Methods: The study was designed as a cross-over study. Eight older adults (65.5 ± 4.3 years) and 8 young adults (23.3 ± 2.3 years) were randomized to receive a daily dose of either Parmigiano Reggiano (PR; 50 g/day) or whey protein (WP; 15 g/day) for 15 consecutive days with 10 days of wash-out between the interventions. An ECC leg extension protocol was performed on day 11 of each intervention. Muscle voluntary contraction (MVC) and soreness (DOMS) together with markers of cellular damage (i.e. CPK, Cholesterol, LDL) were assessed before and 48, 72 and 120 h after performing the exercise.
Results: In young adults, MVC significantly decreased at 48 h ($p = 0.01$) and DOMS were significantly higher compare to baseline ($p = 0.002$) with both supplements; however, MVC recovery was quicker with PR compared to WP ($p = 0.004$). Cholesterol and LDL significantly decreased with WP but were kept constant with PR ($p = 0.02$). Similarly, in older adults MVC significantly decreased at 48 h and DOMS were significantly higher compared to baseline, but MVC recovery ($p = 0.003$) and DOMS attenuations ($p = 0.03$) were quicker with PR. Cholesterol and LDL decreased during both interventions, but the reduction was less with PR ($p = 0.02$). Moreover, the rise of CPK following exercise was attenuated with PR supplementation compared to WP ($p = 0.04$).
Conclusions: The consumption of Parmigiano Reggiano helps to improve recovery after an intense exercise in both young and older adults, although the effects seem less pronounced than the. young adults. Importantly, 10 days of daily supplementation of Parmigiano Reggiano do not increase blood cholesterol or others lipoproteins in healthy older adult.

OP1—A national COVID-19 survey on the return to play characteristics in Italian elite athletes: implications and recommendations

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Purpose: The spread of the SARS-CoV-2 continues to be a public health emergency with a huge impact on sports. Several complications can also occur and must be carefully monitored. Aim was to investigate the side effect during and after illness in a sample of elite athletes diversifying them by the severity of the symptomatology and the type of sport and their influence on their return to play.
Methods: Three web-based questionnaires were administered using censuses of the National Sports Federations; an informative questionnaire draw up by the authors, General Health Questionnaire-12' and Fatigue Severity Scale. Data were collected from 204 self-selected athletes (age 24.96 ± 9.82). The sample will be analysed according to the variant of the virus was contracted (delta and omicron), the severity of the infection (mild, medium and severe), the symptoms (respiratory system, musculoskeletal system, both and none) and by type of sport (power and endurance).
Results: The prevalence of COVID-19 infection among athletes appear to be asymptomatic (18%) or have mild symptoms (42%). Only 2% have contracted the infection in severe form. Respiratory problems affected 33%, muscles skeletal problems 25%, and 24% both the two previous problems. 18% of the participants declared no consequences on health. Significant differences were found for technical level, where high level athletes showed more fatigue than low level ($p = 0.030$). Regarding fatigue perception there are significant differences between males and females ($p < 0.001$) and depending on the infection severity: those who have had severe form have greater fatigue than those who have had mild form ($p = 0.011$) and those with moderate form have more fatigue than mild form ($p = 0.013$). Regarding the sport typology the athletes practicing alternating aerobic anaerobic sport more frequently reported health problems during the return to play (45%). Regarding the quality of life perception, significant differences between males and females ($p = 0.006$) and regarding the infection severity ($p = 0.016$).
Conclusions: The impact of the virus on the interviewed athletes resulted in mild or moderate suggesting that sport may have a protective effect. The most common symptom was the fatigue perception which was more severe in relation to the type of sport. The results of the survey may provide knowledge for coaches to better understand the course of COVID-19 among different athletes in order to individualize the planning of the training.
Acknowledgments: (non obbligatorio).
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OP1—Comparison between water running and water cycling

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Purpose: Water exercises offer a low-impact variety of movements on every axis. The selection of an appropriate physical activity and an individual exercise prescription are essential to obtain health and fitness outcomes.[1] The aim of the present study was to determine individualised relative exercise intensities at four speeds of motion (rhythms) for water cycling and running.
Methods: Fourteen active, apparently healthy females (23.2 ± 1.6 years) underwent a dry land maximal incremental protocol to exhaustion on a treadmill for VO_2max assessment; then they engaged in water running with ground contact (RC), water running suspended (RS) and hydrobike (HB) tests in a swimming pool at the rhythms of 30, 40, 50, and 60 cpm, submerged at the individual xiphoid level. Gas exchanges (VO_2), heart rate (HR), and blood lactate (bLa) were measured at each rhythm, for each exercise mode.
Results: Maximal treadmill tests results were 2621.3±240.7 ml·min^{-1}, 45.4±5.4 ml·kg^{-1}·min^{-1} for VO2max, 196.8 ± 10.6 bpm for HR max and 10.4 ± 0.9 mM·l^{-1} for La peak. The four motion speeds of the three water exercise modalities ranged from 50 to 95% of maximal HR and VO_2, representing a moderate-to-vigorous training stimulus. RS compared to RC and HB elicited the significantly lowest VO_2, (22–33 ml·kg^{-1}·min^{-1}) at all exercise intensities, while bLa (3–5 mM·l^{-1}) and HR (138–150 bpm) were significantly lowest at 50 and 60 cpm only. HB compared to RC and RS presented the significantly highest VO2 (25–38 ml·kg^{-1}·min^{-1}) and non-significantly highest bLa (2.2–7 mM·l^{-1}), reaching vigorous intensity at 50 cpm and near maximal intensity at 60 cpm.
Conclusions: Since RS running does not have fixed points to push from, subjects have more options for individualised motion amplitudes in comparison to HB.[2] Water running, offers the possibility for all the participants to regulate their individual metabolic requirement for each rhythm of exercise and could offer an effective practice for controlled physiological responses in heterogeneous groups. As HB elicits high VO_2 and bLa levels, it may be an exercise indicated for

athletes' training, whereas HS and HC could be more appropriate for health and fitness purposes.

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OP1—The European experts' views on the implementation of dual career policies and provisions at higher education institutions

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Purpose: To establish a convergence of European higher education institution (HEI) experts' opinion on possible implementation of dual career (DC) policies and provision at the university level as the last phase of a 'Delphi' multistage consensus method within the European partnership "More Than Gold" (MTG, 603346-EPP-1- 2018-1-LV-SPO-SCP).

Methods: Following previous Delphi phases encompassing focus groups with university student-athletes (SA) and a workshop with 21 European DC experts (Capranica et al., 2022), an online survey was administered to 71 HEI experts from 12 Member States, who rated the relevance and the feasibility of 32 DC items by mean of a 10-point Likert scale (lowest value = 1; highest value = 10). Then, a go-zone plot identified the most relevant and feasible DC policies and provisions to be implemented at the university level.

Results: The highest relevance and feasibility scores emerged for nine items, four belonging to the assistance/tutorship category (i.e., tutorship/mentorship; psychological support; integration of academic and sports services; and DC programmes adapted to the individual needs SAs), two to curricula requirements category (i.e., individual study plans; and distance learning), two belonging to the social support category (i.e., increased awareness/publicity of the enrolled SAs; and improved DC knowledge), and one belonging to the logistic support category (i.e., access to educational facilities).

Conclusion: Based on a phenomenological lifeworld-led approach, the present findings could be useful to inform practical directions for the implementation of DC policies and provisions at HEI level based on an expert's consensus. The present findings emphasize the current quest for DC progress and reinforce the need for a minimum standard for DC policies and provisions. In this respect, the MTG Team developed the Guidelines to Promote the Dual Career of Athletes-Students: Methodology for Universities and Manual for Authorities, which are available at the European ERASMUS+ platform (https://erasmusplus.ec.europa.eu/projects/search/details/603346-EPP-1-2018-1-LV-SPO-SCP).

Reference: Capranica et al. 2022. https://doi.org/10.1371/journal.pone.0264175.

OP1—Promote multidisciplinary interventions to reduce work-related musculoskeletal disorders: adapted physical activity for employee at ergonomic high-risk for biomechanical overloads

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Purpose: Work-related musculoskeletal disorders (WRMDs) are injuries and/or dysfunctions affecting human musculoskeletal system, which has been demonstrated to have a causal relationship with physical exertion and psychosocial factors at work. Handling of low loads at high frequency (repetitive work) can cause pain and fatigue, which could lead to musculoskeletal disorders, reduced productivity, and deteriorated posture and movement co-ordination. From a socioeconomic perspective, WRMDs are cause of productivity losses and disability, and they imply considerable costs to the healthcare system. Adapted physical activity are able to reduce pain, reducing the relative workload via range of motion improvement. The aim of this study was to evaluate the effect of structured resistance and stretching exercises on physical fitness and pain of upper limb.

Methods: Sixteen women employed as packagers (age: 48.69 ± 5.88 years old; Check- list OCRA > 11) were recruited to participate to a 14 weeks work-based resistance and stretching program. Physical fitness was measured via the 2-min step test (2MST), the bask scratch test and the handgrip test (HG). To evaluate the level of pain in cervical spine, shoulder, elbow and wrist the Visual Analogue Scale (VAS) was used. Differences were verified with t-test. Physical exercise protocol consisted on 24 sessions of resistance and stretching exercise program, performed 2 times per week and lasting 60 min.

Results: After exercise intervention VAS score showed toward reduction, but only cervical spine ($p = 0.02$) and left wrist ($p = 0.04$) VAS decreased significantly. Handgrip strength increased significantly for both right ($p = 0.01$) and left ($p = 0.01$) hands, such as 2MST ($p = 0.01$). Participants who reported WRMDs in cervical spine experienced more symptoms than who did not at baseline; contrarily upper limb VAS did not differ between the two groups at the baseline. Moreover, the presence of WRMDs did not influence performance parameters at baseline, neither the change between baseline and post-training of all the variables considered.

Conclusions: The protocol improved the physical fitness of participants but showed a limited effect on WRMDs pain. The mean adherence was 86.2%, indicated that exercise performed in workplace is well accepted and could be proposed for pain management.

OP1—VALIDITY OF ISOINERTIAL RUFFIER TEST TO ASSESS CARDIORESPIRATORY FITNESS IN HEALTHY INDIVIDUALS

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