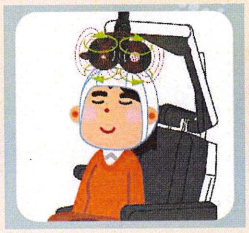
Beat Drugs Fund project sharing

BDF 210050: Innovative medical intervention for drug abusers by using rTMS- a pilot project



禁毒基金 BEAT DRUGS FUND
Regular Funding Scheme

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禁毒基金 BEAT DRUGS FUND
Regular Funding Scheme

- Project Introduction
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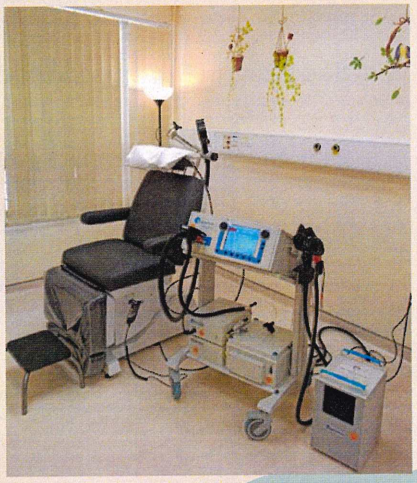
- Conclusion



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Project Introduction

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- Our Substance Abuse Clinic serves around 100 new patients with Substance use disorder (SUD) each year. Near 70% of them experience ongoing craving and lapses.

- Cravings are often triggered by environmental cues and stress. Current medications and cognitive behavioral therapies have limited effect on reducing craving.

(Rachid F, 2018)

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Project Introduction

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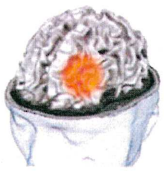
- Repetitive Transcranial Magnetic Stimulation (rTMS) received CE certification in European Union on the use in craving management

Transcranial **M**agnetic-**S**timulation

trans cranial „through the intact cranial bone"

Magnetic / Electric



Diagnostic: Single Pulse = one TMS-Pulse
Therapy: repetitive TMS-Pulses
repetitive TMS, rapid rate TMS = **rTMS**

腦部 磁力 刺激

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Project Introduction

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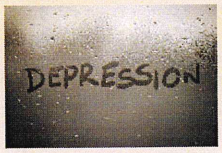
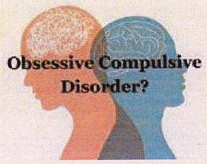
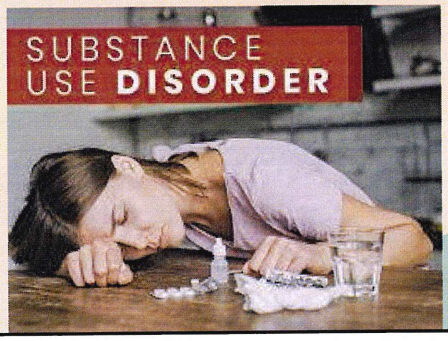
- rTMS was invented in 1980s
- US FDA cleared to treat depression in 2008
- More protocols cleared for different disorders
- Now major authority such as FDA and CE Certification cleared the following uses:







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How does rTMS work?

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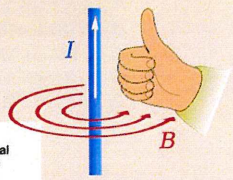
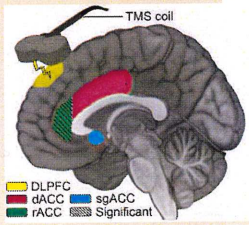
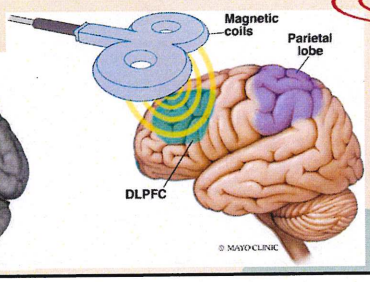
- Faraday's principle
  - Alternating magnetic fields to induce electric currents in cortical tissue
  - Re-and-depolarize neurons, modulate brain excitability and function



- High frequency stimulates on Left Dorsolateral Prefrontal Cortex (DLPFC)

(George et al., 2010; Stöhrmann et al., 2023)





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How does rTMS work?

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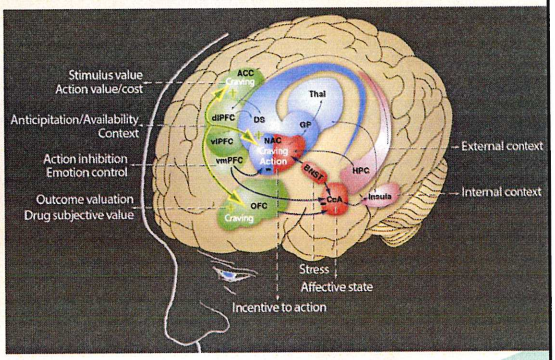
- Decreases in craving correlated an increase in DLPFC activity
- DLPFC has a key role in top-down modulation of emotional and behavioral processes relevant to addiction

Functional connectivity increased within limbic and insula region, subgenual anterior cingulate cortex (emotion and impulse), and DLPFC



(Kober et al., 2010; Janes et al., 2014; Ochsner, Silvers, & Buhle, 2012)

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Common Side effect

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- **輕微頭痛、牙痛或刺激位置抽搐**
  一般因在電磁圈下的肌肉、面部和頭皮神經受刺激而引致。舒緩方法包括服用止痛藥，調節電磁圈位置，和降低治療刺激能量值。

- **短暫聽覺受損和耳鳴**
  配戴耳塞可將此風險減至最低。

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Rare side effect

- **癲癇現象**
  接受rTMS的病人，出現癲癇現象的機會率為每一萬次治療有0.31次，和每一千個病人有0.71人。

Project Objectives

- The project aims to adopt rTMS, an innovative technique, for craving control and improving drug-abusers in:
  - Motivation for Abstinence
  - Frequency of Drug Use
  - Inclination to avoid relapse
- The target was for
  - 70% actual attendance of total sessions offered
  - 70% of participants to show improvement in each aspect.

Contents of the Project

Regular Funding Scheme

1. Introduction and engagement phase

1 session: Recruitment and introduction of rTMS. Conduct baseline assessment of mental state & substance abuse situation

1 session : Assessment of treatment position and all relevant rTMS parameters (intensity, repetition rate, number of pulses in a train, numbers of trains, number of treatment sessions)

Protocol of the Project

Regular Funding Scheme

2. Treatment phase

10 sessions: TMS therapy (5 days treatment and 2 sessions per day)

Protocol of the Project

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3. Review and assessment phase

2 sessions: Treatment progress review with client/treatment team

3 session: Outcome assessment after treatment

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Protocol of the Project

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4. Sharing session to community anti-drug stakeholders

1 session: Sharing session to 50 community anti-drug stakeholders for sharing of experience and outcome.

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Outcome Measurement Tools

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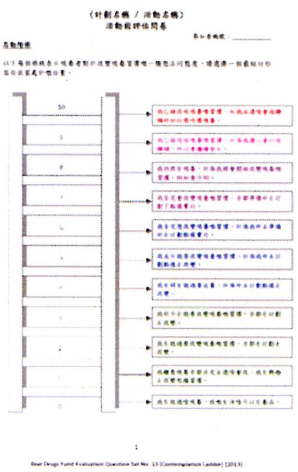
- Assessment of Motivation for Abstinence

  BDF Question Set 13 (Contemplation Ladder)



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Outcome Measurement Tools

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- Assessment of Frequency of Drug Use

  BDF Question Set 5

  (Drug use frequency in the past one month)

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Outcome Measurement Tools

禁毒基金 BEAT DRUGS FUND
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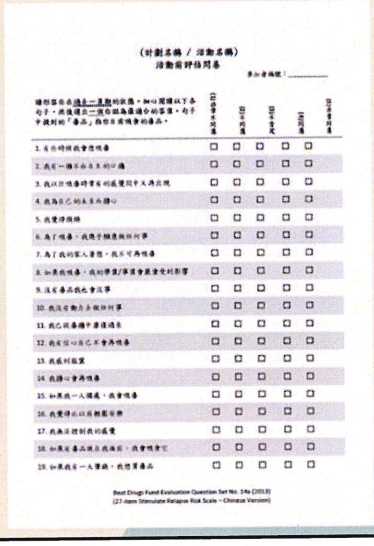
- Assessment of Inclination to avoid relapse
  BDF Question Set No. 14
  (Stimulant Relapse Risk Scale)



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Output and Outcome Evaluation

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Deliverable

Regular Funding Scheme

Deliverable	
Preparatory Session delivered	360 sessions
Treatment Session delivered	1542 sessions
Review Session done	355 sessions
Outcome Assessment Session done	517 sessions
Drug abusers recruited	180 people
Data collected Set	169 sets

Output Evaluation

Regular Funding Scheme

	Description of Indicator	Output Achieved
Output indicator 1	Provide 1 sharing session (2-hour) for **50** community anti-drug stakeholders and healthcare service providers, by which **35** community anti-drug stakeholders and healthcare service providers attend the sharing session	Provide 1 sharing session (2-hour) for **50 (100%)** community anti-drug stakeholders and healthcare service providers, by which **38 (108.6%)** community anti-drug stakeholders and healthcare service providers attend the sharing session.

Output Evaluation

Regular Funding Scheme

	Description of Indicator	Output Achieved
Output indicator 2	Provide **360** preparatory sessions (2-hour) for 180 high-risk substance abusers with a total attendance of **252** man-times	Provided **360 (100%)** preparatory sessions (2-hour) for **180** high-risk substance abusers with a total attendance of **360 (142.9%)** man-times
Output indicator 3	Provide **1800** daily sessions (2-hour) of rTMS treatments for 180 high-risk substance abusers with a total attendance of **1260** man-times	Provided **1800 (100%)** daily sessions (2-hour) of rTMS treatments for **180** high-risk substance abusers with a total attendance of **1542 (122.4%)** man-times

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Output Evaluation

Regular Funding Scheme

	Description of Indicator	Output Achieved
Output indicator 4	Provide **360** review sessions (2-hour) for 180 high-risk substance abusers with a total attendance of **252** man-times	Provided **360 (100%)** review sessions (2-hour) for **180** high-risk substance abusers with a total attendance of **355 (140.9%)** man-times
Output indicator 5	Provide **540** outcome assessment sessions (2-hour) for 180 high-risk substance abusers with a total attendance of **378** man-times	Provided **540 (100%)** outcome assessment sessions (2-hour) for **180** high-risk substance abusers with a total attendance of **517 (136.8%)** man-times

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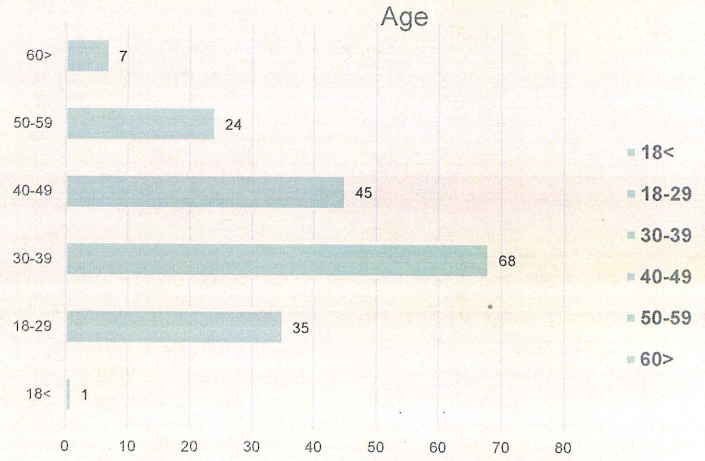
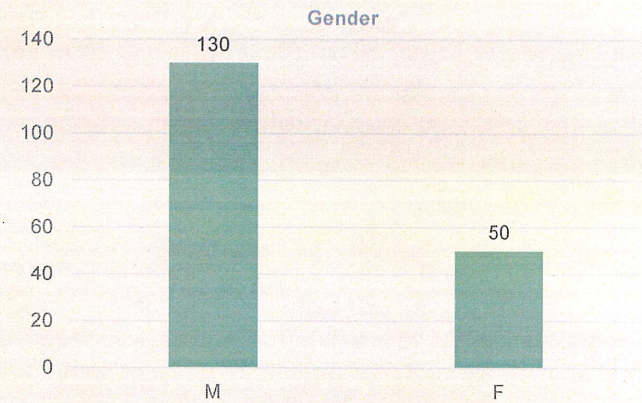
Demographic Data



Demographic Data



Outcome Evaluation

Regular Funding Scheme

Motivation for Abstinence (BDF Question Set 13)

Average improvement in motivation score	3.04
r-Coefficient	0.32
91.7% drug abusers show improvement in readiness to quit drugs	

t 檢定：成對母體平均數差異檢定

	變數 1	變數 2
平均數	7.538461538	4.497041
變異數	2.357142857	2.822908
觀察值個數	169	169
皮耳森相關係數	0.31790814	
假設的均數差	0	
自由度	168	
t 統計	21.01463085	
P(T<=t) 單尾	3.45121E-49	
臨界值：單尾	1.653974208	
P(T<=t) 雙尾	6.90242E-49	
臨界值：雙尾	1.974185191	

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Outcome Evaluation

Regular Funding Scheme

Frequency of Drug Use (BDF Question Set 5)

Change the drug abuser's drug use frequency	-15.75
r-Coefficient	0.80
87.0% drug abusers show reduction in drug use frequency	

t 檢定：成對母體平均數差異檢定

	變數 1	變數 2
平均數	27.992367	12.24775
變異數	1166.6945	448.0274
觀察值個數	169	169
皮耳森相關係數	0.7958483	
假設的均數差	0	
自由度	168	
t 統計	9.5025944	
P(T<=t) 單尾	1.044E-17	
臨界值：單尾	1.6539742	
P(T<=t) 雙尾	2.089E-17	
臨界值：雙尾	1.9741852	

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Outcome Evaluation

Regular Funding Scheme

Inclination to avoid relapse (BDF Question Set No. 14a)

Average improvement in inclination to avoid relapse	2.86
r-Coefficient	0.49
97.6% rehabilitated drug abusers show reduction in their inclination to relapse	

t 檢定：成對母體平均數差異檢定		
	變數 1	變數 2
平均數	7.166807551	10.023669
變異數	2.379363035	2.3071516
觀察值個數	169	169
皮耳森相關係數	0.494385698	
假設的均數差	0	
自由度	168	
t 統計	-24.12529357	
P(T<=t) 單尾	9.148E-57	
臨界值：單尾	1.653974208	
P(T<=t) 雙尾	1.8296E-56	
臨界值：雙尾	1.974185191	

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Some captures of Client Feedback

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F/18 (Cocaine user)
我之前想食果陣會心跳加速，坐唔定，坐立不安。做左之後少左呢種感覺。

M/41 (Ice+GHB users)
好似做完之後多個動力做其他活動。雖然我依家仲有食，但食少左，而且好似自己更加控制到。我依家重新開始左跑步、打boxing、黎緊會同呀媽去旅行。

M/32 (Cocaine user)
再同朋友出去果陣，朋友又拎曬出黎卷煙，仲叫我幫手卷。但我無想主動攞黎食。只係老闆推埋黎，食左兩支，但我無追落去。

21/F (Cough mixture user)
之前有時無錢買咳藥水，或者藥房關左門，之後都會發癲發脾氣。但做完之後真係無得食就由佢算數。食咳藥水既份量大約少左一半

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Letter from clients

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我接受 TMS 治療經已快大半年的時間，雖然這大半年裏因為生活的壓力和工作的轉變，今我也有起伏的情況，也嘗試過幾次重新吸毒，但無論是再次吸毒的次數和用量也和以前不同。我覺得自己可以慢慢學習控制毒癮，慢慢重整自己的人生。

TMS 真的給我很大的幫助，正如[redacted]Sir 所講，TMS 不是仙丹，不會做一次能夠完全改變我，但它真的給了我一個新的開始，令我朝着一個好嘅方向進發。

我好感謝[redacted]由治療至今都一直嘅跟進同埋關心，正如馮 sir 所講，戒毒路上一定有起伏，而佢哋真真正正做到陪伴我高低起跌，亦都支持我令我大大減少跌嘅時間，感謝你哋！

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Letter from clients

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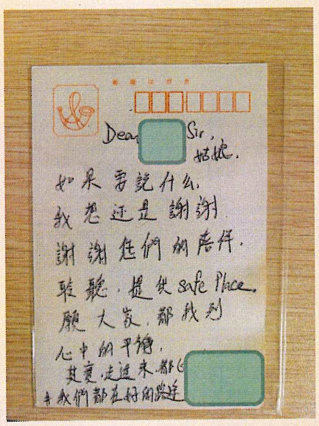

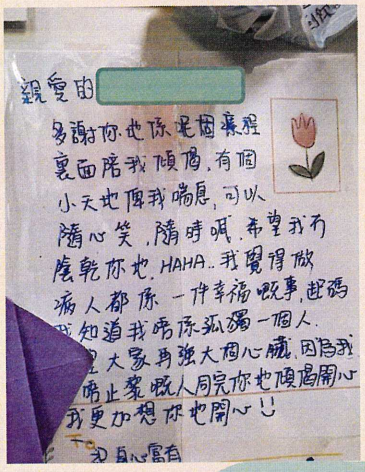

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Letter from clients

Regular Funding Scheme

表揚/意見 Appreciation/ Comment

1. 您到訪的是哪一個部門或病房 Which department or ward did you visit?
   部門 Department: 精神科 病房 Ward: 30
2. 您認為本院的服務如何 How do you think about our services?*

	滿意☺ Satisfactory	一般 Fair	不滿意☹ Unsatisfactory
員工態度 Staff Attitude	☑	☐	☐
環境及設施 Environment & Facility	☑	☐	☐
醫療及護理質素 Clinical Service	☑	☐	☐
整體印象 Overall Impression	☑	☐	☐

3. 其他意見 Other comments:
   值得讚賞的員工或服務 Staff or service(s) to be appreciated: [redacted] 姑娘 TSM過程中非常專業有耐性，講解非詳盡

   希望改善的服務 Service(s) to be improved: 沒有

表揚/意見 Appreciation/ Comment

1. 您到訪的是哪一個部門或病房 Which department or ward did you visit?
   部門 Department: PSY TMS 病房 Ward: PSY
2. 您認為本院的服務如何 How do you think about our services?*

	滿意☺ Satisfactory	一般 Fair	不滿意☹ Unsatisfactory
員工態度 Staff Attitude	☑	☐	☐
環境及設施 Environment & Facility	☑	☐	☐
醫療及護理質素 Clinical Service	☑	☐	☐
整體印象 Overall Impression	☑	☐	☐

3. 其他意見 Other comments:
   值得讚賞的員工或服務 Staff or service(s) to be appreciated:
   態度親切，有愛心

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Experience Gained

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Several strategies facilitated the project's progress, particularly during its early stages when the intervention is less known among other professional stakeholders and drug abusers.

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Experience Gained

1. Close Collaboration with Community Partners
   - Introduction and briefings to community partners when new intervention comes out
   - Regular mutual sharing on updated anti-drug innovative intervention
   - Facilitated timely referral to suitable service

Experience Gained

2. Trial and Lived Experience
   - Service user concerning much on the side effects on medical treatment
   - Lived experience helps relieved worries and anxiety on the new intervention
   - Real place visit and demonstration are important before new treatment to carry out in hospital setting

Experience Gained

Regular Funding Scheme

3. Maintaining Rapport
   - Rapport is important to encourage regular visit and to complete the full course
   - Warm and caring atmosphere in the therapy room motivated regular attendance
   - Holistic care including addressing the deeper needs of users, a safe space for emotional expression, flexible treatment schedule are crucial.

Conclusion

Regular Funding Scheme

- rTMS serves an innovative and a valuable treatment in assisting drug abusers to quit drug or to reduce the amount of abuse
- Many of drug abusers and local anti-drug workers interested in exploring new technology
- Worth to continue carrying out in hospital setting, and to keep update with worldwide developing protocol in rTMS

→ rTMS serves a new treatment to fulfill the gap in craving management

Suggestions

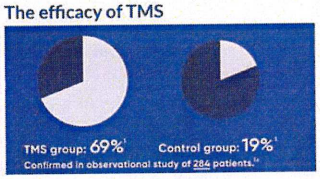
Regular Funding Scheme

- On-going development in the technique and protocol in using rTMS to management craving
- Some suggested to provide more maintenance sessions for higher-risk cases. (Madeo et al, 2020).

MagVenture's CE approval is based on a pilot study[1] as well as the largest naturalistic study with the longest follow-up period available so far[2]. These studies have contributed to the world's first CE approval for TMS therapy for addiction (PSUD)[2].

> The experimental group treated with TMS showed a significant reduction in cravings, relapses, and dropouts compared to a control group.
>
> *Luigi Gallimberti*
> *Psychiatrist, toxicologist and professor, The University of Padua*

The efficacy of TMS



Graphics by MagVenture, based on:
[1]Terraneo et al., 2016, European Neuropsychopharmacology: Transcranial magnetic stimulation of dorsolateral prefrontal cortex reduces cocaine use: A pilot study.

[2]Madeo et al., 2020: Long-Term Outcome of Repetitive Transcranial Magnetic Stimulation in a Large Cohort of Patients With Cocaine-Use Disorder: An Observational Study.

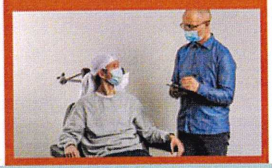
TMS for Addiction

MagVenture TMS Therapy® is an advanced neuromodulation technology that uses magnetic pulses to stimulate the affected areas in the brain.

MagVenture TMS Therapy® is intended to be used as an treatment of psychoactive stimulant use disorder (PSUD) in adult patients. Most common side effects are headache and nausea.

The total treatment time is 13 weeks for a total of 34 treatment sessions:

- Two treatments per day for five days, followed by:
- 2 treatments per day one day weekly for 12 weeks.
- Additional TMS sessions may be applied, for instance, in case of a relapse or the risk of relapse.



Way forward

Regular Funding Scheme

- Costly in private setting, at least $2000-$3000 per session; quite not affordable for the substance abusers who want to quit drug
- Limited recourse in HA currently. No regular manpower in offering such options now

→ rTMS might consider as a regular anti-drug treatment in hospital setting in the future

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