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Upper limbs: how physically limited is your patient?

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Reference values for field tests to be used in clinical trials are obtained from a set of apparently healthy individuals, providing clinicians with a comparative basis for the correct interpretation of the results presented by the patient under evaluation.[1] In addition, by taking the reference values for such tests into account, it is possible to quantify objectively how limited the individual is. It is essential that normative values be established in a specific population, because various factors, such as demographic, anthropometric, clinical, and physiological factors, can influence test performance.[2]

There are a significant number of normative values for field tests, especially those involving the lower limbs, some for use in Brazil.[2] Based on those values, it is known that individuals with chronic diseases perform more poorly on those tests than do their healthy peers. However, normative values are scarce in the scientific literature regarding upper limb exercise tests, although we know that the use of the upper limbs in chronic lung disease triggers a series of changes in ventilation[3] and that the perceived level of exertion is similar to that related to the use of the lower limbs.[4] In addition, whereas the lower limb muscles are mostly responsible for limiting activities such as walking, it is known that approximately 80% of activities of daily living (ADLs) are performed with the upper limbs and that individuals with COPD commonly report dyspnea and fatigue during such activities.[4] When arm activities are unsupported, there is a reduction in inspiratory capacity and thoracoabdominal asynchrony, consequently increasing ventilatory demand and oxygen uptake, thus worsening dyspnea.[5-8] Although oxidative capacity is preserved and even increased in the deltoid muscles, which support the upper limbs, exercise tolerance is lower during activities performed with no upper limb support.[5] Therefore, the use of specific tests for upper limb assessment is crucial in patients who report some type of limitation in the performance of ADLs involving the upper limbs.

The Unsupported Upper Limb EXercise (UULEX) test is one of the recommended tests to assess upper limb functional capacity and endurance.[6] However, due to the lack of normative values for the Brazilian population, there is a gap in the literature regarding the correct interpretation of this test. In the current issue of the JBP, Lima et al.[7] have determined, for the first time, reference values for the UULEX test in healthy adults in Brazil. Their study involved a sample of 100 healthy Brazilian individuals over 30 years of age. The mean test completion time, the main outcome of the UULEX test, was 11.99 ± 1.90 min among the women and 12.89 ± 2.15 min among the men ($p = 0.03$). The regression model developed by the authors demonstrated that UULEX completion time was partly explained by the gender, age, and body mass index of the individuals, those variables collectively accounting for 30% of the variability in completion time.[7] Although the sample size was small and the adjusted coefficient of determination was low ($r^2 = 0.30$), a descriptive analysis of the performance of the individuals in the sample was carried out, providing normative values for men and women in each decade of life. In fact, those results will be very useful to assist in the interpretation of the UULEX test in young adults and elderly individuals in Brazil.

The following is a practical example of how to identify upper limb exercise limitation objectively in a population known to present with pulmonary and systemic impairment. Considering the new UULEX test normative values[7], we will interpret the performance of COPD patients in the study that introduced the UULEX test.[8] In that study, 9 patients underwent the test. The mean age of those patients was 62 years, and most were male. Therefore, we used the normative values obtained in the study conducted by Lima et al.[7] for males in the 61- to 70-year age group; that is, a mean UULEX completion time of 13.05 min (95% CI: 9.00-15.00). Thus, using a simple rule of three, we determined that the patients with COPD in that study showed 61% of the predicted values. Another example can be found in the study conducted by Janaudis-Ferreira et al.,[9] whose sample characteristics also lead us to consider the normative values for males in the 61- to 70-year age group. In that case, the UULEX completion time was 47% of the predicted value.[10] We find it interesting that the UULEX test has recently been validated for patients with rheumatoid arthritis.[11] The mean UULEX completion time was 8.26 min (95% CI: 2.30-11.00), which is below the normative value of 12.50 min (95% CI: 9.48-15.00) for women in the 51- to 60-year age group,[7] corresponding to 66% of the predicted value. Although these are only illustrative examples, because the samples of patients were in countries not included in the development of the normative values, this analysis is a way of showing their applicability not only in research but also in clinical practice.

Finally, the correct assessment of upper limb and lower limb functionality is fundamental for the practice of health care professionals, given that chronic diseases have a major impact on the ADLs of the patients.[12] We suggest that functional tests be administered by professionals

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who work directly with patients who report limitations in ADLs, whether related to the upper limbs, lower limbs, or both. Various tests have been developed for functional assessment and can be easily performed in physician offices, clinics, hospitals, and even in the home environment. It is up to us, health care professionals, to implement such tests and use normative values in clinical practice, so that the objective interpretation of the functional performance of the patients can facilitate clinical decision making.

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