their dominant distal thumb on the anterior finger placement and index distal phalanx on the posterior finger location. Subjects were given 2 attempts to squeeze both finger digits at maximal effort while the researcher recorded the best pinch strength in pounds. Participants were then provided a 5-button (1.0 cm button width) shirt made by the same manufacturer. All sized shirts were fitted for each participant according to their shirt size before the time trials. The researcher digitally timed the participants in seconds on how fast the participant could button down the shirt, starting with both hands touching the top button, taking the best time trial of 2 attempts. A Pearson correlation using SPSS analyzed if a relationship existed between the 2 variables.

RESULTS: The relationship between both variables displayed a moderate negative correlation between the dominant index finger phalanx and thumb digit pinch strength to buttoning speed in seconds ($r = -0.412$; $p < .036$).

DISCUSSION: Past therapies have focused on repetition of fine motor skills to develop the ability to button a shirt. The relationship between pinch strength of the thumb and index finger ($r = -0.412$) could create an ability to change current therapy methods and focus on pinch strength skill development to restore fine motor skills of the fingers, especially with sport or activities of daily living (ADL).

APPLICATION TO THE FIELD: This discovery could change therapy or physical training towards restoration of this motor skill with care givers or therapists. Replication of a sport skill or daily task might not be the only practical use towards motor skill restoration.

All co-authors have no conflict of interest towards the relevance of this submission.

http://dx.doi.org/10.1016/j.jsams.2022.09.118

(P100003)

Determining the Neuromuscular Adaptations to Strength Training in Older Adults: A Systematic Review and Meta-analysis

U. Siddique[a], A. Frazer[a], J. Avela[b], S. Walker[b], J. Athiainen[b], G. Howaston[c,d], J. Tallent[a,e], D. Kidgell[a]

[a]*Monash University, Australia*
[b]*University of Jyväkkylä, Finland*
[c]*Northumbria University, United Kingdom*
[d]*North West University, South Africa*
[e]*University of Essex, United Kingdom*

Introduction: There are observable decreases in muscle strength as a result of ageing that occur from the age 50. The age-related loss of maximal force production is thought to occur as a result of changes within the neuromuscular system. Changes in both maximal force production and rate of force development (RFD) are due to age-related changes within supraspinal (i.e., reduced motor cortex excitability, increased cortical inhibition), spinal (reduced spinal motoneurone excitability which influences motor unit recruitment and discharge rates) and muscular changes (mainly reduced muscle mass). Strength training in older adults is a suitable intervention that may counteract the age-related loss in force production. However, the neuromuscular adaptations to strength-training in older adults is largely equivocal and therefore, a systematic review with meta-analysis will serve to clarify the present circumstances regarding the benefits of strength-training in older adults

Methods: The review was conducted in accordance with the latest Preferred Reporting Items for Systematic Reviews and Meta-Analyses (PRISMA) guidelines. Post standardized search strategy using different electronic databases and full text screening of selected articles, 54 studies that were heterogenous in relation to sample size, settings, outcomes and intervention characteristics were selected. Meta-analyses were performed using a random-effects model. A best evidence synthesis (BES) was performed for variables that had insufficient data for meta-analysis.

Results: 19 randomized controlled trials (RCTs) studies (n=306) reported a moderate increase in strength (26.13%; SMD 0.67; 95% CI 0.37, 0.97; $P < 0.0001$) post strength training. Additionally, rate of force development (RFD) (SMD 0.65; 95% CI 0.09, 1.22; $P = 0.02$; $n = 48$) and surface electromyography (sEMG) (SMD 0.28; 95% CI -0.41, 0.97; $P = 0.42$; $n = 20$) also improved following training in older adults. Results from BES reported strong evidence to suggest that strength-training increases maximal force production and RFD in older adults and moderate evidence for increased agonist activity. There was limited evidence from the included studies for strength-training to improve voluntary activation, spinal excitability and muscle mass.

Discussion: Overall, the findings suggest that strength-training performed between two and twelve weeks increases strength, RFD and muscle activity, which likely improves motoneurone excitability by increased motor unit recruitment and improved discharge rates. The review identified important gaps in the literature as there is a need to explore the sites of adaptation within the nervous system, using synergistic electrophysiological techniques, such as transcranial magnetic stimulation to probe the elements of the neuromuscular system from the cortex to the muscle.

Impact and application to the field: Strength-training in older adults is a suitable intervention that may counteract the age-related loss in force production.

Conflict of Interest Statement: "My co-authors and I acknowledge that we have no conflict of interest of relevance to the submission of this abstract"

http://dx.doi.org/10.1016/j.jsams.2022.09.119

(P100005)

Does BMI influence foot reaction time and balance scores in elderly women?

S. Worthington[a], A. Shim[a], J. Garafalo-Peterson[a], K. Ryan[b]

[a]*College of Saint Mary, United States of America*
[b]*Peru Sate College, United States of America*

Introduction: Older adults who are obese have a higher chance of experiencing falls and according to the American Journal of Physical Anthropology, if you have a Body Mass Index (BMI) of 30 or higher you are considered obese. A longitudinal panel study stated that over 35 percent of older adults have had at least one fall in the past two years. BMI levels are significantly higher with elderly women compared to younger women and could possibly lead to future falls.

Methods: 10 females (age 82.6 ± 7.23 years; height 161.80 ± 7.29 cm; mass 75.33 ± 21.0 kg; BMI 28.73 ± 7.53) from a local senior living community volunteered to participate in this study. No recent falls or lower extremity injuries were reported at the beginning of the research. All female participants were qualified for this study by being over the age of 65 and having signed informed consents. A Bertec computerized posturography plate (Bertec Corp. Columbus, OH) assessed every participant for Center of Pressure (CoP) measurements of eyes open stable surface (EOSS) and eyes closed stable surface (ECSS) without their shoes on. Foot reaction time was assessed using a Lafayette Instruments 3x4 switch mat connected to a digital multi-function timer (model 54035A, Lafayette, IN). With their shoes on, each participant responded to an auditory stimulus that started the timer by the researcher, responding by stepping quickly onto the switch mat to stop the