BEYOND THE BODY: THE POWER OF EXTERNAL FOCUS OF ATTENTION IN POST-STROKE RECOVERY

By Tami Prado-Tector

KEY POINTS

1. Motor performance parameters (velocity and accuracy) as well as anticipatory EMG activity of soleus and tibialis anterior improve with an external focus of attention during a forward-stepping task in post-stroke patients.

2. Grading the difficulty of a forward-stepping task might be a useful training tool to improve anticipatory postural control and decrease risk of falls in post-stroke patients.

Background and objective

Earlier onset of anticipatory postural adjustments (APA) indicates greater postural control but APAs are commonly impaired post-stroke [1,2], and evidence on techniques for improving APAs is limited [1, 3]. Studies have identified that an external focus of attention improves motor performance including postural control, but most studies involve able-bodied young adults [4].
This study investigated the effects of different foci of attention on APAs and motor performance parameters.

Methods

Adults who:

- Had a stroke >1 month prior
- Could stand independently and scored ≥45 on the Berg Balance Scale
- No spasticity in the hemiparetic leg (≥3 on the Modified Ashworth Scale)

> *"This method enhances movement efficiency, consistency, and APAs, which are critical for stability and falls prevention"*

- Task:
  - Participants performed a forward-stepping task with the barefoot hemiparetic leg reaching for a projected target with instructions to mentally focus on their foot and the foot's motion (internal focus of attention) vs. the middle of the target (external focus of attention)
- Data collected included:
  - EMG activity of the soleus and tibialis anterior of both legs
  - Movement time, peak velocity, time to peak velocity, and movement endpoint variability using a motion-capture system

Results

Twelve participants (8 male) aged 62.5 ± 14.4 showed that an external focus of attention led to significantly better motor performance, including:

- Shorter movement time to reach the target (MT)
- Higher movement peak velocity (PV)
- Shorter time to achieve peak velocity during movement (ttPV)
- Smaller spatial variability at the endpoint (SDT), indicating more consistent movements

- Earlier onset and more efficient anticipatory muscle activity of the soleus and tibialis anterior muscles in both the stance leg and the stepping hemiparetic leg

Limitations

- Small and limited sample with higher balance scores
- One-time assessment does not provide information about learning and retaining ability long-term
- The forward-stepping task is an oversimplification of postural control challenges post-stroke patients face
- Despite instructions for internal vs external focus of attention, we cannot verify that participants adhered to the cues for each testing condition
- Participants were not undergoing any formal rehabilitation at the time of the study

Clinical Implications

The study highlights the benefits of an external focus of attention in improving motor performance and postural control in post-stroke patients. Clinically, we can incorporate strategies that shift patients' attention from their body movements (internal focus) to the effects of their actions in the environment (external focus). Therapists can design tasks that promote an external focus of attention, such as reaching for objects or targets and using functional tasks that promote automaticity. This can be applied in exercises ranging from simple reaching tasks to complex balance activities. Supporting research shows that an external focus can enhance motor learning, increase movement automaticity, and reduce cognitive load, which is particularly beneficial for patients with cognitive impairments due to stroke [5, 6].
Additionally, perceptual feedback from the task elicits neural activity in motor pathways and may enhance motor learning [7]. Therapists should apply these principles of sensorimotor learning, tailoring interventions to individual patient needs and capabilities to enhance recovery [8].

STUDY REFERENCE

Aloraini SM, Glazebrook CM, Pooyania S, Sibley KM, Singer J, Passmore S. An external focus of attention compared to an internal focus of attention improves anticipatory postural adjustments among people post-stroke. *Gait Posture*. 2020;82:100-105. doi:10.1016/j.gaitpost.2020.08.133

MEET THE REVIEWER

Tami Prado-Tecter is a physiotherapist trained in Brazil and currently practicing in Winnipeg, MB. Tami holds an MSc in Rehabilitation Sciences and has experience with patient care in private practice and acute care settings. She is passionate about facilitating functional rehabilitation of people with neurological and pain conditions, while emphasizing the psychosocial and culturally sensitive aspects of care.

Supporting References

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Image
Reference: "Proven Stroke Expertise "