

Improving Functional Mobility Following a Basal Ganglia Stroke

J Covilli, BS

University of New England

Background

- The basal ganglia are located in the and are involved in voluntary motor control, emotional reactions, and cognition¹.
- The putamen is housed in the basal ganglia, and is involved in learning and motor skills¹.
- Stroke is the 4th leading cause of death in the U.S. and leads to 1 out of every 19 deaths².
- Stroke is the largest cause of disability in older adults, and the largest consumer of rehabilitation services in the U.S.
- Hypertension is a major risk factor for causing a stroke, and over 90% of patients that have had a basal ganglia stroke have also had stage 2 hypertension (160/100)²

Figure 1

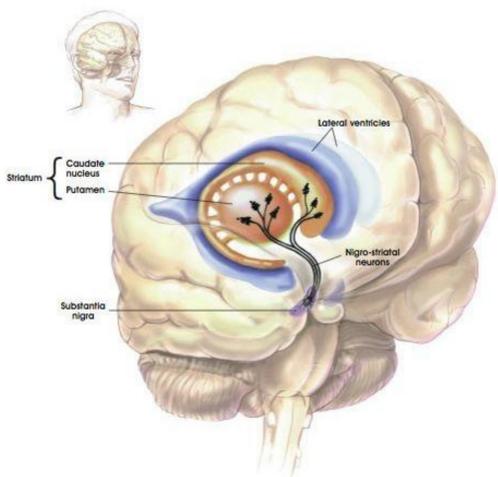


Figure 1 shows the location of the basal ganglia in the brain. The main components of the basal ganglia are the Caudate Nucleus, the putamen, the globus pallidus, the substantia nigra, the nucleus accumbens, and the subthalamic nucleus².
Kirk ST. Sleep and Neurology. Sleep Neurology Web site. 2011. Available at: <http://www.sleepneurology.com/2011/08/parkinsons-disease-part-1.html>

Purpose

- The purpose of this case report is to summarize the physical therapy management for improving independent functional mobility following a left basal ganglia stroke in the outpatient setting.

Patient History

- JD is a 55 year old male that had a left basal ganglia stroke, specifically to his left putamen in March of 2012.
- JD has a history of hypertension since 1999, and a history of low back pain since 2004.
- He lives at home with his supportive wife. He has two adult daughters that don't live with him, but help support him when needed.

Initial Functional Mobility

Bed Mobility	
Logrolling	Contact Guard Assistance
Supine to Sit	Contact Guard Assistance
Sit to Supine	Contact Guard Assistance
Transfers	
Sit to Stand	Contact Guard Assistance
Stand to Sit	Contact Guard Assistance
Car Transfers	Minimum Assistance in and out of the car
Gait/Balance	
Time	5 minutes
Assistive Devices	Bilateral Ankle Foot Orthoses (AFOs), quad cane.
Assistance	Contact Guard Assistance
Stairs	Ascends and descends non reciprocally, with his quad cane, and with contact guard assistance
Balance	Berg Balance score of 27/56 (high fall risk)

Impairments

- Decreased right sided lower extremity strength, active range of motion, sensation, proprioception, and functional mobility
- Increased muscle tone of his right upper extremity
- Impaired balance and coordination.
- Impaired cognition
- Impaired communication (Broca's aphasia)
- Decreased respiratory capacity and exercise tolerance

Interventions

- The main focus of his interventions were to improve his functional mobility, balance, and lower extremity strength and active range of motion
- JD needed frequent breaks between interventions due to his decreased respiratory capacity and exercise tolerance
- Interventions to improve functional mobility were performed at almost every treatment
- All interventions were performed in the parallel bars with a gait belt on for safety.
- Common Interventions performed are pictured below

A: Step Ups/Step Downs



B: Heel to Toe Walk



C: Ball Toss on Uneven Surface D: Step Over Obstacle*

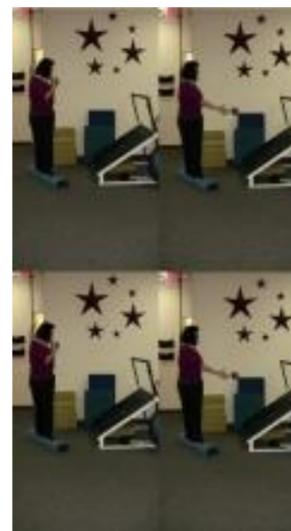


Figure 2

Figure 2 shows interventions commonly used with JD to target his lower extremity strength, his balance, and his coordination. All pictures came from the reference below.
HEP 2 Go. The HEP 2 Go Web site. 2014. Available at: https://www.hep2go.com/index_b.php?userRef=0

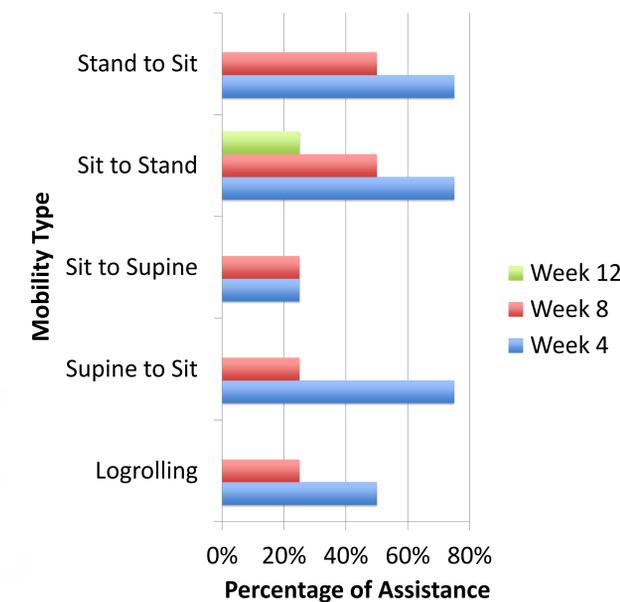
*Often tapped ilioasos to facilitate hip flexion³⁶

Outcomes

- JD was still receiving physical therapy at the end of my clinical rotation, so I was unable to perform a discharge evaluation.

Figure 3

Figure 3 shows the amount of assistance JD needed with his mobility at week 4, week 8, and week 12 of his treatment.



Discussion

- Positive factors in JD's improvement include: his motivation to improve, family support, treatment from an interprofessional team, and improved exercise tolerance as treatment progressed.
- Negative factors limiting JD from further improvement include: his age, cognitive impairments, fear of falling, and slower than expected improvements in strength and active range of motion.

References

1. Shumway-Cook A, Woollacott MH. *Motor Control: Translating Research into Clinical Practice*. 3rd Ed. New York: Lippincott Williams & Wilkins; 2012
2. Gutman SA, Schonfeld AB. *Screening Adult Neurologic Populations*. 2nd Ed. AOTA Press, Bethesda, 2009