Seasonal changes in three-compartment body composition in professional rugby union players over one competitive season: a team and individualised approach

Matthew Lees, Brian Oldroyd, Ben Jones, Amy Brightmore, Matthew Barlow and Karen Hind

Institute for Sport, Physical Activity and Leisure (ISPAL), Carnegie Faculty, Leeds Beckett University, Headingley Campus, Leeds, LS6 3QS, United Kingdom. Email: m.lees@leedsbeckett.ac.uk

Introduction

Identifying and understanding changes in the body composition of rugby players during the competitive season is important from both performance and health perspectives. We investigated three-compartment body composition across one competitive season in professional male rugby union players using dual-energy X-ray absorptiometry (DXA).

Methods

Thirty-five players from one English Premiership team (forwards: n = 20, age: 25.5 ± 4.7 years; backs: n = 15, age: 26.1 ± 4.5 years) received a total-body DXA scan at preseason (August), midseason (January) and endseason (May), enabling quantification of body mass, total and regional fat mass, lean mass, percentage tissue fat mass (%TFM) and bone mineral content (BMC). Both team and individual changes were evaluated, and for the latter, least significant change (LSC) was derived from precision data and applied as per International Society for Clinical Densitometry (ISCD) guidelines.

Results

Mean body mass remained stable throughout the season ($p > 0.05$), but total fat mass and %TFM increased from pre to endseason, and mid to endseason ($p < 0.05$). There were also statistically significant increases in total-body BMC across the season ($p<0.05$). In backs, there was a loss of lean mass between mid and endseason ($p < 0.01$). Individual evaluation using LSC and Bland-Altman analysis revealed a meaningful loss of lean mass in 17 players and a gain of fat mass in 21 players from pre to endseason. Twelve players had no change and there were no differences by playing position. There were individual gains or no net changes in BMC across the season for most players.

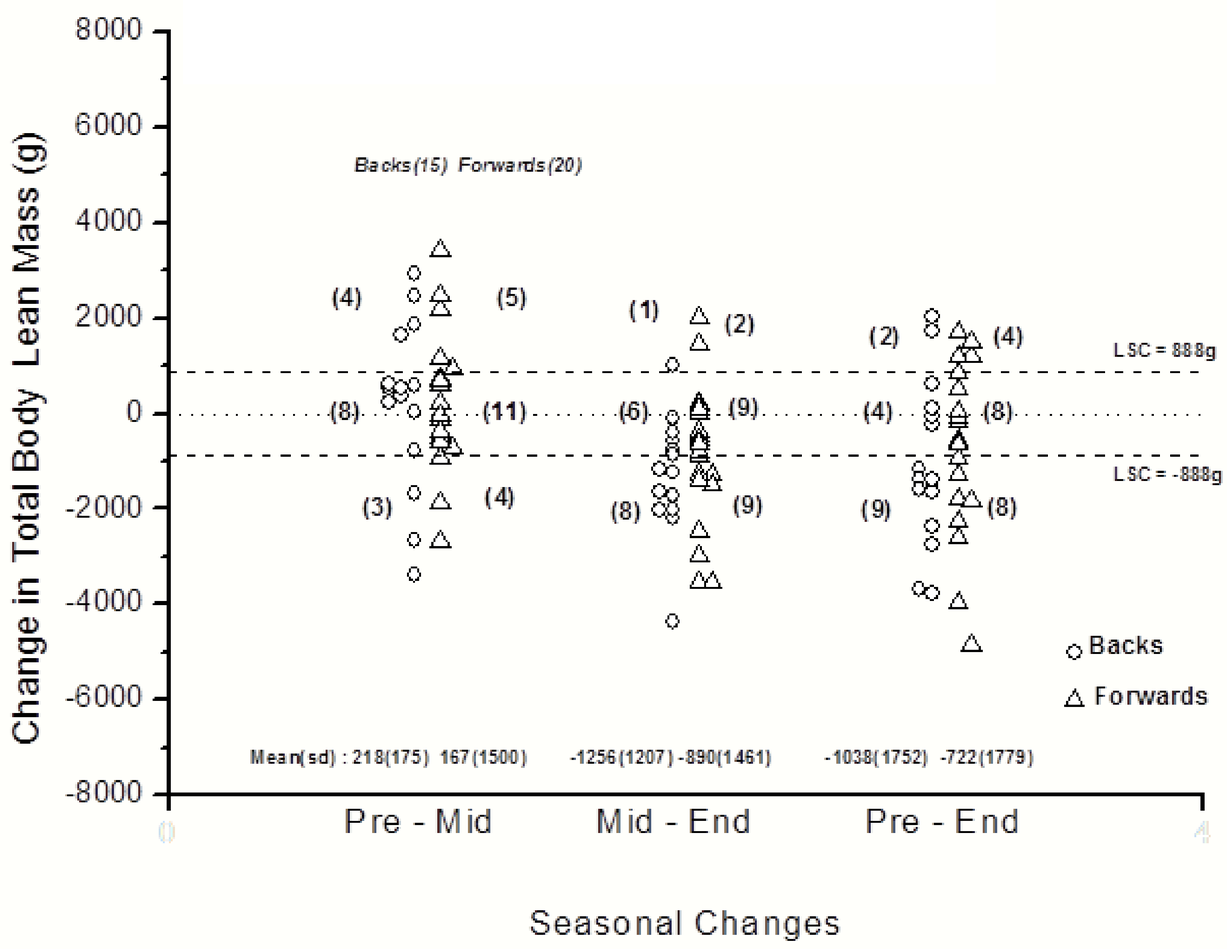

Figure 1. Individual rugby union player seasonal changes in total lean mass by least significant change (LSC) as determined by Barlow et al (2015).

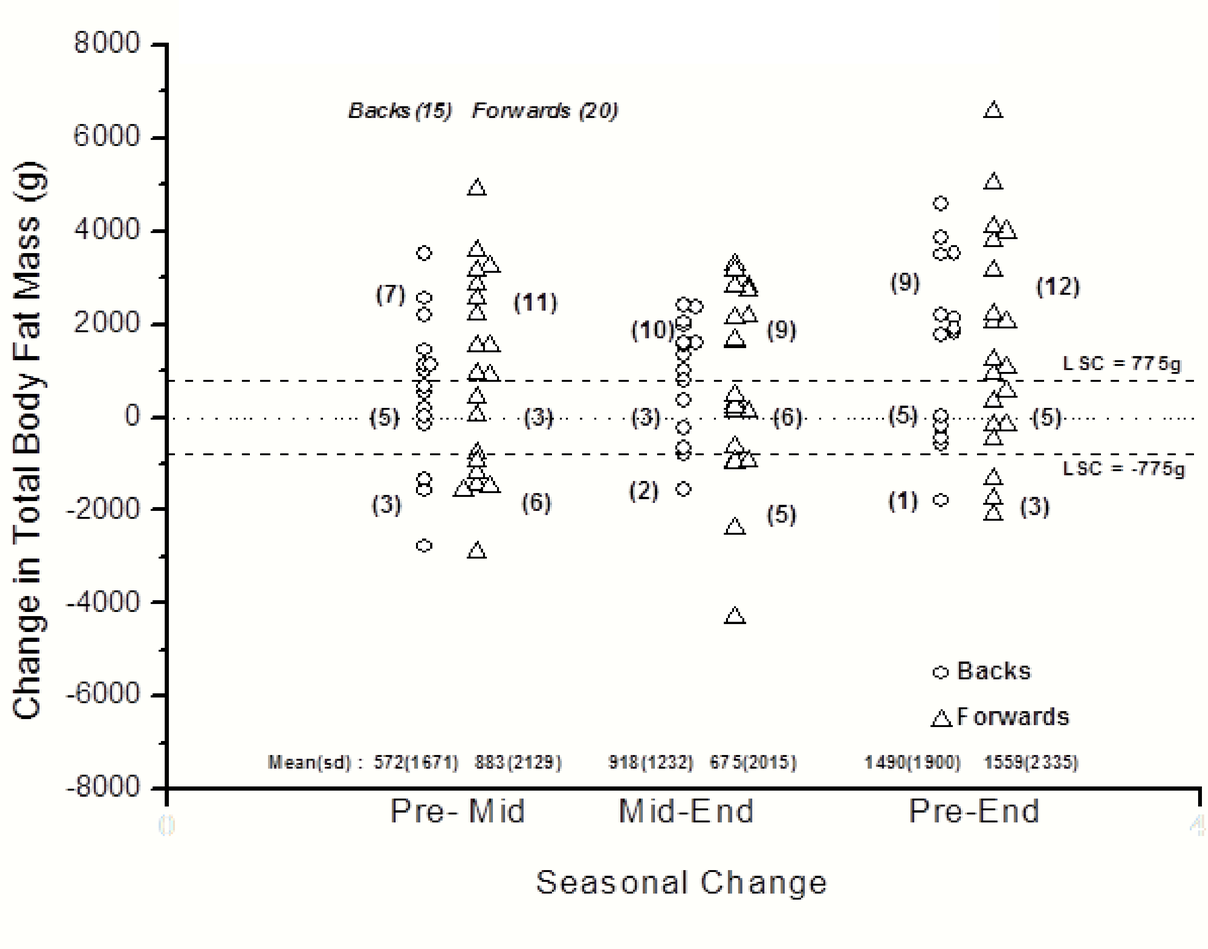

Figure 2. Individual rugby union player seasonal changes in total fat mass by least significant change (LSC) as determined by Barlow et al (2015).

Conclusions

Strategies to improve the maintenance of preseason lean/fat mass ratios across the season for professional rugby union players might be beneficial for performance and health, and thus require exploration. We recommend that future studies include an individualised approach to DXA body composition monitoring and this can be achieved through application of derived LSC.

Barlow, M.J. et al. (2015) Precision Error in Dual-Energy X-Ray Absorptiometry Body Composition Measurements in Elite Male Rugby League Players. J Clin Densitom, 18(4), pp. 546-550.

Presented at the 22nd Annual International Society for Clinical Densitometry Meeting, Galway, Ireland. June 1 – 4, 2016