



US DEPARTMENT OF DEFENSE
BLAST INJURY RESEARCH PROGRAM
COORDINATING OFFICE

Neurocognitive Function and Psychological Health Novel Motor-Skill Therapy Improves Attention and Memory in Blast-Related TBI

Interactive metronome (IM) therapy is an operant conditioning program that develops precision motor timing and coordination. The therapy could be of service to TBI patients by improving efficiency in cerebellar connections. The ultimate result of this therapy may be an improvement in memory and attention among those afflicted with post-concussive symptoms. Investigators with the DVBIC, Fort Carson; the Evans Army Community Hospital, Fort Carson; General Dynamics Information Technology; US Public Health Service; Chenega Corporation; and the University of Washington researched the effect of IM therapy on patients with blast-related TBI. The researchers recruited 48 Active Duty Service Members with a documented history of mild to moderate blast-related TBI. Patients were randomly assigned to standard rehabilitation care (SRC) or standard rehabilitation care with the addition of 15 sessions of IM therapy (IM+SRC). Outcome measures were assessed using the Repeatable Battery for Neuropsychological Status (RBANS), administered at three time points (T1, T2, and T3). Data were analyzed using a one-way, between-groups analysis of covariance with RBANS index scores as the independent variable, treatment as the dependent variable, baseline scores, and loss of consciousness as covariates. The IM+SRC group showed a significant 20 percent increase in RBANS delayed memory scores throughout the course of the treatment. In contrast, the SRC group showed no difference in delayed memory with therapy. The IM+SRC group showed significantly better RBANS immediate memory scores at T2 and significantly better RBANS attention scores at T3. IM therapy results in significant improvements in memory and attention among blast-related TBI patients. This improvement is greater than SRC alone. Recent research suggests the cerebellum is functional in memory and attention in addition to motor control (Koziol et al., 2013). These findings suggest there is transference from practicing precision motor tasks to cognitive performance. Operant training of precision motor skills may improve cognitive abilities by strengthen neural networks in the cerebellum. More research is necessary to evaluate the benefits and limitations of this therapy. It could represent an effective way of treating both Service Members and civilians after sustaining a mild or moderate TBI.