



Mini-Review: Motor Imagery for Gait Rehabilitation Individual with Stroke

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Mini Review

Volume 4 Issue 4

Received Date: December 20, 2021

Published Date: December 29, 2021

DOI: [10.23880/aphot-16000215](https://doi.org/10.23880/aphot-16000215)

Abstract

Motor imagery have many advantages, such as infinite repetition of tasks without actual movement or physical fatigue. However, evidence of motor imagery for gait rehabilitation is very low certainty. This mini-review describes the precautions for using motor imagery in clinical practice.

Keywords: Stroke; Motor imagery; Gait rehabilitation

Introduction

Recently, evidence of gait rehabilitation using motor imagery has been published [1]. According to that review, there is very little certainty regarding the short-term benefits of motor imagery on gait speed compared to other therapies. However, there are many benefits to prescribing motor imagery in a regular physical therapy session, such as infinite repetition of tasks without actual movement or physical fatigue. These advantages suggest that gait rehabilitation using motor imagery may be a promising adjunct therapy. In this short review, I briefly describe the precautions for using motor imagery in clinical practice.

Examination of the Motor Imagery Ability

The assessment of motor imagery ability can be classified based on subjectivity and explicitness. For example, the Kinesthetic and Visual Imagery Questionnaire (KVIQ) offers a subjective and explicit evaluation. Mental chronometry is an objective and explicit evaluation method. On the other hand, mental rotation is objective and implicit. Because motor imagery is multi-faceted in terms of many cognitive functions

and brain regions [2], the results of these measurements are incongruent [3]. Therefore, an appropriate assessment tool should be selected considering the individual characteristics, purpose of the intervention, feasibility, and so on.

When, how, and what Kind of Exercise the Motor Imagery

When

The effects of gait rehabilitation using motor imagery on gait speed are not related to time since the stroke onset [1]. Therefore, in the acute phase, it may be advantageous to repeat one task without actual movement, and in the subacute phase, it is advantageous to be able to repeat indefinitely without physical fatigue. It is advisable to initiate a motor imagery intervention by considering the balance between the risks and benefits.

What Kind of Imagery

From the perspective of physical therapy, the kinesthetic imagery from the first-person perspective has many

advantages over visual imagery, including brain activity [4] and corticospinal excitability [5]. However, the effects of gait rehabilitation using motor imagery on gait speed were not related to the modality of imagery [1]. Furthermore, there is no detailed motor imagery intervention protocol consensus [6]. Therefore, it is recommended to evaluate an individual's motor imagery ability, such as the KVIQ, to better understand the imagery strategy [7].

How

While it is important to consider body posture during motor imagery, this modality has the very powerful advantage of being able to be performed while lying down. However, a posture that matches the movement you imagine provides a better image [8]. Monitoring individuals who perform motor imagery is also important. Successful motor imagery is accompanied by changes in autonomic responses [9]. Verbalization of motor imagery [10] and asking for vividness is also recommended. While its usefulness has not been established [11], it may be better to use log notes for monitoring. The absence of primary motor cortex activity in motor imagery has been discussed previously [12]. If available, it is also recommended to monitor the presence or absence of muscle activity using electromyography. The force of motor imagery affects brain activity and corticospinal excitability [12]. It is also important to consider the parameters of the motor imagery. The brain activity in motor imagery of gait results in brain activity in gait-related regions [13]. In contrast, body-part-specific activation has also been reported in motor imagery [14]. Therefore, we should consider the content of the prescribed motor imagery, whether it is gait or joint motion. Finally, when prescribing motor imagery, it may be better to add not only motor imagery, but also other adjuvant therapies, such as action observation [15].

Conclusion

In summary, we should assess the ability of motor imagery, considering when, how, and what kind of exercise to be incorporated in the motor imagery. Such clinical practice accumulation will help improve the outcomes of very low-certainty evidence.

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