



**TWELFTH ANNUAL  
SCIENTIFIC CONFERENCE**

# **BOOK OF ABSTRACTS**

*“Sports Injuries and Illness in Young  
People — A Complete Picture”*

**Thursday, Friday & Saturday  
17th, 18th & 19th September 2015**

Royal College of Surgeons in Ireland  
123 St Stephen’s Green, Dublin 2

**CPD/CAS credits will apply**

## FOREWORD



**DR NICK MAHONY**

**CHAIR FSEM Annual Scientific Committee**

On behalf of the organising committee I would like to thank all those delegates who have submitted an abstract to the 12th Annual Scientific Conference of the FSEM in Ireland, this year co-hosted by Athletic Rehabilitation and Therapy Ireland and the Irish Society of Chartered Physiotherapists.

The number and quality of abstract submissions this year remains high and quality of research continues to improve. All our conference delegate disciplines are represented and this year we have also a number of presentations from our undergraduate students. All of us no matter what discipline we come from share a similar goal, the best possible care for our athletes and teams, and our active and inactive populations. Our multidisciplinary format is designed to give delegates a mix of current research ideas and experiences, in both oral and poster formats and hopefully this format will continue to nurture understanding and collaboration across our varied disciplines.

In 2012 the FSEM conference committee took the bold step of introducing parallel scientific sessions to give all our delegates the opportunity to present their research work and clinical experiences in an oral format. Again this year, with some very slight restrictions on time, all those who requested an oral presentation have been afforded the opportunity to make at least one presentation if not two oral presentations to an audience of their peers. The slight decrease in submissions and venue restrictions have meant that oral parallel scientific sessions be extended in time.

Friday afternoon is again taken up by our main thematic session, where the programme content was determined by as always selected by prior blinded editorial review. The main scientific session prizes are again awarded by two independent judges for the best oral scientific and clinical case presentation in the main session. In addition on Saturday the best oral scientific presentation from each theme will also receive a prize.

As well as abstracts submitted for oral presentation we have approximately 40 poster presentations, and I would strongly encourage our delegates to accompany our poster judges on Friday lunchtime between 1:15 and 1:45pm to listen to the 2-3 minute poster presentation and Q&A in the adjudicated poster session. Our judges will come together again on Saturday to decide on those shortlisted on Friday for the poster prize.

I once again thank our sponsors for supporting the conference, and note all delegates who visit the sponsor's exhibitions and get their cards stamped will be eligible for our prize draw of SEM related textbooks. Once again on behalf of the committee I would like to thank all you who have put together an abstract for oral or poster presentation, and for your continued support of the research content of the meeting.

A handwritten signature in black ink, appearing to read 'N Mahony', written in a cursive style.

## **O.1 Nutritional supplementation practices in Ulster schools rugby.**

Ms Lynsey Henderson<sup>1</sup>, Mr Gavin Heyes<sup>1</sup>, Mr Chris Bleakley<sup>2</sup>, Mr Richard Nicholas<sup>1</sup>

<sup>1</sup>Royal Victoria Hospital, Belfast, Northern Ireland, <sup>2</sup>University of Ulster, Northern Ireland

**Introduction:** The Irish Football Rugby Union (IRFU 2013) released recommendations for nutritional supplementation in young rugby players. They recommended a healthy eating and drinking practice but advised against ergogenic or protein supplementation. The aim of this study was to examine the current supplementation practice of Ulster schools rugby first fifteen squad players. **Methods:** The nutritional supplement practice of Ulster schools rugby players (aged 15-18 years) was examined. An anonymous online questionnaire was constructed and sent to 512 players. Information on the prevalence, type, frequency, reason and knowledge of supplementation was obtained. **Results:** 310 anonymous responses were received (60.5% response rate). 64% of Ulster schools rugby players regularly used nutritional supplements. 81% of older schools' players (18 year olds) consumed supplements compared to 52% of 15 year olds. Six different types of supplements were consumed. The commonest supplement was protein (95%). The most frequent reason for taking supplements was to improve athletic performance (48.8%) and the commonest reason for not consuming supplements was "no desire" (57.8%). Only 34.8% of total players were aware of the IRFU guidelines on nutritional supplementation. **Conclusion:** The use of nutritional supplementation is commonplace in first fifteen squad Ulster school rugby players. The majority of players are not aware of the IRFU guidelines relating to the use of such supplements. The findings of this study suggest the need for an educational programme in Ulster schools regarding the use and safety of nutritional supplements.

## **P.2 The effects of caudal mobilisation with movement (MWM) and caudal self-mobilisation with movement (SMWM) in relation to restricted internal rotation in the hip: a randomised control trial**

Richie Walsh<sup>1</sup>, Sharon Kinsella<sup>1</sup>

<sup>1</sup>Institute of Technology Carlow, Carlow

**Introduction:** The loss of internal rotation of the hip has been linked to hip pathology. Being able to identify and correct restricted internal rotation of the hip may prevent hip pathology. Identifying whether SMWM are as effective as MWM may allow the prolonged effects of MWMs between treatments. **Study Aim:** The purpose of this study was to determine whether caudal MWMs or SMWMs would cause a significant change in passive or functional hip joint internal range of motion (ROM). **Methods:** 22 subjects participated in this single-blind parallel randomised control study. Passive hip joint internal ROM was measured using the seated internal rotation test. Functional hip joint internal ROM was measured using the functional internal rotation tests. Outcome measures were recorded prior to and immediately after a single intervention of treatment. **Results:** Data was tested using two-way ANOVA with a Bonferroni correction ( $p < 0.05/2$ ). The MWM Group ( $n=6$ ) significantly improved functional ROM by 10.1% ( $p < 0.05/2$ ); and insignificantly improved passive ROM by 21.7%. The SMWM Group ( $n=8$ ) insignificantly improved passive hip joint internal ROM passively and functionally by 16.5% and 12.4% ( $p > 0.05/2$ ), respectively. **Discussion:** From the data presented, it can be suggested that caudal MWMs of the hip appear to have a positive statistical effect on functional internal ROM of the hip ( $p=0.01$ ). This may be due to addressing the positional fault theory or the arthrogenic muscular inhibition theory. MWMs and SMWMs increased passive ROM to within 1° of normative values. SMWMs may be effective in augmenting treatments or as a prophylactic exercise.

### **P.3 Preventing sports injuries among young footballers**

**Dominic Uzodimma Ikwuagwu**<sup>1</sup>

<sup>1</sup>*Unique Ultimate Sport & Academy, Ikorodu-west, Nigeria*

Introduction: Sports Injury in Young-Footballers is a Common and Serious Problem. Background: Functional prevention measures may be achieved with training programmed originating from the field of physical therapy and medicine. These injuries are by far the almost common causes of injuries in children and youth treated in emergency departments. The common causes: Sports injuries can be caused by: Individual risk factors (such as medical conditions). Inadequate physical examination before participating in training or in any games and lacks of pre-season conditioning. Lacks of safety equipment, or poorly fitted, improper equipment (Shin-guard etc.) should be enforced. Taming up by age instead of size, unsafe playing fields, surfaces and environments. Improper training or coaching, or lack of instruction. Fatigue and over-stress in training and games. Weather Temperature or condition and Poor nutrition or hydration may be contributed. Not warming up, cooling down and stretching properly before any game. Result and solution: Coaches should be trained in first aid courses, and should have a plan for responding to emergencies. Coaches should be well trained in the proper use of equipment, and should enforce rules on equipment use. Making sure that the young athletes always use proper gears for a particular sport to reduce chances of being injured. Warm-up exercises make the body's tissues warmer, flexible and loosen muscles that have tightened. Athletes should be accessible to water or sports drinks during the time of playing and that keep them properly hydrated.

### **P.4 Cycling injuries and concussion: the view from an Irish emergency department.**

**James Foley**<sup>1</sup>, Anna Gheorghescu<sup>2</sup>, John Ryan<sup>1</sup>, Denis Evoy<sup>2</sup>

<sup>1</sup>*Department of Emergency Medicine, St. Vincent's University Hospital,* <sup>2</sup>*Department of Surgery, St. Vincent's University Hospital, Dublin, Ireland*

Introduction: The Central Statistics Office Ireland (CSO) reported following the 2011 census a 9.6% increase in the number of people cycling to work compared with 2006. This has led to a higher prevalence of injuries and hospital attendances. We hypothesise that the true number of cycling injuries in Ireland is being under-reported, that cycling related head injuries result in significant morbidities such as concussion and that hospital data may help in the prevention and management of such injuries. Methods: We retrospectively reviewed cycling associated presentations in 2014 using medical records in St. Vincent's University Hospital Emergency Department (ED). Results: There were 534 cycling related injuries presenting to the ED during 2014. There were 83 head injuries in this cohort of patients. 22 of these required overnight neurological observation, 21 underwent a CT brain, with intracranial haemorrhage diagnosed in 6 cases. 41 patients (49%) were diagnosed with concussion. Conclusion: The increasing popularity of cycling as a means of exercise and transport in Ireland is resulting in increased number of head injuries presenting to this ED and nearly half of these patients were diagnosed with concussion. Patients are exercising for the benefit of their health but this comes with a price in terms of morbidity. We feel that there is insufficient awareness of concussion in cyclists compared with other sports and that EDs may provide a vector for concussion prevention and management strategies for what is now, an increasingly popular means of transport and leisure activity.

## **CCP.5 Suspected coexistent osteoporosis and osteomalacia with atraumatic bilateral neck of femur fractures in a 53-year-old man without apparent risk factors**

**Raazi Bajwa**<sup>1</sup>, Josh De Marchi<sup>1</sup>, Sinead Duggan<sup>2</sup>, Paul Magill<sup>3</sup>

<sup>1</sup>*Department of Surgery, Beaumont Hospital, Dublin, Ireland,* <sup>2</sup>*Department of Surgery, Tallaght Hospital, Trinity College Dublin, Dublin, Ireland,* <sup>3</sup>*Department of Orthopaedics, RCSI, , Ireland*

A 53-year-old Irish man represented to the emergency department with left-sided groin pain, which had started insidiously 4 weeks prior. He denied any history of chronic back or joint pain, previous fractures or recent trauma. Repeat pelvis radiograph was normal, showing no fractures, space occupying or bony lesions. MRI showed bilateral femoral neck fractures. The patient underwent bilateral dynamic hip screw stabilisation of the fractures. Subsequent investigations revealed severe osteoporosis and primary 25-hydroxyvitamin D (25OHD) deficiency at a level suggestive of concurrent osteomalacia. Oral vitamin D replacement therapy was commenced. At 6-month follow-up he was pain free, the follow up radiograph showed no evidence of previous fracture and serum 25OHD had increased to 124 nmol/L.

## **O.6 Equestrian injury presentations to a regional trauma centre in Ireland: a retrospective study**

**Raazi Bajwa**<sup>1</sup>, Peter Coffey<sup>1</sup>, Ali Abdulkarim<sup>1</sup>, Lily Edelson<sup>2</sup>, Eoin Sheehan<sup>1,2</sup>

<sup>1</sup>*Department of Orthopaedics and Trauma, Midlands Regional Hospital, Tullamore, Ireland,* <sup>2</sup>*Department of Orthopaedics, University of Limerick, Limerick, Ireland*

Introduction: Horseback riding is considered more dangerous than motorcycle riding, skiing, automobile racing, football and rugby. For such an important industry, there is a paucity of information relating to equestrian injuries. Aims: This is a retrospective study assessing equestrian related injury presentations to a regional trauma centre; examining their mechanisms, nature, and outcomes. Methods: 30,700 presentations to the department were reviewed from 1 January 2013 - 31 December 2013. Patient demographics, date of occurrence, mechanism of injury, radiology reports, management and follow up data were collected and analysed. Results: A total of one hundred and eighty-nine equestrian-related injuries were identified from 149 such presentations. 58% (n=87) of patients were female (p<0.05) with a median age of 27 years. 89% (n=132) of those injured were recreational horse riders (p<0.01). Soft tissue injuries were the most common type of injury (49%), followed by fractures (35%) and head injuries (15%). Falls were the most frequent mechanism of injury at 70% (n=104) (p<0.01). 16% (n=24) required admission, whilst 2% (n=3) were transferred to tertiary care. No deaths were recorded. Discussion: Our study has revealed distinct demographic groups likely to be associated with a broad nature of equestrian related injuries. A treating clinician should have a high index of suspicion when treating an individual with injuries sustained through interaction with a horse. This report should serve to develop safety awareness and promote public health strategies.

## **O.7 Run kinematics with and without a jogging stroller.**

**Rory O'Sullivan**<sup>1</sup>, Damien Kiernan<sup>1</sup>, Ailish Malone<sup>1</sup>

<sup>1</sup>*CRC, Dublin, Ireland*

Introduction: Jogging strollers have become increasingly popular as they allow a parent the freedom to run while negating the need for a babysitter. Few studies have examined the effects of running with a stroller and no study to date has examined the effects on joint kinematics. The aim of this study was to compare lower limb and trunk kinematics while running with and without a jogging stroller. Methods: Participants (N=15) ran on a 16 metre indoor runway with and without a stroller at their self-selected comfortable training speed. Three-dimensional trunk and lower limb kinematics were assessed using the CODA cx1 active marker system. Results: The jogging stroller led to reduced movement of the trunk in both the transverse (mean difference -11.4°, 95% confidence interval (CI) [-14.8°, -8.2°], p<0.001) and coronal (-2.9°, 95% CI [-0.8°, -4.9°], p=0.009) planes most likely due to fixing of the upper limbs. There was also a 6.7° (95% CI [-9°, -4.6°], p<0.001) increase in forward trunk lean, 2.8° (95% CI [-4.2°, -1.7°], p<0.001) increase in anterior pelvic tilt and a 3° (95% CI [-4.4°, -1.5°], p=0.001) decrease in hip extension. There were no significant changes in knee or ankle kinematics and no changes in stride length, cadence or stance time. Conclusion: Our data suggest that jogging strollers lead to minor changes in trunk, pelvis and hip kinematics with no significant changes at the knee and ankle. Due to the changes in kinematics we would recommend flexibility work for the spine, pelvis and hips and hip extensor strengthening.

## **P.8 A comparative analysis exploring the utility of post-operative ACL outcome measure utility between peer professionals nationally and internationally**

**Joanne Mulrooney**<sup>1</sup>, Clare Lodge<sup>1</sup>, Mary Dowling<sup>1</sup>

<sup>1</sup>*Institute of Technology, Carlow, Ireland*

Purpose: To ascertain the use of validated patient reported outcome measures among Irish practitioners (Physiotherapists, Orthopaedic Surgeons, Sports Rehabilitators & Athletic Trainers [SRAT]) and compare utility to a similar professional cohort in the U.S.A. Methods: 225 completed surveys from practitioners in Ireland and the U.S.A were included for analysis of responses regarding outcome measure use and factors influencing their choice of measure. Descriptive statistics were used to analyse responses. 19 question sheets were completed by practitioners in both Ireland and the U.S.A. Opinions, beliefs and attitudes that influence the selection of measures were attained through completed question sheets. Results: Survey analysis of Irish practitioners revealed a 52% of Physiotherapists do not utilised outcome measures compared to 20% of SRATs. Whereas 49% of American Athletic Trainers do not use measures compared to 9% of Physical Therapists. Condition specific measures were found to be the most consistently used measure type with 57% of American practitioners claiming utility, compared to only 34% of Irish practitioners. Question sheet responses demonstrated themes such as lack of resources and time limitations among Irish practitioners that resulted in an absence of utility of measures compared to peer professions in the U.S.A. Many practitioners in the U.S.A stated a preference for functional assessment only of ACL patient's over that of a patient reported outcome measures. Conclusion: Outcome measures are used less in Ireland compared to the U.S.A. Practitioner education on content of available measures may aid in establishing best practice guidelines regarding utility of measures among practitioner cohorts.

## **P.9 Technology use in phase four cardiac rehabilitation: an exploratory study into technology needs of a cardiovascular disease cohort.**

Deirdre Walsh<sup>1</sup>, Catherine Woods<sup>1</sup>, **Kieran Moran**<sup>1</sup>, Noel McCaffrey<sup>1</sup>

<sup>1</sup>*Dublin City University*

Introduction: Uptake of community-based long-term cardiac rehabilitation is very low. PATHway (Physical Activity Towards Health) will provide individualized rehabilitation, through an internet-enabled sensor-based home exercise platform that allows remote participation. Study Aim: The purpose of this study was to assess interest and use of technology of Cardiovascular disease (CVD) patients in order to inform the design of a technology-enabled cardiac rehabilitation (CR) programme. Method: A questionnaire investigating the role of technology and mHealth in a CVD population was used to ascertain the current level of technology use. All patients attending the Phase Four community cardiac rehabilitation HeartSmart programme (MedEx) based at DCU were recruited (N=67; 66.2 years, SD= 8.55, Males =76.1%, Females=20.9%). Results: Technology usage was high with 60% of participants owning a smartphone and 85% accessing the internet regularly. Participants endorsed the idea of technology enabled cardiac rehabilitation, indicating that they found the idea 'appealing'. 79% were interested in receiving ongoing CR support via their smartphones, 79% were interested in receiving CR via the internet, while 52% of patients found the idea of virtual rehabilitation classes appealing. Conclusion: This study provides support for the patient need for the provision of an internet-enabled sensor-based home exercise platform that allows remote participation in CR exercise programs

## **O.11 Investigation of effects of acute sleep deprivation and caffeine on testosterone and cortisol levels in competitive games players.**

**Ciaran McDonald**<sup>1</sup>, Kevin Carmody<sup>1</sup>, Alan McIntyre<sup>1</sup>, Joss Moore<sup>1</sup>, Bernard Donne<sup>1</sup>, Nick Mahony<sup>1</sup>

<sup>1</sup>*Human Performance Laboratory, Anatomy Dept., Watts Building, Trinity College Dublin, Ireland*

Introduction: Sleep deprivation has been described as, a state of being in which adequate sleep has not been achieved (Walters, 2002). Complete rest or sleep is still seen as the main means of restoring physical working capacity, as well as mental restoration (Dale, 2004). A lack therefore of adequate sleep may lead to hindered recovery and decreased performance. The ratio of testosterone to cortisol is considered to reflect states of anabolism when it is high and, inversely, states of catabolism and overreaching when it falls by 30% or more. It has been previously used as an indicator of overreaching or overtraining in athletes induced by sleep deprivation. In this study, the effects of acute sleep deprivation on the latter ratio will be assessed. Methodology: Eleven competitive games players were assessed in this study. Acute sleep deprivation was defined as 24 hours without sleep. The candidates abstained from caffeine for 24 hours prior to sleep deprivation. Three testing sessions were performed for each candidate: one sleep deprived with placebo, one sleep-deprived with caffeine and one non-sleep deprived night. Hormonal levels were taken as salivary assays and were interpreted using ELISA testing. Salivary samples were taken intermittently at time of supplement (8;19), and during aerobic and anaerobic exercises (09:19, 09:29, 10:10, 11:00 and 11:30. Baseline circadian variation levels were also monitored on a non-testing day at same time-zones. Preliminary results: All data collection performed and ELISA testing in progress.

## **O.12 Effects of neuromuscular training on peak torque, muscle stiffness, and musculoarticular stiffness of the knee joint in young female athlete.**

**Dan Wang**<sup>1</sup>, Giuseppe De Vito<sup>1</sup>, Massimiliano Ditroilo<sup>2</sup>, Eamon Delahunt<sup>1</sup>

<sup>1</sup>*School of Public Health, Physiotherapy and Sport Science, University College Dublin, Ireland,*

<sup>2</sup>*Department of Sport, Health & Exercise Science, University of Hull, England, Hull, United Kingdom*

**Introduction:** Appropriate levels of muscle strength, muscle stiffness (MS) and musculoarticular stiffness (MAS) are important factors linked to athletic performance. This study aimed to investigate the effect of a neuromuscular training intervention on parameters of knee joint stiffness in young recreational female athletes. **Methods:** Twenty female recreational athletes (age =  $21.5 \pm 2.7$  years; height =  $168.6 \pm 6.1$  cm, body mass =  $64.2 \pm 9.4$  kg) participated. Participants were randomized to a treatment group (n = 13) or a control group (n = 7). Participants in the treatment group completed 18 training sessions over a 6-week period. The dependent variables assessed were: peak torque (PT) of the knee joint extensor musculature, MS (force applied/muscle displacement) of the vastus lateralis in both relaxed (MSR) and contracted (MSC) conditions, MAS of the knee joint and rate of torque development (RTD). **Results:** The multivariate results were not significant for group. However, significant differences were found for time [F = 4.01, p < .05,  $\eta^2 = 0.64$ ]. Participants in the treatment group were characterized by a significant improvement in MAS [pre-intervention =  $1657.58 \pm 338.53$  N.m, post-intervention =  $1930.79 \pm 419.15$  N.m; F = 4.01, p = 0.039,  $\eta^2 = 0.64$ ] as well as RTD [pre-intervention =  $905.13 \pm 367.11$  N.m/s, post-intervention =  $1076.35 \pm 381.20$  N.m/s; t = -2.71, p = 0.019,  $\eta^2 = 0.38$ ], while there were no significant improvements in PT, MSR and MSC. **Conclusions:** Neuromuscular training could improve the stiffness characteristics of the knee joint in young female recreational athlete.

## **P.13 Comparison of isokinetic thigh muscle strength of elite GAA footballers with similar elite sport cohorts**

**Stephen Gilmartin**<sup>1,2</sup>, Bernie McGowan<sup>1</sup>, Eanna Falvey<sup>2</sup>, Therese Devaney<sup>3</sup>, Carmel Silke<sup>1</sup>

<sup>1</sup>*Our Lady's Hospital Manorhamilton, Manorhamilton, Ireland,* <sup>2</sup>*Sports And Exercise Medicine Department UCC, Cork, Ireland,* <sup>3</sup>*Physiotherapy and Sports Medicine Clinic, Sligo, Ireland*

**Introduction:** At an elite level, sport specific training regimes and favourable body types create substantial differences in player's individual muscle strengths. Currently muscle strength standards in Gaelic Games are largely adopted from other sporting norms. We aimed to examine if this is appropriate for Isokinetic thigh muscle strength testing. **Methods:** 33 Players from the 2014 Sligo senior Football panel performed Pre-season isokinetic Thigh muscle testing. Measurements were recorded for peak hamstring and quadriceps concentric torque at 90°/sec and 180°/sec. These measurements were compared to similar studies in which measurements were performed in elite Soccer/Volleyball and rugby respectively. A combined average of dominant and non-dominant measurements was calculated for both speeds. **Results:** All sports groups were of similar age and developmental stage. Peak torque comparisons were made between elite gaelic, soccer and volleyball players at 90°/sec. Gaelic player's average peak hamstring(H) and quadriceps(Q) torques were lower at H101.25Nm and Q206.3Nm respectively compared to soccer H126nm Q225.8nm and volleyball H132Nm Q262.7Nm. Comparisons at 180°/sec were made between gaelic football and rugby players. Gaelic players were weaker throughout with values of H95.35Nm, Quadriceps159.85Nm compared to elite rugby players H106.4Nm, and Q190.85Nm. **Conclusion:** Isokinetic thigh muscle strengths vary considerably between sports players at an elite level. This is an important factor to consider in GAA as much comparative data is currently adopted from other sports. Further studies focusing on GAA players need to continue in order to find appropriate norms and standards

## **O.14 Thigh muscle strength imbalance and hamstring injury risk in elite Gaelic footballers.**

**Stephen Gilmartin**<sup>1,2</sup>, Carmel Silke<sup>1</sup>, Bernie McGowan<sup>1</sup>, Eanna Falvey<sup>2</sup>, Therese Devaney<sup>3</sup>

<sup>1</sup>*Our Lady's Hospital Manorhamilton, Ireland,* <sup>2</sup>*Sports and Exercise Medicine Department UCC, Cork, Ireland,* <sup>3</sup>*Physio and Sports Medicine Clinic, Sligo, Ireland*

**Introduction:** Isokinetic Thigh Muscle Strength testing is becoming a valuable tool in sport prehab and rehab programmes (1). Research remains equivocal regarding correlation of isokinetic thigh muscle strength and prediction of hamstring injury risk (2-5). We aimed to investigate the relationship in an Elite GAA cohort **Methods:** 33 Sligo senior football players performed pre-season isokinetic concentric strength testing of hamstrings and quadriceps. The Measurements were performed at 90°/sec and 180°/sec. Injury data was prospectively recorded by the medical team. Comparisons were made between the injured and non-injured players in areas of peak muscle torque and hamstring:quad ratio for dominant and non-dominant limbs. Comparisons were also made between bilateral hamstring strength differences. A P value of <0.5 was statistically significant. **Results:** In total 5(15%) of players suffered hamstring injury during the season. Peak muscle torques for hamstrings and quadriceps at all speeds were consistently lower in the injured player group. These results were statistically significant (p<0.05) for all measurements at 180° besides hamstring strength of non-dominant limb. Comparisons of dominant quadriceps strengths at 90°/sec also proved significant (p<0.05). HDom:Hnondom comparisons revealed greater bilateral differences in the injured group, this was not statistically significant(p>0.05). H:Q ratio comparisons revealed similar results with injured players values being consistently lower (P>0.05). **Conclusion:** Isokinetic thigh muscle weakness at 180° may lead to increased risk of future hamstring injury. This determines the need for focused thigh muscle strengthening programmes to prevent injury. Larger study numbers may help determine statistical significance in other strength measurements.

## **O.15 Effect of reduced gravitational load running on lower limb kinematics.**

**Neil Fleming**<sup>1</sup>, Michael Neal<sup>2</sup>, Kenneth Games<sup>2</sup>, Lindsey Eberman<sup>2</sup>

<sup>1</sup>*Human Performance Laboratory, Anatomy Dept., Watts Building, Trinity College Dublin, Ireland*  
<sup>2</sup>*Indiana State University, Terre Haute, United States*

**Introduction:** There is a lack of research on the biomechanical effects of anti-gravity treadmill running. Therefore, the aim of this study to determine the effect of reduced gravitational load (GL) running on lower extremity (LE) kinematics. **Methods:** Fourteen male recreational runners (age=23.1 ± 1.9yr, height= 181.8 ± 6.7cm, mass= 83.5 ± 9.7kg) participated in the study. Participants completed 15 randomised running trials on an Alter G® treadmill under five GL and three velocities. Knee and ankle joint kinematics were recorded via electrogoniometry. Additionally, in-shoe plantar pressure data were recorded to identify spatiotemporal measures of the stride. Kinematic variables included angle at initial contact (IC), toe-off (TO), peak angle and ROM during the stance phase. Spatiotemporal variables included stride frequency, stride duration, ground contact time (GCT), and normalized GCT. 2-factor repeated measures ANOVA quantified statistical differences. **Results:** Reduced GL significantly increased stride duration (F=50.3; P<0.001; d=0.93) and reduced stride frequency (F=50.5; P<0.001; d=0.90). However, GCT significantly decreased (F=43.4; P<0.001; d=0.87) along with normalized GCT (F=21.1; P<0.001; d=1.38); indicating increased glide time as GL diminished. Reduced GL also resulted in significant reductions in peak knee flexion (F=51.3; P<0.001; d=0.78), dorsiflexion (F=24.6; P<0.001; d=0.99), knee ROM (F=33.0; P<0.001; d=1.08) and ankle ROM (F=20.8; P<0.001; d=0.73). **Conclusions:** Reduced GL running alters LE gait kinematics resulting in reduced joint ROM at the ankle and knee, in addition to increasing glide time but reduced GCT. Clinicians must be aware of kinematic alterations to provide safe and effective parameters for rehabilitation involving anti-gravity treadmills.

## **0.16 Rugby injury surveillance in Ulster Schools (RISUS) study: Fracture demographics during 2014-2015 season.**

**Gavin Heves**<sup>1</sup>, Lynsey Henderson<sup>1</sup>, Pooler Archbold<sup>1</sup>, Chris Bleakley<sup>2</sup>

<sup>1</sup>Royal Victoria Hospital, Belfast, Northern Ireland, <sup>2</sup>University of Ulster, Northern Ireland

Introduction: Rugby union is one of the most popular contact sports played at schools level in the United Kingdom. Concern has been expressed regarding the potential deleterious effects of rugby in schools and the burden injury may have on physical and mental wellbeing. Many are now calling for an injury surveillance program that could identify risk factors and inform intervention strategies. We report fracture data from such a program. Methods: 29 Schools with 825 students were recruited. Physiological and prospective injury data was collected by a champion at each school. Results: 33 sustained a fracture. There was no more than one fracture per player and no difference in occurrence during training or competition (P = 0.098). The most frequent mechanism was during a tackle. Fracture risk increases slightly from 1st to 2nd half RR 1.4. Shoulder, clavicle and finger fractures account for over ½ of all fractures. 5 of 33 fractures involved open growth plates. Return within season was n=17days, time out range 21-128days. Age, weight, height and BMI of fractured versus no injury players showed difference (P = 0.668, 0.89, 0.08, 0.94 respectively). Reviewing gum shields, shoulder pads and headgear, only no gum shield was associated with increased fractures (P=0.007). Conclusion: Size does not influence fracture risk and although tackling is the most common mechanism it is not more frequent in competitive matches suggesting tackling skills used in training are continued during match-play. Most fractures are not protected by protective equipment and therefore lack of gum shield may reflect risk taking behaviour.

## **P.18 Use of inertial sensors and depth cameras to aid with the development of an automated athletic screening tool.**

**Darragh Whelan**<sup>1,2</sup>, Martin O'Reilly<sup>1,2</sup>, Eamonn Delahunty<sup>1</sup>, Brian Caulfield<sup>1,2</sup>

<sup>1</sup>UCD School of Public Health, Physiotherapy and Sports Science, Dublin, Ireland, <sup>2</sup>Insight Centre for Data Analytics, University College Dublin, Dublin, Ireland

Purpose: Athletic screening is an important component of injury prevention in athletes across all age ranges. However, screening can prove time consuming and the data collected is often unreliable. This leads to inefficient time management and inaccurate decision-making. Recent developments in Inertial Measurement Units (IMUs) and Red Green Blue Depth cameras may allow for automated screening tools that can provide valid and reliable data, quicker and cheaper than previously possible. Two common screening tools are the squat and single leg squat (SLS). Methods: Nineteen participants (26.09±3.98years, 1.75±0.14m, 75.2±14.2kg) were fitted with a single lumbar-worn IMU and asked to perform squats correctly and with 7 induced deviations along with 10 repetitions of a SLS. Participant performance was recorded and labelled by a Chartered Physiotherapist. Features were extracted from the IMU data and used to train and evaluate a classifier that will form the basis of an automated injury-screening tool. Results: The classifier was able to distinguish between good and bad squat performance with a 64% sensitivity, 88% specificity and 80% overall accuracy. The system achieved an average of 78% sensitivity, 97% specificity and 92% accuracy when analysing the SLS. Conclusion: These results indicate that a single lumbar-worn IMU has promising potential to effectively analyse squat and SLS. Further data collection and analysis will allow for the development of a more robust classification system for these and other movements. Furthermore, the system described may be a useful input to an exercise biofeedback application for conditioning and rehabilitation purposes.

## **O.19 Athletic groin pain: a cohort study and review of athletes undergoing fluoroscopically guided pubic symphysis injection and correlation of outcomes to MRI findings**

**Patrick Fahy - Browne<sup>1</sup>**, Stephen Eustace<sup>1</sup>

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Background: All cause groin pain is a common and debilitating morbidity in athletes. Many treatment pathways exist however efficacy of these is poorly described, with exceptionally few examining Steroid Injections and conservative treatments alone having extremely long recovery times. Purpose: To review the outcomes of 70 patients who having presented with clinically proven groin pain, underwent MRI scans and Fluoroscopically Guided Pubic Symphysis injections. Methods: Between August 2012 and December 2014, 59 patients, who had failed conservative management, underwent Magnetic Resonance Imaging scans followed by Fluoroscopically Guided Pubic Symphysis injections in a Specialist Tertiary Referral Centre, and returned to sport as tolerated. The injections consisted of 80mg of Methylprednisolone & 2ml (0.2%) Bupivacaine. Patients were followed up for a mean of 13.2 Months post injection and outcomes were measured; Return to Sport, Level of Function and Subjective Pain Scores. Results: For all cause Groin pain 64% of our patients (n=38) returned to sport at or before 8 weeks following Injection with a further 15 (n=53, 88%) returning at 6 months. We demonstrated a minimum improvement of 2 functional levels across all participants and a mean improvement of 4.7 points (SD=1.9) on Subjective pain scores, with 56% of patients (n=33) reporting complete resolution of pain at follow up. Conclusion: This is the largest study of its kind and demonstrates an improvement in Function and a rapid Return to Sport time, and suggests a benefit of fluoroscopic guided injections over conservative treatments alone, which have considerably longer recovery times.

## **O.20 The outcomes of mini-open decompression for patellar tendinopathy**

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Background: Patellar tendinopathy (PT) is a chronic and degenerative clinical condition affecting the knee triggered by overuse. Approximately 10% of athletes with PT-related pain undergo surgery. This study will assess post-operative effects of mini-open decompression (MOD) surgery in regards to patient's activity levels, clinical symptoms, resumption of activities post-operatively and to gain an insight on any issues encountered following the surgery. Patients and Methods: From 06/1/11 to 23/12/13, 69 patients underwent MOD surgery performed by the same surgeon. A total of 43 patients were available to participate in the study. A questionnaire was carefully designed to evaluate post-operative effects of the surgery. Patients were contacted by phone. Results: 26 patients (60%) reported reaching pre-injury activity levels while 27 patients (40%) reported improvement but without achieving pre-injury levels post-op. The mean VISA score has risen 50% post-operatively. All clinical symptoms assessed by the Kujala Anterior Knee Score had a positive outcome and 40 patients (93%) rated their knee higher post-op. However, 24 patients (57%) complained of difficulties kneeling down. Conclusions: MOD as a minimally invasive approach to treat jumper's knee delivers satisfactory clinical results in pain reduction and knee function with reasonable recovery time and return to sports.

## **O.21 Arthroscopy for medical meniscal tears. How well do they recover?**

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**Introduction:** Meniscal tears are one of the most common knee injuries. Tears can develop from an acute injury or chronic degeneration. Surgery is indicated if symptoms persist, locking occurs or the patient cannot risk delay. The purpose of this study was to assess the long-term recovery of patients who underwent arthroscopic surgery for isolated medial meniscus tears. **Methods:** The evaluation was carried out using a telephone questionnaire to assess recovery four years after surgery. All patients had knee arthroscopies performed by the same surgeon, from January to April 2011. Two hundred and forty eight patients underwent an arthroscopy in this time period. Patients who had any pathology other than a medial meniscus were excluded. **Results:** Forty one patients were contacted. The mean age was 51 (range 19- 74) years. Thirty six (88%) of the respondents were either satisfied or very satisfied with the outcome of their surgery. 31 (76%) reported that surgery increased their ability to perform activities regularly or very regularly. 25 (60%) of respondents reported or returning to the same or a higher pre-injury level. **Discussion:** Arthroscopic surgery for medial meniscus tears appears to have high long-term satisfaction levels amongst patients. The majority of patients felt that surgery had increased their ability to do their everyday activities. Half of patients rated their subjective knee function score to be currently higher than before their knee injury. **Conclusion:** Arthroscopic surgery for medial meniscus tears appears to have high long-term satisfaction levels amongst patients. 26% had persistent difficulties with kneeling.

## **O.22 The relationship between underlying femoro-acetabular impingement and anterior cruciate ligament rupture.**

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**Introduction:** Femoro-acetabular impingement (FAI) results in progressive limitation of hip movements, which may place additional rotational strain on the knee during field sports, increasing the risk of anterior cruciate ligament (ACL) injury. This prospective, ethically approved study examines the relationship between ACL rupture and the presence of underlying FAI. **Methods:** All sportsmen with an acute ACL injury over a four-month period completed a targeted FAI screening questionnaire. Clinical hip examination was performed including full range of hip motion (ROM) and recognised impingement tests. Plain x-ray assessment included validated measurements and signs of Pincer and CAM deformity. Statistical analysis was performed using both parametric and nonparametric tests (SPSSv21). **Results:** 50 males with an average age of 26 (16-40) years were recruited. Athletes reported sports-related hip pain (12%) and stiffness (20%); impingement testing was positive in 10%. Restriction of ROM was observed (flexion <114° in 51% of cases, internal rotation <27° in 32.7%). X-rays demonstrated an acetabular 'cross over' sign (focal rim prominence), pincer deformity or over coverage (centre-edge angle: CEA >35°) in 53 - 83% of cases; 1 case had evidence of dysplasia (CEA<25°). Asphericity of the femoral head (CAM deformity) was clearly observed in 35%, with an Alpha angle >55° (median 58°) in 48% of cases. **Conclusion:** The study presents evidence of underlying radiological features of FAI and restriction of motion in a significant proportion of sportsmen who have sustained an acute ACL rupture. The results support a possible relationship between the presence of underlying FAI and ACL injury.

## **O.23 Plantaris muscle, its location and size in the region of the Achilles tendon: An observational cadaveric study**

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Introduction: Traditionally Plantaris has been considered of little clinical importance and absent in 8-20% of the population. Recent evidence indicates that it is present in 98-100% of the population and that it may have a contributing role in Achilles tendinopathy due to its close anatomical relationship. The aim of this study was to establish whether Plantaris was present in a sample of cadaveric limbs, to establish its position in relation to the Achilles tendon and to conduct measures of its thickness and width. Methods: Forty eight cadaveric limbs which had been previously dissected were assessed. Plantaris was looked for in the region of the medial Achilles. If it could not be identified here, Gastrocnemius was reflected back to reveal Plantaris tendon beneath, and was then followed distally. All Plantaris tendon measurements were taken 2- 6 cm from the Achilles insertion using a Vernier calliper. Results: Plantaris was present in all of the forty three limbs which were appropriate for assessment. Plantaris was positioned ventromedial to the Achilles tendon in 33 (77%) and medial to the Achilles in 9 (21%) of the limbs. The average width of the Plantaris tendon was 2.8mm (range 1.2-4.9mm) and its average thickness was 0.9mm (range 0.2-1.5mm). Conclusions: Plantaris was present in all limbs in keeping with recent studies. This is the first known study, which measures Plantaris tendon in the region of the mid-portion Achilles. Future studies are planned to compare these measurements with tendinopathic plantaris tendons.

## **O.24 / P.25 A pilot study reviewing cases of concussion presenting to an adult university hospital emergency department.**

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Purpose: Concussion is a complex injury. This pilot study aims to determine the features of concussion in a younger population that present to an adult Emergency Department. Upon the diagnosis of concussion based on Sports Concussion Assessment Tool Version3(SCAT3), patients were followed up in concussion clinic weekly. External cases were also referred into concussion clinic. Design: Cohort Study Method:50 adolescents aged 14-18 with diagnosed concussion were assessed following head injury in 2014.These were followed up within 1-3 weeks in Concussion Clinic. A single consultant evaluator assessed each case at the clinic using SCAT3. Results: 50 adolescents were evaluated following head injury. Most were male with a 9:1 ratio. Presentations included self and specialist referral. 10% arrived by ambulance. Referrals from other sources included hospitals, GPs and consultants at 14%, 12% and 14% respectively. Median time to assessment in the clinic was 1.5 days. Medical histories were taken. 10% had previous diagnosis of migraine or headaches. Dyspraxia and epilepsy were found in 6% of cases. 24% had a previous diagnosis of concussion and/or radiological imaging following head injury. 16% lost consciousness and 44% had amnesia. Evaluation in clinic resulted in 18% requiring imaging–14% requiring CT Brain, 4% underwent MRI. Symptoms were recorded using SCAT3 questionnaire. Common symptoms found were fatigue (90%) and headache (80%).The average symptom severity score was 33/132.Mean number of symptoms was 9/22. Conclusions: EDs must be vigilant in thoroughly assessing patients following head injury. Concussion is a disorder of function and requires close evaluation of each patient based on international guidelines. Follow-up must be tailored to individual cases. The initial statistics have shown interesting trends. Further prospective trials will be needed in the future.

## **O.27 Anterior cruciate ligament injury prevention in elite underage women's Gaelic games**

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Introduction: ACL injury prevalence is increasing in field sports, 70% are non-contact. Evidence suggests, primarily in field-sports, a male to female ratio of 5-6:1; adolescent females the most commonly affected. Certain neuromuscular movement patterns have been propagative for ACL injuries in women. A number of preventative training strategies have addressed these movement patterns in warm-up routines with positive results. Since 2012, three Gaelic games-specific versions of these strategies have been developed and launched in Ireland. The purpose of this study was to determine to what extent these validated preventative strategies are currently in use among underage women's elite GAA. Methods: An 11 question survey was designed and circulated via email to the coaches of all underage women's intercounty GAA teams in Ireland. Results: The cohort group surveyed numbered 158. The response rate was 69%. 71% of coaches stated that they were unaware of any of the prevention strategies. 75% of those aware were not confident in their knowledge of the programmes. 45% used no ACL injury prevention drills. Conclusions: There exists an apparent gap in the knowledge base of the coaches of underage elite women's' Gaelic Games relating to ACL Injury Prevention Strategies. Consequently they appear to remain as yet, significantly underused. Most coaches readily acknowledge this gap and are very open to changing their coaching practices which the vast majority believe should be responsibility of their relevant Sporting Bodies.

## **P.28 The organisation of medical care at major soccer matches in the Aviva Stadium**

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Introduction: The provision of medical care for players and spectators is an essential requirement for major sporting events. This presentation describes the organisation of such care at soccer matches in the Aviva Stadium. Specialised care for players is provided in a dedicated medical room equipped to hospital emergency room specifications, including X-Ray. Medical support for the team doctors is provided by consultants in orthopaedics, radiology and anaesthesiology. There are two fully equipped pitch-side paramedic stretcher teams. An ALS ambulance is dedicated for player use with another as back-up. Initial medical care of spectators is provided in six treatment rooms and around the stadium by 75-80 first aid and paramedic staff, over half of whom are trained to EMT or more advanced levels. Volunteer crowd doctors, trained in immediate care, are deployed around the stadium in proximity to the treatment rooms and include a specialist in emergency medicine. The specialist anaesthetist also provides cover for emergencies involving spectators. Medical equipment and medications are provided for crowd doctors. AED's are located throughout the stadium and carried by patrolling paramedics. Four ambulances, one dedicated for player use, are present. Emergency planning includes evacuation plans, evacuation exercises and a major incident command structure. A ten-bed field hospital facility can be deployed in the stadium or its environs at short notice. Conclusions: Present evidence suggests that the provision of medical care for soccer matches at the Aviva Stadium is fit-for-purpose. Nevertheless ongoing review is required to ensure the maintenance of standards.

## **O.29 The prevalence of femoro-acetabular impingement in the asymptomatic athlete: a screening study.**

**David Filan**<sup>1</sup>, Patrick Carton<sup>1</sup>

<sup>1</sup>*The Hip and Groin Clinic, Whitfield Clinic Medical Centre, Waterford, Ireland*

Introduction: Early detection and treatment of symptomatic femoro-acetabular Impingement (FAI) is critical to successful outcome and return to sports. However, irreversible articular cartilage damage occurs well before the onset of pain or disability. The aim of this prospective, ethically approved study was to evaluate the prevalence of underlying FAI in asymptomatic, athletic volunteers. Methodology: Participants were recruited over 3 separate screening days; data was initially gathered using internationally validated health questionnaires; clinical examination included measurement of range of hip motion and impingement provocation tests. The presence of underlying FAI was examined radiologically using standard measures of acetabular (Pincer) and femoral (CAM) deformity. Results: In total, 124 athletes (248 hips) were recruited with an average age of 26 (18 – 38). Post-activity hip pain and stiffness was reported in 43.1% and 59.3% of athletes, respectively; 50.4% experienced hamstring tightness. Pain was reproduced on impingement testing in 27%, and during FABER manoeuvre in 18.9%, of all hips assessed. Restriction of ROM was observed (Flexion <114° in 10.1%; Internal Rotation <27° in 23.8%). On measurement of the alpha-angle, asphericity of the femoral head (CAM deformity) was seen in 33.1% on the AP pelvic view and 25% when measured on Dunn view. X-rays also demonstrated presence of pincer deformity or over-coverage (CEA >35°) in 35.9% of hips measured. Conclusion: This study highlights the prevalence of underlying FAI in asymptomatic athletes through clinical, subjective and radiological findings; methods utilised may form the basis for developing an effective screening tool for detection of pre-clinical FAI in sport.

## **O.30 The effect of femoroacetabular impingement on athletic performance measures.**

**Karen Mullins**<sup>1</sup>, Michael Hanlon<sup>1</sup>, Patrick Carton<sup>2</sup>

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Introduction: Femoroacetabular impingement (FAI) has the potential to pose significant problems to performance in sport; the aim of this study was to compare functional performance between a group of athletic, male FAI patients and a control group. Methods: Fifty-seven pre-surgery patients with confirmed FAI were recruited along with 58 age, gender and activity matched controls. A 10-m sprint, modified agility T-test, deep squat, single leg drop jump test and hip flexibility measurements were performed on both groups. Parametric (t-test) and non-parametric (Mann-Whitney U) statistical methods were utilised to analyse differences between groups; a value of  $p < 0.05$  was considered significant. Results: Patients were significantly slower in both 10-m (1.70 s vs 1.63 s,  $p < 0.001$ ) and agility T-Test (7.78 s vs 7.14 s,  $p < 0.001$ ). No significant differences were detected between groups in squat depth, reactive strength index, or maximal hip flexion. A significant difference between patients and controls was observed in abduction ( $35^\circ \pm 7$  vs  $45^\circ \pm 8$ ,  $P < 0.001$ ) and internal rotation ( $36^\circ \pm 9$  vs  $55^\circ \pm 9$ ,  $P < 0.001$ ). 55% of patients reported pain during the 10m-sprint, while 64.3% and 53.6% of patients reported pain during the modified agility T-test and squat test, respectively. No control participant reported pain during any of these measures ( $P < 0.001$ ). Discussion: This study highlights some of the functional deficits between athletes with confirmed FAI and healthy controls. In addition to painful symptoms and a reduction in range of hip motion, patients experience significant reductions in the critical performance aspects of speed and agility.

### **O.31 Changes in athletic performance measures following arthroscopic treatment of femoroacetabular impingement: preliminary (12 week) data.**

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Introduction: Arthroscopic correction of Femoroacetabular Impingement (FAI) can result in significant symptomatic improvement and return to sport. As part of a larger one-year prospective study to determine the change in athletic performance measures following FAI surgery; we present the preliminary results at 12 weeks. Methods: Performance measures included a 10-m sprint, modified agility T-test, single leg drop jump (Reactive Strength Index), deep squat and hip flexibility measures including flexion, abduction and internal rotation. Results were compared to the baseline pre-operative data. Patients (n=20) were also compared to an age, gender and activity level matched control group (n=29) who were similarly tested with no intervention. Statistical analysis included a Paired samples t-test (within group changes) and a repeated measures ANOVA (between group); p<0.05 was considered significant. Results: Significant improvements were seen within the patient group post-surgery for flexion (mean 112.4 o to 118.6o, p<0.001), abduction (33.1 to 38.2 o, p<0.004) and internal rotation (35.3 to 41.5 o, p<0.001). Patients showed significantly greater improvements than controls on all three flexibility measures and the agility test (p<0.05). No significant difference was detected within or between groups for any other measure. 45% of patients reported pain during the 10m-sprint prior to surgery which reduced to 15.8% post-operation; pain levels also reduced for modified agility T-test (by 30%) and the squat test (by 35%). Conclusion: As early as twelve weeks post arthroscopic surgery, significant improvements in hip flexibility can be detected with a reduction in pain during more intense functional measures required for sporting activity.

### **P.32 Accuracy of clinical diagnosis compared with diagnostic ultrasound for plantar fasciitis.**

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Objective: Plantar fasciitis (PFS) is a degeneration of the plantar aponeurosis in the foot. Although diagnosis is commonly based on clinical criteria, PF thickness, as measured with diagnostic Ultrasound (US), can be used as a diagnostic imaging technique for this condition, with similar diagnostic accuracy to Magnetic Resonance Imaging (MRI). This study aimed firstly to determine the utility of the clinical diagnosis of PFS compared with US, and secondly to determine the relationship between a range of symptom-related and physical examination items and US-diagnosed PFS. Methods: This cross-sectional study was approved by the Ethics (Medical Research) Committee Beaumont Hospital (REC 14/54). Study participants included those with medial heel pain for a minimum of six weeks, aggravated by rising or initial weight bearing after inactivity. They underwent clinical and US examination by independent blinded assessors. Diagnostic accuracy of the clinical criteria against PF thickness was determined by estimating sensitivity and specificity. Chi-squared analyses tested relationships between PFS and symptom-based variables and physical examination items. Results: Twelve participants (24 feet) were recruited. Sensitivity and specificity of clinical diagnosis compared to US was 57.14% (95% CI: 28.92-82.24%) and 60% (95% CI: 26.37-87.60%), respectively. Increased body weight was significantly associated with PFS (p=0.04), while BMI (p=0.08) and reduced ankle dorsiflexion (p=0.08) were close to statistical significance. Conclusion: Clinical diagnosis demonstrated only moderate diagnostic accuracy for PFS compared with US-measured PF thickness. Weight was significantly associated with PFS. Small sample sizes may partially explain the results.

### **O.33 Comparison of laboratory versus field-based exercise tests to assess aerobic fitness in elite female soccer players.**

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Introduction: Football involves frequent changes in direction and intensity, leading to demands placed on both aerobic and anaerobic energy systems. Despite the increased popularity of women's football, there is limited scientific research into this cohort. Study aims: evaluate player characteristics and determine which field-based measure if any is the most valid in assessing football specific fitness in this cohort. Methods: 20 elite women players were recruited. Fitness was assessed through laboratory-based graded incremental test (GXT) and field-based Yo-YoIR1 and Hoff test. Results: Mean ( $\pm$ SD) age  $21 \pm 3.59$  years; height  $1.67 \pm 0.06$  m; body mass  $63.02 \pm 4.59$  kg; percentage body fat  $23.88 \pm 3.41\%$ . Mean ( $\pm$  SEM) GXT: VO<sub>2</sub>max  $49.71 \pm 1.06$  mL.kg<sup>-1</sup>.min<sup>-1</sup>, HRmax  $190.6 \pm 2.86$  beats.min<sup>-1</sup> and velocity at TLac  $11.79 \pm 0.19$  km.hr<sup>-1</sup>. Mean ( $\pm$  SEM) Hoff distance  $1487 \pm 35.51$ m and Yo-YoIR1 distance  $1133 \pm 66.4$ m. The mean ( $\pm$  SEM) predicted VO<sub>2</sub>max from Yo-YoIR1  $45.91 \pm 0.56$  mL.kg<sup>-1</sup>.min<sup>-1</sup>. Significance difference between VO<sub>2</sub>max and predicted VO<sub>2</sub>max ( $p = 0.009$ ), the predicted underestimating VO<sub>2</sub>max (difference between means  $-3.05 \pm 1.09$  mL.kg<sup>-1</sup>.min<sup>-1</sup>) with effect size of  $r^2 = 0.22$  ( $r = -0.453832$ ). Significant difference in rank between the Hoff vs Yo-Yo ( $p = 0.0005$ ), Hoff vs GXT ( $p = 0.0001$ ) and the Yo-Yo vs. GXT ( $p < 0.0001$ ). Conclusions: Ranks from the field-based tests showed greatest correlation, Hoff test had greater correlation to rank of GXT than that of the Yo-YoIR1. Predicted VO<sub>2</sub>max underestimate the true VO<sub>2</sub>max but effect size was small.

### **P.34 An analysis of pre-season functional movement screening (FMS) scores in a senior inter county Gaelic team.**

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Introduction: The functional movement screening (FMS) instrument developed by Cook et al [1] serves as a useful means of screening and evaluating functional movement in athletic groups. Methods: The FMS procedure consists of seven tests each designed to place the participant in extreme positions where weaknesses and imbalances become apparent if appropriate stability and mobility is not utilised. [1] An FMS score of less than or equal to 14 increases an athlete's risk of injury eleven fold during the playing season [2-5]. All players on a senior Gaelic inter county panel were invited to attend for FMS tests, at the beginning of the season. Players were excluded from the tests if they had a current injury. Results: In total 23 of the inter county Gaelic footballers were included in the study, mean age  $25.21$  ( $\pm$ SD  $3.27$ ), mean FMS score  $14.96$  ( $\pm$ SD  $1.46$ ). In total 7 (30%) of the panel had an FMS score  $<14$ . Defenders had the highest mean FMS score of  $15.5$  ( $\pm$   $0.83$ ), and midfielders had the lowest mean FMS score of  $14.25$  ( $\pm$   $0.95$ ), When compared to the FMS score of eight other athletic groups, the mean FMS score of the present study cohort was amongst the lowest identified. Conclusion: The FMS tests are a validated system of identifying players with potential risk factors for injury at the pre-season stage of the playing season and can allow team management to address any weaknesses identified at the early stages of the season.

### **P.35 Possible correlation between seasonal body composition changes in a senior Gaelic football team and macro nutrient intake values.**

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**Introduction:** Increases in lean mass increase the force of muscular contractions making athletes more energy efficient resulting in increases in speed and mobility. In order to maximize performance, elite Gaelic players must strive to achieve an optimum sport-specific body size and body composition. **Objectives:** To analyse seasonal changes in body composition in a senior inter county Gaelic team and possible correlation with macro nutrient intake values. **Methods:** Body composition analyses was performed using dual energy x-ray absorptiometry (DXA) at the NWRU on (n=31) members of a senior Gaelic inter county team and results were compared to recommended values for athletes. Nutritional assessment was conducted using the validated EPIC Norfolk Food Frequency Questionnaire. **Results:** There was a decrease in % tissue fat from 15.89 ( $\pm$ SD 5.37) at pre-season to 14.65, ( $\pm$  SD 4.80) at mid-season with a corresponding increase in the mean lean mass. The players exceeded daily recommended intake for fat % energy and saturated fat % energy. The intake of fibre and Vit D were significantly lower than the recommended values. The players reported consuming a mean daily total of 1843.99,  $\pm$ 426 calories, lower than the recommended intake of 2400 to 2800 calories for athletes. There was no positive correlation identified between % tissue fat changes and various micro and macro nutrient intake. **Conclusion:** Assessments of body composition and dietary intake provide players and their management during the playing season. Under reporting of nutritional intake has been identified as common among athletic populations, particularly in non-recommended food groups.

### **P.36 The effectiveness of the functional movement screen as a prediction of injury in Gaelic football.**

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**Introduction:** The characteristics and nature of Gaelic football expose players to a considerable injury risk, with epidemiological studies highlighting the need for advances in injury prevention. The use of a screening tool may be a crucial component in injury prevention. No study has evaluated the FMS as a prediction of injury in Gaelic football. **Objective:** 1) Evaluate the effectiveness of the FMS as a prediction of All Injuries (AI) and Lower Limb (LL) injuries in Gaelic football. 2) Acquire a FMS cut-off score and establish injury proportions and injury rates per 1000 hours exposure. **Methods:** Male senior club football players were screened using the FMS within the first two weeks of the 2014 season. Injury data and player exposure to training and match play was recorded weekly for the following seven months through an online web portal to the GAA injury database, an official injury surveillance system. **Results:** Although no statistical significance was demonstrated, the odds of AI (OR=2.24) and LL injury (OR=8.57) was higher in the player group with low FMS scores ( $\leq$ 13) compared to the high score group (FMS>13). Injury rate per 1000 hours player exposure revealed a statistical difference using the FMS cut-off score of 13. The AI rate difference was 12.09 (p=.009) and LL injury rate difference was 12.5 (p=.004). **Conclusions:** There is a relationship between FMS scores and injury prediction in Gaelic football. There was a clear statistically significant difference between FMS scores and injury rate per 1000 hours using a cut-off score of 13.

### **P.37 Endurance training induces muscle-type specific regulation of mitochondrial stasis.**

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Introduction: Mitochondria's role in energy production has sparked research to characterise bioenergetic adaptations to athletic training. Endurance training increases mitochondrial biogenesis, but changes in mitochondrial mass following different training intensities remain poorly understood.

Methods: Swiss mice, (male, 45-55g, 8 weeks) were trained to induce a trained and overtrained state using treadmill running and rested for 0, 2 or 4 weeks. Performance was determined using an incremental load test. Several muscles were retrieved post mortem. Citrate Synthase levels were determined, as a marker of mitochondrial mass. Mitochondrial genome copy number was determined using qPCR. Results: A trained state was confirmed in the training cohort while Functional overreaching was confirmed in the overtraining cohort. Mitochondrial mass in the GC muscle of overtrained mice were 30% less than control ( $p < 0.01$ ), which was sustained during 2 weeks recovery then returning to control levels. Mitochondrial mass in the Quad muscle of overtrained was also suppressed through 4 weeks recovery ( $P < 0.01, P < 0.001, P < 0.001$  for 0, 2 and 4 weeks recovery respectively) compared to control. Mitochondrial mass in the CRD muscle of overtrained mice showed an increase in mitochondrial content post training ( $P < 0.05$ ) and again at 4 weeks post training a marked increase was seen (165%,  $p < 0.001$ ) while genome frequency showed a 1.8 fold increase ( $p < 0.001$ ) post training which returned to control levels ( $p > 0.05$ ) following 2 weeks recovery. Discussion: Analysis showed skeletal and cardiac muscle have distinct mitochondrial responses to different training intensities. Observed trends indicate that the adaptations of mitochondrial mass to endurance training may be muscle-type specific.

### **P.38 Do flip-flops increase the risk of tripping when walking? A cross-sectional study using three-dimensional gait analysis.**

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Background: Flip-flops are a popular footwear choice in warm weather, however their minimalist design may pose risks to stability during gait. The study aimed to determine if flip-flops increase the risk of tripping while walking. Methods: Fifteen healthy individuals (8 male, mean age 27 (standard deviation 8 years)) underwent three-dimensional gait analysis using Codamotion. Kinematic and temporal-spatial data were captured using a standard lower-limb marker protocol, with additional markers on the flip-flops. Minimum clearance of the hallux and flip-flop were determined at their lowest vertical points in mid-swing. Separation between the foot and flip-flop was measured. Results: There were no differences in speed, step length, or single/double support ratios when walking with flip-flops compared to barefoot walking. In flip-flops there was an increase in peak knee flexion in swing (mean difference  $4.6^\circ$ , 95% confidence interval (CI)  $[-5.8^\circ, -3.4^\circ]$ ,  $p < 0.001$ ) and peak ankle dorsiflexion at terminal swing (mean difference  $2^\circ$ , 95% CI  $[-3^\circ, -1^\circ]$ ,  $p = 0.001$ ). Peak separation between the foot and flip-flop occurred at pre-swing, measuring 8.8cm ( $\pm 1.48$ ). In mid-swing, minimum clearance of the hallux in barefoot walking measured 4.2cm ( $\pm 0.8$ ), whereas the flip-flop cleared by just 1.6cm ( $\pm 0.56$ ). Interpretation: Despite an increase in knee flexion and ankle dorsiflexion in swing to maximise ground clearance, the flip-flop at its lowest point was just 1.6cm from the ground compared to barefoot clearance of 4.2cm. This can be explained by its poor adherence to the foot, creating an increased risk of tripping over minor surface imperfections.

## **O.39 / P.40 The epidemiology of field hockey injuries presenting to an adult emergency department.**

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Study Aim: To identify the epidemiology, injuries sustained, resources used and outcome of patients with field hockey injuries presenting to St. Vincent's Emergency Department. Methods: A retrospective study was conducted of all hockey injuries presenting to the department between May 2012 and October 2014. The ED information system, MAXIM©s, database was searched for triage notes containing 'hockey' and its variations. Results: 256 presentations were found, with 180 suitable for inclusion. 63% (n=114) were female, 37% were male (n=66). The head and neck was the most commonly injured site at 45% (n=81) followed by upper limb at 29% (n=53) and lower limb at 21% (n=38). 54% (n=97) of injuries were lacerations and other soft tissue injuries with fractures accounting for 22% of presentations (n=39). 8% (n=14) were diagnosed with concussion. Mechanism of injury was primarily from an impact, 49% (n=89) from a ball, 27% (n=48) from a stick and 7% (n=12) from another player. 14 were admitted to hospital, 8 as deferred admissions, with an average stay of 1.2 nights. 27% (n=49) were referred to outpatient follow up which was attended by 81% for an average of 2.1 visits. Conclusion: Hockey players present to emergency departments with a wide variety of injuries but the high proportion of those affecting the head and neck must be noted. It is possible that injuries requiring presentation to the ED are on the more severe end of the spectrum. Further research is needed to establish the potential benefits of protective headgear.

## **P.41 Rugby-related head and neck injuries presenting to an emergency department over a 2-year period.**

**Stuart O'Flanagan<sup>1</sup>**, Barry O'Flanagan<sup>1</sup>, John Ryan<sup>1</sup>

<sup>1</sup>St Vincent's University Hospital, Elm Park, Dublin, Ireland

Introduction: Head injuries in rugby are common and have gained increasing attention in the public media and medical literature in recent years. However, it is difficult to ascertain whether there has been an increase in incidence of such injuries or rather, greater awareness has led to a rise in numbers reported. Study Aims: To determine the number of rugby-related head and neck injuries presenting to an Emergency Department (ED) in a Dublin hospital over a two-year period. Methods: An ED database was retrospectively analysed for all rugby-related presentations from June 2012 to May 2014. Head and neck injuries were subcategorised into head, neck, ENT, maxillofacial and facial wounds. Results: 306 patients (89% male, 11% female) presented with a head or neck injury. 64% were classified as a head injury, 11% neck injuries, 13% ENT, 5% maxillofacial and 7% facial wounds. Between the periods 2012/13 and 13/14 the total number of head and neck injuries rose by 23%. Similarly, head injury presentations increased by 12%. The adolescent (35%) and 18-24 year old (35%) groups account for 70% of head injuries. The most common referral source to ED was self-presentation (74%). The most common outcome was discharge with no-follow up (41%). Conclusion: The number of rugby-related head and neck injuries presenting to ED are increasing annually. The adolescent and 18-24 age groups account for the highest number of head injuries. This may reflect recent head injury awareness campaigns by Irish sporting bodies such as the IRFU and GAA.

## **O.42 Adolescent rugby injuries presenting to an emergency department over a 2-year period.**

**Stuart O'Flanagan**<sup>1</sup>, Barry O'Flanagan<sup>1</sup>, John Ryan<sup>1</sup>

<sup>1</sup>*St Vincent's University Hospital, Elm Park, Dublin, Ireland*

Introduction: Adolescents with rugby-related injuries frequently present to Emergency Departments (ED) around Ireland. Recent public awareness campaigns and educational courses on recognition and assessment of head injuries, for example, may have led to an increase in ED presentations. This is the first study to look at adolescent rugby-related injuries presenting to an ED since the initiation of such campaigns. Study Aims: To assess the incidence and type of rugby-related injuries in adolescents presenting to an ED in a Dublin hospital over a 2 year period. Methods: An ED database was retrospectively analysed for all rugby-related presentations in adolescents (14-18 years) from June 2012 to May 2014. Results: 363 adolescents presented to ED. 28% presented with a head or neck injury. Of these, 66% were head injuries specifically. 56% presented with upper limb injuries, with shoulder injuries being the most common (19%). 13% presented with lower limb injuries, knee injuries were most common (36%). Trunk injuries accounted for 2% of all injuries. The total number of injuries increased between the year 2012/13 and 13/14 by 26%. Head and neck injuries increased by 35% with total number of head injury presentations increasing by 46%. Upper limb injuries increased by 26%. Lower limb injury presentations reduced by 12%. Conclusion: The number of rugby-related injuries in adolescents presenting to ED is increasing. Head injuries were the most common type of presentation and increased by almost double from the 2012/13 to 2013/14 periods. This may be due to recent head injury awareness campaigns.

## **O.43 Women's rugby related injuries presenting to an emergency department over a 2-year period.**

**Stuart O'Flanagan**<sup>1</sup>, Barry O'Flanagan<sup>1</sup>, John Ryan<sup>1</sup>

<sup>1</sup>*St Vincent's University Hospital, Elm Park, Dublin, Ireland*

Introduction: The recent success of the Irish women's national 7's and 15's rugby teams has led to an increase in the number of female participants in schools and club rugby. Since this increase in popularity, the number of rugby-related injuries presenting to Emergency Departments (ED) in Ireland has not been documented. Study Aims: To assess the incidence and type of rugby-related injuries in women presenting to an ED in a Dublin hospital. Methods: An ED database was retrospectively analysed for all women's rugby-related presentations from June 2012 to May 2014. Results: 152 women presented with rugby-related injuries. The most common injury category was upper limb (49%), most commonly finger injury (33%). Lower limb injuries accounted for 24%, with ankle injuries most common (43%). Head and neck injury presentations accounted for 22% of injuries, 76% of these were head injuries. Trunk injuries accounted for 5%, breathing issues were the commonest complaint (43%). The total number of injury presentations to ED increased between 2012/13 and 2013/14 by 45%. Head and neck injuries increased by 39%, upper limb injuries by 17%, lower limb injuries by 19% and trunk injuries increasing by 14%. Conclusion: The number of women presenting to ED with rugby-related injuries is rapidly increasing. The most common injury category is upper limb injuries, which may be due to trauma related to tag-rugby and non-contact variations of rugby. However, an increase in head injuries has been also demonstrated at a similar rate to male rugby players.

## **O.44 Prevalence of abnormal hip MRI findings in Gaelic football players.**

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Introduction: Hip joint and groin pathology is of significant concern in Gaelic Football players, with hip and groin injuries accounting for 12.5% of all injuries. It has been suggested that strength and conditioning programmes may contribute to these problems, along with the repetitive hip flexion and internal rotation motion associated with kicking in Gaelic football. There is limited information that exists around hip and groin injury rates in Gaelic Football. No study to date examines the prevalence of abnormal hip MRI findings in elite Gaelic Football players. AIM: Identify the prevalence of abnormal hip and groin findings in Gaelic football players, by means of MRI. Methods: 50 male, elite Gaelic football players underwent a bilateral hip and groin MRI at Cappagh National Orthopaedic Hospital using a Siemens Achieva 3T TX machine. Results were independently read by one of two clinical radiologists. Results: 78% (36/50) of participants had abnormal MRI results. The three most common findings identified in the MRI results were bone marrow oedema of the pubic region (40% [20/50]), cam-type deformity associated with femoroacetabular impingement (26% [13/50]) and a labral abnormality (20% [10/50]). Discussion: Gaelic footballer players are at risk of developing a number of abnormalities, resulting from demands of the sport. These findings have highlighted the abnormalities that Gaelic football players may be predisposed to. Appropriate preventative and rehabilitative programmes should be developed to target the most prevalent abnormalities that have been identified in order to reduce the number of injuries in Gaelic football players in the future.

## **O.45 Effects of acute sleep deprivation on aerobic and skills performance following caffeine supplementation.**

**Alan McIntyre**<sup>1</sup>, Kevin Carmody<sup>1</sup>, Ciaran McDonald<sup>1</sup>, Joss Moore<sup>1</sup>, Bernard Donne<sup>1</sup>, Nick Mahony<sup>1</sup>

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Sleep deprivation is relevant for athletes for numerous reasons; travel, shift work and family commitments being some of the most common. Athletes are therefore occasionally required to compete in a sleep deprived state. Previous studies have demonstrated that a period of sleep deprivation can have negative effects on an athlete's aerobic performance. However, the impact of sleep deprivation on an athlete's skills performance has not been extensively researched. The aims of this study were to investigate if sleep deprivation had a negative effect on aerobic performance and if so, could these effects be negated by supplementation with caffeine. A group of male athletes (n=11) were sleep deprived (SD) for 24 hours on two occasions a minimum of one week apart. Each participant received a supplement of either placebo (Lactulose) or Caffeine (6mg/kg) one hour before testing on each day. Participants were also required to complete a non-sleep deprived (NSD) testing day where they received no supplement. The 11 participants were required to complete a modified version of the Hoff test and a YoYo Intermittent Recovery Test. The Modified Hoff is a soccer skills test around a circuit for 10 minutes. Blood lactate samples were taken pre and post Hoff test and pre and post YoYo IR1 test. The data collection phase has been completed and we are currently analysing our results.

## **O.46 High prevalence of vitamin D deficiency in Gaelic athletes: implications for health and use of an oral spray solution to optimise status over 12-weeks.**

**Joshua Todd**<sup>1</sup>, Emeir McSorley<sup>1</sup>, Kirsty Pourshahidi<sup>1</sup>, Sharon Madigan<sup>2</sup>, Pamela Magee<sup>1</sup>

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Introduction: A range of general and athlete-specific factors put athletes at risk of poor skeletal health, owing to total serum 25-hydroxyvitamin D (25[OH]D) concentrations below 50nmol/L. The US Institute of Medicine defines vitamin D sufficiency as a total 25(OH)D concentration >50nmol/L, insufficiency as 31-49nmol/L and deficiency as <30nmol/L. Chronic deficiency manifests itself as rickets in children and osteomalacia in adults and increases risk of stress fracture in the physically active. Study aim: Determine total 25(OH)D concentrations in Gaelic athletes and assess the impact of 12-weeks supplementation on status. Methods: Gaelic footballers (n=23), camogues (n=6) and hurlers (n=6) were recruited for a 12-week intervention between November-April 2014/15. Fasted bloods were obtained at baseline and week 12. Samples were analysed for total 25(OH)D, parathyroid hormone and adjusted calcium concentrations. Athletes self-administered a single oral spray containing 3000IU (75µg) vitamin D3 (n=17) or placebo (n=18) daily and average compliance to the intervention was 95%. Results: Only 29% of athletes were vitamin D sufficient at baseline whereas 50% presented with insufficiency and 21% presented with deficiency. Using ANCOVA, adjusting for age and baseline total 25(OH)D concentration, supplementation significantly increased total 25(OH)D concentrations compared to athletes allocated to placebo (34.8 versus 2.5nmol/L respectively, P=0.001). Discussion: These findings suggest that Gaelic athletes are at risk of poor bone health, due to vitamin D insufficiency/deficiency, and demonstrate that delivery of vitamin D3, via the buccal membrane, is an effective method to raise vitamin D status over wintertime.

## **CCP.47 Pyogenic infection of the sacroiliac joint, in a female lifeguard with lower back pain.**

**Siobhan Graham**<sup>1</sup>

<sup>1</sup>*Department of Rheumatology, Musgrave park hospital, Belfast, Northern Ireland*

A 20-year old lifeguard presented to the out-of-hours GP with lower back pain of sudden onset, while weight lifting; she was diagnosed with sciatica and sent home. Two days later she attended her GP with worsening pain and was referred to A&E; she was discharged with a diagnosis of sciatica. After one week of back pain, she self-presented to A & E, unable to fully weight bear and using crutches. She was pyrexial, with a raised CRP and commenced on the intravenous antibiotics for septic discitis; MRI of the Lumbar-spine was normal. She was re-examined and found to be extremely tender over the left sacroiliac joint, supporting a diagnosis of a septic arthritis of the sacroiliac joint. She was referred to rheumatology where an MRI of the sacroiliac joint was performed, and found to be normal. On consulting the literature we discovered that MRI scan can remain normal for the first seven to ten days of a septic sacroiliac joint and that isotope bone scan was more specific than MRI. Isotope bone scan was therefore performed, which demonstrated increased uptake in the left sacroiliac joint. After five days of i.v. teicoplanin she had an anaphylactic reaction and was switched to i.v. gentamicin, following which there was a dramatic improvement. After 2 weeks of i.v. gentamicin and 4 weeks of oral flucloxacillin, her pain completely resolved and CRP normalised.

## **O.48 Physical activity teaching on the Irish undergraduate medical school curricula; are Ireland's future doctors prepared?**

**Barry O'Flanagan**<sup>1</sup>, Stuart O'Flanagan, Joe Cummiskey, Eanna Falvey.

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**Introduction:** The health and wellbeing benefits of physical activity (PA) are widely accepted. Doctors are ideally placed to promote exercise and its health benefits in the general population. Delivery of the message effectively requires a unique skill-set; an effective, cheap and proven means of improving primary and secondary disease prevention. Studies of undergraduate medical school curricula have shown a paucity of teaching around PA and PA promotion. The aim of this study is to investigate the level of PA teaching included within the curricula of Irish medical schools. **Methods:** A questionnaire to assess the content and quantity of teaching on PA promotion was completed by all 7 medical schools on the island of Ireland. **Results:** All medical schools include some PA related teaching on the curriculum. PA teaching was predominantly delivered between years 1 and 4, most often in year 2. The average number of total teaching hours delivered on PA was 5.3 hours (SD 1.2), ranging from 3 to >6 hours. None of the medical schools in the Republic of Ireland currently teach the Get Ireland Active national guidelines on PA. **Conclusion:** Teaching of PA in Irish medical schools is varied and lacks standardization. No medical school in the Republic of Ireland includes the current national guidelines for PA within the curriculum. It is unclear whether Ireland's future doctors are being adequately equipped with the basic knowledge and skills required to promote, prescribe and counsel patients on the benefits of physical activity and further, treat physical inactivity related disease.

## **P.49 Use of analgesics in endurance athletes; prevalence, reason for consumption, awareness and incidence of adverse associated effects.**

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**Introduction:** Musculoskeletal injuries account for the majority of sports-related injuries. Athletes are often keen to continue training and competing even if injured if at all possible. Athletes frequently use analgesics to minimise musculoskeletal pain and inflammation. **Study Aims:** to examine the use of analgesics- to establish prevalence, reason for use and level of awareness of any adverse effects of NSAIDS in endurance athletes. **Methods:** Preliminary survey- interviewing athletes immediately following the Clonakilty full or half-marathon. Online questionnaire component- non-interventional cohort study posted in the Connemarathon online newsletter and on the Dublin marathon website. **Results:** 605 surveys were commenced online. 91 were excluded as they were missing primary data, leaving 514. 19% of respondents consumed analgesics before racing. Athletes who ingested pre-race analgesics were more likely to encounter an adverse effect during or after their race, with 19.1% of the athletes in the analgesic cohort reporting an issue as compared to 8.1% of the controls. This result was observed in both triathletes and runners. Female athletes were significantly more likely to take pre-race analgesics. Runners in marathons were the most likely group to ingest analgesics prior to racing. **Conclusions:** In conclusion, ingestion of pre-race analgesics is frequent and can be associated with an increased risk of an adverse outcome.

## **O.51 A marker-less motion capture system to enhance injury monitoring in professional sports: a single case validation study on the example of external and internal shoulder rotation.**

**Susan Giblin**<sup>1</sup>, Dara Meldrum<sup>2</sup>, Stuart O'Brien<sup>1</sup>, Fredrich Wetterling<sup>1</sup>

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**Introduction:** Injury monitoring in sport is an evolving challenge; an injured athlete can cause tremendous expenses (therapy, team success, and liability claims etc.). Unfortunately, the transfer of injury screening analysis from the lab to the sports arena has been limited to date. We are presenting a marker-less motion capture system and analysis framework (Capture, Kitman Labs Ltd., Dublin, Ireland) with the aim to improve practical injury monitoring. **Methods:** The external and internal shoulder rotation angles were measured using Capture and Vicon. While Capture utilises a RGB-Depth sensor (Kinect v2, Microsoft) that scans the athlete's surface, Vicon relies on physically attached markers in anatomically predefined locations. **Results:** The mean and standard deviation was computed for a single trial averaged across 20 frames (Capture) and 100 frames (Vicon). Maximum external shoulder rotation was recorded as  $-91.1^{\circ} \pm 1.3^{\circ}$  with Vicon and  $-99.0^{\circ} \pm 2.3^{\circ}$  with Capture. Internal rotation angles were measured to be  $63.1^{\circ} \pm 1.0^{\circ}$  (Vicon) and  $67.3^{\circ} \pm 2.5^{\circ}$  (Capture). Hence, the accuracy of Capture versus Vicon can be stated as  $7.9^{\circ}$  and  $4.3^{\circ}$ , respectively for external and internal shoulder rotation. **Discussion:** The single case results demonstrate that Capture can provide measurements of external and internal shoulder rotation with an accuracy ranging from  $4^{\circ}$  to  $8^{\circ}$  compared to VICON - at present considered the gold standard. The precision of  $2^{\circ}$  was within previously reported values for studies using RGB-Depth sensors. Further studies with a larger sample size are required to confirm these encouraging preliminary results.

## **0.52 Medical services at the UEFA regions cup final round tournament 2014-2015.**

**Conal Hooper**<sup>1,2</sup>, Alan Byrne<sup>1,3</sup>

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**Introduction:** The Final Round Tournament of the UEFA Regions Cup was held in Dublin in July 2015. This presentation describes the operation of the Medical Services Plan required by UEFA for such tournaments. The Tournament Doctor was available 24/7 throughout the tournament and triaged requests for medical assistance. The Medical Service Plan included arrangements for ambulance services, acute and other hospital services, imaging, dentistry, pharmacy, podiatry, ophthalmic optician and match-day arrangements. Two ALS ambulances were present at each match. The National Ambulance Control Centre was provided with details of training venues. Hospital services were accessed by personal calls to consultant colleagues who acted as contacts. Six doctors, trained in immediate care acted as match-day pitch-side emergency doctors. Irish doctors would provide services which visiting team doctors felt unable to undertake for medico-legal reasons. Players, technical staff and officials numbered approximately 350. Eleven incidents required medical intervention. Two players were referred to emergency departments with injuries sustained during matches. One player was referred for X-ray following a training injury. One player suffered concussion and played in the final following a GRTP regime. One official required a dental extraction, another required podiatry. Medical problems encountered included sub-acute appendicitis and acute vertigo. All referrals to outside facilities were conducted promptly and to the satisfaction of the team doctors concerned. **Conclusions:** There were no adverse medical outcomes. The arrangements put in place proved satisfactory and could form a useful template for medical care at similar future tournaments.

## **O.53 Marathon running injuries and illness presenting to a medical support unit.**

**Ui May Tan<sup>1</sup>**, Yvonne Finn<sup>1</sup>, Micheal Newell<sup>1</sup>

<sup>1</sup>*School of Medicine, NUI Galway, Galway, Ireland*

**Introduction:** Marathon running is both challenging and rewarding. For some runners, however, their performance and ability to finish the race is compromised by injury or illness. The aim of this study was to profile marathon running injuries and illnesses presenting to the medical support unit at the Dublin City Marathon. **Method:** A prospective injury surveillance study that recorded location, cause, nature of injury or illness, and treatment provided to marathon runners. **Results:** A total of 72 runners (53 males and 19 females) required treatment at the medical support unit. The mean age of runners was 38 years (range 22-79 years). The number of previous marathons completed ranged from 0 to 20. Average weekly training load was 36 miles (range 6-100 miles) and 89% of runners attending the medical unit finished the race; 65% were brought in and 35% were self-referrals. Dehydration (35%), loss of consciousness (12%), cramp (10%), dizzy light-headedness (7%), and nausea (3%), were the main conditions diagnosed in those presenting feeling unwell. Muscle strain injuries (13%) particularly in the lower limbs were the main injuries recorded. Main treatments included observation (46%), IV hydration (17%), oral hydration (11%), REST (10%), and dressing/ suturing (6%). There were 5 hospital referrals, with 3 confirmed cases of acute renal failure. **Conclusion:** In excess of 70% of cases presenting to the medical support unit required treatment for dehydration. We conclude there is a case for increasing awareness of the risk of dehydration and provision of educational interventions on appropriate hydration strategies among marathon runners.

## **P.54 Hydration strategies and fluid consumption in dehydrated marathon runners.**

**Ui May Tan<sup>1</sup>**, Yvonne Finn<sup>1</sup>, Micheal Newell<sup>1</sup>

<sup>1</sup>*School of Medicine, NUI Galway, NUI Galway, Ireland*

**Introduction:** Dehydration in marathon runners can be detrimental to performance. The loss of body water and failure of homeostatic regulation increases the susceptibility to heat stress, increased stress on the cardiovascular system, and exercise-induced exhaustion. The aim of this study was to assess the hydration habits and fluid preferences of runners seeking treatment for dehydration at the marathon race medical unit. **Method:** A cross-section observational study design was used. Only participants presenting with symptoms of dehydration (including cramps, exhaustion, fainting, and loss of consciousness) were included. Total fluid consumption (before and during the race) and fluid preference was recorded. Fluid consumption was classified into three categories <1000ml, 1000-2000ml, and >2000ml respectively. **Results:** The mean fluid consumption (n=52) was 500ml (range 22-3000ml) pre-race; 1000ml (range 250-4000ml) during the race. In total, 21% of runners consumed <1000ml, 51% consumed between 1000-2000ml, and 27% consumed >2000ml respectively. The probability of dehydration was independent of fluid level consumed (p=0.668). Post-race blood oxygen levels ranged from 48-99% respectively. Low oxygen saturation levels was associated with dehydration (p=0.030). The majority of runners consumed water (98%). Preference for other fluids included gels (42%), sports drinks (23%), and fruit juice (3%) respectively. Nearly all runners (98%) expressed a preference for bottled drinks rather than paper cups (2%) as the drinking vessel of choice. **Conclusion:** Knowledge of individual hydration requirements and maintaining fluid balance could act as a preventive measure against dehydration and should be considered as a possible contributory factor for marathon performance.

## **0.55 Comparison of pre-season and mid-season FMS and injury risk factors in elite club Gaelic footballers.**

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Introduction: Gaelic football is a sport in which is multidirectional in nature and injuries in the sport have been previously documented<sup>1</sup>. It has previously been stated that risk factors for injury in Gaelic football need to be investigated.<sup>2</sup> FMS has been widely used and normative values for FMS performance in elite GAA players have been collated<sup>3</sup>, however there is a distinct lack of information on its application and injury risk factors. Methods: Pre-season and midseason FMS and injury risk factors were recorded in 17 senior club GAA players. Paired samples T-tests were performed using IBM SPSS Statistics version 21.0 to analyse the data. Results: Statistically significant differences in the pre and post in-line lunge, slump test, straight leg raise (SLR,) hip flexor testing and overall FMS score were found ( $P \leq 0.01$ ). The pre and post differences in rotary stability were also statistically significant ( $P \leq 0.05$ ). While performance in Thomas test, in-line lunge, rotary stability and overall FMS significantly improved, there was a significant decrease in slump and SLR ( $P \leq 0.01$ ). Discussion: FMS scores improved from pre-season to mid-season and this can be attributed to the 16 week intervention programme. In comparison, slump test and SLR performance decreased. Interestingly, the incidence of hamstring injury was 4.47/1000 exposure hours questioning the ability of the FMS as a tool for injury risk factors. Conclusion: FMS improves during a 16 week intervention programme in Gaelic footballers but may not detect hamstring injury risk.

## **0.56 Correlation of isokinetics and single leg bridge test in elite U21 Gaelic footballers.**

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Introduction: Hamstring injuries are very common in Gaelic football<sup>1</sup>. Isokinetics has been widely used to assess hamstring strength in gaelic footballers<sup>2</sup> whilst the single leg bridge test (SLBT) has been used in AFL<sup>3</sup>. Purpose: Investigate the relationship between isokinetic assessment and the single leg bridge test. Methods: Twenty one elite Gaelic footballers (age  $20 \pm 1.05$ , standing height  $180.66 \pm$  mm, body mass  $80.66 \pm 7.9$  kg) were assessed. Any players who had a hamstring injury in the previous six weeks were excluded from the study. The SLBT was performed on both legs, patients had to perform as many repetitions until fatigue. Concentric hamstring and quadriceps peak torque at 60, 180 and 240 degrees/second ( $^{\circ}/s$ ) were recorded using an isokinetic dynamometer (Biodex System 3). Results: SLBT correlated with peak torque @ 60/60 ( $^{\circ}/s$ ) ( $r=1$ ), 180/180 ( $^{\circ}/s$ ) ( $r = 0.791$ ) and 240/240 ( $^{\circ}/s$ ) ( $r = 0.567$ ). Also work in the first third @ 60/60 ( $^{\circ}/s$ ) correlated well with SLBT ( $r = 0.898$ ). Discussion: Isokinetic data compared well to performance in the SLBT, however this relationship declined as the speed of isokinetic testing increased. The SLBT may be a useful tool in assessing absolute hamstring strength however isokinetic assessment may provide a greater insight to the performance of the hamstring at greater speeds of contraction. Conclusion: SLBT is an excellent indicator of testing absolute hamstring strength when compared with isokinetics. This test can be used as a pre-season screening tool in the GAA.

## **P.57 Does running surface affect tibia and pelvis impact accelerations?**

**Kieran Moran**<sup>1,2</sup>, Helena Maginn<sup>1</sup>, Chris Richter<sup>2,3</sup>, Amin Ahmani<sup>1,2</sup>

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**Introduction:** High impact loads/accelerations produced when the foot strikes the ground have been strongly associated with running related injuries. It has been suggested that stiffer running surfaces produce higher impact loads/accelerations; however, very few studies have experimentally examined this. **Methods:** A randomised repeated measures design was employed. Fifteen injury free, male, recreational runners (19-32 years) participated. All participants completed three successful trials over 25 meters on each surface at “a self-selected 5 km training pace” ( $\pm 5\%$  variation in running speed was accepted). The four surfaces were concrete, running track, Astroturf and natural grass. Two inertial sensors (Shimmer 3, Dublin) were skin-mounted over the tibia and sacrum to measure impact accelerations over the middle 15 meters of the run. Stiffness of the surface was assessed using a standard coefficient of restitution (CoR) ball drop test (1.8m). **Results:** Surface stiffness (CoR) was greatest for concrete (0.756) and the running track (0.756) followed by the Astoturf (0.600) and grass (0.556). A repeated measures factorial ANOVA found no significant differences ( $p > 0.05$ ) in impact accelerations at the tibia or at the pelvis. **Discussion:** Ground surface had no significant effect on impact accelerations despite clear differences in surface stiffness. This is in contrast to expectations based solely on mathematical modelling (i.e. biomechanical impact – momentum relationship). Runners may be modulating their joint stiffness to optimize running performance (e.g. speed or/and efficiency) or reduce the likelihood of injury when running on stiffer surfaces.

## **O.58 Reduction in running impact accelerations with an audio biofeedback App (“SoftRun”)**

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**Introduction:** Running results in a large number of injuries associated with high impact loads/accelerations produced when the foot strikes the ground. In addition, fatigue may result in greater loads/accelerations thereby further increasing the risk. While a number of running techniques have been suggested (e.g. Chi, Pose) both the ability of runners to utilize them and their ability to reduce loading has been questioned. This study aimed to assess the ability of an audio biofeedback smartphone App to change running technique (use a ‘compliant’ style) and reduce impact accelerations while non-fatigued and fatigued. **Methods:** Impact accelerations were measured at the tibia, pelvis and head using inertial sensors (Shimmer, Ireland) in fourteen male recreational runners during two visits. On the first visit baseline measures for non-fatigued and fatigued running were captured. During the second visit participants were instructed on how to run with a ‘compliant’ technique and provided with audio biofeedback via an in-house developed smart phone app (“SoftRun”) set to beep if tibia impact accelerations were not reduced by 10%. **Results:** The App facilitated reductions in impact accelerations when both non-fatigued (tibia: -23%, pelvis: -39%, head: -32%) and fatigued (tibia: -35%, pelvis: -41%, head: -28%). Fatigue produced a significant increase in impact accelerations only at the tibia and when the App was not utilised (+16%). **Discussion:** The use of the “SoftRun” smartphone App has the ability to reduce impact accelerations when running which, in light of the strong relationship between impact loading/accelerations and injury, may reduce the likelihood of injury.

## **P.59 Are impact acceleration asymmetries present 18 months following ACL reconstruction?**

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Introduction: Relative excessive impact loading/accelerations can cause re-injury following anterior cruciate ligament reconstruction (ACLR). Excessive loading/accelerations may be caused by, or reflective of, impact asymmetries. Running has an extremely high rate of injury, but it is unclear if running-based impact-acceleration asymmetries are present following ACLR. Methods: Participants were nine ACLR (n=4 patellar tendon graft, n=5 hamstring graft) and nine un-injured male recreational runners; groups were matched for weekly running duration ( $6.1 \pm 1.2$  hours), age ( $21.3 \pm 1.9$  years) and weight ( $81.37 \pm 11.3$  kg). ACLR was post reconstruction by  $18 \pm 2$  months. All ACLR occurred on the dominant leg. Tibia, pelvis and head impact accelerations asymmetries were assessed using four skin mounted inertial sensors (Shimmer 3, Dublin). Participants' treadmill ran at a 'self-selected training pace' for five minutes, with impact accelerations captured during the last two. Asymmetry (%) was calculated as:  $100 * (\text{ACLR limb} - \text{uninjured limb}) / (\text{average})$ . Group differences were assessed using an independent samples t-test. Results: On average the acceleration asymmetries were higher for the ACLR group at the head ( $3.2 \pm 6.0\%$  versus  $-0.7 \pm 4.4\%$ ) and pelvis ( $10.4 \pm 17.0\%$  versus  $4.9 \pm 23.0\%$ ), but lower at the tibia ( $5.2 \pm 21.9\%$  versus  $11.3 \pm 24.5\%$ ). However, no differences were significant. Discussion: Findings suggest two possibilities. Firstly impact acceleration asymmetries are no different following ACLR and therefore its assessment is not warranted as a screening tool. Secondly, ACLR participants had recovered sufficiently to no longer exhibit asymmetries. A larger, prospective study is warranted.

## **P.60 Compliance with rehabilitation in anterior cruciate ligament reconstruction**

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Introduction: Rehabilitation following and anterior cruciate ligament reconstruction (ACLR) vital and a considerable amount of commitment is required by the patient for a successful outcome. The aim of the study was to investigate factors that could relate to compliance with rehab. Methods: A study of patients who had ACLR 4-5 years prior was conducted. 400 patients had ACLR's in this period, of whom 137 with an isolated ACL reconstruction were eligible. Patients were questioned to assess recovery and compliance with rehabilitation. Results: 59 subjects were available to contact and included. Eighteen (30.5%) were least compliant with their rehab at 2-4 months. The most common reason was confidence being restored in their knee. Only eleven participants (18.6%) were fully compliant throughout the rehabilitation time. There was a significant correlation between 'hopelessness' ( $r=0.3210$ ) ( $P = 0.013$ ), 'feeling angry' ( $r = 0.263$ ) ( $p = 0.044$ ) and a delay in return to action. A statistically significant correlation was found between the financial cost of the rehab and attendance at rehab, and between the distance from the physiotherapist and attendance at rehab. Fourteen (23.7%) of patients found it hard to find the time to comply with the rehab programme and work was the main reason. Conclusion: The most common time to become least compliant with the rehabilitation was around 3 months. Some psychological factors had a statistically significant negative effect. Thus efforts to deal with the mental health aspect of ACL injury and combine working life with the rehabilitation programme are key in facilitating compliance.

## **P.61 Physical activity levels in chartered physiotherapists in Britain and Ireland.**

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Purpose: The health benefits associated with exercise continue to be explored through medical research. Physiotherapists effectively utilise exercise to treat clients; from fit and healthy athletes to patients with varying co-morbidities. Therefore, it was hypothesised that physiotherapists would achieve high physical activity levels. The aim of this study was to assess physical activity levels in chartered physiotherapists. Methodology: An observational, cross-sectional study was designed. A consent form was combined with a demographics questionnaire and the International Physical Activity Questionnaire. This was distributed to 100 physiotherapists across Britain and Ireland with a return rate of 72%. The data was analysed to determine the level and factors affecting physical activity levels in physiotherapists. Results: The results demonstrated that 61.11% of physiotherapists achieved high physical activity levels, with 5.56% obtaining low levels. The remaining 33.33% attained moderate physical activity levels. Those working in hospital based, orthopaedic or respiratory fields with under 15 years' experience were the most likely to obtain high physical activity levels. Physiotherapists with greater than 15 years' experience, working in outpatient musculoskeletal or women's health achieved the lowest levels of activity. Conclusion: This study showed that overall, physiotherapists attain high physical activity levels. However, there are a minority in the profession who are below the recommended level for the maintenance of health and disease prevention. Leisure time activity should be targeted to improve overall activity levels. Further research, incorporating objective outcome measures, is required in a larger cohort, across the medical professions to extend the results of this study.

## **P.62 Head injuries in sports academy. Evaluation of 12 different sports of FCBarcelona during eight seasons**

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Introduction: Head injuries (HI) and concussion (CC) education and preventing programmes are unquestionable in sport. The effectiveness of its implementation lies on the previous knowledge of incidence and characteristics of each one at our own environment. Method: retrospective evaluation of incidence and type of head injuries from <9 to <18 categories, since 2007-08 to 2014-15 season, of 12 team sport sections of FCBarcelona (n~1100 athletes/year). OSICS registration methodology. Results: A total of 426 events were identified. The prevalence was: 118 laceration (27.7%), hematoma 96(22.5%), concussion 79(18.5%), fractures 51(12.0%), ocular injuries 48(11.3%), and the rest 34(8.0%). The prevalence/season was: football 15.1±3.8, basketball 8.1±4.3, handball 8.0±4.3, roller hockey 8.0±4.0 and rugby 4.7±2.8. The episodes of concussion/season were 10.6±5.7. During the last two seasons the prevalence doubled the previous three 18 vs 9,5. Football 5.1, basketball 1.0 and handball with rugby 0.9 concussions/season, were the higher risk sports. The impact on "days off" were for HI/CC: female football 64.8/3.4, football 47.3/14.4, handball 40.1/9.8, rugby 22.6/2.4, and ice and roller hockey 9.6/0.0 and 4.9/0.0 respectively. None was fatal or with neurologic sequelae. Discussion: Injury and concussion are different episodes with different impact on severity and on days off training. The approach of any action to prevent these episodes should be well explored to obtain better reduction of the injury prevalence and severity. Conclusion: There is a consistent incidence of episodes of head injuries in the sport academy level, not always associated with concussion. The sports in our environment with increased risk are football, basketball, handball, rugby and hockey.

## **O.63 Childhood obesity as a risk factor for upper extremity fractures.**

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Introduction: Childhood obesity is a rapidly increasing global problem. Objectives: To determine whether children or adolescents with increased BMIs had an associated higher risk of upper extremity fractures and to classify the fracture pattern. Methods: We prospectively collected data on 280 children and adolescents between 2 to 19 years of age who presented to hospital with upper extremity trauma. We determined BMI and BMI-for-age percentiles for each patient. Fracture types were classified and the management was recorded. Any complications were recorded in follow up visits from the outpatient department. The associations among the BMI class and specific upper extremity fractures were estimated using multiple logistic regression models and expressed with odds ratios (ORs) and 95% confidence intervals (CIs) using multivariate analysis to adjust for patient demographic variables. Results: Children of both genders with a BMI above the 85th percentile for their age group had an increased OR of an upper extremity fractures (OR, 1.24, with 95% CI, 1.11-1.34) compared to children of the same age below the 85th percentile. The association was strongest in boys between the ages of 5- to 13-year-old. Boys with raised BMI were more likely to require operative management than their normal weight peers (P<.05). Conclusions: Our study found that children with a BMI above the 85th percentile for their age were at increased risk of a more severe upper extremity fracture compared to children with a lower BMI. The raised BMI group was a risk factor operative management of their fracture.

## **P.64 “Wreckage on Reek”, A study on the safety of climbing Ireland’s Golden Mountain- Croagh Patrick’**

**Matthew Mullins**<sup>1</sup>, John Kelly, Tara Connelly, Paul O’Grady

<sup>1</sup>*Trinity College Dublin, Ireland*

Introduction: Croagh Patrick is a famous and holy mountain of Ireland’s ‘wild west coast’. Standing 764 metres tall, it offers a challenging hike and attracts tourists and pilgrims from all corners of Ireland and the world. Our aim was to identify the safety profile of climbing this mountain on the busiest day of the year-Reek Sunday. Methods: We collated ED records of 28 patients attending with injury and/or illness associated with climbing Croagh Patrick on Reek Sunday for the past five years 2010-2014. Results: The average number of presentations to ED is 5.6. Most patients are brought to hospital by ambulance (49.4%). 25% of people seen were admitted and mechanical falls represents the largest injury group with 61%. Data suggests an elevated workload for the local ED’s. The injury patterns incurred suggests that mechanical falls are the commonest injury type with a subsequent 70% chance of sustaining a fracture. This raises serious concerns over the safety of the path on the mountain. Conclusions: Climbing Croagh Patrick is a popular activity that is ever growing. The safety profile of the mountain in terms of pathway and other conditions must be called into question with the injuries we are seeing in ED at Mayo General hospital. Concerns must also be raised about people’s general health and ability prior to undertaking such a challenging climb.

## **O.65 Violence in Irish underage sports: a growing problem in a growing population.**

**Matthew Mullins**<sup>1</sup>, John Kelly, Tara Connelly, Paul O'Grady

<sup>1</sup>*Trinity College Dublin, Ireland*

The aim of this audit was to assess the various attitudes amongst parents, health professionals and children themselves to the growing issues of violence in the realm of underage sporting activities. Methods: We created a questionnaire to identify the level of violence encountered in various sports from each perspective. We also completed a literature review of the topic to compare our findings. Results: Overall, the perception in Ireland is that youths who participate in sports are less likely to be involved in violent and anti-social behaviour off the pitch or sporting arena. However, the trend in certain sports including rugby and Gaelic games is that of growing concern for violence. Conclusion: We are seeing more violent injuries as doctors; as a result of sporting activities in youths. There is a difference of opinion amongst parents, health professionals and young athletes as to the problem areas. There is also a discord in terms of the parties who should ultimately be responsible for eradicating such violence.

## **O.66 Nutrient intakes and eating habits of Irish elite adolescent boxers**

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Introduction: Boxing is a weight category sport where significant weight changes have been observed in the lead up to competition. This has been associated with decrements in performance. Little is known about the dietary intakes of adolescent boxers. The aim of this study was to profile eating habits of Irish elite adolescent boxers in order to design an appropriate nutrition education program. Methods: Food diaries were distributed to 20 elite Irish Youths and juniors (15-18 year olds). 11 completed, 3-day food diaries, were returned, (response rate 55%). These were analysed using Nutritics dietary analysis software. Results: Average carbohydrate, protein and fat intakes were 4.3g/kg/bodyweight (BW) (range 1.0–7.3g/kg/BW), 1.6g/kg/BW (range 0.6-2.3g/kg/BW), and 1.3g/kg/BW, (range 0.7-2.2g/kg/BW) respectively. Sugar intake was >100g/day on 18/33 days, an average of 23% of total energy intake, (range 14-33%), with the greatest contribution coming from fizzy drinks/fruit juice/squash, followed by chocolate & biscuits. Calcium intake reached the recommended guideline of 1200mg 33% of the time. On 19/33 days fruit & vegetable intake was ≤ 1 portion, with ≥4 portions consumed on only 1/33 days. Conclusions: Educational strategies for this athlete group need to focus on improving the overall nutrient composition of the diet, particularly reducing sugar whilst, increasing calcium, fruit & vegetable intakes. As recent research has shown a lack of interest in general health messages is a difficult barrier to overcome when trying to communicate with men about food, these messages could be incorporated into specific weight-making advice.

## **P.67 The impact of a pre-operative physiotherapy education programme on the number of rehabilitation days required post primary total hip and knee replacement surgery.**

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Introduction: Osteoarthritis is the most common joint disease in adults worldwide. Total joint replacement surgery is an effective intervention used for severe hip and knee osteoarthritis. Pre-operative patient education has been identified as an integral component of clinical pathways for lower limb arthroplasties. Study aim: To evaluate the effect of a pre-operative physiotherapy education programme on the number of rehabilitation days required post primary total hip and knee replacement surgery. Method: Data was collected and analysed from 253 elective orthopaedic patients who attended a pre-operative education programme. The number of rehabilitation days required to achieve their negotiated patient goals were compared to the historical number of rehabilitation days required prior to the inclusion of a pre-operative education programme. Results: The number of rehabilitation days required post hip and knee replacement surgery was reduced in a significant number of patients who underwent a pre-operative education programme. Discussion: The results suggest that a pre-operative physiotherapy education programme can reduce the number of rehabilitation days required post primary total hip and knee replacement surgery. This in turn may benefit both the health care provider and the patient as it may reduce the length of hospital stay, reduce the risk of medical complications, reduce overall medical expenses and improve patient satisfaction.

## **CCP.68 A painful finger in a 15 yr old climber**

**James O'Donovan<sup>1</sup>**, Joseph Conway<sup>2</sup>

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We present the case of a 15-year-old left hand dominant, male transition year student. He presented with a progressive left middle finger pain in November 2014. He did not recall any traumatic episode, and had no prior injury history. He reported pain around the proximal interphalangeal (PIP) joint, which was exacerbated by climbing. Clinically, he had swelling at the PIP joint, and there was loss of range of motion over a two week period. There was some tenderness at the site also. An x-ray was performed which was within normal limits. An MRI confirmed bony oedema involving proximal physal middle phalanx. The injury was managed conservatively with rest, and a splint for six weeks. Hand grip and proximal strengthening were undertaken with progressive return to activity at 6 weeks, with full training resumed at 12 weeks. This case demonstrates the need to be alert to other pathologies in a climber's hand, where pulley injuries make up the vast amount. In addition, a lesson to be learned is sudden increase in climbing volume, with poor technique. We feel transition year for most students is one such high risk period.

## **0.69 Audit of the Football Association of Ireland's cardiac screening programme**

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Introduction: A number of sudden deaths of young athletes have occurred in recent years. There is no clear international consensus on best practise regarding cardiac screening of young athletes. The aim of this audit was to assess the results of the cardiac screening programme of the Football Association of Ireland (FAI). Methods: Two groups of players were screened. The first group consisted of players registered for the Republic of Ireland under-15 boys and girls international football team over a four year period; junior players(J). The second group consisted of male players registered for League of Ireland clubs; senior players(S). The cardiac evaluation consisted of a medical history, clinical examination and 12-lead resting ECG. Results: 325 players were analysed; 190 (J) and 135 (S). Average age: (J)  $14.6 \pm 0.3$ ; (S)  $24.6 \pm 4.2$ . Significantly more junior players (21.6% v 6.7%,  $p < 0.001$ ) required further investigation. This was predominantly due to an increased number of abnormal physical examinations (4.7% v 0.7%,  $p < 0.05$ ) and ECGs (14.2% v 3.0%,  $p < 0.001$ ). Questionnaires among senior players had more abnormalities, but this was not significant (3.7% v 2.1%,  $p = 0.20$ ). A single senior player was advised against competitive sport on the basis of this cardiac screening programme. Conclusion: The audit results compare well with other studies, showing increased abnormalities found in younger athletes. Despite the increased abnormalities discovered among junior players, none were found to have a structural cardiac defect. One senior player was excluded. This study highlights the importance of separate criteria for cardiac screening in adolescents

## **0.70 Exploring the prevalence of musculoskeletal impairments in children and adolescents attending an obesity management service.**

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Obesity is associated with musculoskeletal impairments (MSKI) which can restrict participation in health-enhancing physical activity. We examined the prevalence of MSKI in children with obesity to explore if obesity (BMI Z-score) could predict the presence of impairment. The medical records and service use of a series of 178 consecutive children attending a National paediatric obesity centre were reviewed. Children completed a standardised musculoskeletal examination to screen for: pain; standing balance; muscle flexibility; gait and function (hop, jump and lunge). MSKI was classified based on the presence of specific pre-determined criteria. Descriptive statistics and logistic regression models were used. MSKI were observed in 89.9% of the group, 51% reported pain, 45% had a radiological scan for MSKI, 69% had been referred to orthopaedics and 30% to A&E for MSKI. Difficulties with gait and function were observed in 19% and 9.6% respectively. Results of the logistic regression analysis were statistically insignificant. Musculoskeletal impairment, in particular of the lower limb, is a frequent co-morbidity in children who are obese. Severity of obesity could not predict the presence of impairment thus each child should be screened for barriers that could limit time spent in activity.

## **P.71 Relationship between balance and quality of life in youth who are obese.**

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Introduction: Associations are seen between obesity and balance impairments, and between obesity and impaired physical functioning. Whether balance impairment (BI) affect quality of life is unknown. The study aimed to 1) investigate whether obesity was related to BI and health related quality of life (HRQoL) and 2) investigate whether BI was related to health related quality of life in children and adolescents with obesity. Methods: A series of 126 consecutive patients (3-18 years) referred to a National paediatric obesity treatment centre were included in the study. Standing balance and HRQoL was measured using the balance subscale of the Bruinniks-Oteresky Test of motor Proficiency and the PedsQL inventory. BMI Z-scores were calculated using the LMS method. Results: 80.2% of the group presented with a balance impairment and 87.2% of parents and 72.3% of children perceived that the child had a reduced overall quality of life. Significant negative correlations were found between obesity and impaired quality of life for physical functioning (P=0.03) but not for obesity and balance score. BI was positively correlated to impaired quality of life for the physical functioning domain ( $\rho \geq 0.2$ , P=0.04). Conclusions: Impaired standing balance and quality of life are prevalent in children who are obese and may increase as a child becomes more severely obese. Further work is warranted to explore whether obesity treatment can improve balance and quality of life.

## **P.72 Paediatric obesity and perceived exertion: difference between weight-bearing and non-weight-bearing exercises.**

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Excess body weight composes an important limitation to exercise in obese youth. The aim of this study was to compare the perceived exertion of obese adolescents between weight-bearing (WB; running) and non-weight-bearing (NWB; cycling) exercises performed at moderate (55%VO<sub>2</sub>max) and high (75%VO<sub>2</sub>max) intensities. Twenty-four obese adolescents were recruited. After assessment of their body composition and physical capacities, they had to complete four isoenergetic exercise sessions: (1) a cycling session performed at 55% of their maximal capacities (NWB-55%); (2) a cycling session set at 75% (NWB-75%); (3) a running session at 55% (WB-55%); and (4) a running session at 75% (WB-75%). Perceived exertion was assessed using a visual scale at regular interval. While no significant difference between WB and NWB modalities was observed, the adolescents expressed a significantly lower rate of perceived exertion (RPE) during exercises at 55%VO<sub>2</sub>max (P < 0.0001). An intensity × modality interaction revealed that RPE was lower at 75% VO<sub>2</sub>max during NWB exercises (P < 0.05). While obese adolescents expressed lower RPE during exercise at moderate intensity whatever its modality, low level of perceived exertion has been observed during high-intensity exercises and especially during NWB. High-intensity exercise appears well tolerated in adolescents when their body weight is supported.

## **O.73 Effects of acute sleep deprivation and caffeine on anaerobic performance.**

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**Introduction:** A growing collection of evidence indicates that sleep plays a major role in the recovery and performance of athletes, yet many of the complex processes of sleep remain a mystery. Understanding the impact of sleep, disturbed sleep and sleep deprivation, promote a better appreciation of its effect on athletes. **Methods:** 11 male games players completed the testing protocol, which consisted of 3 testing sessions performed at least one week apart. In the sleep deprivation condition volunteers remained awake overnight and in the control condition the same subjects slept at home, retiring between 2230 and 2330 hours, as decided individually, and rising at 0700 hours. Two of the testing sessions were carried out following 24 hours of sleep deprivation, and one testing session following a normal night's sleep. Each participant chose a pill that either contained caffeine or placebo one hour prior to physical performance. The anaerobic testing consisted of 20-metre sprint, vertical jump height, 10 x 5 metre shuttle sprint and the Illinois speed agility tests. **Results:** Pending. **Discussion:** There are many commercial products that claim to offset the impact of sleep deprivation on performance. This study has helped to show the effects of these products on anaerobic performance in athletes following acute sleep deprivation.

## **0.75 Familial predispositions for injury to the anterior cruciate ligament**

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**Introduction:** Anterior Cruciate Ligament (ACL) injuries are common and almost exclusively linked to sport. The aim of this study was to explore familial predisposition for ACL injury. **Method:** A study cohort was contacted by SMS and by a follow up telephone questionnaire. **Results:** 308 patients were contacted during the study, with 148 (48%) responding. 21 (14.8%) of those who responded were found to have a first degree relative with a history of ACL injury. When all affected relatives were taken into account, a total of 54 ACL injuries were identified with familial links to 46 patients. The average age of ACL injury was 21 years old, with 63% of the injuries occurring before the age of 25. 96% of the injuries were sports related, although there was no difference in the incidence of the injury across four major sports (Rugby, Hurling, Soccer and Gaelic Football). While injury to the ACL is commonly associated with contact during sport, this study found that the majority of injuries (65%) suffered by those with a relevant family history occurred outside the contact zone. **Conclusion:** This study establishes a familial link in ACL injury. These results suggest that there may be a role for assessment of individuals with a positive family history of ACL injury and that preventive exercise programmes, such as plyometric and dynamic balance, may be beneficial.

## **P.76 An investigation into the relationship between hip joint range of motion and magnetic resonance imaging in elite male gaelic footballers**

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Introduction: Chronic groin pain (CGP) and femoroacetabular impingement (FAI) remain a challenge to even experienced clinicians. The prevalence of CGP and FAI appears to be higher in athletic male populations. Previous studies have shown a connection between reduced hip joint range of motion (ROM) and CGP. MRI is regarded as the gold standard for imaging of hip/groin injuries. However, there has been no study investigating the relationship between ROM and MRI findings in elite male Gaelic footballers. Purpose: To investigate the prevalence of hip/groin abnormalities including signs of FAI in elite male Gaelic footballers and examine the relationship between these findings and hip joint ROM. Methods: 49 elite male Gaelic footballers were recruited from DCU and Dublin Minor Panels. All players (49) underwent full hip joint ROM testing. 44 received a full MRI of their hip and pelvis. Independent samples t-tests were used to investigate for significant differences in ROM between those with and without abnormal MRI findings. Results: 59% of hips which received MRI displayed some form of abnormality. 19% had signs of FAI, 7 had bilateral signs of impingement. The prevalence of labral abnormalities was 12.5% and bone marrow oedema at the pubic bones was 24%. There was a significant difference in total rotation and hip extension between those with and without signs of FAI on MRI. Conclusion: There is a relationship between hip rotation and extension and FAI. The clinical relevance and the relationship between MRI and ROM findings and the likelihood of becoming symptomatic remain unclear.

## **P.77 A retrospective study to evaluate differences in quadriceps and hamstring muscle strength and endurance in patients who underwent anterior cruciate ligament reconstruction using a hamstring tendon graft.**

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Introduction: anterior cruciate ligament rupture is a common and serious knee injury in the young active population. The primary goal of anterior cruciate ligament (ACL) reconstruction surgery is to re-establish a stable knee joint that enables patients to return to their previous activities by achieving or exceeding a minimal level of function after a period of rehabilitation. It has been shown that functional outcome after ACL reconstruction has a positive correlation with knee extensor and flexor strength measurements. Study Aims: to evaluate differences in quadriceps and hamstring muscle strength and endurance in patients who underwent ACL reconstruction using a hamstring tendon graft. Method: Data was collected from a pool of 954 patients who met the inclusion criteria. Patients were selected who underwent ACL reconstruction using a hamstring tendon graft and underwent isokinetic testing 5 months post-operatively. Hamstring and quadriceps muscle strength and endurance were measured and analysed using data collected from an isokinetic testing device. Isokinetic muscle strength and endurance of the operated legs were expressed as percentages of those of the un-operated legs at the same test speeds. Results: Analysis of results is ongoing but trends thus far suggest that there are deficits in quadriceps and hamstrings strength at five months post operatively. Discussion: The results thus far suggest that both quadriceps and hamstring muscle strength and endurance are reduced on the operated leg compared to un-operated leg at five months post ACL reconstruction. This can have implications in terms of rehabilitation and timeframes for return to sport.

## **P.78 An exploratory pilot trial of “TickerFit”: A smartphone application developed to increase physical activity**

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**Introduction:** Physical inactivity is a leading cause of global mortality. Technology developments and adherence studies have encouraged the use of smartphones in activity promotion. The aim of this study was to implement an exploratory pilot trial of “TickerFit”, a smartphone application developed to increase physical activity. **Methods:** Thirty-six patients were screened at a physiotherapy outpatient department of a teaching hospital. Eligible patients were screened for safety and randomised into a control or intervention group. Both groups received the TickerFit application and were encouraged to carry their smartphone during waking hours. Only the intervention group had access to their statistics on TickerFit and received feedback on their progress. Baseline activity levels were measured in steps and minutes for the first week. Subsequently, participants received daily goals via the application over an eight-week intervention period. There were two follow-ups – initially after the intervention period, and at three months post-intervention. **Results:** Five patients were deemed eligible for the pilot trial, and participants’ daily step count and active minutes were monitored through TickerFit. For two participants, the application switched off unknowingly and their counts remained unmonitored. Although there were data gaps, we can observe that both trial participants remained more active and motivated, whereas the control participant did not continue much activity after 25 days. A further study with a larger number of participants will be needed to further support the TickerFit program. **Conclusions:** The outcomes of this pilot trial show a promising result and demonstrate how technology can benefit our daily health.

## **O.79 The reliability of a multi-directional hurling simulation protocol.**

**Kieran Collins**<sup>1</sup>, Dominic Doran<sup>2</sup>, James Morton<sup>2</sup>, Allistair McRobert<sup>2</sup>

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**Introduction:** The range of factors which effect performance during hurling match-play creates a challenge for a research scientist to identify the effectiveness of a training intervention or ergogenic aid. The aim of the current study was to determine the reliability of an intermittent multidirectional hurling simulation protocol. **Methods:** Twenty sub-elite Gaelic games players (age 21±3 years; 176±5.5 cm; 79±5 kg; 57±3 mL.kg-1.min-1) undertook a hurling simulation on 2 separate occasions, with performance and physiological monitoring no more than 7 days apart. Reliability was assessed using the log transformed typical error and the coefficient of variation. **Results:** Participants covered 110±2 m.min-1 with, 91±2 m.min-1 at low speed (0-16.9 km.hr-1) and 19±2 m.min-1 at high speed (>17 km.hr-1) of which 6±2 m.min-1 was at very high speeds (>22 km.hr-1). Participants undertook 226±7 accelerations during the protocol. The simulation elicited an average heart rate of 82±3 % HRmax. The most reliable aspect of the hurling simulation protocol (lowest CV%) was total distance m.min-1 whilst all of the other measured variables demonstrated a CV% of less than 5% aside from very high speed running distance (27.1 %). **Conclusion:** The results of the current study suggest the hurling simulation is reproducible and simulates the demands of hurling match-play. The hurling simulation protocol should be regarded as a basic model of match-play, replicating some, but not every aspect of elite hurling performance.

## **0.80 Vaccine status of a group of elite international rugby players in Ireland**

**Mortimer O'Connor**<sup>1,2</sup>, Rod McLoughlin<sup>3</sup>, Michael G. Molloy<sup>1</sup>, Éanna C. Falvey<sup>1,3</sup>

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**Introduction:** The positive benefits of exercise are well documented. High intensity exercise may impair immune system function. Potentially increased infection risk is a concern in elite team sport. To prevent this, vaccination against certain infections may be beneficial. In this study we examine what a group of elite international rugby players self-report to be vaccinated against and cross correlate this with their serology and GP records. **Methods:** A cross sectional self-completed questionnaire, on vaccines and travel, was administered to all 2014 - 2015 Irish National Senior Men's Rugby team players in 2014. Phlebotomy for serological titres for MMR, VZV and Hepatitis B were carried out. GPs of players with equivocal serological results were contacted to trace vaccination records. Players with non-immunity to MMR, VZV and/or Hepatitis B were offered vaccinations. **Results:** There was a 100% participation rate (n=39). Mean age was 27.1 years. There were equal numbers of back and forward position players. A statistically significant number of players were unable to confirm their vaccine history, including travel and recent vaccinations. Serological results showed 30 out of 39 players require vaccination against at least one of measles, mumps, rubella, varicella or hepatitis B. GP records for vaccinations are poor. **Conclusions:** The level of non-immune individuals in this cohort is higher than would be expected. A substantial number need vaccinations to reduce the risk of preventable infections for which vaccines are available. The authors would support the introduction of a vaccine passport as part of professional rugby player's contract.

## **0.81 Does the GAA15 improve neuromuscular control in adolescent hurlers and camogie players?**

**Catherine Blake**<sup>1</sup>, Ms Sharon Boland<sup>1</sup>, Mr Andrew Cullinane<sup>1</sup>, Ms Aoife Henry<sup>1</sup>, Ms Veronica Horgan<sup>1</sup>, Ms Rachel Murphy<sup>1</sup>

<sup>1</sup>*University College Dublin, Dublin, Ireland*

**Introduction:** The effectiveness of coach-led implementation of the GAA15 injury prevention programme in adolescent players has so far not been reported. **Study Aims:** (i) To assess the efficacy of the GAA15 in improving key neuromuscular injury risk factors in juvenile hurling and camogie players. (ii) To assess acceptability of the programme. **Methods:** A two-arm controlled trial evaluated neuromuscular outcomes in a group of hurling and camogie players (65% male, 35% female) recruited from 3 post primary schools, over a 6 week training period. Neuromuscular risk indicators included the Landing Error Scoring System (LESS) and the Y balance test (YBT). Differences in responses over time between GAA15 intervention and usual training controls were assessed with one way ANOVA. A questionnaire was used to gather subjective responses about acceptability of the GAA15. **Results:** Of 66 participants enrolled, 49 completed (n=27 intervention, n=22 control). The GAA15 group improved significantly more than controls in jump landing patterns (mean reduction; intervention 2.55±2.1 v control 0±1.2, p<0.01). For the YBT, greater gains occurred for the intervention group in the left leg (intervention 2.22 ±2.9 vs. control 0.5±6.2) but for controls in the right leg (intervention 1.1±5.3 v control 3.3±6.4; both p>0.05). Ninety five percent of the intervention group players stated they would incorporate the GAA 15 into training, 35% reported it was much better and 35% somewhat better than usual warm up. **Discussion:** This shows promising short-term results and acceptability for coach-led implementation of the GAA15. Issues of attrition, adherence and sustainability still require examination.

## **P.82 The relation between number of comorbidities and functional capacity**

**Aaron McLoughlin**<sup>1</sup>, Emer O'Leary<sup>1</sup>, Catherine Woods<sup>1</sup>, Brona Furlong<sup>1</sup>, Noel McCaffrey<sup>1</sup>

<sup>1</sup>*School of Health & Human Performance, Dublin City University, Dublin 9, Ireland*

Background: In patients with an established chronic illness, comorbidities are frequent and can contribute to disease severity, morbidity and mortality. These coexisting medical conditions increase the complexity of individual patients and have important consequences for patient assessment and management. Comorbidities can significantly impact patient quality of life and functional capacity. The relation between the quantity of comorbidities and functional capacity is unknown. Purpose: To investigate the relation between number of comorbidities and functional capacity. Methods: 195 participants (81 female, 110 male, mean age 65 years) with at least one diagnosed chronic condition completed a questionnaire to self-report the number and nature of their chronic medical conditions. Participants selected from the following list of conditions: type 1 diabetes, type 2 diabetes, asthma, chronic bronchitis, emphysema, or COPD, other lung disease, heart disease, arthritis or other rheumatic disease, cancer, depression, anxiety or other emotional mental health condition, other chronic condition (specify). Participants performed the 10m incremental shuttle walk test (10MISWT). The number of completed 10m shuttles was recorded. Results: The number of chronic conditions per participant ranged from 1 to 7, with a mean of 1.82. The 10MISWT scores ranged from 1 to 102 shuttles. There was a significant but weak inverse relation between the number of chronic conditions and the 10MISWT score ( $r_s=0.20$ ,  $p<0.01$ ). Conclusion: There is a weak relation between the number of comorbidities a patient has and their functional capacity. The number of comorbidities accounted for a very small amount (4%) of the variance in 10ISWT performance.

## **P.84 Physiological, perceptual, and affective responses during community-based cardiac rehabilitation**

**Nicola Hurley**<sup>1</sup>, Hannah Smith<sup>2</sup>, Kathleen Field<sup>3</sup>, Brona Furlong<sup>1</sup>, Noel McCaffrey<sup>1</sup>, Niall Moyna<sup>1</sup>

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Background: Cardiac rehabilitation (CR) is a multifaceted intervention that aims to optimise cardiovascular disease (CVD) risk reduction. International guidelines identify exercise as an integral component of CR and recommend that CR participants exercise at an intensity corresponding to 50-80% VO<sub>2</sub>max. Purpose: To characterize the physiological, perceptual, and affective responses during a community-based CR (CBCR). Methods: Ten men (mean  $\pm$  SD; age  $66.4 \pm 7.3$  y, BMI  $27.4 \pm 3.2$  kg.m<sup>2</sup>; VO<sub>2</sub>peak  $26.8 \pm 5.7$  ml.kg<sup>-1</sup>.min<sup>-1</sup>) with stable CVD, who were attending a CBCR program (MedEx) for at least 6 months, were recruited. Participants underwent a graded treadmill exercise test with a 12 ECG to measure VO<sub>2</sub> peak and HR peak. They subsequently participated in two CR classes during which expiratory gases and heart rate were continuously measured using a portable open circuit spirometry and telemetry system, respectively. Rating of perceived exertion (RPE) and affective state were recorded before and after each 60 min exercise class. Classes involved a combination of aerobic exercises and resistance training. Exercise intensity was self-regulated. Results: Participants exercised at an exercise intensity corresponding to  $54.3 \pm 5.7$  % VO<sub>2</sub> peak and  $72.1 \pm 11.0$  % HR peak. The mean affect score was +4 and mean RPE was 13 (somewhat hard). Conclusion: When allowed to self-regulate their exercise intensity during CBCR, participants select an intensity that they perceive to be somewhat hard and provides a high level of positive affect. The self-regulated exercise intensity is within the physiological range considered safe and effective to optimise CVD risk reduction.

## **P.85 MedEx move on: community-based exercise rehabilitation for cancer survivors.**

**Fiona Skelly**, Mairead Cooney, Emer O'Leary, Brona Furlong, Catherine Woods, Noel McCaffrey.

*School of Health & Human Performance, Dublin City University, Dublin 9, Ireland*

Background: MedEx is a community-based exercise rehabilitation programme located at Dublin City University. It offers medically supervised exercise classes for patients with a range of chronic illnesses. Move On is the MedEx programme that caters for cancer survivors. Purpose: To determine the effect of Move On physical and psychological wellbeing in cancer survivors. Methods: Adults with an established diagnosis of cancer, who have completed their adjunctive therapy are referred to Move On. Participants attend two 60 min supervised exercise classes per week for 12 weeks. Classes involve a combination of aerobic and resistance training. At baseline and week 12, assessments are performed of cardiorespiratory fitness (10m shuttle walk), strength (timed sit-to-stand), flexibility (sit-and-reach), and quality of life (FACT-G). Results: From 2012 to 2014, 206 participants (female 71%; mean age 56.9±11.0 yr; cancer diagnosis: breast 61%, colorectal 31%, other 8%) started Move On. 83.4% completed the programme. There were significant improvements in cardiorespiratory fitness (70.5±24.2 to 79.4±23.1 shuttles,  $p<.01$ ), flexibility (12.7±9.3 cm to 16.5±8.3 cm,  $p<.01$ ), strength (17.3±6.2 to 14.2±4.1 sec,  $p<.01$ ) and quality of life (78.2±17.7 to 85.8±17.8,  $p<.01$ ). Conclusion: Community-based exercise rehabilitation can significantly improve physical and psychological wellbeing in cancer survivors.

## **P.86 The work-rate of elite international female field hockey players during competitive match-play.**

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Introduction: An examination of work-rate responses during match-play may provide a framework from which training methodologies which replicate game demands may be constructed. The aim of the current study was to investigate the positional work-rate of elite international female field hockey players during match-play. Methods: Using 4 Hz GPS (VXSport, New Zealand) technology, 23 elite international field hockey players were monitored over 7 matches (88 samples). Players were categorised as defender, midfielder or forward. Activity was categorized into total distance ( $\text{m}\cdot\text{min}^{-1}$ ) and high speed running distance ( $\text{m}\cdot\text{min}^{-1}$ ) ( $>16 \text{ km}\cdot\text{h}^{-1}$ ). The number of high speed running efforts and maximal efforts ( $>21 \text{ km}\cdot\text{h}^{-1}$ ) were quantified. Results: The average total distance and high speed running distance was  $103\pm 14 \text{ m}\cdot\text{min}^{-1}$  and  $13\pm 6 \text{ m}\cdot\text{min}^{-1}$  respectively. Players undertook  $50\pm 17$  high speed running efforts and  $9\pm 5$  maximal efforts in a game. A significant ( $P=0.001$ ) difference with respect of position was observed for time on field and high speed running distance. Defenders spent the longest time on field ( $63\pm 7$  min) compared to midfielders ( $49\pm 8$  min) and forwards ( $43\pm 5$  min). Forwards had a significantly ( $P=0.001$ ) greater high speed running work-rate ( $15\pm 7 \text{ m}\cdot\text{min}^{-1}$ ) compared to midfielders ( $12\pm 4 \text{ m}\cdot\text{min}^{-1}$ ) and defenders ( $9\pm 4 \text{ m}\cdot\text{min}^{-1}$ ). A non-significant difference was observed for all other variables. Conclusion: Elite female field hockey requires intermittent bouts of low speed movement interspersed with periods of complex high speed running patterns. Distinctive variations in positional demands are evident. Coaches should consider the positional demands of the sport when planning physical training.

## **P.87 Validity and reliability of the 6 minute walk test in a group and unsupervised setting in a clinical population.**

**James MacLaughlin<sup>1</sup>**, Jack McCaffrey<sup>2</sup>, Brona Furlong<sup>1</sup>, Niall Moyna<sup>1</sup>, Noel McCaffrey<sup>1</sup>

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Background: Cardiorespiratory fitness (CRF) is one of the strongest independent predictors of morbidity and mortality in both primary and secondary prevention. The 6 minute walk test (6MWT) is a valid and reliable measure of CRF including in older adults and clinical populations. It is easily administered, inexpensive, well tolerated, and reflective of activities of daily living. These characteristics make it a useful and commonly used tool for administration with an individual patient in a supervised setting. Purpose: To determine the validity and reliability of the 6MWT in a group setting and unsupervised setting in a clinical population. Methods: 17 participants (14F, 3M; mean age 69±9 years) were recruited from MedEx, a community-based exercise rehabilitation programme for chronic illness located at Dublin City University. Each participant performed six 6MWTs. Four tests were performed in a supervised setting, two of which were performed individually (SI) and two as part of a group (SG). Two tests were performed at home in an unsupervised setting (UI). Results: There was no statistically significant difference in the 6MWT results between the 3 settings ( $p = 0.148$ ). The SG and UI administered 6MWTs had a high level of reliability, Cronbach's  $\alpha = .95$  for both. Conclusion: The 6MWT is valid and reliable when administered in a group setting and unsupervised setting. This permits group testing of CRF in chronic illness rehabilitation programmes and identifies a useful tool for home-based rehabilitation programmes.

## **P.88 Validity of assessing memory and attentional functioning in a group setting.**

**Terry McElvaney<sup>1</sup>**, Sarah McCaffrey<sup>2</sup>, Brona Furlong<sup>3</sup>, Noel McCaffrey<sup>3</sup>, Teresa Burke<sup>1</sup>, Siobhan McArdle<sup>3</sup>, Lorraine Boran<sup>1</sup>

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Background: Research on cognitive functioning suggests that regular exercise and physical activity may be associated with an amelioration of the cognitive decline commonly associated with ageing. Attentional control and working memory are two cognitive functions that may improve with physical activity. The assessment of these cognitive functions in community-based exercise rehabilitation programmes is valuable but may be practically difficult. Due to the size and nature of these programmes, the only viable way to administer these tests is in a group setting. However, the validity of group cognitive testing has come under criticism. Purpose: To test the validity of administering visual working memory and attentional control tests in a group setting. Methods: Participants ( $n=25$ ; 15M, 10F; mean age 66.6 years) were recruited from MedEx, a community-based exercise rehabilitation programme for chronic illness, located at Dublin City University (DCU). Participants visited DCU on 2 occasions, separated by  $\geq 7$  days. On both visits, participants completed two tasks, the Luck Vogel Visual Working Memory Task, and the Attentional Network Task. During one visit, these tasks were administered in an individual setting and during the other visit, in a group setting. The order of the task setting was randomised. Results: There was no significant difference between scores on either task when completed individually or within a group setting. Conclusion: This supports the validity of administering these cognitive tasks in a group setting of older adults with established chronic illness, suggesting their use is viable in exercise rehabilitation programmes.

## **O.89 Chondrogenesis of mesenchymal stem cells in healthy and diseased knee joints**

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Adult stem cells are a promising cell source for biological cartilage regeneration and may ultimately be used in novel therapies to treat diseases such as osteoarthritis. We have previously demonstrated that functional cartilage tissue can be engineered using human infrapatellar fat pad derived stem cells (FPSCs) isolated from osteoarthritic joints. However, it is unclear if the disease state of the donor impacts on the chondrogenic potential of FPSCs. Furthermore, it is unclear if the response of stem cells to joint specific environmental cues such as hydrostatic pressure (HP) is influenced by the disease state. The object of this study was to explore if the response of FPSCs to biochemical (TGF- $\beta$ 3) and biophysical (HP) cues changes with the development of osteoarthritis. Diseased infrapatellar fat pads were harvested from osteoarthritic patients during total knee replacement, while biopsies of healthy fat pads were harvested from donors without osteoarthritic symptoms during ACL ligament reconstruction surgery. After expansion, FPSCs were cultured as pellets in a chemically defined chondrogenic media supplemented with 10 ng/ml TGF- $\beta$ 3. After 2 weeks of culture, pellets were also subjected to 10 MPa of cyclic HP for 2 weeks. Constructs were analysed histologically and biochemically. FPSCs isolated from osteoarthritic donors displayed a comparable chondrogenic capacity to healthy donors. A donor dependant response to HP was observed, but again evidence was found to suggest that FPSCs from diseased joints display a diminished response to HP. These results confirm that FPSCs may be a suitable autologous cell source for cartilage regeneration for osteoarthritic patients.

## **0.90 An investigation into the effect of anticipation on trunk and lower limb kinetics and kinematics during a side-cutting manoeuvre**

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Introduction: Trunk and lower limb kinetics and kinematics during single-leg change of direction manoeuvres have been associated with non-contact ACL injury. The aim of this study was to investigate the effect of anticipation on the trunk and lower-limb kinetics and kinematics during a side-cutting manoeuvre. Methods: A controlled laboratory design, in which participants performed both anticipated (AN) and unanticipated (UN) standardized side-cutting tasks was used. 26 elite Gaelic footballers were recruited. Kinematic and kinetic variables were calculated using a motion analysis system in combination with inverse dynamics modelling. Results: Anticipation had a statistically significant effect on peak knee flexion angle in the (AN 65° vs. UN 69°), peak thorax abduction angle (AN -17° vs. UN -24°), peak trunk rotation angle (AN 20° vs. UN 15°) and trunk abduction angle at initial contact (AN -13° vs. UN -17°). For the kinetics, peak knee abduction moment was greater in the anticipated condition (AN 15.47 Nm.kg<sup>-1</sup> vs. UN 12.75 Nm.kg<sup>-1</sup>). The time to peak thorax abduction angle was also significantly affected (AN 0.081s vs. UN 0.135s). Conclusion: Anticipation has a significant effect on trunk and lower limb kinetics and kinematics during a side-cutting manoeuvre. During the unanticipated condition peak knee abduction moment decreased and time to peak trunk abduction increased (implying a lower risk of injury).. Additionally, greater peak knee flexion angles in the unanticipated side-cut would support the assumption of lower risk of injury. Conversely, the greater observed peak trunk abduction, is associated with a higher risk of knee injury.

## **0.96. A comparison of hip range of motion between elite male Gaelic footballers and elite male track runners.**

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**Introduction:** Hip and groin injuries are much more common in multidirectional sports such as Gaelic football than in track athletics. Decreased hip range of motion (ROM) has long been suggested as a potential risk factor for hip and groin injuries. **Objective:** to compare hip ROM in a sample of elite Gaelic footballers to those of a sample of track athletes. **Design:** A cross sectional study of elite Gaelic footballers and track athletes. **Methods:** Participants: 68 subjects took part in this study. Of these, 48 Gaelic footballers recruited from both the GAA academy in DCU and the U 21 Dublin inter county Gaelic football team (mean age 20.82years) with 20 male track athletes recruited from the DCU athletics' academy (mean age 20.55years). **Main outcome measures:** Hip abduction, internal and external rotation and hip extension (using the modified Thomas test) were measured passively. The active knee extension (AKE) test was used to assess hamstring flexibility. Independent samples T tests were used to analyse for any differences between the groups. **Results:** Gaelic footballers had significantly decreased ranges of hip internal rotation ( $p < 0.01$ ), abduction ( $p < 0.05$ ) and extension ( $p < 0.05$ ) in comparison with track athletes. **Conclusions:** The results of this study indicate that in the elite Gaelic footballers had significantly less hip ROM in comparison to track athletes. This may at least partially explain the elevated incidence of hip and groin injuries in Gaelic footballers. Further study should prospectively determine if reduced hip ROM is a risk factor for sustaining a hip and groin injury.

## **0.97 Putting Hip/Groin Under Pressure: A Prospective epidemiological study of injury incidence in the Irish Women's U16 and U17s International soccer squads 2014/15.**

Lise-Ann Ni Neill MISC<sup>1,2,4</sup>, Dr Helen French<sup>2</sup>, Dr Nick Mahony<sup>3</sup>, Dr Alan Byrne<sup>1</sup>

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**INTRODUCTION:** The FAI Irish Women's U16 and U17s squads are development teams for elite female players. Both attend training camps and international tournaments. Number of same depends on qualification status for tournaments.

Soccer injury can lead to recurrence which impacts on a player's health and performance (Lucera et al, 2005). Strategies to reduce injuries should be based on an audit of the problem (Hagglund et al, 2005). No published data from Irish Women's adolescent elite soccer exists.

**METHODS:** Injury data for the 2014/15 campaigns for U16 and U17 players was documented contemporaneously by lead investigator and analysed. Players were assigned unique codes for confidentiality.

**RESULTS:** 62 players participated. Average age: 15.7 years. Most injuries were new, not recurrent and occurred during match-play.

Muscle injuries were more common than ligament injuries. Hip/groin and thigh injuries were most prevalent. There was a higher incidence of concussion in this group than for a similar study of elite male adolescent players (O'Neill LA et al, 2015: Unpublished Data).

**CONCLUSION:** Internationally, the most common injuries in similar cohorts are to knee and ankle followed by concussion (Giza et al, 2005)(Ekstrand et al, 2011). Results for Irish players were significantly different in that hip, groin and thigh injuries were most prevalent. Injury prevalence was similar to findings from UEFA research on injuries in elite, adult male footballers (Ekstrand et al, 2013). There is a need for more data to be collected to allow for development of injury prevention strategies specific to Ireland's young, elite female players.

## **P.98 The Rocky Road to Recurrent Injury: A Prospective epidemiological study of injury incidence in the Dublin FAI Emerging Talent Program (ETP) for the 2014/15 season.**

**Lise-Ann O'Neill MISC<sup>1,2,4</sup>**, Dr Colin Dunlevy MISC<sup>1</sup>, Dr Helen French<sup>2</sup>, Dr Nick Mahony<sup>3</sup>

<sup>1</sup>*Football Association of Ireland*, <sup>2</sup>*RCSI School of Physiotherapy*, <sup>3</sup>*Trinity College Dublin (Sport Medicine & Dept of Anatomy)*, <sup>4</sup>*Chartered Physiotherapists in Sports & Exercise Medicine (CPSEM)*

### **INTRODUCTION:**

The Emerging Talent Program (ETP) provides professional soccer coaching to elite adolescent players in Ireland. We prospectively collected injury data from the Dublin ETP Centre of Excellence for the 2014/15 season.

Soccer injury leads to recurrence which impacts on a player's health and performance (Lucera et al, 2005). Strategies to reduce injuries should be based on an audit of the problem (Hagglund et al, 2005). There is no published data from Irish soccer at elite youth level.

### **METHODS:**

All injuries occurring in male players U15 at the Dublin ETP centre during 2013/14 were recorded contemporaneously. Information was collected by lead investigators for analysis. Players were assigned unique codes for confidentiality.

### **RESULTS:**

41 players participated although group reduced to 25 by March. Average age: 14.5 years. There were 72 documented injuries. The majority occurred during club play, not at the ETP.

Most were new, non-contact injuries. Most were muscle injuries. Thigh and hip/groin injuries most common. Midfielders were most injury prone.

Similar to American data (Kucera et al, 2005), midfielders sustained most injuries.

### **CONCLUSION:**

Injury profiles of Irish players differ to those internationally, the main difference being more muscle injuries occurring. The ETP will be expanding injury surveillance to the Dublin Women's ETP Centre for the 2015/16 season as well as the Men's ETP. This will allow more data to be collected, leading to development of injury prevention strategies specific to Irish youth elite soccer.



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