

Faculty
Sports and Exercise
Medicine

dámh leigheas spóirt agus aclaíochta



RCSI



ROYAL COLLEGE OF
PHYSICIANS OF IRELAND

TENTH ANNUAL
SCIENTIFIC CONFERENCE

BOOK OF
ABSTRACTS

Friday & Saturday
20th & 21st September 2013

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



FOREWORD



Dr Nick Mahony MSc FFSEM
Assistant Professor of Anatomy
& Course Coordinator MSc Sports and Exercise Medicine.
Human Performance Laboratory, Anatomy Department, Trinity College Dublin

Dear ASC FSEM delegate,

This year we again received in excess of 50 abstracts in our three conference themes; trauma orthopaedics and radiology, physical activity and population health, and sports science and exercise physiology. The number of abstracts again necessitated parallel scientific sessions, which as conference chairman I would like to see a permanent part of the program.

Parallel sessions will give all delegates submitting an abstract the opportunity to make an oral presentation of at least one of their submitted abstracts. Poster presentations will also be made in the main exhibition hall and I would encourage all our delegates to attend our poster judging session on Friday afternoon in the lunch break between 1pm and 1:30pm where each delegate will make a short two minute presentation followed by questions to one of our panel of poster judges.

The poster, main and parallel scientific sessions along with our thematic, short updates, guest lecture sessions and panel discussion have thus extended both the content and duration of our conference, putting it on par with the best sports and exercise meetings in UK, Europe and further abroad.

I once again thank all our contributors for the number and quality of submissions to our conference scientific program. I also thank our conference committee team of Ms Marije Kraan from Abbey for collating the abstracts 'on line', our editorial panel of Dr Mary Archer and Professor Moira O'Brien for blinded review of abstracts; and Ms Stephanie Billault, in the Faculty office, for putting together our second book of abstracts.

A handwritten signature in black ink, appearing to read 'Nick Mahony', written in a cursive style. The signature is positioned above a horizontal line.

Dr Nick Mahony, Conference Chairman

CONFERENCE SCIENTIFIC PROGRAM: POSTER PRESENTATIONS

No	Short running title	Author
	Trauma, Orthopaedics & Radiology	
P1	Return to competitive sport following anterior cruciate ligament surgery	Hoare E
P2	Beliefs and implementation of injury prevention methods in county gaelic football	Bell A
P3	Sports related stress fractures: imaging evaluation	Karde S
P4	Clinical and radiological evaluation of scrotal injury in sports	Karde S
P5	MRI in imaging of sports related gleno-humeral instability and injuries	Karde S
P6	Sports related injuries in cricket: a pictorial review	Bhand P
P7	Multidisciplinary exercise class for the rehabilitation of patients with knee pathologies	Moffatt S
P8	Achilles tendon rupture – on the heels of sporting success	Matthews D
P9	Rugby related renal trauma	Freeman C
P10	Review of MRI imaging findings in high ankle sprain in elite performance athletes	Coyle J
P11	Imaging of the post-operative acl reconstructed knee using dual energy ct	Coyle J
P12	Acute injuries to the hand and wrist pattern recognition and radiologic findings	Coyle J
	Physical Activity and Population Health	
P13	PRP injection treatment: patient understanding and satisfaction of treatment	O'Flanagan S
P14	Relationship between diagnosis and objective tests in the assessment of athletic groin pain	Boland M
P15	Medical profiles of female triathletes at routine laboratory based exercise testing	Mahony N
P16	TRX induced rhabdomyolysis	Ni Bhraonain S
P17	A blinding hockey-stick injury	Manning S
	Sports Science and Exercise Physiology	
P18	EMG study on the effect of seat-tube-angle on lower limb muscle activity in elite cyclists	Duggan W
P19	Reliability of Bodymetrix US vs. standard calliper in the assessment of body composition	Marshall I
P20	Lower limb EMG activity and 2D kinematics during cycling, elliptical trainer and treadmill	O'Donovan J
P21	Comparison of maximal incremental tests on treadmill, cycle ergometer and cross-trainer	Garvey C
P22	Placebo effects on laboratory exercise testing to exhaustion in rowers	Massey E
P23	3D motion capture analysis in the examination of athletic groin pain	Marshall B
P24	Stretching, as part of a specific gaelic football warm-up, on measures of performance	Whyte E
P25	3D kinematic analysis of a simulated horse riding task	Welch N
P26	Upper body biomechanics during 2 common strike types in an elite level hurler	Breen D
P27	Anthropometric, physiological profiles and race performance of female triathletes	Mahony N

CONFERENCE SCIENTIFIC PROGRAM: ORAL PRESENTATIONS

Number	Short / Running Title	Author
	Main Scientific Session [FRIDAY]	
TOR 1	Sports related facial injuries in Ireland – a one year review	Murphy C
TOR 2	Radiological variation in sportsmen treated for femoro-acetabular impingement	Carton P
TOR 3	Platelet rich plasma injection treatment on selected musculoskeletal injury sites	O'Flanagan S
TOR 4	Adductor tenotomy for groin pain in athletes – patient selection improves outcomes	Fitzgerald C
PH 1	Sports participation amongst children with idiopathic congenital talipes equinovarus	Morrissey D
PH 2	Impact of poor fitness and obesity on older adults living in a rural community	Cooney J
PH 3	Stroke-related disability does not limit fitness benefits of aerobic exercise training	Lennon O
PH 7	Hip and groin score and adductor squeeze in male athletes with chronic groin pain	Ward J
EXSC 1	HIT exercise effect on knee kinematics in a stop jump manoeuvre	Whyte E
EXSC 2	Assessment of the reliability and reproducibility of the lactate minimum test	O' Sullivan E
CP 1	Endoscopic repair of a ruptured gluteus minimus tendon: case report	Carton P
CP 2	A tale of two kidneys: renal trauma while playing gaelic football	Mc Manus C
CP 3	Unhappy Gilmore - bilateral recurrent groin pain in an elite hurler	Kearney R
CP 4	The fainting hockey player	Ryan J
	PARALLEL 1 Trauma Orthopaedics Radiology [SATURDAY]	
TOR 5	Bony morphology and clinical outcome following the arthroscopic management of FAI	Carton P
TOR 6	The high patella: an under-diagnosed condition in cerebral palsy athletes.	Elhassan Y
TOR 7	Facial fractures sustained in sport	Beirne C
TOR 8	Ankle sprain: a systematic review and meta-analysis of prospective studies.	Doherty C
TOR 9	Clinical and radiologic findings in ischiofemoral impingement with therapeutic options	Hogan B
TOR 10	A systematic review of surgical intervention in athletic groin pain	King E
	PARALLEL 2 Physical activity and population health [SATURDAY]	
PH 6	Movement efficiency and physiological performance in adult gaelic games players	King E
PH 4	Audit of exercise prescription for MSK injuries & patient engagement using a mobile platform	Ni Mhuiri A
PH 8	Gait re-training to alleviate anterior biomechanical overload syndrome of the lower limb	Breen D
PH 5	Normative values for the functional movement screen in male gaelic field sports	Fox D
PH 9	Piriformis muscle length tests - reliability, normative values and stretch response	Jordan S
PH 10	Kinesio tape, performance and perception of stability in male gaelic footballers'	Spain T
	PARALLEL 3: Sports science and exercise physiology [SATURDAY]	
EXSC 3	Fatigue on peak torque and muscle stiffness of the knee joint extensor musculature	Wang D
EXSC 4	A kinematic analysis of the star excursion balance test compared to the y-balance test	Fullam K
EXSC 5	Dynamic postural stability in young adolescent male and female athletes.	Holden S
EXSC 6	Single leg squat and lower extremity control during more dynamic sporting actions?	Marshall B
EXSC 7	Biomechanical factors associated with better times in a running cut maneuver	Marshall B
EXSC 8	Exercise based training interventions and injury prevention: a systematic review	O'Malley E
	PARALLEL 4: Trauma/Ortho/Radiology & Phys Activity [SATURDAY]	
TOR 11	Injury to the head in county-level gaelic football and hurling over six playing seasons	Blake C
TOR 12	The effect of platelet rich plasma treatment on hamstring injuries	O'Flanagan S
PH 11	Impact of heart age on engagement with health behaviours to reduce blood pressure	Byrne S
PH 12	Spinning-related rhabdomyolysis: case series of a new and increasing phenomenon	Cronin O
PH 13	Morbidity at major soccer matches in the aviva stadium	Molloy M
TOR 13	Factors affecting on sport injuries and the role of physiotherapist to treat them	K.JuiRay M

P1: Return to pre-injury level of competitive sport following anterior cruciate ligament surgery: A systematic review.

Hoare E, Newell M

NUI Galway

Anterior cruciate ligament (ACL) injuries can lead to short term disability and long term rehabilitation. Athletes undergo surgical techniques to restore the laxity and instability of the knee joint. The percentage of athletes returning to preinjury level of sport is not as high as perceived pre-surgery. The aim of this systematic review was to evaluate the return to preinjury level of sport following anterior cruciate ligament reconstruction and rehabilitation; and to determine the secondary outcomes used to permit this safe return. Method: Systematic review methods were used to identify, analyse and synthesise data for cruciate ligament reconstruction, rehabilitation, and return to pre-injury level of sport. Secondary outcomes included for safe return to sport. Electronic searches of Medline, Scopus, PubMed, The Cochrane Library, Embase and CINAHL, from earliest available to May 2013. Results: 65 studies were included (8842 athletes). 37% of athletes returned to their pre-injury level of sport. Only 7% returned to competitive sport. Approximately 86% of the athletes achieved normal or nearly normal knees on the activity based outcome IKDC and a mean score of 90 on the Lysholm activity scale. Only 3 studies reported on psychometric aspects of recovery following ACL reconstruction, while the other 62 studies all reported on activity and impairment based outcomes. Conclusion: Despite the high recovery rate of function and activity following ACL reconstructive surgery, only 7% returned to competitive sport. Other factors need to be considered when assessing the athlete for return to sport, including fear or re-injury and other psychological aspects.

P2: A survey of beliefs and implementation of injury prevention methods in county Gaelic football

Bell A, Horgan P, Prunty P, Blake C

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

There is growing evidence that some sporting injuries may be prevented through training methods, but little is known about the extent to which this is translated into Gaelic Football. This study aimed to investigate if County Gaelic Football trainers implement injury prevention methods and to determine their knowledge and attitudes to injury prevention techniques. Information was gathered using a specifically designed questionnaire, sent to 32 Men's and 31 Ladies inter-County trainers at the end of the 2012 season. Data were analysed using descriptive statistics and content analysis. Thirty one trainers responded (49.2%). There was diversity in the level of coaching/training education, ranging from relevant third level degrees (25.5%), recognized courses (14%), courses provided by Governing bodies (61%), and 13% had no formal coaching training. The trainers rated muscle imbalance, core strength, previous injury, strength and lack of recovery highly as contributors to injury, however player age, stress and player mood were rated lower. All (100%) were implementing some components of injury prevention training. Flexibility was perceived as the most important component (74.1%) with balance perceived as the least important, scoring a lower median (4) than strength, flexibility and agility (5). Awareness of trainers/coaches was identified as a barrier to implementation of injury prevention. Conclusion: It was clear that the County trainers were implementing injury prevention methods in Gaelic Football and had a good awareness of injury risks and prevention. However, some discrepancies between beliefs/practice and research findings exist in relation to flexibility and balance.

P3: Sports related stress fractures: Imaging evaluation

Karde S, El Saeity N, Ramesh N

Radiology Department, Midland Regional Hospital, Portlaoise

Introduction: Stress fractures are a common cause of pain and morbidity amongst individuals playing all times of sports. Early diagnosis of such injuries is important to prevent progression to a complete fracture. Stress reactions and stress fractures represent a spectrum of soft tissue and osseous injuries

that occur in response to abnormal repetitive stress applied to healthy bone and tends to occur commonly in persons newly undertaken sports activity. Methods: Clinically the diagnosis of stress injuries may be difficult as it mimics other musculoskeletal pain. Conventional radiographs remain the main and first imaging in this cohort of patients. However, advanced imaging including MRI, CT, ultrasonography and bone scintigraphy may need to be performed to confirm diagnosis. Results: Stress fractures can occur anywhere in the skeleton, certain fractures are associated with various activities—tarsal bones, in running, bowling; sacrum, running; pelvis and lumbar spine, gymnasts; upper extremity in throwing sports. Conclusions: We briefly explain the definitions, biomechanics, and typical clinical signs of stress fractures Imaging plays an essential role in the identification of abnormalities that are worrisome for stress-related disease. Imaging evaluation of a sportsperson with suspected stress fracture should begin with radiographs, with other imaging modalities in inconclusive or indeterminate cases.

P4: Clinical and radiological evaluation of scrotal injury in sports

¹Karde S, ²Sanneerappa PB, ¹El Saeity N, ¹Ramesh N

¹Radiology Department, Midland Regional Hospital, Portlaoise

²Paediatric Emergency Medicine Department, Midland Regional Hospital, Portlaoise

Introduction: Male genital trauma is a rare but potentially serious sports injury. Although such an injury can occur by many different mechanisms, including falls, collisions, straddle injuries, kicks, and equipment malfunction, the clinical presentation is typically characterized by pain and swelling. Almost all sports-related male genital injury comes from blunt force trauma, with involvement of scrotal structures far more common than penile structures. Most injuries can be treated conservatively, but catastrophic testicular injury must first be ruled out. Despite being relatively uncommon compared with other sports injuries, more than half of all testicular injuries are sustained during sports. Methods: Scrotal trauma patients present with acute pain, and accurate diagnosis is necessary to minimize complications and prevent loss of the testis. A thorough history and detailed physical examination are essential for an accurate diagnosis. High-resolution USG with Doppler flow evaluation is the investigation of choice for the evaluation of scrotal abnormalities. Results: Image findings include extratesticular {scrotal wall, extra testicular haematoma, hydrocele, haematocoeles, epididymal injuries} or testicular {testicular contusion, fracture or rupture} It is non invasive and can be used to quickly evaluate scrotal contents, testicular integrity and blood flow. Conclusions: Testicular injuries are best prevented by practicing safe behaviours and always wearing the proper safety equipment, such as a protective cup. Ultrasound remains the main imaging modality in evaluation of scrotal trauma.

P5: MRI in imaging of sports related gleno-humeral instability and injuries

Karde S, El Saeity N, Ramesh N

Radiology Department, Midland Regional Hospital, Portlaoise

Introduction: The glenohumeral joint is a synovial-lined ball-in-socket joint that has the greatest range of motion of any joint in the human body. The glenohumeral joint is the most commonly dislocated joint, attributed to the much larger articular surface area of the humeral head and the smaller, shallow glenoid fossa. The glenoid labrum is a fibrocartilaginous cuff surrounding the glenoid fossa. The labrum deepens the fossa and increases the articular surface area of the glenoid. The osseous rim of the glenoid and the fibrocartilaginous labrum are sites of attachment for the glenohumeral ligaments and long head biceps tendon, which can be injured individually or together. Methods: The glenoid labrum is commonly torn or avulsed when excessive force is applied to a glenohumeral ligament or the long head biceps. These injuries have classic appearances on MRI scans. Results and Conclusions: Shoulder pain and instability are common orthopedic problems in athletes. With its high spatial resolution, excellent image contrast, and multiplanar capabilities MRI is an excellent tool in the evaluation of the shoulder joint. MR allows accurate depiction of the size and location of labral tears and their associated capsular and glenohumeral ligament injuries.

P6: Sports related injuries in cricket: a pictorial review

¹Bhand P, ²Karde S, ²Ramesh N

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²Radiology Department, Midland Regional Hospital, Portlaoise

Introduction: The purpose of this poster is to present the various types of sports injuries associated with the game of cricket. Methods: A cohort cricketers presenting at trauma clinics were reviewed retrospectively. Results: Cricket is a popular sport in many other Commonwealth countries and is slowly gaining popularity in Ireland. The repetitive nature of the game and the need often to be out on the field of play for long periods predispose cricketers to a wide range of injuries. Injury can occur during any phase of the game – bowling, batting or fielding – and can involve any part of the body. Although strictly a non-contact sport, injuries in cricket can result in a number of ways. A direct blow from a cricket ball during delivery or fielding may result in fractures, bruising, or a fielder may fall or collide with other fielders. Cricketers also suffer from a range of overuse injuries associated with all aspects of the game including running, throwing, batting and bowling, the latter was found to be the most common. Injuries were found to be more common in children and in the lower league matches, {80%}. Lower limb and back injuries accounted for more than 90% of the injuries. Conclusion: Players, especially children are recommended to wear a range of protective gear to protect from injury. Prompt first aid will prevent long term problems.

P7: Effectiveness of a multidisciplinary exercise class for the rehabilitation of patients with knee pathologies.

Moffatt S, O'Connor L, Monroe C

UPMC Beacon Hospital, Sandyford, Dublin

Purpose: To assess the effectiveness of an exercise class with a multidisciplinary approach for the rehabilitation of patients with knee pathologies. 14 subjects (5 male, 9 female) participated. Inclusion criteria allowed chronic/overuse injuries, patients post elective orthopaedic surgery and post trauma. Methods: Subjects participated in an exercise class once a week for four weeks and attended pain management and nutrition talks including Body Mass Index measurements. Participants performed an individually tailored home exercise program twice a week and completed an exercise diary. Outcome measures on week one and four included the Knee Injury and Osteoarthritis Outcome Score (KOOS), the 5-Times-Sit-to-Stand (5TSTS) Test, the One Leg Hop (OLH) Test or the Timed Up and Go Test (TUGT). The PAR-Q and a patient satisfaction questionnaire were also completed. Results: KOOS demonstrated a decrease in pain by 14.25%, symptoms by 2.80%, improvement in activities of living by 5.40%, sport and recreation by 55.50% and quality of life (QOL) by 16.40%. OLH Test demonstrated improvements from 0-118%, 5TSTS Test -15.71% to 24.36% and TUGT -14.28% to 23.84%. Nine completed satisfaction questionnaires, the average score was 96.66% satisfied. Conclusion: Results indicate a clinically significant decrease in pain and improvements in sport, recreation and QOL. The majority also significantly improved their functional measures with satisfaction levels indicating that a class with a multidisciplinary approach is beneficial. As exercise has important implications for knee osteoarthritis prevention, future recommendations include stricter inclusion criteria to target those at risk of or with early-stage knee osteoarthritis.

P8: Achilles tendon rupture – on the heels of sporting success.

Matthews D, Arya A

Kings College Hospital, London

Introduction: An extension of the gastrocnemius and soleus muscles, the Achilles tendon inserts onto calcaneum facilitating plantarflexion and locomotion. Rupture of the Achilles tendon is now a commonplace sporting injury. We endeavoured to assess the rates, aetiology and complications resulting from acute Achilles tendon rupture. Methods: All patients presenting to King's College Hospital, London between January 2008 and December 2012 with acute Achilles tendon rupture were

identified. After excluding 9 patients, a total of 99 cases were reviewed using postal surveys, telephone interviews and analysis of medical records. Results: All 99 patients underwent surgical repair of their Achilles tendon. The mean age at time of rupture was 37 with a clear male predominance - 74% (n=73) occurring in men and 26% occurring in women (n=26). The side of rupture was roughly equal with 44.5% (n=44) occurring on the left and 55.5% (n=55) occurring on the right. 10% (n=10) had significant co-morbidities present, 9% (n=9) suffered a contralateral tendon rupture and 9% (n=9) had complications associated with their surgery. The activity most frequently being undertaken at time of rupture was football, accounting for 30% (n=30) of cases. Conclusions: Achilles tendon ruptures are most commonly seen in men in their late thirties participating in sports that involve running, sprinting and brisk changes in direction. Previous rupture significantly increases the likelihood of a rupture of the contralateral tendon. There is no clear link with any one systemic co-morbidity. The majority of patients make a good/full recovery following surgical repair.

P9: Rugby Related Renal Trauma

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¹Department of Urology, St Vincent's University Hospital, Dublin

²Department of Emergency Medicine, St Vincent's University Hospital, Dublin

Introduction: Anecdotally, recent departmental experience has noticed rugby related renal trauma in semi/professional players as an increasingly common presentation to our emergency department. Although the management of these injuries is usually conservative, there is a lack of evidence and guidance for repeat imaging and return to full impact rugby. Methods: We report on renal trauma injuries sustained amongst semi/professional rugby players in the last 3 years presenting to St. Vincent's University Hospital. We reviewed mechanism and grade of injury, imaging, recovery and timing of returning to playing. Results: During the study period, five players to our knowledge sustained renal trauma while playing rugby. Injury was graded according to the American association for the surgery of trauma (AAST) score. Two players had grade II, two had grade III and one had grade IV injury. All were male with a mean age of 24.7 years old (Range 20 – 28). One player had a pre-existing atrophic kidney. All were managed conservatively and subsequently returned to competitive rugby. See table below for computerized tomography (CT) findings and grade of injury. Conclusion: We express concern with our recent experiences of rugby related renal trauma in the modern era of the semi/professional player. We are observing increased presentation of these injuries. This study aims to highlight this complication and the need for an international consensus on timing of return to sport.

P10: Moving above the malleoli! A case based review of MRI imaging findings in High Ankle Sprain in Elite performance athletes.

Coyle J, Hogan B, Falvey E, Logan M, McGrath F

Sports Surgery Clinic, Santry Demesne, Dublin

Introduction: Ankle inversion injuries represent 12% of all presentations to Emergency departments worldwide. High ankle sprains have become an increasingly common diagnosis in athletes with persistent pain following inversion injuries or following direct trauma to the lower leg. Advances in imaging capability and availability, particularly of MRI, have allowed more complete assessment of the distal tibio-fibular syndesmosis as well as the ankle ligaments themselves in this clinical scenario. Methods: We reviewed MRI imaging findings in a group of elite athletes (Rugby, GAA, track and field and soccer players) in whom an MRI diagnosis of a "High Ankle Sprain" had been made over a one year period. All patients had a 3 tesla MRI of the ankle either at initial injury or at a delayed phase of treatment. Results: We present a case based review of MRI imaging findings of the distal tibio-fibular syndesmosis in normal anatomy and in injury. Findings include disruption of posterior and anterior inferior tibio-fibular ligaments, syndesmototic sprains, syndesmototic impingement and injury to the interosseous membrane. Post operative imaging findings are reviewed also. Conclusion: The distal Tibio-Fibular-Syndesmosis and the interosseous membrane should be considered as a potential site of

injury in patients with ongoing pain following ankle inversion injuries. MRI is often required and accurate diagnosis and appropriate management facilitates early return to play. Surgical stabilisation may be necessary.

P11: Imaging of the post-operative anterior cruciate ligament reconstructed knee using dual energy computed tomography.

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Introduction: Anterior Cruciate Ligament (ACL) reconstruction is a common procedure after ligament rupture. Post-operative complications may occur and are routinely evaluated using Magnetic Resonance Imaging (MRI). Exquisite soft tissue detail is achievable with MRI, although assessment of osseous structures may be more limited. CT scan provides unparalleled imaging of fine bony detail. Despite advances in scan technology in recent years soft tissue assessment on conventional CT scan remains limited, when compared to MRI imaging. Dual Energy CT (DECT), using a collagen material decompensation algorithm is developing a role in the assessment of soft tissues in this scenario. Results: We present a case based review of imaging of the knee post ACL reconstruction. Surgical and radiologic databases were retrospectively reviewed and cases where both MRI and DECT had been performed on post-operative ACL reconstructed knees were selected. Complications such as focal anterior arthrofibrosis (Cyclops lesion), lateral meniscal tear, Pellegrini-Steida lesions, intra-articular loose osseous bodies and osseous oedema are depicted on MRI and subsequent DECT using a collagen material decomposition algorithm. Conclusion: Dual energy CT scan (DECT) offers additional soft tissue information when compared to conventional CT scan. This is offered at no increase in dose to the patient. This modality may play a complimentary role to MRI in the assessment of the post operative knee.

P12: Acute injuries to the hand and wrist: pattern recognition and radiologic findings. What the sports physician, emergency physician and radiologist need to know.

¹Coyle J, ¹Hogan B, ²White L, ²Naraghi A, ¹Hanson R

¹Sports Surgery Clinic, Santry Demesne, Dublin & ²Mount Sinai Hospital, Toronto, Canada

Introduction: Injuries to the hand and wrist are very common, accounting for 20% of acute fractures presenting to emergency departments. The hand is the most active part of the body, is the least well protected and thus is often injured. Most injuries occur secondary to a fall on an outstretched hand (FOOSH) and injury patterns are highly predictable by age. Methods: We reviewed imaging findings from a large grade one trauma centre (Mt Sinai Hospital, Toronto) of patients presenting with upper limb trauma. Imaging involved predominantly plain radiographs however CT and MRI were found to have an increasing role, particularly in problem solving and depending on availability. Results: We present a case based review of imaging findings of common injuries to the hand and wrist presenting to the emergency department. Injury pattern and radiologic findings are highly predictable by age and injury mechanism. We discuss the role of developmental anatomy in injury mechanism. We present a systematic approach to the radiograph and will highlight subtle radiologic findings and common pearls and pitfalls. Conclusion: In trauma to the wrist and hand mechanism and age predict injury pattern. Radiographs of the hand and wrist are a staple for the Emergency Physician and Radiologist and a systematic approach aids detection of often subtle findings.

P13: Platelet rich plasma injection treatment: patient understanding and satisfaction of treatment

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¹University of Limerick & ²Sports Surgery Clinic, Santry Demesne, Dublin

Introduction: The number of treatment options available to patients with sports related musculoskeletal injuries is on the increase. Consequently, patients may not feel fully informed when choosing between

options. This study is the first to investigate patient understanding and satisfaction of Platelet Rich Plasma injection treatment (PRP). Study Aims: To investigate patient understanding and satisfaction of Platelet Rich Plasma injection treatment of musculoskeletal injuries. Methods: 95 patients completed an online questionnaire following PRP injection treatment. Patients responded to a series of questions regarding their treatment and rehabilitation process, understanding and overall satisfaction. Results: In total, 97% of patients reported good understanding of their treatment and 93% felt that the treatment process was well explained to them. 73% of patients reported being satisfied with their overall experience. A significant relationship was found between patients satisfied with their PRP treatment experience and patients reporting complete resolution of symptoms ($p=0.03$). A significant relationship between patients satisfied with treatment and those with no injury recurrence ($p=0.01$) was also found. Discussion: A high proportion of patients who opted for PRP injection treatment exhibited good understanding of the treatment purpose and process. A large proportion of patients also expressed satisfaction with their PRP treatment experience, which has not been reported in the literature thus far. These findings suggest that PRP injection treatment of musculoskeletal injuries may provide greater patient satisfaction than a placebo treatment.

P14: An Investigation of the Relationship between Diagnosis and Objective Tests in the Assessment of Athletic Groin Pain

Boland M, King E, Falvey E, Byrne D, Franklyn-Miller A

Sports Surgery Clinic, Santry Demesne, Dublin

Introduction: Hip range of motion, Adductor squeeze test and the crossover sign are widely used clinical indicators in the assessment of groin pain. This study investigated the relationship between the presenting diagnosis and the objective findings of the Adductor squeeze test, crossover sign and hip internal and external range of motion. Methods: Retrospective study of a cohort of 40 males presenting with groin pain. Subjects were diagnosed by a sports medicine consultant and assessed by a physiotherapist. The study cohort were grouped according to diagnosis; anterior plate ($n=26$), Hip (FAI/CAM) ($n=7$), anterior plate and hip ($n=7$) and symptomatic side; right side ($n=18$), left side ($n=17$), bilateral ($n=5$). Results: A significant difference in hip internal rotation was found in subjects on their symptomatic side in comparison to the non-symptomatic side ($p<0.001$)(mean 5.28 $SD\pm 4.99$, mean 6.76 $SD\pm 7.06$). The crossover sign was found to be significantly correlated to the Adductor squeeze test at 45 degrees ($p=0.05$) but not at zero or 90 degrees ($p>0.05$). No correlation was found between diagnosis and either the Adductor squeeze tests or crossover sign ($p>0.05$). Discussion: This study highlight the presence of loss of hip internal rotation in individuals with groin pain, demonstrated by the significant asymmetry in range of motion relevant to asymptomatic side. Considering the absence of a correlation between the Adductor squeeze tests and diagnosis found in this study, the squeeze test may best used as a pain provocation test rather than a diagnostic test.

P15: Demographic, training, and medical profiles of Irish female triathletes presenting for routine laboratory based exercise testing.

Mahony N, Marshall I, Donne B

Human Performance Laboratory, Anatomy Department, Trinity College Dublin

Despite the popularity of triathlon little published population data exists for Irish recreational female triathletes. This study evaluated demographic, training, and medical profiles by audit of preliminary medical and ancillary test data of female triathletes attending from June 2012 to 2013. Socio-demographic data: 24 triathletes mean ($\pm SD$) age 37 ± 5 yr were tested; 20/24 had white collar occupations; age at entry to triathlon was 33 ± 5 yr, and mean experience was 4 ± 3 yr. All had completed sprint and Olympic distance events and 3/24 had completed $\frac{1}{2}$ Ironman races. Number/duration of training sessions was 8 ± 3 wk⁻¹ and 12 ± 3 h, respectively; all exercise modes were employed in training with 3/24 incorporating additional core and flexibility sessions. No medical problems requiring disqualification were discovered; however, 2/24 had suffered acute traumatic injury, 11/24 chronic overuse injury, and 4/24 had a significant medical problem requiring time off training in the previous year. No significant personal history of cardiovascular disease was detected although 1 athlete had

been investigated for a heart murmur. Medication use was limited to asthma inhalers and contraceptives. Menstrual function was normal in 19/24, 7/24 were COCP regulated; however, 5/24 reported irregular cycles for over six months; in 4/24 this was due to IUNIVERSITY COLLEGE DUBLIN and POP usage, and one had exercise related amenorrhea. Vitamin, supplement and sports drink usage, clinical examination, full blood count and pulmonary function testing results will also be reported. In conclusion, this study highlights a range of medical, musculoskeletal and women's health issues that impact on both health and performance of female endurance athletes.

P16: TRX induced rhabdomyolysis

Ni Bhraonain S, O'Hare D, Rochford M

Emergency Department, Adelaide Meath and National Children's Hospital, Tallaght, Dublin

Introduction: We present the case of a 36 year old gentleman with a case of TRX induced rhabdomyolysis. Case: 36 year old male who self presented to a tertiary emergency department with a 1 day history of painless haematuria. He had noticed discolouration of his urine one day previously. He had undertaken a class of TRX at his local gym 2 days previously. Investigations: Urine dipstick revealed 3+ blood however microscopy revealed no red cells. Routine bloods showed a normal renal function, normal inflammatory and infectious markers. His initial creatine kinase was markedly elevated at 57,247. Management: A diagnosis of TRX induced rhabdomyolysis was made and he was admitted for aggressive intravenous fluid rehydration and urinary output monitoring. His creatine kinase peaked at 57247, however his renal function remained normal throughout. Outcome: He was subsequently discharged home day 3 with outpatient follow-up for regular CK blood tests. He was advised to abstain from exercise until his CK returned to normal limits. Discussion: Rhabdomyolysis is defined as a syndrome resulting from skeletal muscle injury with release of muscle cell contents into the plasma. One of the main causes of rhabdomyolysis is eccentric exercise against high resistance. Conclusion: we present the case of a 36 year old gentleman who engaged in a class of TRX who subsequently developed rhabdomyolysis.

P17: A blinding hockey-stick injury: case report

Manning S, Murphy C, Kilmartin D

Royal Victoria Eye and Ear Hospital, Dublin

We present the case of a 15-year-old male secondary school student who attended the Eye Casualty Department shortly after sustaining an eye injury from a hockey stick during sports class. He had perception of light only in the left eye, with an extensive rupture of the globe and extrusion of intraocular contents. Primary surgical repair under general anaesthesia, performed the same evening and subsequent vitreoretinal surgery and silicone oil tamponade a number of weeks later, did not improve the outcome. At most recent follow-up, the patient had no perception of light in that eye and persistent hypotony. This case highlights the need for increasing awareness about the danger of blinding eye injuries caused by hockey sticks, especially in settings where face protectors are not mandatory.

P18: An electromyographic study on the effect of seat-tube-angle on lower limb muscle activity in elite cyclists.

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Introduction: Seat-tube-angle (STA) is the position of the saddle relative to a horizontal line through the crank axis. Road-cyclists use lower STA in mountain-stages and higher STA on the flat. Studies have shown improved cycling efficiency at higher STA in non-inclined cycling. This study investigated the effect of STA on electromyography (EMG) patterns when cycling. Methods: 13 trained cyclists were tested at 160W and an individualised workload (IWL) just below lactate

threshold at 3 STA (70, 75 and 80°). EMG data recorded from Vastus Medialis (VM), Rectus Femoris (RF), Vastus Lateralis (VL) and Biceps Femoris (BF) were analysed using a two-way repeated measures ANOVA, $P < 0.05$ inferred statistical significance. Results: STA had a significant effect on timing of onset ($P < 0.05$) and offset ($P < 0.01$) of VM, timing of offset ($P < 0.05$) of VL, and the angle at peak ($P < 0.05$) for RF, all occurring later at 80 vs. 70° STA at IWL. In RF, there was increased activity during the first 108° of the crank cycle at 80 vs. 70° STA at IWL ($P < 0.01$). Conclusions: As most power in the pedal-stroke is generated between 60-120° past top-dead-centre, movement of muscle activity into this range accounts for increased efficiency at higher STAs. As higher STA facilitates a more efficient bike-run transition, increased activity of RF from 0-108° of the crank cycle possibly mimics the pelvic stabilising activity of RF in running.

P19: Repeatability and reliability and of the BodyMetrix ultrasound device vs the standard calliper in the assessment of body composition

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Assessments of body composition are common practice in sport however little data currently exists on the anthropometric characteristics of Irish athletes. The purpose of this study was to determine the repeatability, measure limits and relative reliability of the BodyMetrix (BM) ultrasound machine (Intelamatrix, USA) in comparison with standard skinfold calliper assessment (CAL). Repeat measurements of subcutaneous fat thickness were taken at 4 anatomical locations (biceps, triceps, subscapular, iliac crest) in 56 male collegiate athletes using the BM device and a skinfold caliper (Harpenden, UK). Standard nomograms developed by Durnin and Wormsley (1974) were used to determine percentage body fat (%BF) from these four sites. Mean and difference data were then analysed for repeatability using intraclass correlation coefficient (ICC), bias and scedasticity using Bland-Altman plots and Pearson correlation coefficient; and, relative reliability were expressed as limits of agreement (95%LOA) and technical error of measurement (%TEM). Results of Body fat % analysis; ICC were 0.99 for both CAL and BM; mean bias for CAL and BM were 0.03 and 0.18% respectively and relationships of mean vs. difference data for both were homoscedastic ($r < 0.3$). Measurement limits (95%LOA) were; +0.39 to -0.33% for CAL and +1.17 to -0.79% and relative reliability (%TEM) were 0.7% and 1.9% for CAL and BM respectively. BM data repeatability were similar to calliper methods and reliability was within acceptable limits reported in the literature, however CAL demonstrated reduced bias and greater relative reliability and therefore remains the standard assessment method in this laboratory.

P20: Comparison of lower limb EMG activity and 2D kinematics during exercise on cycle ergometer, elliptical trainer and treadmill

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Introduction: Lower limb injuries commonly occur in athletes, and recovery usually involves a period of rest with a subsequent gradual return to activity. Different exercise modalities are frequently used in an attempt to resemble normal actions and provide similar training stimuli. This is a particular problem in runners and field sports players, as they unable to use running as a viable method of training with a lower limb injury. Purpose: This study compared lower limb (electromyographic) EMG activities and 2-D kinematics across exercise modalities using an elliptical cross-trainer, cycle ergometer and treadmill. Methods: Healthy male ($n=14$) volunteers (mean; age 27 ± 5 yr, mass 79 ± 9 kg, BMI = 23.8 ± 2.3 kg.m⁻²) whose primary sport was running, completed a graded incremental test to exhaustion on a treadmill, cycle ergometer and an elliptical cross-trainer. Participants exercised at two fixed exercise intensities equivalent to 60 and 80% of maximal exercise capacity. EMG muscle activity was recorded by radiotelemetry (Mega ME6000, Mega, Kuopio, Finland) from gastrocnemius, vastus lateralis, gluteal maximus and semitendinosus musculature, in addition, 2-D kinematics were recorded across exercise modalities. Results: EMG and 2-D kinematic data are currently being analysed and mean changes, if any, across intensity and modality will be discussed in detail following

appropriate statistical analysis (repeated measures ANOVA). Conclusion: Recorded data will be presented to highlight the extent of the neuromuscular differences across modalities and to assess their similarity, if any, to treadmill exercise.

P21: Comparison of physiological data during maximal incremental tests on treadmill, cycle ergometer and cross-trainer.

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Introduction: When an athlete sustains a lower-limb injury, exercise modalities frequently used to mimic muscle activity include cycling and elliptical training. This study compared physiological response during graded incremental exercise across three exercise modalities. Methods: male athletes ($n=12$, $M\pm SD$; age 27 ± 5 yr, mass 79 ± 9 kg and BMI 23.8 ± 2.3 $\text{kg}\cdot\text{m}^{-2}$), completed randomised incremental tests to exhaustion on treadmill, cycle ergometer and elliptical trainer. Tests were performed on three occasions separated by >48 h. Participants refrained from strenuous activity and maintained similar nutritional intake in the 24 h prior to testing. During testing; heart rate, VO_2 and blood lactate (BLa) data were recorded every 3 min. Data expressed as % reserve (%HRR and % VO_2R) were analysed using a repeated measures ANOVA. Results: Analysis revealed that mean %HRR at TLac differed significantly across modality; running vs. cycling (84 ± 5 vs. 74 ± 9 , $P<0.01$), running vs. cross-training (84 ± 5 vs. 77 ± 8 , $P<0.05$) and cycling vs. cross-training (74 ± 9 vs. 77 ± 8 , $P>0.05$). Mean % VO_2R at TLac also revealed a significant difference ($P<0.05$) for running vs. cycling (84 ± 7 vs. 75 ± 9), however no significant differences were detected comparing running vs. cross-training (84 ± 7 vs. 77 ± 10) or cycling vs. cross-training (75 ± 9 vs. 77 ± 10). Mean BLa at TLac for treadmill, cycle ergometer and cross-trainer were 2.1 ± 0.5 , 2.7 ± 0.5 and 2.4 ± 0.8 $\text{mmol}\cdot\text{L}^{-1}$, respectively, and differed significantly ($P<0.05$). Conclusion: Cross-training would appear to better simulate running in terms of assessed physiological variables.

P22: The effect of a placebo intervention on laboratory based graded incremental exercise testing to exhaustion in rowers.

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Placebo effects on performance are gaining increasing interest in sports science, however few studies have examined placebo effects on standard laboratory based exercise tests. This study examined the effects of placebo during a standard laboratory based incremental test (GXT). In a randomised double blind design, 9 rowers ($M\pm SD$) age 22.8 ± 5.2 yr, height 186.7 ± 4.4 m, body mass 83.2 ± 14.1 kg, underwent four GXT on the Concept II rowing ergometer to volitional exhaustion. Prior to two GXT, rowers received a placebo lactose capsule (BDH chemicals, UK) and were either informed (INF) or misinformed (MIS) that it contained a nutritional ergogenic aid. On two other occasions, CON1 and CON2, rowers performed GXT with no intervention to ascertain test-test repeatability (ICC) and reliability (%TEM \rightarrow). Heart rate (HR), blood lactate (BLa), oxygen uptake (VO_2), stroke rate ($\text{S}\cdot\text{min}^{-1}$) and Load (W) were recorded for each increment. Maximal data was analysed using one way ANOVA. Repeatability (ICC) was good for Load (0.9), moderate for SR and HR (0.8), but poor (<0.4) for VO_2 and BLa. Reliability (%TEM) was acceptable for Load, SR and HR (3-6%) but not for, VO_2 (10%) and BLa (23%). Mean ($\pm SD$) maximum data were; load 333 ± 63 , 326 ± 87 and 337.7 ± 75 W; VO_2 59.2 ± 6.1 , 57.1 ± 7.5 and 57.8 ± 6 $\text{mL}\cdot\text{kg}^{-1}\cdot\text{min}^{-1}$; BLa 6.7 ± 2.4 , 6.6 ± 3.0 and 6.2 ± 3.9 mmol ; and HR was 193 ± 13 , 192 ± 8 , and 193 ± 11 for CON, MIS and INF respectively. There were no significant differences in performance or metabolic data across all conditions ($P>0.05$). In conclusion a placebo intervention had no significant effect on laboratory based GXT performance in rowers.

P23: The use of 3D motion capture analysis in the examination of athletic groin pain

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Introduction: 3D motion analysis may be useful in the examination of athletic groin pain but no studies have investigated the suitability of relevant movement tests for this purpose. Study Aims: To compare the 3D kinetics and kinematics produced during a drop landing, hurdle hop and running cut. Methods: Sixteen elite, injury free, rugby union players undertook three trials on the dominant leg for a running cut, drop landing and hurdle hop. Vicon Nexus 3D motion capture was used to collect and process all data. Statistical differences between tests were assessed using repeated measure ANOVAs. Results: Participants exhibited significantly ($p < 0.05$) more hip internal rotation in the cut in comparison to the other tests despite the fact that hip eccentric external rotation moments were significantly smaller. Peak vertical ground reaction forces and hip resultant forces were greatest in the drop landing and sequentially smaller in the hurdle hop and cut ($p < 0.05$). Discussion: While loading in the cut was less than in the hurdle hop or drop landing, the body's orientation in the cut may increase the stress across relevant tissues (adductor aponeurosis and greater oblique aponeurosis). In addition, findings suggest that the hip joint undergoes poorly controlled internal rotation during a cutting manoeuvre which may be a potential mechanism of chronic groin injury. A battery of relevant functional tests has been identified which should allow for the future identification of biomechanical loading and control factors associated with athletic groin pain.

P24: An investigation into the effects of different stretching protocols, as part of a specific gaelic football warm-up on measures of performance

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Background: Previous research has demonstrated that dynamic stretching has beneficial effects on performance indicators compared with static stretching. However the majority of this research has not incorporated the stretching protocol into a sports specific warm-up. Aim: To examine the effects of static, dynamic and no stretching on agility, countermovement jump (CMJ) and perceived readiness (PR) immediately after stretching and after a gaelic football specific warm-up. Methods: A repeated-measures experimental design was used to examine the effect of different stretching on protocols (no stretch [NS], static stretch [SS] and dynamic stretch [DS]) on CMJ, agility (505 agility test) and PR immediately after stretching and the sports specific warm-up. 19 intermediate senior male gaelic footballers (23.16 ± 4.2 years) completed a general warm-up, one of the three stretch protocols, and a specific gaelic football warm-up. A repeated measures ANOVA (2x3) was used to identify, and a Bonferroni post hoc analysis was used to determine the location of, any significant differences ($p < 0.05$). Results: Results showed immediately post stretch that stretch condition had significant effects on CMJ height (DS>SS>NS) agility time (DS+SS<NS) and PR (DS>SS>SS). Following the gaelic football sport specific warm-up it was found that stretch condition had no effect on CMJ height (DS=SS=NS), an effect on agility time (DS+SS<NS) and PR (DS+SS>NS). Conclusion: DS has significantly beneficial effects on CMJ compared with SS and NS immediately post stretch. However, when incorporated into a sports specific warm-up, the DS and SS protocols induced similar beneficial effects in CMJ, agility and PR compared with NS.

P25: A 3D Kinematic analysis of a simulated horse riding task

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Purpose: To analyse the 3D kinematics of a jockey during a simulated horse riding tasks in order to inform exercise selection and training plan design for injury prevention and performance enhancement. Methods: A single experienced jockey was asked to simulate riding in their race position using their own saddle set over the top of an elevated platform and asked to simulate riding in

their race position. Kinematic data were collected using a 6 camera 3D motion analysis system with markers placed at bony landmarks on the lower limbs, pelvis and trunk according to Plug in Gait marker locations. Results: Hip flexion angles ranged 90.4 – 52.3°, hip adduction angles ranged 8 – 2.5° and hip internal rotation angles ranged 11.6 – 6.8°. Conclusions: The consistent angles of hip flexion, adduction and internal rotation throughout the movement is of particular interest to strength and conditioning coaches as common practice in other sports is the reduction of these movements for injury prevention. Conversely, a relatively high proportion of injuries to jockeys are related to falls where hip internal rotation and adduction movements are thought to contribute to knee ligament injuries. This apparent conflict in strength requirements provides the strength and conditioning coach with some interesting challenges in training plan design.

P26: Case study of upper body biomechanics during two common strike types in an elite level hurler

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Introduction: Little is known on the swing kinematics of hurling. This data would provide valuable information for both injury rehabilitation and performance. Methods: 3D analysis was used to examine two strikes from the dominant side, a strike on the run and a free strike. Joint range of motion was gathered for the shoulder, elbow, wrist, and thorax. Results: Significant differences in joint kinematics were seen between both strikes. Striking on the run is a more wrist dominant strike with total flexion/extension range of 225.7° compared to 66.2° during a free strike, and a total supination range of 213.5° compared to 86.5°. The free strike is a more shoulder and thorax dominant strike with a thorax rotation range of 156.6° compared to 109.3° during the strike on the run. Shoulder angles of the right side (dominant) during position of highest risk during the swing (flexion, adduction, internal rotation) were observed at near peak values for each angle. In this position, during late swing phase, flexion was 58°/62.1°, adduction was 47.7°/49.2°, internal rotation was 99.1°/99.3°. Discussion: Kinematic data shows striking on the run is a wrist dominant strike. The free strike is a more shoulder and thorax dominant strike. Shoulder impingement and posterior joint subluxation are at highest risk during the late swing phase of the free strike where shoulder angles are at their largest range. These findings have implications for injury prevention, rehabilitation, and conditioning of the upper body joints for hurling players.

P27: Anthropometric and physiological data of Irish female triathletes from laboratory based exercise testing and relationship to competition performance

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Despite popularity of triathlon in Ireland there is little or no published population data for Irish female recreational triathletes. The purpose of this study was to examine anthropometric and physiological data, by audit of laboratory based exercise testing results, and then to examine for relationships to performance. Body composition and physiological data were scrutinised for all female triathletes undergoing exercise testing from June 2012-2013. 24 female triathletes mean (\pm SD) age 33 \pm 5yr; body mass 62.9 \pm 7.3kg; height 1.67 \pm 0.05m; BMI 22.4 \pm 2.1kg.m⁻²; sum of skin-folds 40.1 \pm 12.9 mm; body fat % 23.1 \pm 4.2% and lean body mass 47.0 \pm 7.1kg completed 4 running and 19 cycling tests to exhaustion and 1 sub-maximal cycling test. Mean (\pm SD) maximal data for (19/24) cycling tests were; P 249 \pm 25W / 3.56 \pm 1.31 W.kg⁻¹, HR 181 \pm 9 beats.min⁻¹; BLa 6.3 \pm 3.1 mmol.L⁻¹ VO₂ 52.2 \pm 5.4 mL.kg⁻¹.min⁻¹ and VE 128.0 \pm 12.0 L.min⁻¹. Mean (\pm SD) data at lactate threshold (TLac) from graphical plots were; P 197 \pm 23 W; HR 163 \pm 9 beats.min⁻¹ and BLa 2.3 \pm 0.6. Interpolated mean heart rate training zones were; 125-135 beats.min⁻¹ for active recovery / warm up/cool down, 140-150 beats.min⁻¹ for steady aerobic conditioning; and, 155-165 beats.min⁻¹ for lactate threshold training. Best performance times in the 40km cycle element of triathlon competition for the group were highly course and weather dependent but ranged from 68 to 79 min.

TOR1: Sports related facial injuries in Ireland – A one year review

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Introduction: Sports related maxillofacial injuries contribute a significant proportion of the workload in a maxillofacial unit. The aim of this study was to identify the incidence of maxillofacial sports related injuries, treatment required, and assess impact of injury on future participation. **Methods:** A retrospective review was carried out on all maxillofacial trauma referrals from September 2009 to September 2010. Patient records were reviewed and the following variables were recorded: age, gender, sport involved, injury sustained, mechanism of injury, treatment, subsequent participation and interval before return to sport. **Results:** The study population included 162 patients (145 male, 17 female) with sports related facial injuries. The mean age of player injured was 27 years (range 6 - 67 years). The most common sporting injuries were as follows: Gaelic football 35.3% (n=57), soccer 22.3% (n=36), rugby 12.4% (n=20) and equestrian sports 12.4% (n=20). The most common injury sustained was zygomatic complex fracture (n=66), mandible fracture (n=28), nasal bones fracture (n=21) and orbit fracture (n=19). The commonest mechanism of injury was from clash of heads (23.4%) followed by elbow to face (17.2%) and kick/knee to face (13%). The majority of patients (84%) resumed participation in their chosen sport at mean interval of 7.3 weeks. **Conclusion:** This study identified the number of sporting facial injuries which present over one year. Ninety seven patients underwent surgery for management of their injuries. This study highlights the need to educate all players regarding use of personal protective equipment and adherence to the rules of sports.

TOR2: The radiological variation in sportsmen treated for femoro-acetabular impingement

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Introduction: Femoro-acetabular impingement is a major cause of chronic groin and hip pain in young sportsmen. Accurate radiological assessment of the bony abnormalities is critical in the diagnosis and management of symptomatic FAI. **Methods:** Validated radiological measurements were utilised to assess the type and extent of bony abnormality in the hips of sportsmen treated for FAI. Statistical analysis was performed to assess the variation of bony abnormalities in this cohort and ascertain the level of correlation between deformity and presence of symptoms. **Results:** There were 185 patients (370 hips) included in the study; 86 patients had bilateral symptoms (99 patients unilateral); and mean age was 27 years (range 17 – 48). 42.2% of patients had evidence of CAM deformity, 16.2% had evidence of over coverage (7.6% had both) and 25.9% of patients demonstrated signs of acetabular retroversion. 10.2% had evidence of dysplasia (all unilateral symptoms); severe dysplasia was present in 3.2% of patients. The presence of a CAM deformity was strongly associated with symptoms ($p < 0.01$). Degenerative changes were more likely to be present with increasing alpha angle ($p < 0.01$), with increasing age ($p = 0.05$) and in the symptomatic hip ($p < 0.05$). There was no apparent association between level of dysplasia (centre edge angle and acetabular index) or pincer deformity (acetabular retroversion and over coverage), and degeneration. **Conclusion:** CAM deformity has the greatest level of correlation with symptoms of FAI and progression to degeneration when compared with other radiological abnormalities. Standard radiological assessment may be under-diagnosing bony rim abnormalities, which are commonly observed in practice.

TOR3: The effect of platelet rich plasma injection treatment on selected musculoskeletal injury sites.

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Introduction: Current applications for Platelet Rich Plasma (PRP) injections include chronic tendinopathies, acute ligamentous injuries and muscle injuries. This is the first paper to compare the

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effectiveness of PRP treatment between several common treatment sites. Study Aims: To compare the effect of PRP injection treatment on five common sites of musculoskeletal injury. Methods: 95 patients completed an online questionnaire following PRP injection treatment for a musculoskeletal injury of the shoulder and elbow (n=20), hamstring (n=39), patellar (n=13) or achilles (n=15) tendons. Patients were asked to comment on resolution of their injury and whether they returned to pre-morbid levels of activity following treatment. Results: In total, 85% of patients experienced a positive improvement in resolution following PRP treatment. Patients in the hamstring injury group demonstrated the highest overall positive response with 85%. The shoulder and elbow group achieved a 70% positive outcome, followed by patellar tendon injuries (62%) and Achilles tendon injuries (62%). The hamstring injury group also demonstrated the highest level of return to pre-morbid levels of activity (58%) with 10% of these patients reporting a return to higher levels of activity. Discussion: These findings suggest that PRP injection treatment is effective in achieving a positive improvement in resolution of several musculoskeletal injuries. When comparing injury treatment sites, hamstring injury treatment exhibited the highest response rate to PRP treatment. This study suggests that PRP injection treatment may be more effective in treating some musculoskeletal injuries compared with others.

TOR4: Adductor tenotomy for groin pain in athletes – patient selection improves outcomes

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Introduction: Previous studies have shown complete recovery rates in up to 68% in cases of adductor tendon injury treated with adductor tenotomy. The aim of this study was to determine if outcomes from adductor tenotomy for adductor injury improve when only patients with severe injury who fail a rehabilitation programme are selected for surgery. Methods: Between 2007 and 2011 athletes with adductor injuries who had failed a focused active rehabilitation programme and were no longer able to play any sport (Level 4 injury) or who are forced to miss training or matches due to injury (Level 3) underwent adductor tenotomy by a single surgeon with a described technique. A detailed pre-operative and post-operative questionnaire was completed, with severity of adductor symptoms recorded using a previously described rating scale for adductor injury. Results: 79 adductor tenotomies were completed between 2007 and 2011. Median age at surgery was 27 years. Median time to presentation from injury was 8 months. The most commonly represented sport was Gaelic football (n=49). 77% (61/79) of all patients returned to optimum performance level without any pain (Level 1) – 76% of Level 4 patients (45/59) and 70% of Level 3 (14/20). Median time to return to sport was 13 weeks. Complications were recorded in 4% of cases (n=3). Conclusion: Selecting only patients with severe adductor tendon injuries who are refractory to active rehabilitation improves outcome of treatment with adductor tenotomy.

PH 1: Sports participation amongst children treated with the Ponseti method for idiopathic congenital talipes equinovarus

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The Ponseti method for the treatment of CTEV has gained wide acceptance in the last decade. Success rates with the technique have approached 90%. It may be expected that sporting participation in this cohort would be equivalent to their peers. We sought to identify the level of physical activity amongst Ponseti treated children. We identified 48 children 4 years or older, from our prospectively gathered database, who were treated from birth with the Ponseti method. A chart review was performed to assess treatment and surgical intervention. Children and parents were interviewed and filled out a validated physical activity participation form for young children (Physical Activity Questionnaire-PAC-ES) modified for the Irish population, in addition to a subjective outcome score. The children were examined and a foot posture index (FPI) score was calculated. Of the 48 children identified, 31 patients have been assessed to date. 6 have had further input other than basic Ponseti casting. The

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remaining 25 reported moderate to good activity levels and occasional pain. None are avoiding activity secondary to pain or treatment. They participate in a range of activities, mainly GAA. The main difficulty was obtaining appropriate shoe wear and most patients were satisfied with appearance. In unilateral cases, there was an average of 1-2 points difference on the FPI when both feet were compared. Children treated with the Ponseti method for CTEV can expect to have a high level of physical activity and should be encouraged to participate in sporting activities

PH 2: Impact of poor fitness and obesity on older adults living in a rural community

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Purpose: The purpose of this study was to determine the current overall health, fitness and cognitive function of older adults living in a rural community. **Methods:** This abstract reports the health-related baseline data of the AgeWell Study, which was conducted in partnership with Age Cymru Gwynedd â Mon. 75 community-dwelling volunteers were recruited as they attended a rural 'Agewell' centre. Health assessment included blood pressure, calculation of cardiovascular disease (CVD) risk (QRISK2), BMI, 8-foot-up-and-go, step test for aerobic fitness, self-rating of health-related Quality of life (QoL: 0-100) and cognitive function (MOCA). **Results:** The participants (86% female; 68.2±7.9 years) rated their QoL high (77.3±15.4). However, their fitness was low (17.9±3.9 ml/kg/min, n=47) with 35% not able to complete the first stage of the step test. Fitness was associated with cognitive function (25.9±3.0; P<0.05). The participants were generally overweight (BMI=29.1±4.9) and BMI was positively associated with CVD risk and negatively associated with QoL, fitness, physical and cognitive function (P<0.05). The 10 year CVD risk was moderate (19.7±10.5%). Of the participants, 56% were either hypertensive (n=22) or on medication (n=20) and 83% had either high cholesterol (n=41) or were medicated (n=21). **Conclusions:** Although rural community-dwelling older adults in North Wales generally scored their QoL as high, their aerobic fitness levels were low and the high levels of obesity were linked to poor overall health, fitness, physical and cognitive function. Also many had untreated CVD risk factors which should be addressed. Funded by the Lifelong Health and Well-being Programme through the MRC (G1001888/1).

PH 3: Stroke-related disability does not limit fitness benefits of aerobic exercise training

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Introduction: The Cochrane Library and American Stroke Association have highlighted the need for research into feasibility and efficacy of aerobic exercise post stroke. This study considers stroke-related disability, its influences on fitness levels and explores whether these factors influence fitness gains following an eight week aerobic exercise intervention. **Methods:** Seventy two (49 ischaemic stroke and 23 TIA) community-dwelling participants were assessed at baseline for aerobic fitness VO₂ (mL.kg⁻¹.min⁻¹) using the Astrand Rhyming protocol. They were allocated a Functional Ambulatory Category (FAC) and a Modified Rankin Scale of disability (mRS). The intervention consisted of 16 one hour aerobic-training sessions. Independent t-tests examined differences in fitness levels between stroke and TIA patients at baseline and also whether improvements in VO₂ post aerobic training differed between groups classified by acquired disability (i) Stroke vs. TIA, (ii) FAC dependent vs. independent and (iii) mRS dependent vs. independent. **Results:** Baseline data demonstrated significantly poorer VO₂ levels in subjects with stroke versus TIA (t= -6.08, p<0.001), and in categories of dependence vs. independence in the mRS and FAC (t=3.17, p=0.003 and t=-4.25, p<0.001 respectively). All participants increased aerobic fitness after the exercise intervention. No statistically significant differences were observed in the VO₂ gains made by the stroke/TIA (t= 0.57, p=0.57); FAC dependent/independent (t=0.73, p=0.47) and mRS dependent/independent (t=1.19, p=0.24) groups. **Conclusion:** Despite marked differences in baseline levels of fitness, stroke-related disability did not influence the extent of improvement in fitness (VO₂) achieved in response to aerobic exercise.

PH 7: Correlation between Copenhagen hip and groin outcome score (HAGOS) and adductor squeeze test at 0°, 60° and 90° hip flexion in male athletes with chronic groin pain

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Introduction: Athletic related chronic groin pain is common in multidirectional sports. The Adductor Squeeze Test and Hip and Groin Outcome Score (HAGOS) are two useful clinical tools to aid diagnosis and track rehabilitation. The aim of the study was to assess correlation between HAGOS and pain provocation during the Adductor Squeeze Test at 0°, 60° and 90° hip flexion in 100 male athletes with chronic groin pain. Methods: One hundred male athletes with groin pain completed the HAGOS and Adductor Squeeze Test at 3 different positions of hip flexion 0°, 60°, and 90°. Athletes were asked to maximally contract against a sphygmomanometer inflated at 20 mmHg until their pain was reproduced. The mean of 3 attempts for each test was recorded. Results: A statistically significant effect ($P < 0.05$) was found between HAGOS and Adductor Squeeze Test at 90° ($p = 0.001$) and 0° ($p = 0.03$) but, not at 60° ($P = 0.25$). A positive relationship between HAGOS and squeeze at 90° ($r = 0.3$) and 0° ($r = 0.2$) was noted. Conclusion: HAGOS is a reliable and valid outcome measure of hip and groin disability in young to middle-aged athletes with chronic groin pain. Our study indicates that assessment of groin pain irritability during the Adductor Squeeze Test at 0° and 90° hip flexion maybe a better indication of when to progress an athlete's rehabilitation. A clinician should expect to see that as patient's pain improves during squeeze at 0° and 90° that their HAGOS should see a similar trend.

EXSC 1: An investigation into the effects of a high intensity, intermittent exercise protocol on knee kinetics and kinematics in a stop jump manoeuvre.

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Background: Fatigue and decreased knee flexion during landing are proposed risk factors for anterior cruciate ligament (ACL) injuries. These tend to occur in the first 40 milliseconds (ms) after initial contact (IC) during stop jumps (SJs). SJs consist of 2 phases: deceleration and jumping followed by landing. Aim: Investigate the effects of high intensity, intermittent exercise (HIIE) on knee joint biomechanics during SJs. Methods: 19 male athletes (21.85 ± 2.05 years) performed SJs pre and post a HIIP. This consisted of 10 metres (m) forward sprinting with a 90° change of direction followed by backwards sprinting for 5m (x4), two-legged jumping (x10), high knee side stepping (x10) and lateral 5m shuffling (x4). Participants rested for 30 seconds before repeating the course until 18 was reported on Borg's Scale of exertion. A motion-analysis system (Vicon) and force plate (AMTI) assessed knee joint biomechanics during the initial 40ms of the two phases of a SJ. Variables were analysed using two-way repeated measures ANOVA. Results: The HIIP resulted in significantly decreased knee IC and peak flexion angles ($p = 0.02, 0.015$). The landing phase had lower knee IC and peak flexion and abduction angles, and peak, and time to peak, vertical ground reaction force (vGRF). A significant interaction effect was seen in time to peak vGRF ($p = 0.043$). Conclusion: Participants landed with a more extended knee in the 0-40 ms timeframe following the HIIE and in the second phase of landing indicating that there may be increased vulnerability to injury which may be offset by a decreased vGRF.

EXSC 2: Assessment of the reliability and reproducibility of the lactate minimum test: A protocol for the estimation of maximum lactate steady state.

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Introduction : The lactate minimum (LM) test has been purported as a tool to estimate maximal lactate steady state (MLSS), a desirable training and performance threshold to determine for time-trial

ORAL PRESENTATIONS: MAIN SCIENTIFIC SESSION

cyclists. We hypothesise that our protocol will induce a more controlled state of hyperlactemia thus attaining a more accurate determination of lactate minimum (LM), previously used to estimate MLSS (Knoepfli-Lenzin & Boutellier, 2011). Study aims: This study evaluated reliability and reproducibility of a novel protocol to determine LM using a repeated intermittent sprint (RIS) protocol to induce hyperlactemia. Methods: Healthy male road cyclists or triathletes (n=16, mean; age 30±4 yr, mass 75±10 kg) participated. Each athlete visited the laboratory on three occasions. Initially a graded incremental test assessed load at Dmax, during two subsequent visits LM was assessed using an RIS protocol. Results : Mean load at LM was poorly correlated with load at Dmax (r=0.291). When repeated LM data were analysed between visits, the difference data were homoscedastically distributed (r=0.233), absolute and relative TEM for LM were 7.3W and 3.1%, respectively. The ICC was 0.857, mean bias was < 1W and 95%LOA were +20.8 and -21W, respectively. Discussion: Assessing LM using an RIS protocol is highly reproducible and reliable.

CP 1: Endoscopic repair of a ruptured gluteus minimus tendon: a case report

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A 63-year old recreational walker fell awkwardly onto her right side twisting her hip. Severe persistent lateral hip and thigh pain resulted with significant right leg weakness and a constant limp. A rupture of the short hip abductors was suspected on clinical assessment; an MRI scan confirmed a displaced rupture of the gluteus minimus attachment at the level of the greater trochanter. An endoscopic gluteus minimus repair was undertaken, using bone suture anchors, reattaching the muscle to the trochanteric crest. 3 months following surgery pain has been completely relieved and normal gait has returned. There are only two previous reports of endoscopic abductor reconstruction in the international literature and this case represents the first of its kind treated nationally. Clinical and radiological assessment, operative technique and post-operative outcome are presented.

CP 2: A tale of two kidneys: renal trauma while playing gaelic football in the presence of unknown ureteropelvic obstruction

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Introduction: Ureteropelvic obstruction is a well recognised urological anomaly. Reports of renal pelvis trauma in the presence of previously unknown ureteropelvic junction (UPJ) obstruction are rare in the literature. We could not locate any record of such an injury being the result of playing sport. Management of these injuries varies and depends on accurate clinical surveillance and appropriate radiological grading. Methods: Case reports for two Gaelic footballers admitted with renal trauma in the presence of previously undiagnosed UPJ obstruction within a twelve month period to Letterkenny General Hospital were undertaken. Discussion: Not only is UPJ obstruction more common than generally appreciated, if longstanding leads to the development of enlarged hydronephrotic kidneys. Although isolated injury to the renal pelvis following blunt trauma is extremely rare, the presence of a pre existing renal abnormality obviously increases the risk. Management of these patients depends on close clinical surveillance allied with appropriate clinical and radiological diagnostics. Conclusion: History taking skills, accurate clinical examination with monitoring of vitals and urine analysis remain the corner stone for reviewing patients at risk of kidney injury post blunt trauma to the abdomen. Flank pain associated with frank haematuria requires appropriate radiological imaging to determine significant renal injury. Underlying UPJ obstruction in these cases should be considered and investigated for. Management, either conservative or with surgical intervention, depends upon the clinical status of the patient and the diagnostic radiological findings.

CP 3: Unhappy Gilmore - bilateral recurrent groin pain in an elite hurler: a case report

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We present the case of a 32-year-old ex-inter-county hurler. In 2008, at the age of 27 he presented with acute right groin pain while sprinting during a match. A clinical diagnosis of Gilmores Groin was made and the player underwent Gilmores groin mesh repair surgery. Following six weeks rehabilitation he suffered a recurrence of the right groin pain similar to the initial presentation. MR Hip Arthrogram showed a right sided labral tear and femoral acetabular impingement. Successful debridement and reattachment of labrum as well as femoral osteoplasty for a CAM lesion was carried out at hip arthroscopy. Three years later the player re-presented with acute groin pain again while sprinting during a match, except this time on the left side. The player underwent a left sided Sports inguinal hernia repair. Recently, at four months post-operative the player again re-presented with left groin pain. The player is now awaiting an MR Hip Arthrogram with the suspicion of similar hip pathology as was seen on the right side.

CP 4: The Fainting Hockey Player

Ryan J, Cronin J, Keane D

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We present the case of a 17 year old schoolgirl and keen hockey player who fainted at school 4 days before a hockey cup final. She was taken to our Emergency Department but made a rapid recovery and clinical examination was entirely normal. A key investigation, the electrocardiograph, revealed previously unknown Wolf Parkinson White syndrome. An exercise ECG revealed persistence of the delta wave at a heart rate of 184 beats per minute. A 24 hour holter monitor was performed and an echocardiogram was normal. She was referred for electrophysiological studies and cardiac ablation of an accessory pathway. She has successfully returned to hockey.

TOR 5: The relationship between bony morphology and clinical outcome following the arthroscopic management of femoro-acetabular impingement (FAI)?

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Introduction: Bony deformity correction is essential for the successful treatment of FAI; it is unclear whether the extent and type of bony deformity can affect outcome from surgery. Methods: A cohort of active sportsmen treated surgically for symptomatic FAI underwent retrospective assessment using validated radiological techniques used to measure bony deformity in FAI. All patients prospectively completed a preoperative and 1-year post-operative clinical outcome assessment (HHS, UCLA, WOMAC and SF36). The correlation between bony morphology and clinical outcome following surgery was analysed. Results: There were 105 hips (86 patients) included in the study; the average age was 32 years (19 – 53). 69% of patients had evidence of CAM deformity, 9.5% had evidence of over coverage. 18.1% had evidence of dysplasia; severe dysplasia was present in 6.7% of patients. A low centre edge angle demonstrated high correlation with poorer outcome scores at 1 year (HHS $p < 0.05$, UCAL $p < 0.01$, SF36 $p < 0.01$). A high alpha angle measured on the pre-operative Dunn view correlated well with improved outcome following surgery (HHS: $p < 0.01$). No other deformity measures had a significant effect on outcome. Conclusion: This study demonstrates that patients with decreasing centre edge angle have a poorer outcome from surgery for FAI. Symptomatic impingement in the absence of a CAM deformity may lead to a poorer outcome. Dysplasia could represent a relative contraindication to surgical treatment of FAI.

TOR 6: The high patella: an under-diagnosed condition in cerebral palsy athletes.

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Introduction: Paralympic games are becoming popular and have its elite athletes; more individuals with Cerebral Palsy (CP) are getting involved in sport. We highlight the risk of Knee Extensor Disruption (KED) in diplegic athletes with mild knee crouch, presenting examples in three young footballers. Methods: We have reported the diagnostic kinematics during gait analysis of KED in 10 CP patients, which was evident in the knee flexion –extension sagittal graph and was confirmed as patella Alta on plain X-rays. Using this kinematic pattern we identified three athletes suffering from KED and confirmed the condition with X-rays. Results: The most significant changes between pre and post rupture gait was found in the return to extension in mid-stance (P value < 0.001) and shock absorption in the initial contact (< 0.009). Underlying risks involved most importantly the degree of crouch $> 30^\circ$, and higher BMI. In three athletes with mild crouch, two had fractures of the patella and one had an avulsion fracture of the tibial tubercle combined with an undisplaced fracture of the patella diagnosed in gait analysis and confirmed radiologically. Conclusion: KED is relatively common in diplegic CP, and the risk increases in those who play sport with crouch knees, due to the possibility of increased crouch angle as a result of muscle fatigue while playing sport. Trainers and supervisors should have a high index of suspicion of KED when these children complain of pain around the knee or when gait deteriorates.

TOR 7: Facial fractures sustained in sports

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Sports are a well recognised cause of facial fractures. Between 2010 and 2012 254 patients were operated on who had sustained facial fractures in Sport. The male to female ratio was 6.9 to 1 and the commonest age group in which to sustain a facial fracture requiring treatment was between 16 to 20 years of age. The Commonest cause of the fractures treated was Gaelic Football. There were 21 documented alleged assaults. An Analysis of the data will be presented with discussion on legislative change and prevention strategies.

TOR 8: The incidence and prevalence of ankle sprain injury: a systematic review and meta-analysis of prospective epidemiological studies

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Purpose: To provide a contemporary review and meta-analysis of ankle sprain incidence and prevalence. Methods: A systematic review and meta-analyses of articles using relevant computerised databases and the following inclusion criteria: the study must report epidemiology findings of injuries sustained in an observed sample; the study must report ankle sprain with either incidence or prevalence, or provide sufficient data from which these figures could be calculated; the study design must be prospective. Prevalence and incidence estimates were recorded for 3 sub-categories of surveyed samples (gender, activity type and age), and for high and low methodological quality studies. Results: 181 prospective epidemiology studies were included. The main findings of the meta-analysis demonstrated a higher incidence of ankle sprain in females compared to males (13.6 versus 6.94 per 1000 exposures), in children compared to adolescents (2.85 versus 1.94 per 1000 exposures) and adolescents compared to adults (1.94 versus 0.72 per 1000 exposures). The activity category with the highest incidence of ankle sprain was indoor/court sports, with a cumulative incidence rate of 7 per 1000 exposures. Low quality studies underestimated the incidence of ankle sprain when compared to high quality studies (0.54 versus 0.12 per 1000 exposures). Ankle sprain prevalence period estimates were similar across sub-groups. Conclusions: Females were at higher risk of sustaining an ankle sprain compared to males, children compared to adolescents and adults, with indoor and court sports the highest risk activity. Studies at greater risk of bias were more likely to underestimate the risk of ankle sprain.

TOR 9: Clinical and radiologic findings in ischiofemoral impingement with therapeutic options.

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Introduction Ischiofemoral impingement is a newly described entity representing impingement of the quadratus femoris between the ischium and the lesser trochanter. We describe the clinical presentation and radiologic findings of this rare cause of hip and buttock pain. Methods: We reviewed the clinical findings and MRI images of ten patients with abnormal signal in the quadratus femoris. Two musculoskeletal radiologists measured the ischiofemoral and quadratus femoris distances and compared these with control subjects. Statistical analysis determined inter-observer variability and differences between groups. Results: All patients were female with a main presenting complaint of buttock pain. Both acute post-traumatic and insidious onset presentations were seen. All patients had pain on prone knee-flexed internal rotation of the hip with otherwise normal hip and neurologic examinations. The ischiofemoral and quadratus femoris spaces were significantly narrowed on MRI imaging when compared with controls. Abnormalities of the quadratus femoris included oedema, partial tear and fatty infiltration with hamstring involvement also seen. Ischiofemoral space narrowing can also be demonstrated with ultrasound, which also facilitates image-guided injection of the space. Conclusion Ischiofemoral impingement represents a predominantly female cause of hip and buttock pain with relatively consistent clinical symptoms and signs. The MRI findings include narrowing of the ischiofemoral and quadratus femoris spaces and altered signal in the quadratus femoris muscle. Ultrasound can diagnose ischiofemoral space narrowing and offers dynamic imaging as well as therapeutic options.

TOR 10: A systematic review of surgical intervention in athletic groin pain

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Introduction: Athletic Groin pain is common in multidirectional sports and associated with considerable time lost to sport. Many diagnoses fall under athletic groin pain including osteitis pubis, adductor tendinopathy, and sportsman's hernia. There is large debate over the appropriate course of treatment for this group of injuries with varying views on the benefits of surgical over conservative intervention. The purpose of this review was to assess the effectiveness of surgical procedures in returning athletes to play with athletic groin pain. **Methods:** A systematic review was carried out on Pubmed, CINHALL, EMBASE and Google Scholar for articles relating to surgical intervention for the various forms of athletic groin pain. The primary outcomes were return to play (RTP) rates and recovery times. **Results:** 44 papers were identified as appropriate for inclusion; 5 papers related to surgical intervention for pubic related pain, 34 for abdominal related pain and 5 for adductor related pain. There were 3210 athletes included. The level of evidence was low with 1 level III study and 43 level IV studies. The average RTP rate after surgery was 94% and average time to return was 12 weeks. The RTP rate for adductor, pubic and abdominal related surgery was 81%, 17 weeks; 91% 17 weeks and 95%, 11 weeks respectively. **Conclusions:** This review showed that the standard of evidence for surgical intervention in athletic groin pain is low but the overall RTP rate is high (94%) with adductor related intervention having the lowest RTP rate after surgery of 81%.

PH 6: An assessment of movement efficiency and physiological performance in adult gaelic games players

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Introduction: Movement efficiency has been suggested to play a role in injury prevention and performance enhancement. An analysis of these variables in Gaelic Games will provide normative values across Gaelic Games as well as highlight areas for future intervention. Methods: Players were assessed in groups in player profiling days. Movement efficiency tests included: overhead squat, hurdle step, rotational stability, trunk stability press up, lunge, shoulder mobility and active straight leg raise. The physiological testing included 5, 10 and 20m sprints, AFL agility test and countermovement jump. Results: 469 male players from 24 GAA clubs across Ireland partook in player profiling days. The average player weight was 79.9 kg. The mean score (\pm SD) for the physiological testing was 1.16 \pm 0.8 s, 1.93 \pm 0.11 s and 3.27 \pm 0.16 s for 5, 10 and 20 metre sprints; 8.87 \pm 0.5 s for AFL agility test and 50.9 \pm 8.2cm for the countermovement jump height. The mean in the seven movement efficiency tests scores (out of 3, right side then left) were shoulder mobility 2.72, 2.52; hurdle step 2.08, 2.00; rotational stability 2.06, 2.05; overhead squat 1.89; trunk stability press up 1.85; lunge 1.83, 1.82 and the lowest score was active straight leg raise 1.29, 1.29. Discussion: This assessment of movement efficiency and physiological testing in Gaelic Games players provides normative data across a large cohort. It also highlights movement efficiency scores which had the greatest deficit across the playing group and suggested areas for future injury prevention/performance enhancement intervention.

PH 4: Audit of exercise prescription for musculoskeletal injuries and patient engagement using a web / mobile platform

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Introduction: Exercise is an important part of musculoskeletal injury rehabilitation, however adherence to home exercise programmes can be as low as 30% (Jack et al 2010). Understanding exercise prescription professional practice and patient engagements with prescribed exercise programs can inform optimum rehabilitation approaches. As translating research into clinical practice is challenging (Glasgow & Emmons 2007), a practice-based evidence approach is recommended (Green 2008). Methods: Data was captured on injury diagnoses and exercises prescribed through a web application and patient engagement with the rehabilitation app. (A multimedia platform for exercise prescription was previously developed iteratively based on focus groups and user testing. An app was developed for patients to view videos of their exercises, log their adherence and record progress.). Results: Physiotherapists (n=147) prescribed pilates/core stability (53%), strength (20%) and range of motion exercises (16.3%) for low back pain (LBP) (n=542 diagnoses). Strength (43.6%), neuromuscular training (19.5%) and core stability (19.5%) exercises were most common prescribed for muscle injury (n=124 diagnoses). Peak patient engagement with the app, was at 2 p.m., 9 p.m. and 9 a.m. respectively and the median login was 1.8 times per day. Discussion/Conclusion: Consistent with research, LBP was the most common diagnosis in physiotherapy practice. Interestingly, stretching exercises were not a main part of LBP or muscle injury exercise programs. The peak time and length of engagement suggest that people do their exercises in the morning, around lunchtime and in the evening and do not require a long period of watching the videos to learn them.

PH 8: Gait re-training to alleviate Anterior Biomechanical Overload Syndrome (ABOS) of the lower limb

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Introduction: Exercise induced lower limb pain (EILP) is a commonly diagnosed overuse injury in runners. Patients frequently undergo surgical decompression of the compartment by fasciotomy though recently considered a response to a biomechanical overload and best treated through kinematic intervention. Study Aims: To investigate the effects of a kinematic gait retraining intervention on exercise induced lower limb pain of the anterior compartment. Methods: 10 patients with exercise related running pain in the anterior compartment of the shank were examined for clinical outcomes after running re-education over a 6-week period. Four coaching cues aimed at increasing hip flexion and cadence, maintaining an upright torso, and achieving a mid-foot landing were used to change kinematic variables. 2D analysis was used to measure kinematic data and patients self reported level of function and pain free running was measured. Results: Running distance, EILP scores and patients pain improved significantly. The largest improvement in reported function was observed in 'Running after 30 minutes or longer' at 57.5%. 70% of patients were running pain-free at follow-up. Kinematic changes affected at consultation were maintained at follow-up including angle of dorsi-flexion, angle of tibia at initial contact, hip flexion angle and stride length. A mean improvement of the EILP Questionnaire score of 40.3%. Discussion: This series represents a successful non-surgical intervention for patients with biomechanical overload syndrome of the anterior shank. Three of the four coaching cues affected lasting changes in gait kinematics. Significant improvements were shown in pain-free running times and function.

PH 5: Normative values for the functional movement screen in male Gaelic field sports

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Introduction: to determine normative values for the functional movement screen in elite and sub-elite male Gaelic football and hurling players. Methods: A cross sectional study of functional movement in Gaelic games. Players were video recorded completing the Functional Movement Screen Tool and scored after the testing was completed. Each test is scored out of 21, with a score of >14/21 indicating a heightened risk of injury. A total of 62 male players were tested. This consisted of 41 Hurling players and 21 Gaelic Football players. 30 of these participants were deemed elite and 32 were deemed sub-elite. The mean age of the sample was 22.1±3.0 yr. Comparisons were analysed using a two factor ANOVA and Mann Whitney U tests. Results: The normative value for composite FMS score for the total sample was 15.6±1.5. There was no significant difference between Hurling and Gaelic Football players, or between elite and sub-elite players. No significant difference was found for composite FMS score when an interaction between sport and level of participation was analysed. No correlation was found between composite FMS score and age, BMI, height or body mass. Conclusions: The homogeneity of the normative data across the different groups indicates no need for separate injury prevention interventions. With increasing numbers of studies being carried out on injury prevention in Gaelic sports, this research concludes that no fundamental differences in movement occur between players of either sport regardless of level of participation.

PH 9: Piriformis muscle length tests - reliability, normative values and stretch response for multi-directional and linear athletes

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Background: The flexion adduction internal rotation (FAIR), supine flexion/adduction/external rotation (supine) and functional internal rotation (IR) tests are commonly used to test for piriformis dysfunction and this study aims to 1) explore reliability 2) generate normative values 3) establish normative stretch responses 4) examine for correlations between tests 5) compare results of multidirectional and linear athletes. Methods: FAIR, supine and functional IR rotation range of motion tests were conducted on 48 multidirectional (soccer, hurling) and 24 linear (runners) young male athletes using standardised procedures. Intraclass Correlation Coefficient (ICC) values, Pearson Product Moment Correlation and Independent T Tests were utilised to explore for reliability, investigate test correlations and for group comparisons. Results: Excellent intra-rater reliability was established for all three tests with ICC values of 0.82 to 0.94 ($p < 0.05$). Normative values were: FAIR test $40.7^\circ \pm 4.4^\circ$; supine test $49.9^\circ \pm 4.5^\circ$; functional IR test $60.2^\circ \pm 7.6^\circ$. 'Across the buttock' and 'side of the hip' were the most common location of stretch responses. Positive correlations were identified between the three tests; with the strongest correlation between the FAIR and functional IR test ($r = 0.87$, $p < 0.05$). Multidirectional athletes had reduced range of motion in the FAIR and functional IR test compared to the linear group ($p < 0.05$) with no significant between group difference for the supine test. Conclusions: The FAIR, supine and functional IR tests are clinically reliable and normative values and responses have been established. Multidirectional athletes demonstrated less piriformis flexibility than linear athletes for the FAIR and Functional IR tests.

PH 10: The effects of Kinesio tape on functional performance and perception of stability in male Gaelic footballers'

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Introduction: Kinesio Tape (KT) is an elastic tape which proposes to increase athletic performance by providing kinaesthetic awareness, but studies testing its effect on functional performance are scarce. This study examined the effects of KT applied with tension, compared to sham tape and no tape, during a drop rebound jump in male Gaelic football players. Methods: Seventeen club-level Gaelic footballers performed drop-rebound jumps onto a portable force platform under three conditions: KT with tension, KT without tension (sham tape), and no tape. A questionnaire examined perceived levels of stability and confidence. Repeated measures analysis of variance (ANOVA) tested for differences in jump characteristics between test conditions and effects size statistics (partial eta squared) were calculated. A chi square test examined proportions reporting perceived stability and confidence. Results: No statistically significant differences between the three conditions were noted, in jump height by take-off velocity ($p = 0.77$) or jump time ($p = 0.26$), maximum power ($p = 0.78$), flight time ($p = 0.55$), or reactive strength index (RSI) ($p = 0.23$). Moderate between condition effect sizes were noted for height jumped by jump time (partial eta squared = 0.086), and RSI (partial eta squared = 0.095). With KT, feelings of confidence and stability increased in 35% ($n = 6$) and 24% of players ($n = 4$) respectively, but the observed proportions were no better than expected by chance. Conclusion: KT seems to positively influence perceptions of stability and confidence during a dynamic jump task in some individuals, however utilisation for improving jump performance is not supported.

EXSC 3: The effects of fatigue on peak torque and muscle stiffness of the knee joint extensor musculature

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Purpose: To investigate the acute effects of fatigue on peak torque of the knee joint extensor musculature and muscle stiffness (MS) of the vastus lateralis of young male athletes. Methods: Twenty-five male recreational athletes volunteered to participate. Peak torque of the knee joint extensor musculature was assessed on an isokinetic dynamometer whilst MS (Δ force/ Δ muscle length) of the vastus lateralis muscle was measured using a Myoton-3 (Müomeetria AS, Tallinn, Estonia) in both relaxed and contracted conditions. These measures were performed before and after a specifically developed cycle ergometer fatiguing protocol. Results: A significant decrease in peak torque of the knee joint extensor musculature was observed from pre-fatigue ($236.2 \pm 55.8 \text{ N}\cdot\text{m}$) to post-fatigue ($201.5 \pm 51.2 \text{ N}\cdot\text{m}$) [$t(24) = 5.3, p < 0.01$]. Absolute MS was significantly increased ($p < 0.01$) from pre-fatigue ($371.4 \pm 37.1 \text{ N}\cdot\text{m}^{-1}$ – relaxed; $520.4 \pm 73.2 \text{ N}\cdot\text{m}^{-1}$ – contracted) to post-fatigue ($488.6 \pm 70.5 \text{ N}\cdot\text{m}^{-1}$ – relaxed; $584.4 \pm 103.2 \text{ N}\cdot\text{m}^{-1}$ – contracted). Normalized MS (MS/load supported) was significantly increased ($p < 0.01$) from pre-fatigue ($18.7 \pm 4.7 \text{ N}\cdot\text{m}^{-1}\cdot\text{kg}^{-1}$ – relaxed; $26.4 \pm 6.9 \text{ N}\cdot\text{m}^{-1}\cdot\text{kg}^{-1}$ – contracted) to post-fatigue ($24.6 \pm 6.7 \text{ N}\cdot\text{m}^{-1}\cdot\text{kg}^{-1}$ – relaxed; $29.4 \pm 7.2 \text{ N}\cdot\text{m}^{-1}\cdot\text{kg}^{-1}$ – contracted). Conclusions: These findings indicate that fatigue acutely impairs maximal torque production of the knee joint extensor musculature. It is hypothesized that the concomitantly observed increase in MS may be a compensatory mechanism to increase knee joint stability in the presence of muscle fatigue.

EXSC4: A kinematic analysis of the anterior reach direction of the Star Excursion Balance Test compared to the Y-Balance Test

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Purpose: The Star Excursion Balance Test (SEBT) and the Y-Balance Test (YBT) have 3 common reach directions; anterior (ANT), posterior-medial (PM) and posterior-lateral (PL). Recently published data has shown that the reach distance achieved on the ANT reach direction of the SEBT differs to that on the YBT. Lower limb movement patterns associated with performance of the ANT reach direction of the SEBT and YBT warrant investigation to determine in any kinematic differences are evident between these - commonly used clinical measures of dynamic postural stability. Methods: 29 participants each performed 3 trials of the ANT reach direction of the SEBT and YBT. Sagittal plane lower-limb kinematic profiles were recorded using a 3D motion analysis system. Reach distance was recorded and normalized to limb length by calculating the maximized reach distance (%MAXD). Results: Participants reached significantly further on the ANT reach direction of the SEBT ($67.05 \pm 4.97 \text{ \% MAXD}$) compared to the YBT ($59.74 \pm 4.85 \text{ \% MAXD}$) ($p < 0.05$). Furthermore, participants were characterized by a significantly more flexed position of the hip joint at the point of maximum reach on the YBT ($27.94 \pm 13.84^\circ$) compared to the SEBT ($20.37^\circ \pm 18.64^\circ$) ($p < 0.05$). Discussion: Test performance on the ANT reach direction of the SEBT and YBT differs as evidenced by differences in reach distance achieved and associated test kinematic profile. We conclude that the SEBT and YBT should not be used interchangeably.

EXSC 5: Dynamic postural stability in young adolescent male and female athletes

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Introduction: Dynamic postural stability is an integral component of lower limb neuromuscular control. Adolescent female athletes have a higher prevalence of non-contact lower limb injuries than their male counterparts, which may be linked to differences in neuromuscular control. However, it is not known at age these differences become apparent. The aim of the present study was to investigate dynamic postural stability performance as quantified by the composite reach distance of the anterior (ANT), posterior-medial (PM) and posterior-lateral (PL) reach directions of the Star Excursion Balance Test (SEBT) of male and female adolescent athletes. Methods: Eighty nine male and 81 female adolescent athletes (mean age = 13yr) participated. Each participant performed three trials of the ANT, PM and PL reach directions of the SEBT on each limb. Reach distance for each reach direction was expressed as a percentage of leg length, with the composite reach distance of the three reach directions being used as the dependant variable. Results: There was no significant difference between the composite reach distance of male and female athletes ($p = 0.18$). Composite reach distance did not differ significantly between dominant and non-dominant limbs for male or female athletes ($p = 0.64$). Conclusions: Although no significant between group differences were observed in this age group, it is possible that differences in dynamic postural stability could manifest with increasing biological maturity. Further longitudinal research is needed to confirm or refute this hypothesis.

EXSC 6: Does the single leg squat provide a useful insight into lower extremity control during more dynamic sporting actions?

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Introduction: The single leg squat is widely used in functional movement screening and in 3D motion capture to assess abnormal movement patterns but few studies have examined whether the results of such analyses can be generalised to more dynamic sporting movements. Study Aims: To compare lower extremity biomechanics in a single leg squat, drop landing, hurdle hop and running cut. Methods: Sixteen elite rugby players were recruited and a 3D biomechanical analysis of trials of each of the four movement tests was undertaken. Correlations were carried out between hip, knee and pelvis joint angles achieved in the squat compared to the other movements. Results: Of the 27 comparisons made between joint angles in the squat versus those in the other movement tests only 7 were statistically significant. A significant correlation ($p < 0.01$) was found between the squat and drop landing for hip rotation ($r = 0.54$), knee valgus ($r = 0.55$) and pelvic drop ($r = 0.75$). In addition there was a significant correlation between the squat and the hurdle hop, and the squat and the cut, for both hip flexion ($r = 0.53$ and $r = 0.87$, respectively) and knee internal rotation ($r = 0.60$ and $r = 0.62$, respectively). Discussion: In general there were few correlations between joint angles exhibited in a single leg squat and those in other more sport specific movements. The validity of using a single leg squat as an indicator of lower extremity control in more dynamic tasks is therefore questionable.

EXSC 7: Biomechanical factors associated with better times in a running cut manoeuvre

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Introduction: Change of direction (cutting) ability is an important component of many team sports including soccer, rugby and Gaelic games. The biomechanical factors associated with better cutting times are not well known but such an understanding should allow strength and conditioning specialists and physiotherapists provide more effective training/rehabilitation programs. Study Aims: Identify the biomechanical factors associated with a running cut manoeuvre. Methods: 12 elite inter county hurlers

were recruited and a 3D biomechanical analysis of a running cut manoeuvre was undertaken. Pearson correlations were carried out to examine the relationship between biomechanical variables of interest and cutting time. Results: Ground contact time ($r = -0.48$), pelvis range of motion ($r = -0.54$), thorax rotation ($r = 0.51$) and maximum ankle plantar flexor moment ($r = 0.65$) and power ($r = 0.77$) were all significantly ($p < 0.01$) correlated with running cut time. Discussion: This is the first study to specifically examine the biomechanical factors associated with better cutting times. Control of the pelvis and torso, as well as force and power production about the ankle, were identified as key variables. These findings indicate that to improve cutting performance, conditioning specialists/physiotherapists should incorporate exercises aimed at enhancing functional pelvis and thorax stability, and in addition, reactive strength and power output about the ankle.

EXSC 8: Effective exercise based training interventions, targeting injury prevention in team-based sports: a systematic review.

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Purpose: Exercise training is proposed to aid injury prevention through enhanced neuromuscular control and muscle strength. This systematic review assessed the effects of exercise-based interventions on injury incidence in team sports. Methods: Five electronic databases were searched (12/1/13) returning 275 unique articles. Randomised controlled trials (RCTs) that reported overall or lower limb injury incidence were included. The methodological quality of each trial was assessed using a tool developed by the Cochrane Bone, Joint and Muscle Trauma group (Goldman and Jones 2010). Meta-analysis was performed on homogenous studies using RevMan 5.1 software. Risk ratios (RR) and 95% confidence intervals (95%CI) were calculated using the Mantel-Haenszel method in a random effects model. Results: Twenty-three RCTs involving 21,479 participants were included. Multifaceted exercise programmes were tested against controls in twelve studies reducing overall injury (RR=0.65, 95%CI 0.44-0.96, P=0.03), knee injury (RR=0.79, 95%CI 0.63-0.99, P=0.04), ACL injury (RR=0.51, 95%CI= 0.28 to 0.93, P=0.03) and ankle injury (RR=0.72, 95%CI 0.58-0.90, P=0.003). Seven studies used a balance board intervention, reducing hamstring (RR=0.22, 95%CI=0.05-1.02, P=0.05) and ankle injury risk (RR=0.64, 95%CI=0.49-0.83, P=0.001). Three studies targeted hamstring muscle training with no significant effect (RR=0.46, 95% CI=0.19-1.11, P=0.09). One study examined eccentric training of the Achilles and patellar tendons but found an increased injury risk (RR=2.5, 95%CI=1.35- 4.61, P=0.003). Conclusions: Exercise based interventions can reduce injury risk in team-based sports. Strategies are required to translate this evidence into practice.

TOR 11: Injury to the head region in county-level Gaelic football and hurling over six playing seasons

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Purpose: The aim of this study was to describe incidence of injury to the head region in elite Gaelic football and hurling over six playing seasons. **Methods:** Male county teams were tracked prospectively over the 2007-2012 seasons, from January 1st until the team ceased to participate in competition for that year. Weekly data were recorded online in the National GAA Injury database. Injury was defined as causing time-loss from training or match-play (minimum 24 hours from midnight of the day of injury). **Results:** Thirty-five football and 28 hurling squads participated. There were 1188 football players and 914 hurlers in total over the 6 years. Injuries to the head region constituted 3.0% of all football injuries and 2.4% of all hurling injuries. There was a pooled incidence rate of 0.26 head injuries per 1000 hours of football and 0.19 per 1000 hours of hurling overall. Concussion was diagnosed in 0.8% football and 0.8% hurling injuries. Fractures to the nose constituted 0.7% football injuries and 0.3% hurling injuries. Fractured mandible was reported in football (0.2% injuries) and fractured maxilla/orbit in hurling (0.08%). Perforated eardrum was reported in both football (0.08%) and hurling (0.09%). Lacerations and contusions accounted for 0.9% injuries for football and 0.8% for hurling, while there was an additional retinal bleed (0.09%) and dental injury (0.09%) in hurling. **Conclusions:** These results provide an insight into trauma to the head region and consequent injuries in elite male Gaelic games players.

TOR 12: The effect of Platelet Rich Plasma treatment on hamstring injuries

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Introduction: A recent randomized controlled study on PRP treatment of proximal hamstring injuries reported a significant reduction in pain and disability. In addition, all patients returned to baseline activity levels following treatment. This study further investigates the effects of PRP treatment of hamstring injuries in a larger group of patients. **Study Aims:** To investigate the effect of PRP injection treatment on hamstring muscle and tendon injuries. **Methods:** 39 patients who received PRP injection treatment completed an online questionnaire regarding their injury. Responses were analysed to establish levels of injury resolution and return to pre-morbid levels of activity. **Results:** 85% of patients experienced a positive improvement in hamstring injury symptoms following PRP treatment. 60% of patients achieved moderate or complete injury resolution. In total, 60% of patients returned to pre-morbid levels of activity with 10% reporting a return to higher levels of activity than prior to injury. **Discussion:** A recent small scale randomised controlled trial reported 100% success rate in reduction of pain and disability in high level athletes with hamstring injuries, with all patients returning to pre-injury baseline activity levels. By comparison, this study, with a 3-fold increase in the number of participants, also found a high level of improvement in symptoms (85%) with a 60% rate of return to pre-morbid activity levels. These findings suggest that PRP injection treatment is a viable treatment option for improving symptoms and also for assisting patients with return to baseline or improved activity levels following hamstring injury.

PH 11: The impact of telling a population of newly diagnosed hypertensive patients their heart age on their level of engagement with health behaviours appropriate to reducing blood pressure.

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Introduction: Cardiovascular diseases are the leading cause of death in Europe, accounting for 44% of all deaths in men, and 57% in women in 2004. Hypertension is a powerful and independent risk factor for CVD. A number of non-pharmacological therapies, also termed “lifestyle modifications,” have been proven to lower BP, and are currently recommended for the prevention and treatment of hypertension. **Methods:** A randomised controlled pilot study in a population of newly diagnosed hypertensive patients to compare the new heart age message to the standard 10-year QRISK percentage message on level of engagement with health behaviours appropriate to reducing blood pressure. **Results:** 60% of intervention group participants perceived the heart age message to be easier to understand than the QRISK percentage message. 50% of control group participants and 73% of intervention group participants achieved a composite measure of lifestyle behaviour change, however the difference was not statistically significant (P=0.387). 80% of respondents in the intervention group stated that the heart age message was helpful in initiating lifestyle behaviour changes. **Conclusion:** The small number of participants in the pilot study prohibits any concrete conclusions being made about the effectiveness of the heart age message compared to the standard 10-year QRISK percentage message. A further trial to evaluate this is warranted, and further research is required to identify how to convert risk perceptions into lifestyle change.

PH 12: Spinning-related rhabdomyolysis: Case series of a new and increasing phenomenon.

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Introduction: Exercise-related rhabdomyolysis is a well-recognized complication of unaccustomed levels of activity. In recent years, the popularity of 'spin' classes has soared amongst sedentary individuals as a means of improving fitness levels. This has led to an increased number of spinning-related rhabdomyolysis presenting to accident and emergency departments. **Methods:** We conducted a 2-year retrospective case series, of all individuals presenting to the accident and emergency department, Cork University Hospital, with rhabdomyolysis. In cases where the precipitant was found to be a spinning class, the patient's case was detailed in terms of initial clinical features, biochemistry, fluid management, complications (e.g. acute kidney injury, compartment syndrome) and subsequent investigations (e.g. MRI, muscle biopsy). **Results:** Myalgia, muscle swelling and urine discoloration were the most frequently observed clinical features in spinning-related rhabdomyolysis. In the majority of cases, patients presented after their first spin class. Creatine kinase levels greater than 100,000 units were recorded on multiple occasions. Typically, patients presented on days 3 to 4 post spinning class and required 4 days of inpatient intra-venous fluid replacement before discharge. **Conclusions:** Spinning classes are a potentially harmful form of exercise in the unfit athlete. They can result in significant morbidity and hospital inpatient days. Precautions should be taken to educate participants of the importance of slowly graduating levels of exercise.

PH 13: Morbidity at major soccer matches in the Aviva Stadium

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Introduction: Medical care of spectators has become an integral part of Sports and Exercise Medicine. Study Aims: To review morbidity at soccer matches at the Aviva Stadium since August 2010. Methods: Patient records were anonymised and reviewed. Data were abstracted and analysed. Results: Total attendance was 927,080 spectators. 202 patients were treated. For six matches, summary data only was available. 167 records were reviewed. 126 male patients aged 4-86 years (mean=29) and 41 female patients aged 4-72 years (mean=29) were treated, some with pre-existing conditions. 20 were staff members. Numbers presenting ranged from 0-14 per match (mean=6.5). 81 (49%) attendances were for trauma, mainly minor limb injuries. The most common medical presentations included abdominal pain, headache and vomiting. Two cardiac arrests were managed on-site. One was successfully resuscitated with return of spontaneous circulation. 90 patients (54%) were treated exclusively by first aid personnel. Of the 77 patients examined by doctors, 10 (13%) were transferred immediately to hospital, 9 (12%) were referred for hospital follow-up and 43 (56%) for GP follow-up. Follow-up was not required in 13 (17%) cases. Conclusions: The number of patients treated (2.2 per 10,000 attendees) was broadly in line with international experience. The number, variety and complexity of cases treated highlight the need for physician presence. These results should inform medical input into the planning and management of major sports events.

TOR 13: The factors that they affecting on sport injuries and the role of physiotherapist to treat them

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Sport injuries reasons can be classified for either internal or external factors. External factors include training methods and equipment, environment and insufficient warm-up and condition. Internal factors include age, sex, muscle strength, flexibility and length difference for extremity. Besides that, rehabilitation effectiveness can also influence treatment period. The aim of this study was to determine injuries frequency, factors that may be affective on these injuries and frequency of physiotherapist choices on individuals from Physical Education and Sport Sciences College in Islamic Azad University. This study was conducted on 22 females and 68 males via survey method. Total 90 participants in this study were responded by the questionnaire and survey of specialist, researchers and physiotherapists and all questions were responded by him/her. As a result, all athletes indicated to injury that the highest injury rate of 79.2% posterior of left knee in athletes, 42.2% from same sides, sudden initiation of injury as 78.9% and 22.2% after crushing with other player. The most affecting factors to all injuries were the most 67.8% in the sports hall, during training as 51.1%, the most 31.1% while jumping, outdoor activities as 65.6% and 63.3% at warm weather condition. Therefore, all athletes were no wear the orthosis and taping material during injury (81%) and done with the treatments after injury to physical therapist as 12.2% as that they were known about physical therapist as the profession. It seems that most of our athletes don not know about benefits of physiotherapists to protection and treatment injury.

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