

February 21, 2023



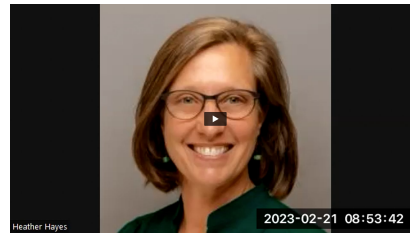
# STROKE SPECIAL INTEREST GROUP

Academy of Neurologic Physical Therapy

## In this newsletter...

- **\*\*NEW\*\*** Assessing Impairments in Visuomotor Adaptation After Stroke
- CSM events to note on your calendar. See you there!
- Did you guess the trivia question correctly?

New Audio recording of the  
Newsletter.  
Quick listen.



Stroke SIG article review summary.

**Completed by:** Jessica Terrell, DPT **THANK YOU!**

**Summary topic title:** Assessing Impairments in Visuomotor Adaptation After Stroke

**Article reference:** Moore RT, Piitz MA, Singh N, Dukelow SP, Cluff T. Assessing impairments in visuomotor adaptation after stroke. *Neurorehabilitation and neural repair*. 2022;36(7):415-425. doi:10.1177/15459683221095166

**Link to full article if available:** <https://pubmed.ncbi.nlm.nih.gov/35616370/>

### **Background:**

Humans often perform routine tasks that require changes to motor patterns to sufficiently adapt for interaction with various objects or environments.

Motor adaptation is the ability of the nervous system to make changes in the body or the environment to reduce errors.

For individuals with chronic stroke, motor adaptation is reduced resulting in difficulty using error feedback when interacting with the environment.

Visuomotor rotations are a common method for assessing error feedback for arm movements.

These visuomotor rotation tasks create discrepancies between the position of one's arm and a feedback cursor in a virtual space. The resulting error can estimate the nervous system's ability to adapt arm movements.

**Purpose:**

Establish a relationship between visuomotor adaptation and motor impairment in persons following a stroke.

**Methods:**

65 participants were recruited.

36 participants were individuals post-stroke, in either the sub-acute or chronic phases.

29 individuals were matched controls.

**TASK:** Participants performed reaching movements with their arm supported by a robotic exoskeleton. Their arm was occluded from their view by a metal shutter to reduce visual feedback. The stroke group completed the task with their effected arm and the control group performed with their dominant arm.

**ASSESSMENTS:** included imaging and lesion delineation for participants with stroke.

Clinical assessments included: a) Fugl-Meyer Assessment of Motor Recovery – Upper Extremity Motor Assessment; b) Chedoke–McMaster Stroke Assessment – Arm Impairment Inventory; c) Thumb Localization Test; **(A video of this test <https://vimeo.com/138227545>)** d) Modified Ashworth; e) Montreal Cognitive Assessment; f) conventional sub-tests of the Behavioral Inattention Test; g) Functional Independence Measure.

The visual motor adaptation task was divided into baseline, adaptation, and washout phases. 25 baseline movements were performed with the cursor aligned with the index finger. The cursor was realigned to 30 degrees counter clockwise and was performed for 125 movements. For the washout period, the cursor was realigned with the index finger and performed for an additional 25 movements. Adaptation was measured by angular deviation of the hand relative to the straight line from the starting point and the goal target. Initial adaptation, the average reach of the first 5 trials/ block, Final Adaptation, the average reach of the first 5 trials/ block, and trials to adapt were recorded.

**Results of interest:**

Both control and stroke groups initially performed accurate movements in the baseline phase, with the stroke group demonstrating more variable baseline movements. Participants in the control group performed a greater amount of initial adaptation than the stroke group. The range of final adaptation in the stroke group was more variable than in the control group, though 53% of participants did have noticeable impairment in adaptation.

Participants in the stroke group required more trials to adapt than the control group.

**Initial adaptation did not differ between stroke participants who had their non-dominant versus dominant arm effected. However, participants who had their dominant arm effected demonstrated poorer in final adaption. There was not a significant difference in trials needed to adapt.**

FMA-UE and FIM scores did not correlate with initial adaptation or Trials to adapt but did positively correlate with final adaptation.

**Discussion, take home message:**

Following stroke, a patient may have impairments in visuomotor adaptation. Impairment ranges for these patients ranged from 0% to 47%. While there was a reduction in the initial adaptation period, it was not significant enough to classify participants as impaired. Participants following a stroke demonstrated impairments in final adaptation and most significantly, trials needed to adapt.

The data also demonstrated a weak correlation between the chronicity of the stroke and initial adaptation.

Arm dominance also plays a role in visuomotor adaptation. Average levels of final adaptation were reduced in participants who had the dominant arm affected. For participants with the nondominant arm affected, final adaptation was more similar to that of controls but they still required more trials to adapt. More research is needed to assess adaptation and motor skill learning following stroke as well as development of bedside tools that can be used in clinical examination

**Additional reference:** Characterization of the Adaptation to Visuomotor Rotations in the Muscle Synergies Space. This article examines how visuomotor adaptation effects muscle synergies at the musculoskeletal level.

<https://www.frontiersin.org/articles/10.3389/fbioe.2020.00605/full>

Save these dates for CSM 2023, San Diego  
See you there!  
Great Stroke content.  
Great Stroke SIG events. We can connect.



**Wednesday, 2/22/2023 Join us for Stroke SIG social gathering. 6 – 7 pm.** Odysea Waterfront Lounge, Hilton Bayfront, San Diego. 1 Park Boulevard (Next to the Convention Center)

**Thursday, 2/23/2023 Join us for the SIG Welcome event and awards.** 6:30 – 7:30 am. Hilton Bayfront – Sapphire UMN

**Thursday, 2/23/2023 ANPT Networking Mixer.** 7:30 – 9:00 pm. Hilton Bayfront – Indigo AE

**Friday, 2/24/2022 ANPT Business Meeting/Awards/Myelin Melter.** Hilton Bayfront – Indigo DH. Great SWAM from the Stroke SIG - come to our booth.

Stroke specific content.

Wed. 2/22 Pre-con. 8:00 AM - 5:00 PM

**NE-13859** Swing into Action: Applying the Clinical Practice Guideline on Afo and Fes Poststroke into Practice

**\*1-day Preconference Course**

*Lisa E. Brown, PT, DPT, Therese E. Johnston, PT, MSPT, MBA, PhD, Louis N. Awad, PT, DPT, PhD, Elizabeth Danielle Cornforth, PT and Sally Dibello*

*San Diego Convention Center - Room 30D (Upper Level)*

Thursday 2/23 3:00 PM - 5:00 PM

**NE-15205** Neurology Platform 2: Degenerative Diseases and Stroke

Friday 2/24 11:00 AM - 1:00 PM

**NE-14286** Combining Motor-Learning Principles with High-Intensity Training to Enhance Locomotion Post-Stroke: Identifying the Skill of Gait-Training

**Thomas George Hornby, PT, PhD, FAPTA, Darcy Schwartz Reisman, PT, PhD, FAPTA, Kristan Anne Leech, PT, DPT, PhD and Carey Lane Holleran, PT, MPT, DHS**

Hilton Bayfront - Indigo BCFG (Level Two)

Handout(s) available

**Poster sessions 1 – 3. Numbers 2001 - 2065**

Saturday 2/25 8:00 AM - 10:00 AM

**NE-14214** Bridging Care Gaps with Music-Based Digital Interventions: Evidence in Stroke, Multiple Sclerosis, and Parkinson Disease

**Louis N. Awad, PT, DPT, PhD, Theresa D. Ellis, PT, PhD, FAPTA, Brian Harris and Francois Bethoux**

Hilton Bayfront - Indigo AE (Level Two)

Handout(s) available

---

Challenge your knowledge.

This final question changed up the winners quite a bit. We will tell you the correct answer next week!

21. Bonus: Which was the preferred snack for the CPG development group?

Trail mix

CORRECT ANSWER:

Chocolate chip cookies

Chocolate covered ginger

Chocolate Covered Ginger.  
Most of you got it right.

Emmy's Lemon coconut  
cookies

---

**VISIT THE STROKE SIG ONLINE!**





**Academy of Neurologic Physical Therapy**  
info@neuropt.org | www.neuropt.org

**ANPT Social Media**



Academy of Neurologic Physical Therapy | 1935 County Road B2 W Ste 165, American Physical  
Therapy Association, Roseville, MN 55113

[Unsubscribe info@neuropt.org](mailto:info@neuropt.org)

[Update Profile](#) | [Constant Contact Data  
Notice](#)

Sent by info@neuropt.org powered by



Try email marketing for free today!