Arthritis UK

Centre for Sport, Exercise and Osteoarthritis

Impact Report

The link between lifestyle and biology in osteoarthritis

In the UK alone, more than 450,000 people are diagnosed every year with osteoarthritis – a painful condition which occurs when the body can no longer maintain and repair one or more joints.

We know today that there are many factors that contribute to the development of osteoarthritis. For example, sports injuries are one cause of osteoarthritis in the community. We also know that when people with osteoarthritis exercise, not only does their physical health improve, but their mental health, too. So ensuring that people with osteoarthritis can remain active for as long as they are able to is vital.

Fifteen years ago in the UK, there was little research activity specifically directed towards understanding how best to prevent osteoarthritis developing following a sports injury. Which is why, in 2013, Arthritis UK established the Arthritis UK Centre for Sport, Exercise and Osteoarthritis.

Our research centre of excellence enters the ring

The Universities of Nottingham, Bath, Loughborough, Leeds, Southampton and Oxford teamed up with Nottingham University Hospitals NHS Trust to generate game-changing improvements in understanding the interplay between sport, exercise and osteoarthritis.

Under the leadership of Dr Mark Batt and Professor James Bilzon, the Centre has received over £4.8 million of infrastructure funding from Arthritis UK. This has supported network creation, capacity building, tackling unanswered scientific questions, obtaining additional funding, and integrating patient and public involvement.

Professor James Bilzon
Centre Director

Arthritis UK

Centre for Sport, Exercise and Osteoarthritis

Professor Paul Greenhaff
Deputy Director

University of Nottingham
UK | CHINA | MALAYSIA

Dr Carly McKay
Deputy Director

UNIVERSITY OF BATH

Professor Jonathan Folland
Deputy Director

Loughborough University

Professor Tony Redmond
Deputy Director

UNIVERSITY OF LEEDS

Professor Maria Stokes OBE
Deputy Director

University of Southampton

Professor Nigel Arden
Deputy Director

UNIVERSITY OF OXFORD

Dr Stefan Kluzek
Deputy Director

NHS
Nottingham University Hospitals
NHS Trust

The Arthritis UK Centre for Sport, Exercise and Osteoarthritis investigated ways to

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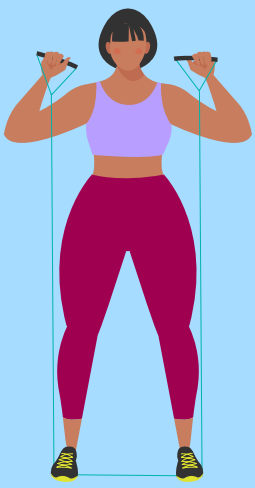

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Tackle osteoarthritis as a team

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Our research impact areas

New knowledge

Influence on policy and practice

New networks

Leveraged funding

Increased capacity to conduct research

Patient and public involvement

New intellectual property, products and services

£4.8m of Arthritis UK funding has led to:

More than

500

publications cited more than 10,000 times.

More than

£25m

leveraged funding.

More than

210

staff and students employed and trained.

01

Uncover the link between sports injuries and osteoarthritis risk

Why is this important to people with arthritis?

Exercise is one of the best things that people with arthritis can do to improve their health and ease their symptoms.

However, keeping active can be especially challenging for those with sore joints and there is a lot of discouraging misinformation about the detrimental lifelong effects of exercise. Centre research has explored the link between sports injuries and osteoarthritis risk to help bust myths and protect and rehabilitate sports participants at all levels and ages.

Uncovering patterns of risk

The Centre has established many cohorts focussed on former athletes from different sports. These include the Significant Ankle Ligament Injury (SALI), Health of Adults Longitudinal Observational (HALO), and Foot Osteoarthritis and Concussion in UK Soccer (FOCUS) cohorts. Some of these are the largest of their kind in the world, and have shown that:

For leisure exercisers:

- Running does not have a clear detrimental effect on the knees. By reviewing existing evidence, the Centre found that it may in fact have a protective effect against the future need for osteoarthritis surgery.
- Previous knee injury increases the risk of knee osteoarthritis nearly three-fold.

For elite athletes:

- Cricketers that play sport while injured are at higher risk of osteoarthritis, joint pain and a worse health-related quality of life in the future.
- Former male rugby union players, a population of athletes with high rates of injury, are four times more likely to be diagnosed with osteoarthritis. They are also six times more likely to have a joint replacement than the general population.
- Former male footballers are up to three times more likely to be diagnosed with osteoarthritis and require total knee replacement surgery than the general population. Injury is a major risk factor for this.
- Excessive exercise before the age of 14 may lead to the development of an abnormal hip shape called cam morphology. This is a strong risk factor for hip pain, osteoarthritis and future total hip replacement.
- Retired Team GB Olympic athletes are more at risk of osteoarthritis and melanoma, but less at risk of osteoporosis and many other long-term conditions like diabetes and asthma, than the general population. Career-related injury is associated with this increased risk of osteoarthritis.

Former professional male footballers are up to

three times more likely

to be diagnosed with osteoarthritis.

Injury is a major risk factor for osteoarthritis.

Preventing injury is the name of the game

Key messages:

- The increased risk of osteoarthritis in former athletes arises from traumatic injuries rather than taking part in sport itself.
- Osteoarthritis isn't inevitable, keeping active as you get older has multiple health benefits.
- Listen to your body when exercising, taking care to avoid injury.

The World Health Organization recommends 150 minutes or more of moderate intensity activity every week for adults.

Starting young to promote lifelong joint health

Sport-related joint trauma in young adults can lead to a condition called post-traumatic osteoarthritis (PTOA). There are no treatments to manage this disease which is why the Centre is leading important research in this area.

Designing a targeted exercise program

Centre researchers have been designing a targeted exercise programme to reduce injury, aid rehabilitation and prevent progression of injury to PTOA. First, the Hip and Lower Limb Movement Screen was developed to identify movement control problems. The tool was then used to inform warm-up exercise programmes for improving movement control and preventing injury in various groups, including young community footballers and rugby players, and military recruits.

Helping young adults take control

Centre researchers have also been developing self-management tools for young adults after experiencing a sport-related knee injury. Digital tools hold great potential because they can be accessed no matter the time or where a person lives. One example is the Post-traumatic Osteoarthritis Support Tool (POST) – a tool designed using a person-based approach following interviews from both healthcare professionals and young adults that could help young adults self-manage their joint health following sport-related knee trauma.

Mark's story

"I am a consultant in Sport and Exercise Medicine, Honorary Professor at the University of Nottingham, and was the Director of the Centre between 2013 and 2020."

How did the Centre begin?

"The opportunity to establish this Centre was timed perfectly following the 2012 Olympic Games, where I was part of the medical organising committee. I was very keen to ensure that the legacy of the Games included the development of sports medicine as a specialty of medicine, anchored within the NHS, and with a strong research emphasis. The Centre provided an opportunity and allowed us to focus on the links between long-term health, osteoarthritis and exercise. The Centre has helped the development of sports medicine in the UK by bringing together specialists from different fields such as rheumatology, physiotherapy, epidemiology and basic science research. It was a serious investment in sports medicine research in the UK at that time."

What findings from the Centre is Mark most proud of?

"We've been able to help clarify that exercise itself does not cause osteoarthritis. To that effect, it is very bad to do no exercise, and it's also not great to do really extreme amounts of exercise. **Avoiding joint injury is the key.**

Not many years ago, if you went to your doctor with knee pain, the doctor may have told you that years of running or football had 'worn your knee out' and advise you to put your feet up and rest. Instead, we should help people stay physically active. We've shown that having osteoarthritis is not good for long-term health because it's often the thing that stops people from being physically active, leading to other problems such as obesity, diabetes and heart disease.

We have also started cohort studies, including one on retired professional footballers. This has shown that joint injuries are bad, and that playing when injured is particularly bad. This group have a higher rate of ankle osteoarthritis, but also a three-fold increased risk in developing dementia than the average person, which might be explained by repetitive, direct force and injury to the head and [supporting] joints often experienced by professional footballers. Despite this, the overall health of retired footballers is better than that of an average individual."

Why is the Centre and its osteoarthritis research so important?

"Over time, we have realised there are different forms of osteoarthritis. This creates a clash when somebody goes to a healthcare professional and expects personalised advice, because we are still providing guidance based on whole populations. This is why as a multi-disciplinary centre we have worked closely with the other Arthritis UK Centres to investigate patient-led areas of research and care."

02

Improving osteoarthritis care

Why is this important to people with arthritis?

Fifteen years ago, the mechanisms that can lead to osteoarthritis weren't well understood. Researchers acknowledged that many factors, including our biology and lifestyle habits, contributed towards a person's risk for developing osteoarthritis. How these factors interacted with each other wasn't fully understood though, nor how important each factor was at play.

Centre research is helping change this by increasing our understanding of osteoarthritis so that it can be predicted and treated earlier and ultimately managed better.

Who is at most risk of osteoarthritis?

Centre researchers have identified four groups they believe may be at more risk than others:

Certain ethnic groups

It is known that the risk of developing hip osteoarthritis varies amongst different populations. However, hip joint shape between different groups had never been studied together in one consistent study, to try and understand why, until the Centre did in 2020. They found significant shape differences in hips across four different groups that may help explain variations in hip osteoarthritis prevalence rates between these groups.

People with flatter hip features

Centre researchers have identified specific, flatter hip shape variants linked to a future need for total hip replacement in females.

Adults with obesity

Obesity increases the risk of developing hand, hip and knee osteoarthritis. When 1.8 million individuals living with excess weight were compared with individuals at a healthy weight, the risk of knee osteoarthritis doubles. Living with obesity increases the risk a further five times. This important research was cited to help emphasise the significance of obesity on musculoskeletal health in the World Health Organization's 2022 European Regional Obesity Report.

Individuals with prior knee injury

Many, but not all, individuals with a knee injury go on to develop osteoarthritis. However, we currently cannot identify which individuals with prior knee injury will go on to develop osteoarthritis, which won't, and which could benefit from early targeted treatment. However, researchers from this Centre helped the Arthritis UK Osteoarthritis Pathogenesis Centre to identify biomarkers that may bridge this gap. By combining clinical data with biological samples like blood and synovial fluid, they showed that early osteoarthritis could be detected and that outcomes like long-term pain could be predicted shortly after knee injury.

Differences in hip shape across four different ethnic groups may explain variation in hip osteoarthritis prevalence.

Obesity increases the risk of developing hand, hip and knee osteoarthritis.

What is the best thing a person with osteoarthritis can do for their condition?

Centre member Professor Nigel Arden, in collaboration with other experts in the field across the world, wrote guidelines on managing osteoarthritis without surgery on behalf of a leading, global medical society called the Osteoarthritis Research Society International (OARSI). They recommend that the best two things an individual can do are to:

Learn about and understand osteoarthritis.

Exercise such as strengthening, cardiovascular, tai chi or yoga programmes.

"It can be challenging for clinicians to stay up-to-date of the rapidly evolving evidence base and changing best-practice guidance, while continuing to deliver the highest standard of care for their patients.

Dr Thomas Perry

Importantly, Centre researchers have also highlighted what shouldn't be recommended, deciding against the use of electromagnetic therapy for treating knee osteoarthritis unless it is part of a research study. This decision is echoed in England's healthcare guideline (NICE) on magnetic resonance therapy for knee osteoarthritis.

That said, there are many medical societies that each establish their own recommendations. So, Centre members Professor Nigel Arden and Dr Thomas Perry have helped bring clarity by comparing recommendations between OARSI and a European society called ESCEO. They found that education and exercise, among other things, are recommended by both whilst some supplements (glucosamine and chondroitin sulphate) are recommended by ESCEO but not OARSI.

Could existing medications be part of the answer?

A third of people with osteoarthritis experience severe pain every day, which can have profound life-limiting effects. Although pain-relief interventions are available, they're limited and don't work for everyone. This is why Centre members have been studying potential new uses for medicines already used by people with arthritis, showing what might and might not work:

- Hydroxychloroquine (an existing drug used to treat rheumatoid arthritis, systemic lupus erythematosus and juvenile idiopathic arthritis) is not effective at treating painful, severe hand osteoarthritis.
- Methotrexate can be effective at treating painful knee osteoarthritis. This finding, funded by additional Arthritis UK investment, provides hope for treating this painful condition in the future.

03

Enabling everyone to benefit from exercise

Why is this important to people with arthritis?

Exercise has a profound, positive effect on our health-related quality of life.

Even doing a small amount of meaningful exercise has a huge benefit for people with arthritis, like improving energy levels, mood, social connections and independence. Our Centre is identifying and unlocking barriers to physical activity so that everyone can benefit from the wide range of advantages that moving more can bring.

Benefits of exercise

- Positively affects our bone mineral density. Centre research supports this known, modest benefit by showing that acute bouts of high impact exercise (like hopping) can stimulate bone signalling and cartilage turnover markers.
- Reduces knee joint pain in the short term – even arm exercise (ergometry) can help lower knee pain for up to a whole day after exercising.
- Increases muscle power – this is best achieved by exercising with relatively light loads and moving as quickly as possible throughout the whole movement.
- Provides a wide range of mental health and wellbeing benefits.

Improves physical function – Centre Director Professor James Bilzon leveraged £1.6 million from the NIHR for the REtirement in ACTion (REACT) study. This study demonstrated that community-based physical activity interventions improve physical functioning for at least two years.

What happens when we don't exercise?

Being sedentary and prolonged periods of bed-rest can have rapid and major negative effects on health. It can make your body less responsive to insulin, which helps control blood sugar, and reduces the way your muscles build and maintain protein. Even keeping a single limb completely still, as if in a cast, lowers insulin sensitivity within a day. The good news is that exercise can restore these effects, but the restoration occurs at different rates.

That research underpinned a £1.7 million grant from UKRI led by Centre Deputy Director Professor Paul Greenhaff, to study this subject further. This project aims to help people stay healthier as they age, by exploring how physical activity benefits the body at a biological level.

How do we encourage people with arthritis to move more?

Moving when we're in pain isn't easy. However, with all the benefits exercise brings, it's important to encourage movement wherever possible. Supportive, accessible and personalised tools can be of use here. For example, the Centre co-developed and tested the Intelligent Knee OsteoArthritis Lifestyle App (iKOALA). In this 12-week research study, 35 people with knee osteoarthritis trialled iKOALA and they reported symptom improvements.

Jonathan's story

"I am a Professor of Neuromuscular Performance at Loughborough University. I have been part of the Centre since it began, back when I was a Senior Lecturer."

What did Jonathan discover and why is it important?

"My research focusses on improving neuromuscular function and performance in older people through exercise to help prevent osteoarthritis. It is widely known that our muscle function can decline with age. What we've found though is that **being able to produce force quickly, known as muscular power, is incredibly important for maintaining our musculoskeletal health as we age, more so than strength**. In fact, power can predict a person's ability to perform everyday activities so it can be vital for maintaining independence and quality of life.

Power and strength are not the same thing. The government's physical activity guidelines recommend muscle strengthening exercises, but they don't talk about power despite its importance. More emphasis needs to be placed on power which is why we're exploring the best types of exercise a person can do to develop power. To do this, we've run a large study called REPROOF comparing different types of resistance exercise in post-menopausal women. The main focus was on power training by moving light loads quickly and ideally in a ballistic way, as if you're trying to take-off. We found that with appropriate training, ballistic power training was not only safe in this population but was the most effective way at developing muscular power."

What is Jonathan working on next?

"We're investigating a related phenomenon that especially affects people with osteoarthritis called arthrogenic muscle inhibition. It is where the muscles around an affected joint struggle to activate properly. It can weaken a person's muscles over time even if a person tries to exercise, limiting recovery. We're trying to better understand this limitation and where it comes from so we can better tackle it."

How has being part of the Centre helped Jonathan?

"The Centre gave me a bigger network and the opportunities to build my research profile and develop my career (such as helping me achieve a promotion to Professor). My time at the Centre has been a positive experience and the network of people it brought together from different disciplines, bouncing ideas from one another, was really helpful to drive high-quality research."

Jem's story

"I was the patient and public involvement lead at the Centre. I have held many senior positions in sports administration and governance and participated in many different sports since I was young. So excessively so, [that] by the age of 23 I'd had three meniscectomies. I had five subsequent surgeries on my knees and later developed osteoarthritis."

Why is Jem passionate about the Centre and its research?

"I have competed in triathlons since the 1980s. I keep active to manage my condition and believe it is the reason why, although I have a restricted range of movement in my knees, I live a full life with a little discomfort rather than severe pain. **It is incredibly important to stay active into older age – I think people must be proactive in being active whilst guarding against potential injury.** To achieve this they need support, expert advice and encouragement. Centre research is tackling these issues at a human behaviour level, and has the potential to make a real, positive impact on people's lives. That is what motivated me to get involved with the Centre."

What was Jem involved with at the Centre?

"I joined the Centre's Research Strategy Board and became the joint lead for work package three, which covers research about the life course impact of osteoarthritis. I chaired conference talks, reviewed draft grant applications, became a [guardian] for researchers requesting access to the Chingford study data, and got involved with the International Movement Screening and Intervention Group. I also co-authored a scientific paper assessing online self-management webpages for people with osteoarthritis.

Before I became involved with the Centre, I didn't know what public and patient involvement was. Now I know a lot more and why it is so important. My time at the Centre was incredibly interesting and informative, and brought me a fascinating insight into the world of academia."

What is the Chingford Study?

A long-running cohort study funded by Arthritis UK from 1989 until 2012, tracking the musculoskeletal health of around 1,000 women to see how it changes over time. It has led to the discovery of many important osteoarthritis and osteoporosis findings to date such as the link between high BMI and increased osteoarthritis risk, plus the role of genetics in the development of this condition.

Why was patient and public involvement a success at the Centre?

"There was real collegiate feel at the Centre, I was accepted as an equal and made many friends. Each university within the Centre brought a different element but they were all compelled to help people with arthritis – [to] find out how we can live active lives whilst avoiding injury and mitigating discomfort."

04

Tackle osteoarthritis as a team

Why is this important to people with arthritis?

A critical mass of researchers and international, multidisciplinary teamwork is essential to tackle the trickiest questions in science and drive more positive change.

The Centre for Sport, Exercise and Osteoarthritis is a hub of research activity that supports both these things. It builds capacity and capability within the field through training and by forming new networks.

Advancing research skills and careers

The Centre ran an internship scheme from 2013 to 2022 for newly graduated health clinicians or scientists to use state-of-the-art equipment, receive formal mentoring and work alongside some of the UK's leading researchers in a multi-disciplinary environment.

Over 30
individuals completed an internship and

75% progressed
onto clinical or academic careers.

Over 45
PhD students supported.

6 researchers
have been promoted to Professors.

These promotions were awarded to Professors Jo Adams, Catherine Bowen, James Bilzon, Kim Edwards, Jonathan Folland and Keith Stokes.

Joining forces with the Ministry of Defence

Some Centre researchers work closely with the Defence Medical Rehabilitation Centre, a state-of-the-art Ministry of Defence clinical rehabilitation facility. This relationship led to the establishment of the Military Rehabilitation Special Interest Group (MRSIG). MRSIG has led a series of projects, underpinned by three Centre PhD students. Including:

- ADAPT – low-load blood flow restriction is a resistance training method where you lift weights whilst wearing bands to partially restrict blood flow. It is often better tolerated than resistance training for people with knee pain. The ADAPT study is a randomised control trial testing how well this preferred technique is at improving persistent knee pain. Understanding the range of benefits it brings may help more widely encourage its use in practice to aid rehabilitation.
- Military Hip Rehabilitation Outcomes (MILO) – residential rehabilitation is a widely accepted form of treatment in the military for physical and mental health rehabilitation but has never been studied for pre-arthritis hip pain. MILO is the first randomised control trial to do this and the results brought some short-term benefits, such as better balance and hip mobility.

Working with Arthritis UK and specifically the Sport, Exercise and Osteoarthritis Centre has been an excellent and highly beneficial collaboration for Defence Rehabilitation. As a result we have completed randomised controlled trials that have directly influenced the rehabilitation care of military personnel with musculoskeletal injury.

Group Captain Professor Alex Bennett

Joining forces around the world

Two international osteoarthritis networks have been established and supported by the Centre: the International Foot and Ankle Osteoarthritis Consortium and the International Movement Screening and Interventions Group.

The International Foot and Ankle Osteoarthritis Consortium

The International Foot and Ankle Osteoarthritis Consortium comprises more than 80 clinicians, scientists and healthcare professionals and is an OARSI special interest group. Together, they've published research on priorities and key knowledge gaps related to foot and ankle osteoarthritis.

By analysing all English-published work in this field before 2024, they found an upsurge in articles published in the past decade. The third most frequent institution publishing research during this time across the globe came from the University of Leeds, linked to the Centre.

The International Movement Screening and Interventions Group

Established by the Centre in 2014, the International Movement Screening and Interventions Group comprises more than 70 members including researchers and clinical academics. It aims to gain international consensus on the use of movement screening tools and interventions for populations at risk of a musculoskeletal injury. Together, they've evaluated many different movement screening tools, interventions and sport-specific programmes for preventing injury and aiding sports rehabilitation.

Their review of movement screening tools revealed a lack of consensus on their practical utility – the evidence is inconsistent as to whether movement screening tools can actually help reduce lower limb injuries in 'at-risk' populations. Because of this, there was a change in UK military policy – they stopped using one particular screening tool.

The Centre established two global networks advancing osteoarthritis and injury-prevention research.

Catherine's story

"I'm a podiatrist by training and led on developing the careers of our early career researchers at the Centre."

What research did Catherine focus on at the Centre and why?

"I built an international group addressing the issues surrounding foot and ankle osteoarthritis, with a global perspective, called the International Foot and Ankle Osteoarthritis Consortium. There aren't many podiatrists like me who have gone on to do research and because of this, the field is understudied. There are far fewer researchers focused on foot osteoarthritis than there are focussed on knee or hip osteoarthritis. This difference is astounding given that the weight we put through our hips and knees has a consequent damage on our feet, which can lead to pain, osteoarthritis and mobility issues that can all negatively affect quality of life."

What did Catherine discover through the Centre?

"In 2016, we studied the scale of foot and ankle pain by looking at all available literature. We found cohorts that had useful data but didn't tell us the whole truth. Foot pain is underreported and the people who are involved with existing cohorts lack diversity. Importantly, we also found that no general estimates of foot and ankle pain in the community existed. Then, I won a fellowship from NIHR to get closer to the truth. We analysed real-world data from patients who had seen their GPs across the UK. This showed us that foot and ankle osteoarthritis is less well managed by GPs and clinicians in practice. More often, they're being referred to orthopaedics rather than a podiatrist. On top of this, we spoke with GPs, patients and health commissioners to help unpack the story further. We found that many patients didn't know what podiatry services were available to them. We also showed that patients struggled to access podiatry services, helping to explain why so many referrals were happening to orthopaedics. **This work was provided as evidence to a House of Lords enquiry to help inform more effective referral pathways to podiatry. It also helped shape recommendations in the Royal College of Podiatry Workforce, Education and Development Strategy Group Report**."

How has being part of the Centre helped Catherine?

"It gave me the network and focus to win my Fellowship from NIHR and to conduct research that would benefit people who had foot pain. Because of my clinical background, my route into academia came later in life. Once I got the Fellowship though, everything caught up and I became a professor. Getting this title helped me stand shoulder to shoulder with other researchers and develop my skills as a leader. That led me to where I am now: the Director of the Applied Health and Care Research Collaboration Wessex."

Rachel's story

"I joined the Centre in 2019 when I began my PhD [partly funded by Arthritis UK] at the University of Bath."

What did Rachel discover and why is this important?

"My first project at the Centre showed that, in individuals with chronic knee pain, participating in lower body exercise can increase pain 24 hours after exercise whereas taking part in upper body exercise leads to a significant reduction in pain. This result is incredibly important, especially for the many people living with osteoarthritis that are experiencing a fear of movement. This fear can heighten pain from a psychological standpoint. Our research now suggests that exercise which avoids the affected joint could offer a practical solution to help people with osteoarthritis reduce their pain whilst becoming more active.

Our findings so far show us what happens but not why. Our next steps would be to run a larger study to look at the underlying mechanisms responsible for influencing pain.

The latest project I was involved with found that combining aerobic exercise with calorie restriction is more effective than calorie restriction alone in reducing pain, improving mobility and slowing down disease progression of some specific disease-related inflammatory markers. This finding emphasises that lifestyle changes can have a really powerful effect on disease, symptoms and quality of life."

How has being a part of the Centre helped Rachel?

"The breadth of expertise within the Centre opened my eyes to different disciplines, such as psychology, which I was then able to incorporate into my own research. Being surrounded by experienced researchers helped me to gain confidence in myself personally and in my work. I am now a Clinical Trial Manager and Research Associate at Cardiff University [linked to the Arthritis UK Biomechanics and Bioengineering Centre]. The skills I gained through the Centre helped me to get this job. For example, my interviewers highlighted that my experience in conducting research, networking with researchers, and involving patients, were key reasons for securing the position. I feel especially close to the cause because both my mum and grandma have knee osteoarthritis.

The most rewarding part of my work is hearing how our study participants have benefitted from the research. I've heard some of them say things like 'I've been able to go a whole day without my pain medication' or 'I've walked further than I have done in months or years'.

Hearing this motivates me to keep going and to try and run these studies in larger groups to help more people."

Glossary

Arm ergometry

Type of exercise where arms are used to pedal against resistance.

Ballistic power training

Type of exercise that involves performing fast, high-intensity movements with explosive speed.

Biomarker

Measurable sign of a condition or disease.

Cam morphology

Abnormal hip joint shape which can damage cartilage over time.

Cartilage

Smooth cushioning substance covering the ends of bones.

Cohorts

Group of people that are followed over a period for researchers to find trends and explore relationships between certain factors and their health.

Electromagnetic therapy

Type of therapy using low-level electromagnetic waves to stimulate the body's cells and tissues.

Epidemiology

Science of studying large groups of people to identify the causes, risk factors and consequences of disease.

Excessive exercise

Doing more exercise than our body can handle or exercising in an unsafe way.

Juvenile idiopathic arthritis (JIA)

Group of autoimmune conditions that start in childhood, where painful, stiff and restricted joints are the main symptoms.

Meniscectomy

Surgical procedure that removes all or part of a meniscus, a piece of cartilage in the knee, when it is damaged.

Moderate intensity activity

Exercise that raises your heart rate which you can talk along during but not sing.

Movement screening tool

Simple set of tests used to assess how a person moves during specific exercises, to find weaknesses or problems that could lead to a higher risk of injury in the future.

Neuromuscular performance

How well your nerves and muscles work together during movement.

Podiatry

Field of care for treating foot disorders.

Post-traumatic osteoarthritis (PTOA)

Joint damage that happens after an injury, which leads to osteoarthritis.

Power

Maximum amount of force that can be generated in a single effort rapidly.

Randomised control trial

A type of clinical trial in which participants are assigned at random (by chance) to different groups, at least one of which will be a ‘control’ (or comparison) group.

Rheumatology

Branch of medicine relating to arthritis and other conditions and diseases that affect our joints, muscles, bones and immune system.

Strength

Maximum amount of force that can be generated in a single effort.

Synovial fluid

Lubricating fluid found in the joints of our body that helps our bones move smoothly.

Systemic lupus erythematosus

Rare autoimmune condition where your immune system, which normally protects us against infection and illness, starts to attack the body’s own tissues instead.

Want to find out more?

Sign up to our newsletter using the link below. We'll be in touch by email a few times a month with the latest arthritis news, including research and campaign updates, as well as tips and advice about how to live well with arthritis, and ways you can get involved.

arthritis-uk.org/signup

Arthritis UK
Third Floor
120 Aldersgate Street
London
EC1A 4JQ

t 0300 790 0400
e enquiries@arthritis-uk.org

arthritis-uk.org

Search 'Arthritis UK'

Arthritis UK

Centre for Sport, Exercise and Osteoarthritis