TITLE: Functional Electrical Stimulation for Pediatric Patients with Upper Limb Paralysis: Clinical Effectiveness

DATE: 13 October 2015

RESEARCH QUESTION

What is the clinical effectiveness of functional electrical stimulation (FES) for pediatric patients with upper limb paralysis?

KEY FINDINGS

Two randomized controlled trials and one non-randomized study were identified regarding the effectiveness of treating pediatric patients with upper limb paralysis with functional electrical stimulation.

METHODS

A limited literature search was conducted on key resources including PubMed, The Cochrane Library, ECRI, University of York Centre for Reviews and Dissemination (CRD) databases, Canadian and major international health technology agencies, as well as a focused Internet search. No filters were applied to limit the retrieval by study type. The search was limited to English language documents published between Jan 1, 2010 and Sep 28, 2015. Internet links were provided, where available.

The summary of findings was prepared from the abstracts of the relevant information. Please note that data contained in abstracts may not always be an accurate reflection of the data contained within the full article.

SELECTION CRITERIA

One reviewer screened citations and selected studies based on the inclusion criteria presented in Table 1.
Table 1: Selection Criteria

<table>
<thead>
<tr>
<th>Population</th>
<th>Pediatric patients (0 to 18 years) with upper limb paralysis resulting from brain injury or stroke, or hemiplegia (due to any cause)</th>
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</table>
| Interventions       | • Functional electrical stimulation (FES);  
                      • FES based therapy protocols (e.g., MyndMove)  |
| Comparators         | • No therapy;  
                      • Other active comparators (e.g., robotic devices, virtual reality, spasticity treatment, biofeedback, sensorimotor interventions, hand splinting, constraint induced movement therapy, upper extremity neuroprostheses, conventional therapy [e.g., physiotherapy, occupational therapy, rehabilitation therapy, repetitive/task-specific training]);  
                      • No comparator |
| Outcomes            | Clinical effectiveness outcomes (e.g., performance of activities of daily living, hand and arm function, pain reduction, resistance to passive movement, voluntary contraction levels, level of spasticity, coordination) |
| Study Designs        | Health technology assessments, systematic reviews, meta-analyses, randomized controlled trials, non-randomized studies |

RESULTS

Rapid Response reports are organized so that the higher quality evidence is presented first. Therefore, health technology assessment reports, systematic reviews, and meta-analyses are presented first. These are followed by randomized controlled trials and non-randomized studies.

Two randomized controlled trials and one non-randomized study were identified regarding the effectiveness of treating pediatric patients with upper limb paralysis with functional electrical stimulation. No health technology assessments, systematic reviews, or meta-analyses were identified.

Additional references of potential interest are provided in the appendix.

OVERALL SUMMARY OF FINDINGS

Two randomized controlled trials\(^1\)\(^{-2}\) and one non-randomized study\(^3\) were identified regarding the effectiveness of treating pediatric patients with upper limb paralysis with functional electrical stimulation (FES).

Two randomized controlled trials\(^1\)\(^{-2}\) were identified regarding the treatment of pediatric patients (zero to 18 years old) with upper limb paralysis who were treated with FES. One of the studies evaluated the effectiveness of constraint therapy with and without FES\(^1\). The other study assessed the effectiveness of botulinum toxin type A in combination with FES against treatment with botulinum toxin type A alone. The results in both studies indicated that combination treatments that included FES have a greater potential for improving upper extremity function.\(^1\)\(^{-2}\)

The identified non-randomized study\(^3\) evaluated the effectiveness of FES therapy for retaining voluntary reaching and grasping. Based on the average results, FES therapy demonstrated potential for improving upper limb function.
REFERENCES SUMMARIZED

Health Technology Assessments
No literature identified.

Systematic Reviews and Meta-analyses
No literature identified

Randomized Controlled Trials


Non-Randomized Studies


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APPENDIX – FURTHER INFORMATION:

Systematic Reviews – FES Not Specified in Abstract


Review Articles

