Within-Patient Effects of a Novel Hand Exercise Device and Therapy Program for Patients with Hand Osteoarthritis:

A Quasi-Experimental Study

By Sarah Betts

Arthritis is the most frequent cause of disability, comprised of more than 100 rheumatic conditions which affect 50 million people worldwide. The most common type of arthritis is osteoarthritis (OA), a degenerative disease impacting the hand, knee, spine, and hip joint in individuals 65 and older. Symptomatic hand OA is a form of arthritis which has significant daily functional limitations related to pain, weaker grip strength, and activities requiring precise finger flexion and grip.

The purpose of this study was to determine if a specific hand exercise device could improve hand function, grip strength, and joint pain in those with hand OA who are 65 and older.

This study utilized the ViEx™ (U.S. Patent & Trademark Office Patent Numbers 9,277, 107 and 9,630,58), a new hand strengthening device for patients with hand OA. It requires precise finger flexion using the joints of the entire finger: the metacarpophalangeal (MP) joint, the distal interphalangeal (DIP) joint, the proximal interphalangeal (PIP) joint, and the carpometacarpal (CMC1) thumb joint.

Twenty participants with self-reported physician-diagnosed hand OA, 65 years and older, exercised with the ViEx™ every day for four weeks. The outcome measures were hand function via the QuickDASH Questionnaire, grip strength via a hand dynamometer, and pain via a Wong Baker scale journal.

After the four-week exercise program using the ViEx™ hand device, 70% of the subjects experienced improved joint pain, 95% experienced improved hand function, and 95% experienced improved overall grip strength.

While this study focused on ViEx™, the study ultimately evaluated the value of daily exercises targeting specific finger flexion. The assessment of overall change in grip strength,

hand function, and joint pain occurred between the initial and final visits. The participants were individually measured without comparison among participants, decreasing the overall variability of the results. The statistical tests (paired t-test and Wilcoxon signed rank test with Cohen's d and Pearson correlation coefficients for effect sizes) suggest the change in grip strength, upper limb and hand function, and pain after the ViEx™ exercise program is significant and clinically meaningful. Ultimately, these findings suggest that the precise individual finger exercises with the ViEx™ may significantly benefit hand OA patients by increasing grip strength, improving hand function, and reducing joint pain.

In summary, exercise is crucial for patients with hand osteoarthritis. A hand exercise program involving individual finger flexion can significantly improve grip strength and reduce upper limb disability as well as hand pain. This quasi-experimental study determined that exercises utilizing individual and precise finger flexion can create significant benefits for patients with hand osteoarthritis. Further research is additionally needed to test the results of this device in a control group with no treatment or another more conventional hand therapy approach.