

Faculty  
Sports and Exercise  
Medicine  
Dámh leigheas spóirt agus aclaíochta



**NINTH ANNUAL  
SCIENTIFIC CONFERENCE**

**Book of  
Abstracts**

Friday and Saturday  
21st & 22nd September 2012

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

*CPD / CAS credits will apply*



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## **ABSTRACTS:**

### **Thematic Sessions**

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#### **Book of Abstracts**

##### **Edited by:**

Dr Nick Mahony & Dr Eamon Spillane

##### **Blinded Abstracts Reviewed by:**

Dr Mary Archer  
Dr Phillip Carolan  
Dr Alan Byrne



Dr Nick Mahony MSc FFSEM  
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Human Performance Laboratory, Trinity College Dublin

Research in sports and exercise medicine in Ireland is gathering pace! This year the ASM committee received 52 original research abstracts and 34 clinical case reports. The conference committee are particularly delighted to have received research papers from a variety of academic and clinical institutions across Ireland, the UK and US. In the interests of inclusivity the committee has decided to extend the conference to give submitting authors a greater opportunity to submit their research. An extra scientific parallel session on Saturday has been added to allow more oral presentations.

The oral presentations were selected by an editorial committee who reviewed blinded abstracts with author and institution details removed, and while we would obviously like to facilitate all those who requested oral presentations the conference program structure only allows a limited number of presentations from each section, sports and exercise medicine, exercise science, orthopaedics, clinical case series and individual case reports. We would hope, if the meeting continues to grow at its current rate, to expand opportunities for oral presentations in future meetings.

All this extra research activity needs an audience, so I would encourage delegates to attend the extra scientific session on Saturday and especially poster presentations in the lunch time sessions in the exhibition hall on both days.

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

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<b>SCIENTIFIC SESSION I Friday 13:45-16:15 Main Lecture Theatre</b>				
Time	Min	Abstract No.	1 <sup>st</sup> Author	Short Title
13:45	5	Introduction to session: Dr Nick Mahony		
13:50	10	SEM 3	Condon	Concussion in Rugby Players
14:00	10	SEM 9	Joyce	Exercise Rx training for GPs
14:10	10	SEM 14	Madigan	Vit. D supplementation for athletes
14:20	10	SEM 19	Moran	Exercise for Over-pronation
14:30	10	EXSC 14	O'Malley	Neuromuscular Control Training
14:40	10	EXSC 2	Byrne	Placebos effect in GAA players
14:50	10	OR 3	Carton	Arthroscopic repair FAI
15:00	10	OR 5	Gibson	Surgilig for AC joint repair
15:10	20	Coffee Break outside main lecture theatre		
15:30	10	CS 5	McCafferty	Arterial Endofibrosis
15:40	10	CP 7	Lowther	Ischial Tuberosity avulsion
15:45	5	CP 5	Kelly	Renal Trauma in a GAA Player
15:50	5	CP 9	Lynch	Spinal Cord Injury Hurling
15:55	5	CP 12	Martin	Sinister Shoulder Pain in a Golfer
16:00	5	<i>Run over .....</i>		
16:10	5	<i>Introduction of Guest Lecturer</i>		

<b>PARALLEL SCIENTIFIC SESSION II Saturday 13:45 - 14:45</b>					
Venues:		Main LT	Ana LT	TR2	TR3
Chairs:		Dr Alan Byrne	Dr Mary Archer	Dr Nick Mahony	Mr David Moore
Time	Min	SEM (+CP)	CS (+CP)	EXSC (+CP)	OR (+CP)
13:45	10	SEM 1 Blake	CS 3 Kelly	EXSC 6 Kerr	OR 2 Carton
13:55	10	SEM 15 Mahony	CS 8 Morrissey	EXSC10 McCarthy	OR 4 Efuwape
14:05	10	SEM 21 Morrissey	CS 12 Rowan	EXSC 3 Condon C	OR 6 Suhail
14:15	10		CS 15 Walter	EXSC 4 Holden	OR 7 Walsh
14:25	5	CP 14 Meighan	CP 8 Lundon	CP 2 Clarke	CP 1 Carton
14:30	5	CP 15 Moffatt	CP 10 Martin	CP 3 Clarke	
14:35	5	CP 17 Ryan J	CP 11 Martin	CP 4 Francis	
14:40	5	CP 18 Ryan J		CP 16 Niven	

FRIDAY 21 <sup>st</sup> September					
Stn	Time	Abst. No.	1 <sup>st</sup> Author	Short Title	Judge
1	13:00	SEM 2	Canavan	Return to sport post ACL	MOB
2	13:05	SEM 4	Cronin	AED usage and availability in Cork	MOB
3	13:10	SEM 5	Cronin	Referee attitudes to AEDs	MOB
4	13:15	SEM 6	Delahunty	Concussion in schoolboy rugby player	MOB
5	13:20	SEM 7	Gallagher	Muscle function tests RA patients (clinic)	MOB
6	13:00	SEM 8	Gallagher	Muscle function tests RA patients (lab)	PON
7	13:05	SEM 10	Kelly	Analysis of research output in SEM	PON
8	13:10	SEM 11	Keramat	Isometric exercise for shoulder rehab	PON
9	13:15	SEM 12	Leonard	Exercise, mood state & cardiac rehab	PON
10	13:20	SEM 13	Lowther	Flexibility and lower limb injury	PON
11	13:00	SEM 17	Meighan	NSAID use Irish women's rugby team	JOR
12	13:05	SEM 18	Meighan	Concussion Irish women's rugby team	JOR
13	13:10	SEM 20	Moran	Concussion GAA players	JOR
14	13:15	SEM 23	O'Loughlin	Syndesmosis / lateral ankle injury NFL	JOR
15	13:20	SEM 24	Patterson	Injury risk high school athletes (US)	JOR
16	13:00	SEM 25	Patterson	Supplements high school athletes (US)	EF
17	13:05	SEM 26	Ryan	Groin hip injury risk factors field sports	EF
18	13:10	SEM 27	Sheeran	Intraocular pressure & altitude illness	EF
19	13:15	SEM 28	Sheeran	Static dynamic tests & altitude illness	EF

SATURDAY 22 <sup>nd</sup> September					
Stn	Time	Abst. No.	1 <sup>st</sup> Author	Short Title	Judge
20	13:00	EXSC 1	Whyte	HITT and dynamic balance	MOB
21	13:05	EXSC 5	Hooper	Gender profile joggers in South Dublin	MOB
22	13:10	EXSC 7	Lambe	HITT vs TLac training & BLa clearance	MOB
23	13:15	EXSC 8	MacColgain	Reliability new hiking test in elite sailors	MOB
24	13:20	EXSC 16	Whyte	HITT & drop jump performance	MOB
25	13:00	EXSC 9	Bailey	GXT data audit Irish endurance athletes	JOR
26	13:05	EXSC 11	Melvin	Reliability body composition tests female	JOR
27	13:10	EXSC 12	O'Cathain	'Groucho' running to reduce injury?	JOR
28	13:15	EXSC 13	O'Mahony	HITT vs TLac training & Tri performance	JOR
29	13:20	EXSC 15	Whelan	Dynamic warm up and performance	JOR
30	13:00	CS 1	Clarke	Helmets for Hockey	EF
31	13:05	CS 2	Francis	Facial fractures in rugby football	EF
32	13:10	CS 4	Lundon	Contact sports & testicular trauma	EF
33	13:15	CS 6	McCallion	'Green prescription' physical activity	EF
34	13:00	CS 7	Memon	Arthroscopic surgery synovial disorders	PON
35	13:05	CS 14	Suhail	Surgical repair massive rotator cuff tears	PON
36	13:10	CS 16	Walter	Medical issues in Marathon running	PON
37	13:15	CP 16	Niven	Dealt with a belt What the black belt felt	PON

# INVITED SPEAKERS

## **Damage and repair in bones under stress**

**Taylor D**

Bones have evolved to resist mechanical forces: this resistance is achieved through structure, at all levels from macroscopic shape to nano-scale ultrastructure, and through the processes of remodelling and adaptation, controlled by cellular activity. Normally this works very well, allowing bone to be repeatedly stressed during walking, running etc. Failures occur for one of two reasons: either the bone experiences cyclic stress at unusually high levels or else the bone itself is unusually weak and unable to resist normal stresses. We call these phenomena “stress fractures” and “fragility fractures” respectively, but the underlying mechanism is the same: damage in the form of microcracks occurs and grows faster than it can be repaired, leading to what engineers call a “fatigue failure”. This talk will review our current state of knowledge regarding this type of failure, the main factors which control it and the results of recent research to study and quantify it.

## **Rehabilitation and Return to Sport (Physiotherapist’s view)**

**Steele C**

The Rehab section will aim to describe the typical progressions currently used to take a patient from the non-weight bearing phase right through to return to participation. Case study examples will be used mainly from lower limb injuries but examples of lumbar spine progressions will also be described. Recent equipment technology advances such as the Alter G treadmill and SAQ aero floor will be demonstrated alongside more traditional Hydrotherapy and static proprioception protocols. A key discussion point for debate might be the argument that stress fractures and bone fatigue issues may not necessarily require a completely non load bearing phase in the early stages of recovery.

## **Recent Key Papers in Sports and Exercise Medicine**

**MacAuley D.**

A whirlwind tour of the “top ten” research papers from sport and exercise medicine published during the last year. It will focus, in particular, on those papers that challenge current practice, make us think about what we do, and look for the evidence behind accepted practice. In this context he will also give some insights into the recently commissioned BMJ series exploring the myths of sports medicine leading to a high profile BMJ - Panorama television collaboration.

## **Current scientific evidence on overtraining and fatigue in athletes**

**Meeusen R**

Successful training must involve overload but also must avoid the combination of excessive overload plus inadequate recovery. Athletes can experience short term performance decrement, without severe psychological, or lasting other negative symptoms. This Functional Overreaching (FOR) will eventually lead to an improvement in performance after recovery. When athletes do not sufficiently respect the balance between training and recovery, Non-Functional Overreaching (NFOR) can occur. The distinction between NFOR and the Overtraining Syndrome (OTS) is very difficult and will depend on the clinical outcome and exclusion diagnosis. The athlete will often show the same clinical, hormonal and other signs and symptoms. A keyword in the recognition of OTS might be ‘prolonged maladaptation’ not

## **INVITED SPEAKERS**

only of the athlete, but also of several biological, neurochemical, and hormonal regulation mechanisms. It is generally thought that symptoms of OTS, such as fatigue, performance decline, and mood disturbances, are more severe than those of NFOR. However, there is no scientific evidence to either confirm or refute this suggestion. One approach to understanding the aetiology of OTS involves the exclusion of organic diseases or infections and factors such as dietary caloric restriction (negative energy balance) and insufficient carbohydrate and/or protein intake, iron deficiency, magnesium deficiency, allergies, etc. together with identification of initiating events or triggers. In this paper we provide the recent status of possible markers for the detection of OTS. Currently several markers (hormones, performance tests, psychological tests, biochemical and immune markers) are used, but none of them meets all criteria to make its use generally accepted.

### **Overtraining and /Underperformance: Player Burnout Issues in Gaelic Games**

**O'Neill P**

Player 'burnout' in Gaelic games was defined as reduced interest in, or total withdrawal from, participation in Gaelic games, particularly in talented adolescent and young adult players. Development of player 'burnout' in Gaelic games was multi-factorial because of the psychological, physiological and physical demands. Most common factor in its development is excessive and inappropriate schedules of training and games usually with numerous teams, in multiple competitions. Player burnout issues in Gaelic Games were attributed to excessive collective training with origins in a combination of the following: multiple age group and team involvement; overlapping competition schedules; absence of a defined closed or off-season other than the designated period in November-December for games and collective training purposes at inter-county level; undue emphasis placed on physical fitness training inputs and/or the provision of inadequate time for rest and recovery; undue time/travel demands placed on students particularly between January and March; and predisposing personality or environmental factors.

### **Barefoot Running**

**McGeough M**

This presentation will put forward the podiatrist's perspective on barefoot running and the biomechanical influence of minimalist and physiological footwear. Background on the barefoot running phenomenon, the biomechanical differences between barefoot running versus shod, implications and potential injuries and the ideas about the barefoot running transition.

### **Current concepts in acute soft tissue injury management- P.O.L.I.C.E.**

**Bleakley C.**

The acronym PRICE (protection, rest, ice, compression and elevation) has been central to acute soft tissue injury management for many years despite paucity of high quality, empirical evidence to support the various components or as a collective treatment package. Treatment paradigms in sports medicine must be updated based on contemporary research evidence. We will introduce POLICE, which represents protection, optimal loading, ice compression and elevation. POLICE is not just an acronym to guide management but a stimulus to a new field of research; in particular towards new and innovative strategies for safe and effective loading in acute soft tissue injury management.

# SPORTS AND EXERCISE MEDICINE

## **SEM1: Epidemiology of injury in elite male Gaelic football and hurling, 2007-2011.**

<sup>1</sup>Blake C, <sup>1</sup>O'Malley E, <sup>2</sup>Gisane C, <sup>3,4</sup>Murphy J

<sup>1</sup>UCD School of Public Health, Physiotherapy and Population Science, Belfield, Dublin 4.

<sup>2</sup>Directorate of Sports Rehabilitation, St Mary's University College, Twickenham, London.

<sup>3</sup>GAA Medical, Scientific and Player Welfare Committee, Croke Park, Dublin.

<sup>4</sup>Medfit Wellness and Rehabilitation, Blackrock, Co. Dublin.

**Purpose:** this study reports on the epidemiology of injury in elite male Gaelic football and hurling teams in the National GAA injury database from 2007-2011. **Methods:** participating male senior county teams were enrolled from January each year until elimination from the inter-county championship competition, in a prospective design. A time-loss injury definition was used in line with international consensus definitions in sport. The team doctor or chartered physiotherapist recorded date, type and circumstances of injury, as well as date of return to partial or full fitness. Injury incidence was expressed as rate per 1000 hours participation in match play and training. Injury proportions were calculated. **Results:** twenty nine football teams (n=1049 players) and 25 hurling teams (n=856 players) participated. Mean age of players was  $24.1 \pm 3.3$  years, football and  $24.3 \pm 3.6$  years, hurling. There were 1180 football and 1030 hurling injuries, sustained by 67% and 71% players respectively. The match play injury rates were: football 56.08/1000h, hurling 61.75/1000h. In training, football teams sustained 4.04 injuries/1000h and hurling 2.99 injuries/1000h. Lower limb injuries were dominant (75.8% football, 68.1% hurling). The upper limb sustained 11.4% football injuries and 18.6% hurling. The trunk was the site of 8.3% injuries in football and 8.4% injuries in hurling, while the head and neck region accounted for 3.4% football and 4.1% hurling injuries. **Conclusions:** these results document incidence and distribution of injury in county level football and hurling, using standardised definitions in a long-term prospective design. Further detail on common injury presentations will be provided.

## **SEM2: Return to Gaelic sports post anterior cruciate ligament reconstruction**

<sup>1</sup>Canavan K, <sup>2</sup>Campbell J, <sup>3</sup>Murray P

<sup>1</sup>Royal College of Surgeons Ireland, 123 St. Stephen's Green, Dublin 2

<sup>2</sup>The Galway Knee Clinic, Suite 32, Galway Clinic, Doughiska, Co. Galway

**Purpose:** To determine post ACL reconstruction return to sport outcomes in Gaelic players. **Methods:** Gaelic players who had an ACLR between January 2008 and December 2012 were eligible for inclusion. Evaluation was carried out 13-44 months post ACL reconstruction via a telephone questionnaire comprising of thirty questions. **Results:** Out of a possible 367 subjects, 112 responded (n=125 knees). 78 (62.4%) Gaelic players were included in the study; 71 males and 7 females. The mean age was 24.9 years at time of ACLR (range: 13-44 years). 50 subjects (64%) returned to pre-injury level and 28 subjects (35.9%) did not return to the same pre-injury level. In the 18-24 ACLR age group it took 10-12 months to return to pre-op levels. Reasons for not returning were a combination of factors; age at time of injury, ACL revision, additional injury such as cartilage damage or hamstring strain, fear of re-injury, time and financial constraints due to work and college. **Conclusions:** more than 60% of subjects in Gaelic sports returned to pre-injury level. However, despite the relatively overwhelming success of surgery with 50% stating their functional status was 95-100%, 35% still did not return to pre-injury level action. Psychological issues and fears of re-injury are major factors in this decision. These have become more obvious now in the current economic downturn, where patients cannot afford physiotherapy sessions post-op as well as the time absent from work to recuperate fully or the risk of re-injury which will keep them out of work.



# SPORTS AND EXERCISE MEDICINE

## **SEM3: The prevalence and attitudes to concussion in Irish amateur rugby players, taking part in the 2011 Provincial Towns Cup.**

**Condon B**, Delahunty S, Toomey D, Delahunt E, Blake C.

School of Public Health, Physiotherapy and Population Science, University College Dublin

Purpose: Concern regarding concussion injury in rugby union has grown, yet the prevalence in Ireland is unknown. There are strict 'return to play' guidelines after concussion; however, it is unclear how compliant players are with regard to these regulations. The aim of this study was to document prevalence of concussion in amateur rugby players in Ireland and to explore players' attitudes and understanding of concussion. Methods: A cross-sectional survey was conducted in teams participating in the 2011 Towns Cup, using an anonymous questionnaire. Data were analysed with descriptive statistics using PASW V.18. Ethical approval was granted by UCD Research Ethics Committee. Results: 25% of eligible teams were recruited (6/24) and 114 male amateur Irish rugby players responded. Almost 33% (37/114) of players suffered a diagnosed concussion over their rugby-playing career (95% C.I. 23.4%-40.6%). Headache was the most common post-concussion symptom, present in 86% (32/37) of those with diagnosed concussion. 75% (85/114) of respondents felt that concussion was a danger to their welfare, but 57% (65/114) would play a big game, even if they had concurrent concussion symptoms. Regarding return to play guidelines, 55% (64/114) of players reported never receiving any information. Conclusions: The results highlight that close to one third of amateur rugby players had a diagnosed concussion injury, but there is a lack of information dissemination and knowledge of concussion management amongst Irish amateur rugby players. This suggests the need for increased focus on the education of players to optimise management of concussion and promote compliance with concussion guidelines.

## **SEM4: Prepared for sudden cardiac arrest? A cross-sectional study of automated external defibrillator use, availability and maintenance in amateur sport in Cork.**

<sup>1</sup> **Cronin O**, <sup>1</sup> Jordan J, <sup>2</sup> Quigley F.

<sup>1</sup> Dept. of Medicine, Cork University Hospital

<sup>2</sup> Dept. of Sports and Exercise Medicine, University College Cork.

Purpose: Sudden cardiac arrest (SCA) is a rare yet tragic part of professional and amateur sport. Following high profile deaths there have been many calls for the widespread availability of automated external defibrillators (AEDs) at sports grounds, as a means of providing effective treatment for SCA. This study aims to examine the availability of AEDs across approximately 200 amateur sports clubs in Cork City and County, investigating additional information with respect to the purchase, accessibility, maintenance and training in the use of AEDs. Methods: 143 GAA clubs, 30 soccer clubs, 27 rugby clubs based in Cork City and County will be contacted by telephone between July and August 2012. A self-designed questionnaire will be carried out. Results (provisional): to date, 20 soccer clubs and 36 GAA clubs have been recruited. 47/56 (83.9%) clubs own an AED for a mean of 2.94 years. Of the 9 clubs with no AED, 5 (55%) propose expense as the reason they have not purchased an AED. 33/56 (58%) of clubs maintain their AED(s) on a regular basis. 25/56 (44%) of clubs have ten or more club members formally trained in the use of AEDs. 4/56 clubs have used their AED in cases of SCA. Conclusions: A large proportion of amateur sport clubs in Cork own an AED. Several areas of improvement have been identified with respect to the maintenance of AEDs. This project model may serve as a pilot study for a nationwide project to assess our preparedness for SCA in sport.

# SPORTS AND EXERCISE MEDICINE

## **SEM5:Referee's experiences and attitudes towards automated external defibrillators in amateur sport: The answer to our fears?**

<sup>1,2</sup> **Cronin O**, <sup>1</sup> Jordan J, <sup>2</sup> Quigley F.

<sup>1</sup> Dept. of Medicine, Cork University Hospital.

<sup>2</sup> Dept. of Sports and Exercise Medicine, University College Cork.

Purpose: early defibrillation with an automated external defibrillator (AED) offers the best chance of effective resuscitation following a ventricular fibrillation cardiac arrest. Following multiple high profile deaths and episodes of cardiac arrest during both amateur and professional sport, there has been increased provision of AEDs. However, it may occur that despite increasing availability of AEDs at amateur sports grounds in Ireland, often there be may be nobody trained in the use of AEDs, attending the sporting fixture. This study aims to explore referee's opinions and attitudes towards formal training in AED use. Methods: a self-designed, anonymous questionnaire will be distributed to approximately 100 referees affiliated with the Cork branch of the Irish Soccer Referee's Society. Questionnaires will be distributed at a monthly meeting of the branch in August 2012. Referees with medical training or occupation in healthcare provision will be excluded. The questionnaire will examine areas such as previous background training in AED use and basic life support, previous experiences with AEDs and attitudes towards formal, regular training in AED use. Results: pending. Discussion: referees offer a unique and reliable option with respect to ensuring an AED trained individual is present at all amateur competitive sporting fixtures. Within the training of referees, there is potential to comply with American Heart Association recommendations of regular 2 yearly refresher courses in AED training.

## **SEM6: Prevalence of and attitudes to concussion in Irish schools rugby union players.**

<sup>1</sup>**Delahunty S**, <sup>1,2</sup>Delahunt E, <sup>1</sup>Condon B, <sup>1</sup>Toomey D, <sup>1</sup>Blake C

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

<sup>2</sup>Institute for Sport and Health, University College Dublin.

Purpose: to (i) investigate both annual and career prevalence of concussion in an Irish schoolboy rugby union cohort (ii) evaluate players' personal beliefs regarding concussion and their education to date on this topic. Methods: Schoolboy rugby union players who participated in the 2010 Provincial Senior and Junior Cup schools championships in Ireland were eligible for inclusion following parental/guardian consent. A cross-sectional survey was conducted, using an anonymous self-reported questionnaire. Diagnosed concussion was defined as an injury with a confirmed diagnosis made by a health professional or coach. Demographics, prevalence, knowledge and attitudes to concussion were collated. Data were analysed with descriptive statistics and independent T tests. Results: the career prevalence of diagnosed and suspected concussion was 19.4% and 36.5% respectively. Annual prevalence of diagnosed concussion was 6.6%. Internal pressure was the most common reported factor in feeling under pressure to play whilst concussed (11.8%). 25.4% of players with diagnosed concussions returned to play without any medical advice. Players who sustained a diagnosed concussion had significantly ( $P<0.05$ ) greater exposure to rugby compared to those who did not (mean years playing = 7.7 vs. 6.5 yr, mean competitive games a year = 17.7 vs 14.7). A need for further concussion education was clearly identified by the majority of participants (89.5%). Conclusions: this study found that close to one fifth of the 12-18 year old schoolboys surveyed had a diagnosed concussion, with almost twice as many suspecting concussions. These findings have relevance for governing bodies, coaches, clinicians, schools, rugby union players and their parents.

# SPORTS AND EXERCISE MEDICINE

## **SEM7: To examine muscle function in rheumatoid arthritis patients in a Clinic setting using various methods of field strength tests.**

<sup>1</sup>Gallagher D, <sup>1</sup>Regan J, <sup>1</sup>Donlon E, <sup>1</sup>McGourty P, <sup>2</sup>McGowan B, <sup>2</sup>Silke C, <sup>2</sup>Whelan B

<sup>1</sup>Health Science and Physiology, Applied Sciences, I.T. Sligo

<sup>2</sup>Northwestern Rheumatology Clinic, Our lady's Hospital, Manorhamilton

Purpose: the aim of this project is to examine muscle function in rheumatoid arthritis patients. Baseline measurements were recorded on 28 Patients using a range of upper and lower limb tests. Methods: 8 Clinic tests were administered on 28 patients (age: 64 m=15, f=13) recruited as they presented for clinics in NWRU. Medication, disease history and whether the inflammatory arthritis was active or not was blinded to the tester, also receiving full body DEXA scans. Results: Performance in clinic tests were recorded for each test and compared with age adjusted means. Get up and Go demonstrated that 9 were freely mobile (<8s), 16 were mostly independent (8-15s), 2 had variable mobility (16-24s) and 1 had impaired mobility (>24secs). In the Press up test 4 were classified as Good, 3 average, 2 Fair and 19 Poor. Vertical Jump test (4.7 SD±4.1cm), Squat demonstrated that 1 was above average, 4 below average, 5 poor and 17 were classified as very poor, Hand grip test (21 ± 9kg), Back leg strength test (55± 35 Kg), Stork balance test demonstrated that 3 were average, 5 were fair and 20 classified as poor and the Star excursion test performance varied considerably for all patients. Conclusion: this study shows that compared with healthy norms that RA patients don't perform well while RA patients still have the capacity to record results for each of the muscle strength and endurance tests. 15 patients out the 28 didn't record any result for either the Press up or Star Excursion test.

## **SEM8: Muscle function of rheumatoid arthritis patients in a laboratory setting, and correlate of results with clinic tests and healthy controls.**

<sup>1</sup>Gallagher D, <sup>1</sup>Regan J, <sup>1</sup>DonlonE, <sup>1</sup>McGourty P, <sup>2</sup>McGowan B, <sup>2</sup>Silke C, <sup>2</sup>Whelan B

<sup>1</sup>Health Science and Physiology, Applied Sciences, I.T. Sligo

<sup>2</sup>Northwestern Rheumatology Clinic, Our lady's Hospital, Manorhamilton

Introduction: reduced muscle function is common in Rheumatoid Arthritis (RA) patients. Purpose: the aim of this study was to compare muscle function clinic and lab based tests on RA patients and to compare isometric and isokinetic extension/flexion of the knee joint in RA patients versus healthy counterparts (HC).Methods: 6 (mean age= 58, m=3, f=3) RA patients of the 28 clinic project and 6 HC (mean age=45, m=4, f=2) were recruited for muscle function lab testing. The lab tests included performing a 90° Isometric test and at two speed Isokinetic knee extension/flexion test (90° & 180°/sec). Biodex Systems 3 dynamometer, raw numbers evaluated PT and BW. Results: there was a strong correlation between the squat test and isometric dominant leg P/T to B/W ( $r=0.95$ ,  $p=0.002$ ) and isokinetic P/T per B/W 90° ( $r=0.88$ ;  $P=0.02$ ). There was a strong correlation between average PT of isometric dominant and squat test ( $r=0.59$ ;  $P<0.05$ ) and vertical jump ( $r=0.59$ ;  $P<0.05$ ), while there was a weak correlation between the stork test and PT of isometric dominant ( $r=0.3$ ;  $P<0.05$ ). There was a significant difference between RA patients and healthy counterparts in relation to the dominant leg PT/BW isometric ( $M\pm SD$  RA=  $159.9 \pm 45.6$ Nm, HC= $244.0\pm 62.6$  Nm;  $P=0.02$ ), isokinetic 90° ( $t=-3.81$ ,  $P=0.003$ ,  $n=6$ ) and isokinetic 180° ( $t=-3.23$ ,  $p=0.008$ ,  $n=6$ ) tests. Conclusion: this study showed strong correlation between clinic and lab tests on muscle function. There was a significant difference between RA patients and HC in terms of isometric/isokinetic tests when BW was accounted for.

# SPORTS AND EXERCISE MEDICINE

## **SEM9: Exercise counselling habits and training of General Practitioners in the Mid-West of Ireland: a cross-sectional study.**

<sup>1</sup>Joyce C, <sup>2</sup>O'Tuathaigh C.

<sup>1</sup>GP Registrar, Mid-West GP Scheme, University of Limerick

<sup>2</sup>School of Medicine, University College Cork, Cork

**Introduction:** both NICE in 2006 and recent systematic reviews have established that brief interventions in primary care are both effective and economic at promoting physical activity. Lack of training has previously been identified as a barrier to lifestyle counselling in Ireland. **Purpose:** this study evaluated frequency of exercise counselling (EC) in patients with six chronic illnesses by general practitioners (GPs) in the Mid-West of Ireland and whether training in EC influences frequency of EC. **Methods:** a cross-sectional questionnaire survey of general practitioners based in counties Limerick, Clare and North Tipperary was conducted during February and March 2012. The questionnaire was handed out to 39 GPs at two CME meetings and then posted to 120 other GPs in the area. **Results:** 64% (n=102) of GPs responded. Frequency of exercise counselling varied among the chronic illnesses evaluated. Use of written advice and advice on resistance exercise in EC was low. Only 17% of GPs had previous training in EC. 94% of GPs would use guidelines to prescribe exercise in chronic illness if they were available to them. The association of previous training in EC with frequency of EC was variable, with significantly higher counselling rates found in type 2 diabetes mellitus, obesity and healthy adults (Mann Whitney U, all  $P < 0.05$ ) but no significant difference was found in other patient groups. **Conclusion:** GPs in the Mid-West of Ireland often advise their chronic illness patients about physical activity. Improved training of GPs and development of guidelines are two areas which may improve the frequency and quality of exercise counselling in Ireland.

## **SEM10: A bibliometric analysis of global research output in sport and exercise medicine over 20 years.**

**Kelly B**, Lundon DJ, Felle P.

Department of Healthcare Informatics, University College Dublin.

**Purpose:** to provide an in-depth evaluation of research yield in sports and exercise medicine from 1991 to 2011, using large-scale data analysis and the employment of bibliometric indicators of production and quality. The Impact Factor (IF) and Eigen factor (EF) are implied as proxy indicators of journal quality. IF relates to the average number of citations to articles published, whereas the EF is a measure of how likely a journal is to be used. **Methods:** all the relevant data was retrieved from the Web of Science (WOS) science citation expanded database. The relevant MESH headings were used to extract data. The top journals were ranked by IF and EF. Journals publishing most prolifically were identified and their impact assessed. **Results:** over the past 20 years there have been 6822 publications on sports and exercise medicine. With the USA (33.2%), England (11.9%) and Australia (9.9%) having the highest output, with Ireland ranked 27<sup>th</sup> (0.7%); of the top institutions, the Australian Institute of Sport ranked highest. The journal "Medicine and Science in Sports and Exercise" published the most articles (15.1%) with a high IF (4.1) and a high EF (0.03) relative to its field. **Conclusion:** This work provides quantitative and qualitative analysis of global research in sports and exercise medicine. Globally, the research output within this field continues to increase annually. Europe continues to have a high research output relative to its population and funding. However, Ireland is performing poorly on the international stage. International collaboration may be a potential avenue to improve upon Ireland's research publication profile in sports and exercise medicine.

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## **SEM11: Co-contraction exercise is effective in early stage rehabilitation of subacromial impingement syndrome – a pilot study.**

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**Introduction:** subacromial impingement syndrome (SIS) refers to a condition in which the subacromial structures are entrapped between the humeral head inferiorly and anterior acromion superiorly. The vicious cycle of chronic SIS is a result of the complex interaction of posterior capsular tightness, rotator cuff dysfunction, scapular dyskinesis, alteration in force couple of muscles and pain. Co-contraction exercise (CCE) consist of simultaneous contraction of all muscles around the shoulder and can potentially address the multiple issues associated with SIS. **Purpose:** this study aims to determine and compare the effects of CCE treatment with the conventional resisted isometric exercise (ISME) treatment in people with chronic SIS. **Methods:** 12 participants in each CCE and ISME group with chronic SIS (>3months) recruited in this pilot study of RCT design. All patients (N=24) in both groups received mobilisation. Treatment duration for both groups was 6 weeks. Outcome measures used were the Rotator cuff-Quality of Life (RC-QOL) scale and 10 points visual analogue Scale (VAS). **Results:** both groups improved from their baseline scores; in CCE mean ( $\pm$ SD) RC-QOL score improved  $33\pm 12$  and VAS score  $4\pm 1$ ; and in ISME mean improvement was  $22\pm 12$  units in RC-QOL and  $3\pm 1$  in VAS. Significant difference was found between the two groups for change in RC-QOL (11.19, 95% CI 0.65 to 21.74) and change in pain (1.17, 95% CI 0.086 to 2.248). **Conclusion:** CCE group, on average, showed greater improvement than ISME group in improving the pain and rotator cuff related quality of life. CCE is therefore effective SIS treatment.

## **SEM12: The acute effect of exercise on mood state in patients attending cardiac rehabilitation.**

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**Purpose:** Cardiac Rehabilitation is believed to offer participants both physical and psychological benefits. We investigated the acute effect of a single exercise session on mood state, in subjects attending phase IV cardiac rehabilitation and the duration of this effect. **Methods:** Prospective cohort study in Heartsmart cardiac rehabilitation class, DCU. Participants completed the POMS Brief inventory prior to exercise, ten minutes following exercise and four hours following exercise. The exercise session, was their routine cardiac rehabilitation session. This involves a warm-up and warm down period, and sixteen two minute circuits of aerobic and resistance exercises. Exercise intensity was interpreted by using the Borg, Rating of Perceived exertion, scale. To determine if there was a difference in mood factor pre and post exercise, a dependent T test was used for each mood factor i.e.: Anxiety/Tension, Depression/ Dejection, Fatigue/ Inertia, Vigour / Activity, Anger/ Hostility and Confusion/Bewilderment. **Results:** The results revealed that all mood factors showed a statistically significant ( $p < 0.05$ ) positive improvement, in the immediate period post-exercise and at four hours. The only exception was vigour/activity, which had returned to pre-test values at the four hour mark. **Conclusion:** These results suggest that, in patients attending cardiac rehabilitation, a single session of exercise can have a positive effect on different aspects of mood state. This effect can last at least four hours.

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## **SEM13: The relationship between lower limb flexibility and hamstring injury in male Gaelic footballers.**

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**Introduction:** hamstring injuries are common in Gaelic football and have been associated with reduced flexibility in other sports. **Purpose:** the aim of this study was to examine the relationship between lower-limb-flexibility and previous hamstring injury in male Gaelic footballers as this has not been previously investigated. **Methods:** eighteen male club-level Gaelic footballers (9 previously injured, 9 non-injured) underwent four different muscle length tests bilaterally, using standard goniometry or a tape measure. Hamstring muscle length was measured using the passive-knee-extension test. Gastrocnemius muscle length was measured using the dorsi-flexion lunge test. Iliopsoas and rectus femoris muscle lengths were measured using the modified Thomas test. **Results:** Hamstring and gastrocnemius flexibility were significantly greater ( $P < 0.05$ ) in the non-injured limb compared to the injured limb in the injured group. There were no significant differences in flexibility ( $P > 0.05$ ) for any of the other named muscle groups for within-subject or between subject comparisons. **Discussion:** this group of Gaelic footballers with a history of hamstring injury who had returned to full sporting participation demonstrated significantly reduced hamstring and gastrocnemius flexibility of their injured limb when compared to their non-injured limb. The retrospective study design did not allow for interpretation of whether these changes were present before or after injury. Prospective research on a larger sample size is needed to examine the association of lower limb flexibility and hamstring injury further.

## **SEM14: Development of an evidence-based vitamin D supplementation protocol in elite Irish athletes.**

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**Introduction:** vitamin D insufficiency has recently been associated with an increased risk of stress fracture, inflammation, infectious illness and impaired muscle function and is thus likely to impair athletes' performance. While reported elsewhere, no evidence exists regarding the vitamin D status of Irish athletes. **Purpose:** to determine the effect of wintertime vitamin D<sub>3</sub> supplementation (intervention; 5000IU/d or 1x50,000IU vs. control; no supplement) on vitamin D status in elite Irish athletes with a view to developing an evidence-based supplementation protocol. **Methods:** Non-fasting blood samples were taken from consenting athletes (n=84). To account for seasonality, two groups were sampled before and after winter (total n=50; boxers, n=17 and paralympians, n=33) and the third were sampled only at the end of winter (GAA: n=34). Serum 25-hydroxyvitamin D (25(OH)D) was quantified by enzyme immunoassay (IDS Ltd, Boldon, UK). **Results:** boxers and paralympians had significantly higher 25(OH)D before winter, compared to the GAA athletes after winter ( $66.9 \pm 25.2$  and  $59.1 \pm 19.9 \text{ nmol.L}^{-1}$ , respectively vs.  $35.4 \pm 8.5 \text{ nmol.L}^{-1}$ ;  $P < 0.001$ ). Before winter, one third of the boxers (29%) and paralympians (27%) were vitamin D insufficient/deficient ( $< 50 \text{ nmol.L}^{-1}$ ). However, in the GAA athletes sampled after winter, the majority (94%) fell into this category. Twenty-seven athletes received supplementation over the winter, which significantly increased 25(OH)D from baseline ( $62.5 \pm 15.0$  vs.

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76.6±20.0nmol.L<sup>-1</sup>;  $P=0.001$ ), compared to a significant decrease in the control group (60.8±28.3 vs. 46.2±19.9 nmol.L<sup>-1</sup>;  $P<0.001$ ). All athletes in the intervention group were classed as vitamin D sufficient ( $\geq 50\text{nmol.L}^{-1}$ ) following wintertime supplementation. Conclusions: Athletes may require vitamin D<sub>3</sub> supplementation to improve vitamin D status, particularly over the winter months.

### **SEM15: Medical exclusions, restrictions and findings of pre-participation evaluation of athletes attending for laboratory based exercise testing.**

**Mahony N, Bailey D, Donne B.**

Human Performance Laboratory, Anatomy Department, Trinity College Dublin

Introduction: recent systematic reviews have highlighted clinical safety issues with web based pre-participation medical evaluation (PPE) questionnaires routinely used by non-medical personnel to screen athletes prior to laboratory exercise testing. Purpose: to analyse pre-participation medical evaluation: questionnaire, examination and ancillary investigation of athletes attending for laboratory exercise tests to determine requirement for routine medical input in the PPE process. Methods: all PPE questionnaire, examination and ancillary investigation results, of athletes attending for exercise tests between July 2010 and June 2011 were scrutinised. Medical exclusions, restrictions and further findings impacting on health and performance; as well as anthropometric measures and ancillary investigations (FBC / PFT) were recorded on an Excel™ spread sheet for qualitative analysis. Results: 136 athletes mean ( $\pm$ SD) age 29±9yr performed a total of 166 tests; main sports were cycling (29%), triathlon (26%), running (16%), rowing (15%) and others (14%). Exclusion rate was ~7% (n=9), reasons: inter-current illness (n=6), pre-syncopal episodes (n=1), female athletic triad (n=1) and iron deficiency anaemia (n=1). Restriction rate was ~8%; reasons: age >35yr and CVD risk factors (n=9) and respiratory limitations (n=2). A further 21% (n=26) had significant medical findings potentially impacting on health and performance. Discussion: Most exclusions and restrictions would be evident to both medical and non-medical personnel on PPE questionnaire; little or no added benefit accrued from medical examination; and, investigations did yield additional benefit but pick up rate was low. However, substantial numbers of athletes required further management and we conclude that PPE remains a complex process requiring medical input.

### **SEM16: International Footballers Awareness of Doping in Sport**

**Massey, A**

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Purpose: to gather data on: players' knowledge of the prohibited substance list; use of permitted supplements; how to check a substance; whether players sought advice, and if so from whom, about their use of supplements/medication; their experience of being tested and educated on doping and who prescribes their medication. Methods: questionnaires were completed by all members of a Full International squad. 22 questionnaires were completed, a response rate of 100%. Results: 18% of players stated that they had never received education on doping throughout their career, those that did receive advice reported an average of 2.22 sessions throughout their career. 27% were unsure of how to check if medications were on the banned substance list. 10% were taking medications prescribed by someone other than their club doctor. 50% admitted to using supplements. 82% of players had been tested within the last 2 years; less than 15% had ever been tested out of competition, 73% thought that it was very likely that they would be tested whilst on international duty. 82% stated that they

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were sure that the supplement(s) they were taking were not on a banned substance list and 18% said they could not be sure. Conclusions: there is a need to ensure that footballers are given appropriate advice about the use of medications/supplement. Athletes must be provided with the correct information and health advice. National associations need to ensure that they provide players and medical staff with education and resources to assist in the fight against doping in football.

### **SEM17: An audit of non-steroidal anti-inflammatory drug use of by the Irish women's rugby team 2012.**

**Meighan V**

Team Doctor IRFU Women's Team and University Hospital, Galway

Introduction: non-Steroidal Anti Inflammatory medications are widely used amongst athletes for pain management. All NSAIDs, have well recognized side effects which occur in approximately 20% of patients. Purpose: to identify the prevalence of NSAID/Diclofenac use within the Ireland Women's Rugby Team 2012 and to determine prescribing patterns and side effects experienced. Methods: all 22 squad members completed a confidential online questionnaire about Diclofenac use during the six nations championship 2012. Results: all squad members (22) completed the questionnaire; 100 % had taken a NSAID; 14 % (3) had a prescription for Diclofenac supplied by the Team Doctor; 86 % (19) were prescribed Diclofenac by their own GP; 27 % (6) had a 'repeat prescription' for Diclofenac; 82 % (18) used Diclofenac regularly at least x3/day for > 3 days consecutively and for > 3 weeks; 23% (5) experienced GI upset; 9 % (2) felt wheezy 82 % (18) were not aware of peptic ulceration being a long term side effect of NSAID use; 82 % (18) said this would deter them from using NSAIDs in the future; and, 18 % (4) used Diclofenac 'prophylactically'. Discussion: NSAIDs are useful for pain management of soft tissue injury but are not recommended where bleeding/contusion or muscle tear is suspected. All of the team used Diclofenac and, worryingly, are unaware of the side effects. They can access the medication without seeing a doctor. I would advocate use of NSAID's within the IRFU be strictly monitored/ audited and prescriptions only be from the team doctor.

### **SEM18: An audit of the Ireland Women's Rugby Team player's knowledge and attitudes towards concussion.**

**Meighan V**

Team Doctor IRFU Women's Team and University Hospital, Galway.

Introduction: concussion is potentially a catastrophic injury and occurs relatively commonly in contact sports particularly in rugby. Purpose: this study aimed to ascertain pre-existing knowledge of concussion and determine concussion rates amongst the Ireland Women's Rugby Team 2012. Methods: 22 squad members completed a confidential online questionnaire about concussion. Results: 64 % (8) had been concussed at least once and 18 % (4) concussed >5 times; 95% (21) thought concussion had to involve LOC; 23% (5) recognized headaches; 9 % (2) recognized nausea as symptoms; 9 % (2) had sought medical attention; none took time out from play during or after the game; 9 % (2) recognized affects on decision making during play; none had been informed about the importance of concussion or that it could have cumulative effects; 27 % (6) felt concussion was not as serious as other rugby injuries; 45 % (10) would play in an important game even if concussed; 22 % (5) said they would not tell anyone if concussed for fear of being substituted or dropped; none were aware of or had ever undergone neuropsychological testing; 54 % (12) felt the coach should



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make the decision if they should play on; 46 % felt the doctor and physiotherapist should decide. Discussion: There is ignorance amongst players regarding the seriousness of concussion and the potential long term sequelae. Furthermore there is reluctance to present with concussion because of fear of return to play decisions. This reflects a need for better education surrounding concussion and its potential hazards.

### **SEM19: Can five weeks of endurance-based exercises decrease foot over-pronation?**

**Moran K**, Clarke A, McCaffrey N, Downey M, Whyte E.

Sports Medicine Research Group, School of Health and Human Performance, Dublin City University.

Introduction: over pronation has been linked to a number of lower limb injuries (e.g. medial tibial stress syndrome, stress fractures, general knee pain). While orthotics have been recommended to counter over-pronation, some question their effectiveness or believe that they can further weaken the muscles controlling pronation and therefore are not a long-term viable solution. Purpose: the present study appears to be the first study to examine the effect of endurance-based exercises on over-pronation. Methods: 16 (7 male, 9 female) over-pronators (navicular drop test > 10mm), undertook 4 endurance based exercises for 5 weeks. Twenty repetitions by three sets were completed 3/week (toe curls, medial arch raises, heel raises and combined foot plantar flexion/inversions). Dynamic pronation was assessed for walking and running (1m RSscan pressure plate) by examining rear and fore-foot loading patterns. Results: exercise resulted in less pronation during running and walking as evident by significantly ( $P<0.05$ ) more rear foot lateral loading (eta squared = 0.24) and less forefoot medial loading (eta squared = 0.30), respectively. Navicular drop also decreased significantly ( $P<0.05$ , eta squared 0.77) by 2.7cm (CI: 1.9 to 3.5cm). Conclusion: in light of the positive changes in pronation associated with the short exercise regime and the link between injury and over pronation, the authors recommend the inclusion of these exercises in a treatment protocol prior to utilising orthotics.

### **SEM20: Knowledge, attitude and practices of GAA players and coaches to concussion.**

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Introduction: concussion can have serious implications if not managed properly. The knowledge, attitude and practices of players and coaches to concussion can significantly influence the safety and effectiveness of management strategies. Misconceptions relating to concussion have been found in other sports but to date have not been examined for GAA sports. Methods: a 29 question survey was completed by 331 players and 60 coaches. Descriptive and analytical statistics were used to explore the data. Results: there was a low level of knowledge of common signs and symptoms associated with concussion (18.3 and 16.6 correct identifications out of 27 for coaches and players, respectively); 18% of coaches and 33% of players would not always report a concussion to medical personnel; and almost 30% of players did not report to anyone; 45% of coaches and 60% of players were unaware that a player is more likely to sustain a second concussion if they continue to play on; 45% of coaches and players were unaware that concussion could have long term effects; and 20% of coaches would consider allowing a concussed player to play on. Only 9% of coaches and 21% of players had read the GAA position statement on concussion. Most responses were unaffected by 'years of coaching', 'level of coaching qualification' and 'having read the GAA position statement on concussion'. Conclusion: a lack of knowledge and good practice

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towards concussion was evident amongst GAA players and coaches. This needs to be addressed to protect the safety of players.

### **SEM21: Non-viral gene delivery to muscle tissue and potential ramifications for gene doping detection in sport.**

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University College Cork.

Purpose: *in vivo* gene therapy directed at muscle tissue could potentially be used in the illegal augmentation of an athlete's performance. Our aim was to assess the duration and magnitude of skeletal muscle non-viral plasmid gene expression and examine the applicability of the technique in human *ex-vivo* tissue. Methods: using luminescent imaging, *in vivo* murine muscle gene expression was examined and compared to that of adenoviral gene expression. Temporal control was assessed using a doxycycline-inducible system. An *ex vivo* model was developed and optimised using murine tissue. This model was subsequently used to assess the application of non-viral gene therapy in *ex vivo* human tissue. Results: murine muscle luciferase expression did not silence over the study period. Although maximum luciferase expression was higher in muscle with adenoviral delivery, compared to plasmid delivery, silencing occurred over time with the viral construct. Expression was greatly increased with a transposon construct. The inducible promoter cassette successfully regulated gene expression. Expression was re-induced to a similar level on a temporal basis. Gene expression was achieved in *ex vivo* human muscle and tendon. Conclusions: plasmid constructs result in long term *in vivo* gene expression in skeletal muscle, while expression can be simply controlled with oral agents. Plasmid gene transfection in human *ex vivo* mesenchymal tissue was demonstrated for the first time. Potentially, these techniques may be applied to illegally augment an athlete's performance and indeed may currently be in use. Methods need to be developed to detect its improper use.

### **SEM22: Adductor squeeze test values and hip range of motion in Gaelic football players with chronic groin pain.**

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<sup>2</sup>Institute for Sport and Health, University College Dublin, Dublin, Ireland

Introduction: groin injuries account for 9% of injuries in Gaelic football; of particular clinical interest is the lengthy absence from sport and high recurrence rates associated with these injuries. A paucity of literature exists relating to adductor squeeze test values and hip joint range of motion in Gaelic Football athletes with chronic groin pain. Purpose: to determine whether differences exist in adductor squeeze test values and hip range of motion between athletes with chronic groin pain and injury-free controls. Methods: 18 Gaelic football players with current chronic groin pain and 18 matched controls were assessed in the performance of the adductor squeeze test. Adductor squeeze test values were quantified using a sphygmomanometer. A fluid-filled inclinometer was used to assess hip internal and external rotation range of motion. A bent knee fall-out test was also utilized to examine hip joint range of motion. Results: a significant difference in adductor squeeze test values was observed between the control group ( $269 \pm 25\text{mmHg}$ ) and groin pain group ( $202 \pm 36\text{mmHg}$ ;  $t(34) = 6.31$ ,  $p < 0.01$ , two-tailed). Furthermore the groin pain group had a decreased bent knee fall-out ( $p < 0.01$ ) bilaterally, as well as decreased hip internal rotation ( $p < 0.01$ ) and external

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rotation ( $p < 0.01$ ) range of motion bilaterally when compared to the control group. Conclusion: Gaelic football players with chronic groin pain exhibit decreased hip joint range of motion and adductor squeeze test values when compared to non-injured players. These findings have implications for assessment and rehabilitation practices, as well as return to play criteria.

### **SEM23: Syndesmosis and lateral ankle sprains in the national (American) football league.**

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Introduction: syndesmosis sprains in the NFL are a significant source of disability. Compared to lateral ligamentous ankle injuries, syndesmosis injuries are more challenging and more likely to delay an athlete's return-to-play. Purpose: this study evaluated diagnostic, treatment, and outcomes of NFL syndesmosis and lateral ankle sprains to better enable physicians to identify and manage these injuries. Methods: all syndesmosis and lateral ankle sprains from the NFL team database were reviewed over a 15-year period, and all 32 NFL team physicians completed a questionnaire detailing their sprain management approach. Comparative analysis was performed with several variables, including diagnosis, treatment methods, and time loss from participation. Results: over 15 years, 36 syndesmosis and 53 lateral ankle sprains occurred amongst players in the NFL. The mechanism of injury was typically direct impacts in the syndesmosis group and torsion in the lateral ankle sprain group ( $P = 0.034$ ). All players were managed non-operatively. Mean time lost from participation was 15.4 days in the syndesmosis group and 6.5 days in the lateral ankle sprain group ( $P < 0.001$ ). NFL team physicians vary their treatment for syndesmosis sprains depending upon degree of diastasis but recommended non-operative management with weight-bearing as tolerated for lateral ankle sprains. Discussion: A successful return-to-play, without surgery, can frequently be achieved for both syndesmosis and lateral ankle sprains depending on injury severity. Historically, many syndesmosis injuries have taken upwards of 6-8 weeks to heal. Whilst they continue to require longer rehabilitation periods than lateral ankle sprains, the time may not be as great as previously reported.

### **SEM24: Injury risk rates in high school athletes**

**Patterson B**, Ray M, Labocki C.

The National Training Center Sports Medicine Institute, Clermont, Florida, USA.

Purpose: the objective of this survey was to identify injury rates in high school (secondary school) sports. Methods: sports pre-participation evaluations (PPE) were completed on 745 high school student athletes, at six high schools in Lake County, Florida. After the PPEs, each student athlete was asked if they would answer four questions pertaining to injuries they received during participation in their sport (Table I). The questions included age, sex, sport, and whether they injured themselves during their sport and if they did what body part was affected. It was presumed some sports make their participants more prone to specific injuries than other sports. Results: 100% of the 745 athletes that completed PPEs, ages 13-18, complied with the survey. Sports with the most injuries were weightlifting (52.4%) followed by soccer (European football) (51.7%). Wrist injuries (14.3%) were the most common among weightlifters, and weightlifters were the only group with back injuries (9.5%). Ankle injuries (22.4%) were the most common injury for soccer players. When soccer and (American)

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football were compared head-to-head, soccer players had a 1.9 fold greater chance of having any injury than football players. Swimming, cheerleading, and bowling were the safest sports with only about 20% injuries. Conclusion: Our study reveals soccer players are 1.9 fold more likely to get injured than American football players. Weight lifters and soccer players are more likely than any other sport to get injured with swimming, cheerleading, and bowling being the safest sports. Injury rates increase across all sports as age increases.

### **SEM25: Supplement use in high school athletes**

**Patterson B**, Bullach P, Labocki C.

National Training Center Sports Medicine Institute, Clermont, Florida, USA.

Purpose: the objective of this survey was to report the number of male high school athletes whom use nutritional supplementation. Methods: sports pre-participation evaluations (PPE) were completed on 270 high school student athletes, at two high schools in suburban Detroit. PPEs were completed on male high school athletes. 100% of the 270 athletes, ages 13-18, complied with the survey. Prior to the survey, we presumed supplement use was not widespread in high school athletes. Results: 35.6% of the 270 athletes surveyed use supplements. 9.6% use PES, 25.9% use HMS, and 1.1% use both. 80.4% of all surveyed who use supplements, participate in fitness training outside their sport. Statistical significance was reached ( $p=0.001$ ) when comparing the number of boys who fitness train and use supplements (40.9%) with the number who do not fitness train and use supplements (20.2%). Football (American football) was highest for PES use (21.1%). PES use increases with age and is statistically significant ( $p<0.001$ , Fisher's exact test) when larger age groups are formed. Statistical significance does not exist between these two age groups when comparing HMS use. 86.8% use supplements on a regular basis. Conclusion: the majority of high school athletes do not take supplements, with a small percentage taking PES. PES use increases significantly after the age of 14; however, HMS use is more consistent throughout the teenage years. If high school athletes take PES, they are more likely to be participating in contact sports.

### **SEM26: Risk factors for groin/ hip injuries in field based sports: a systematic review**

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<sup>1</sup> Clinical Therapies Department, University of Limerick.

<sup>2</sup> Physiotherapy Dept, University Hospital Galway.

Purpose: this systematic review was undertaken to identify and examine the evidence for groin/hip injury risk factors in field based sports (FBS). Methods: Fourteen electronic databases were searched using keywords. Studies were included if they met the inclusion criteria and investigated one or more risk factors with relation to the incidence of groin/hip injuries in FBS. Studies were collected and analysed by two reviewers under a 12-point quality assessment scale. Due to the heterogeneity of studies and the outcome measures used meta-analysis could not be conducted, thus risk factors identified were pooled for analysis. Results: Of the potentially relevant 5842 studies, 7 high quality studies were included for analysis. Results demonstrated that previous groin/hip injury was the most prominent risk factor (4 studies). Followed by- older age and weak adductor muscles (2 studies). Eight other significant risk factors included: reduced dominant femur diameter, reduced total internal and external hip range of motion (ROM), hip abduction ROM, body mass, early biological maturing players, abduction and adduction with rotation peak torque, strength ratio of hip muscle groups and bilateral difference in extension peak torque; which were each reported

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once across the included studies. Conclusions: eleven significant risk factors for groin/ hip injury for FBS players were identified. The main limitation was heterogeneity of studies and the outcome measures used, which did not allow for meta-analysis. Future research should include a prospective study of a group of FBS players to confirm a relationship between the number of risk factors identified and development of groin/hip injuries.

## **SEM27: Intraocular pressure measurement and acute mountain sickness.**

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Purpose: acute mountain sickness and high altitude cerebral oedema due to hypobaric hypoxia are considered to be two different points on the same spectrum of high altitude disease. Intraocular pressure (IOP) has been evaluated in previous studies as an assessment of intracranial pressure the study aims to evaluate how well IOP follows symptoms of acute mountain sickness (AMS), as determined by the Lake Louise definitions. Methods: intraocular pressure will be measured using a tonopen, in a group of 30 Irish male and female climbers, aged between 15-60, twice a day. These measurements will be taken at approximately the same time, morning and evening, over a six day period, in conjunction with heart rate (HR), oxygen saturation (SaO<sub>2</sub>) by pulse oximetry and respiratory rate (RR). The group will gain altitude, at an approximate rate of ascent of 800m a day climbing to a total height of 5,900m. Data analysis: IOP profiles of asymptomatic controls and symptomatic climbers will be compared to evaluate how IOP varies with the symptoms of AMS. Data and statistical analysis will be carried out by CSTAR in UCD. Discussion: it is hoped that analysis of the results of this study will show whether intra-ocular pressure monitoring might be a useful marker of impending AMS / cerebral oedema in non-acclimatised individuals ascending to altitude.

## **SEM 28: Static and dynamic tests used as early warning signs of acute mountain sickness**

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<sup>1</sup>Our Lady's Children's Hospital Crumlin

<sup>2</sup>Kilimanjaro Achievers Ireland

Introduction: for the last two years Kilimanjaro Achievers Ireland have been assisting climbers from schools (transition year students/teachers and parents) to climb Kilimanjaro (5900 m). As part of a health and safety initiative, we assessed climbers HR (heart rate)/ SaO<sub>2</sub> (oxygen saturations using pulse oximetry) / and RR (respiratory rate) every morning and evening. No difference was detected between teenager and adult responses, but twice daily measurement of vital signs allowed early warning signs of acute mountain sickness (AMS) to be detected (Proceedings of FSEM Annual Scientific Meeting, 2011). Purpose and Methods: this year, as well as documenting static assessments of 120 climber's performance during a world record attempt ascent to altitude on Mount Kilimanjaro, we aim to perform standardised exercise tests, same distance and pace every day; with the same measurement of vital signs pre and post exercise test. In conjunction we will also measure the haematinics; ferritin, serum iron, and vitamin B12; and also vitamin D purported to increase VO<sub>2</sub> max, reduce inflammation and improve innate immunity, to see if they confer any advantages to climbers ascending to altitude. Power and statistical analysis of results will be carried out by

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CSTAR of UCD. Discussion: Our early studies indicated that climbers with higher levels of serum ferritin have much better vital sign profiles on ascent to altitude. In this study additional dynamic assessment data of climber wellbeing at altitude might show that measurement of exercise profiles can improve the predictive capacity of our clinical assessment of warning signs of AMS.

### **SEM 29: Overcoming perceived barriers to exercise leads to increased physical activity levels – findings from a cardiovascular disease prevention programme.**

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Purpose: to investigate the correlation between overcoming perceived social, psychological and health-related barriers to exercise and increased physical activity levels among participants of a community-based cardiovascular disease (CVD) prevention programme. Methods: Patients with a Heart SCORE  $\geq$  5% were enrolled on a 12-16 week intensive lifestyle and risk modification programme delivered by a multidisciplinary team in a community setting. Data were collected on physical activity levels, perceived barriers to exercise, aerobic capacity, anthropometric data and quality of life scores. At initial assessment and end of programme physical activity levels were objectively measured by mean daily step count and seven day pedometer. Results: Data on 103 patients who had completed the programme were analysed. Three categories were derived from the stated barriers; physical, environmental and psychological. There was a mean increase of 1620 (n=73) in the number of daily steps taken in individuals who overcame their primary barrier to exercise by the end of programme, compared with 244 (n=30) in those who did not. An increase in daily step count significantly correlated with overcoming the primary barrier to exercise ( $P < 0.039$ ). Conclusions: This study shows that individuals at increased risk of CVD who overcame their primary barrier to exercise achieve an objective increase in physical activity as measured by a daily step count. Physical inactivity is an independent risk factor for CVD and these results demonstrate that identifying and addressing barriers to exercise is an effective approach to increasing physical activity levels in patients at high risk of CVD.

## **EXSC1: An investigation into the effect of an intermittent, high intensity protocol on dynamic balance.**

**Burke A**, White E, Whyte E.

Athletic Therapy and Training, School of Health and Human Performance, Dublin City University.

Background: sporting performance decreases and injury incidence increases after periods of high intensity, intermittent exercise. It is proposed that neuromuscular control responses are negatively affected by such exercise to the point that potentially hazardous, and; or less efficient movement patterns are employed. Purpose: To investigate the effect intermittent, high intensity exercise on the dynamic balance of males and females as measured using all eight directions of the Star Excursion Balance Test (SEBT). Methods: Normalised SEBT measures of 40 healthy, active males ( $n=20$ , age  $20.8 \pm 1.5$ yr) and females ( $n=20$ ; age  $20.4 \pm 1.3$ yr) were recorded pre and post the high intensity, intermittent exercise protocol. The protocol involved a 10 metres forward sprint with a  $90^\circ$  change of direction followed by a backwards sprint for 5 metres (x4). This was followed by two-legged jumps (x10), high knee side stepping over 50cm hurdles (x10) and a lateral 5 metre shuffle (x4). The participant was given a 30 second break before repeating the course. This continued until the participant reported 18 on Borg's Scale of perceived exertion. Results: Paired samples T-Tests demonstrated the exercise protocol had a significant detrimental effect on SEBT measures in all directions ( $P<0.05$ ). Independent samples T-Tests showed that females performed better on the SEBT with the difference amplified in the post-fatigue condition ( $P<0.05$ ). Conclusion: The high intensity, intermittent exercise protocol has a negative effect on dynamic balance as assessed by the SEBT, which may lead to the employment of less efficient or potentially hazardous movement patterns in an exercising athlete.

## **EXSC2: The effect of placebo on exercise performance in Gaelic football players.**

**Byrne I**, Mahony N, Donne B

Human Performance Laboratory, Anatomy Department, Trinity College Dublin

Introduction: although previous studies have suggested a positive effect of placebo on performance in some field sports, to date the effects of placebo on Gaelic Football players are unknown. Purpose: This study aimed to examine the effects of placebo on exercise performance in Gaelic Football players. Methods: Nine club level Gaelic Football players ( $M \pm SD$ : age  $23 \pm 3$ yr, mass  $80.2 \pm 10.4$  kg, height  $182 \pm 7$ cm, underwent 3x20m sprint tests, an Illinois Agility test and an aerobic Multi Stage fitness test (MSFT) on four occasions; familiarisation, baseline and under two experimental conditions; informed placebo and misinformed ergogenic aid (also placebo). A deceptive protocol was employed whereby participants received a non-effect Lactose capsule for both experimental conditions, despite being told one capsule was placebo and one was an ergogenic aid. Heart rate and Blood Lactate (BLa) were measured throughout to assess participants' physiological state across all conditions. Data were analysed using one-way repeated measures ANOVA or Kruskal-Wallis test in case of non-parametric data, with appropriate post-hoc analysis. Results: No significant differences were detected in 20m sprint times between baseline, informed and misinformed conditions ( $3.24 \pm 0.23$ s,  $3.26 \pm 0.21$ s,  $3.21 \pm 0.31$ s respectively,  $P>0.05$ ); and in Illinois Agility test times across conditions ( $16.75 \pm 0.5$ s,  $16.74 \pm 0.5$ s,  $16.59 \pm 0.7$ s,  $P>0.05$ ). However MSFT performance significantly improved in the misinformed condition versus baseline and informed placebo ( $690 \pm 96$ s,  $666 \pm 109$ s,  $668 \pm 97$ s,  $P<0.05$ ). There were no differences in physiological parameters across conditions. Conclusion: Results suggest that placebo consumption significantly improved aerobic exercise test performance (MSFT) in Gaelic Football players, but had no significant effect on selected sprint and agility tests.

## **EXSC3: Percentile standing broad jump abilities in children in Ireland aged 4-15.**

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<sup>1</sup>Department of Physiotherapy and <sup>2</sup>Discipline of Occupational Therapy, Trinity Centre for Health Sciences, St James's Hospital, Dublin.

Purpose: the aim of this study is to report the current percentile range of the Standing Broad Jump (SBJ) in children attending school in Ireland. There has been concern that Irish children are less active than previous generations. Standing Broad Jump has been used for many years to assess muscle power in population testing and has been used in test batteries to assess physical performance in younger children. Methods: children performed two SBJ from a crouched position on a standard jumping mat with a 5cm marking in the school environment. A two foot take-off and landing was used, with swinging of the arms and bending of the knees permitted. Height (cm) and body mass (Kg) was measured, barefoot in school clothing, using standard equipment. Results: are presented for 532 Children from 11 schools in 5 age groups (4-5, 6-7, 8-9, 10-11, and 12+). For boys median score (cm) and 25<sup>th</sup> -75<sup>th</sup> percentile for each age group was 85cm (65-95), 95cm (87.5-110), 115cm (105-125), 120cm (100-120) and 120cm (100-135) respectively. Girls' scores were 80cm (60-90), 90cm (80-105), 105cm (90-115), 110cm (100-120) and 115cm (100-135) respectively. Conclusion: in line with previous work, the SBJ scores for males were significantly greater between the ages of 6 and 12 ( $P < 0.05$ ). However in this study, children performed poorer on the SBJ compared to mean Eurofit scores for boys and girls 11 years upwards. These results were also lower than current European children, particularly as children got older. Results show that performance has declined since 1990 and is poorer in comparison to other European children.

## **EXSC4: The use of the Yo-Yo Intermittent Recovery Test level 1 (Yo-Yo IR1) as a high intensity training tool: aerobic and anaerobic responses.**

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Introduction: physical inactivity is a growing problem among young adult females. This is a major concern as physical inactivity has been identified as the fourth leading risk factor for global mortality, contributing to 6% of global deaths annually. Purpose: this study aims to investigate the effects of using the Yo-Yo IR1 as a high intensity training tool for sedentary female university students. Methods: 25 participants participated in this study and were matched for body fat percentage before being randomly allocated to the intervention group (n=12) or control group (n=13). Baseline measures were recorded for body fat percentage, Wingate Anaerobic Test performance and Yo-Yo IR1 performance. Intervention participants underwent a 6-week training programme using the Yo-Yo IR1. Sessions took place twice a week for 6 weeks. Intensity was set at a percentage of their initial Yo-Yo IR1 score and was progressively increased. Control participants undertook no training. All participants were then re-tested using the same outcome measures. Results: This training programme resulted in a 75% increase ( $P=0.001$ ) in Yo-Yo IR1 score in the intervention group. An 18% increase was recorded in peak power ( $P=0.002$ ) and a 10% increase in mean power ( $P=0.009$ ) in the intervention group as measured by the Wingate Anaerobic Test. Discussion: this is the first study to use the Yo-Yo IR1 as a training tool. The results of this study show that a 6-week high intensity intervention programme using the Yo-Yo IR1 increases both aerobic and anaerobic capacity in a sedentary female population.



## **EXSC5: Gender profile of joggers in south Dublin.**

**Hooper ACB**

Centre for Sports Studies, School of Public Health, Physiotherapy and Population Science, University College Dublin.

Purpose: jogging is the tenth most popular form of exercise in Ireland, excluding walking. The present study was undertaken to determine the relative proportion of male and female joggers and to identify gender differences in selected parameters. Methods: joggers were observed in South Dublin during a 12 month period. Organised groups were excluded. The gender of each jogger was recorded as was the day and time. The use of earphones, drinks and high visibility clothing was noted. Results: 2,553 joggers were observed. 60% (n=1,513) were male and 40% female (n=1,042). The highest proportion of female joggers (48%) was seen at out-of-hours times during weekdays. 81% of male joggers and 77% of female joggers ran alone. Same-gender partnerships (male 12%; female 15%) were more frequent among the remainder. The carrying of drinks was negligible. The wearing of high visibility clothing was low (male 4%, female 5%) and 29% of female joggers, but only 7% of males, wore earphones. Conclusions: These results confirm the greater participation of males in sport and exercise reported previously. The social relationships of male and female joggers were similar. The low usage of high visibility clothing by both genders, especially at night, and the high use of earphones by female joggers have safety implications for joggers and others.

## **EXSC6: An investigation into the effect of a high intensity, intermittent exercise protocol on attention, information processing and reaction time in healthy active males.**

**Kerr G, Gibbons N, Whyte E.**

Athletic Therapy and Training, School of Health and Human Performance, Dublin City University

Background: it has been demonstrated that athletic performance level decreases and injury incidence increases during the later stages of an event. However, the extent to which a decrement in attention, information processing and reaction time contributes to these is unclear. Purpose: to examine the effect of an intermittent high, intensity exercise protocol on attention, information processing and reaction time. Methods: a pilot study was conducted on 17 participants (age:23±6yr, years of education (YE): 17±1yr to determine the reliability and learning effect of the Stroop and Symbol Digits Modality Tests (SDMT). 42 healthy, active male participants were randomly allocated to an intervention (age: 21±1yr, YE: 17±1yr) and control group (age: 21±1yr; YE: 17±1yr). Testing of attention, information processing and reaction time as assessed by the Stroop test and SDMT were performed at baseline and post high intensity, intermittent exercise protocol (intervention) or sitting (control). Results: The pilot study demonstrated high test-retest reliability and internal consistency of the Stroop test and SDMT (Cronbach's Alpha: 0.91 and 0.93; ICC: 0.83 and 0.87 respectively) and a significant learning effect ( $P<0.05$ ). A Mixed Between-Within ANOVA demonstrated a significant effect within groups from time one to time two ( $P<0.05$ ). The control group demonstrated a learning effect for the Stroop ( $P<0.01$ ) and SDMT ( $P<0.01$ ). There was no learning observed in the intervention group ( $P=0.50$  and  $0.60$  respectively). Conclusions: the intermittent high intensity exercise protocol of this study had a negative effect on the expected attention, information processing and reaction time measurements in healthy active males.

## **EXSC7: Effects of 8-week high intensity interval training vs. lactate threshold training on lactate clearance and subsequent performance capacity in club-level triathletes.**

**Lambe P, Donne B**

Human Performance Laboratory, Anatomy Department, Trinity College Dublin

Purpose: high-intensity interval training (HIIT) can induce faster lactate clearance kinetics when compared with other standard training protocols. This study evaluated the effects of 8-weeks HIIT vs. lactate threshold training (LTT) on lactate clearance kinetics and subsequent supra-maximal (>100% VO<sub>2</sub>max) performance. Methods: healthy male club-level triathletes (n=16, mean ± SD; 31±4 yr, 182±6 cm, 82±8 kg) were randomly assigned to one of two 8-week training interventions (HIIT or LTT) based on maximum power output achieved during a graded incremental cycling test. Participants performed repeated intermittent sprints on a cycle ergometer separated by a 30 min active recovery (40% Pmax) pre- and post-intervention. The initial sprint session (10 by repetitions of 30 s at 40% Pmax followed by 30 s at 120% Pmax) elevated blood lactate (BLa); post-recovery sprint session to fatigue assessed supra-maximal exercise performance. BLa data from fingertip capillary samples pre-, during and post-recovery were recorded. Test sessions were separated by 8-weeks. Data were analysed using a 2 factor ANOVA with time as a repeated measure,  $P<0.05$  inferred significance. Results: no significant differences ( $P>0.05$ ) in clearance kinetics, assessed by computing half-life for lactate clearance, were detected across time or group. In addition, no significant group effect were detected assessing post-recovery performance in kJ.kg<sup>-1</sup> ( $P>0.05$ ), however, a significant (HIIT: 2.46 vs. 3.18 kJ.kg<sup>-1</sup>; LTT: 2.24 vs. 2.98 kJ.kg<sup>-1</sup>;  $P<0.05$ ) overall time effect was detected. Conclusion: adopting an in-season HIIT program can reduce overall time spent training (96 vs. 203 min.wk<sup>-1</sup>) without compromising lactate clearance kinetics or sprint performance.

## **EXSC8: Reliability and reproducibility of a hiking test in elite and novice dinghy sailors assessed via EMG and force output.**

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Introduction: the “Bucket test” is a method for assessing hiking endurance in dinghy sailors. However, extensive literature searches reveal no scientifically validated or quantified tests of hiking endurance. Purpose: to assess the reliability and reproducibility of a modified bucket test (MBT) using an isokinetic dynamometer. Methods: elite and novice sailors (n=13) were assessed using the MBT on two occasions. EMG and force data were recorded for knee extensor and flexor musculature. The MBT involved a lever arm fixed at 50° from full knee extension and appropriate pre-calculated isometric incremental forces were applied by volunteers until failure. Results: 2 way repeated measure ANOVA between initial and final readings showed significant increases in aEMG and aRMS activity, during both visits in all knee extensor musculature ( $P<0.001$ ). There were no significant aEMG differences recorded in knee flexor musculature except for right *biceps femoris* ( $P<0.01$ ) during visit 1, and right *biceps femoris* ( $P<0.001$ ), left *biceps femoris* ( $P<0.05$ ) and right *semitendinosus* ( $P<0.01$ ) during visit 2. Significant aRMS differences were noted in knee flexor musculature; right and left *biceps femoris* and right *semitendinosus* during visit 1 ( $P<0.05$ ) and during visit 2 ( $P<0.001$ ). Computed ICC and TEM data were low for time to failure (TTF) between tests with the exception of knee flexor vs. extensor TTF data on day 2; 0.71(10.2) [ICC (TEM)]. Conclusion: TTF data are inconsistent, requiring further research, however EMG data conforms to current hiking research.

## **EXSC9: An audit of performance data, physiological markers and interpolated aerobic heart rate training intensities derived from laboratory based exercise tests to exhaustion.**

**Mahony N, Bailey D, Donne B.**

Human Performance Laboratory, Anatomy Department, Trinity College Dublin

Introduction: athletes perform graded exercise tests to exhaustion (GXT) to gauge fitness and determine individualised aerobic training prescription. Study aims: to audit performance, physiological responses, and heart rate training zones (HRZ) derived from GXT in our laboratory between July 2010 and June 2011. Methods: GXT were performed on motorised treadmill (RUN), electronically loaded cycle ergometer (CYC) or rowing ergometer (ROW). Performance data (Load; Velocity), physiological responses at maximum and lactate threshold ( $T_{Lac}$ ) and HRZ for hard (A3), steady (A2) and easy (A1) aerobic training interpolated from graphical plots were recorded on Excel™ spreadsheet. Results: athletes  $M \pm SD$  age  $29 \pm 9$ yr completed 122 GXT (CYC 65, ROW 38, and RUN 19). Female ( $n=21$ ) load; velocity at max was: CYC  $246 \pm 46$ W; RUN  $16.0 \pm 2.0$ km.hr<sup>-1</sup> and at  $T_{Lac}$  was: CYC  $191 \pm 42$ W; RUN  $13.7 \pm 2$ km.hr<sup>-1</sup>. Physiological markers ( $VO_{2peak}$ ;  $HR_{max}$ ;  $HR@T_{Lac}$ ) were; CYC  $51.3 \pm 6.3$ mL.kg<sup>-1</sup>.min<sup>-1</sup>;  $189 \pm 12$ beats.min<sup>-1</sup>;  $171 \pm 13$ beats.min<sup>-1</sup> and RUN:  $50.1 \pm 7.1$  mL.kg<sup>-1</sup>.min<sup>-1</sup>;  $194 \pm 12$ beats.min<sup>-1</sup>;  $178 \pm 8$ beats.min<sup>-1</sup> respectively. Mean HRZ (A3; A2; A1; beats.min<sup>-1</sup>) were: CYC 163-171; 145-156;  $\leq 141$ ; and RUN 171-178; 157-166;  $\leq 154$ . Male ( $n=101$ ) load; velocity at max were: CYC  $344 \pm 44$ W; ROW  $357 \pm 31$ W; RUN  $19.0 \pm 2.0$  km.hr<sup>-1</sup> and at  $T_{Lac}$ : CYC  $269 \pm 46$ W; ROW  $253 \pm 34$ W; RUN  $16.8 \pm 1.8$ km.hr<sup>-1</sup> respectively. Physiological markers were: CYC  $59.6 \pm 6.7$ mL.kg<sup>-1</sup>.min<sup>-1</sup>;  $189 \pm 12$ beats.min<sup>-1</sup>;  $171 \pm 13$  beats.min<sup>-1</sup>; ROW  $62.1 \pm 6.4$ mL.kg<sup>-1</sup>.min<sup>-1</sup>;  $193 \pm 8$ beats.min<sup>-1</sup>;  $172 \pm 11$ beats.min<sup>-1</sup> and RUN  $63.4 \pm 7.5$ mL.kg<sup>-1</sup>.min<sup>-1</sup>;  $188 \pm 9$ beats.min<sup>-1</sup>;  $173 \pm 10$ beats.min<sup>-1</sup> respectively. Mean HRZ (A3;A2 ;A1; beats.min<sup>-1</sup>) were; CYC 159-167; 141-152;  $\leq 137$ ; ROW 159-167; 141-152;  $\leq 137$ ; and RUN 163-172; 147-157;  $\leq 143$ . Discussion: this audited normative GXT and aerobic training intensity data for an Irish athletic population could be useful for coaches, trainers and athletes for; comparison purposes and planning of aerobic preparation phase training.

## **EXSC10: Effect of a 12 week simulated barefoot running in VibramFiveFingers™ footwear on foot-strike pattern and hip kinematics in female recreational runners.**

**McCarthy C, Donne B.**

Human Performance Laboratory, Anatomy Department, Trinity College Dublin

Introduction: habitual barefoot runners tend to have a forefoot strike (FFS) pattern. Runners unaccustomed to barefoot running may not immediately adopt this pattern. We hypothesize that differences in foot strike pattern may also affect 3D hip kinematics. Purpose: Investigate if differences in 3-D hip kinematics and foot strike patterns between barefoot and shod conditions are dependent on habituation to simulated barefoot running (SBR). Methods: Healthy female athletes ( $n=15$ ) with no previous experience of SBR commenced a 12 week transition program with SBR footwear (V). Age and activity matched controls ( $n=15$ ) continued running in standard footwear (C). 3-D motion analysis of treadmill running at  $12$ km.h<sup>-1</sup> was performed, on both groups, in barefoot and shod conditions pre- and post-intervention. A 3-factor ANOVA investigated effects of condition and intervention. Results: 9 of 15 (V) and 10 of 15 (C) completed the program. In V, a FFS pattern was observed in 9 of 9 post- versus 5 of 9 pre- when barefoot, and 5 of 9 post- versus 0 of 9 pre- when shod. In C, a FFS pattern was observed in 4 of 10 post- versus 3 of 10 pre- when barefoot, and 0 of 10 both pre- and post- when shod. Hip kinematic data analysis is on-going. Conclusion: A 12 week transition program to SBR induces a change to a more FFS pattern when barefoot, which

persists when shod. The effect on hip kinematics appears small. SBR may be an effective training tool for runners aiming to develop a more FFS pattern.

### **EXSC11: Repeatability, systematic bias, measurement limits and reliability of Bodymetrix™ ultra-sound in body composition assessment of female collegiate students.**

**Melvin E.** Mahony N, Donne B.

Human Performance Laboratory, Anatomy Department, Trinity College Dublin

Introduction: measurement validity in sports medicine research is critical for interpretation of results as better reliability allows for improved detection of meaningful longitudinal changes in athletic populations. Purpose: to determine the measurement limits and reliability of the Bodymetrix™ ultrasound machine; a non-invasive method for assessment of body composition. Methods: repeat measurements were made of subcutaneous fat thickness at 7 anatomical sites (chest, subscapular, axilla, triceps, supraspinale, iliac and thigh) in 24 female college athletes using the Bodymetrix™ ultrasound machine. Body fat percentages (%BF), computed by the device using the Jackson-Pollock formula, and the sum of 7 skin thicknesses (7SCT) were recorded. Statistical Analysis: Repeatability was determined using intra-class correlation coefficients (ICC 3,1). Bland-Altman plots and Pearson product moment correlation coefficients (r) were used to assess systematic bias and scedasticity of measurement. Measurement limits; reliability were expressed as either % coefficient of variation (Heteroscedastic;  $r > 0.5$ ) or 95% limit of agreements (95%LOA) (Homoscedastic;  $r < 0.3$ ); and as % technical error of measurement (%TEM). Results: ICC for 7SCT and %BF were 0.81 and 0.83 respectively; measurement variation was homoscedastic in both cases ( $r < 0.3$ ) and there was minimal systematic bias. Measurement limits expressed as 95%LOA were -15 to +20mm for 7SCT and -3 to + 4% for %BF; and, % TEM was ~ 9 % and 5% respectively. Conclusion: Repeat BodyMetrix™ 7SCT and %BF data showed moderate repeatability, minimal bias, wide 95%LOA and high %TEM, which were just at the limits of acceptability as a body composition measurement device in female athletes.

### **EXSC12: Can ‘Groucho running’ arboreal primates teach humans how to reduce running injuries?**

**Ó’Cathain C.** Moran K.

School of Health and Human Performance, Dublin City University

Background: impact accelerations, “shock-waves”, produced when the foot strikes the ground, cause a number of running related injuries e.g., stress fractures, osteoarthritis. Altering running technique may reduce these accelerations. One solution, ‘Groucho running’, taken from primates who manage to run with low impact on thin branches, involves “keeping the hips low and knees flexed more”. Purpose: to investigate the effect of Groucho running on impact accelerations and energy consumption in comparison to normal running. Methods: 12 healthy, injury-free, participants were taught over 3 weeks how to Groucho run. They then completed a day of Groucho and a day of normal running tests, in random order: (i) an impact acceleration and knee;hip kinematics test, and (ii) an energy consumption test. Results: Groucho running (i) significantly decreased sacral ( $\downarrow 22\%$ ;  $P < 0.01$ ) and head ( $\downarrow 28\%$ ;  $P < 0.01$ ) impact accelerations and reduced (non-significantly) tibia accelerations ( $\downarrow 12\%$ ;  $P = 0.20$ ), and (ii) significantly increased energy consumption ( $\uparrow 10\%$ ;  $P = 0.02$ ). These differences were due to a more compliant running technique: increased knee and hip flexion at foot-ground contact ( $\uparrow 12^\circ$ ,  $\uparrow 10^\circ$ ,  $P < 0.001$ , respectively) and at terminal loading ( $\uparrow 10^\circ$ ,  $P = 0.02$ ;  $\uparrow 10^\circ$ ,  $P < 0.001$ ,

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respectively). Conclusion: Groucho running decreases impact accelerations and therefore has the potential to (i) decrease the rate and severity of running related injuries, and (ii) allow ‘at risk’ groups to run (e.g. obese, osteoporotic). In addition, Groucho running provides greater health benefits associated with higher energy consumption, which is extremely important given the high prevalence and impact of hypokinetic diseases (e.g. CVD, diabetes, hypertension). Thanks primates.

### **EXSC13: Comparison between 8-week high intensity interval training versus lactate threshold training programs on performance indicators in male triathletes.**

**O’Mahony R, Donne B.**

Human Performance Laboratory, Anatomy Department, Trinity College Dublin

Introduction: high intensity interval training (HIIT) can enhance performance variables such as  $\text{VO}_2\text{max}$ , maximum power and load at lactate threshold ( $T_{\text{Lac}}$ ) when compared to other training scenarios. Purpose: to determine which training programme produces the greatest improvements in performance indicators over an 8-week in-season intervention phase. Methods: club level male triathletes ( $n=16$ , mean  $\pm$  SD;  $31 \pm 4$ yr,  $182 \pm 5.5$ cm,  $82.4 \pm 8.4$ kg,  $49.8 \pm 5.3$ mL.kg<sup>-1</sup>.min<sup>-1</sup>) completed a repeated measures randomised controlled study. After familiarisation, triathletes attended for a graded incremental test and were randomly assigned to one of two 8-week training interventions (HIIT or Threshold) based on maximum power output. Once completed, a second graded incremental test was performed. Heart rate, blood lactate and power output data were collected and lactate threshold determined using the V-slope method. Pre- and post-intervention data were analysed using a 2 factor ANOVA with time as a repeated measure,  $P<0.05$  inferred significance. Results: there were significant global time effects ( $P<0.05$ ) detected for  $\text{VO}_2\text{max}$ , blood lactate concentration at  $T_{\text{Lac}}$ , heart rate at  $T_{\text{Lac}}$  and max load, however, these differences were not attributable to either intervention. No significant differences in load at nominal concentration of 2mmol.L<sup>-1</sup> or load at  $T_{\text{Lac}}$  were detected across time or group. Further analysis revealed significant increases ( $P<0.05$ ) in max load and significant decreases ( $P<0.05$ ) in HR at  $T_{\text{Lac}}$  independently of assigned group. Conclusion: the only significant advantage, for club level triathletes, in adopting HIIT programs in-season is a reduced overall training time commitment (96 vs. 203min.wk<sup>-1</sup>).

### **EXSC14: Effects of an exercise based training programme on neuromuscular outcomes in a Gaelic football and hurling population, a cluster randomised controlled trial.**

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Purpose: team-based neuromuscular training programmes have been tested in female and adolescent athletes in soccer, handball and basketball, with limited research in adult male field sports. This randomised controlled trial explored whether a multifaceted GAA-specific 8-week neuromuscular training programme could improve lower limb dynamic stability and neuromuscular control in male Gaelic footballers and hurlers. Methods: two collegiate teams, one football, one hurling, ( $n=41$ ), were randomised into the intervention group, undertaking a 15 minute programme of neuromuscular training exercises at the start of team training sessions, twice weekly for 8 weeks. The remaining two teams ( $n=37$ ) acted as the control, participating in usual team training. Lower extremity stability (Y-Balance Test) and jump-landing technique (Landing Error Scoring System) were assessed pre and post intervention.

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Ethical approval was granted by UCD Research Ethics Committee. Results: improvements in mean composite YBT scores after the trial were statistically greater ( $P<0.05$ ) in the intervention group (I) than in the control (C) for both right (I:+3.2% C:+0.4%) and left (I:+4% C:+0.8%) legs. Mean LESS scores were similar at pre-test (I: 7.1, C: 8.1), but there was a statistically greater ( $P<0.05$ ) reduction in mean error score in favour of the Intervention group after training (I:-3.0 C: -0.9). Group classification in the intervention group went from poor (LESS score  $>6$ ) to excellent (LESS score  $\leq 4$ ). Conclusion: clinically and statistically significant improvements in dynamic balance and jump-landing technique occurred in collegiate level Gaelic football and hurling players who participated in a GAA specific 8-week neuromuscular training program, when compared to usual training.

### **EXSC15: Comparison of dynamic warm-up protocols on anaerobic exercise performance in male athletes.**

**Whelan D, Donne B.**

Human Performance Laboratory, Anatomy Department, Trinity College Dublin

Purpose: Usage of a dynamic warm-up (DWU) has replaced static stretching as the warm-up of choice for many athletes. Recent research has investigated usage of a weighted dynamic warm-up (WDWU) as a means of enhancing performance. The aim of this study was to compare a DWU with a WDWU using a weighted vest equivalent to 10% of an individual's body mass and its effect on anaerobic performance. Methods: fifteen ( $n=15$ ) athletes completed a repeated measures randomised controlled study. Following familiarisation, each participant returned for testing on four separate occasions to investigate a single outcome measure during each visit. The outcome measures investigated were vertical jump (VJ), standing long jump (LJ), 20m sprint time and a modified Illinois speed agility test. Data were analysed using a repeated measures ANOVA with Tukey *post-hoc* analysis completed as required. Results: improvements in VJ, LJ and 20m sprint performance were detected ( $P<0.05$ ) following both warm-up conditions when compared to baseline. No significant differences were identified in the modified Illinois speed agility test data following either warm-up when compared to baseline. No significant differences were detected between DWU and WDWU in any of the outcome measures assessed. Conclusion: a DWU can enhance an athlete's VJ, LJ and 20m sprint times but does not result in improved speed agility performance. The addition of a weighted vest, equivalent to 10% of body mass, does not result in improvements in anaerobic exercise performance when compared to a non-weighted DWU.

### **EXSC16: An investigation into the effect of a high intensity intermittent exercise protocol on drop jump performance**

**Whyte E, Moran K, Richter C**

Athletic Therapy and Training, School of Health and Human Performance, Dublin City University

Background: Elements of sporting performance have been observed to decrease after high intensity, intermittent exercise. However, this decrease is not always evident in short duration, maximal effort activities. It has been suggested that athletes employ compensatory mechanisms to maximise performance. Purpose: This study aims to investigate the effect of a high intensity intermittent exercise protocol on drop jump performance. Methods: 10 healthy, active males (age:  $25.46\pm 2.73$ ) performed maximal effort drop jumps pre and post a high intensity, intermittent exercise protocol. One cycle of the protocol involved a 10 metres forward sprint with a  $90^\circ$  change of direction followed by a backwards sprint for 5 metres

## EXERCISE SCIENCE

(x4times). This was followed by two-legged jumps (x10 times), high knee side stepping over 50cm hurdles (x10 times) and a lateral 5 metre shuffle (x4 times). The participant was given a 30 second break before repeating the course. This was continued until the participant reported 18 on Borg's Scale of perceived exertion. Drop jump performance characteristics were measured using Vicon 3-D motion analysis and 2 AMTI force plates. Results: Despite a reduction in lap completion time ( $P=0.006$ ), repeated measures ANOVA analysis demonstrated no change in jump height ( $P=0.944$ ), ground contact time, ankle, hip and knee joint excursion, stiffness, peak concentric and eccentric power ( $p>0.05$ ). Conclusion: Despite signs of fatigue, there was no difference in drop jump performance or technique in the variables assessed. This suggests that there is a reserve of neuromuscular power generation for maximal efforts of short duration post high exertion exercise.

## **OR1: withdrawn by author**

## **OR2: Arthroscopic bony correction and labral repair for mixed cam and pincer femoro-acetabular impingement (FAI): minimum one-year clinical outcome**

**Carton P, O'Shea O.**

The Hip and Groin Clinic, Whitfield Clinic Medical Centre, Butlerstown North, Waterford.

**Introduction:** labral pathology is a recognised source of hip and groin pain in the young athletic population. Labral repair may have advantages over debridement in restoration of the suction seal, improving joint lubrication, preserving an increased surface area and improving stability. **Study aims:** to demonstrate the objective clinical improvement in patients following arthroscopic labral repair with a min one year follow up. **Methods:** between September 2009 and June 2011, 173 patients who underwent arthroscopic labral repair for FAI and had completed pre- and post-operative outcome assessments, were included in the study. Internationally validated outcome assessments were utilised, including the Harris Hip Score (HHS), Short Form (SF) 36, UCLA activity rating and WOMAC osteoarthritic index. Patient satisfaction surveys were also completed postoperatively. Clinical outcome and patient satisfaction scores at a minimum of one-year follow up were analysed. **Results:** the median preoperative HHS was 81; median postoperative scores were 96 at 1 year and 100 at 2 years; ( $P<0.01$ ); UCLA activity rating increased from a median pre-operative value of 8, to 9 postoperatively ( $P<0.05$ ); SF36 scores increased from a median of 76 to 89 ( $P<0.05$ ); the WOMAC score reduced from a median value of 12, to a postoperative value of 5 ( $P<0.01$ ). For 87% of patients, the outcome of surgery met their expectations. **Conclusion:** Objective clinical outcome assessment, at a minimum of one-year follow-up, demonstrated a statistically significant functional improvement for patients with FAI undergoing arthroscopic labral repair.

## **OR3: Arthroscopic management of femoro-acetabular impingement: influence of symptom duration on clinical outcome, in competitive and recreational athletes.**

**Carton P, O'Shea O.**

The Hip and Groin Clinic, Whitfield Clinic Medical Centre, Butlerstown North, Waterford.

**Introduction:** femoro-acetabular impingement (FAI) may be present in up to 15-20% of the young active population. Symptoms are often non-specific and subtle, leading to delays in diagnosis and resulting in progressive damage to the labrum and articular surface; this may affect the success of surgery and predispose to early osteoarthritis. **Purpose:** to examine the influence of symptom duration on clinical outcome following surgery. **Methods:** all patients undergoing hip arthroscopy for FAI between January 2009 and May 2012 had pre- and post-operative (3 month, 1 and 2 years) clinical outcome assessments performed, using internationally validated scoring systems (Harris Hip Score, UCLA Activity Scale, Short form 36 and the WOMAC score); all patients also completed a satisfaction survey and a detailed questionnaire relating to type and duration of symptoms including their level of sporting involvement. **Results:** 454 patients were included in the study. Overall there was a statistically significant improvement in clinical outcome, following surgery ( $P<0.05$ ), which met patient expectations in 86.5%. Long periods of symptom duration were observed: <6 months (20.7%); 6-12 months (28.6%); 1-2 years (21.2%); 2-5 years (21.4%); >5 years (8.1%). Younger patients ( $P<0.05$ ) and males ( $P<0.01$ ) presented earlier. Longer symptom duration influenced clinical outcome (HHS at 3 months,  $P<0.05$ ) and (UCLA, SF36, WOMAC) at one year following surgery ( $P<0.05$ ). **Conclusion:** delay in diagnosis with prolonged duration of



symptoms will influence clinical outcome following surgery. Developing strategies to improve the awareness and diagnosis of FAI may help reduce the level of damage to the joint and maximise the success of surgery.

### **OR4: Tranexamic acid reduces blood loss and blood transfusion requirements in primary total hip arthroplasty.**

**Efuwape A**, Hamadto M, Queally J, Bennett D, Hughes B, O'Grady P, Yacoub O.  
Department of Orthopaedic Surgery, Mayo General Hospital

**Introduction:** total hip replacement is a commonly performed procedure and many patients wish to return to sport and exercise following surgery. There are significant risks associated with surgery and significant blood loss may be problematic. Tranexamic acid is an antifibrinolytic agent that has been proven to reduce peri-operative bleeding in gynaecological surgery. **Purpose:** the aim of this study was to investigate the effect of a single preoperative bolus dose of tranexamic acid (15mg/kg) on peri-operative blood loss and packed cell transfusion requirements in primary total hip arthroplasty. **Methods:** a prospective, randomised, double-blinded, controlled trial was conducted on patients undergoing primary total hip arthroplasty. 40 patients were randomized to receive either 15 mg/kg tranexamic acid (TA group) or an equal volume of saline (placebo group) given 15 minutes before incision. Peri-operative and postoperative blood loss and transfusion requirements were recorded. **Results:** peri-operative blood loss was not significantly different between the two groups (TA: 460 mL, placebo 540 mL;  $P=0.09$ ). Postoperative blood loss up to 24 h, and total blood loss were significantly less in the TA group: 321 vs 532 mL ( $P=0.013$ ), and 801 vs 1038 mL ( $P=0.013$ ), respectively. Packed red blood cell transfusion requirements were significantly lower in the TA group (1/20 patients, total 2 units) compared to the placebo group (6/20 patients, total 13 units). **Conclusion:** Tranexamic acid 15 mg/kg given as a single preoperative bolus dose reduces postoperative and total blood loss, and packed cell transfusion requirements in primary total hip replacement surgery.

### **OR5: Preliminary results of the 'Surgilig' synthetic ligament in the management of acute acromioclavicular joint separation.**

**Gibson N**, McKeown R, Craig D  
Trauma and Orthopaedics Dept., Craigavon Area Hospital, N. Ireland.

**Introduction:** acromioclavicular joint dislocation is a relatively common shoulder girdle injury. It is generally accepted that Rockwood type I and II acromioclavicular joint injuries are successfully treated conservatively, the ideal treatment for type III injuries remains a matter of debate, and type IV, V and VI require surgical fixation due to pain and dysfunction. This surgical technique involves the use of a polyester fibre, braided synthetic ligament, which acts as a scaffold encouraging tissue in-growth. **Methods:** Between November 2009 and March 2012, 27 patients proceeded to Surgilig reconstruction of the acromioclavicular joint. The indication for surgery was as a result of a traumatic injury to the shoulder, resulting in a displaced acromioclavicular joint, resulting in a loss of function, equating to a Rockwood >III. **Results:** The functional outcome of 25 patients (2 lost to follow up), whom were on average 16 months post-surgery, were assessed with validated outcome scores, Oxford Shoulder, Nottingham Clavicle and Constant Shoulder. Ratio male: female, 8:1; mean days to surgery 29; Constant score 91; Oxford score 43; and Nottingham score; 85 At follow up, most patients reported a return to work and sporting activities. **Conclusions:** this study suggests very positive early results for the use of Surgilig in primary acute acromioclavicular

dislocations. The benefit of a single definitive operation has major benefits in the public health care setting, with only one night in hospital, and no need to return to surgery for removal of plates and screws etc.

### **OR6: Exostosis of the shoulder in athletes, can they play?**

**Suhail U, Adebowale N, Rowan F, O'Grady P.**

Department of Orthopaedic Surgery, Mayo General Hospital.

**Introduction:** shoulder injuries are common place in many contact sports. Osteochondroma (exostosis) are the most common benign bone tumour accounting for 20-50% of benign bone tumours. Upper limb osteochondroma may incidentally present during routine x-rays for shoulder injuries. They present a management dilemma for the sports physician. The incidence of vascular and neurological injuries is increased in patients with a bony exostosis, particularly in contact sports. **Methods:** proximal humeral osteochondroma were retrospectively reviewed. Clinical, operative, radiological and histological data were analysed. Surgical or non-surgical clinical pathway was reviewed and outcome measures were recorded and analysed with univariate and categorical statistics. Specific details of sporting participation and return to sport following surgery were assessed. **Results:** There were sixteen patients, ten male, with a median age of 34.9 years. Seven presented incidentally. Thirteen were humeral and three were scapular. Six required surgical excision due to cartilaginous cap size >1.5cm or mass-effect symptoms. There were no complications in the operative cohort. All patients reported no difference in shoulder ROM and there was no difference in DASH score at final follow up ( $P=0.19$ ). **Conclusions:** Upper limb osteochondroma are an independent risk factor for athletes. Excisional biopsy of symptomatic osteochondroma is safe and does not negatively affect function of the upper limb. We present our experience managing upper limb osteochondroma and suggest a management algorithm.

### **OR7: Cost containment and managed patient care in economic times of crisis**

**Walsh M, O'Grady P**

Department of Trauma & Orthopaedic Surgery, Mayo General Hospital

**Background:** currently in Mayo General Hospital, over 500 patients per year receive intra-articular injections for the treatment of arthralgia. In the orthopaedic clinic, the average waiting time for assessment prior to an intra-articular injection is twenty-two months (as of June 2011). Patients are then reviewed back in clinic six to eight weeks after the procedure. As a result, over 500 patients each have two outpatient clinic appointments. Traditional follow-up in the outpatient clinic can lead to long waiting times for patients and consequent parking and transport costs. **Methods:** Forty patients who received intra-articular injections were followed up by telephone review. This was used in place of the traditional outpatient follow-up. All suitable patients were identified at the initial pre-procedure evaluation and given a copy of the oxford pain score with their procedure appointment letter. The CNS in Pain Management telephoned the patient six-weeks post procedure and a second oxford pain score was assessed over the phone. A comparison was made between the score pre-treatment and that post-treatment. **Results:** As a result of the phone call, 15 (37.5%) patients required further Orthopaedic follow up and an appointment was activated by the CNS; and, 25 (62.5%) patients were discharged to the care of their GP. **Conclusion:** from this pilot study, we have shown that follow up by a CNS via telephone can reduce unnecessary follow up in busy outpatient departments and subsequently reduce cost for both the patient and the hospital.

### **CS1: Helmets for hockey?**

**Clarke S, Barton D.**

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Purpose: hockey is a popular sport in Ireland, not without significant injury risk considering the hard ball used and the increased use of aerial play as demonstrated in our following case presentations. Methods: 3 players who suffered injury during hockey matches presented to the emergency department. All 3 were referred for CT brain following clinical examination. Case 1: 23 year old male hit in the head by hockey ball to right parietal region, CT brain showed a traumatic subarachnoid haemorrhage. Case 2: 30 year old female hit in the head by hockey ball, CT Brain showed haemorrhagic contusion left temporal lobe and a minimally displaced fracture of the temporal bone. Case 3: 30 year old female, hit by a hockey ball just above the right eye, sustained a large periorbital hematoma, with a laceration necessitating sutures. CT Brain was normal. Results: 3 different head and facial injuries sustained playing hockey are presented. All required CT imaging in the Emergency Department. Conclusion: Helmets have been successfully introduced in the last number of years in all age levels in hurling and camogie. We ask the question if it is time for the lawmakers in hockey to consider the introduction of helmets to improve the safety for all participants in the sport.

### **CS 2: A series of facial bone fractures in rugby football.**

**<sup>1</sup>Francis E, <sup>1</sup>Quinn E, <sup>1</sup>Ryan J, <sup>2</sup>Heffernan E**

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Introduction: 11-40% of all sports injuries involve the face, predominantly due to direct hits with a ball or player-to-player contacts. The highest incidence are seen in the 20-30 year old age demographic. Team sports are responsible for the majority of facial fractures. Sports related facial trauma is one of the most common presentation to the ED. Increasing numbers of patients are undergoing surgical intervention. Maxillofacial injuries are more common among professionals compared to amateurs (86% and 42.1%). Purpose: to review facial bone fractures sustained from an International to an amateur level in rugby football. Methods: We retrospectively identified two International, one Leinster and one schools rugby players through emergency department records who had been investigated with plain films and CT and treated for facial bone fractures. Results: both International players aged between 20-30, sustained blows to the face causing fractures, one during an International fixture and another in training. The provincial and schools rugby players sustained facial bone fractures by player-player collision. All players required ophthalmology and maxillofacial consults and one player underwent surgical repair. Discussion: facial bone fractures represent a common presentation of sports related trauma to the ED. It is important to note common patterns of injury that vary with the sport being played and to understand the mechanism of injury while conducting your clinical assessment. If there is clinically a high index of suspicion CT facial bones is indicated. Facial bone fractures require an MDT approach especially in elite athletes facilitate an early and safe return to play.

### **CS3: Acute Shoulder Injury with a normal x-ray: a simple algorithm of patient assessment to guide the need for further imaging.**

**Kelly P, O'Rourke S.**

Emergency Department, Midlands Regional Hospital, Tullamore, Co Offaly

**Purpose:** patients presenting to their General Practitioner or to the Emergency Department following an acute shoulder injury but a normal x-ray may have a significant underlying injury to the Rotator Cuff. Imaging (whether by ultrasound or MRI) is often indicated but available clinical evidence has yet to establish what group of patients benefit most from early imaging. **Methods:** In March 2012 a multidisciplinary approach has been introduced to assess adult patients attending the Emergency Department with acute shoulder injuries, severe pain and/or restricted shoulder movement, but a normal x-ray. This involved a senior medical assessment within 7 days following presentation. All patients with pseudo-paralysis (defined as the inability to abduct the shoulder beyond 45°) and patients with abduction in the range of 45-90° with positive clinical tests suggesting significant rotator cuff involvement are referral for urgent ultrasound. Image confirmed acute, full thickness rotator cuff tears were seen within ten days by an orthopaedic surgeon with a special interest in shoulder surgery. **Results:** to date 25 patients have been assessed. 11 patients (aged between 42 and 80 years) have met the criteria for early imaging for acute rotator cuff tears. Five confirmed acute tears of the rotator cuff have been referred for early surgical intervention. One patient had a fracture of the greater tuberosity not seen on x-ray. **Conclusion:** early post-trauma assessment of patients with acute shoulder injuries with normal x-rays using simple assessment criteria will identify patients at significant risk of acute rotator cuff tears requiring early surgical intervention.

### **CS4: Ball Games: Participation in contact sports and Testicular Trauma.**

<sup>1,2,3</sup>**Lundon D,** <sup>2</sup>Kelly B, <sup>1</sup>O'Kelly F, <sup>1</sup>Thomas A, <sup>1</sup>Lennon G, <sup>1</sup>Galvin D, <sup>1</sup>Mulvin D, Quinlan D<sup>1</sup>

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**Introduction:** Testicular tissue is immensely delicate and vulnerable to injury. Some sporting bodies in Ireland have introduced mandatory protective equipment for head injuries, but not for other commonly injured organs. The Irish Sports Monitor Report has shown increases in participation in contact sports amongst physically active men. With the increase in participation, there has been anecdotal evidence that there is a corresponding increase in the rate of testicular trauma. Blunt trauma to the scrotum can cause subcutaneous scrotal-haematoma, haematoscrotum, testicular dislocation and/or testicular rupture. Testicular rupture is present in up to 50% of direct blunt scrotal traumas. The consequences of this injury include infection, testicular atrophy, sub-fertility and orchidectomy. Urgent surgery is often indicated. **Methods:** Data was collected on all cases of blunt testicular trauma (n=11) in young males aged from 17 to 37years, presenting to a tertiary hospital from July 2011-July 2012. **Results:** All of these injuries were obtained from sporting pursuits; severity ranged from American Association for Surgery of Trauma(AAST) grade1 to grade3. Urgent investigation was performed and treatment was in accordance with the European Association of Urology(EAU) guidelines. **Conclusions:** In the diverse catchment area of this institution, relatively few contact sports contribute to all of the injuries. This highlights the need to educate sports participants on the potential benefits of utilising protective equipment. And crucially for the pitchside doctor/physio, this series highlights the caveat that with testicular trauma- "time is testicle", as prompt surgical intervention is frequently indicated.

### **CS5: External iliac artery endofibrosis and claudication in endurance athletes**

**McCafferty M**, Kheirelseid E, Martin Z, Haider N, Colgan M, Moore D, Madhavan P, O'Neill S.  
Vascular Department, St James' Hospital, Dublin

**Introduction:** external iliac artery (EIA) endofibrosis is a relatively uncommon non-atheromatous vascular condition specific to endurance athletes, particularly cyclists. It is a flow-limiting phenomenon that restricts an athlete's maximum exercise performance. It is difficult to diagnose as symptoms are often attributed to musculoskeletal injury. **Methods:** we present a series of five cases of endofibrosis in three female endurance athletes. The patients described lower limb claudication symptoms during intensive exercise. All patients had an ankle brachial pressure index (ABPI) and lower limb arterial duplex measured at rest and post simulated maximal exercise. Lower limb magnetic resonance angiography (MRA) was performed prior to elective endofibrosectomy and patients were followed-up clinically with non-invasive testing. **Results:** the mean age was thirty-six years. Two patients had bilateral disease. Clinical examinations were normal and peripheral pulses were present in all cases. Resting ABPIs were normal and Doppler ultrasound of the lower limb arteries showed relatively normal velocities. Post-exercise (10-20 min) a greater than 50% drop in ABPI was recorded in the symptomatic limb coinciding with significant increases in flow velocities through the EIA. MRA aided surgical planning. All patients had uneventful EIA endofibrosectomy with long saphenous vein patch plasty. Post exercise ABPIs and flow velocities were normal at two month follow-up. **Conclusions:** focused history with pre- and post-exercise ABPIs and arterial duplex imaging are essential in making the diagnosis of endofibrosis in symptomatic athletes. Endofibrosectomy with autologous patch angioplasty is a favourable surgical option in its management.

### **CS6: The 'Green Prescription' Physical Activity Case Study**

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**Purpose:** the 'Green Prescription' programme involves referral of patients by the GP to community walks and has been piloted in County Donegal. This case series study aimed to outline the process of implementing the programme, its' feasibility, acceptability and initial effects on referred walkers and primary care practice in relation to physical activity in one community. Recommendations regarding further development of the programme are also made. **Methods:** the research design is primarily qualitative with two focus groups (referred walkers and community walkers) and five interviews (general practitioner, support worker, walking leader, community leader and programme co-ordinator). **Results:** Many aspects of the model were successfully implemented and all stakeholders were positive about the programme, while making suggestions for improvement. Patients' self-reported benefits included increased physical activity levels, decreased blood sugar levels in diabetics, decreased weight, reduced medication and making greater social connections within the community. Increased self-confidence to undertake physical tasks including more walking as a result of the programme was prominent. The GP saw benefits in having a structured programme for patients compared to giving advice but cited time constraints as a consideration. The GP referred to the transition 'from patient to walker in the walking group'. **Conclusion:** this programme provides real possibilities for primary care to refer patients to a community-based programme and opportunities for communities to support members. The evaluation of the refined model in a more comprehensive roll-out is recommended, including establishing the best method of engaging and supporting GPs and communities to implement the programme.

### **CS7: Arthroscopic synovectomy in the management of synovial proliferative disorders of the knee**

<sup>1</sup>Memon A, <sup>2</sup>Bennani F, <sup>3</sup>Ryan R, <sup>4</sup>Lowther D <sup>1</sup>O'Grady P

<sup>1</sup>Department of Orthopaedic Surgery, Mayo General Hospital. <sup>2</sup>Department of Pathology & <sup>3</sup>Department of Radiology, Mayo General Hospital. <sup>4</sup>Sports Clinic West, Castlebar, Co. Mayo

Introduction: synovial proliferative disorders of the knee may present with recurrent effusions that are resistant to normal treatment modalities. We present a case series of 4 rare synovial disorders that were treated with an arthroscopic synovectomy. This 'limited surgical' approach can facilitate an early return to sport and activity as opposed to an 'open synovectomy'. Case (1): lipoma arbroescens (LA) is a rare condition of the knee that can simulate an inflammatory arthropathy. It is characterised by villous lipomatous proliferation of the synovium. Synovial proliferation with fatty infiltration can often be identified with an MRI scan. Case (2): pigmented villonodular synovitis (PVNS) is a benign local aggressive tumour of the synovium. It may present as a recurrent monoarticular haemarthrosis. MRI features include the presence of intra articular nodular masses of low signal intensity with haemosiderin deposition. Case (3): synovial chondromatosis is characterized by the metaplastic conversion of cartilagenous tissue in the synovial tissue to ossified loose bodies. Plain radiographs are often sufficient for diagnosis. Case (4): haemophilic arthropathy may occur with recurrent haemarthrosis due to coagulation disorders such as haemophilia. This may induce synovial proliferation with further bleeding and chronic synovitis. Discussion: synovial Proliferative disorders should be considered in patients with recurrent knee effusions and soft tissue swelling resistant to conservative management. We report 4 cases in patients successfully treated with an arthroscopic synovectomy.

### **CS8: Acetabular fractures in the skeletally immature rugby player: a case series**

**Morrissey D**, Leonard M, Good D, Devitt B, Morris S, McElwain J

Department of Trauma Orthopaedics and Reconstructive Pelvic and Acetabular Surgery Adelaide and Meath Incorporating the National Children's Hospital, Tallaght, Dublin

Background: since the introduction of professionalism to the sport of rugby union, an increasing rate of injury has been noted in the playing population. Acetabular fractures are generally seen after violent trauma and can be associated with poor long term outcomes. We have previously described two acetabular fractures in young patients (16 and 24 years of age) sustained during rugby matches. Purpose: here we present a case series of four isolated hip dislocations with acetabular fractures in three skeletally immature young male patients (13-16 years of age), two of which required open reduction and internal fixation. Cases: all fractures were sustained whilst engaged in playing rugby union. Over a two year period, three skeletally immature patients were referred to a tertiary referral service with fractures of the acetabulum, sustained whilst playing rugby. One patient had sustained bilateral acetabular fractures. Open reduction and internal fixation was performed in two of these patients, with two fractures treated conservatively. Acetabular fractures are uncommon injuries, mostly encountered following high energy trauma. Discussion: we report five cases that have occurred in the past two years in four skeletally immature patients as a result of rugby injuries. We have not previously observed these injuries in a young rugby playing population. It is possible that recent changes in rules, alterations in body habitus/training regimens or a combination of these factors has resulted in players being more susceptible to these serious injuries.

### **CS9 - CS 11 Withdrawn by the authors**

### **CS12 Imaging post sports concussion – ready for the consequences?**

**Rowan C, Clarke S, Ryan J.**

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**Purpose:** concussion awareness is growing. The need for imaging is a constant question, depending on clinical presentation but may have unforeseen implications if there are unexpected findings on CT. **Methods:** 3 players who suffered concussion during rugby matches presented to the emergency department with on-going symptoms. All 3 were referred for CT brain following clinical examination. Only one patient required MRI to further assess the findings. Neurosurgical opinion was sought in all 3 cases. Case (1) 29 year old male suffered concussion. CT brain showed a colloid cyst posterior to septum pellucidum. Case (2) 19 year old male was found to have a 1cm cystic lesion in the left frontal lobe post-concussion. He had further imaging to characterise this lesion. It was determined to be most likely a post-traumatic cyst. Case (3) 20 year old male who underwent CT brain, showing an arachnoid cyst in the posterior fossa. **Results:** 3 abnormal cysts were found on CT brain, which has led to cessation of contact sports since the diagnosis for all of the above patients. **Conclusion:** careful consideration must be taken when requesting imaging following concussion. As shown, what are initially worrying clinical findings can often contribute to the already stressful experience for the patient in the emergency department. These incidental CT findings necessitate specialist assessment, further adding to the workload of the already limited neurosurgical services

### **CS13 withdrawn by the authors**

### **CS14: Surgical Repair of Massive Rotator Cuff Tears.**

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**Introduction:** Massive rotator cuff tears are a difficult problem. High re-tear rates have been reported following surgery. Double row fixation allows for secure fixation and the tendon can attach over a larger footprint. The aim of study was to evaluate the final functional outcome and overall quality of life following double row knotless fixation of massive rotator cuff tears. **Material & Methods:** All patients undergoing rotator cuff repair were reviewed. Massive tears, defined as being over 5cm, formed the study group. All patients with massive tear underwent open or mini open repair. A research physiotherapist measured clinical outcome scores including Constant Score, Oxford Shoulder Score and SF-12 were assessed. Ethical approval was obtained. **Results:** 486 patients were included. Of those 62 were classified as having massive rotator cuff tears. Mean age was 65.3 years, 68% were male. Average follow up was 11 months. Mean constant score following surgery was 74.12. Oxford Shoulder Score averaged 43.5. 72% of patients had good or excellent functional results and 78% of patients returned to work or pre-injury activities. **Conclusion:** Massive rotator cuff tears present a difficult surgical challenge. Suture anchors can provide secure fixation, leaving the rotator cuff tendon as the 'weak link'. Double row techniques allow a wider area of bone-tendon apposition and may provide a stronger post-operative construct. Early mobilization minimizes complications and improves outcomes. Patient satisfaction and functional outcome is good to excellent in selected patients with massive tears using this technique.

### CS 15 Electrolyte changes in collapsed runners immediately after a marathon

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Purpose: abnormal biochemical measurements have previously been described in runners following marathons. For example one study suggested that 31% of plasma sodium levels were outside the normal range. We have been responsible for the medical care of collapsed runners at the Brighton Marathon for the last 3 years, & describe changes seen in serum sodium, potassium and creatinine for these runners. Methods: point-of-care biochemical blood analysis was obtained from any collapsed runner treated by the medical team during the 2010, 2011 & 2012 Brighton Marathons. Results: from 44 collapsed runners were available. Mean (range) plasma estimations were sodium  $141 \text{ mmol.L}^{-1}$  ( $138\text{--}147 \text{ mmol.L}^{-1}$ ), creatinine  $154 \text{ }\mu\text{mol.L}^{-1}$  (range  $73\text{--}240 \text{ }\mu\text{mol.L}^{-1}$ ), and potassium  $4.3 \text{ mmol.L}^{-1}$  ( $3.5 - 5.5 \text{ mmol.L}^{-1}$ ). Creatinine was  $> 120 \text{ }\mu\text{mol.L}^{-1}$  in 80%. Conclusions: abnormal sodium concentrations were not a feature of collapsed runners in the Brighton marathon over a 3 year period. This may reflect the advice given out to all Brighton marathon runners to drink enough fluid to quench thirst, in contrast to older guidelines which advised drinking a specified volume. Hyperkalaemia, although well recognised, was not observed in this study. Previous studies suggest that a raised creatinine after a marathon occurs in 30-50% of runners. In our population of collapsed runners the incidence of a raised creatinine was much higher, which may reflect increased rhabdomyolysis and reduced renal clearance. Collapsed runners should be followed up and advice given to both runners and their medical professionals following marathons, to avoid exacerbating potential renal dysfunction.

### CS 16: Medical issues in marathon running – what do the runners know?

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Purpose: to determine runners' knowledge of medical issues during marathon running, and identify if further information would be of benefit. Methods: all participants of the 2012 Brighton Marathon were invited to take part in an online survey prior to the event. Results: of 9000 runners who took part in the marathon, 520 (5.8%) replied. The majority of the respondents were first time marathon runners (46%) & aged between 40-50 years (50%). 82 took medications which could worsen renal function if the runner experienced hypovolaemia and/or exertional hyperthermia during marathons. 64 took NSAIDs during training but overall only 3 respondents (0.6%) knew NSAIDs increased the risk of renal dysfunction. 28 took drugs that can predispose to exertional heat stroke (EHS), but no-one was aware of the risk. 234 (45%) were unaware of the dangers of running a marathon if suffering from a flu-like illness. Current recommendations to drink enough fluids to quench thirst were known to 284 (54.6%) respondents. 79 respondents (15.1%) requested more medically related information to help train for the marathon. Conclusions: although the response rate was low, the demographics of the respondents suggest that the population at risk of medical issues were well represented. The potential risks to marathon runners of medication related renal dysfunction & EHS were not well known. These risks would be exacerbated by the lack of awareness in nearly 50% of the respondents regarding current fluid intake guidelines.



## CASE PRESENTATIONS

### **CP1: Anterior inferior iliac spine tubular exostosis: a rare cause for femoral acetabular impingement: arthroscopic correction of deformity.**

**Carton P**, Bartha A.

The Hip and Groin Clinic, Whitfield Clinic Medical Clinic, Butlerstown North, Waterford.

A 37 year old Gaelic football player presented with recurrent groin pain on intense physical activity and squatting. He sustained an injury to his right hip after kicking a ball off of the ground 6 years earlier. A decreased range of hip motion (flexion and internal rotation) and a positive hip impingement test was noted on examination. Radiographs demonstrated a large (4-5cm) tubular exostosis extending from his anterior inferior iliac spine with minor cam and pincer deformities in an otherwise normal hip. Magnetic resonance arthrography (MRA) study was performed which confirmed minor bony abnormalities of the hip joint with mild chondral degeneration and a small area of hyper-intense signal indicating possible labral pathology. The large AIIS bone spur was considered to be the main source for the patient's symptoms and signs, and an arthroscopic excision was undertaken. The procedure was uncomplicated and the patient returned quickly to full activities, with successful resolution of his preoperative symptoms. To our knowledge this is the first ever-reported case, of a tubular AIIS exostosis, causing femoro-acetabular impingement, undergoing arthroscopic resection. The clinical findings, investigations and arthroscopic surgical resection, are presented.

### **CP2: C2 fractures in two 13 year old brothers sustained while playing rugby**

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<sup>1</sup>Emergency Department and <sup>2</sup>Radiology Department, St. Vincent's University Hospital, Dublin

Purpose: neck injuries are not uncommonly sustained in rugby football. They have short and long-term consequences. Clear diagnosis and injury reporting is important for injury prevention. Aims: to describe the radiological findings on images obtained following hyper-flexion neck injuries to two brothers aged 13, who suffered similar injuries to their necks 18 months apart. Methods: in the course of two rugby matches, one year apart, two brothers suffered hyper-flexion neck injuries with resultant pain and discomfort. MRI scans were subsequently performed. Results: the MRI of the first boy showed an avulsion fracture at the C2 spinous process with an associated ligament tear. He made a good recovery with conservative treatment and returned to rugby 9 months later. The second boy, one year later and now at the same age of 13 years also had a MRI scan performed which showed a more prominent disruption at C2 with again avulsion of the spinous process and an interspinous ligament injury. Despite a complete symptomatic recovery a flexion view suggested C2/3 subluxation. A spinal surgeon was consulted with regards to the need for fixation. Discussion: "Clay-shoveler's fracture" is a stable fracture through the spinous process of a vertebra, mainly occurring at lower cervical and upper thoracic levels. We describe a similar injury at the C2 level in two brothers sustained while playing rugby when both were 13 years of age. Conclusion: Coaches, referees, players and law makers should be aware of these injuries which can occur in young adolescents.

## CASE PRESENTATIONS

### **CP3: Costochondral disruption - radiological illustration of a common rugby injury**

<sup>1</sup>Clarke S, <sup>1</sup>Ryan J, <sup>2</sup>McCarthy C, <sup>2</sup>Moynagh M.

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Introduction: the costochondral joints are hyaline cartilaginous joints prone to separation if sufficient force is applied. There is normally no movement at these joints. Due to the forces involved in rugby football the thorax often comes under excessive stress during particularly during scrummaging which leads to a clinical presentation of a strained costochondral junction. Purpose: the aim of this presentation is to illustrate the anatomical disruption which occurs at the costochondral junction when an injury in this area is suffered while playing rugby. Methods: three players attended the Emergency Department having suffered a rib injury during the course of a match or training. They complained of severe pain in the rib and could pin point the exact location of pain. Chest x-ray and subsequent CT images were obtained. Results: plain radiographs were normal. CT scans of the thorax clearly identify the anatomical separation at the costochondral junction. Discussion: the clinical presentation of costochondral strain suffered while playing rugby is clearly demonstrated in our series as costochondral disruption with displacement.

### **CP4: In your face!**

Francis E, Quinn E, Ryan J

Department of Emergency Medicine, St Vincent's University Hospital, Dublin

We present the case of a 17-year old soccer player. He presented complaining of a right sided facial swelling and pain post mid-air collision with another player. He blew his nose post collision and noticed he could not open his right eye. Plain films confirmed he had a supraorbital fracture with air in the orbit. CT facial bones demonstrated a depressed comminuted skull fracture of the frontal bone with large volume air within the orbit. CT brain showed right frontal lobe pneumocephaly. He was transferred to Ophthalmology and Maxillofacial services where he underwent surgical repair of his frontal sinus.

### **CP5: Renal trauma on the sports field.**

Kelly B, Landon D, Jaffry S.

Department of Urology, Galway University Hospital.

We present the case of a 28-year old male soccer goalkeeper. This athlete received a "knee in the back" as he landed on the ground after catching a ball in the air. Due to excessive pain he was substituted off and was assessed at the scene by a physiotherapist and a doctor. He was alert and conscious at all times. He later developed visible haematuria and was transferred to a regional hospital. Despite an initial attempt at conservative management, this athlete subsequently required an emergency nephrectomy for a grade 4 renal Trauma. The athlete made a full recovery and was well on discharge but has not resumed playing soccer. Although renal trauma is rarely seen in contact field sports, this case highlights that urgent assessment should be sought in all potential renal injuries as the results can be fatal.

### **CP6: withdrawn by the author**

### **CP7: Avulsion fracture of the Ischial Tuberosity**

<sup>1</sup>Lowther D, <sup>2</sup>Rowan F, <sup>3</sup>Casey M, <sup>2</sup>O'Grady P

<sup>1</sup>Sports Clinic West, McHale Park, Castlebar, Co. Mayo; <sup>2</sup>Department of Orthopaedic Surgery, Mayo General Hospital; <sup>3</sup>Department of Pathology, Mayo General Hospital

A schoolboy had an acute hamstring tear diagnosed clinically, he failed to improve despite physiotherapy and four years later he had still been unable to return to sport. He had difficulty sitting for long periods at school and had intermittent paraesthesia along the lateral border of the right foot. Plain X-ray of the pelvis revealed a large avulsion fracture of the right ischial tuberosity. CT scan demonstrated an atrophic non-union of the fracture. Risks and benefits of surgery were discussed and he underwent surgical exploration of the sciatic nerve and open reduction, internal fixation and bone grafting of the ischial tuberosity. He made an uneventful recover and remains well. Avulsion of the ischial tuberosity usually occurs when sudden forcible contraction of the hamstring muscles against resistance causes excessive eccentric overload, as in sprinting. Proximal tenderness on examination should be evaluated with plain x-rays of the pelvis to exclude the presence of a fracture. Patients without a fracture should be investigated further with an MRI scan to detect a possible avulsion of the hamstring origin. A management algorithm is presented as well as a discussion of the aetiology.

### **CP8: Testicular trauma in a hurler.**

<sup>1,2,3</sup>Lundon D, <sup>2</sup>Kelly B, <sup>1</sup>O'Kelly F, <sup>1</sup>Thomas A, <sup>1</sup>Quinlan D.

<sup>1</sup>Department of Urology, St Vincent's University Hospital, Dublin. <sup>2</sup>Department of Healthcare Informatics, University College Dublin, Dublin. <sup>3</sup>Surgical Laboratory, School of Medicine and Medical Sciences, University College Dublin.

We present the case of a 31 year old hurler who presented to a tertiary care centre having sustained blunt trauma from a sliotar whilst playing hurling. Initial investigations revealed a Grade 1 (adapted AAST Severtiy) Testicular Trauma and in accordance with the European Association of Urology's treatment guidelines, this man was treated conservatively. Upon discharge from hospital at the patient's request- he was given instructions for strict rest and provided with certification not to participate in sports until further review and satisfactory resolution. Eight days following discharge from hospital the gentleman represented to hospital complaining of increased pain and swelling in his scrotum following resumption of physical activity. Further assessment revealed development of a significant haematoma and absent signal on Doppler ultra-sonography. He underwent testicular exploration and required an orchidectomy for a non-viable testis. This case demonstrates the precarious nature and one of the severe consequences of blunt testicular trauma, and the importance of patient compliance when managing testicular trauma. It also highlights the widespread absence of legislation in contact sports in Ireland to wear relatively inexpensive scrotal protective equipment.

### **CP9: Spinal cord injury during hurling.**

<sup>1</sup>Lynch D, <sup>1</sup>Smith E

<sup>1</sup>The National Rehabilitation Hospital, Dun Laoghaire, Co Dublin

Spinal cord injury occurs rarely in the game of hurling, with only 3 cases previously recorded. We present the first description of a traumatic spinal cord injury sustained during the game of hurling, with clinical and radiological correlation. Our patient is a 29 year old man who was tackled and collided against another player's knee. He was knocked to the ground and experienced immediate loss of power in the upper and lower limbs, without loss of consciousness. The patient was transferred to the National Spinal Injuries Unit, where a CT scan identified a rotatory subluxation of C1 on C2 and a fracture of the spinous process of C4. MRI confirmed an extensive area of signal change and haemorrhage within the spinal cord extending from the C2 to C5 vertebral levels. He was treated conservatively. Spinal Cord Injury classification on admission was C4 ASIA impairment grade C. The patient was later transferred to the National Rehabilitation Hospital for a period of intensive rehabilitation. He has since improved to C5 ASIA impairment grade D. His impairments are tetraparesis, neurogenic bladder & bowel, intermittent neuropathic pain and spasticity. Six months following the event he can walk short distances with crutches and still has predominant upper limb and hand weakness as a result of which he requires some assistance with personal care. While traumatic spinal cord injury occurs rarely in hurling, it is important to recognise the potential for injury, as early recognition and appropriate emergency management are essential to preventing neurological deterioration.

### **CP10: Atypical foot pain in a runner**

<sup>1</sup>Martin D, <sup>2</sup>Bennani F, <sup>3</sup>O'Grady P

<sup>1</sup>Sports Clinic West, McHale Park, Castlebar, Co. Mayo. <sup>2</sup>Department of Pathology, Mayo General Hospital. <sup>3</sup>Department of Orthopaedic Surgery, Mayo General Hospital

A social recreational runner had foot pain and paraesthesia that failed to resolve despite physiotherapy and orthotics. Plain X-Rays were normal. Clinical examination was suggestive of Tarsal Tunnel Syndrome. MRI scan revealed the presence of a Giant Cell Tumour. Complete resolution of symptoms followed surgical excision. Impingement of the Tarsal tunnel should be considered in patients with persistent foot pain and paraesthesia. We present a brief review of the aetiology, classification and management of this uncommon entrapment neuropathy.

### **CP11: Superficial peroneal nerve paresis in a dancer caused by a mid-foot ganglion**

<sup>1</sup>Martin D, <sup>2</sup>Dowling J, <sup>3</sup>Casey M, <sup>2</sup>O'Grady P

<sup>1</sup>Sports Clinic West, McHale Park, Castlebar, Co. Mayo. <sup>2</sup>Department of Orthopaedic Surgery, Mayo General Hospital. <sup>3</sup>Department of Radiology, Mayo General Hospital

Ganglia are the most common soft-tissue masses of the foot and ankle. Forefoot ganglions are typically located dorsal to the MTP joints and tendons. Tight dancing shoes may cause friction over the dorsum of the foot, repetitive trauma may lead to mucoid cystic degeneration and ganglion formation. **Most ganglions are slow growing and asymptomatic,**

## CASE PRESENTATIONS

neurological impairment is rare. We present the case of a young Irish dancer with a forefoot ganglion. There was no history of trauma or infection. On examination she had altered sensation in the lateral border of the foot. Tinel's sign was positive and the lesion transilluminated with the superficial peroneal nerve visible as it was stretched over the swelling. Symptoms resolved after surgical excision and she returned to dancing, there was no recurrence at follow up one year later.

### **CP12: A sinister cause of shoulder pain**

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A 54 year old social golfer was complaining of left shoulder pain and was been treated for a suspected rotator cuff injury. He failed to resolve with anti-inflammatories, physiotherapy and injections. Plain radiographs were unremarkable. 'Red flags' included night pain and weight loss. MRI scan revealed a lesion of the left scapula. Staging CT scan of the thorax, abdomen and pelvis (CTAP) demonstrated multiple metastases. An adenocarcinoma of the rectum was identified as the primary. This case is very unusual in the distribution of the metastases, in that he has sparing of his liver, lymph nodes and spine. In view of the disseminated nature of his disease he is been managed with chemotherapy and radiotherapy. Shoulder pain is a common complaint in people who play overhead sports and rotator cuff injuries and impingement are the usual aetiology. A high index of clinical suspicion is required to diagnose more sinister pathology. Careful identification of 'red flags' is an essential part of the management of musculoskeletal pain.

### **CP13: Atraumatic posterior hip dislocation in a 16 year old recreational soccer player**

**Massey A.**

Medical Department, Irish Football Association, Belfast, Northern Ireland

The case of a 16 year old male recreational soccer player. He presented with hip pain and deformity. The mechanism of injury was one of weight-bearing on the right leg whilst the opposing player stood on his right foot. There was a resultant external rotation movement of the right hip and the patient described a bilateral abduction movement of both hips – akin to doing the splits. Immediately the patient complained of pain and inability to move the leg actively. Initial analgesics were given. The patient described pain in the region of his right thigh mid shaft femur. There was also tenderness over the right ischial tuberosity. All active and passive movements were severely restricted by pain. There was no neurovascular compromise. The posterior dislocation was confirmed on plain X-ray and reduction was performed within 6 hours of the event. The Rochester Method was employed. Reduction was obtained by traction, internal rotation, and then external rotation once the femoral hip cleared the acetabular rim. There was no obvious fracture seen on initial X-ray, so a CT was arranged that displayed no femoral head or acetabular fracture and no loose intra articular fragments. MRI was arranged at 8 week follow up, which excluded any avascular necrosis.

### **CP14: ‘I’m Grand Doctor’.... Concussion in a professional rugby player**

**Meighan V, O’Donnell J.**  
Galway University Hospital

Background: concussion remains a controversial issue in contact sport. Assessment tools are limited and reliance is made on player disclosure and a high degree of clinical suspicion. Discussion: a 25 year old professional rugby player sustained an injury when playing for his province in February 2012. During a ruck, he was kneed to the right temple by a team mate. He was ‘dazed’ and so was assessed immediately by the Team Doctor. He sustained no loss of consciousness and answered all Maddox questions correctly. He had no external evidence of head injury. Eager to play on, he was reassessed and allowed. At half time he still had no symptoms and was extremely keen to play. During the second half he vomited and was taken off. He remained asymptomatic after the match, not nauseated/ vomiting and had no headache and so was allowed home. The following morning he was asymptomatic and feeling well. At 36 hours post injury he started to develop a mild parietal headache and became nauseated. His team doctor organized a CT brain to exclude a traumatic brain injury. His CT demonstrated a small focal intraparenchymal bleed in association with an undisplaced temporal bone fracture. Beaumont Hospital Neurology team advised conservative management with rest and analgesia and not to return to play for 12 weeks. He has subsequently been assessed by a consultant neurologist who advocated wearing protective head gear in future. He continues to make a good recovery and has returned to play since June.

### **CP15: Matrix-induced autologous chondrocyte implantation (MACI): procedure and rehabilitation of the tibio-femoral joint.**

<sup>1</sup>Moffatt S, <sup>2</sup>Neligan M.

<sup>1</sup>Physiotherapy Department, UPMC Beacon Hospital, Sandyford, Dublin. <sup>2</sup>Department of Orthopaedic Surgery, UPMC Beacon Hospital, Sandyford, Dublin

Purpose: to perform the first Matrix-Induced Autologous Chondrocyte Implantation (MACI) surgery of the tibio-femoral joint in Ireland and evaluate the results of the procedure and the accelerated rehabilitation protocol. Methods: in this single case study the MACI was performed on a young patient who presented with an osteochondral lesion of the medial femoral condyle. Initial arthroscopic harvest of healthy articular cartilage was performed at the UPMC Beacon Hospital in July 2010. Isolation and expansion of chondrocytes took place in Denmark with arthroscopic re-implantation of the cells ten weeks later. The patient completed an accelerated rehabilitation programme post operatively. Outcome measures included knee range of motion, the Knee Injury and Osteoarthritis Outcome Score (KOOS), the EQ-5D and the 6 minute walk test (6MWT). Results: the KOOS results indicated low scores for pain, symptoms and daily activities over the twenty month rehabilitation period, with scores for sport/recreation and quality of life reducing after nine months. The EQ-5D indicated ‘no severe problems’ on any of the five subscales with the 6MWT results demonstrating a 100% increase in finishing speed and a 94% increase in distance covered over the twenty month period. Conclusion: results demonstrated a positive outcome post MACI procedure indicating that it is a beneficial treatment option for young patients with osteochondral lesions. The accelerated rehabilitation protocol in conjunction with good subject compliance resulted in the patient successfully achieving a higher functional level than his pre-operative baseline.

### **CP16: Dealt a belt: What the black-belt felt.**

**Niven W, Ryan J**

Emergency Department, St Vincent's University Hospital, Dublin

We present the case of a 52 year old man who presented to our department with a two day history of occipital headache, dizziness and episodic in-coordination noticed in his hands that began suddenly whilst driving causing him to have to stop the car in the middle of the road. A friend brought him to a hospital where he was reviewed and an ECG was performed. He was told he had vertigo and was prescribed stemetil for symptomatic relief. He had attended his GP when the symptoms continued to persist. Whereupon he was referred to our hospital to out rule a transient ischaemic attack (TIA). Further questioning revealed that he had landed awkwardly on his neck 2 weeks previously after having had his legs swept from under him during a karate sparring bout and that he had experienced whiplash since that incident. There was mild intention tremor on the right but little else to find on examination. He was transferred for a CT angiogram of his brain and neck based upon the mechanism. This revealed a dissection of the left vertebral artery and a marked corresponding cerebellar infarct out of proportion to the findings on initial examination. He was subsequently referred to the neurology team for further treatment and was commenced on warfarin. He made an uneventful recovery and three weeks later was symptom free at review.

### **CP17: Acute Back Pain in an adolescent rugby player**

**Ryan J.**

Emergency Department, St Vincent's University Hospital, Elm Park, Dublin

A 15 year old boy schoolboy was referred to the Emergency Department with a 2 week history of low back pain. It had come on a few hours after playing a school's rugby match. He had played wing forward. There was no recollection of a specific injury. The pain became so severe that he was unable to attend school. The pain radiated to his right knee. In the past he had bilateral subdural collections as a neonate. He had also sustained 3 concussive injuries, the most recent being 3 months previously when a CT of his brain was normal. He had marked reduction in range of movement. Neurological examination was normal. A MRI scan revealed a subdural collection from L4/5 to lower border S1. This was treated conservatively and he made a good recovery over a number of months. A thrombophilia screen was normal.

### **CP18: It's not only the bones that groan**

<sup>1</sup>Ryan J, <sup>2</sup>Skehan S.

<sup>1</sup>Emergency Department and <sup>2</sup>Radiology Department, St Vincent's University Hospital, Dublin

A 26 year old rugby coach attended a chiropractor for a stiff neck. There was some improvement in his symptoms. 10 days later he played in a 7 a –side competition and collided with another player. He initially had global weakness which resolved but was left with tingling in both little fingers. His spine was immobilised and he was transferred to a local ED where x-rays of his neck revealed degenerative changes and he was discharged. As his symptoms persisted he was seen 5 days later when a MRI showed acute traumatic disc protrusion at C5/6 level. A spinal fusion was performed which resulted in complete resolution of his symptoms.

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