Creighton UNIVERSITY

School of Pharmacy and Health Professions
Department of Occupational Therapy

Program Development: Promoting Massed Practice with Functional Electrical Stimulation

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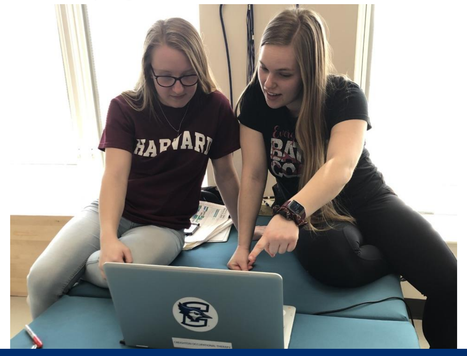
BACKGROUND

After discussion with the therapy team at Quality Living Incorporated (QLI), we determined there was a need for program development for the functional electrical stimulation (FES) system, Xcite. The Xcite system is a physical and occupational therapy system which provides a library of coordinated multichannel FES therapies for people with neurological impairments [4]. “In addition to combining several valuable neuro-rehabilitation interventions, functional electrical stimulation, mass practice, and neuromuscular re-education, Xcite is portable and easy enough to use that it could be used in the patient’s home,” said Prof Susan Harkema of the Kentucky Spinal Cord Injury Research Center, University of Louisville [4]. The goal of program development was to schedule adjunct therapy outside of formal therapy times with the QLI Rehabilitation Technicians (RTs) to encourage neuroplasticity and gain extra repetitions. My goal was to improve patient outcomes by developing this program, supporting the program efficacy with evidence-based practice, and organize the program for ease of use.



Evidence –Based Practice

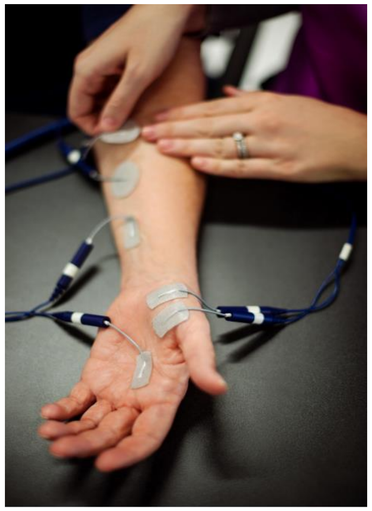
There are many high-level studies conducted using NMES in neurological rehabilitation that supports the efficacy of the intervention and encourages massed practice during sub-acute rehabiliation. A randomized control trial (RTC) by Noma, Matsumoto, Shimodozono, & Kawahira [3] of 30 patients who experienced a sub-acute stroke compared a group using NMES of the shoulder, elbow, wrist, and fingers to a control group utilizing conventional rehabilitation 6 days/week for 4 weeks. The NMES group showed significantly greater improvements in the upper extremity using the Fugl-Meyer Assessment especially in the distal portions of the assessment. According to “Systematic Review-Efficacy of Functional Electrical Stimulation (FES)”, FES moderately improved activity (specifically upper extremity activity) when compared with no intervention or training alone [2]. There is significant research to show that NMES is an effective treatment method, however the next question is how much FES and can there be too much FES? In the RCT “12-Hour Neuromuscular Electrical Stimulation for Recovery of Upper Extremity Function in Sub-acute Stroke”, compared a control group who received 30 minutes of NMES and conventional rehabilitation to a treatment group that received 12 hours of NMES (at rest or during sleep) 6 days a week for 4 weeks [1]. The 12-hour NMES group showed greater improvement in upper extremity motor function including wrist and hand function [1]. From this study we can gather that the more FES a client received during their rehabilitation, the more likely they are to improve functionally.

FOCUSED QUESTION

Does adding FES adjunct therapy to patient’s schedule increase repetitions for functional movement patterns and promote massed practice?

METHODS

- Gathered research on functional electrical stimulation and outcomes for patients who have experienced neurological injuries
- Collaborated with the therapy team to ask their ideas for the program, present my ideas, and ask for feedback
- Trained RTs one-on-one and asked how they would best learn to utilize the Xcite system
- Developed a training video explaining the purpose of FES, demonstrated multiple types of set-ups, electrode pad placement, and contraindications.
- Sent the video to the RTs, RT supervisor, and therapy directors and asked for feedback
- Collaborated with the IT department to create a shared calendar with available Xcite session times that fit with the current RT schedule
- Worked one-on-one with a member of the therapy team to assess and develop a protocol for our first resident
- Supervised and requested feedback from residents, RTs, and therapy team on thoughts, questions, and concerns with the program design and implementation.
- Promoted the program in therapy team meetings and educated therapists one-on-one to the benefits of the program for their residents.



PROGRAM DETAILS

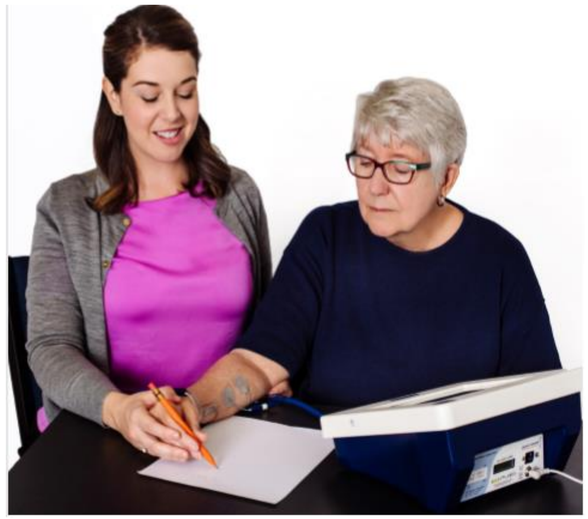
Therapists from occupational therapy (OT) and physical therapy (PT) will assess patients to determine if they are appropriate for adjunct therapy. The focus of adding Xcite times is to improve functional performance in areas of deficit after a neurological incident. The main diagnoses seen at QLI are patients who experienced a traumatic brain injury (TBI), spinal cord injury (SCI) or cerebral vascular accident (CVA). Symptoms from these injuries include spasticity, tone, decreased active range of motion, decreased innervation, and decreased coordination causing decreased functional performance. Once the therapist has determined the patient responds well to FES and they are appropriate for Xcite, they set up a time with the RTs on the Xcite calendar. During the first session the therapist will go over the patient's specific protocol and write out a simple plan in the Xcite binder. Moving forward the patient and RT will meet at assigned time to complete the program dictated by the therapist. The RT will provide feedback to the therapist as needed allowing the therapist to make adjustments to the protocol as needed.

BOTTOM LINE FOR OT

Occupational therapy has an emerging and integral role on the interprofessional team in implementation of functional electrical stimulation program development for patients with neurological deficits . This role encompasses the ability to develop, implement, and assess programming to meet the needs of clients experiencing occupational deficits in functional performance.

RESULTS

This program has enabled patients who have participated to increase repetition that have contributed to mass practice. Patients get approximately 30-60 minutes of additional functional electrical stimulation which correlates to anywhere from 30-100 additional repetitions outside of formal therapy. Both the therapy team and participants in the program have expressed the benefits in functional performance, improved strength, and increased muscle activation. Patients have expressed the program is very motivating and they feel that it is relevant to their program and completing their daily routines.



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