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## **Title: THE RELATIONSHIP BETWEEN PEAK POWER AND LEG SIZE IN MOUNTAIN BIKE CYCLISTS.**

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**Introduction:** Recent literature has suggested that complex anthropometrics, such as area and volume are better predictors of sporting performance, than traditional anthropometrics of length, breadth and girth<sup>1</sup>. The aim of this study was to determine the relationship between peak power and leg size, both girth and volume, in mountain bike cyclists.

**Method:** This study was an observational, cross sectional investigation of 13 recreationally competitive mountain bike cyclists (age  $33 \pm 6$  years; stature  $1.83 \pm 0.10$  m; body mass  $80.28 \pm 3.16$  kg). In accordance with the International Society for the Advancement of Kinanthropometry (ISAK) five anatomical locations on each leg were manually palpated and marked. Three-dimensional (3D) images of the lower body were captured using a high precision commercially available surface imaging system, 3dMD (3dMD Inc., Atlanta, GA, USA). The 3D images were manually digitised using bespoke software developed in-house (KinAnthroScan). ISAK Girth anthropometrics; thigh girth and calf girth, and volume anthropometrics; lower leg volume and upper leg volume, for each leg were exported. To acquire peak power, participants completed four, six second all out sprints against randomly assigned loads (7.5 % BW, 9% BW, 10.5% BW, 12% BW) from a seated stationary start on an electromagnetically braked cycle ergometer (Lode Excalibur Sport with Pedal Force Measurement, Groningen, Netherlands). Each sprint was separated by 5 minutes rest (4 minute active recovery + 1 min rest). These data were collated and the relationship between leg size and peak power explored using linear regression analysis.

**Results:** All anthropometrics demonstrated a significant ( $p < 0.05$ ) and strong positive correlation ( $r > .50$ ) with peak power. Volume anthropometrics demonstrated a greater contribution to the variance in peak power ( $R^2 = 0.66$ ,  $p = 0.05$ ) compared to girth anthropometrics ( $R^2 = 0.57$ ,  $p = 0.11$ ).

**Conclusions:** This study suggests that volume anthropometrics provide a better predictor of peak power than girth anthropometrics, in mountain bike cyclists. Future kinanthropometry studies on mountain bike cyclists should consider the use of volume anthropometrics.

### **References:**

1. Schranz N, Tomkinson G, Olds T, Petkov J, Hahn AG. Is three-dimensional anthropometric analysis as good as traditional anthropometric analysis in predicting junior rowing performance? *Journal of Sports Sciences*. 2012 Aug 1; 30(12):1241-8.

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