UNIVERSITY OF ST. AUGUSTINE FOR HEALTH SCIENCES

Shock and Awe: Functional strength training to improve balance and function in a patient post electrocution

Amanda K Boone SPT and Anne H Boddy PT, DPT, NCS

BACKGROUND PURPOSE:

An electrical injury is defined as an injury caused by an electrical current passing through the body. Occupational fatalities due to electrical contact account for approximately 9% of deaths yearly in the industrial industry.[1] Patients may also present with prolonged arrhythmias and concurrent problems such as stroke or heart attack.[2]

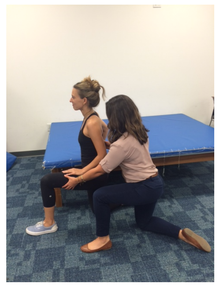
The purpose of this case study is to study the effects of functional strength training rehabilitation in a patient post electrocution suffering from a concurrent stroke.

CASE DESCRIPTION:

The patient was a 62 year old male retired plumber who suffered from an electrocution accident resulting in an ischemic attack to the left middle cerebral artery. Outcome measures in this study included:

- Numeric Pain Rating scale
- Lower Extremity Functional Scale
- Tinetti Balance Testing
- Manual Muscle Testing

Functional strengthening and balance training was used for 7 weeks following the electrocution accident to restore strength, balance, and proprioception to the right lower extremity and regain functional independence.



INTERVENTION:

Table 1: *Functional strengthening and balance training activities*

Weeks 1-4	Weeks 5-7
Seated BAPS board exercises	SLR x 3 directions AROM
Recumbent Biking x 8 minutes	Combined bridging/adduction ball squeezes
Seated coordination exercises	Gait Training Exercises in ladder- Side stepping, high knees
Functional Sit to Stand	Lateral Step Downs
Hip Adduction Ball Squeezes/Bridging	Fall Recovery Strength Training- Tall Kneeling, Half Kneeling, Floor to Mat transfers
Theraband 4-way ankle exercises	Recumbent Bicycle x 10 minutes with varying resistance
Standing heel raises with weight shifting	Treadmill walking x 2.0 miles per hour x 6 minutes
Stair stepping foot placement exercises	

RESULTS:

Table 2: *Manual Muscle Testing Pre-treatment*

	Left Lower Extremity	Right Lower Extremity
Hip Abduction	3+/5	3+/5
Hip Extension	3+/5	3+/5
Hip Flexion (painful on left)	4-/5	4-/5
Knee Extension	4+/5	4-/5
Knee Flexion	4+/5	4+/5

Table 3: *Manual Muscle Testing Post-treatment*

	Left Lower Extremity	Right Lower Extremity
Hip Abduction	5-/5	4/5
Hip Extension	5-/5	5-/5
Hip Flexion (painful on left)	4+/5	4/5
Knee Extension	5/5	4+/5
Knee Flexion	5/5	5/5

Table 4: *Outcome Measure Results*

	Pre Treatment Score	Post Treatment Score
National Pain Rating Scale	8/10	0/10
Tinetti Balance Test	15/24	23/28
Lower Extremity Functional Scale	24/80	34/80

DISCUSSION:

At discharge the patient reported regaining full independence with functional activities such as driving, ambulation within the home, and donning/doffing clothing. Noted improvements included the Lower Extremity Functional Scale by 10 points and the Tinetti Balance Test score from a high fall risk to a moderate fall risk..

CONCLUSION:

75 percent of patients diagnosed with stroke each year report limitations in mobility that result in decreased ambulation speed and independence.[3] Functional recovery reflects an individual's ability to perform activities of daily living with functional independence, decreased compensation, and normal community ambulation speed.[3] Through the use of functional strengthening, this patient experienced significant gains towards functional independence in bed mobility, don/doff clothing, stair negotiation, and home improvement hobbies.

REFERENCES:

1. Janicak CA. Occupational fatalities due to electrocutions in the construction industry. *J Safety Res.* 2008; 39(6): 617-621. doi: 10.1016/j.jsr.2008.10.007.

2. Yew, Kuan. Electrocution Induced Symptomatic Bradycardia Necessitating Pacemaker Implantation. *Heart Views.* 2014 Apr-Jun; 15(2): 49-50. doi: 10.4103/1995-705X.137497

3. Sullivan KJ, Klassen T, Mulroy S. Combined task-specific training and strengthening effects on locomotor recovery post-stroke: A case study. *Journal of Neurologic Physical Therapy.* 2006;30(3):130-41. http://search.proquest.com.prx-usa.lirn.net/docview/213738387?accountid=158603

This case report was required for partial fulfillment for the Doctor of Physical Therapy degree (DPT) at the University of St. Augustine for Health Sciences.