

independently perform activities of daily living (ADL). This quasi-experimental controlled trial aims to analyze the effects of a 6-month MT intervention on functional capacity of individuals diagnosed with NCD. Forty-three subjects (N Major NCD: 36) participated in the Body&Brain Project and were subdivided in exercise group (EG; N: 23; 75.09 ± 5.65 years; age range: 61-83) or a control group (CG; N:20; 81.90 ± 5.95 years; age range: 70-89). The EG was submitted to bi-weekly exercise sessions, and the CG received monthly recreation sessions. At baseline and at post-intervention Timed-Up-and-Go (TUG), 6-meters Walk Speed and Handgrip tests were applied to evaluate lower body mobility, walking speed and handgrip strength, respectively. Results from linear mixed models revealed a statistically significant interaction between group (intervention vs. control) and time for TUG and walk speed test, but not for handgrip strength. The 6-month MT intervention improved lower body mobility and walking speed of older adults diagnosed with NCD, which might potentially impact ADL independence and quality of life. Trial registration: ClinicalTrials.gov - NCT04095962. Supported by FCT: "Body and Brain" (POCI-01-0145-FEDER-031808), CIAFEL (FCT/UIDB/00617/2020), and Ph.D. Grants (SFRH/BD/136635/2018) to FM and [2020.05911.BD] to DB.

DUAL-TASK COSTS IN GAIT SPEED DIFFERS ACROSS AGE GROUPS

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With age, there are simultaneous reductions in gait speed (GS). This decrease in GS has been associated with an increased fall risk and negatively impacts independence. Further, GS naturally declines with the addition of a secondary stimulus (i.e., cognitive requirements). Combined, these decrements can be additive in nature potentially leading to robust declines with advancing age. Therefore, the aim of this study was to examine age-related effects of dual-task cost (DTC) while walking. Adults (N = 145), over the age of 45 years, completed two walking trials for each GS condition: habitual (HAB) and fast (FST), with and without a DT (i.e., counting backwards by serials of three). Subjects were classified into four age groups: youngest-old (YG ≤ 64 years, n = 24), young-old (YO, 65-74 years, n = 46), middle-old (MO = 75-84 years, n = 54), and oldest-old (OO ≥ 85 years, n = 21). DTC was calculated and ANOVAs were used to assess differences between the groups. There was no difference in HAB DTC between the age groups (p=.61). However, there was a significant difference in FST DTC (p=.04) between the YO ($M \pm SD$: $-14 \pm -11\%$) and OO ($M \pm SD$: $-24 \pm -12\%$). These data indicate there was an age-related affect for fast dual-task cost, but not for habitual dual-task cost while walking. An increase in dual-task cost among the oldest-old may be associated with an inability to properly maintain a faster cadence while performing an arithmetic task which may be related to task prioritization.

EFFECT OF HIGH-INTENSITY INTERVAL TRAINING ON RHEUMATOID ARTHRITIS CD4+ T CELL OXIDATIVE METABOLISM

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Persons with rheumatoid arthritis (RA) have poor cardiorespiratory fitness and accelerated biological aging driven by systemic impairments in metabolism and inflammation. In this study of older RA participants, our goal was to identify the effects of a high-intensity interval training (HIIT) program on cardiorespiratory fitness and peripheral CD4+ T cell metabolism. We isolated CD4+ T cells from peripheral blood mononuclear cells in sedentary female RA participants (n=6; age=64.0+/-6.3 years) who underwent cardiopulmonary exercise testing and phlebotomy before and after 10 weeks of HIIT. HIIT improved RA cardiorespiratory fitness by 6.5+/-6.0% (pre-HIIT VO₂ peak=25.1+/-5.1 ml/kg/min, post-HIIT VO₂ peak=26.7+/-5.0; p=0.05). As measured by Seahorse XF Mito Stress Test, there were no significant mean changes in CD4+ T cell oxidative (oxygen consumption rate (OCR); pmol/min) or glycolytic (extracellular acidification rate (ECAR); mpH/min) metabolism, however there was large interindividual variability. RA peripheral CD4+ T cells preferred glycolytic metabolism (pre-HIIT mean basal OCR/ECAR ratio=0.78+/-0.13 pmol/mpH), while HIIT non-significantly shifted cellular preference toward oxidative metabolism (post-HIIT mean basal OCR/ECAR ratio=0.86+/-0.16; p=0.30). Increases in RA cardiorespiratory fitness following HIIT were significantly associated with increases in RA peripheral CD4+ T cell OCR/ECAR ratio (Spearman's rho=1.0, p<0.001) and basal and maximal respiration (rho=0.89, p=0.02 for both). Additionally, increases in CD4+ T cell mitochondrial ATP-linked respiration were significantly associated with increased quantities of circulating naïve CD4+CCR7+CD45RA+ T cells (rho=0.89, p=0.02). Our findings suggest that targeting cardiorespiratory fitness may be key in modulating T cell specific oxidative metabolism and function to prevent immunosenescence in older patients with chronic inflammatory diseases.

EFFECT OF VIDEO ASSISTED HOME-BASED EXERCISE INTERVENTION ON FALL RISK AND GAIT PARAMETERS IN OLDER ADULTS IN INDIA

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Countries across the globe recommended isolation to protect older adults from COVID-19 infection. However, this led to decreased mobility and physical inactivity potentially increasing their risk of fall. The study was conducted in a group of 88 older adults between 60-74 years with known gait impairments and high fall risk. The participants were part of our cohort study on fall prevention program. Fall risk and gait impairments were measured using wearable sensors during the Timed-up and go test (TUG) at baseline. Using technology, a 16-week video assisted home based exercises intervention was delivered to reduce fall risk and improve gait parameters. The intervention consisted of flexibility, strengthening, balance and gait training exercises given

progressively through one video session per week. The participants performed these exercises at home for the rest of the week. A home visit immediately after 16th week was arranged to collect post intervention parameters. Results showed an average 20% decrease in fall risk post intervention. An overall large effect size with Cohen's *d* of 0.90 was reported for fall risk. Significant difference in TUG time ($Z = -4.610$, $p < 0.000$), stride velocity ($Z = -5.035$, $p < 0.000$), stride length ($Z = -5.867$, $p < 0.000$), time taken to stand ($Z = -7.363$, $p < 0.000$) and time taken to turn ($Z = -6.079$, $p < 0.000$) was observed in the post-test measurements as compared to pre-test measurements. Therefore, we conclude that video assisted exercise programs can be highly beneficial as alternatives to in person exercise intervention to prevent falls during COVID-19 isolation.

EFFECTS OF DIFFERENT 16-WEEK EXERCISE INTERVENTIONS ON BONE MINERAL DENSITY OF SEDENTARY OLDER WOMEN

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Multicomponent exercise that includes both resistance and aerobic training is recommended to prevent loss of bone mineral density (BMD) in postmenopausal women. However, optimal training frequency has not been determined. Sixty-three non-osteoporotic sedentary women ages 60y and older were randomized to one of three exercise groups for sixteen weeks: 1) one resistance and one aerobic session per week, 2) two resistance and two aerobic sessions per week, or 3) three resistance and three aerobic sessions per week. Resistance exercise included supervised sessions on weight machines, and aerobic exercise was treadmill walking. BMD of the hip and lumbar spine (L1-L4) was assessed by dual energy X-ray absorptiometry (Prodigy, GE Medical Systems Lunar, Madison, WI, software version 6.10.029), and *z* scores were calculated from a reference population adjusted for age and sex. Among the total cohort with BMD measurements at week 16 ($n=58$; 83% white), *z* scores improved for the trochanter, Ward's triangle, total hip, L1 and L4. Within-group comparisons showed improvement at the trochanter, total hip, and L1 for group 2 only, while only group 1 demonstrated an increase at L4 ($p < 0.05$ for all). However, no time-by-group interactions were observed. Sixteen weeks of combined resistance and aerobic training is effective for improving BMD of older adult women. Results suggest training frequency of two sessions per week may be optimal. Postmenopausal women should be encouraged to do aerobic exercise such as walking plus resistance training at least once weekly to prevent osteoporosis.

EFFECTS OF TAI CHI ON BIOMARKERS AND THEIR IMPLICATION TO NEUROREHABILITATION – A SYSTEMIC REVIEW

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Introduction: As an effective holistic therapeutic exercise program, Tai Chi (TC) has been widely used for patients with

a variety of neurological disorders. In last 1-2 decades, there has been an increase in the number of research studies that examined the TC effects on biomarkers andIntroduction: As an effective holistic therapeutic exercise program, Tai Chi (TC) has been widely used for patients with a variety of neurological disorders. In last 1-2 decades, there has been an increase in the number of research studies that examined the TC effects on biomarkers including inflammatory cytokines, oxidative stressors, and neurotrophic factors. Thus, the purpose of this article is to review such effects and their possible implications to neurorehabilitation. Method: In this systematic review, we searched TC-related articles from the last 15 years until July 2020 that had investigated changes of biomarkers after TC practice. The search identified 24 studies that were included in our analysis. Results: It is found that TC practice is able to 1) reduce pro-inflammatory and increase anti-inflammatory cytokines (including Interleukins -1, 6, 10, 12, tumor necrosis factor, the nuclear factor kappa-light-chain-enhancer of activated B cells, and the C-reactive protein); 2) decrease oxidative stress factors (like plasma 8-isoprostane, malondialdehyde, and protein carbonylation); and 3) increase neurotrophic factors (brain-derived neurotrophic factor (BDNF), and N-Acetylaspartate). Conclusions: TC may take effect on patients with neurological dysfunctions through anti-inflammation, anti-oxidative stress, and neural health promotion.

FIT FOR THE NEXT FIFTY EXERCISE PROGRAM: 25 YEARS OF REFLECTIONS, RESULTS, AND PARTNERSHIPS

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Consistent exercise provides a multitude of physical, social, and emotional benefits. Common barriers to regular exercise for older adults include time, transportation, risk of injury, existing limitations, and negative experiences or attitudes about exercise. Fit for the Next Fifty is a comprehensive exercise and wellness program designed to address barriers and excuses. The program, based in CNY, has an impressive 25 year history of providing a unique mix of aerobic, strength training, yoga, and balance-based ballet. Participants (100-120) attend up to 5 classes per week at no charge during summer months and continue through winter months for a small fee. Developing and sustaining funding partnerships has been critical to the long-term success of Fit for the Next Fifty. Participants, ages 60-96, are active providers of feedback and suggestions, a key component to keeping the music, movements, and fellowship enjoyable and meaningful for over two decades. Program details, participant pictures and testimonials, research results, surveys across the years, and partnering/funding strategies provided. Of special interest is the social support dimension of the program. Participants have developed a sophisticated network to support each other outside of the exercise and wellness programs provided by Fit for the Next Fifty.

PERCEIVED EXERTION IN PHYSICAL ACTIVITY MEASUREMENT ACROSS THE LIFECOURSE: RESULTS FROM SWAN

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