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## FACTORS RELATED TO THE RISK OF ABNORMAL GENERAL MOVEMENTS IN PRETERM INFANTS IN A NEONATAL INTENSIVE CARE UNIT: DEVELOPMENT OF A MULTI-CRITERIA INDEX

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**Background:** The General Movements Assessment (GMA) is one of the most important tools for early diagnosis of neurodevelopmental disorders. It is a reliable, quick, and non-invasive assessment of spontaneous movements in newborns, ideal for use in the Neonatal Intensive Care Unit (NICU). Previous studies have identified a strong influence of postnatal clinical factors on the classification of general movements using the GMA in the NICU. However, this literature is still scarce in developing countries, limiting the use of the tool and, consequently, the early diagnosis and the monitoring of developmental changes.

**Objectives:** To develop a multicriteria index with the main clinical factors related to the occurrence of abnormal classification of general movements during the NICU stay; To verify the contribution of the index to explain the percentage of abnormal classifications of general movements and to identify babies at risk for developmental changes.

**Methods:** This is an exploratory cross-sectional study, with data from a prospective longitudinal study. Preterm newborns (PTNB) with less than 37 weeks of gestational age were included, according to admission to the NICU. Their spontaneous movements were classified as normal or abnormal through the GMA by 2 trained and certified evaluators. The babies' clinical variables were recorded on a data sheet. Data analysis was performed using the Multicriteria Decision Support, a method that allows the development of an index to identify risk factors related to the abnormal classification of the general movements of newborns.

**Results:** Fifty-two PTNB were evaluated, of which 30 (57.7%) were male, with a mean gestational age of 31.63 ( $\pm 2.38$ ) and mean birth weight of 1560.13 ( $\pm 412.86$ ). The mean total hospitalization time of the babies was 32.84 days, with the mean use of mechanical ventilation for 2.05 days; 45 (86.5%) used non-invasive ventilatory support and/or oxygen therapy. Grade I-II peri-intraventricular hemorrhage was identified in 24 (44.8%) babies and grade III in just two (3.8%); 4 (7.7%) PTNB had patent ductus arteriosus and 7 (13.5%) had postnatal infection. As for socioeconomic level, 44 (84.6%) families had an average income of less than 2 minimum wages. The multicriteria index was calculated from the equation: Multicriteria Index child  $i$  = Evaluation criterion 1 child  $i$  weight criterion 1 + .... + Evaluation criterion  $n$  child  $i$  weight criterion  $n$ . A significant positive linear association was found between the multicriteria index and the abnormal trajectories of general movements ( $R^2=0.27$ ;  $\beta=0.51$ ;  $p<0.0001$ ).

**Conclusion:** The developed multicriteria index was able to identify PTNB with a higher risk of developmental changes, given its positive relationship with the percentage of abnormal general movements.

**Implications:** The results of the present study reinforce the possibility of using GMA for the early detection of neurodevelopmental disorders in PTNB even during their stay in the NICU, helping with postnatal follow-up and early intervention, if necessary.

**Keywords:** General Movements, Preterm infants, Early diagnosis

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## FUNCTIONALITY AND RESPIRATORY MUSCLE STRENGTH POST-COVID 19 IN A CARDIOPULMONARY REHABILITATION SERVICE OF THE UNITED HEALTH SYSTEM (SUS)

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**Background:** Infection with SARS-CoV-2 (coronavirus) led to the involvement and complications of different organs, which may lead to signs and symptoms that can last for months after infection, functionally compromising these individuals. Faced with this, the physiotherapist has a fundamental role.

**Objective:** Describe the Functional Status and Respiratory Muscle Strength of post-covid patients, referred to start an outpatient cardiopulmonary rehabilitation (CPR) program of the Unified Health System (SUS), with complaints of dyspnea and fatigue.

**Methods:** Individuals with medical referral for rehabilitation due to cardiorespiratory and/or musculoskeletal complications due to COVID-19 infection were included, regardless of gender and age, and regardless of the type of clinical treatment performed during the infection phase of the disease. As estimates, the pre-intervention was linked to a research and extension project in cardiopulmonary rehabilitation aimed at patients with post-covid complications. The assessment was structured and performed with the application of the following tests and tests: Post-COVID-19 Functional Status Scale (PCFS), Modified Medical Research Council, Degree of Dyspnea (MRC), Test 1-minute Sit and Stand-Up Test (TST1), 2-minute Stationary Walking Test (SWT2), 6-minute Walk Test (6MWT) and Manovacuometry (MIP - Maximum Positive Inspiratory Pressure / MEP - Maximum Positive Expiratory Pressure).

**Results:** At this time, six (6) were evaluated, 4 males and 2 females, with a mean age of 52 years ( $\pm 18$ ). As results obtained are: PCFS: Grade 0 (1 person), grade 1 (2 people), grade 2 (2 people), grade 3 (1 person); MRC 1 ( $\pm 1$ ); TST1 17 repetitions  $\pm 6$ , SWT2 53 lifts ( $\pm 25$ ), 6MWT 413 m ( $\pm 112$ ) with mean predicted value of 595; PiMax -82cmH<sub>2</sub>O ( $\pm 31$ ) with a mean predicted value of -100cmH<sub>2</sub>O; PeMax +83cmH<sub>2</sub>O ( $\pm 31$ ) with a predicted average of +104cmH<sub>2</sub>O.

**Conclusion:** For these patients, it was possible to observe PiMax and PeMax values below the predicted values, showing impairment of the respiratory muscles. In addition, a single individual did not present functional dysfunction, and the functional performance tests justified the lower-than-expected results.

**Implications:** Individuals with symptoms of dyspnea and fatigue after infection with COVID-19 have a functional and respiratory disability and should be referred to outpatient public services specialized in rehabilitation.

**Keywords:** COVID-19, Respiratory Muscle Strength, Physiotherapy

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## HEART FAILURE AND POST-COVID SYNDROME: A CASE REPORT ON THE EVOLUTION OF THE FUNCTIONAL STATUS AFTER A CARDIOPULMONARY REHABILITATION PROGRAM

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**Background:** Submaximal field walking tests are easy to apply and low cost, but it is necessary to standardize their application, especially in the pediatric population. The feasibility and its use in patients with congenital heart disease (CHD) have been studied.

**Objectives:** To verify the submaximal field walking tests applied in the cardiopulmonary evaluation of children and adolescents with CHD.

**Methods:** Literature systematic review, the search for scientific articles was carried out in the electronic databases Medical Literature Analysis and Retrieval System Online (MEDLINE via PubMed), Latin American and Caribbean Literature in Health Sciences (LILACS), Cochrane Library, Physiotherapy Evidence Database (PEDro), Scientific Electronic Library Online (SciELO) and ScienceDirect, structured in PICO format, without date restrictions. For the search strategy, words from the Medical Subject Heading Terms (MeSH) dictionary were used with the following descriptors: [(“Congenital Heart Defects” OR “Congenital Heart Defect” OR “Malformation of Heart” OR “Heart Abnormality” OR “Congenital Disorders” OR “Neonatal Diseases and Abnormalities” OR “Tetralogy of Fallot” OR “Tricuspid Atresia” OR “Ebstein Anomaly” OR “Ebstein’s Malformation” OR “Birth Defects” OR “Congenital Abnormalities”) AND (“Walk Test” OR “6 -min Walk Test” OR “6-minute Walk Test” OR “Six-minute Walk Test” OR “Endurance Shuttle Walk Test”)], which were later adapted to the other bases that were used in this review. Looking for studies that used submaximal field walking tests in children and adolescents with congenital heart disease aged 5 to 18 years. Methodological quality, effectiveness and safety, and risk of bias were assessed.

**Results:** Five studies met the eligibility criteria with a sample of 160 individuals with CHD, and all used the six-minute walk test ([https://www.physio-pedia.com/Six\\_Minute\\_Walk\\_Test/\\_6\\_Minute\\_Walk\\_Test6MWT](https://www.physio-pedia.com/Six_Minute_Walk_Test/_6_Minute_Walk_Test6MWT)). Note that different methodologies and modifications are used. The only clinical trial showed good methodological quality. Four studies had a low risk of bias, and one study had a moderate risk.

**Conclusion:** In this review, the 6MWT proved to be the first-choice method for assessing exercise capacity in children and adolescents with CHD, however, the lack of standardization in the application of

the test became evident, which made it difficult to compare the results.

**Implications:** Reducing the limitations and heterogeneity in the application of the test will enable more concrete outcomes and facilitate their reproduction in clinical practice.

**Keywords:** Pediatrics, Congenital Heart Disease, Field walking test

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## POST-COVID-19 SEQUELAE AND THE ASSOCIATION OF INSPIRATORY MUSCLE TRAINING IN A CARDIOPULMONARY REHABILITATION PROGRAM: A CASE REPORT

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**Background:** Post-COVID-19 symptoms are persistent, and their sequelae include fatigue, dyspnea, and decreased functional capacity. In this context, cardiopulmonary rehabilitation can improve the symptoms, functional capacity, and quality of life of these patients.

**Objective:** This paper reports the case of a woman with COVID-19 sequelae presenting frequent symptoms such as dyspnea and fatigue.

**Methods/Case Description:** Patient I.S, 56 years old, presenting dyspnea and post Sars-Cov-2 fatigue, scheduled for a cardiac rehabilitation program. The pre- and post-intervention assessment was based on the: Post-COVID-19 Functional Status Scale (PCFS), 1-minute Sit and Stand Test (SST1), 2-minute Stationary Gait Test (2MWT), Test of 6-minute walk (6MWT) and Manovacuometry. The progressive recovery program had the duration of 8 weeks, 2 times per week, based on: 1) Aerobic exercises on a treadmill; 2) respiratory kinesiotherapy; 3) Inspiratory Muscle Training with POWERbreathe® equipment, with progressive load; 4) Circuits and Stretches. The first session started with aerobic exercise for 15 minutes, at 5 km/h, without incline, in continuous use of POWERbreathe® in 2 cmH<sub>2</sub>O and respiratory kinesiotherapy exercises. The patient had a 100% adherence to the program. Sessions were based on 20 minutes of aerobic exercise at 5 km/h and rib cage stretching exercises with continuous POWERbreathe® at 4 cmH<sub>2</sub>O.

**Results:** The results obtained were: PCFS Grade 0 pre- and post-intervention, SST1 (24 repetitions vs 29 repetitions), 2MWT (87 lifts/Borg Final 3 vs 130 lifts/Borg Final 3), 6MWT (561 vs 630m) and Manovacuometer (-80cmH<sub>2</sub>O / +100cmH<sub>2</sub>O vs -100cmH<sub>2</sub>O / +120cmH<sub>2</sub>O).

**Conclusions:** A cardiopulmonary rehabilitation program, associated with inspiratory muscle training and respiratory kinesiotherapy, for 8 weeks, was able to promote improvement in respiratory muscle strength and functional capacity after COVID-19.

**Implications:** A functional rehabilitation program for patients with post-COVID associated with inspiratory muscle training promotes care and respect for the singularities of each case, allowing an early return to activities of daily living.

**Keywords:** Inspiratory Muscles, COVID-19, Aerobic Exercise