



## Sport and Flexibility: sports performance without risk of injury

Antonio Cejudo-Palomo\*

Faculty of Sports Science, University of Murcia, Spain

*Director*

Dr Pilar Sainz de Baranda Andújar

Faculty of Sports Science, University of Murcia, Spain

Dr Fernando Santonja Medina

Faculty of Medicine, University of Murcia, Spain

Dr Francisco Ayala Rodríguez.

Faculty of Social and Health Science, Miguel Hernández University of Elche, Spain

*Date read:* 18 December 2015

OPEN  ACCESS

**Editor:**

© Generalitat de Catalunya  
Departament de la Presidència  
Institut Nacional d'Educació  
Física de Catalunya (INEFC)

ISSN: 2014-0983

**\*Corresponding author:**

Antonio Cejudo-Palomo  
[antonio.cejudo@um.es](mailto:antonio.cejudo@um.es)

**Section:**

Doctoral Dissertations

### Abstract

This article-based thesis is part of the “optimum performance with a lower predisposition to sports injury” research line. Its objectives were: a) to present a specific proposal for the assessment of the range of motion (ROM) of the legs, the “ROM-SPORT Protocol”; b) to analyse the precision of measurement of the protocol tests, and c) to determine the flexibility profile in different sports. A total sample of 329 subjects registered with federations in futsal, handball, football and triathlon took part in this paper. The ROM-SPORT protocol consists of 11 angular tests to assess the flexibility of the main leg muscles. For the study of the reliability of the ROM measurement, and after the familiarisation session, each participant was examined a total of three times with an interval of two weeks between assessment sessions. For the description of the flexibility profile, and after the familiarisation session, each athlete was assessed once. The participants were encouraged to make a maximum of two attempts at each test on a random basis. A descriptive analysis was conducted of each one of the quantitative variables including the mean and its standard deviation. Student's t-test was used to determine the significant existence of flexibility asymmetry and to observe differences between tactical positions. The reliability of the test-retest of the measurements was determined through the change in the mean between assessment sessions (CM), standard error of the measurement, minimum detectable change 95% and intra-class correlation coefficient. The test-retest reliability of the ROM measurement was calculated separately for each one of the paired sessions (2-1 and 3-2) to analyse its consistency in the time interval between consecutive assessment sessions. The conclusions of the scientific study provide significant information about the description of each one of the ROM-SPORT protocol tests. The design and choice of the inclinometer with a telescopic rod make it applicable to sport and health. The results suggest that the ROM-SPORT protocol tests present good relative and absolute reliability. From the training standpoint, a major change in the initial values between 3.7° and 6.9°, depending on the ROM test used, will indicate a real change in flexibility values. The results define the first values of the flexibility profile of the leg in the futsal, duathlon and handball athletes analysed.

**Keywords:** range of movement, inclinometer, reliability, injury and performance