INTRODUCTION: There is limited research on the fitness benefits of certification courses offered in higher education.
PURPOSE: To identify the fitness and functional movement effects from a 14-week, didactic, active learning suspension training certification course.
METHODS: Forty-two participants (30 females; 12 males; Age = 25.6 ± 10.0 yrs; Height = 169.4 ± 9.8 cm; Body Mass = 69.7 ± 15.4 kg) in a suspension training curricular course completed 28 applied-learning sessions over a 14-week period. Initial 9 weeks were instructor-led educational lectures, workouts, and critique of techniques, whereas, the latter 5 weeks were student-led exercise programming and workouts for curricular evaluation. Throughout each 40-minute exercise session, six body positions were utilized across push, pull, rotational, squat, and lunge movements. Pre- and post-fitness assessments included body composition, muscular endurance, muscular strength, flexibility, and a functional movement screen (FMS). Dependent t-tests were used to determine if there were mean changes in fitness-related and functional movement status. Due to multiple comparisons, Bonferroni correction was used, therefore, alpha level was set at .007.
RESULTS: There were no significant changes in mean body mass, fat mass, and lean mass. There were, however, significant positive changes in mean percent body fat (24.0% ± 9.8% to 22.9% ± 10.5%), sit-and-reach (41.5 ± 9.2 to 44.0 ± 7.9 cm), quantity of push-ups (25.9 ± 11.5 to 32.0 ± 13.5), handgrip dynamometer (83.1 ± 29.5 to 90.6 ± 30.5 kg), and FMS (14.9 ± 2.4 to 16.5 ± 2.2) values.
CONCLUSIONS: Students participating within the 28-session suspension training curriculum experienced significant decrements in percent body fat and gains in flexibility, upper body muscular endurance, upper body muscular strength, and functional movement screening scores.

3402 Board #90 June 1 9:30 AM - 11:00 AM

Physiological Differences Between Motorized and Non-Motorized Treadmill Running

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Non-motorized treadmills (NMT) are designed to replicate overground exercise and are used in fitness testing, simulation of team sport exercise, and sprint training. Limited research describes differences in physiological responses between running on a curved NMT and motorized treadmill (MT) at the same speed.
PURPOSE: Examine physiological differences between running on a NMT and a MT at the same speed and identify at which MT grade the physiological response to running on a MT is similar to a NMT at the same speed.
METHODS:Ten active females ran at three speeds (2.68, 3.13, and 3.58 m/s) on a curved NMT and a standard MT. Five participants also ran at 3.13 m/s and 4%, 6%, and 8% grades on the MT. $\dot{V}O_2$, blood lactate, heart rate, and rating of perceived exertion were compared between treadmills at each speed and grade using ANOVAs and paired samples *t* tests.
RESULTS: NMT $\dot{V}O_2$ was significantly greater at 2.68 m/s (40.89 $\pm$ 2.13 vs. 35.73 $\pm$ 1.92 ml/kg/min; $p < 0.01$) and 3.13 m/s (47.7 $\pm$ 4.06 vs. 42.29 $\pm$ 2.14 ml/kg/min; $p = 0.004$), but not significantly different from MT at 3.58 m/s (50.30 $\pm$ 5.76 vs. 47.64 $\pm$ 2.73 ml/kg/min; $p = 0.085$). NMT blood lactate concentration was significantly greater at 3.13 m/s (8.83 $\pm$ 2.55 vs. 6.02 $\pm$ 2.75 mmol/L; $p < 0.01$) and 3.58 m/s (11.63 $\pm$ 2.25 vs. 8.10 $\pm$ 2.74 mmol/L; $p < 0.01$). At 3.13 m/s and a MT grade of 8%, $\dot{V}O_2$ ($t = -1.46$, $p = 0.22$) and blood lactate ($t = -2.64$, $p = 0.06$) were not significantly different from NMT at 3.13 m/s.
CONCLUSIONS: The physiological response to running on a NMT was significantly greater than a MT at submaximal speeds. A greater non-oxidative contribution to running at 3.58 m/s on the NMT is likely due to runner position on the curved belt. Running on a MT at an 8% grade produces similar $\dot{V}O_2$ and blood lactate responses to running on a NMT at the same speed. Practitioners prescribing NMT exercise should consider exercise intensity and effect of the NMT incline.

3403 Board #91 June 1 9:30 AM - 11:00 AM

Functional Assessment of the Upper Limb: Support for Isotonic Measurement Devices

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(No relationships reported)

Accurate evaluation of arm strength and function is important to prevent injury, aid rehabilitation, and enhance training. Traditional assessments involve isokinetic devices (e.g., Cybex) to determine post-injury abilities. However, this method is confined to a linear motion and fails to mimic normal isotonic movement patterns. Instruments that measure isotonic motions in three-dimensional space may be more appropriate.
PURPOSE: Compare upper limb isokinetic force characteristics to those produced in isotonic actions.
METHODS: 35 healthy college students (12 women, 23 men) performed biceps curls and triceps extensions of the dominant arm on one of two machines: Cybex HUMAC NORM isokinetic dynamometer (N=17) or Proteus (N=18), which measures upper limb motion in three-dimensional space using magnetically-mediated resistance. Subjects performed practice trials to minimize learning effects. After completing testing, we used independent and paired-samples t-tests to compare peak force ratios of biceps and triceps generated by the different testing devices.
RESULTS: Peak biceps torque on the Cybex was 25.9 ± 8.5 ft-lb; peak triceps torque was 24.3 ± 6.3 ft-lb. On average, it took the biceps approximately 62% longer to reach peak torque than it did the triceps ($p<0.001$). The isokinetic biceps-triceps strength ratio was 1.07:1 ± 0.22:1. This ratio was different between men and women ($p<0.001$). Among men, it was 1.28:1 ± 0.16:1. Among women, it was 0.99:1 ± 0.20:1. This ratio was also different when compared to peak power calculated by Proteus ($p=0.033$). In our sample, isotonic, free-motion testing associated with a higher and more variable biceps-triceps strength ratio: 1.38:1 ± 0.99:1.
CONCLUSION: Performance prediction models and return-to-play testing batteries have traditionally captured functional profiles through isokinetic testing. Restricting movement to a limited range of isokinetic motion results in an inaccurate depiction of what a patient or an athlete does outside of the clinic. Isotonic resistance permitting three-dimensional assessment may be able to provide a more optimal analysis of upper limb function, which translates more directly to athletic and therapeutic contexts. More research is needed to understand how these values may help personalize training and rehabilitation programs.

3404 Board #92 June 1 9:30 AM - 11:00 AM

Special Fitness Judo Index Test to Evaluate Sports Performance According to the Training Stage In Athletes

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Through precise training for the athlete we can improve their specific physical condition for each sport discipline, in the same way the tests we perform to see the metabolic changes according to the corresponding pathways to the sport activity must try to be as specific as possible and simulate sports techniques.
PURPOSE: To analyze with specific judo fitness test, the sports performance according to the training stage in athletes.
METHODS: Descriptive study, n = 18, 11 males, 7 females of the Judo Senior Team, age 20.4 ± 3.9 years, with a range of 15 to 29 y. The same test was performed three times, every 4 months. The test is performed to assess the sports training in judo. The first and second tests, 11 athletes were evaluated, and in the 3rd test, 16 athletes participated. The fitness index tests are specific, analyze the performance with Judo technique ("Ippon-sevi-nage"), the Index consists of the measurement of the maximum heart rate of effort (MHRE) plus the heart rate at the minute of recovery at the end of the test, in beats per minute, divided by the number of techniques, made from the 1st 15 seconds (s), 10 s recovery, 2nd 30 s, 10 s recovery and 3rd 30 s work, and the heart rate at the minute of recovery. It started at 0900 hrs, with an ambient temperature 20°C, monitoring the heart rate, during rest, warm-up, maximum effort and at one minute of recovery using PolarV800 heart rate monitors. Additional instruments used were writing board, sheets of bond paper, pencil, whistle and a chronometer. The information was tabulated in Microsoft Excel 2016.