

299

NEUROMUSCULAR ELECTRICAL STIMULATION AND PHOTOBIOMODULATION IN THE FUNCTIONAL RECOVERY OF SARCOPENIA

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Background: Sarcopenia is a musculoskeletal disorder characterized by reduced strength and muscle mass in aging. Photobiomodulation through LED Therapy (LEDT, acronym for Light Emitting Diode Therapy) can influence the components of the mitochondrial respiratory pathway by converting electromagnetic energy into biochemistry, with increased synthesis of adenosine triphosphate (ATP) and growth factors. On the other hand, Neuromuscular Electrical Stimulation (NMES, acronym for Neuromuscular Electrical Stimulation), provides artificial muscle stimuli to replace voluntary stimuli in physical exercise, with muscle hypertrophy responses.

Objectives: To analyze therapeutic responses in muscle thickness and functional tests in elderly women with the simultaneous association of NMES to photobiomodulation through LEDT during a four-week program aimed at the prevention and treatment of sarcopenia.

Methods: The study participants were selected and comprised of 20 sedentary women with an average age of 60 years. The participants were randomly distributed into two groups (G1 and G2). In G1, the participants were treated with NMES (carrier frequency of 2500 Hz; 3 channels and electrodes with a diameter of 7 cm; frequency of 50 Hz, on/off time of 6/18 s in the first week, evolving to 10/30 s in the second week, 12/30 s in the third week and 15/30 s in the fourth week; with 20 minutes of therapy per session). G2 simultaneously associated NMES (similar parameters) and LEDT (set of 10 LEDs coupled to each NMES electrode, totaling 60 LEDs, power of 30 mW/LED, with a wavelength of 830 nm, application time of 180 s and total energy of 324 J in the quadriceps femoris muscle). The electrophotostimulated muscles were the vastus lateralis, vastus medialis and rectus femoris, with a stimulation frequency of three times a week. The analysis of ultrasound scans of the quadriceps femoris and functional tests such as the time up and go (TUG), walking speed and the sit-to-reach test were performed before and at the end of the therapeutic intervention.

Results: Therapeutic interventions through NMES alone or associated with LEDT demonstrated a significant increase in muscle thickness after one month of therapy in all quadriceps femoris muscles. The NMES promoted an increase in the flexibility of the hamstring muscles of the volunteers, observed in the sit and reach test. Neuromuscular electrical stimulation demonstrated a significant increase in TUG tests and gait speed. G2 showed no significant difference in responses to optimize the increase in muscle thickness and muscle functions through the TUG tests and gait speed in relation to the isolated use of NMES.

Conclusion: Electrophototherapy promoted an increase in quadriceps femoris muscle thickness and significant improvements in

functional tests. However, the simultaneous association of NMES to LEDT did not demonstrate a significant difference in the supplementation of muscle functions during physical exertion in relation to the isolated use of NMES.

Implications: NMES may prevent and rehabilitate sarcopenia by increasing muscle thickness, improving gait speed and neuromuscular coordination.

Keywords: Photobiomodulation, Electrostimulation, Sarcopenia

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300

PREVALENCE OF MUSCULOSKELETAL DISORDERS IN RESISTANCE TRAINING PRACTITIONERS IN BRASÍLIA/DF, BRAZIL: A CROSS-CROSS STUDY

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Background: Musculoskeletal disorders (MD) in weightlifting sports are a major health hazard and can significantly affect the quality of life of practitioners. Most studies on the prevalence of MD in sports were carried out in high-income countries, with different characteristics from middle- and low-income countries. In Brazil, few high-quality data are investigating the prevalence of MD in resistance training (RT) practitioners in the country.

Objectives: To investigate the prevalence of MD in RT practitioners in the city of Brasília/DF, Brazil

Methods: A cross-sectional study that recruited 730 RT practitioners of both sexes, aged 18 years or older, regular RT practitioners, who trained at a gym in Brasília/DF registered with the CREF-7, who had not undergone musculoskeletal system surgery in the last 6 (six) months and had not fractured at the time of data collection. The collection was carried out in Brasília-DF, in four gyms that authorized the research to be carried out on their premises. From May to December 2022, participants were invited to participate in the study according to the arrival or departure flow at the gyms. Interviews and self-administered questions were used to estimate the prevalence of pain or injury (PI) in the last 30 days and last 12 months. In addition, sociodemographic information, the anatomical regions affected and the exercises that possibly triggered PI were collected.

Results: The estimate of punctual prevalence of pain was 20.3% and injury 7.4%, prevalence in the last 30 days for pain was 37.7% and injury 12.8%, and prevalence in the last 12 months for pain 42 % and injury 79.7%. The anatomical regions with the highest indications of pain involvement were the lumbosacral spine (34.3%), shoulder (33%) and knee (32.7%). The anatomical regions affected by injury show, in particular, the shoulder regions (31.1%), lumbosacral spine

(29.1%) and knee (14.9%). Exercises identified as triggering pain are squatting (39.7%), bench press (17.7%), leg press (17.7%), rowing (13%), stiff (7%) and extension chair (7%). Among the exercises that possibly triggered the injury, the squat (28.4%), bench press (16.2%), rowing (11.5%), stiff (8.1%) and press (5.4%) stand out. %).

Conclusion: The prevalence of musculoskeletal PI in the last year is higher than existing data in developed countries. The results of this study can be used by the government, the private sector, universities, and professionals working in sports health, providing a better targeting of public policies and research funding, as well as an effective management of musculoskeletal disorders in middle-income countries.

Implications: This study highlights possible risk factors and appropriate interventions for the prevention and treatment of musculoskeletal disorders in Brazil. This is an important step towards revealing the magnitude of the effects of these musculoskeletal disorders, providing guidance for preventive and intervention strategies in this population.

Keywords: Musculoskeletal pain, Musculoskeletal injury, Resistance training

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301

RELATIONSHIP BETWEEN MUSCULOSKELETAL PAIN AND COVID-19 SEVERITY IN RESISTANCE TRAINING PRACTITIONERS

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Background: Musculoskeletal pain (MP) in sports has been compared to an acute traumatic injury or overuse injury. This scenario represents a challenge for sports science, as it is not fully explained by biomechanics, muscle stress, or overuse injuries. Practitioners of resistance training (RT) affected by COVID-19 still need investigations into the relationship between MP and the severity of COVID-19 because Brazil is still incipient with regard to relevant and quality studies that investigate this relationship.

Objectives: To investigate the relationship between MP and the severity of COVID-19 in the city of Brasília/DF.

Methods: A cross-sectional study that recruited 730 RT practitioners of both sexes, aged 18 years or older, regular RT practitioners, who trained at a gym in Brasília/DF registered with the CREF-7, who had not undergone surgery in the musculoskeletal system in the last 6 (six) months and had not fractured at the time of data collection. The collection was carried out in four gyms in Brasília-DF that authorized the research to be carried out on their premises. Participants were invited to participate in the study according to the arrival or departure flow at the gyms, from May to December 2022. Interviews and self-administered questions were used to estimate the relationship between MP and the severity of Covid-19.

Results: Regarding the prevalence of MP, participants who reported a diagnosis of Covid-19 have a higher prevalence of pain in the last 30 days (42.0% with 95% CI: 31.4% to 52.6%), being higher than the prevalence in the group that did not report a diagnosis of Covid-19

(29.5% with CI 13.5% to 45.6%). In the mild Covid-19 severity groups (did not require hospitalization) and moderate (hospitalization in the ward), men, from social class A, with a postgraduate degree, employed and who have been practicing bodybuilding for more than 12 months, stand out.

Conclusion: The prevalence of pain was higher in RT practitioners who were diagnosed with Covid-19 in the last 30 days, compared to the group that was not affected by Covid-19. Indicating that in Brazil there is a need for coordinated efforts by the government, the private sector, universities, civil society, and health professionals, in order to provide effective management of musculoskeletal pain in people affected by Covid-19.

Implications: This study highlights possible risk factors and appropriate interventions for the prevention and treatment of musculoskeletal pain in Brazil. This is an important step towards revealing the magnitude of the effects of these musculoskeletal disorders, providing guidance for preventive and intervention strategies in this population.

Keywords: Musculoskeletal pain, Resistance training, Covid-19

Conflict of interest: The authors declare no conflict of interest.

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302

THE EFFECT OF ILIOPSOAS MYOFASCIAL RELEASE ON POSTURAL balance in futsal athletes

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Background: Myofascial release (MFR) is a technique based on the application of compression and stretches to the myofascial complex. MFR has been of potential interest in sports to the injury prevention and the rehabilitation of iliopsoas function; a muscle often injured in futsal athletes. Even though MFR seems to benefit functional performance, such as increased range of motion, reduced myofascial pain and improved postural balance, its effects applied to iliopsoas muscle on neuromuscular responses is still an open question we addressed here.

Objectives: To investigate the immediate effect of iliopsoas MFR on postural balance during standing in female futsal athletes.

Methods: Non-randomized, controlled, before-and-after study with a sample size of 50 participants. Participants performed one session of MFR lasting 5 minutes and involving 15 applications of compression and stretches to the iliopsoas bilaterally. Participants were assessed before and after the intervention and in each session they were asked to stand upright barefoot with their arms alongside the body on a baropodometric platform during four postural tasks lasting 60 seconds each one, involving the manipulation of support base and visual information: i) feet apart with eyes open (EO); ii) feet apart with eyes closed (EC); iii) feet together with EO; iv) feet together with EC. The center of pressure (CP) under the feet was measured (sampling frequency of 100Hz) and the following parameters were computed: the standard deviation and the mean velocity in the antero-posterior (AP) and medio-lateral (ML) directions using the whole trial data. For each condition of support base, a one-way analysis of variance (ANOVA) for repeated measures was used, with