The Effects of Cryotherapy, Weight-Bearing Exercises, and Transcutaneous Electrical Nerve Stimulation on Upper Extremity Unilateral Spasticity after Stroke.

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Introduction

Cryotherapy, weight bearing exercises and transcutaneous electrical nerve stimulation (TENS) are all useful modalities that have been shown to help reduce spasticity individually. This study aims to examine the impact of sequencing and combining these modalities on upper extremity (UE) unilateral spasticity in individuals who have experienced a stroke.

Methods

Two adult participants status post stroke > 6 months were screened and enrolled in the study. Each participated in a 90-minute program, five days a week for three weeks.

The participants completed pre-treatment testing, testing before and after each treatment session, and post treatment testing. Testing included:

- Modified Ashworth Scale (MAS)
- Active Range of Motion (AROM)
- Canadian Occupational Performance Measure (COPM)
- Spasticity Quality of Life (SQoL)

Treatment involved the sequenced use of cryotherapy in the form of an ice bath for the more affected wrist and hand followed by 30-minute TENS application for the wrist and finger extensors combined with weight bearing exercises.

The elbow, wrist and fingers were tested daily before the session and after the session for spasticity active movement using the MAS and AROM.

Results

For both participant 1 and 2, spasticity in the elbow flexors decreased as indicated by lower MAS scores. Participant 1 also showed decrease in wrist flexor spasticity and participant 2 showed a decrease in finger flexor spasticity.

Figure 1

Participant 1 Elbow Flexor MAS

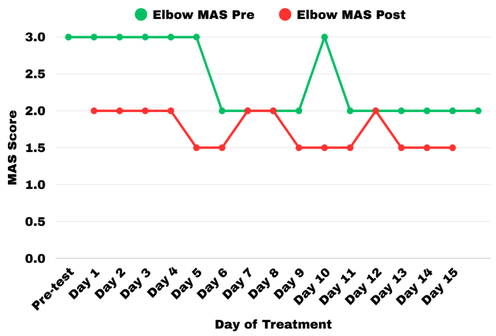
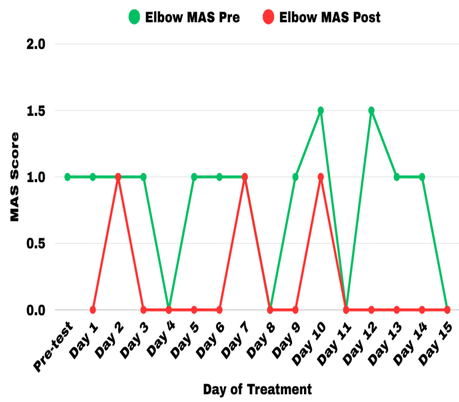


Figure 2

Participant 2 Elbow Flexor MAS



The COPM showed an increase in satisfaction and performance scores in both participants with a mean increase of 2.2 for satisfaction score and 0.8 for performance score. The SQoL showed a slight decrease in the quality of life score of participant 1 from 58.33 to 54.17 and the score remained the same for participant 2 at 79.16.

Discussion

Both participants showed decreased spasticity and increased AROM in the areas addressed. This suggests that sequencing and combining cryotherapy, weight-bearing exercise, and TENS may be an effective strategy for reducing spasticity in the more-affected UE after a stroke.

Both participants reported improved performance and satisfaction with the COPM for preferred ADL. The SQoL slightly declined or did not change for these participants despite the MAS, AROM, and COPM gains.

Conclusion

The combination of of cryotherapy, weight-bearing exercises, and TENS may reduce spasticity and aid in increasing AROM in the distal UE for individuals with spasticity after stroke. Future research that combines this treatment with a home program and a weight-bearing splint is needed to potentially further improve the outcome. Incorporating these findings into clinical practice may assist in reducing spasticity in the UE and possibly increase the quality of life for stroke survivors.

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Acknowledgement & Contact information

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