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## Introduction

In stroke rehabilitation, there is in general a relationship between the time spend on therapy and recovery:

- The more a patient practices, the better or faster he/she recovers.
- Mental practice has been put forward as an additional training method that might increase the amount of practice in a safe and cost-efficient way, especially when therapy is limited by the physiological boundaries of the patient (e.g. fatigue) or insufficient therapy time.

We assessed the potential use of movement imagery for learning daily activities in patients after stroke in nursing homes. Mental practice is an intervention in which *the person imagines himself undertaking the skilled movement without actually doing it*. The project was structured according to the cycle process of developing and evaluating complex interventions as suggested by the Medical Research Council.

## Systematic review

In the first step we conducted a systematic review of the evidence of mental practice in patients after stroke.

- Results from the review seemed promising.
- More research was recommended because of small population sizes and variation in the imagery interventions.

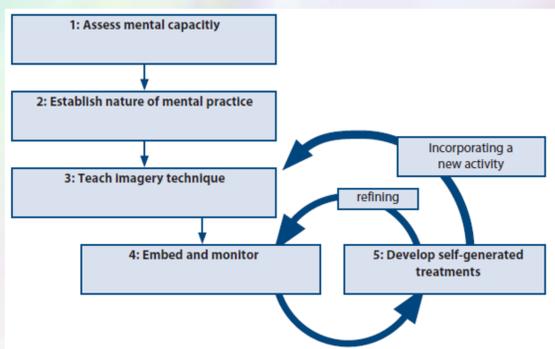


Fig. 1: Five-step protocol to teach and develop imagery skills.

## Develop model

An imagery intervention was developed in which evidence from rehabilitation, sports literature and own experiences were incorporated. A flexible framework allowed tailoring of the intervention to the patient's ability and preferences and a five step protocol (fig. 1) ensured a standard approach in teaching and monitoring the intervention by the therapists.

## Feasibility & Piloting

In the second step the intervention framework was tested (fig. 2) on its feasibility and a patient series was performed. The positive results from the pilot were used to argue decisions for the randomized controlled trial.



Fig. 2: Practising meaningful activities in thought.

## Multi-centre randomized controlled trial (RCT)

A RCT was performed in three Dutch nursing homes in the third step. Over a six weeks intervention period both groups received multi professional therapy as usual with (experimental group) or without (control group) embedded mental practice.

- The primary outcome measure was the patient-perceived effect on performance of daily activities (10-point Likert Scale).
- Six secondary outcomes on impairment and activity level were also assessed at six weeks and six months follow up.
- Primary analysis was performed according to the intention to treat principle. General estimation equations were used to analyze effects.
- A process evaluation was performed.

Thirty-six adult stroke patients were randomly assigned to the control (n=18) or experimental group (n=18). No effect in favor of the mental practice intervention on any outcome measure could be detected at any of the measuring points.

## Conclusions

Embedded mental practice was not better than the current standard of care. Several points within the trial design and execution that may have contributed to the results were recognized and discussed (fig. 3). It however needs to be considered, that previous positive results may not be practical when applied in a general fashion across different facilities providing long-term stroke care.

## Implications

We do not (yet) recommend implementation of the described mental practice framework on a large scale in therapy of patients suffering from stroke in the sub acute phase of recovery. However, there is enough evidence from steps one through three of the MRC guidance and from this research project to continue research (fig. 3):

1. Development. Study underlying mechanisms of why mental practice works in some patients and does not in others (individually and disease related).
2. Piloting. Determining and evaluating clinical pathways to gain a more realistic view on recruitment.
3. Evaluation. Select the best measuring instruments to determine effects on different levels: cognition, emotion and motor performance.

To research possible effects of a complex intervention in patient populations with complex pathologies in complex clinical pathways is not easy. Future research is necessary to determine more realistically what mental practice might contribute to rehabilitation of patients with stroke and which expectations mental practice cannot fulfill.

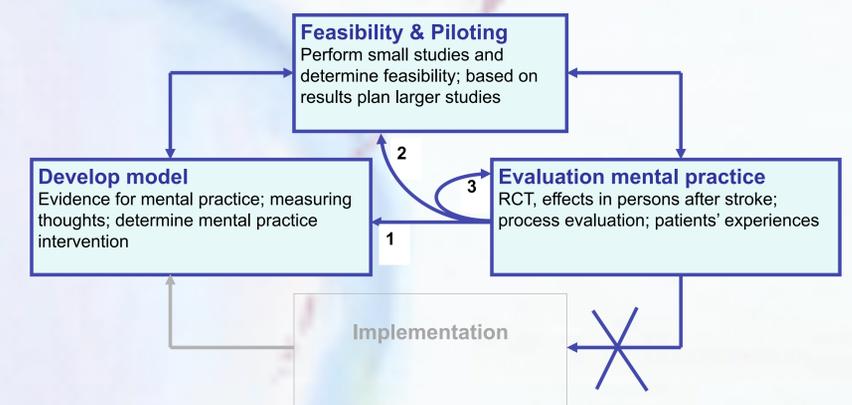


Fig. 4: The four steps within the development and evaluation of complex interventions according to the model of the Medical Research Council (Craig et al. 2008). Further research should focus on the first three steps.

## References

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