PO-H-27-SAT1 THE USE OF FES AS A STRATEGY TO IMPROVE UPPER LIMB FUNCTION IN STROKE. WHAT IS MISSING?

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Background: Stroke is the main cause of adult disability that leads to significant impairment of upper limb (UL) function. However, despite the various rehabilitation strategies, only 5-20% recover completely. This data point to the need of improving stroke intervention methods. Therapeutic approaches have evolved including methods to manipulate the brain plasticity in response to task-specific practice. In this perspective, functional electrical stimulation (FES) is a promising tool, considering proven evidence in perfusion of the ipsilateral sensorimotor cortex and excitability of the motor areas of the cortex. However, the scientific and clinical evidence still does not allow establishing conclusions about its effectiveness in the UL rehabilitation, as well as the optimal therapeutic window for its use.
Purpose: The aim of this study is to present a critical view about what is already known about the role of FES in UL recovery of stroke patients and what are the main reasons that limit the establishment of conclusions about its effectiveness.
Methods: A narrative review approach was adopted.
Results: A wide body of evidence supports that FES improves range of movement, strength and postural tone and that neural plasticity changes are greater if the practice method is meaningful, repetitive and intensive. If performed under these conditions, FES leads to activation of the ipsilateral somatosensory cortex and bilateral supplementary motor areas and to a modification of the corticospinal cell synapse and the related output. However, the protocol involving FES that interfere with the quality of UL movement of stroke patients has not been stablished yet. This may result from the predominant use of qualitative measures. These type of measures can detect change but they cannot differentiate compensation from restitution of movement. Kinematics parameters are strongly recommended as one of the best ways for this purpose. Therefore, ULs kinematics should be adopted in order to quantify movement objectively, during goal-oriented tasks, through the selection of gold standard optoelectronic systems and an adequate kinematic metrics extraction and interpretation. It should be also consider that the protocols involving FES have mainly targeted distal individual muscles. Statistical evidence shows that FES benefits are greatest when combined with maximum voluntary effort from the patient and when the UL muscles are trained in a synergic pattern involving related segments like trunk and contralateral limb.
Conclusion(s): No specific guidelines for the management of FES in UL of stroke patients were published. A detailed evidence-based clinical practice guideline for FES-management to improve UL movement quality in stroke patients is, therefore needed.
Implications: Establishment of the therapeutic window for the FES application to improve the quality of UL movement in stroke patients will allow building a base of knowledge that could improve the incorporation of this technology in UL rehabilitation. This could have a significant contribution for stroke rehabilitation considering the possibility of delivering intensive treatment periods with little demand on resources.
Key-Words: Stroke, Functional electrical stimulation, Movement quality
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