

risk of falls, with falls as the dependent variable. A p-value of < 0.05 was considered statistically significant.

Results: This study included 96 individuals (59.3 ± 12.3 years old, 57.3% male). The incidence of falls was 29.2%. Fallers presented lower sedentary time on nondialysis days than nonfallers did (504.9 ± 136.7 vs. 580.9 ± 120.0 minutes per day, $p = 0.012$). In the unadjusted logistic regression analysis, sedentary time on nondialysis days was directly associated with risk of falls [OR: 1.005 (1.001 to 1.009); $p = 0.016$]. After adjustment for potential confounders, including age, gender, time on hemodialysis, body mass index, cardiovascular disease, diabetes mellitus, sedentary time on nondialysis days remained associated with risk of falls [OR: 1.005 (1.000 to 1.009) $p = 0.037$].

Conclusion: Higher sedentary behavior on nondialysis days increased the risk of falls for individuals on hemodialysis.

Implications: The assessment of sedentary behavior can be used to identify individuals on hemodialysis with higher risk of falls and to contribute for the development of preventive strategies.

Keywords: Renal Dialysis, Accidental falls, Sedentary Behavior

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3

INFLUENCE OF SEDENTARY TIME ON FUNCTIONAL CAPACITY AND LEVEL OF PHYSICAL ACTIVITY LEVEL AFTER A PULMONARY REHABILITATION PROGRAM

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Background: Pulmonary rehabilitation (PR) improves functional capacity in individuals with Chronic Obstructive Pulmonary Disease (COPD); however, these effects diminish over time, and these individuals exhibit a vicious cycle of sedentary behavior, leading to functional losses. However, there are still gaps in the literature regarding whether this behavior influences functional capacity, physical activity levels post-PR, and the maintenance of long-term benefits.

Objectives: To verify whether pre-PR sedentary time can explain functional capacity and physical activity levels post-rehabilitation and over six months.

Methods: This is a longitudinal study conducted on individuals with COPD who completed an eight-week PR program based on functional tests. The study was approved by the institution's Ethics Committee. Participants were assessed at three time points: pre-PR, post-PR and six months after PR. The assessments included functional capacity (six-minute walk test - 6MWT and six-minute step test-6MST). To measure sedentary behavior and physical activity levels, an accelerometer was worn on the right thigh for seven consecutive days. The accelerometer data were processed using ActiPASS software, and repeated measures ANOVA, Pearson Correlation and simple linear regression analysis were conducted using SPSS. The significance level was set at $p = 0.05$.

Results: A total of 26 individuals with COPD were evaluated, with a mean age of 67 ± 7 years, 15 (58%) males, FEV1 of $51 \pm 14\%$, and a BMI of 25 ± 5 Kg/m². There was a significant improvement in functional capacity from pre- to post-PR with no differences after six months. Regarding physical activity levels, no significant differences were found across the three time points. A correlation was observed

between pre-PR sedentary time and 6MWT ($r = -0.506$, $p = 0.008$), 6MST ($r = -0.532$, $p = 0.005$), post-PR physical activity level ($r = -0.616$, $p = 0.001$) and six-month post-PR physical activity level ($r = -0.760$, $p < 0.001$). Regression analyses showed that the pre-PR sedentary time explained 22.5% of the variance in functional capacity for the 6MWT (adjusted $R^2 = 0.225$, $p = 0.008$), 25.4% for the 6MST (adjusted $R^2 = 0.254$, $p = 0.005$), 35.3% for the post-PR physical activity level (adjusted $R^2 = 0.353$, $p = 0.001$), and 55.6% for six month post-PR physical activity level (adjusted $R^2 = 0.556$, $p < 0.001$).

Conclusion: Pre-PR sedentary time explained the variance in functional capacity and physical activity levels post-PR, as well as long-term physical activity levels. This reinforces the need to encourage more sedentary individuals to break this behavior during and after PR to maintain functional gains.

Implications: The findings of this study highlight the importance of Behavior change strategies targeting more sedentary individuals to enhance PR responses and maintain its long-term benefits.

Keywords: COPD, Pulmonary Rehabilitation, Sedentary Behavior

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

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4

FEASIBILITY AND REPRODUCIBILITY OF THE UNSUPPORTED UPPER LIMB EXERCISE TEST AND SIX-MINUTE PEG BOARD RING TEST FOR CHILDREN AND ADOLESCENTS

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Background: Activities involving the upper limbs are part of daily life in home, work, or leisure environments. However, children and adolescents with chronic lung disease, in certain situations, may experience limitations in the use of their upper limbs (UL), such as reduced strength and endurance of the UL. Much is known about the Unsupported Upper Limb Exercise Test (UULEX) and Six-Minute Peg Board Ring Test (6MBRT) in adult individuals, but there is no description in the literature regarding the use of UULEX and 6MBRT in the pediatric population.

Objectives: To evaluate the feasibility and reproducibility of two field clinical tests for upper limbs (Unsupported Upper Limb Exercise Test - UULEX and Six-Minute Pegboard Ring Test - 6PBRT) in children and adolescents.

Methods: Feasibility study. Fifteen healthy volunteers aged 6 to 17 years were included. Spirometry was performed, followed by randomization of three tests: Cardiopulmonary Exercise Test (CPET) or UULEX or 6PBRT. The CPET was performed on an upper limb ergometer with a load increment protocol every minute. For UULEX, the volunteer sits in front of a panel and raises their arms while holding bars of different weights (0.25 kg to 2.0 kg) at different heights; outcome: execution time. For 6PBRT, the volunteer sits in front of a panel with four pins (two upper and two lower) and moves rings from the lower pins to the upper ones (and vice versa) for six consecutive minutes; outcome: number of rings moved. For all tests, maximum oxygen consumption (VO_{2peak}) and peak ventilation per minute (VE_{peak}) were also evaluated as outcomes. The UULEX and 6PBRT were performed twice each (test and retest), with a 30-minute interval between each. For feasibility, less than 15% of volunteers could reach the ceiling effect and/or floor effect.

Results: Volunteers were 11 years (9-15 years), and normal pulmonary function (FVC, FEV1, FEV1/FVC > 80% predicted). The UULEX time in the test and retest was 9.5 min [8.0 - 12.0 min] vs. 9.4 min [8.2 - 12.0 min], respectively; and the number of rings in the 6PBRT was 299 [258 - 373] vs. 340 [244 - 387], respectively, $p > 0.05$. The CPET showed higher VO_2peak 22.8 (19.4 - 26) mL/kg compared to UULEX at 11.8 (10.2 - 13.6) mL/kg and to 6PBRT 11.6 (9 - 12) mL/kg, $p = 0.001$. The VEpeak was higher at CPET 31.5 (22.9 - 33.9) L/min compared to UULEX 19.7 (15.6 - 23.1) L/min and to 6PBRT 14.4 (12.2 - 19.3) L/min, $p = 0.001$. The ICC for the test and retest of UULEX was 0.93 (0.78 - 0.97) $p < 0.001$, and for 6PBRT was 0.97 (0.91 - 0.99) $p < 0.001$. Two volunteers (13%) achieving ceiling effect at UULEX, and no floor effect for any field test.

Conclusion: The UULEX and 6PBRT are feasible and reproducible field tests for upper limbs in children and adolescents, have lower metabolic demand compared to CPET. It provides an alternative to assess upper limbs pediatric population.

Implications: New upper limb test for the pediatric population.

Keywords: Field Test, Upper Limb, Children and Adolescent

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5

ULTRASONOGRAPHIC EVALUATION OF PULMONARY AERATION AND ITS RELATIONSHIP WITH FUNCTIONAL CAPACITY IN PATIENTS WITH CHRONIC HEART FAILURE

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Background: Early identification of pulmonary congestion is essential for optimizing clinical management and improving outcomes in individuals with heart failure (HF) enrolled in cardiovascular rehabilitation programs. However, the clinical presentation of this condition is heterogeneous, and conventional methods such as chest radiography and pulmonary auscultation have low sensitivity for early detection. In this context, lung ultrasound (LUS) has emerged as a reliable and accurate tool for assessing pulmonary aeration, enabling the early identification of congestion and the appropriate guidance of therapeutic interventions.

Objectives: To evaluate the relationship between pulmonary aeration and functional capacity in individuals with chronic HF at the beginning of a cardiovascular rehabilitation program.

Methods: This was an observational, analytical-descriptive, and cross-sectional study conducted with individuals aged 18 to 65 years with chronic HF and a left ventricular ejection fraction (LVEF) < 50%, undergoing screening for a cardiovascular rehabilitation program. Participants underwent pulmonary aeration assessment using the LUS protocol, which analyzed 12 lung regions (6 anterior and 6 posterior), generating a total score ranging from 0 (normal aeration) to 36 (diffuse pulmonary consolidation). Pulmonary aeration was classified as mild (1-5 points), moderate (6-15 points), or severe (> 15 points). Functional capacity was determined by the six-minute walk test (6MWT) and peak oxygen consumption (VO_2max). Statistical analysis was performed using SPSS 27.0 software, employing

tests for mean comparisons and association analysis between variables.

Results: A total of 21 individuals with chronic HF were evaluated, 70.6% male and 29.4% female, with a mean age of 52.95 ± 8.27 years and a mean LVEF of $34.7 \pm 11.7\%$. Pulmonary aeration classification revealed that 19.05% had mild impairment (LUS score between 1 and 5), while 80.95% were classified as normal. Participants showed impaired functional capacity, with a mean VO_2max of 17 ± 4.4 mL/kg/min, with 76.2% classified as "very weak" and 23.8% as "weak." In the 6MWT, the average distance covered was 433.36 ± 114.74 meters, and 55% of individuals performed below 80% of the predicted distance. A statistically significant association was identified between the LUS score and VO_2max classification ($p < 0.05$), indicating that individuals with very weak functional capacity had a higher frequency of pulmonary alterations. Conversely, those classified as weak or moderate/good predominantly had normal pulmonary scores.

Conclusion: This study demonstrated a significant association between pulmonary aeration and functional capacity in individuals with chronic HF. Even mild pulmonary alterations were linked to functional limitations, highlighting the need for an integrated assessment of pulmonary and cardiorespiratory function in clinical practice.

Implications: LUS appears to be a valuable tool for monitoring pulmonary congestion in patients with chronic HF undergoing cardiovascular rehabilitation. Early detection of pulmonary impairment may enable adjustments in exercise prescription and clinical management, contributing to a more personalized approach. Incorporating LUS into the routine assessment of these patients could assist in risk stratification and the optimization of therapeutic strategies.

Keywords: Heart failure, Lung ultrasonography, Functional capacity

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POST-TUBERCULOSIS LUNG DISEASE: ASSOCIATIONS BETWEEN EXERCISE OXYGEN CONSUMPTION, LUNG FUNCTION AND IMAGE FINDINGS

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Background: The burden of functional impairment after tuberculosis (TB) treatment is a global health issue, now referred to as post-tuberculosis lung disease (PTLD). These patients often suffer not only from persistent respiratory symptoms but also from exercise intolerance as a result of the pulmonary sequelae.

Objectives: To evaluate the correlations of peak oxygen uptake (VO_2peak) with lung mechanics, radiographic abnormalities, and quality of life (QoL) in adults with post-tuberculosis lung disease (PTLD).

Methods: This is a cross-sectional study in which 60 adults with PTLD underwent a cardiopulmonary exercise test (CPET) using a small sample of the expired volume through a miniaturized