Medicine & Science in Sports & Exercise

Issue: Volume 43(5) Suppl 1, May 2011, p 108

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Publication Type: [B-65 Free Communication/Slide - Bone Content: JUNE 1, 2011 3:15 PM - 5:15 PM: ROOM: 401]

DOI: 10.1249/01.MSS.0000402994.36487.79

ISSN: 0195-9131

Accession: 00005768-201105001-00328

[B-65 Free Communication/Slide - Bone Content: JUNE 1, 2011 3:15 PM - 5:15 PM: ROOM: 401]

Body Composition Change Over a Professional Rugby League Season and Relationship to Rates and Types of Injury:
864: June 1 3:45 PM - 4:00 PM

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PURPOSE: Rugby league, a highly physical full contact football code played by many thousands of people around the world, is associated with roughly 40.3 injuries per 1000 playing hours. The relationship of body composition and the change in composition during a playing season, to rate and type of injury is not well understood. We examined the anthropometric characteristics of Australian National Rugby League (NRL) players across a professional season and relationships between body composition, or change in composition, and type or incidence of injury.

METHODS: 44 NRL players were examined at pre-, mid- and post-season time-points of the 2009 NRL competition, and pre-season in 2010. Measures included: biometrics; bone, muscle and fat mass by dual-energy x-ray absorptiometry (DXA, XR800, Norland Medical Systems); tibial geometry and strength by peripheral quantitative computed tomography (pQCT; XCT 3000, Stratec); calcaneal broadband ultrasound attenuation by quantitative ultrasound (QUS-2, Quidel); diet; physical activity history; muscle power; and balance. Injury data for the 2009 season were obtained from team records. Repeated-measures ANOVA were used to examine differences in body composition at each measurement time-point. Anthropometric differences between injured and non-injured players were compared using t-tests. Multiple regression analyses were used to examine the ability of anthropometric characteristics to predict injury.

RESULTS: Muscle mass decreased progressively over the season ($p \leq 0.05$), while whole body bone mineral density (WBBMD) increased until mid-season ($p \leq 0.001$) then decreased thereafter ($p \leq 0.001$). No other significant body composition or performance changes were observed. Start-of-season WBBMD and muscle mass were negative, and weight, BMI and tibial mass at the 38% site were positive predictors of bone injury incidence ($p \leq 0.003$).

CONCLUSIONS: An overall loss of muscle mass was observed in players over the course of an NRL season. As bone injury incidence was highest in those with lowest start-of-season bone and muscle mass, seasonal losses may compound the risk of bone-related injury to players who begin the season with lower than average lean tissue mass.

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