Discussion The increase in left M1 MEP amplitude and reduction in CSP and SICI during and after 20 min of right M1 a-tDCS is most likely to be attributed to a reduction in interhemispheric inhibition that is modulated by a-tDCS during the performance of an active task. Our findings may have significant implications for stroke rehabilitation whereby the application of a-tDCS on the contralesional M1 during neurorehabilitation of the paretic limb may be beneficial for inducing neuroplasticity of the ipsilesional M1 to improve motor function.

Keywords Transcranial direct current stimulation; Primary motor cortex; Excitability; Transcranial magnetic stimulation; Stroke

Disclosure of interest The authors have not supplied their declaration of conflict of interest.

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Study of the effects of a 5-day brain stimulation with Paired Associative Stimulation (PAS) against placebo in 28 hemiplegic patients

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Objectives The Paired Associative Stimulation (PAS) is a non-invasive brain stimulation technique combining an electrical peripheral stimulation and a magnetic cortical stimulation. Applied on the wrist extensor muscles, one session induced changes in cortical excitability. We studied the effects of a repetition of 5 PAS sessions against placebo.

Material and methods This is a prospective, randomized, double-blind against placebo study. One session consisted in applying an electrical peripheral stimulation on the wrist extensor muscle followed by a 25-ms later magnetic cortical stimulation over the wrist area, at a 0.1-Hz frequency during 30 minutes, the patient receiving 180 paired stimuli. In the SHAM group, the patient received the electrical peripheral stimulation and a SHAM magnetic stimulation. One session was applied every day during 5 days. The changes in area of the motor-evoked potential (MEP), reflecting the changes in cortical excitability, and motor changes studied by the Fugl-Meyer score were assessed at the end of the 1st and 5th session, 3, 5 and 7 days after the end of the 5 days session.

Results Twenty-eight patients were included (19 men, mean age: 49.9 ± 13.5 years), with stroke from 10.0 ± 5.1 weeks. Only data from 24 patients were exploitable, 13 patients being included in the PAS group. It was not found significant differences between the two groups regardless of the time after stimulation, or the electrophysiological parameters, neither the motor scores. However, there is a greater MEP variability in the PAS group compared to the SHAM group. All patients ($n = 5$) for which PAS increased cortical excitability (D8-MEP > +200% D1-MEP) were those with a low initial level of cortical excitability.

Discussion The initial level of cortical excitability seems to play a key role of repeated sessions of PAS on the lasting effects on brain plasticity. Our results confirm the importance of the initial level of neuronal activation in the cortical modulation induced by TMS.

Keywords Stroke; Transcranial magnetic stimulation; Cerebral plasticity

Disclosure of interest The authors have not supplied their declaration of conflict of interest.

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Study of motor and electrophysiological effects induced by the association of motor imagery exercises and Paired Associative Stimulation in 6 hemiplegic patients

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Objective Motor imagery (MI) is a cognitive process of imagining a movement without actually doing it. This technique has demonstrated its benefits in the rehabilitation of hemiplegic patients. Non-invasive brain stimulation (NIBS) is still at a preclinical stage but has demonstrated their adjunct effect in the learning of a motor task. In this study, we studied the motor and electrophysiological effects of a session combining Paired Associative Stimulation (PAS), a technique of NIBS and MI exercises (PAS-MI).

Methods A prospective, randomized cross-over study where six patients were included (4 men, age = 44.5 ± 13.7 years; 5.7 ± 7.7 months post-stroke). They randomly underwent three 15-minute sessions of stimulation, one week apart: PAS-MI, PAS alone and ShamPAS associated with MI exercises (ShamPAS-MI). The PAS intervention consisted in an electrical stimulation of the hemiplegic extensor carpi radialis (ECR) associated with cortical magnetic stimulation over the wrist motor area. In MI condition, the patient was instructed to imagine extension of his hemiplegic wrist and in ShamPAS intervention, we used a SHAM probe. We compared the surface variation of the motor-evoked potential (MEP) of the ECR and the amplitude of active extension (AE) of the hemiplegic side obtained after each session.

Results Twenty-five minutes after the end of session PAS alone, an increase of MEP surface (+91% ± 150.3%) which reveals a higher cortical excitability associated with a slight motor improvement ($\Delta EA = 1.33 \pm 3.14^{\circ}$) was shown. A smaller facilitation was shown after sessions PAS-MI and ShamPAS-MI (+45.97 ± 134.32% and 44.85 ± 28.77%, respectively) and, in these cases, was not associated with motor improvement.

Conclusion The session PAS alone seems to induce motor improvement associated with increased cortical excitability not shown after the other two sessions. The combination of two types of stimuli seems to have less effect, perhaps because of the mechanisms regulating the homeostasis of brain plasticity. The results have to be confirmed on a larger sample.

Keywords Stroke; Transcranial magnetic stimulation; Cerebral plasticity

Disclosure of interest The authors have not supplied their declaration of conflict of interest.

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Submental sensitive transcutaneous electrical stimulation reverses virtual lesion of the oropharyngeal cortex

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Objective The aim of this study was to assess the effect of submental sensitive transcutaneous electrical stimulation (SSTES) on pharyngeal cortical representation after a virtual pharyngeal lesion in healthy subjects.
Methods Motor-evoked potentials of the mylohyoid muscles and videofluoroscopic parameters were measured before and after the creation of the virtual lesion, at the end of SSTES (T0), at 30 minutes (T30) and 60 minutes (T60).
Results Nine subjects completed the study. After 20 minutes of SSTES, there was an increase of motor-evoked potential amplitude at 0 and 30 min ($P < 0.05$). There was no significant modification of videofluoroscopic measurements. Regarding the cortical mapping after SSTES, there was an increase in the number of points with a cortical response in the dominant hemisphere but also in the non-dominant hemisphere, effect which remained constant at 60 minutes ($P < 0.05$).
Discussion SSTES is effective on cortical plasticity for the mylohyoid muscles and reverses pharyngeal cortical inhibition in healthy subjects. It could therefore be a simple non-invasive way to treat post-stroke dysphagia.
Keywords Swallowing disorders; Electric stimulation therapy; Stroke; Motor potential evoked; Cineradiography
Disclosure of interest The authors have not supplied their declaration of conflict of interest.

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Is motor imagery really a window for studying stroke recovery at subacute stage?

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Background Because of similarities with overt movement execution, motor imagery is considered as a way to study motor recovery after stroke. However, some studies could not correlate motor imagery abilities with motor function at the subacute stage of stroke challenging motor imagery as a substitute to motor execution in these patients. The aim of this study was to compare explicit and implicit motor imagery abilities in stroke patients and in healthy subjects, to correlate those with motor function and investigate the role of lesion side and location on performances.
Methods Twenty-two stroke patients at the subacute stage and 22 healthy volunteers performed implicit and explicit motor imagery tasks (Hand Laterality Judgment Task [HJLT], imagined and executed self-paced hand movements) and a motor assessment (maximal grip strength, Jebsen-Taylor Test [JTT]). Differences between healthy subjects and patients and the impact of lesion side and location on motor imagery were studied using ANOVA. Correlation coefficients were used to analyze the relationship between motor imagery abilities and motor function.
Results For implicit imagery in HLJT, stroke patients had slower reaction times ($P \leq 0.03$) and tended to have higher rates of errors ($P = 0.05$) but shared similar characteristics (angle effect: $P \leq 0.01$) compared to healthy subjects. For explicit imagery, patients were slower than healthy subjects for the affected hand in the executed condition ($P = 0.04$) and tended to be slower in the imagined condition ($P = 0.06$). Patients and healthy subjects exhibited a temporal congruence ($P \leq 0.004$) except for right-sided strokes ($n = 8$) and patients with parietal damages ($n = 9$) for the affected hand. Finally, in stroke patients, implicit and explicit imagery performances were not correlated with upper limb function.
Conclusion Caution must be taken to use motor imagery as a tool for monitoring stroke recovery because subacute stroke patients exhibit motor imagery deficits, independently of the severity of motor impairment.
Keywords Stroke; Motor imagery; Recovery
Disclosure of interest The authors have not supplied their declaration of conflict of interest.

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Partners of the speech therapist in management of swallowing disorders; establishment of an interdisciplinary project

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During the first three months after a stroke, healthcare teams are confronted to feeding problems such as swallowing disorders. Many studies have revealed that 91% of patients suffer from lating swallowing reflex (AHCPR, 1999; Veis and Logemann, 1985). Assessment and management are available in the acute care but are unknown later and in consequence not applied during the rehabilitation. However, the continuity of care is a major issue because swallowing disorders may have negative even vital effects. Rehabilitation team called "Filiere AVC Lille Flandre Lys", which includes four speech therapists, works with eight rehabilitation hospitals as partners. Since January 2013, an improvement project has been implemented with all partners regarding to post-stroke dysphagia. The aim of this project is firstly to improve and secure the management and support of swallowing disorders, and secondly to integrate it in everyday practice from acute to rehabilitation care. This project helps speech therapist to identify team's knowledge about dysphagia but it also offers theoretical and practical training programs to any nursing staff and participant. A referent is nominated and become the main spokesperson for the team and also for the speech therapist. In consequence, the management of dysphagia is optimized (texture, prevention of complications, internal communication). Another aim is to promote exchanges between referents to compare practices and communication tools in their care units, and to develop adapted menus for dysphagic patients, in an interdisciplinary approach. The management of this project by a speech therapist shows the necessary evolution of this profession at hospital. Beyond its abilities in assessment and rehabilitation, the speech therapist's role is to create link between all the people involved in daily life having an action on the feeding conditions of the patients. The action of the speech therapist is no longer restricted one to one patient/therapist relation. It is important for the speech therapists to become aware of it and for hospitals to integrate this new dimension of the practice.
Keywords Swallowing disorders; Continuity of care; Speech therapist; Healthcare team; Interdisciplinary project
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