1 THE USE OF PLATELET-RICH PLASMA (PRP) TO TREAT CHRONIC TENDINOPATHIES: A TECHNICAL ANALYSIS

[1]JF Kaux, [1]T Emonds-Alt, [2]S Sport. *[1]Department of Physical Medicine and Sports Traumatology; [2]FIFA Medical Centre of Excellence, University and University Hospital of Liège, Belgium*

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Platelet-rich plasma (PRP) is blood plasma with a high concentration of autologous platelets which constitute an immense reservoir of growth factors. The clinical use of PRP is widespread in various medical applications. Although highly popular with athletes, the use of PRP for the treatment of tendinopathies remains scientifically controversial, particularly due to the diversity of products that go by the name of 'PRP.' To optimize its use, it is important to look at the various stages of obtaining PRP. In this literature review, we take a closer look at eight parameters which may influence the quality of PRP:

1. anticoagulants used to preserve the best platelet function,
2. the speed of centrifugation used to extract the platelets,
3. the platelet concentrations obtained,
4. the impact of the concentration of red and white blood cells on PRP actions,
5. platelet activators encouraging platelet degranulation and, hence, the release of growth factors, and
6. the use or nonuse of local anesthetics when carrying out infiltration.

   In addition to these parameters, it may be interesting to analyze other variables such as
7. the use of ultrasound guidance during the injection with a view to determining the influence they have on potential recovery.

In conclusion, there is a lack of standardization in PRP preparation technique for tendinopathies. However, it appears that the use of a platelet concentration lower than 5 times the baseline and avoidance of leukocytes should be preferred.

2 MENTAL WELLBEING IN ELITE MALE UNDER 23 SOCCER PLAYERS: A TEAM CASE STUDY

[1]Andy Richardson, [1]Tom Clifford, [2,3]Will Abbott, [4]Thomas E Brownlee, [5]Liam D Harper, [5]Robert J Naughton. *[1]Institute of Cellular Medicine, School of Biomedical Sciences, Newcastle UK; [2]School of Sport and Service Management, Brighton University, UK; [3]Brighton and Hove Albion F.C, American Express Elite Performance Centre, Lancing, UK; [4]Research Institute for Sport and Exercise Sciences, Liverpool Johns University, Liverpool, UK; [5]School of Human and Health Sciences, University of Huddersfield, UK*

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Recent research suggests a high prevalence of mental health disorders in professional soccer players, including symptoms of anxiety, depression, distress and adverse eating behaviours. Whilst a limited number of studies address this issue, the existing evidence is alarming and highlights a need for further investigations to develop a better understanding of the causes and consequences of mental health problems in professional soccer players. Thus, the aim of this study was to examine the influence of physical and emotional stressors on mental wellbeing (MW) in professional male soccer players. Using a longitudinal design, twenty-five male soccer players from the under 23 squad playing in the Premier League 2 division in the UK completed the Warwick-Edinburgh Mental Well-being Scale (WEMWBS) each week of the 2017/2018 season (37 weeks in total). Independent predictor variables of MW were injury, match selection (in the match squad), weekly training load (sum of total duration, total distance and total sprint distance) and win rate. Mean MW scores were calculated across the season for each player with a squad mean of 48±3.94, which is below the England population norm of 51.6. Mean MW was significantly lower when injured vs. not-injured (43.6±5.0 vs 49.9±3.5; $p=0.01$), but was not affected by selection, training load or match result. Multivariate regression models showed time out with injury to have the strongest influence on MW ($r^2=0.40$, $p<0.01$), with longer periods of injury linked to lower MW scores. Matchday selection was the only other statistically significant variable, with a positive correlation between MW and selection ($r^2=0.23$, $p=0.02$). Whilst elucidating the mechanisms by which time out with injury may affect MW was beyond the scope of this study, the association between injury and reduced MW highlights a need for mental health and wellbeing monitoring in injured soccer players. This could facilitate interventions and support to ensure health and performance are not negatively affected.

3 INFLUENCE OF INPUT DATA ERRORS ON THE INVERSE DYNAMICS ANALYSIS OF HUMAN LOCOMOTION: TIME-SERIES CHANGES IN LOWER EXTREMITY JOINT MOMENT AND POWER DURING RUNNING

Heung-Youl Kim. *Physical Education Center, Nanzan University, Japan*

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The purpose of this study was to investigate the influence of inaccuracies between the center of pressure (CoP) recorded from a force platform and the body segment parameters (BSP) calculated from the different anthropometric models on resultant joint moment and power. Biomechanical data while running were obtained for one healthy male subject. Using inverse dynamics procedures, the lower extremity joint moment and power were computed for five successful trials. Thereafter, recalculations of the joint kinetic values were carried out under the following conditions: (1) five different BSP models (i.e., Ae (Japanese model), Vaughan, Chandler, Zatsiorsky, and De Leva), and (2) The CoP shifted in the anterior-posterior direction by ±5% and±10% from the actual location. Changes of the joint kinetics resulting from difference in BSP models showed similar changes in all joints. There was similar changes between the curves, and statistically significant difference in the results was not observed. On the other hand, the anterior shifts in the CoP caused an elevation in the ankle plantal flextion and hip extension moment curves and a decrease in the knee extension moment curves. The posterior shifts in the CoP had the opposite effects. But the times of occurrence of the peak values were not affected. When CoP was shifted in the anterior direction, the ankle and hip joint power generations were increased, and decreased in the posterior direction. In the knee joint power generation had the opposite results. The adjustments in the CoP produced changes in the observed joint moment variables of 14% and 34%, on average for the ±5% and±10% shifts, respectively. On the other hand, in the joint powers, greater power generation was observed with hip joint than other joint powers. Using a one-way repeated measures ANOVA, when CoP

location was shifted in the anterior-posterior direction (±5% and±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

[1]C Xu, [2]J Walter, [3]LL Low, [4]KW Lai. *[1]Department of Family Medicine, Singhealth Polyclinics, Singapore; [2]Singapore Cricket Club, Singapore; [3]Department of Family Medicine and Continuing Care, Singapore General Hospital, Singapore; [4]Island Orthopaedic Consultants, Singapore*

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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 paying 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

D Moore, C Harrison, S Moore. *School of Social Sciences, Humanities and Law, Teesside University, UK*

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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

[1]S Rowell, [1,2]N Relph. *[1]Department of Medical and Sports Sciences, University of Cumbria, UK; [2]Department of Applied Health and Social Care, Edge Hill University, UK*

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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