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THE USE OF NEUROMUSCULAR ELECTRICAL STIMULATION (NMES) IN GLENOHUMERAL UNIDIRECTIONAL INSTABILITY WHEN AN EXERCISE BASED APPROACH HAS FAILED: A CASE REPORT

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INTRODUCTION

- Anterior shoulder instability represents 95% of traumatic instability cases.¹
- Glenohumeral internal rotation deficit (GIRD) is a commonly seen unidirectional instability among overhead athletes.²
- PT interventions for GIRD includes manual techniques and flexibility exercises to improve range of motion (ROM) followed by strength training of the scapular and the rotator cuff (RTC) muscles to improve stability during overhead activities.³ Neuromuscular re-education through neuromuscular electrical stimulation (NMES) is used in neurologic population for the shoulder instability, but not commonly used in orthopedic PT.⁴
- Purpose of this case study was to report the role of NMES to restore strength and normal motion in a patient with unidirectional shoulder instability or GIRD.

CASE DESCRIPTION

- A 23-year-old female PT student
- H/O two traumatic right anterior shoulder dislocations 7 and 3 years ago followed by multiple shoulder subluxations and dislocations; 2-3 subluxation/week and one dislocation every 2-3 months.
- Aggravating factors: Overhead activities, practicing lifting and transfers techniques in school.

Physical Findings:

- Severe limitation in active and passive IR due to the tight joint capsule in the posterior direction. Tightness and trigger points in upper trapezius (UT), levator scapulae (LS), and infraspinatus (IFS).
- Loss of motor control during arm elevation due to severe weakness of the rotator cuff (RTC) and the scapular muscles.

INTERVENTIONS

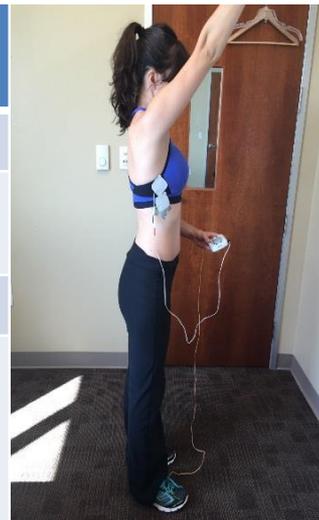
Visits 1-6: Dry needling to the UT, LS, and IFS, Maitland Grades III and IV during the posterior humeral glide, and followed by the sleeper stretch to gain full passive ROM.

Visits 7-11: Periscapular muscles exercises focusing on the serratus anterior (SA), RTC, middle trapezius, and lower trapezius to gain active ROM and improve motor control during the overhead arm elevation. However, no upward rotation of the scapula was observed during arm elevation after 5 weeks resulting in lack of active ROM even though the patient had full passive ROM.

Visits 12-18: NMES (30Hz, 300µs, symmetrical waveform; 5 days/week) along with patient performing active shoulder flexion and abduction motion to re-educate the SA to normalize the scapulohumeral rhythm. Initially patient tolerated NMES for only 2-3 minutes/session but then progressed to 15 minutes/session by the 7th week. The patient continued with the home exercise program.

RESULTS

Outcome Measures	At baseline	At 9 Weeks
IR AROM	40°	80°
MISS	49/100	85/100
NPRS	7/10	0/10
RTC and scapular muscles MMT	2+/5	5/5



DISCUSSION

- NMES is commonly used in patients with cerebrovascular accidents for neuromuscular reeducation (NMReEd) to improve shoulder stability and reduce subluxations.
- The use of NMES for serratus anterior NMReEd played a pivotal role in achieving successful outcomes when the SA did not respond to the traditional strengthening exercises.

CONCLUSION

Based on our results, NMES use shall be explored as a complementary modality to other therapeutic interventions used in orthopedic rehabilitation.

REFERENCES

- Satterwhite YE. Evaluation and management of recurrent anterior shoulder instability. J. Athl. Train. 2000;35(3):273-7.
- Burkhart SS, Morgan CD, Kibler, WB. The disabled throwing shoulder: Spectrum of pathology Part I: Pathoanatomy and biomechanics. Arthroscopy. 2003;19(4):404-420.
- Burkhart SS, Morgan CD, Kibler WB. The disabled throwing shoulder: Spectrum of pathology part III: The SICK scapula, scapular dyskinesis, the kinetic chain, and rehabilitation. Arthroscopy. 2003;19(4):641-661.
- Gu, P., Ran, J.-J. Electrical Stimulation for Hemiplegic Shoulder Function: A Systematic Review and Meta-Analysis of 15 Randomized Controlled Trials. Arch. Phys. Med. Rehabil. 2016;97(9):1588-1594.