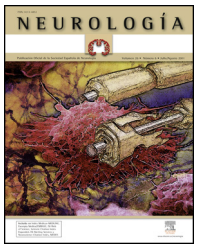
Neurología. 2016;31(1):43—52

NEUROLOGÍA

www.elsevier.es/neurologia



REVIEW ARTICLE

Effectiveness of motor imagery or mental practice in functional recovery after stroke: a systematic review☆

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Received 1 November 2012; accepted 5 February 2013
Available online 12 January 2016

KEYWORDS
Mental practice;
Mental imagery;
Motor imagery;
Stroke;
Hemiparesis;
Rehabilitation

Abstract
Introduction: In recent decades, many stroke rehabilitation methods have been developed. Mental practice (MP) is a dynamic state in which the subject evokes an imaginary representation of a motor action or skill in order to learn or perfect that action. Although functional imaging has shown that MP produces similar cortical activation patterns to those of movement, the clinical effectiveness of such methods in rehabilitation and functional recovery has yet to be demonstrated.
Development: Systematic search of all clinical studies published in the main scientific databases between December 2011 and October 2012 concerning MP in stroke rehabilitation. We selected 23 clinical trials testing different MP protocols in patients with hemiparesis.
Conclusions: MP is effective when used in conjunction with conventional physical therapy for functional rehabilitation of both upper and lower limbs, as well as for the recovery of daily activities and skills. Owing to the heterogeneity of the studies with regard to the intervention protocol, specific imagery technique, time spent practicing, patient characteristics, etc., more studies are needed in order to determine the optimal treatment protocol and patient profile.

☆ Please cite this article as: García Carrasco D, Aboitiz Cantalapiedra J. Efectividad de la imaginería o práctica mental en la recuperación funcional tras el ictus: revisión sistemática. Neurología. 2016;31:43—52.

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PALABRAS CLAVE
Práctica mental;
Imaginería mental;
Entrenamiento mental;
Ictus;
Hemiparesia;
Rehabilitación

Efectividad de la imaginería o práctica mental en la recuperación funcional tras el ictus: revisión sistemática

Resumen
Introducción: En las últimas décadas han surgido diferentes métodos de tratamiento rehabilitador para pacientes con hemiparesia. Uno de ellos es la práctica mental (PM) del movimiento, consistente en la evocación de un movimiento o gesto por parte del sujeto con el fin de aprender o mejorar su ejecución. A pesar de que las técnicas de neuroimagen han demostrado que durante la PM se ejecutan patrones de activación neuronal similares a los que aparecen durante el movimiento, es necesario demostrar su efectividad clínica en la rehabilitación y recuperación funcional de pacientes.
Desarrollo: Para ello, entre diciembre de 2011 y octubre de 2012 se realizó una búsqueda sistemática en las principales plataformas bibliográficas y bases, seleccionándose 23 ensayos clínicos referentes a distintos protocolos de PM en pacientes con hemiparesia.
Conclusiones: La PM es efectiva cuando se combina con terapia convencional en la recuperación funcional del miembro tanto inferior como superior, así como para el entrenamiento de actividades y gestos cotidianos. Dada la heterogeneidad de los estudios en cuanto a la técnica de evocación mental, el volumen de entrenamiento, los sujetos incluidos..., se necesitan más estudios para determinar el tipo de paciente y el protocolo ideal de tratamiento.

Introduction

Cerebrovascular accident (CVA) has become one of the leading causes of mortality among adult populations in developed countries.[1–3] In fact, stroke incidence is approximately one million yearly in the European Union.[4] Care and management of patients have improved greatly over the last few years, which has in turn increased survival rates. However, stroke sequelae are still dramatic for patients. One of the most frequent is hemiplegia or hemiparesis. Hemiplegic patients present impaired mobility on one side of the body, and therefore their function and independence are severely limited, as well as their quality of life.[5] The financial costs resulting from stroke, including disability payments, medical and drug expenses, and assistance for dependent persons, are enormous.

Various strategies and treatment approaches aiming to improve patient function and independence have been developed over the years.[6,7] In the last 20 years, neuroimaging techniques and the discovery of mirror neurons have brought about a deeper understanding of brain function. This in turn has led to the design of new treatment approaches such as action observation,[8] constraint-induced movement therapy,[9] bilateral rehabilitation,[10] mirror symmetric bimanual movement priming,[11] use of virtual reality,[12] robotics,[13] or mental representation of a motor action. This article focuses on the latter.

Mental practice or motor imagery training is a type of therapy in which the patient evokes a gesture or a movement so as to learn, reinforce, or improve performance of that movement. This activity has traditionally been used in athletics[14,15] in an intuitive manner, with the aim of reviewing or reinforcing the sequence of movements that make up the action to be performed. There are 2 types of imagery techniques: external or visual, in which subjects imagine seeing themselves from the viewpoint of an external observer, and internal or kinaesthetic, in which subjects imagine the sensations of motion in their own bodies.

Using new imaging techniques, research in the past few years has shown that the activation sequences in the motor cortex during mental imagery of a movement are similar to those occurring during performance of that movement.[16,17] This finding serves as a scientific basis for developing a methodology for motor imagery training in both healthy and impaired subjects. Treatment strategies have recently been developed for patients with neurological disorders,[18,19] but their effectiveness has yet to be proved. We need to identify the most effective procedure and the target patient, since certain lesions in some cases render the patient unable to visualise movement.[20,21]

Therefore, the aims of this study are to examine scientific evidence on the effectiveness of motor imagery as a post-stroke therapeutic option for hemiparetic patients (with impairment of both the upper and lower limb), check the viability of establishing a mental imagery protocol, and assess the best way to do so.

Development

Material and methods

Between December 2011 and October 2012, we performed a systematic literature review of the following databases: ISI Web of Knowledge, PubMed, Physiotherapy Evidence Database (PEDro), Cumulative Index to Nursing and Allied Health Literature (CINAHL), and Scopus.

For searches in the ISI Web of Knowledge, we entered the combination of keywords 'mental practice' OR 'mental imagery' OR 'motor imagery' OR 'locomotor imagery training' in the 'Title' field. Subsequently, we selected