

# **MODIFIED INCREMENTAL SHUTTLE WALKING TEST: Reference Values in Healthy Italian Adolescents**

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## **BACKGROUND**

Incremental Shuttle Walking Test (ISWT) is an incremental field exercise test used in clinical practice, both in adults and children. The test's aim is to evaluate physical performance and, consequently, the subject's cardiorespiratory capacity. ISWT is one of the most useful tests for assessing the person's physical condition and their response to treatment<sup>1</sup>.

ISWT was initially used as an outcome measure for adults with chronic obstructive respiratory diseases<sup>3</sup> and later has been added to other disorders including cystic fibrosis and asthma<sup>4</sup>.

As regards the pediatric subjects, this test has been scarcely investigated: there are only a few studies that have used this test in children born preterm and in children with chronic respiratory diseases.

The use of the modified ISWT in clinical practice is required to have predicted values on the healthy population in order to better interpret the result obtained<sup>5</sup>.

Currently only one study in literature proposes an equation for calculating the predicted distance the modified ISWT in pediatric subjects aged 6 to 18<sup>2</sup>.

## **OBJECTIVES**

1. Identify which variables are predictive of the distance traveled by the children
2. Formulate an equation that allows the calculation of the distance predicted by the test, creating reference values for the modified ISWT
3. Compare the values obtained with the resulting equation with those found in the literature (Lanza's study).

## **METHODS**

A cross-sectional study enrolling 148 healthy Italian volunteer adolescents aged 11-17 was carried out. Anthropometric characteristics of the subjects were recorded and the following parameters were detected before and after the test: blood pressure, peripheral oxygen saturation, heart rate, respiratory rate and the subjective sensation of dyspnea and muscle fatigue. Participants were also interviewed about their regular physical activity. The tests were performed in accordance with the American Thoracic Society guidelines<sup>1</sup>.

## **RESULTS**

The normality of the distribution of continuous variables was tested through the Shapiro-Wilk test. The Bland Altman test was performed to verify the congruence between the measured distance and the predicted distance with the built model. The derived regression model was used to establish a new predictive equation for walking distance.

It was found that sex, age, heart rate and BMI were the statistically best significant predictors of modified ISWT ( $p < 0,001$ ).

## CONCLUSION

This study identified the proposed equation which can be used to interpret the modified ISWT performance in pediatric subjects with chronic diseases compared to their healthy reference population in the age group 11–17 years.

## REFERENCES

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