

Supplementary Material

S1: Test set of articles

- 1: Lennox, M. A., & Coolidge, J. (1949). Electroencephalographic changes after prefrontal lobotomy. *Archives of Neurology & Psychiatry*, 62(2), 150.
<https://doi.org/10.1001/archneurpsyc.1949.02310140027002>
- 2: Krueger, E. G., & Loewenberg Wayne, H. (1952). Clinical and electroencephalographic effects of prefrontal lobotomy and topectomy in chronic psychoses. *A.M.A. Archives of Neurology and Psychiatry*, 67(5), 661–670. Retrieved from <http://www.ncbi.nlm.nih.gov/pubmed/14914248>
- 3: Klotz, M. (1955). Incidence of seizures, with EEG findings, in prefrontal lobotomy. *A.M.A. Archives of Neurology and Psychiatry*, 74(2), 144–148. Retrieved from <http://www.ncbi.nlm.nih.gov/pubmed/14397890>
- 4: Evans, B. M., Bridges, P. K., & Bartlett, J. R. (1981). Electroencephalographic changes as prognostic indicators after psychosurgery. *Journal of Neurology, Neurosurgery, and Psychiatry*, 44(5), 444–447. Retrieved from <http://www.ncbi.nlm.nih.gov/pubmed/7264694>

S2: Detailed search strategy

Research Question	
<p>Population: Individuals undergoing psychosurgery</p> <p>Intervention: Electroencephalography</p> <p>Effect: Biomarkers and correlates of treatment</p>	<p>What are the electroencephalographic correlates of psychosurgery, and what are potential opportunities in the field?</p>

Searchable Concepts				
Concept 1:	Concept 2:	Concept 3:	Concept 4:	Concept 5:
<p>Psychosurgery (MeSH Term)</p> <p><i>Neurosurgical manipulation of activity or integrity of a neurological structure, to treat a psychiatric disorder</i></p>	<p>Electroencephalography (MeSH Term)</p> <p><i>A method for recording electrical activity in the brain</i></p>	<p>Biomarker (MeSH Term)</p> <p><i>A quantifiable biological metric that can be used to: describe, evaluate, or predict a physiological state/condition</i></p>	<p>Evoked potentials</p> <p><i>An electrical potential recorded from the nervous system, which may be time-locked to particular stimulus or event</i></p>	

Synonyms				
Concept 1:	Concept 2:	Concept 3:	Concept 4:	Concept 5:
<p>Psychiatric neurosurgery, deep brain stimulation, capsulotomy, lobotomy, topectomy, cingulotomy</p>	<p>EEG, Brain Wave (MeSH Term), oscillations, electrical activity, electrophysiology, psychophysiology</p>	<p>Biological marker, biological indicator, neurological correlate, neurofeedback</p>	<p>Event-related potential, contingent negative variation, error-related negativity, N100, P300</p>	

<p>tractotomy, thalamotomy, orbital undercutting</p>				
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<p style="text-align: center;">Information Sources and Search Limits</p>				
<p>Core Databases:</p> <ul style="list-style-type: none"> • Ovid MEDLINE® (1946 – Present, Epub Ahead of Print, In-Process & Other Non-Indexed Citations, and Daily) • Embase • PsycINFO 	<p>Grey Literature Sources:</p> <ul style="list-style-type: none"> • Clinical trial records (ClinicalTrials.gov, WHO International Clinical Trials Registry Platform, and the Cochrane Central Register of Controlled Trials) • Conference proceedings (Scopus “Conference Papers” documents, Web of Science: Core Collection, and proceedings from the American Society for Stereotactic and Functional Neurosurgery (ASSFN) and World Society for Stereotactic and Functional Neurosurgery (WSSFN) conferences) • Theses and dissertations (ProQuest Dissertations & Theses Global) • Government documents (Custom Google Search and Publications Canada) • Corporate reports (BIOPAC, NeuroScan, and Advanced Brain Monitoring websites) • Newspapers and magazines (ProQuest) • Practice guidelines from the ASSFN and WSSFN 			

Limits:

- Human studies only → The goal of this review is to explore the electroencephalographic correlates of psychosurgery and future opportunities in humans only, and so animal studies were excluded
- No reviews → The focus of this literature review is primary research, and so review articles were excluded (except for occasional pearl growing and reference tracking)
- English language, or English translation available → Although this may have produced some bias in findings, resource limitations necessitated that only studies in English, or with a translation readily available, were reviewed

Supplementary Search Techniques

- Reference tracking → Examining the cited works for key studies relevant to the research question
- Citation tracking → Searching for articles that have cited known, key studies relevant to the research question
- Database alerts → Setting up an alert on popular databases for a particular search, to be automatically notified of new records
- Journal browsing → Scanning relevant journals, and/or journals in which multiple relevant studies have been found, for potential articles to include

Search phrases:

MEDLINE: Epub Ahead of Print, In-Process & Other Non-Indexed Citations, Ovid MEDLINE® Daily and Ovid MEDLINE® (1946-present): (electroencephalography (MeSH) OR brain waves (MeSH) OR electrocorticography (MeSH) or electroencephalography phase synchronization (MeSH) OR evoked potentials (MeSH) OR contingent negative variation (MeSH) OR event-related potentials, P300 (MeSH) OR evoked potentials, auditory (MeSH) OR evoked potentials, motor (MeSH) OR evoked potentials, somatosensory (MeSH) OR evoked potentials, visual OR cortical spreading depression (MeSH)) AND (psychosurgery (MeSH) OR capsulotomy OR lobotomy OR tractotomy OR topectomy OR cingulotomy OR thalamotomy OR "orbital undercutting" OR (deep brain stimulation (MeSH) AND (psychiatry (MeSH) OR mental disorders (MeSH))))

- 313 results

Embase + Embase Classic (1947-present): (electroencephalography OR electrocorticography OR stereoelectroencephalography OR evoked response OR nervous system electrophysiology OR evoked cortical response OR motor evoked potential OR sensory evoked potential) AND (psychosurgery OR (brain depth stimulation AND (psychiatry OR mental disease)))

- 259 results

PsycINFO (1806-present): (electroencephalography OR electrophysiology OR alpha rhythm OR beta rhythm OR delta rhythm OR gamma rhythm OR theta rhythm OR p300 OR evoked potentials OR auditory evoked potentials OR contingent negative variation OR mismatch negativity OR olfactory evoked potentials OR p300 OR somatosensory evoked potentials OR visual evoked potentials) AND (psychosurgery OR thalamotomy OR tractotomy OR ((deep brain stimulation OR electrical brain stimulation) AND (psychiatry OR mental disorders)))

- 26 results

S3: Summary of grey literature

Resource	Type of Grey Literature	Search terms	Number of results	Number included
ClinicalTrials.gov	Clinical trials registry	“Psych” (subject heading) AND “electroencephalography”	9	0
WHO International Clinical Trials Registry Platform	Clinical trials registry	electroencephalography, EEG, EEG (Electrophysiology), Electroencephalogram, electroencephalogram (EEG), Electroencephalogram (procedure), Electroencephalogram, EEG abnormalities syndrome AND surgery, Surgically	49 records from 48 trials	1
Cochrane Central Register of Controlled Trials	Clinical trials registry	“electroencephalography” AND “surgery”	7	0
Scopus “Conference Papers” documents	Conference proceedings	(TITLE-ABS-KEY (electroencephalography) AND TITLE-ABS-KEY (psych*) AND TITLE-ABS-KEY (surgery)) AND (LIMIT-TO (DOCTYPE , "cp"))	38	1
ProQuest	Newspapers and Magazines	“electroencephalography” AND “psych*” AND “surgery”	61 (47 newspaper articles, 14 magazine articles)	1 (newspaper article)
BIOPAC website	Corporate reports	“Research” page	12	0
NeuroScan website	Corporate reports	“Research” page	2	1
Advanced Brain Monitoring website	Corporate reports	“Clinical Trials” and “EEG Biomarkers” webpages	2	0
American Society for Stereotactic and Functional Neurosurgery website	Practice guidelines	“Clinical Practice” page	0	0

World Society for Stereotactic and Functional Neurosurgery	Practice guidelines	“Clinical” page	0	0
ProQuest Dissertations & Theses Global	Theses and dissertations	Electroencephalography and (“psychiatric surgery” OR psychosurgery)	88	0