Biopsies from m. vastus lateralis were obtained in a resting state. Total RNA was isolated by standardized procedures and mRNA of activin A, myostatin, GDF-15, ActRIIB, IGF-1 and follistatin were quantified by real-time RT-PCR using GAPDH for normalisation. In addition, body composition was determined by bioimpedance analysis. Differences between groups were detected by ANOVA followed by post-hoc analysis with Bonferroni correction. Results Severe dynapenic women were older (p=0.004, +8 years) and had lower body mass (p=0.003, -20 %) than non-dynapenic women. Most interestingly, ActRIIB expression was higher in severe (p=0.002, +88 %) and mild dynapenic (p=0.023, +76 %) as compared to non-dynapenic participants. Furthermore, ActRIIB mRNA expression significantly correlated positively with age (ρ=0.535, p=0.001) but negatively with PTE (ρ=-0.485, p=0.002), handgrip strength (ρ=-0.603, p<0.001), muscle mass (ρ=-0.375, p=0.020) and fat mass (ρ=-0.379, p=0.019). None of the other parameters were influenced by strength level. Discussion The findings from this study suggest that the loss of muscle strength during the ageing process is associated with changes in ActRIIB. Besides inducing atrophy signals, ActRIIB regulates key determinants of muscle energy metabolism endowing skeletal muscle with high oxidative capacity and low fatigability [4]. As both, endurance and strength are important for healthy ageing there is an urgent need to have a closer look on ActRIIB signaling in this context. References [1] Barry & Carson (2004) J Gerontol A Biol Sci Med Sci, 59(7):730-54 [2] Clark & Manini (2008) J Gerontol A Biol Sci Med Sci, 63(8):829-34 [3] Hofmann et al (2015) Exp Gerontol, 64:35-45 [4] Relizani et al (2014) Mol Ther, 22(8): 1423-1433 Contact marlene.hofmann@univie.ac.at

THE WAY YOU SPEND YOUR SEDENTARY TIME ALSO MATTERS: AN ANALYSIS OF THE ASSOCIATION BETWEEN SEDENTARY TIME, SEDENTARY PATTERNS AND FRAILTY IN THE ELDERLY

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Introduction Time spent in sedentary activities has been associated with negative health outcomes in older people (Stamatakis et al., 2012). However, the role that sedentary behaviour patterns play on health has been scarcely investigated in this population group. The ability of performing well in the diverse activities of the daily life is partially determined by the level of frailty (García-García et al., 2014). However, no studies have been conducted yet to clarify the role of sedentary behaviour on frailty. We therefore examined the associations of daily sedentary time (DST) and sedentary patterns (SP) with frailty in elderly. Methods A triaxial accelerometer (ActiGraph, ActiTrainer 3X) was used to determine the DST and SP in 234 males and 285 females aged between 67 and 95 years in the ETES study (Carcaillon et al., 2012). Using the z-scores of the number of 10-min sedentary behaviour bouts and the average duration of those bouts, a SP composite score was created, according with other previous studies (Artero et al., 2011). Frailty was calculated using the Frailty Trait Scale (FTS). Different linear regression models were performed in order to analyse the associations of DST and SP with FTS. All models were adjusted for gender, age, educational level, Charlson index, Katz index, Mini Mental State Examination, and number of drugs. Results After adjusting for the mentioned potential confounders, a statistically significant association was found between SP and FTS (B [95%CI]: 1.573 [0.364, 2.781], β=0.104, p<0.001). DST was also significantly associated with FTS (B [95%CI]: 0.015 [0.002, 0.028], β=0.095, p<0.001). Discussion Both sedentary patterns and daily sedentary time are associated with frailty in older people from the ETES study. Our results suggest that interventions should not only be focused on reducing the total time spent in sedentary activities but also on how that time is accumulated in order to prevent frailty in elderly people. References Artero E, Ruiz J, Ortega F, España-Romero V, Vicente-Rodríguez G, Gutiérrez A, et al. (2011). Pediatr Diabetes, 12(8): 704-712. Carcaillon L, Blanco C, Alonso-Bouzón C, Alfaro-Acha A, Garcia-García F, Rodriguez-Mañas L. (2012). Plos One, 7(3): e32401. García-García F, Carcaillon L, Fernandez-Tresguerres J, Alfaro A, Larrion J, Rodriguez-Mañas L, et al. (2014). J Am Med Dir Assoc. 15(5), 371. Stamatakis E, Davis M, Stathi A, Hamer M. (2012). Prev Med, 54(1), 82-87. Contact Asier.Manas@uclm.es

MENTAL SIMULATION OF LOCOMOTOR TASKS IMPROVES REHABILITATION OUTCOME IN ELDERLY ADULTS AFTER HIP SURGERY

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Introduction: Prolonged immobilization and inactivity after injury and/or surgery may lead to serious motor/cognitive dysfunction, especially in older adults. Previous work has revealed that mental simulation such as action observation (AO) or motor imagery (MI) activates similar brain regions as actual motor execution and increases corticospinal excitability (Wright, Williams & Holmes, 2014); mechanisms that may accelerate (re-)learning and rehabilitation of motor skills (e.g. Mulder, 2007). This study aimed to determine whether the combination of AO and MI could positively affect locomotor performance and prefrontal cortex (PFC) oxygenation when tested 60-days post hip surgery. Methods: Of an initial 405 participants [database of the Orthopaedic Hospital Valdoltra (Slovenia)], 26 eligible patients were screened (e.g. no significant co-morbidities) of whom 21 successfully completed all study measurements. They were randomly split into 2 groups: Control (CON;N=11;63±6y) which followed a standard rehabilitation protocol, and Intervention (INT;N=10;64±4y) which received additional cognitive interventions (AO+MI of locomotor tasks) for 30 min/day in the hospital, then 3x/week in their homes, for a period of 2 months. Gait and postural control during dual-tasking (DT; balancing/walking while subtracting by threes), Timed Up and Go (TUG) and Four Step Square Test (FSST) were measured before and 60-d after hip surgery. Additionally, PFC (O2Hb and HHb levels, by continuous-wave near-infrared spectroscopy [NIRS]) was assessed during postural/DT control. Interaction effects (groups x time) were evaluated using a 2x2 mixed ANOVA. Results: At baseline, both groups were matched in their cognitive and functional abilities (p>0.341). There were significant interactions for TUG (p=0.045), FSST (p<0.001), gait performance (p=0.028), and mental arithmetic while DT (p=0.042) exhibited better outcomes for the INT vs. CON. No interactions were found for NIRS (p>0.221) and balance (p>0.229) parameters. Discussion: These results demonstrate that mental simulation provides positive outcomes on motor-cognitive measures after hip surgery in elderly people. Interestingly, all parameters associated with locomotor activities improved significantly, whereas balance skills were not affected by AO+MI, demonstrating the specificity of the training intervention. From a functional perspective, it is positive that cognitive performance during DT-walking improved, although these adaptations were not accompanied by changes in PFC. Overall, utilizing AO+MI training during rehabilitation is advised, especially when physical practice is constricted or not possible. References: Wright DJ, Williams J, Holmes PS. (2014). Front Hum Neurosci., 8, 951. Mulder T. (2007). J Neural Transm, 114(10), 1265-1278. uros.marusic@upr.si