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Kara Johnsen  
*Western Michigan University*

Jessica Tariske  
*Western Michigan University*

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# Functional Electrical Stimulation Compared to Stretching/Strengthening Interventions for the Multiple Sclerosis Individual

Kara Johnsen, OTS and Jessica Tariske, OTS

## Background

In an outpatient clinic for adults, the OT frequently works with clients diagnosed with Multiple Sclerosis. Personalized interventions that include stretching and strengthening to maintain UE function are typically used for this clientele within this setting. The OT has seen results with UE stretching and strengthening but is curious to know if there are any other interventions that can be used with his MS patients in order to maintain function. The therapist has looked into a new intervention of functional electrical stimulation. FMES is an emerging intervention that is being used to strengthen muscles through electrical impulses. Repetitive muscle contractions are then elicited through the use of these impulses. The OT wants to know the efficacy of routine use of functional muscular stimulation for the MS client compared to a program of light stretching and strengthening.



## 1 Ask: Research Question

What is the efficacy of the use of functional electrical stimulation for the MS client for maintaining upper extremity function, compared to a program of stretching/strengthening?

## 2a Acquire: Search Terms

**Patient/Client group:** Multiple Sclerosis, MS, Upper Extremity, UE, Transverse Myelitis **Intervention:** Neuromuscular Electrical Stimulation, Electrical Stimulation, NMES, Stretching, Strengthening, Functional Electrical Stimulation, Resistance Training **Comparison:** Any, Difference, Between, Compared **Outcome:** Maintaining UE Function, Increased Function, Performance, Occupations, Functional Mobility, ROM, Strength, Stretching, ADL's, IADL, Activities, Occupations

## 2b Acquire: Selected Articles

**Barrett et al. (2009):** A randomized control trial (RCT) that examines the effects of both functional electrical stimulation and therapeutic exercise on walking performance for the multiple sclerosis individual.

**Broekmans et al. (2010):** A randomized control trial (RCT) that examines the effects of both long-term resistance training and simultaneous electro-stimulation on lower extremity muscle strength and functional mobility for the multiple sclerosis individual.

**Esnouf et al. (2010):** A randomized control trial (RCT) that measures the impact of using a functional electrical stimulation device on activities of daily living in individuals with dropped foot secondary to multiple sclerosis. Satisfaction and improvement in activities of daily living were measured by the Canadian Occupational Performance Measure.

**Kjølhede et al. (2012):** A systematic review that examines the effectiveness of progressive resistance training in the multiple sclerosis individual.

## 3a Appraise: Study Quality

**Barrett et al. (2009):** fairly small n-size, first study examining FES to widely accepted intervention of exercise, results should be generalized with caution to the MS population as a whole, limitations: representation of a highly selected group of clients, clinical assessors were not blinded to the interventions and also provided treatment, which then contributed to measurement bias.

**Broekmans et al. (2010):** fairly small n-size, through findings found it may be beneficial in exploring this research to cognitive deficits during resistance training, results should be generalized with caution to the MS population as a whole, limitations: investigator blinding, which was only the case for the research neurologist and all the investigators during baseline measurements leading to bias and influenced results.

**Esnouf et al. (2010):** fairly small n-size, first patient-centered outcome measure reported in the assessment of FES devices, results should be considered to be representative of the MS population that requires use of ankle-foot orthosis for functional mobility, limitations: Odstock dropped foot stimulator led to a reduction of activity, making an interpretation in the comparison difficult, no known proportion of the time spent at home using the AFO could be documented, client report.

**Kjølhede et al. (2010):** large n-size, moderate amount of publications included in systematic review, results can be generalized to the the population of MS as a whole, limitations: less convincing evidence existing that progressive resistance training improves functional capacity, balance, mood, and quality of life, general lack of blinding of both assessors and participants.

**3b Appraise: Study Results** There is strong evidence that progressive resistance training and/or stretching/strengthening intervention successfully increased lower extremity muscle strength. However, there are findings that suggest that there was a modest increase in upper extremity strength when muscle groups were specifically targeted in the same type of strengthening, stretching, and progressive resistance training. In comparison, functional electrical stimulation did not show any additional benefits in range of motion, strength, performance, or satisfaction in functional mobility in multiple sclerosis patients.

**4 Apply: Conclusions for Practice** Based on the findings, occupational therapists would find it to be an effective use of time to implement a treatment intervention of light stretching/strengthening, or resistance therapy for upper extremity function in individuals with Multiple Sclerosis. In regards to functional mobility, Multiple Sclerosis clients have shown greater progress in an exercise program with a "cool down" in comparison to FEM used independently or combined with other exercise. There is not enough research or evidence in general to support FES/NMES as an effective intervention in gaining or increasing upper extremity function in regards to Multiple Sclerosis. Further research should be conducted.

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**Functional Electrical Stimulation for the MS individual is not as effective in the UE compared to a program of light stretching/strengthening.**

**W** College of Health and Human Services  
**Department of Occupational Therapy**  
WESTERN MICHIGAN UNIVERSITY