Neuromuscular Electrical Stimulation and Post--Stroke Glenohumeral Subluxation

Tera Richards
Western Michigan University, tera.a.richards@wmich.edu

Jason Colon
Western Michigan University, jason.l.colon@wmich.edu

Follow this and additional works at: https://scholarworks.wmich.edu/ot_posters

Part of the Occupational Therapy Commons

WMU ScholarWorks Citation
Richards, Tera and Colon, Jason, "Neuromuscular Electrical Stimulation and Post--Stroke Glenohumeral Subluxation" (2015). Occupational Therapy Graduate Student Evidenced-Based Research Reviews. 4. https://scholarworks.wmich.edu/ot_posters/4

This Article is brought to you for free and open access by the Occupational Therapy at ScholarWorks at WMU. It has been accepted for inclusion in Occupational Therapy Graduate Student Evidenced-Based Research Reviews by an authorized administrator of ScholarWorks at WMU. For more information, please contact wmu-scholarworks@wmich.edu.
Neuromuscular Electrical Stimulation and Post-Stroke Glenohumeral Subluxation

Tera Richards, BS & Jason Colon, BS
College of Health and Human Services
Western Michigan University, Kalamazoo MI 49008

Introduction

A cerebral vascular accident (CVA) occurs when the blood supply to the brain is interrupted, either because a blood vessel has been occluded or the blood vessel has ruptured. This typically results in hemiplegia or paralysis of the muscles on the side of the body contralateral to the lesion site within the brain.

The humeral head sits in the glenoid cavity and is stabilized by the labrum; the glenohumeral, coracohumeral, and coracoacromial ligaments; the infraspinatus, teres minor, subscapularis, supraspinatus, and the deltoid. The deltoid and the supraspinatus muscles are noted as the greatest contributors towards counteracting glenohumeral subluxation (GHS).

Post-stroke hemiplegia renders the muscles ineffective in contributing to the stability of the humerus and counteracting gravitational forces, therefore weaker structures, like the ligaments and the labrum, are unsuccessfully relied upon for support. This can lead to GHS, which is diagnosed through radiographs or palpation (see figures 1-3). GHS has a reported prevalence of 17%-64%.

Neuromuscular electrical stimulation (NMES) is the electrical stimulation of an intact lower motor neuron for the purpose of stimulating paretic muscles. NMES can be likened to an electrical form of shoulder support. NMES has been noted to be effective in preventing or treating GHS.

Methods

Objective: To investigate the effectiveness of NMES for treating or preventing post-stroke GHS

Databases Searched: PubMed, Medline, Cochrane, PEDro, CINAHL, Proquest, Scopus

Keywords Used: Stroke, Electrical Stimulation, Subluxation

Results: From Baseline to End of Treatment:

- A significant (p ≤ 0.05) decrease in subluxation was reported in 5 of the studies.
- In contrast, 4 studies did not demonstrate a significant decrease in subluxation; however, 2 of those studies indicated a significant decrease in subluxation only in the short duration hemiplegia subgroup.

From Baseline to Follow up:

- Of the 4 studies that included a follow up assessment, 1 reported a significant reduction in subluxation while 2 studies did not.
- The last study indicated an increase in subluxation at follow up, although a comparison was not made to the baseline measurement.

Conclusion

Overall, the selected studies demonstrated that NMES is effective in treating post-stroke GHS, however the studies do not indicate that NMES is effective in preventing GHS.

The studies suggest that NMES has greater effectiveness for reducing GHS when used in earlier post-stroke stages and that once NMES has been discontinued that the gains made during the treatment period may be reduced.

Implications

On average the duration of NMES required per treatment session exceeds a typical 60 minute therapy session, therefore NMES may be better suited for at home use. Occupational therapists should provide patient and family education on the at home use of NMES in order to maximize patient recovery.

Future high quality studies are needed to address the best time to use NMES post-stroke and the most effective form of NMES, as well as NMES’s role in prevention of GHS. As technology, such as implanted forms of NMES evolve, future studies may be warranted to assess its effectiveness on GHS.