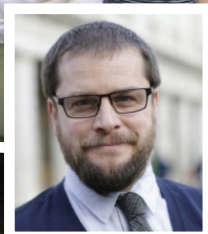
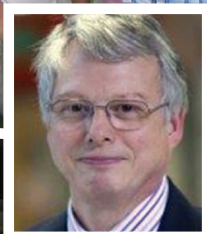
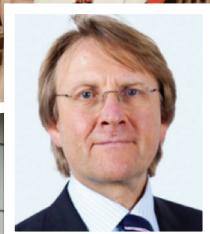


BASEM

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TODAY



CELEBRATING 40 YEARS OF SEM EDUCATION

THE NEWSLETTER OF THE
BRITISH ASSOCIATION OF
SPORT AND EXERCISE
MEDICINE



Queen Mary
University of London



Edited by Prof Nat Padhiar, Dr Catherine Lester,
Prof Roger Wolman and Prof Dylan Morrissey

BASEM REPORTS

Edited by Prof Nat Padhiar, Dr Catherine Lester, Prof Roger Wolman and Prof Dylan Morrissey

CELEBRATING 40 YEARS OF SEM EDUCATION

This edition is dedicated to celebrating the 40th Anniversary of the internationally renowned Centre for Sports and Exercise Medicine (SEM) based within the William Harvey Research Institute, Barts & The London School of Medicine & Dentistry, Queen Mary, University of London (QMUL) and Barts Health NHS Trust. The centre is an educational and research hub, which has trained some of the most prominent SEM practitioners currently in the field over the last 40 years.

The core of both our clinical activity is, and always has been, the ongoing monthly combined clinic which embodies and shapes the unique ethos of SEM at the London. In the present economic climate, it is challenging to commission NHS SEM services. The service at Barts Health NHS Trust is run by a dedicated multi-disciplinary SEM team, led by Consultant in SEM yet also incorporating the full range of associated secondary care specialities, thus providing truly inter-disciplinary care to our patients. These clinics provide a platform for our students to learn from, engage in and model respectful inter-disciplinary collaboration thus forming a crucial part of their clinical learning. Our motto is to Inspire Clinical Excellence through Science. Our ethos is collegiate.

As we celebrate the 40th Anniversary of the London Hospital course and describe how this team works, we also take a moment to remember Prof John B King, an academic pioneer, who in 1981 laid the foundation of the longest running academic course in SEM in the UK, Europe and probably the world - then offered by the London Hospital Medical College.

The course was initially for doctors and later on a separate course was offered to physiotherapists. 40 years on and, under 5 different leaderships, it has undergone many evolutionary changes. In 2002, the course became truly modular and inter-professional and the younger sibling - the intercalated BSc in SEM was added, another unique offering in its truly clinical application. In 2016 and 2021, we were the first in the world to design and offer a post-graduate certificate (PgC) and an MSc in Podiatric Sports Medicine respectively. These developments have allowed students from a range of clinical backgrounds, to tailor their education according to their particular desired learning outcomes.

In this issue we reflect on the history of SEM at The London, collate reports from our decorated and renowned alumni who reflect on their experience whilst a student and the impact it had on their career (Prof Nick Webborn, Dr Simon Kemp and Dr Richard Budgett).

Also, in this issue we have a report by our alumni, Dr Ros Carbon and Dr Catherine Lester, both passionate about the benefits of physical activity and promoting Moving Medicine. In their report they show that evidence is emerging of how physical activity can have myriad of positive health benefits especially in enhancing circulating insulin and, the importance of correctly diagnosing insulin resistance in Metabolic Syndrome.

There are also reports by our alumni reflecting on challenges ahead in Football Medicine (Dr Zaf Iqbal, Dr Ian Beasley, Dr Bryan English), and the importance of evidence based practice and research. There is a thought provoking staff report Dr Manuela Angioi and Professor Roger Wolman on benefits of increased physical fitness in relation to both dance performance and injury. Finally, in keeping with our motto, Prof Hazel Screen and Prof Dylan Morrissey update us on a snippet of current research concerning the inter-fascicular matrix and its relevance to tendinopathy.

In the last decade, SEM has led or been involved in >£10m of funded research across the spectrum of clinical innovation, discovery science, randomised controlled trials, artificial intelligence, exercise for health and evidence translation. This funded work builds directly on student endeavour which results in 50 quasi-experimental studies and 30 systematic reviews being produced every year at, or near to, publication standard.

So, with the festive season approaching, enjoy some indulgence but do also keep that New Year resolution to get everyone moving more for a healthy mind and healthy body for 2022. SEM at QMUL will continue innovating in the combination of the best clinical practice, world-leading education and research in order to deliver further step changes in care for our patients, learning outcomes for our students and knowledge within our speciality.

Merry Christmas and a Healthy New Year.

WANTED!

CALLING ALL SEM ALUMNI OF THE LONDON COURSE, CSEM, QMUL (FORMERLY LONDON HOSPITAL MEDICAL COLLEGE)

Please contact Prof Nat Padhiar on n.padhiar@qmul.ac.uk who is compiling a list of all graduates from our course since 1981 (doctors, physiotherapists, podiatrists, and osteopaths).

Information required: Full Name with title, year graduated, current job title, level of involvement in sport, any photographs whilst a student and contact email. Please share this request with colleagues you know, who are also alumni of our course.

THANK YOU

ALUMNI & STAFF REPORT:

40 Years of Sports Medicine Education at 'The London'

ARTICLE BY **DR TOM CRISP**, **PROF NAT PADHIAR** AND **DR J DAVID PERRY**

In 1981 the foundation stone was laid by the late Prof John B King to start the first formal education programme in the UK and Europe, leading to qualification in sports medicine (SM) awarded by London Hospital Medical College. His shining beacon was Galen (AD 129-210), probably the first Sports Physician, looking after the Gladiators of Pergamum.



Above:
Combined
clinic early
days

In 1978, Dr David Perry was appointed Consultant & Senior Lecturer at The London (now The Royal London Hospital) along with John. They met at a "Meet the new Consultants Evening" and discussed John's vision of Sports Medicine education.

John had returned in 1977 from what he described as a career-changing experience in Lyon under Professor Albert Trillat's supervision, which fuelled his lifelong interest in ACL injury and quality of SM rehabilitation. He was keen to link up with the SM clinic set up in the Rheumatology Department in 1975 by Dr Michael Molloy, one of Ireland's most capped Rugby Union players and later Professor of Rheumatology at University College, Cork.

The clinic had developed links at an early stage with Crystal Palace National Sports Centre (CPNSC). After the arrival of Dr David Perry, an evening clinic at The

London was formally established as a multi and inter-disciplinary clinic, commonly known as 'combined clinic'. When John was invited to attend one of these clinics he was so impressed that it provided him with the 'Road to Damascus' moment. He began to understand how little he knew and that the results of surgery depended hugely on the quality of the support team. In other words, the surgeon is in fact a very small cog in the machinery of bringing an athlete back to top performance. This became an integral part of the SEM course and remains so today.

John was also inspired by his senior colleagues, Basil Helal (Olympics), Taffy Cameron (GB Swimming) and Brian Roper (West Ham FC), and worked tirelessly to bring to fruition his vision of SEM, despite his immense role in leading Trauma Services in the Trust.

In 1980, David Perry was invited by the late Professor David Ritchie (subsequently Dean) to express the Trust's support, at a meeting where John set out his plan for the College to begin a London University Diploma Course in SM, to be offered by London Hospital Medical College, with the support of the Institute of Sports Medicine.

In 1983, it was a slow start (1 student) which very quickly built up to 20-25 with many overseas doctors and, for years, the Australian Army sent one of the doctors to the course. Professor Tony Harding Rains was our external examiner and his input was huge.

By 1986, when Dr Tom Crisp attended the course, it was already attracting budding sports physicians from around the world - that year including Nigeria, Australia, Uruguay, and New Zealand.

He recalls 'It was a practical course with lots of anatomy and examination technique alongside the physiology and psychology. Lecturers came from a wide spectrum, including experienced physiotherapists, sports specialists, radiologists, rheumatologists, and podiatrists. It was initially a doctors only course but tailoring the course for physiotherapists and more recently, podiatrists has increased the breadth of knowledge and inter-disciplinary learning.

The course over the last 40 years has produced many doctors and physiotherapists who work at the highest level



within all elite and professional sport. In 2012 London Games, it is estimated that 17 Chief Medical Officers from different countries were CSEM alumni.

Research projects have always been integral to the Course with many published or presented at national/international meetings leading to important contributions to SEM knowledge and development.

The appointment of Prof Nicola Maffulli as the CSEM lead in 2008 accelerated the publication rate and, with a more structured research process today, with 2 dedicated modules (Research & Literature Review), quality and quantity of research output continues to rise.

John King was the architect, pioneering academic and the impetus came initially from him, with his extraordinary skills in teaching the basics as well as a desire to create a true multi-disciplinary team.

The latter is never better exemplified than the monthly evening clinics run in the department where everyone's opinion was valued, no ego got in the way and surgeons, physicians and non- doctors all found common ground.

These values were embraced and shared by successive Centre Leads once John had taken a back seat, by Mr Peter Hamlyn, Prof Nicola Maffulli, Prof Nick Goulding and the current, Prof Dylan Morrissey.

John's legacy lives on, inspiring future sports physicians, physiotherapists, and podiatrists.



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SPORT AND EXERCISE MEDICINE AND THE OLYMPIC GAMES

ARTICLE BY DR RICHARD BUDGETT

Both Sport Medicine and the Olympic Games stretch back into antiquity.
A symbiosis that has benefitted athletes for millennia...

In the last century Olympic sport in the UK rejoiced in the ethos of plucky amateurs and dedicated volunteers. Then in the 1990s that all began to change. This started with a dedicated Medical Centre for Olympic Athletes funded by the British Olympic Association. I was lucky enough to join that small team and worked there after completing my Sport Medicine diploma at the Royal London Hospital.

My main area of research was into so called "Overtraining Syndrome"⁽¹⁾ which I tried to rename as "*Unexplained Underperformance Syndrome*" to better reflect the picture in most athletes.

I learnt how difficult it is to change the name of a condition with an easy acronym (OTS) to a name with an

unpronounceable and misleading acronym (UUPS)! I went on to describe it as "*Under Recovery Syndrome*", but URS never caught on either.

Then came lottery funding, EIS, UK Sport and the professionalisation of Olympic Sport in the UK. The creation of world class multidisciplinary teams with full time coaches and athletes was revolutionary and the sporting success followed.

In 2005 the UK bid for the 2012 Olympic Games. Most people think that it was Sebastian Coe, Craig Reedie, Tony Blair, and other politicians who pushed London over the line just ahead of Paris. In fact, it was Sport Medicine!

Recently rebranded Sport and Exercise Medicine, it was awarded

NHS speciality status the day before the presentation to the IOC Evaluation Committee – the confirmation of London as 2012 host was a formality after that!

It was only after joining the IOC in late 2012 that I realised the respect of the world for Sport Medicine in the UK and, the medical care that was delivered at the Olympic Games London 2012.

This was thanks to thousands of volunteers who were truly professional. Some rightly grumbled that the plumbers were paid but not the medical staff. Nevertheless, they came and committed themselves to ensuring the Games were such a great success.

The medical priority for the IOC in the last 15 years has been illness and injury prevention, with a focus on injury



“It’s nearly a decade since the Olympic Games in London and there are diploma courses all over the world, in-person, on-line and multidisciplinary.”



Dr Richard Budgett
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Graduated in SEM 1989.
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Chief Medical Officer, LOCOG, 2012.

Reference:

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surveillance as the first and important step, at the Games and working with the International Federations.

Injury and illness prevention are now embedded in the work of sport organisations and the jewel in the crown of this long campaign is the 3 yearly world conference in Monaco. Doping is the other major challenge for the modern Olympic movement with the extraordinary manipulations in Russia including the hole in the wall in the Sochi laboratory. However, the reanalysis programme was extraordinarily effective revealing over a hundred new positive cases from Beijing 2008 and London 2012.

Injury prevention and Anti-Doping continue to be crucial but now

Public Health has taken centre stage. The importance of Public Health at Mass Gatherings is not new. In the last 5 years there was Zika in Rio, Norovirus in PyeongChang, and there was even the threat of Ebola affecting the Youth Games in Nanjing, but the Covid-19 Pandemic has had the biggest impact of all due to its' widespread effect on all aspects of life, including sport and very obviously the Olympic Games.

It's nearly a decade since the Olympic Games in London and there are diploma courses all over the world, in-person, on-line and multidisciplinary. Imitation is the greatest form of flattery and it all started back in 1981 with John King at the Royal London Hospital.

PARALYMPIC MEDICINE:

“I insisted that the teaching of Paralympic medicine was a necessary part of the curriculum, so ensuring that all SEM trainees had exposure to this in their training if they were to be caring for athletes in 2012.”

A Personal Account of my Journey In Paralympic Medicine

ARTICLE BY **PROFESSOR NICK WEBBORN**

In 1992 I returned to my alma mater, The Royal London, to take the Diploma Course in Sports Medicine under John King. I had incurred a spinal injury playing rugby as a medic in the RAF in 1980. The experience of the rehabilitation process and a lifelong love of sport provided the stimulus to take the course; not sure where it would lead...

During that year I started working with the British Paralympic Association and was astounded by the lack of knowledge and support for Para athletes. At that time there were just nine relevant articles in the whole literature, and I became determined to bring the same level of support to these athletes as their Olympic counterparts.

The Diploma course provided me with both the grounding of knowledge and contacts in the sport medicine world, as I started to find my way into the world of the Paralympics.

With the heat of the Atlanta Games beckoning, this lead on to a Master's thesis on total body water and water turnover in Paralympians training in the heat at the BOA camp in Tallahassee and from there a heat mitigation strategy was developed for the team.

The Winter Games in Nagano in 1998 opened my eyes to the challenges in the cold environment and an interest in the injuries incurred. As a physician with an inquiring mind, and a reluctance to accept anything but the best care for the athletes, I was fascinated by the relationship between the diverse impairments, the sports and their equipment and their relationship to illness or injury.

I started writing and getting published and my persistence led me to being asked to join the IPC Medical Committee in 2001. Perhaps they felt it might be easier to have the annoying, questioning British medic on the inside!

At the Salt Lake Games in 2002 I started the first IPC injury survey and found a clear mechanism of injury in Ice Sledge Hockey between protective equipment and the five lower limb

fractures that occurred. By speaking with the International Federation, I was able to propose changes in regulations and up until 2018 there has only been one lower limb fracture in all the subsequent Winter Games in this sport. The success led to the introduction of the injury and illness survey at summer Games at 2012 and this is now established as part of the IPC Medical Committee roles at Games time leading to not only multiple publications but most importantly educational resources, workshops, and an impact on athlete welfare.

During the bid phase of the 2012 Games to London I joined the Medical Advisory Group to develop the Health Services plan. An integral part of the submission included the development of Sport and Exercise Medicine as a specialty, which was finalised just prior to the visit of the IOC Evaluation Commission in 2005.

However, I insisted that the teaching

of Paralympic medicine was a necessary part of the curriculum, so ensuring that all SEM trainees had exposure to this in their training if they were to be caring for athletes in 2012.

2012 was also my proudest moment as CMO for Paralympics GB and coming into the stadium at the opening ceremony at the back of the team.

Now nearly thirty years into my career in sports medicine there continue to be gaps in knowledge that we still have in this field. However, in seeking answers I have made many friends worldwide who, like me, want to improve care of the Para athlete, understand injury mechanisms and illness patterns. As such it often doesn't seem like work. I never set out to be 'an academic' but find myself as a professor, and author of 100+ articles/book chapters, but still regard myself as a sports physician who wants better care for athletes and hopefully it stays that way.



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Paralympic Association.
Chief Medical Officer, UK
Invictus Team.

FOOTBALL MEDICINE:

The Emergency Care of Footballers, are we winning?

ARTICLE BY DR ZAF IQBAL, DR BRYAN ENGLISH AND DR IAN BEASLEY

The importance of having a dedicated Pitch side medical team available to deal with the emergency management of players was clearly highlighted on 12th June 2021, when Christian Eriksen of Denmark, collapsed on the field before halftime in a Euro 2020 game vs Finland.

The rapid recognition and use of CPR and a defibrillator to restart his heart, will have contributed to the successful resuscitation, much to the relief of all those in the stadium and millions watching around the world.

It has not always been like this, and it is fair to say that the events of October 2006, where Petr Cech, while playing for Chelsea against Reading, sustained a head injury, was a catalyst for the improved emergency care in Premier league games⁽¹⁾. At the time of the Petr Cech injury, it was not mandatory for the doctor and physiotherapist to be on the bench or for there to be a dedicated stretcher crew and ambulance just for the players. There was also the creation of a specific on pitch emergency course that all relevant doctors and Physiotherapists are expected to complete every 3 years with an annual refresher update. The Premier League doctors group was also formed and agreed on a minimum standard and a checklist of equipment which is required to be present at all Premier League games.

If nothing else following the Eriksen incident, then we hope that it again highlighted the importance of an AED

being immediately available anywhere that people are playing sports. Other examples have been demonstrated in 2012 with the management of Fabrice Muamba who was resuscitated at White Hart Lane and survived. Other similar incidents were not as successful due to the absence or delay in using an AED such as was the case in the tragic collapse and subsequent death following an on the pitch cardiac arrest of Marc Vivien Foe, in France in June 2003.

There is plenty of evidence that shows that every minute's delay of using an AED results in a 10% decrease in chances of survival⁽²⁾. The Premier league has set up a Premier League Defibrillator initiative, which will support the installation of Automated External Defibrillators (AEDs) and External Storage Cabinets at thousands of grassroots clubs and facilities currently without a device on site⁽³⁾. There is also further support for legislation for AEDs to be made mandatory in all schools and public places in the UK.

The emergency care of footballers is not a uniform standard across Europe and at international competitions, which many doctors and players have reported

when their teams have played outside the Premier League. It was only around 10 years ago, when UEFA adopted a similar standard of equipment and personnel provision to the Premier league for the Champions league and Europa league competitions. Further improvements and adjuncts have been introduced via the Premier League such as the use of pitch side tablets for the medical team that are able to review injury mechanisms, in particular determining possible concussion.

However, despite these measures there are still areas that can be improved as has been shown in recent international competitions, where the management of concussion and head injuries has been controversial and not reflected well on UEFA and FIFA, by their lack of leadership and guidance. We hope the type of standards set up for the Emergency care within the Premier League are adopted across all Professional football.

We should continue to look at improving the emergency care for footballers, because considering the resources and finances available and the worldwide audience watching, there should not be any compromise in this area.

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Sports and Exercise Medicine

Celebrating 40 years of Sports and Exercise Medicine at Queen Mary

Sports and Exercise Medicine (SEM) at Queen Mary University of London runs the longest-running MSc in SEM in the world, and a popular intercalated degree alongside a programme of research and diverse clinical activity.

- Mixed Mode Education – students participate either online or in-person on the campus
- MSc programmes in Sports and Exercise Medicine, Podiatric Sports Medicine, MACP accreditation
- iBSc for medical students
- Cadre of inter-disciplinary PhD students
- Modular Structure – core modules specific to your professional route, elective modules to tailor your studies
- An active community of clinicians, scientists, and academics working together
- Human Performance Laboratory – a collaborative venue with state of the art physiological and biomechanical testing
- Research and Publication opportunities
- Monthly multi- and inter-disciplinary clinic for interactive learning
- Annual Scientific conference, opportunity for networking and reunion



qmul.ac.uk/sportsmed



MOVING MEDICINE AND BENEFITS OF PHYSICAL ACTIVITY

Exercise, Insulin Resistance and The Metabolic Syndrome

ARTICLE BY **DR ROSLYN CARBON** AND **DR CATHERINE LESTER**

**Around 4.7 million people in the UK are living with type 2 diabetes (T2D).
The cost of T2D to the NHS is estimated to 10 billion pound per annum.⁽¹⁾**

Regular physical activity (PA), often taken in the form of exercise, has a myriad of positive health benefits including amelioration of many diseases. An important effect of exercise is to enhance the effect of circulating insulin by facilitation of cell membrane receptors.

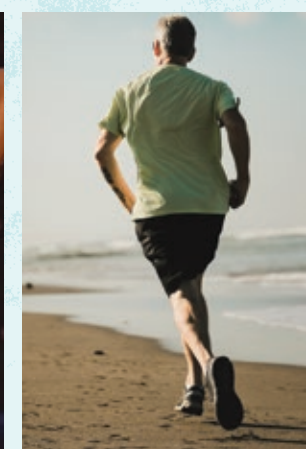
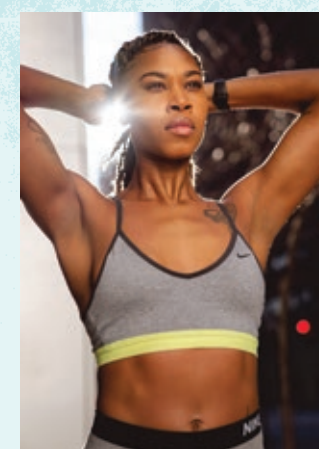
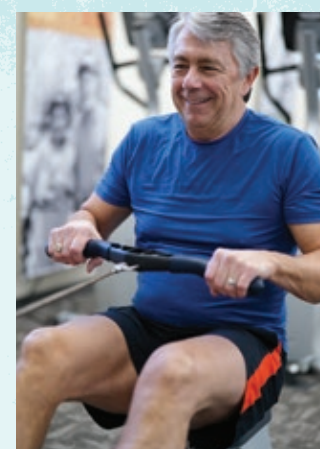
In the minutes to hours after exercise, insulin sensitivity is increased such that liver and muscle cells are able to more effectively take in glucose to store as glycogen. In the context of chronic exercise there is an upregulation of the

effect of insulin. Alternatively, in the absence of insulin sensitive cells (ie Insulin Resistance (IR)), available glucose is more readily stored as fat in adipose tissue.⁽²⁾

IR is the main aetiological factor of T2D. It is also one of the main risk factors for the Metabolic Syndrome, a multiplex condition in which related hormonal and biochemical abnormalities manifest across many organ systems in the body.⁽³⁾ IR is common, affecting 10 to 40% of the population in varying severity and across all ages. Clinical syndromic features can include high

blood pressure and cardiovascular atherosclerotic disease, T2D, abdominal obesity and skin changes (skin tags and acanthosis nigricans - dark pigment) secondary to chronic inflammation, a pro-thrombotic state and altered lipids in the blood, increased incidence of clinical anxiety and depression, and alterations in fertility manifesting as polycystic ovarian syndrome (PCOS) in women.⁽⁴⁾

In patients in whom symptoms suggest Metabolic Syndrome, it is important to correctly diagnose Insulin Resistance to ensure a



properly tailored treatment algorithm.

Exercise is the mainstay of treatment for IR, and consequently Metabolic Syndrome, but treatment of specific organ system disease may be required. Systematic reviews have shown the benefit of combined resistance and aerobic training on improved HbA1c, fasting glucose levels and body composition.⁽⁵⁾

Increased benefits are also seen in increased PA durations above the minimum recommended 150 min/week with Colberg et al concluding that while 150 minutes will improve blood glucose control and reduce CVD risk, greater PA durations are required for weight loss.⁽⁶⁾

If lower time commitments are more achievable evidence supporting high intensity interval training (HIIT) training for 1.5 hours vs 2.5 hours of moderate intensity training shows similar benefits.⁽⁷⁾

Studies have shown that the majority of patients will respond to aerobic exercise, resistance training and dietary modification. Even in those with raised fasting blood sugar there is good evidence that lifestyle change, as a secondary prevention treatment, can delay the onset of frank diabetes for years.

However there is a cohort of IR patients in whom medication is required to normalise insulin sensitivity, particularly in established Metabolic Syndrome. Tailored exercise prescription, minimisation of health risk with or without medication, and close follow-up (including serial blood tests) to assess progress are required.

Patients often face significant barriers in accessing and maintaining an exercise program, as it may be a substantial departure from their usual lifestyle.

Further the diagnosis of the clinical paradigm of Metabolic Syndrome can often be missed or delayed in a patient with risk factors for chronic disease, leading to a deteriorating prognosis. Timely diagnosis and a comprehensive management plan, delivered by an integrated clinical team across the professions, will reduce the burden of disease for many of our patients.

In the UK organisations⁽⁸⁻¹⁰⁾ are working to improve PA in people living with T2D and help healthcare practitioners support their patients.

With millions of contacts happening across the year in healthcare the opportunity to promote positive behaviour change through brief intervention is huge.

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THE LONDON HOSPITAL DIPLOMA COURSE IN THE 1990'S

Where so many of us started our Sports Medicine Journey - A Personal Account

ARTICLE BY DR SIMON KEMP

Maintaining a focus on looking forward rather than back is generally accepted to be a good thing especially as one gets older. There are a number of exceptions to this rule and reviewing significant periods in one's life and the people who have made a big impact is an accepted way to reframe important memories

The 40th Anniversary of SEM at The London has prompted such a reflection. It is hard to over emphasise the effect my year on the Diploma course in 1991-92 has subsequently had on my professional life and indirectly much of my personal life. Prior to the year, it's fair to say that I didn't feel wholly enthusiastic about either hospital based specialist training or general practice as career choices but had greatly enjoyed my Senior House Officer jobs in Orthopaedic and Emergency Medicine and probably felt most comfortable amongst sports people.

The course was inspirational with clinical leadership from John King and David Perry. Most of our day to day contact was with Roslyn Carbon (who had been part of the formal training scheme in Australia and appeared incredibly knowledgeable) and an impressive group of guest lecturers who were actually earning their living in this barely known area of medicine. Mike Hutson, always impeccably suited, provided much of the non-operative MSK teaching, Malcom Read (who had actually been to Olympic games) practical insights into the world of the team physician and Rose MacDonald taught us how to strap.

Physiology was an important part of the course and Andrew Wade and Craig Sharp guided us through the key elements of Exercise Medicine, at least a decade before Sports Medicine became Sport and Exercise Medicine.

As students we were thirsty to learn and from the 91-92 course,

Mark Wotherspoon (Fulham FC, Southampton FC, GB Hockey and England Cricket), Steve Targett (Wellington Hurricanes, New Zealand Rugby Football Union and Aspetar), Toni Tramullas (FC Barcelona and Aspetar) and Anik Shawdon (AFL, Commonwealth games, Australian Open Tennis) and myself all went on to develop full-time careers in sports medicine. Rob Kofoed (Auckland, NZ) and Ros Wilson (Rotorua) both brought great personal charm and energy and were at all of the best social events. Rob's wife, Gerri was temping in a doctor's locum agency and would alert us to the quietest best paid weekend locums as they were phoned into her.

At the end of the year, when we needed to make their own way in the sports medicine world, the course could still assist by providing experience on Sundays in the Crystal Palace Sports Injury clinic or the monthly MDT clinics that neatly segued into curry evenings at the Royal London Hospital.

In my case, Steve Targett and I connected with Ruth Highet, another course graduate based in Wellington, New Zealand who offered us paid employment in her clinic whilst we gained priceless real world experience. This led to paid team physician work with the Wellington Hurricanes and a meet-up the following year with David Hughes, from the 90-91 course who was back working at the AIS and pitch-side with the ACT Brumbies. When I returned to the UK, it was to work at Nottingham

under Mark Batt, a 90-91 course graduate.

I hope this shows that the influence of the course was much more than our experience in our own year as students and shouldn't be understated.

Just as the original Comedy Store provided much of the DNA for all of the stand-up comedy that followed, the London course seems to be the racehorse that sired most of the sports medicine doctors, before specialist training, and consequently many of the leaders in English sports medicine in the early 21st century.



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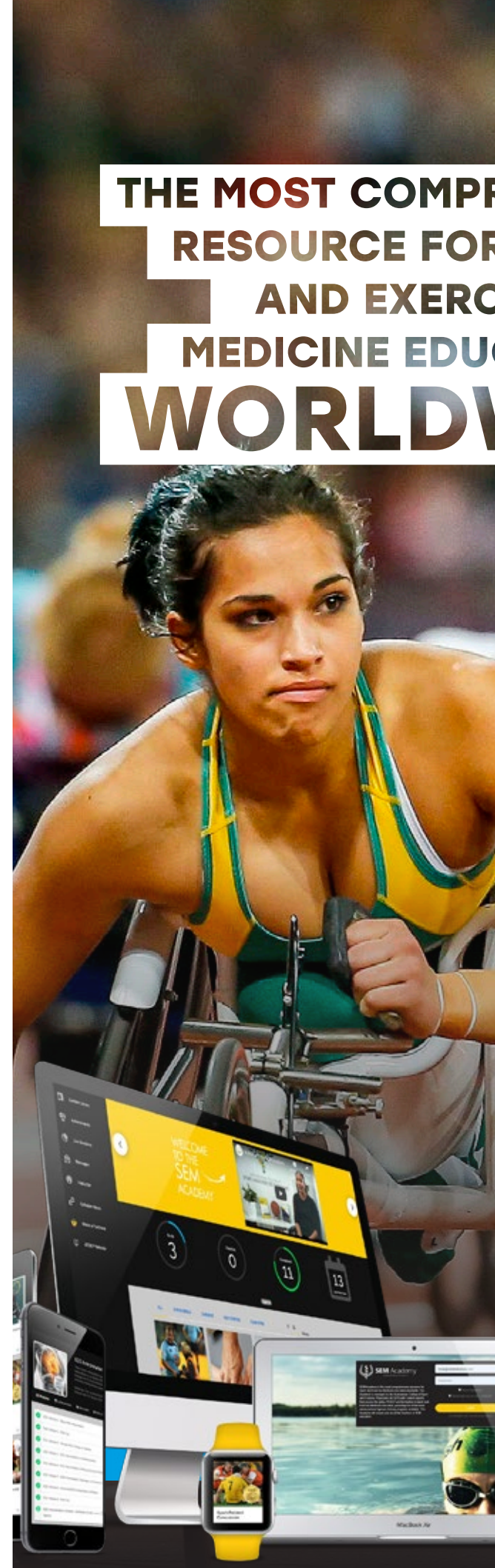
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DO FITTER DANCERS DANCE BETTER AND LONGER?

Examining selected evidence discussing the effects of Supplementary Fitness Training In Dance.

The benefits of increased physical fitness levels in relation to both performance and injury has been increasingly investigated in the last decade. Poor levels of physical fitness are generally associated with increased injury risk; inadequate aerobic capacity, for instance, is linked to fatigue, which in turn may lead to injury⁽¹⁾.

In dance, common exploits of upper body muscular endurance occur during partner work, when lifting other dancers, as well as during transitory movements from floor to standing and vice versa⁽²⁾. Lower body muscular power is necessary in the development of elevation during the take-off phase of any type of jump.

Early studies detected associations between lower body muscular power, upper body muscular endurance and aerobic capacity and qualitative aspects of performance⁽³⁾ and injury severity⁽⁴⁾ in contemporary^(3,4) and ballet dancers^(5,6). Days off due to injuries in contemporary dancers was best predicted from standing vertical jump performance⁽⁴⁾. In ballet dancers, low levels of aerobic fitness were found to be associated with increased injury occurrence over a 15-week period. Reduced levels of body fat percentage were found to be associated with increased recovery time from a diagnosed injury⁽⁶⁾. Nevertheless, these observed associations do not imply causality. Only carefully designed intervention studies can determine whether improvements in levels of fitness (e.g., aerobic, strength, flexibility) can reduce the risk of subsequent injury.

A recently published systematic review⁽⁷⁾ examined the literature for effects of supplementary fitness training on performance and injury in dancers from all genres. The most frequent dance styles were mixed,

contemporary and ballet, with one study including hip-hop dancers⁽⁸⁾. Few studies have so far employed some form of a randomized controlled interventional study design; the majority used convenience or non-random cohort samples for case-control or single-group pre-post study design.

Heterogeneous outcome measures have been used to investigate the effects of supplemental training on fitness components, injury, and qualitative aspects of dance performance.

According to Ambegaonkar et al.⁽⁷⁾ the supplemental training program dosage used so far is one hour, two to three times per week for around eight weeks, with a wide variety of supplemental training methods, such as strength and cardiovascular training. Published studies suggest supplemental fitness training enhances performance and aesthetic qualities. However, for injury, very limited number of studies have so far reported beneficial effects and therefore the available evidence does not currently allow for external validation.

Incorporating supplementary training could help bridging the observed fitness gap between performance preparation (class and rehearsals) and performance periods. Nevertheless, the incorporation of supplemental training into the dancers' schedule must consider present workload, which can already involve six to eight hours/day of exercise at varying intensities. Training sessions need to be timetabled to prevent fatigue interfering with the high skill elements of dance.

There is an opportunity in here

“**Higher-quality, adequately powered studies and randomized controlled trials are still needed to determine which interventions have the greatest effects on dancers' performance and injury risk.**”

to suggest considering whether supplementary fitness training could be implemented within the existing skills training to avoid overloading and therefore investigate replacing some of the skills training instead of adding extra hours of fitness to the already existing long hours of training. The selection of exercises could be tailored to the choreographic demands if these were known in advance, and they should be specific to the dance style.

In the words of Ambegaonkar et al.⁽⁷⁾, we agree, “higher-quality, adequately powered studies and randomized

controlled trials are still needed to determine which interventions have the greatest effects on dancers' performance and injury risk”.

Our final recommendation is to expand to direct comparison between dance styles and levels, using robust study designs and adequate sample size to ensure external validity can be reached.



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TENDINOPATHY - PROBLEMS AND SOLUTIONS

ARTICLE BY PROFESSOR HAZEL SCREEN AND PROFESSOR DYLAN MORRISSEY

Musculoskeletal disease accounts for 30% of the global burden of disability. Tendinopathy is the most common musculoskeletal condition, with lower limb tendinopathy incidence exceeding osteoarthritis (10.52 vs 8.4 per 1,000 person-years)^(1,2). Incidence increases with age, engendering a growing socioeconomic burden, where the pain and disability not only impacts productivity, but also leads to depression, isolation, obesity and reduced cardiovascular health for many individuals...

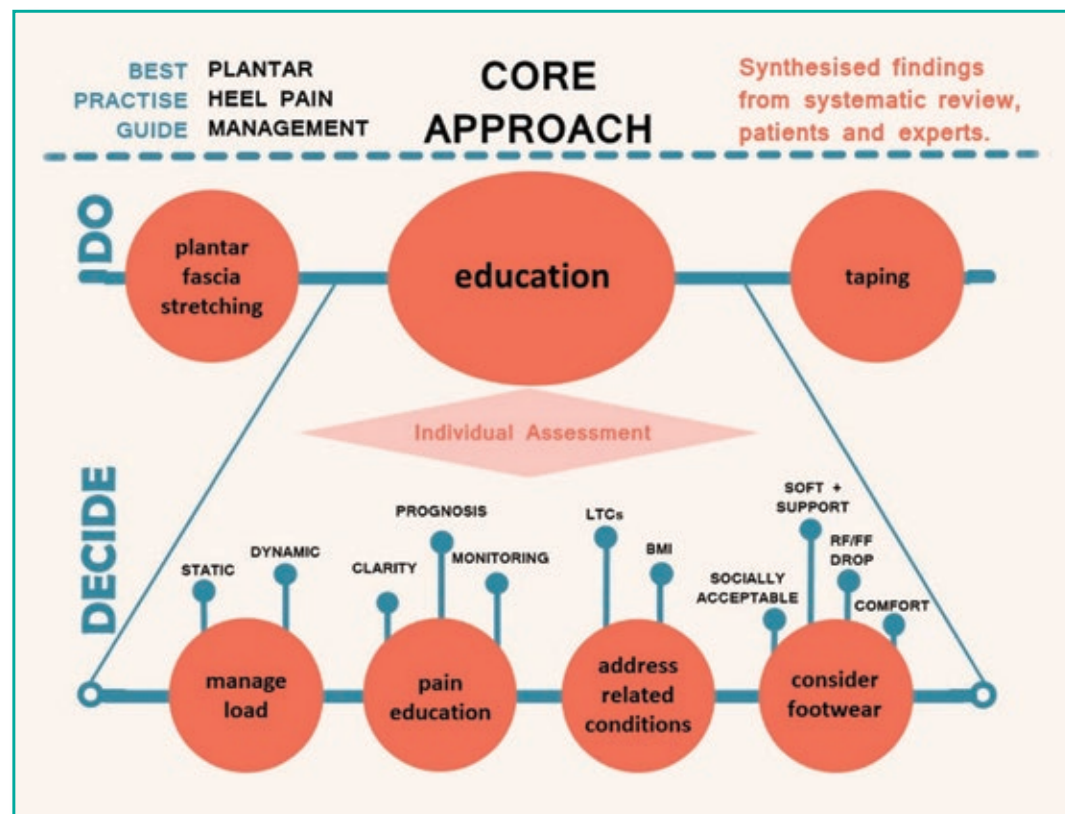


Figure 1: From (6) DOI <http://dx.doi.org/10.1136/bjsports-2019-101970> Core approach to the management of plantar heel pain based on the best available evidence, expert opinion and the patient voice. The top layer ('DO') of taping, stretching and education are required initial interventions with each patient. The individual assessment ('DECIDE') is of which specific educational aspects are needed. BMI, body mass index; FF, forefoot; LTC, long-term condition; RF, rearfoot.

At a biomedical level, tendinopathy is mechanobiology driven, where mechanical damage occurs concurrently with cellular changes. However, the interplay of these driving factors, and impact of biopsychosocial covariates on disease progression and treatment response remains unknown. Current diagnostic tools detect tendon structure, but this is poorly associated with disease severity, prognosis, and treatment response. In addition, the disease progression and response to treatment is highly variable

between individuals. This mismatch between clinical imaging outcomes and patient-reported status prevents progress, there is need for better biomarkers.

Management remains challenging and outcomes poor, with demonstrably compromised long-term quality of life. There is need for more targeted treatments, where the clinically-led activity at Queen Mary University of London (QMUL) has focused on producing clinical guidelines (Figure 1) leading to identification of new diagnoses⁽³⁾, inventing new treatment approaches⁽⁴⁾, and running innovative

cohort studies with early publications^(5a,b). More headline results to follow, watch this space.

The model is that of a multi-disciplinary approach to address mechanical and cellular disease progression, plus improved diagnostic tools to predict optimal personalised treatment and stratify patient management accordingly.

Pathomechanism

Most of the innovation has been in the clinical space but step-changes in management require mechanistic understanding. The engineering-

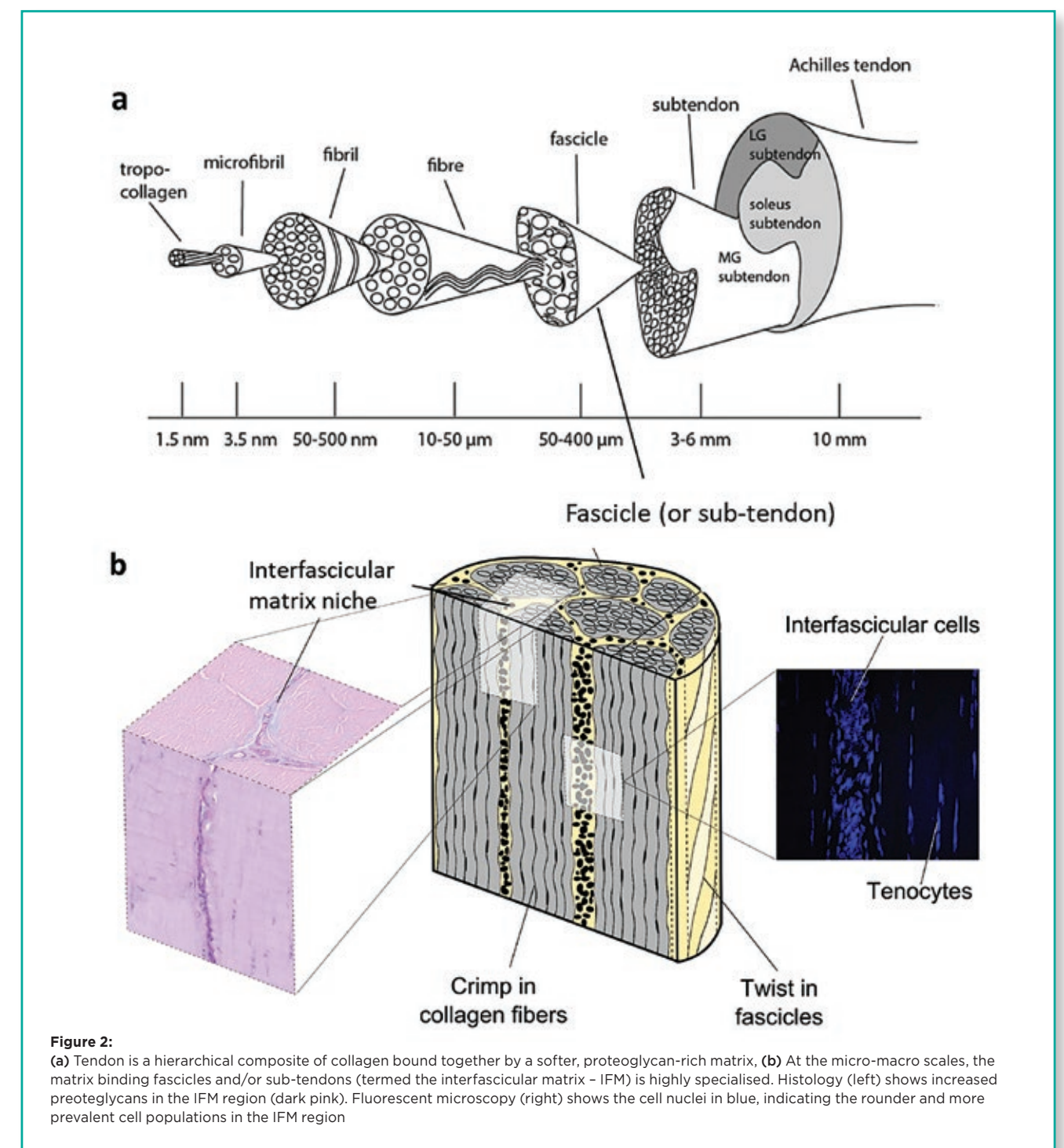


Figure 2: (a) Tendon is a hierarchical composite of collagen bound together by a softer, proteoglycan-rich matrix. (b) At the micro-macro scales, the matrix binding fascicles and/or sub-tendons (termed the interfascicular matrix - IFM) is highly specialised. Histology (left) shows increased proteoglycans in the IFM region (dark pink). Fluorescent microscopy (right) shows the cell nuclei in blue, indicating the rounder and more prevalent cell populations in the IFM region

focused activity at QMUL, has concentrated on the multiscale characterisation of structure-function and biomechanical property of the achilles tendon, revealing a paradigm shift in defining the aetiology of achilles tendinopathy. There is extensive data that indicate that the interfascicular matrix (IFM) niche drives tendinopathy progression and can be targeted in management^(7,8) (Figure 2).

The IFM is the matrix that binds collagen fascicles, which mechanically, structurally and cellularly, is highly specialised to enable sliding between fascicles. This protects the tendon from damage when it is overloaded, enabling spatial variations in tendon strain, for independent function of attached muscles, or tendon action around a joint⁽⁷⁻¹⁰⁾ (Figure 2).

Studies have shown that IFM stiffens

with age which then restricts spatial strain variation and, with tendon overload, initiates an inflammatory/degradatory response which is focal to the IFM⁽¹¹⁾ (Figure 3 - next page).

There is enough evidence that indicate that tendinopathy arises from IFM stiffening, restricting fascicle sliding and altering IFM cell mechanobiology towards inflammatory/degradatory repair attempts. ➡

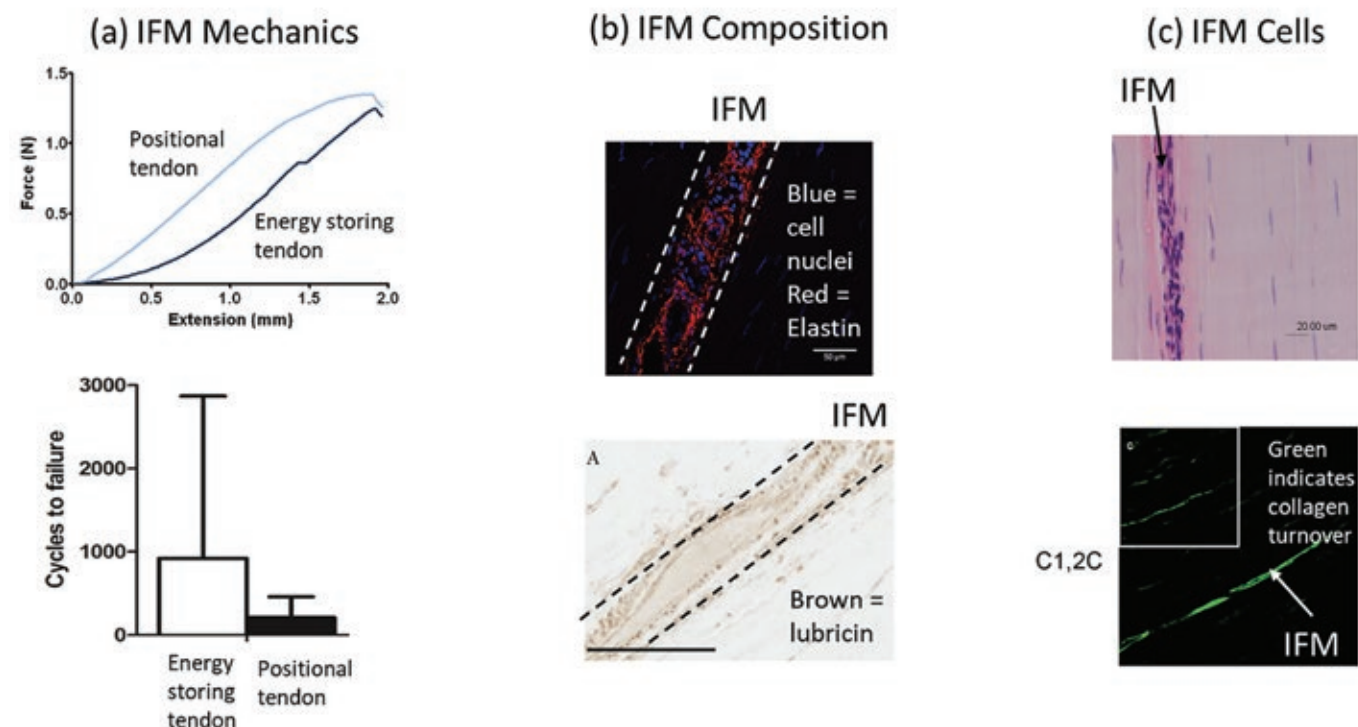


Figure 3:
(a) The IFM has specialised mechanics which vary between tendons appropriate to tendon function:
 Pull to failure tests show IFM is less stiff (more extensible) in energy storing tendons with greater functional demands. Cyclic loading shows IFM is more fatigue resistance in energy storing tendons
(b) The IFM has a specialised structure to meet specific functional needs:
 Lubricin & elastin for sliding & recoil are localised to the IFM & more prevalent in energy storing tendons
(c) The IFM cell population is larger & increased matrix turnover in this region indicates the cells are more active:
 A greater numbers of more rounded cells are found in the IFM, alongside increased collagen turnover (indicative of increased homeostatic maintenance).



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 Professor of Biomedical Engineering

At QMUL, collaborative research will continue between the Centre for Sports and Exercise Medicine (CSEM) and other departments, in the foreseeable future to better understand aetiology of some of the common musculoskeletal condition.

The team have recently developed a novel ultrasound-based imaging approach which is able to detect IFM mechanics in-vivo, which has been termed “functional biomechanical imaging” (FBI)⁽¹²⁾.

FBI collects data on IFM mechanics, which we hypothesise can be used to predict optimal treatment approaches. Combining the strength of clinical cohort studies, we are investigating FBI parameters, unravelling aetiology mechanisms, and developing mechanical/cellular treatments for these, focused on the IFM which we anticipate will help bridge the gap between structure and function.

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CHALLENGES IN FOOTBALL

ARTICLES BY **DR IAN BEASLEY, DR ZAF IQBAL AND DR BRYAN ENGLISH**

THE OLDER PLAYER

Arsene Wenger was famous for not offering more than one year contracts to outfield players if they were 30 years or more. These days, with modern training and monitoring, players often play into their mid-thirties.

Professional players undergo cardiac screening on signing for a new club. This is repeated throughout their careers. There are some conditions that evolve over time and pre-dispose to sudden cardiac arrest (SCA); for instance arrhythmogenic right ventricular cardiomyopathy⁽¹⁾. It is well known that some players have cardiac events despite having being screened many times, so what happens?

Studies demonstrate that highly trained athletes have an increase in atrial fibrillation later in life, so something is evolving⁽²⁾.

We know that coronary artery calcification is more common in ex-athletes, albeit ‘mixed’ rather than calcified plaques are associated with cardiac incidents^(3, 4).

Also, the number of viral infections accumulates with age, COVID is just one more. All can cause cardiac fibrosis⁽⁵⁾.

Echocardiogram picks up suspicious areas that are further elucidated with the use of cardiovascular magnetic resonance (CMR)⁽⁶⁾. The provocative question we are posing is, should the player over 30 years old undergo regular CMR examination?

Early days, and we will not know what we are seeing yet.

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EX-FOOTBALLERS' HEALTH

It has often been said that the footballers' career is a short one. For most players this means pursuing another career after retirement, and making a living depends, in part, on good health. Although ex-footballers are said to live longer⁽¹⁾, mental health problems⁽²⁾, degenerative joint disease⁽³⁾, cardiovascular disease⁽⁴⁾, and neurodegenerative disease⁽⁵⁾ can cause morbidity, having a bearing upon normal daily life.

Mental health issues are more common in ex-players⁽⁶⁾ and have personal and relationship ramifications that impact normal life. Hip arthritis in ex-players has been shown to interfere with quality of life⁽⁷⁾, and ex-footballers' necessity for joint replacement far outweighs their general population peers⁽³⁾. Those who have trained intensively, like ex-professional footballers, they are more prone to developing lone atrial fibrillation⁽⁴⁾ necessitating medical intervention. There has been much written about heading the football, and dementia associated with CTE^(5, 8-10), but ALS is also more common in ex-footballers⁽¹¹⁻¹³⁾.

Playing professional football is a dream of many. Like many occupations, it is not without risk. A short career, but potentially many years of disability. The time has arrived when we should have a system in place to address this issue^(14,15).

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CENTRE FOR SPORTS AND EXERCISE MEDICINE (CSEM)

CENTRE LEADERS 1981 - 2021



Prof John King

Founder and CSEM Lead: 1981 - 2003

Late John King, warmly known as King of Sports Medicine was an academic pioneer who first laid the foundation for the first academic course in Sports Medicine in 1981. He had the vision of Sports Medicine as it is today, a specialty within Medicine & Surgery with clearly defined career pathway. Even after he formally ended his lead role in CSEM he continued to be involved as an honorary; advancing education in SEM at many levels. John had many maxims and aphorisms which he parted with a smile and wit, he sadly passed away in 2018 but his legacy lives on.



Mr Peter Hamlyn

CSEM Lead: 2003 - 2008

This was the period when SEM really grew, the new modular MSc was consolidated, and the intercalated degree was added to CSEM educational portfolio. He continued the tradition of academic neurosurgeons at the London being highly involved in sport and, brought particular expertise to sporting spine and brain injury management. He was an empathic and thoughtful leader at a pivotal time and enjoyed being at the helm when London 2012 was confirmed, and the SEM speciality was announced.



Prof Nicola Maffulli

CSEM Lead: 2008 - 2012

I am an Orthopaedic Surgeon trained directly by John King. John also supervised my PhD in Paediatric Sport Medicine, which revealed important information about risk factors for injury in young athletes, still relevant to workload management. During my tenure, I expanded the research outputs of the Centre, and more than 200 articles were published in peer reviewed journals. I am delighted to maintain an Honorary Professorship at QMUL while being the Chair in Trauma and Orthopaedics at the University of Salerno, Italy, and running a busy private practice in London.



Prof Nick Goulding

CSEM Lead: 2012 - 2017

It was an enormous privilege to lead the sports and exercise medicine team for 5 years. During this time, we continued to build upon the success of my predecessors in establishing a team with a reputation for high educational quality, innovation, and student satisfaction. Our undergraduate and postgraduate programmes maintain their position as amongst the very best in the UK. Long may that continue.



Prof Dylan Morrissey

CSEM Lead: 2017 - current

Every day I am delighted to be reminded that, despite an increasingly atomised world, our success is ALL ABOUT THE TEAM. SEM at QMUL is thriving on the educational, research and clinical fronts. With robust and increasing student recruitment and achievement; better staffing; more funded research and a strong clinical service; the future is very bright. All of these achievements come from teamwork that it is my pleasure to lead, by learning from those who came before alongside those who are delivering now. Here's to the future!

Sports Trivia Quiz Answers

Question 1:

What is the highest score in an International football match?



Answer: 31-0.

On 11 April 2001, the Australian and American Samoa national soccer teams played each other in an Oceania qualifying match for the 2002 FIFA World Cup. The match was played at the International Sports Stadium in Coffs Harbour, Australia. Australia set a world record for the largest victory in an international football match, winning the game 31-0. Australia's Archie Thompson also broke the record for most goals scored by a player in an international match by scoring 13 goals. The previous record was Australia's 22-0 win over Tonga, recorded two days earlier in the same competition. The American Samoa team were troubled by passport issues, with only one member of their original 20-man senior team, goalkeeper Nicky Salapu, eligible to play. American Samoa was also unable to call on their under-20 players because most of them were involved in high school exams at the time. They were forced to draft in their youth players, including three 15-year-old players, to put together a makeshift team with an average age of 18. Before the match, Australia was ranked 75th in the FIFA World Rankings, while American Samoa was ranked 203rd, the lowest of all FIFA members.

In women's football, the highest score was when the US Women's National team won 13-0 against Thailand in the 2019 Women's World Cup.

Question 2:

What is the highest score in an International Rugby football match?



Answer: 145-17

On the 4th June 1995 at Bloemfontein, in the pool stages of the 1995 Rugby World Cup, New Zealand beat Japan 145-17. Jonah Lomu and Andrew Mertens had both been rested. Of the 21 All Black tries, six were scored by Marc Ellis, the record number of individual tries in an international match. Simon Culhane, making his international debut, converted 20 of the tries and scored one himself giving him the world record number of points in a match with 45. He was dropped for the rest of the tournament in favour of Andrew Mertens and he would only play another 5 times for his country. New Zealand would be beaten in the final, 15-12 by the hosts, South Africa in an exciting match which ended with the iconic image of Nelson Mandela presenting the trophy wearing a South African Rugby shirt. This would be the last amateur World Cup, the game going professional the following year.

In Women's Rugby, the highest score was when the Netherlands beat Denmark 141-3 at Toulouse on the 2nd May 2004 in a Fédération Internationale de Rugby Amateur (FIRA) tournament.

Question 3:

What is the highest winning score in a cricket Test match?

Answer: 903-7 declared.

In the last Ashes Test match before World War 2, at the Oval, 20-24th August 1938, England won the toss and decided to bat. After almost 3 full days batting they declared at 903 for 7 wickets. England's centurions included opener Len Hutton with 364, Maurice Leyland, 189, and Joe Hardstaff, 169 not out. The Australian captain, Donald Bradman twisted his ankle bowling his 3rd over and was treated in a plaster cast for a 'chipped' bone in his ankle. Jack Fingleton pulled a muscle while fielding. Neither was able to play any further part in the game, and they did not bat in either innings. There was no sports medicine support in those days. Australia were dismissed for 201 in their first innings and, on following on, were dismissed for 123 in their second innings. Thus England won by an innings and 579 runs, which tied the series although Australia retained the Ashes. The placid pitch was blamed on head groundsman Bosser Martin and his 4 ton heavy roller.

This was not the highest ever score. In Colombo, 2-6th August 1997, India scored 536 for 8 declared, with centuries from Sidhu, Tendulkar and Azharuddin. In reply, Sri Lanka were 952 for 6 declared at the end of the match, with centuries from Jayasuriya 340, Maharama 225, and Aravinda de Silva 126. The match was drawn.

