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1

PHOTOBIOMODULATION MAY REVERSE CELLULAR SENESCENCE BY INDUCING CELL PROLIFERATION AND PRESERVING NUCLEAR SIZE

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Background: Cellular senescence is an irreversible state of cell cycle arrest, thus being characterized by decreased cell proliferation and increased nucleus area, often acting as a tumor suppressor program. Photobiomodulation (PBM) has been used in several conditions to increase the mitochondrial response, promoting nuclear changes and cell proliferation. However, the effects of PBM on cells are still unclear.
Objectives: To verify the efficacy of photobiomodulation on cell senescence processes.
Methods: We utilized A172 glioblastoma cells transduced with H2B-mCherry by lentivirus to nuclear tagging. Treatment was done with GaAlAs Laser (850nm). Cells were divided by intensity into the following groups: C= Control, L1= 1J/cm^2, L2= 2.2J/cm^2, L3= 3J/cm^2, L9= 9J/cm^2, L15= 15J/cm^2, L21= 21J/cm^2, nuclear evaluation was performed at experimental times (0h, 24h, 48h and 72h). For data analysis, two-way ANOVA with the Tukey post hoc test was used. Differences were significant when $p<0.05$.
Results: PBM on intensities of 1J/cm^2, 2.2J/cm^2, 3J/cm^2, 9J/cm^2 e 15J/cm^2 showed a lower increase at the nuclear size when compared with time 0h and 72h in the control group. All intensities (1, 2.2, 3, 9, 15, and 21 J/cm^2) promoted cellular proliferation after 72 hours, while 15J/cm^2 presented an accentuated increase compared to groups L1, L2.2, and L3.
Conclusion: PBM enhanced cellular proliferation while causing a reduced nuclear increase in glioblastoma cells.
Implications: In this study, we found that the laser decreased the cellular senescence state from the evaluation of the morphological parameters, thus increasing cell proliferation and decreasing the nuclear area; therefore, it is an important therapeutic tool against the cellular aging process.
Keywords: Photobiomodulation, Glioblastoma, Cellular senescence

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Ethics committee approval: Not applicable.

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PHYSICAL EXERCISE AND PHOTOBIOMODULATION INCREASE NRF2 EXPRESSION IN THE SKELETAL MUSCLE OF RATS WITH HEART FAILURE AND DIABETES MELLITUS

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Background: Heart failure (HF) and type 2 diabetes mellitus (DM2) are prevalent diseases worldwide, and both can cause muscle atrophy. Both disorders are related to increased autophagy and apoptosis in muscle cells, consequently reducing muscle volume. Physical exercise associated with photobiomodulation seems promising to attenuate the skeletal muscle changes caused by HF and DM2.
Objectives: To verify the influence of physical exercise and the association with photobiomodulation on autophagy, apoptosis, and cell survival signaling pathways in myocytes from rats with HF and DM2.
Methods: 18 male rats were divided into four groups: CT (not included in protocols), CT- (HF + DM2), EX+HF+D (HF + DM2 + aerobic exercise), and EX+HF+D+P (HF + DM2 + aerobic exercise + photobiomodulation). To induce DM2, streptozotocin (0.25 ml/kg, i.p.) was injected. To induce HF, coronary ligation was performed. After one week of disease induction, aerobic exercise, and photobiomodulation protocol were started for eight weeks. The protein expressions

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analyzed by the western blot were BAX, CASPASE-3, CASPASE-9, ANEXIN-V, P-ASK, MTOR, BECLIN-1, P62, LC3-I, LC3-II, NRF2 and P-AKT.
Results: The apoptosis proteins BAX (p=0.13), CASPASE-3 (p=0.62), CASPASE-9 (p=0.20), ANEXIN-V (p=0.85), and P-ASK (p=0.71), as well as autophagy proteins - MTOR (p=0.71), BECLIN-1 (p=0.58), P62 (p=0.70) and LC3-II (p=0.16) did not show statistical significance among groups. EX+HF+D+P group expressed increased NRF2 (p=0.04), p-AKT (p=0.03), and LC3I (p=0.005) expression compared to the CT- group.
Conclusion: We demonstrated the positive effects of physical exercise associated with photobiomodulation, increasing the expression of proteins related to myocyte survival.
Implications: In this study, we observed an increase in Nrf2 levels in animals that performed physical exercise related to photobiomodulation, demonstrating a protective effect of the association of these two protocols on the gastrocnemius of animals with HF and DM. These results are relevant since there is a lack of therapeutic agents that may mitigate the muscle damage related to the association of DM and HF. Therefore, we suggest that the association between therapies can revert possible changes involving cell death.
Keywords: Photobiomodulation, Heart failure, Diabetes mellitus type II

Conflict of interest: The authors declare no conflict of interest.
Acknowledgment: We thank CNPQ and Universidade Federal de Ciências da Saúde de Porto Alegre for collaborating and financing the project.
Ethics committee approval: Committee for Ethical Use of Animals (CEUA) of the Universidade Federal de Ciências da Saúde de Porto Alegre (UFCSPA), Rio Grande do Sul, Brazil, Ethical Approval number: 655/19.

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PRELIMINARY CONTENT VALIDITY OF THE BRAZILIAN VERSION OF THE PEDIATRIC RATING OF CHRONIC ILLNESS SELF-EFFICACY (PRCISE)

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Background: Content validity is the degree to which the content of an instrument is an adequate reflection of the construct to be measured. It can be assessed by patients or specialists during the development or cross-cultural adaptation (CTA) of measurement instruments. In this sense, the Pediatric Rating of Chronic Illness Self-Efficacy (PRCISE) is a self-efficacy questionnaire for pediatric patients with chronic conditions, which is being adapted and validated in Brazil, but its content validity has not yet been evaluated.
Objectives: To assess the preliminary content validity of the Brazilian version of the PRCISE in children and adolescents with chronic respiratory conditions.
Methods: Exploratory methodological study in which the TCA protocol was elaborated according to internationally established recommendations, involving translation, back-translation, expert committee and pre-test procedures. The pre-test of the Brazilian version of the PRCISE was performed on a sample of 30 children and adolescents of both sexes, aged 7 to 18 years, and diagnosed with isolated asthma, cystic fibrosis, or other chronic respiratory conditions. To determine content validity, subjects participated in virtual interviews using Google Meet and evaluated the questionnaire for item clarity, comprehensibility, relevance, and comprehensiveness. In the data analysis, the Content Validity Index (CVI) was used, adopting values ≥ 0.78 for each item as a reference.
Results: The sample consisted of 15 individuals with asthma and 15 individuals with cystic fibrosis, with a mean age of 12.3 ± 2.8 years, 53.3% male, 66.7% elementary school students, and 56.7% from the Northeast region of Brazil. In the assessment of the questionnaire, all 15 items had a CVI ≥ 0.78, with values ranging from 0.93 to 1.00, and 60% of the items had CVI = 0.96, demonstrating good content validity. Items 2 and 15, related respectively to the domains of obtaining and humor, were more difficult for the participants to understand (CVI = 0.93). The illness management domain obtained CVI = 0.63 and, therefore, will be modified according to the participants' suggestions and assessed in a new evaluation round.
Conclusion: The Brazilian version of the PRCISE presented good preliminary content validity by assessing children and adolescents with chronic respiratory conditions. The illness management domain did not reach the recommended value and will be modified and reassessed by participants.
Implications: Based on these results, we have the basis for further establishing the content validity of the Brazilian version of the PRCISE for children and adolescents with chronic respiratory conditions. Furthermore, this is the first step to analyzing the psychometric properties of this instrument and to determine if it provides valid and reliable measures before being used in clinical practice.
Keywords: Respiratory diseases, Self-efficacy, Validation study

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Acknowledgment: Not applicable.
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PHYSICAL THERAPY EXERCISE IN EARLY AND LATE POST-OPERATIVE PERIOD OF TOTAL KNEE ARTHROPLASTY: SYSTEMATIC REVIEW WITH META-ANALYSIS

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Background: Objective: To analyze the effects of exercise-based rehabilitation on the functionality of individuals with Total Knee Arthroplasty (TKA) in the early and late postoperative period.
Methods: Systematic review of which studies were selected through six databases (Pubmed, PEDro, LILACS, EMBASE, CINAHL, and Cochrane Library) from January 2010 to August 2020. Only randomized clinical trials of primary unilateral TKA in the early or late postoperative period were included. All meta-analyses were conducted using Review Manager – RevMane software described as standardized mean differences with 95% confidence intervals (CI). Outcome data, including the final mean, standard deviation, and sample size values, were extracted by two reviewers. The data extraction process was performed using a standardized form and disagreements were resolved by a more experienced third author. PROSPERO Register: CRD42020200375.
Results: Five studies were chosen for full-text review. The main findings of this study demonstrated that physical therapy exercise,