Nearly all patients on placebo relapsed
- Relapse rate on combined nortriptyline-lithium was ~40%.



Sackeim et al. JAMA 2001.

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Limitations of ECT: Cognitive Side Effects

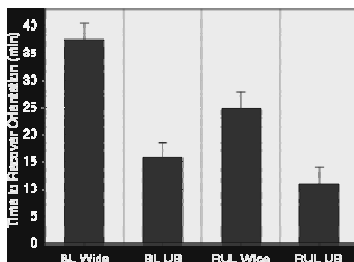
- Cognitive side effects are highly stereotyped and time dependent
- Persistent effects have been demonstrated for memory of the recent past
- Many neuropsychological functions improve following ECT
- Severity and persistence of cognitive effects strongly determined by treatment parameters
- New treatments preserve efficacy and minimize adverse cognitive outcomes

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Disorientation Following Seizure Induction

- Can vary from a few minutes to many hours depending on treatment parameters
- Use of ultra-brief stimulation and right unilateral electrode placement both reduce duration of disorientation

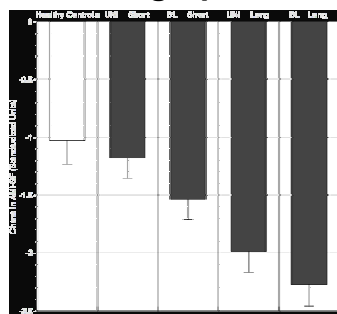


Sackeim et al. *Brain Stimulation*, 2008

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Retrograde Amnesia for Autobiographical Information



- Memory loss for autobiographical information highly sensitive to ECT technique
- No difference between RUL UB group and super normals in memory loss over period of ECT

Sackeim et al. *Brain Stimulation*, 2008

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Long-term Retrograde Amnesia: Ultra-brief Advantage

Effects of pulse width on amnesia maintained through 6-month follow-up

Sackeim et al. *Brain Stimulation*, 2008

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Conclusions

- ECT is reserved for special populations
- Short-term efficacy in major depression is unmatched
- Long-term benefit is problematic, but relapse rates are comparable to alternative treatments
- Cognitive side effects are common but limited in time and scope. Nonetheless, dense memory loss can occur
- Sophistication of treatment technique strongly impacts on benefits and risks

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