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LETTER TO THE EDITOR

FEASIBILITY OF A HOME CONSTRAINT-INDUCED MOVEMENT THERAPY FOR HAND WEAKNESS AFTER STROKE

Sir,

Constraint-induced movement therapy (CIMT) is an efficacious treatment for chronic arm and hand impairment after stroke. A recent meta-analysis concluded that CIMT is more effective than alternative therapies or no treatment at all (1). Despite this evidence, CIMT is under-utilized. A difficult protocol and extraordinary demands on therapists' time are often cited (2). In the EXCITE trial of CIMT, an additional obstacle was the expense of travel incurred by families transporting patients to and from the treatment center (3). A CIMT with a simpler protocol, less demand on therapist's time, and reduced cost to families would offer broader accessibility. If efficacy is preserved, this treatment can improve quality of life after a stroke. We report here the results of a pilot study of CIMT for mild hand weakness after stroke that was modified to be less intensive with no therapist-guided treatment, for use in a home program (HCIMT). The goals of this study were to evaluate feasibility and to guide the design of larger studies of this method.

Nine subjects were recruited who were ≥ 6 months post-stroke. Seven patients had cortical-subcortical strokes; 2 had purely subcortical strokes. Six patients had mild dominant hand weakness; 3 had non-dominant hand weakness. All patients had completed a traditional out-patient hand therapy program but had persistent impairments in hand use. Inclusion required active finger and wrist extension > 20° from the neutral position. After initial assessment, subjects were instructed in 12 standardized dexterity tasks. Each participant also identified 4 additional tasks, with the guidance of an occupational therapist, which were chosen to be specifically relevant to the subject's preferred activities, e.g. computer typing exercises. The unaffected arm was restricted using a splinted restraint for 90% of the day for the duration of the treatment. Subjects performed the individualized functional activities and the standard dexterity exercises at home with the affected arm for 4 h on 20 consecutive weekdays. Motor hand function changes were analyzed pre- and post-treatment using the following parameters: (*i*) power: grip and pinch dynamometries; 3-jaw chuck; and (*ii*) dexterity: tapping speed; 9-hole peg test. Improvement was defined as > 25% change on 3 or more tasks. Feasibility was defined as compliance > 90%. Compliance was measured by monitoring motor activity logs as well as through interviews with family members. In addition we investigated the influence of the following variables: (*i*) dominant vs non-dominant hand; (*ii*) sensory loss; (*iii*) motor deficit severity. Because our sample size was small, we only present the results as descriptive.

Mean compliance with the protocol was 96.3% and greater than 90% in 8 out of 9 subjects. Improvement on 3 or more tasks was observed in a third of the subjects (0.33; 95% confidence interval 0.12–0.64). All 3 of the dependent variables influenced the efficacy of the treatment protocol. Half of the participants with weakness in the dominant hand showed improvement, while none of the subjects with weakness in the non-dominant hand showed improvement. Three out of the 5 participants who had sensory loss in the impaired hand showed improvement, while none of the 4 participants with intact sensation improved. All 3 of the participants who demonstrated moderate impairment at the beginning showed significant improvement, while none of the participants who initially presented with mild or severe impairment improved.

First, we observed that good compliance and intensity of treatment can be achieved with a HCIMT regimen that is both less intensive than the standard CIMT protocols and less demanding of therapist's supervision. This contrasts favorably with studies that have demonstrated that many patients may not perform tasks at home that they are capable of performing when evaluated in the clinic (4). This has the potential to benefit more patients, while still alleviating time constraints for therapists who would otherwise be unable to see all of these patients.

Second, the home method benefited some patients. All of the patients who demonstrated moderate disability at the beginning of this study showed significant improvement. Because of the small number of subjects and the absence of a control group, conclusions are tentative, but all patients had chronic and apparently stable impairments prior to treatment.

Third, although the therapist-patient interaction may be critical for some patients (3), given the logistical, travel and reimbursement obstacles to standard CIMT, these results should justify a full trial of HCIMT with a control group (either alternative treatment or no treatment). Other modifications of CIMT are likely to emerge, and for comparison of differing protocols, all should include a uniform measure such as the meaningful change measure of the Motor Activity Log used for the EXCITE trial (3) and measure clinical variables that may influence response to some but not all modifications.

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