Effects of different mental training techniques on fine motor performance.

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Main Information

Primary registry identifying number
LBCTR2021054816

Protocol number
CEHDF 1787

MOH registration number

Study registered at the country of origin
Yes

Study registered at the country of origin: Specify

Type of registration
Prospective

Type of registration: Justify
N/A

Date of registration in national regulatory agency
28/05/2021

Primary sponsor
Saint Joseph University of Beirut

Primary sponsor: Country of origin
Lebanon

Date of registration in primary registry
18/06/2021

Date of registration in national regulatory agency
28/05/2021

Public title
Effects of different mental training techniques on fine motor performance.

Acronym

Scientific title
Comparison between the effects of Neurofeedback training and Motor imagery training on motor performance in a finger tapping task.

Acronym

Brief summary of the study: English

Motor Imagery (MI) refers to the act of imagining a specific action without actually executing it (Decety et al., 1994). This ability for humans to mentally rehearse a movement has been extensively documented due to its benefits in both sport and clinical contexts (Schuster et al. 2011; Guillot, 2019).

EEG-Neurofeedback (EEG-NF), is also a type of mental training that teaches self-control of brain activity by measuring brain waves and providing a feedback signal. Through the EEG-NF process, a person can learn to modulate its own neuronal activity. Ros et al. (2010) observed an increase in corticospinal excitability in the primary motor cortex following a 30-minute session of mu wave desynchronization training with EEG-NF. Moreover, Ros et al. (2014), showed that an EEG-NF training of 30 minutes aiming to induce desynchronization of mu brain wave leads to better implicit motor learning of a sequential motor task.

The main aim of this study is to elucidate the effect of desynchronization of mu brain wave in the primary motor cortex through EEG-NF training on explicit sequential motor performance in healthy humans. We will also compare the effects of EEG-NF training to those of MI training which has already proven its efficiency. Finally, we aim to see if the association of those two trainings would be more beneficial.

Brief summary of the study: Arabic

تم توثيق قدرة البشر على التصور الحركي. (Decety et al., 1994) التصور الحركي هو القدرة على تخييل حركة معينة دون تنفيذها فعلياً (Schuster et al. 2011; Guillot, 2019)..على نطاق واسع نظرًا لفوائد هذه التقنية في مجال الرياضة وإعادة تأهيل الحركة

الإرتجاع العصبي يشكل نوع أخر من التدريب الذهني. تهدف تقنية الارتجاع العصبي إلى تزويد الفرد بمعلومات عن نشاط دماغه في الوقت الفعلي. يتعلم الشخص ، المطلع على حالته الذهنية ، السيطرة عليها تدريجياً. هذا قد يسمح بتحسين الأداء المعرفي أو الحركي. روس (Ros et al. 2010) دقيقة على زيادة النشاط في المنطقة الذهنية المسؤولة عن الحركة يؤدي30أثبت أن تقنية الإرتجاع العصبي وتحديداً التمرين لمدة أن التمرين نفسه خلال تقنية الإرتجاع العصبي، يؤدي إلى (Ros et al. 2014) إلى استثارة الخلايا العصبية. في دراسة أخرى، يظهر روس تحسين تعلم حركة جديدة بشكل غير مباشر.

يهدف هذا البحث لإثبات دور تقنية الإرتجاع العصبي وتحديداً التمرين على زيادة الاستثارة العصبية في المنطقة الذهنية المسؤولة عن الحركة على الأداء الحركي المباشر. بالإضافة إلى ذلك يهدف هذا البحث إلى المقارنة بين فعالية الإرتجاع العصبي والتصور الحركي،التي اثبتت فعاليتها، على تطور الحركة. أخيراً يهدف هذا البحث إلى دراسة تأثير دمج التقنياتان على الحركة.

Health conditions/problem studied: Specify

This study is conducted with healthy adult volunteers and could help enhance their motor skills. If the EEG-NF technique proves to be beneficial in explicit motor performance it could be eventually applied in the context of pathologies.

Interventions: Specify

Intervention 1: EEG-Neurofeedback (30 minutes of training to desynchronize the mu band in the C4 area)
Intervention 2: Motor Imagery (30 minutes of imagination of movement)
Intervention 3: Motor imagery training, EEG-Neurofeedback (30 minutes alternated training)
Intervention 4: Control group (placebo/sham)

Key inclusion and exclusion criteria: Inclusion criteria

-Healthy adults (aged between 18 and 40 y.o.)
- right handed

Key inclusion and exclusion criteria: Gender	**Key inclusion and exclusion criteria: Specify gender**
Both	

Key inclusion and exclusion criteria: Age minimum	**Key inclusion and exclusion criteria: Age maximum**
18	40

Key inclusion and exclusion criteria: Exclusion criteria

-Any neurological disorder
-Humor disorders

Type of study

Interventional

Type of intervention	**Type of intervention: Specify type**
Rehabilitation strategies	N/A

Trial scope	**Trial scope: Specify scope**
Other	

Study design: Allocation	**Study design: Masking**
Randomized controlled trial	Open (masking not used)

Study design: Control	**Study phase**
Placebo	N/A

Study design: Purpose	**Study design: Specify purpose**
Supportive care	N/A

Study design: Assignment	**Study design: Specify assignment**
Parallel	N/A

IMP has market authorization	**IMP has market authorization: Specify**

Name of IMP

Year of authorization

Month of authorization

Type of IMP

Pharmaceutical class

NA

Therapeutic indication

The training suggested, if proved to be beneficial, could be eventually applied in the context of motor rehabilitation.

Therapeutic benefit

The suggested trainings could lead to the improvement of motor skills

Study model

N/A

Study model: Explain model

N/A

Study model: Specify model

N/A

Time perspective

N/A

Time perspective: Explain time perspective

N/A

Time perspective: Specify perspective

N/A

Target follow-up duration

Target follow-up duration: Unit

Number of groups/cohorts

Biospecimen retention

None retained

Biospecimen description

NA

Target sample size

60

Actual enrollment target size

60

Date of first enrollment: Type

Anticipated

Date of first enrollment: Date

01/06/2021

Date of study closure: Type

Anticipated

Date of study closure: Date

01/07/2022

Recruitment status

Recruiting

Recruitment status: Specify

Date of completion

01/07/2022

IPD sharing statement plan

Yes

IPD sharing statement description

1. Individual participant data will be available.
2. Individual participant data that underlie the results reported in the article, will be shared after deidentification.
3. Study protocol, Statistical Analysis Plan, Informed Consent Form, Clinical Study Report, Analytic Code will be available.
4. The above data will be shared with researchers who provide a methodologically sound proposal.
5. Sharing data could be done for any purpose of analyses.
6. Proposals should be directed to sandra.kobaitermaarrawi@usj.edu.lb. To gain access, data requestors will need to sign a data access agreement. Proposals may be submitted up to 36 months following article publication. After that time, data will be available in our university Lab database.

Additional data URL

Admin comments

Trial status

Approved

Secondary Identifying Numbers

Full name of issuing authority	Secondary identifying number
Not Applicable	Not Applicable

Sources of Monetary or Material Support

Name
Saint Joseph University of Beirut - Faculty of Medicine - Research council

Secondary Sponsors

Name
Not Applicable

Lebanon Clinical Trials Registry

Contact for Public/Scientific Queries

Contact type	Contact full name	Address	Country	Telephone	Email	Affiliation
Public	Sandra Kobaiter Maarrawi	USJ	Lebanon	01421677	sandra.kobaitermaarrawi@usj.edu.lb	USJ - FM
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Centers/Hospitals Involved in the Study

Center/Hospital name	Name of principles investigator	Principles investigator speciality	Ethical approval
Laboratory of Research in Neuroscience	Sandra Kobaiter Maarrawi	Neuroscience	Approved

Ethics Review

Ethics approval obtained	Approval date	Contact name	Contact email	Contact phone
Hotel Dieu de France	08/03/2021	Pr Michel Scheuer	michel.scheuer@usj.edu.lb	01421000 ext 2228

Countries of Recruitment

Name
Lebanon

Health Conditions or Problems Studied

Condition	Code	Keyword
Motor skills	2-Propanol (T51.2)	Motor skills

Interventions

Intervention	Description	Keyword
Mental (motor) imagery	the act of imagining a specific action without actually executing it	Motor imagery
Neurofeedback	mental training that teaches self-control of brain activity by measuring brain waves and providing a feedback signal	Neurofeedback
Placebo	sham condition	Placebo

Primary Outcomes

Name	Time Points	Measure
The number of sequences correctly executed throughout training blocks	Immediately after training	keyboard press task
The average time needed to complete a correct sequence throughout training blocks	Immediately after training	keyboard press task

Key Secondary Outcomes

Name	Time Points	Measure
Motor Performance	20 minutes after training/24h after training	keyboard press task
Percentage of Event related desynchronization	during training	Procomp infiniti EEG-Neurofeedback machine

Trial Results

Summary results

Study results globally

Date of posting of results summaries   **Date of first journal publication of results**

Results URL link

Baseline characteristics

Participant flow

Adverse events

Outcome measures

URL to protocol files