

location was shifted in the anterior-posterior direction ( $\pm 5\%$  and  $\pm 10\%$ ) were significantly associated with joint moment and power values ( $p < 0.01$ ). The joint moment and power are more sensitive to errors in the CoP calculated from a force plate measurements than in BSP parameters. Consequently, those results suggest that it is necessary to pay close attention to the level of experimental errors to ensure meaningful results when using inverse dynamics procedures in various fields.

#### 4 A 6-YEAR RETROSPECTIVE REVIEW OF INJURIES SUSTAINED DURING THE SINGAPORE CRICKET CLUB INTERNATIONAL RUGBY SEVENS TOURNAMENT

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Rugby Sevens is gaining popularity in Asia as evidenced by the increase in number of tournaments and participants of the sport. Currently, there are limited studies that look at injury statistics for Rugby Sevens, especially at the amateur level. This study aims to assess injury patterns among amateur Rugby Sevens players participating in the annual Singapore Cricket Club Rugby Sevens International tournament from 2012 to 2017. A retrospective review was made of recorded injury data of all players participating in the 2012 to 2017 Singapore Cricket Club Rugby Sevens Internationals tournament. Main outcome measures include incidence rate of injuries expressed per 1000 player hours, injury rate according to anatomical location, and comparative injury incidence between successive days within each tournament. 343 injuries were recorded over the 6 tournaments, with an injury incidence of 348 per 1000 player hours. The lower limb was the most commonly injured region (46%, 159 per 1000 playing hours), followed by head and neck injuries (24%, 82 per 1000 playing hours), upper limb injuries (21%, 74 per 1000 playing hours) and trunk injuries (9%, 32 per 1000 playing hours). There was a greater incidence of injuries on day 3 of competition compared to day 1 for the 2013 and 2016 tournaments (2013: 541 per 1000 player hours vs. 520 per 1000 player hours; 2016: 191 per 1000 player hours vs. 767 per 1000 player hours). Being the first study of injuries in Asian Rugby Sevens, this serves to inform of the background risk of injuries, which is much higher than is currently reported in the literature. A well-designed, prospective injury surveillance study will be necessary to investigate if injury rates are indeed higher at the amateur level in Asia, and whether there are modifiable risk factors unique to this part of the world which should be considered to guide injury prevention programmes.

#### 5 THE INTERCHANGEABILITY OF THE 2.4 KM RUN TIME AND MULTISTAGE FITNESS TEST SCORE AS PERFORMANCE PREDICTORS FOR PHASE 2 ARMY RECRUITS COMPLETING A 12.8 KM LOADED MARCH CARRYING AN 11 KG BACKPACK AND 4 KG RIFLE

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Pre-loaded-march fitness tests are implemented continually during a soldier's career. The 2.4 km maximal-effort run protocol and the multistage fitness test (MSFT) protocol are used interchangeably as a surrogate tests prior to a loaded-march. Previous research identified that the 2.4 km run time and MSFT score have a strong correlation, no research examined if they had a similar predictive strength in relation to loaded-march performance. This study aimed to quantify the predictive strength of the MSFT score and 2.4 km maximal-effort run time for performance in a 12.8 km 15 kg loaded-march and if the MSFT and 2.4 km maximal-effort run can be used interchangeably with the same predictive strength alongside strength tests and anthropometric measurements from current Army protocols. Testing was completed over eight-days with phase-two British Army recruits from the Royal Electrical and Mechanical Engineers (REME) (n=12 male recruits aged 18–27). Day one involved collection of anthropometric data and completion of the 2.4 km run protocol, on day four the MSFT protocol was completed and on day eight the 12.8 km 15 kg loaded-march protocol was completed with heart-rate (HR) recorded throughout. The MSFT score and 2.4 km maximal-effort run time do not adequately predict the average percentage of estimated HR maximum (average%E-HRmax) during a 12.8 km 15 kg loaded-march ( $p = -470$  and  $0.513$  respectively). The MSFT score alongside measures of waist circumference (WC), body fat percentage (BF%) and height is a strong predictor of average%E-HRmax during the 12.8 km 15 kg loaded-march ( $r = -0.668$ ,  $p = 0.049$ ). The MSFT score, WC, weight and BF% showed a statistically significant negative correlation with the average%E-HRmax during the 12.8 km 15 kg loaded march ( $r = -0.794$ ,  $p = 0.011$ ), the 2.4 km run time, WC, weight and BF% exhibited a statistically significant strong positive correlation in relation to the average%E-HRmax during the 12.8 km 15 kg loaded-march ( $r = 0.726$ ,  $p = 0.027$ ). The MSFT and the 2.4 km maximal-effort run can be used interchangeably alongside measures of BF%, WC and weight to predict 12.8 km 15 kg loaded-march performance. Low BF% and WC suggest that the presence of excess adipose tissue is detrimental to performance during load-carriage. The current Army strength tests have limited significance to load-carriage performance.

#### 6 THE LANDING ERROR SCORING SYSTEM (LESS) AND LOWER LIMB POWER PROFILES IN ELITE RUGBY UNION PLAYERS

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The Landing Error Scoring System (LESS) is a relatively new clinical test that assesses landing biomechanics during a drop jump task. Performance measures such as Jump Height (JH), Power (P), Contact time (CT) and Reactive Strength Index (RSI) are common performance measures in an athletic population. Comparing results from the LESS against these performance measures has not previously been reported in an elite rugby union setting. The aim of this study was to compare differences between LESS scores and lower limb performance measures in elite male rugby union players. Thirty two male, elite rugby union players participated in the study. Each participant completed 3 trials of the LESS. Performance data