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ACUTE EFFECT OF LASER PHOTOBIOMODULATION IN THE INTEGRATION PROCESS OF TOTAL SKIN GRAFT IN RATS

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Background: Skin grafting consists in a surgical procedure where a skin segment is transported from one region of the body to another, with applicability in different scenarios such as burns, neoplastic excisions and others. However, the procedure failure may occur due to a frequent complication, the tissue necrosis. Therefore, resources are sought to improve the skin graft integration, seeking to minimize this important complication. In this sense, photobiomodulation (PBM) has been investigated, considering its relevant effects on the healing process such as neovascularization stimulation, fibroblastic proliferation and modulation of inflammatory mediators. However, until now, there are no studies that have performed open bed irradiation, before skin replacement, to prepare it for receiving the tissue and aiming to be a PBM promising application.
Objectives: Evaluate and compare the effects of laser PBM, at red and infrared wavelengths, in the total skin graft integration process, in rats.
Methods: Eighteen Wistar rats were used, allocated in three groups: red laser (660nm), infrared laser (808nm), and control. In all groups, a 5x3 cm skin segment was removed, followed by panniculus carnosus muscle dissection. In the control group, the skin was replaced on the bed after a 180° rotation. In the laser groups, the bed first received irradiation with fluence of 25 J/cm^2 and irradiance of 2,500 mW/cm^2, in a total of 6 points, and then the skin was replaced in the same way. Euthanasia occurred on the 7th postoperative day, when photographic captures and skin tissue samples were collected for macroscopic analysis of tissue necrosis and descriptive histology, respectively. Statistical analysis was carried out using the Levene and Shapiro-Wilk tests, followed by Anova-Two-way test with Tukey post hoc and a significance level of 5%.
Results: The macroscopic analysis showed that the control, laser 660nm and laser 808nm groups had mean necrosis percentages of 26.30%, 16.01% and 37.29%, respectively. It was observed that the 660nm group reached a lower percentage, proving to be more effective than the 808nm laser group (p=0.0022), but there was no statistical difference when compared to the control. In the histological analysis, it was noted that the control and 660nm groups presented similar fibrosis formation and granulation tissue, with no presence of granulation tissue in the 808nm group. Furthermore, moderate inflammatory infiltrate was identified in the control group, weak in the 660nm group, and intense in the 808nm group.
Conclusion: The control and 660nm laser groups obtained similar results in macroscopic and microscopic analyses, while the 660nm laser showed superior performance compared to the 808nm laser group in skin graft integration.
Implications: This study presents an innovative character in that it performs irradiation of the open bed before skin grafts replacement, acting as a starting point for future research. More studies are needed for a better understanding of this PBM application, seeking to optimize the skin grafting procedure using a low-cost therapeutic resource with high applicability.
Keywords: Low-Level Light Therapy, Skin Transplantation, Tissue Repair

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EIGHT WEEKS OF FUNCTIONAL TRAINING IMPROVES FUNCTIONAL CAPACITY IN INDIVIDUALS WITH SPINAL CORD INJURY

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Background: Spinal cord injury (SCI) is a neurological condition that results from the interruption of the motor and sensory tracts of the spinal cord, causing deficits in functional abilities. Interventions that aim to improve the functional capacity of these individuals should be applied, and functional training (FT) is one possibility.
Objectives: To investigate the effect of eight weeks of FT on the functional capacity of individuals with SCI.
Methods: A prospective cohort study was carried out with 14 individuals with SCI who participated in a physical exercise program based on the FT model. The FT was performed once a week, lasting 60 minutes, and included strength, balance, and other exercises necessary for the development of functional capacities. The functional capacity was evaluated with the Motor Test Battery related to Functional Independence, composed of the tests: suspension for five seconds (0 to 3 points); transfer from wheelchair to another seat (0 or 1 point); biceps muscle endurance in 30 seconds (0 to 3 points, and number of repetitions); triceps muscle endurance in 30 seconds (0 to 3 points, and number of repetitions); lateral functional reach (0 to 2 points, and distance in cm), lower lateral (0 to 2 points), frontal (0 to 5 points; and distance in cm), and with trunk rotation (0 to 2 points); step transposition (0 to 3 points); and chair touch for 400 meters (0 to 3 points, and travel time). After the sum of the test scores, the individuals were classified as: "complete dependence" (0 to 6 points), "moderate autonomy" (7 to 13 points), "high autonomy" (14 to 20 points), and "total autonomy" (21 to 27 points). Assessments were conducted at T_0 (all participants were returning to FT activities after the flexibilization of social distancing measures due to COVID-19) and at T_1 (after eight weeks of FT). Results were presented as median and interquartile range (IQR), and comparisons between T_0 and T_1 were made with Wilcoxon's test [p-value and effect size (ES)] (α=5%; JASP 0.16.4).
Results: Participants were mostly male (n=11; 76%), aged 50 (IQR=13) years, and had SCI for 17 (IQR=22,3) years. At T_0, 21% (n=3) were classified as having "moderate autonomy", and 79% (n=11) as "total autonomy". After the eight weeks, all participants (100%; n=14) were classified as "full autonomy." A statistically significant increase was observed in overall battery score (T_0= 21.5; IQR=5 vs. T_1=23.5; IQR=4,25; p=0.045; ES = 0.550) and in lateral functional reach distance (T_0=23.0 IQR=10 *vs.* T_1=29.0; IQR=8,5; p=0.035; ES= 0.572) cm, and without statistical significance in muscle endurance of biceps (T_0= 23; IQR=10,8 *vs.* T_1=25; IQR=7,5; p=0.131; ES= 0.413) and triceps (T_0= 25; IQR=14,5 *vs.* T_1=28; IQR=10; p=0.054; ES= 0.523).
Conclusion: Eight weeks of FT were associated with improvements in functional capacity in individuals with SCI.

Implications: Although the study design used here i.e., prospective cohort, is not the most recommended for investigating the effects of interventions, FT seems to be an effective strategy for improving the functional capacity of individuals with SCI, and therefore can be incorporated into the rehabilitation of this group.
Keywords: Spinal cord injury, Functional training, Functional capacity

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CAN THE BEDDING BRIDGE TEST IN HOSPITALIZED PATIENTS PREDICT OUTCOMES AFTER 6 MONTHS OF FOLLOW-UP?

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Background: Early detection of functional limitations remains an important goal to prevent disability in individuals who have been hospitalized.
Objectives: To examine the association between versions of the bed bridge test (BBT), a new functional test to assess hospitalized patients, and post-hospitalization outcomes such as return to work, death, readmission and falls in individuals after six months of discharge.
Methods: This is a longitudinal, observational, prospective study, in which 92 hospitalized patients eligible for the study performed in random order o BBT: 5 repetitions (BBT5R) and 10 repetitions (BBT10R), 30 seconds (BBT30sec) and 60 seconds (BBT60sec). Sociodemographic data, diagnosis, comorbidities, and length of stay were recorded. Six months after hospital discharge, telephone contact was made and information was obtained on return to usual/work activities, rehospitalization, falls, functional independence, and the patient's vital status. Bivariate correlation analysis was performed. The independent variables were gender, age, comorbidities, length of stay, and performance on the BBT versions. The dependent variables were usual/work activities, rehospitalization, falls, functional independence, and death. Linear regression models were used to determine whether the BBT versions and sociodemographic variables predict return to usual/work activities, rehospitalization, falls, functional independence, and death.
Results: The participants (50.9±17.2 years old, 60% women) included in the study were composed of 66% with clinical condition and 34% with surgical condition. All versions of the BTT were associated with age and FSS comorbidity (rs=-0.50 to -0.20 and 0.28 to 0.43; $p<0.05$ for all). Only BBT30s (rs=0.28) and BBT60s (rs=0.37) were directly associated with returning to usual/work activities. There was no association between the BBT versions and the other dependent variables. Patients who resumed their usual/work activities performed better in BBT30s and BBT60s when compared to those who did not resume their activities (BBT30s = 19 ± 6 vs 15 ± 3.5 repetitions, $p = 0.007$; and BBT60s = 35 ± 11 vs 30 ± 5.4; p=0.015). Lower comorbidity score, female gender, and better performance on the BBT60s were independent predictors of higher return to work, explaining 40% of the variation.
Conclusion: This study demonstrated a modest association between return to work 6 months after discharge and better performance on the BBT60s during hospitalization, including lower scores for comorbidities and female sex. This relationship should be interpreted with caution and confirmed in future studies. The BBT60s is a simple, quick, and useful way to include hospitalized people in the follow-up.
Implications: This study allows us to present suggestions for future studies. Thus, it is suggested to continue investigating whether the BBT can be used as a predictor of other outcomes.
Keywords: Hospitalization, Patient outcome assessment, Mobility Limitation

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CLINIMETRIC PROPERTIES OF THE BRIDGE TEST IN BED FOR HOSPITALIZED PATIENTS

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Background: Functional performance tests are often not applicable to bedridden patients. The proposal to perform a physical test that requires little equipment, minimal training and simple execution in bed, expands the opportunity for evaluation and rehabilitation strategies for a variety of hospitalized patients, from bedridden to independent ones. Thus, the bed bridge test (BBT), and its time-limited and repetition-limited versions, may constitute a new functional test.
Objectives: To test the clinimetric properties of BBT reliability and validity: 5 repetitions (BBT 5R) and 10 repetitions (BBT 10R), 30 seconds (BBT 30sec) and 60 seconds (BBT 60sec), in hospitalized patients.
Methods: Were included 92 patients eligible for the study performed in random order the BBT5rep, BBT 10rep, BBT 30sec and BBT 60sec repeated on two days with an interval of 48 hours. Validity was tested by correlation analysis between the Functional Status Score (FSS) scale, the sit-to-stand test (BBT) and the Short-Physical Performance Battery test (SPPB). With data from day 2, reproducibility was analyzed with the intraclass correlation coefficient (ICC), standard error of measurement (SME) and minimum detectable difference (DMD). Effect floor and ceiling were also tested.
Results: Participants were 50.9±17.2 years old, 60% women and 66% with clinical condition. The test-retest ICC (95%) was good to excellent (BBT 5R CCI:0.89, 95%CI 0.84-0.93; BBT 10R CCI:0.92, 95%CI 0.88-0.95; BBT 30sec CCI:0.87, 95%CI0.80-0.91; and BBT 60sec CCI:0.88, 95%CI0.83-0.92). The concordances observed for the BBT 5R were EPM: 1.2 and DMD: 3.4; for BBT 10R EPM: 1.8 and DMD: 5.0, for TPL30sec EPM: 1.6 and DMD: 4.4; and for BBT 60sec EPM: 2.8 and DMD: 7.6. There were appropriate ceiling and floor effects for all versions. Content validity was observed by the weak association between the performance of the BBT versions and the