SOMNUS PSYCHOLOGY

(03) 6292 6056

info@somnuspsychology.com.au

250 Macquarie Street, Hobart, 7000, TAS

Brain Stimulation in Depression

Frequently asked questions and evidence summary

Companion handout to "Are We Forgetting Brain Stimulation?" | Chloe Stone, Psychologist | September 2026

Purpose. A concise clinical overview of ECT, rTMS/iTBS and tDCS for depression. Statistics are shown with their study context because response and remission vary with population, protocol and study design. This is an educational resource, not a treatment protocol.

The basics

What is the difference between ECT, rTMS and tDCS?

ECT is performed under anaesthesia and intentionally produces a therapeutic seizure. rTMS uses a magnetic field to induce electrical current in targeted cortex without anaesthesia or a therapeutic seizure. iTBS is a patterned form of TMS that can deliver a session in about three minutes. tDCS applies a weak direct current through scalp electrodes and alters neuronal excitability rather than directly triggering action potentials.

Why is the DLPFC commonly targeted in depression?

The dorsolateral prefrontal cortex is part of distributed cognitive-control and limbic networks implicated in depression. Stimulation is intended to influence these connected networks rather than a single isolated 'depression centre'.

ECT

How effective is ECT for depression?

For Australian practice, the RANZCP describes ECT as a highly effective treatment with a strong evidence base, particularly for severe depressive disorders, and reports studies showing ECT is effective in approximately 70–90% of cases, with especially high success rates in severe depression (RANZCP, 2019). The RANZCP mood-disorders guideline also gives an EBR I recommendation that ECT is safe and effective for more severe depression and should be considered first-line for psychotic depression or when an immediate response is required (RANZCP, 2020).

How many ECT treatments are usually given, and when might benefit appear?

RANZCP guidance states that an acute course generally involves 6–12 treatments, with the number guided by clinical progress rather than a fixed target (RANZCP, 2019). In one study of major depression, improvement after six ECT sessions was strongly informative about eventual response and remission, although some patients improve earlier and others require a longer course (Lin et al., 2016).

What are the main risks of ECT?

ECT deliberately induces a controlled seizure, so accidental seizure risk is not the relevant comparison. Important considerations include anaesthetic risk and cognitive adverse effects. RANZCP notes that anterograde memory generally returns to baseline within about 2–4 weeks, while retrograde effects can persist longer in some people (RANZCP, 2019). A pooled analysis of 766,180 treatments estimated ECT-related mortality at 2.1 per 100,000 treatments (Tørring et al., 2017).

rTMS and iTBS

What response and remission rates are seen with rTMS?

In 29 sham-controlled trials of high-frequency rTMS involving 1,371 participants, response was 29.3% with active treatment versus 10.4% with sham, while remission was 18.6% versus 5.0% after about 13 sessions (Berlim et al., 2014). In an Australian private-hospital cohort receiving 20 sessions over four weeks, response was 54% and remission 28% on the HAMD-17 (Dowling et al., 2020). The larger routine-care figures should not be interpreted as sham-controlled treatment effects.

How long does rTMS take to work?

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A conventional course is commonly 20–30 weekday sessions over 4–6 weeks (Perera et al., 2016). Registry data suggest courses shorter than 30 sessions are associated with less benefit, while some slower responders continue to improve beyond 36 sessions (Hutton et al., 2023). In a large deep-TMS dataset, the median onset of sustained response was 16 sessions, about 21 days, and sustained remission 17 sessions, about 23 days (Tendler et al., 2023).

How different is iTBS from conventional rTMS?

The THREE-D trial randomised 414 adults with treatment-resistant depression and found iTBS non-inferior to conventional 10 Hz rTMS for depressive symptoms. Treatment time was about 3 minutes for 600 iTBS pulses versus 37.5 minutes for 3,000 conventional pulses (Blumberger et al., 2018).

What is the seizure risk with rTMS?

Seizure is the most serious recognised acute adverse event, but it is rare. A survey covering 586,656 clinical rTMS sessions reported 18 seizures, equivalent to 0.31 per 10,000 sessions, or about 1 per 32,600 sessions overall (Taylor et al., 2021). Another survey found fewer than 1 seizure per 60,000 sessions when TMS was delivered within published safety guidelines to people without recognised risk factors (Lerner et al., 2019).

How durable is a successful rTMS response?

Among initial responders in a meta-analysis, 66.5% remained responders at three months, 52.9% at six months and 46.3% at 12 months. Maintenance treatment was associated with better durability at some time points (Senova et al., 2019).

tDCS

How effective is tDCS for depression?

A 2026 individual-patient-data meta-analysis of 1,246 participants found a small active-versus-sham improvement in depressive symptoms (Hedges' d = 0.24) and higher odds of response (OR 1.33). Remission was not significantly different from sham (OR 1.30, 95% CI 0.98–1.74) (Razza et al., 2026). This can coexist with Fregni et al.'s Level A, 'definitely effective', classification because evidence certainty and effect magnitude are different concepts.

What do response rates look like in a home-tDCS trial?

In a 10-week remote randomised trial of 174 adults with major depression, 58.3% receiving active home tDCS met response criteria compared with 37.8% receiving sham (Woodham et al., 2025). The continuous symptom difference was more modest than the headline response percentages, which is why both types of outcome matter.

How long does tDCS take to work?

An individual-participant-data analysis of 576 people found that the active-versus-sham antidepressant effect peaked at approximately six weeks and continued to diverge through ten weeks. The authors concluded that treatment courses lasting at least six weeks may be indicated (Nikolin et al., 2023).

How safe is tDCS, and does it cause seizures?

Conventional tDCS has not shown the same seizure risk as rTMS. A safety update reported no serious adverse effect or irreversible injury across more than 33,200 conventional tDCS sessions within studied parameters (Bikson et al., 2016). A review of 158 repeated-session studies involving 4,130 participants found no increase in adverse-event risk with greater exposure (Nikolin et al., 2018). Common effects are usually mild and transient, including itching, tingling and headache (Brunoni et al., 2011).

Can tDCS be used at home?

Yes, where the device and clinical model are designed for clinician-managed home treatment. Home use should not be confused with DIY stimulation. Clinical models can include assessment, fitting and training, device-controlled protocols, treatment logs, outcome monitoring and a clear pathway for review.

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Putting the numbers in context

Modality	Study context	Response	Remission
ECT	RANZCP Australian guidance	~70–90% effective*	Not specified as one pooled Australian rate
HF-rTMS	29 sham RCTs, n=1,371	29.3% vs 10.4% sham	18.6% vs 5.0%
rTMS	Australian routine care, n=153	54%	28%
Home tDCS	10-week RCT, n=174	58.3% vs 37.8% sham	Trial-specific
tDCS	2026 IPD meta-analysis, n=1,246	OR 1.33 vs sham	OR 1.30; NS

*RANZCP's 70–90% figure summarises the broader ECT literature cited in its Australian position statement; it is not a single Australian cohort response rate.

Response usually means ≥50% symptom reduction; remission means symptoms fall below a defined threshold. Percentages change with severity, treatment resistance, rating scale, course length and comparator. Naturalistic response rates are not treatment-specific effect sizes.

Where psychologists fit

What can psychologists contribute without administering stimulation?

Assessment, formulation, recognising possible candidates, referral, psychoeducation, measurement-based care, concurrent psychotherapy and relapse-prevention work all sit naturally within psychological practice.

Can psychologists administer rTMS or tDCS?

Administration and prescription are different questions. Australian Medicare-funded rTMS is a psychiatrist-prescribed pathway. For hands-on neuromodulation, individual competence, practical training, device requirements, indemnity, governance, informed consent and collaboration with medical care where indicated all matter. The companion Australian Clinical Pathway handout addresses these issues in more detail.

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Note: Evidence and guidance change. Check current professional standards, clinical guidelines and device instructions before applying this information clinically.