



2019 ASCA INTERNATIONAL CONFERENCE ON APPLIED STRENGTH & CONDITIONING

8 - 10 NOVEMBER | MARRIOTT, GOLD COAST, AUSTRALIA

CERTIFICATE OF ATTENDANCE

The Australian Strength and Conditioning Association verifies that

**PRIYANKARA MANOJ RAJAKARUNA
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Attended the

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ON APPLIED STRENGTH & CONDITIONING**

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RELATIONSHIP BETWEEN ALTERNATIVE POWER TESTS AND THEIR ASSOCIATION TO THIGH GIRTH AND LEG LEAN MUSCLE MASS IN HEALTHY YOUNG MALES**R.M.P. Manoj Rajakaruna^{1,2,3}, W.E.M. Gayathri Iresha Ekanayake⁴ & Christopher J. Marley¹**¹Faculty of Life Sciences and Education, School of Health, Sport & Professional Practice, University of South Wales, UK.²Center for Exercise and Sports Science Research, School of Medical and Health Sciences, Edith Cowan University, WA, Australia.³Department of Sports Science, Faculty of Applied Sciences, University of Sri Jayewardenepura, Sri Lanka.⁴National Institute of Sports Science, Colombo, Sri Lanka.**BLUF**

Given their relationship with the gold-standard 30-second Wingate test and the isokinetic dynamometer, simple measures such as the vertical jump or thigh girth can be used as a surrogate indicator of muscular power, allowing strength and conditioning coaches to easily assess and monitor the lower body muscular power during training, player selection and talent identification programmes.

INTRODUCTION

There are many laboratory tests and anthropometric measurements have been used to assess athlete's power and performance in modern sports. However, some tests are considered expensive and difficult to administer for a wide variety of population. Furthermore, it is important to find alternative simple and inexpensive tests for strength and conditioning coaches to utilize during their training process. Therefore, this study investigated the relationship between leg muscle power measurements (isokinetic dynamometry and vertical jump) and the gold-standard Wingate test, as well as their association between thigh girth and leg lean muscle mass.

METHODS

Thirty-one apparently healthy males (age= 27 ± 5 years; body height= 179 ± 7 cm; body mass= 90 ± 16 kg; BMI= 28.2 ± 4.6 kg/m²) participated in 30-second Wingate, vertical jump and isokinetic dynamometry tests, as well as measures of height, body weight, leg lean muscle mass and thigh girth testing. All measurements were completed over three visits separated by 72 hours and the tests were randomized for each participant to prevent any order effects. Ethical approval for this study was provided by the University of South Wales [Ethics reference number: 19CM0701LR].

RESULTS

The statistical results revealed strong positive relationships between both isokinetic dynamometry power ($r=0.687$, $P<0.05$) and vertical jump ($r=0.576$, $P<0.05$) with the 30-second Wingate test. Additionally, the isokinetic dynamometry power showed moderate positive relationships with thigh girth ($r=0.391$, $P<0.05$) and leg lean muscle mass ($r=0.444$, $P<0.05$). However, the moderate positive relationships that were identified between thigh girth ($r=0.334$, $P>0.05$) and leg lean muscle mass ($r=0.349$, $P>0.05$) with the 30-second Wingate power were not significant. Thigh girth ($r=-0.251$, $P>0.05$) and leg lean muscle mass ($r=-0.230$, $P>0.05$) showed a weak negative correlation with the vertical jump no significant correlation was observed (Figure 1).

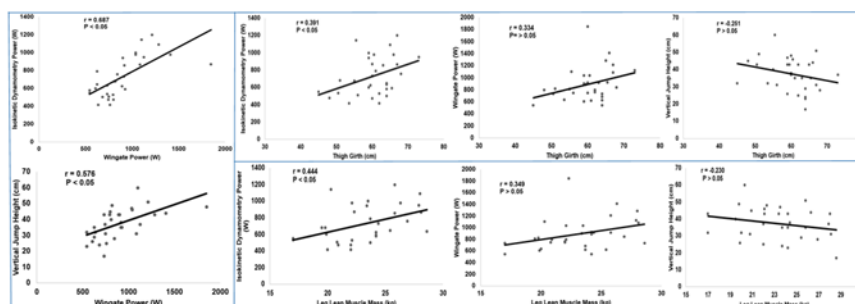


Figure 1 - Relationship between power tests and their association to thigh girth and leg lean muscle mass.

DISCUSSION

These findings suggest that the vertical jump and isokinetic dynamometry tests were positively correlated with the 30-second Wingate test. The 30-second Wingate and isokinetic dynamometry tests showed moderate positive relationships with thigh girth and leg lean muscle mass because the greater muscle mass contains a higher number of fast-twitch fibres. Also, suggested that the thigh girth and leg lean muscle mass are valid anthropometric parameters to measure the leg power instead of the 30-second Wingate test. However, these two selected anthropometrics showed negatively weak correlation with the vertical jump height in healthy young males and the thigh girth and the leg lean muscle mass should not be used to predict the vertical jump height.

PRACTICAL APPLICATIONS

The findings of this study provide coaches, researchers, physical education teachers and athletes an important recommendation from a practical perspective that coaches can be confident in using simple measures such as the vertical jump or thigh girth as an indicator of power, given their relationship with the gold-standard 30-second Wingate test and the isokinetic dynamometer which can be used to plan and implement periodization of training to achieve expected goals more effectively and economically.



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