

# knowledge snapshot



## Non-invasive brain stimulation may help treat gambling disorder: A review

### What this article is about

Gambling disorder (GD) is a behavioural addiction. It is also a public health concern because it harms individuals, their families, and communities, as well as the economy. However, no medical treatment has been approved for GD.

People with GD can have similar behavioural symptoms to people with substance use disorders. GD and substance use disorders also have common neurobiological bases. For example, both GD and substance use disorders are linked to impaired functioning of the cognitive control system in the brain. Cognitive control processes include inhibiting behaviours as needed, problem-solving, self-control, and decision-making. Impaired cognitive control can reduce someone's ability to resist gambling.

The dorsolateral prefrontal cortex (DLPFC) is one of the brain areas involved in cognitive control. One way to improve functioning of specific brain areas is through non-invasive brain stimulation (NIBS). The two most commonly used types of NIBS are repetitive transcranial magnetic stimulation (rTMS) and transcranial direct current stimulation (t-DCS). rTMS and t-DCS deliver magnetic or electric currents through the skull to a specific brain area. Research shows that using NIBS on the DLPFC can help treat substance use disorders. So, NIBS may be able to treat GD as well. The authors performed a systematic review of the current research on using NIBS to treat GD.

### What was done?

The authors performed a systematic review, following the PRISMA standards. They searched for relevant

### Why is this article important?

Gambling disorder is a behavioural addiction. Finding effective treatments for gambling disorder is important because of the harm it causes people who gamble, their families, and the community. Non-invasive brain stimulation (NIBS) has been used to treat substance use disorders. NIBS may be an effective treatment for gambling disorder as well. The authors performed a systematic review of studies on NIBS treatments for gambling disorder. They found 11 studies that matched their criteria. Of these 11 studies, 7 reported a decrease in gambling behaviour, cravings, and gambling-related symptoms after NIBS treatments. Additionally, all 11 studies found no side effects of NIBS. Thus, NIBS may be an effective and safe treatment for gambling disorder. However, the studies were not consistent in how they administered the NIBS and measured outcomes. Also, most studies had few participants and the long-term effects were unknown. Thus, further research on NIBS for gambling disorders is recommended.

articles on Pubmed, Science Direct, and Web of Science databases. They searched for articles that included both gambling terms (e.g., gambling disorder, pathological gambling) and NIBS terms (e.g., transcranial magnetic stimulation, TMS, NIBS).

The initial search found 269 studies. The authors then screened the titles and abstracts using Rayyan software. For studies to be included, they had to meet the following criteria:

- An original study that used NIBS

- Participants were diagnosed with GD or pathological or problem gambling
- NIBS was used for therapeutic goals (e.g. reducing GD symptoms, or related psychiatric symptoms)

Eleven studies met the eligibility criteria and were included in this review. For each study, the authors recorded the number of participants, their gender, and whether they had other psychiatric conditions or disorders. They also recorded the type of NIBS used (rTMS or t-DCS), the number of sessions, and what brain areas were targeted. Finally, they looked for changes in clinical outcomes for the participants.

## What you need to know

Of the 11 total studies, 7 used rTMS and 4 used t-DCS. Additionally, 6 of the studies were experiments with control groups while the others were uncontrolled experiments or case reports. Two case studies had only 1 participant, while other studies had up to 34. However, across all studies the majority of participants were men. Additionally, some studies included a single NIBS session, while others had multiple sessions across many weeks.

All 11 studies targeted the DLPFC. The DLPFC is a brain region that is important for cognitive control (e.g., self-control and decision-making abilities). People with GD have reduced cognitive control, which can lead to compulsive gambling and intense craving. The rTMS studies either targeted the left or the right DLPFC. All t-DCS studies targeted both regions.

Overall, 7 of the studies found a reduction in gambling behaviour, craving, or gambling-related symptoms after NIBS treatment. However, they did not find a consistent decrease in other psychiatric symptoms like depression or anxiety. Of the 4 studies that did not find an effect of NIBS on gambling behaviour, 2 of them used rTMS and 2 used t-DCS. Finally, all 11 studies reported no side effects from NIBS. Thus, NIBS is a safe and possibly effective treatment for GD.

## Who is it intended for?

This paper is intended for other researchers studying treatments for GD. The authors found that there are few studies on the use of NIBS for treating GD. They also found that NIBS may be an effective treatment

with little to no side effects. They suggest future studies use larger sample sizes and look at the long-term outcomes of NIBS treatment for GD.

## About the researchers

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## About Gambling Research Exchange (GREO)

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