The YMCA’s cycle ergometer test is valid to estimate the energy expenditure of the physical activity

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Introduction
The physical activity professionals need simple and cheap validity tools to evaluate physical fitness and quantifying energy expenditure. On this manner, the YMCA cycle ergometer test is a commonly used test for the cardiorespiratory condition evaluation fitness (known as \(\text{VO}_2\text{max}\)); however it could also be used to quantifying energy expenditure since this test is based on the \(\text{VO}_2\)-HR relationship by an indirect way. Our purpose was to study the utility of the YMCA cycle ergometer test to estimate the energy expenditure of the physical activity in an adult population.

Methods
56 subjects (28 male, 28 female) participated in this study (43.5 ± 5.9 years). All of them achieved: (1) a continuous and maximum triangular test, (2) a test of 3 stages with workloads that corresponded to the 40, 55 and 70% of the \(\text{VO}_2\text{peak}\) measured in the test 1 and (3) an YMCA cycle ergometer test. All the tests were accomplished on a cycle ergometer. Respiratory gases were collected, breath by breath, throughout the tests 1 and 2 using a Medical Graphics analyzer. An individual regression \(\text{VO}_2\)-HR was calculated according to the data registered in the test 1 and in the test 3. Starting from this regression line we estimate the \(\text{VO}_2\) that we used at the 3 workloads of the test 2 and it was compared with the measured \(\text{VO}_2\) of the same test.

Results
The \(\text{VO}_2\text{peak}\) measured in the maximum test is significantly greater in men (3311 ± 866 ml min\(^{-1}\)) that in women (1814 ± 436 ml min\(^{-1}\)) (Figure 1). According to YMCA test the \(\text{VO}_2\text{peak}\) estimated for women is statistically different (p<0,01) of \(\text{VO}_2\text{peak}\) measured in the maximum test; the same measures performed by men did not show any differences.

When comparing the \(\text{VO}_2\) in each workload of the test 2 with the \(\text{VO}_2\) estimated according to the relationship \(\text{VO}_2\)-HR of the YMCA test (Table 1), statistical differences were not observed in any sex.

Discussion/Conclusion
The YMCA test has been designed to estimate the \(\text{VO}_2\text{max}\), in spite of this main utility the results of our study indicates that YMCA test overestimates the \(\text{VO}_2\text{peak}\) in women. But when we estimate \(\text{VO}_2\) using the \(\text{VO}_2\)-HR relationship calculated from the YMCA test we have a reliable tool to estimates \(\text{VO}_2\). The YMCA test can be a simple, easy and cheap method to estimates \(\text{VO}_2\) during the physical activity; consequently it is a useful test for the daily work of the physical activity professionals.

References