3-2019

Best Practice for Increasing Upper Extremity Sensory Function after a CVA

Holly Nagy
Western Michigan University, holly.t.nagy@wmich.edu

Christie Schmitt
Western Michigan University, christie.n.schmitt@wmich.edu

Best Practice for Increasing Upper Extremity Sensory Function After a CVA

Holly Nagy & Christie Schmitt

Western Michigan University

1. Ask: Research Question

What is the most effective approach for increasing upper extremity sensory function after a CVA?

2a. Acquire: Search

Databases: Clinical Key, Proquest, WMU Library
Patient/Clinic group: CVA
Intervention: Increasing upper extremity (UE) sensory function
Comparison: No treatment, standard occupational therapy
Outcomes: Increased UE sensory function after CVA

2b. Acquire: Selected Articles

Carey, MacDonnell, & Matyas (2011): Randomized parallel-group controlled trial, with blinding of subjects, clinical assessors, and data analysts. Participants received somatosensory (feeling of temperature, pressure, vibration, etc.) touch discrimination training or repeated exposure to sensory stimuli in 60-minute sessions for a total of 10 hours.

Wu, Huang, Chen, Lin, & Yang (2013): Randomized controlled trial, single-blinded with pretest, posttest, and follow-up assessments. Participants were randomized to receive treatment 1.5 hours/day, 5 days/week, for 4 weeks, with the mirror therapy group receiving 60 minutes of mirror therapy followed by 30 minutes of task-oriented functional practice and the control group receiving 90 minutes of task-oriented functional practice treatment.

Cambier, Corte, Danneels, & Wittvrouw (2002): Randomized, controlled preliminary trial that compared the application of intermittent pneumatic compression with a passive treatment strategy.

Schaubrun & Hillier (2009): Systematic review of the volume and quality of the evidence available for both passive and active sensory training following stroke. As well as an aim to quantify the effect of sensory training on impairment and function.

3a. Appraise: Study Quality

Carey, MacDonnell, & Matyas (2011): Level 2, n= 50. Strengths: Randomized participants with control group. Blinding of subjects, clinical assessors, and data analysts. Experimental group showed improvements at all 5 reassessments in vibration and pressure sensation. Limitations: Limited time frame and small sample size. All 3 outcome measures were combined into one measure making it difficult for study replication.

Wu, Huang, Chen, Lin, & Yang (2013): Level 2, n= 33. Strengths: Randomized participants with control group. Single blinding of therapist. Showed promising effects on temperature and sensory recovery. Limitations: Limited time frame and small sample size. Chance of Type 1 error (rejection of true null hypothesis) = .05. Limited to mild to moderate severity of CVA.

Cambier, Corte, Danneels, & Wittvrouw (2002): Level 2, n= 23. Strengths: Nottingham Sensory Assessment was designed specifically to measure sensory impairment after a CVA and monitors recovery over time and has good intra-rater reliability. The Nottingham Sensory Assessment for sensory function was 50.2% higher than the control group at end point. Intermittent pneumatic compression is inexpensive and not labor-intensive Limitation: Limited time frame and small sample size. Potential reimbursement difficulties as current occupational therapy practices focus more on occupation-based activities.

Schaubrun & Hillier (2009): Level 1, n= 199, 14 studies. Strengths: Large sample size. Limitations: Of the 14 studies, only 2 interventions were for improving UE sensory function. Neither studies were statistically significant and did not have control groups.

3b. Appraise: Study Results

Carey, MacDonnell, & Matyas (2011): Experimental group had greater improvements in sensory discrimination (p=.004) meaning treatment was significant.

Wu, Huang, Chen, Lin, & Yang (2013): Experimental group had improvements in temperature (p=.04), pressure (p=.07), and bilateral simultaneous touch (p=.08).

Cambier, Corte, Danneels, & Wittvrouw (2002): Experimental group had improvement in Nottingham Sensory Assessment score (p=.027), tactile sensation (p=.039), and stereognosis (p=.013). Kinesthetic sensation (p=.050) and two point discrimination (p=.926) did not have statistically significant results.

Schaubrun & Hillier (2009): Both interventions had insufficient statistical effects therefore, a meta-analysis could not be performed.

4. Apply: Conclusions for Practice

Intermittent pneumatic compression was the most effective intervention for sensation recovery post stroke, specifically for tactile sensation. SENSe (Neuro rehabilitation) was the most effective intervention for somatosensory function post stroke. However, further high quality research is required to investigate interventions for improving other aspects of sensory function.

References

Cambier, D., Corte, E., Danneels, L, & Wittvrouw, E. (2002). Treating sensory impairments in the post-stroke upper limb with intermittent pneumatic compression. Results of a preliminary trial. *Clinical Rehabilitation 2003,* 17, 14-20. Retrieved from https://searchproquestcom.libproxy.library.wmich.edu/docview/200756963?accountid=15099&rfr_id=info%3Axri%2Fsid%3Aprimo

Carey L, Macdonell R, Matyas, T (2011). SENSe: Study of the effectiveness of neurorehabilitation on sensation: A randomized controlled trial. *Neurorehabilitation and Neural Repair*, 25(4), 304–313. doi:10.1177/1545968310397705

Schabrun, SM & Hillier, S (2009). Evidence for the retraining of sensation after stroke: A systematic review. *Clinical Rehabilitation*, 23, 27-39. Retrieved from https://journalssagepubcom.libproxy.library.wmich.edu/doi/pdf/10.1177/0269215508098897

Wu, C., Huang, P., Chen, Y., Lin, K., & Yang, H. (2013). Effects of mirror therapy and sensory recovery in chronic stroke: A randomized controlled trial. *Archives of Physical Medicine and Rehabilitation, 94*, 1023-1030. Retrieved from https://www.archives-pmr.org/article/S0003-9993(13)00132-9/fulltext

Intermittent pneumatic compression is most effective for tactile sensation (touch and texture discrimination) recovery post stroke, while SENSe (neuro rehabilitation) is the most effective for other somatosensory function (vibration and pressure) post stroke.

College of Health and Human Services
Department of Occupational Therapy
Western Michigan University