

Under Pressure

A Report on the State of the Nation's Knees



Authored by national health journalist Adrian Monti
and commissioned by Contura Orthopaedics Limited



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Foreword by

Rakesh Tailor

CEO of Contura International Ltd



TOO MANY PEOPLE know the painful reality of living with osteoarthritis in their knees.

It can mean suffering discomfort on a daily basis, with the knowledge that it's only likely to get worse. So, what can they do?

There's a familiar and well-trodden pathway for those who have it. Often doctors suggest weight loss, light exercise and some physiotherapy. Later painkillers and possibly steroid injections might be offered. Afterwards, with their knee becoming more of an issue in their daily lives, many consider undergoing an operation.

That's an awful situation for any patient to be in, especially if they're at the younger end of the scale. It's far from ideal to be told when you're only in your 50s or early 60s that you need knee replacement surgery. And because of your relatively young age, you're likely to need it again once that replacement knee eventually wears out in around 20 years or so.

Although your doctor will be doing their best for you, the truth is that, for some time, there's been a lack of options they can offer their patients with osteoarthritic knees.

This is where Arthrosamid® can come in and fill this gap. It's a unique hydrogel which is injected directly into the affected knee. It starts making a difference straight away. It works by calming down the inflammation inside the joint by firmly embedding itself into the synovium, the membrane tissue found inside our knees. Synovium irritation plays a critical role in the symptom severity and structural progression of osteoarthritis.

Arthrosamid® is different. It isn't like the other established types of injectables used to treat osteoarthritic knees. For a start, it's inert so it won't react with anything else in the body. And once in place, it will stay there for years, continuing to ease that knee discomfort. It also does not damage the joint. This is important because if surgery is eventually required at some later stage, the Arthrosamid® inside the knee will not affect this still being an option.

I often say Arthrosamid® is like one of the world's best kept secrets. I believe if more patients and health professionals knew about it, many more people could today be enjoying their lives as normal once again.

We know that people are suffering and it's affecting their work, their family life, relationships and even their sleep, so to help us really understand what people in the UK feel about living with knee problems, we commissioned a survey amongst 1,000 adults in the UK to inform this report.

And, what we found is that it really is an issue that's preying on people's minds, with mobility issues such as joint pain and knee problem the biggest issue worrying people about getting older (67% of people agreed). In the past 12 months, respondents reported that joint pain such as back ache, bad knees or hips had made it harder to garden (24%), sleep (23%), exercise (22%), take part in sport (16%) or carry out paid employment (10%). However, the reality is that 61% of people would be anxious about surgery, with 23% saying that they couldn't take the time off work to recover.

Already, in less than three years, some 10,000² people across Europe have had Arthrosamid® injected in to their knees. In most of those cases, patients are delighted with the results so far.

Contura Orthopaedics, who have developed Arthrosamid® over the past two decades, are continuing to spend millions on ongoing research, so this game-changing treatment can benefit even more patients. The story of Arthrosamid® is a fascinating one. First used in the veterinary world to treat lame horses, it's now used in a pioneering way to treat the growing issue of people's knees which are being damaged by osteoarthritis.

Currently it's only available privately. But our goal is that all patients suffering with pain from knee osteoarthritis will have the option to have treatment. So, we hope that in the near future, it will be approved by The National Institute for Health Care Excellence (NICE), meaning Arthrosamid® would be available on the NHS for all who need it.

So to anyone who has osteoarthritis in their knees or knows someone struggling with it, I would simply say to them that knee surgery is no longer the only option you have left. Why not try Arthrosamid® first?

We feel it's been a secret for far too long. It's time now for more of us to discover how Arthrosamid® can really help.

**Each year in the UK,
an estimated 350,000
people are diagnosed
with osteoarthritis**

Chapter 1

The true scale of knee osteoarthritis today

The knee is the biggest and one of the most complex joints in our body, so it may not be surprising to learn that it's also one of the most likely to be affected by osteoarthritis.

Osteoarthritis occurs when the knee's cartilage – the smooth, tough tissue which covers the ends of the thigh and shin bones which make up the knee joint – becomes thinner and rougher. This means the joint no longer moves as easily as it once did. It can lead to pain, stiffness and often swelling when moving while sometimes causing disturbance to your night's sleep. It's a chronic condition which cannot be cured.

Worryingly, osteoarthritis is a problem which is getting worse both here and elsewhere. The most recent Global Burden of Disease Study reported that about 528 million people were living with osteoarthritis - a 113 per cent increase on 1990.¹ Meanwhile, another study predicts that by 2050, one billion people globally will have osteoarthritis. This research goes on to say that also by 2050, osteoarthritis in the knees in particular will have increased by almost 75 per cent.²

When viewed closer to home, it's estimated that ten million people (about six million women and four million men) live with osteoarthritis, according to data from the Versus Arthritis UK charity. From these figures, it can be extrapolated that about 5.4 million of those people are living with this degenerative disease in their knees.³

But what's driving this rise? According to a range of influential reports, the main factors are a growing global population which is ageing and becoming more obese.¹

Each year in the UK, an estimated 350,000 people are diagnosed with osteoarthritis, with 55 being the average age when symptoms are noticed.³ As many of us are now working well into our 60s if not beyond, our workforce includes a significant number who are trying to manage their osteoarthritic knees. This will create a negative economic impact. For example, it's believed that someone with arthritis is 20 per cent less likely to be in work than someone who doesn't have it.

Several studies including one from 2022 highlighted how worldwide osteoarthritis is the 15th highest cause of years lived with a disability.⁴ Meanwhile, a recent study published in the Journal of Health and Outcomes Research illustrated this further following some revealing number-crunching. It showed how a 50-year-old UK-based individual with severely uncontrolled osteoarthritis (who would normally expect 15 more years of employment), could lose more than £126,000 in earnings over that period; they would also pay less taxes to the government and

be entitled to a larger sum of state benefits compared to someone with moderately well-managed osteoarthritis.⁵

But what can be done if you suspect or have been diagnosed with osteoarthritis of the knees? Although we know it cannot be cured with medication, it can be managed to try and lessen its symptoms. In its early stages, your GP or consultant might advise you to lose weight, exercise gently (such as walking more), and change your type of footwear, all of which might ease it on a daily basis. Physiotherapy can also be recommended.

Medicines can be used too, ranging from paracetamol for short-term pain relief to non-steroidal anti-inflammatory drugs such as ibuprofen which can reduce swelling and pain. But these might not suit everyone, and over a long period they can cause serious side effects. Some people turn to stronger painkillers such as codeine or other opioids, but these can be highly addictive (so their use needs to be closely monitored) and there's little evidence that they offer long term pain relief.

Injections have also traditionally been used to treat osteoarthritis. Usually this is either hyaluronic acid which helps lubricate the knee joint or a steroid/cortisone injection which can offer some temporary reduction of inflammation.

After these more conservative approaches have been worked through, you might feel the only answer is knee surgery. This can be either a total or partial knee replacement. A total knee replacement involves the ends of both the thigh and shin bone where the cartilage is damaged being removed and replaced with metal and plastic parts. Meanwhile a partial knee replacement means only part of the joint being removed and replaced to make the joint move more smoothly again. Depending on a variety of factors, you and your consultant will decide which is the best option.

Despite more minimally invasive surgery along with other newer techniques being introduced in recent years, knee replacement is still a major operation. According to the Royal College of Surgeons of England, it will take about



six weeks before you are pain free and 3-6 months before you can fully resume your normal life.⁶ While it is considered a safe operation with a patient satisfaction rating of about 85 per cent, a knee replacement operation is not always the end of the story. An important factor is at what age you undergo knee surgery. Although in those aged under 55, 90 per cent of knee replacements are still working a decade later, at 15 years this falls to 75 per cent still functioning.⁷ This depends on how active those living with an artificial knee are, but the younger you are when you undergo this surgery, the more likely you will be to require a further operation to replace the then worn-out replacement joint at some later stage. But this revision or 'redo' surgery can be challenging and can sometimes result in poorer outcomes than the initial knee operation.

But as we're only too aware, NHS treatment is often not a speedy process. The Office for National Statistics released data in April (2024) saying that 9.7 million people in England are stuck in an NHS waiting list; it means 21 per cent of the population is waiting for a 'hospital appointment, test or to start treatment'.⁸ Of those patients in the queue, more than 800,000 were waiting to be treated for cases of trauma and orthopaedics, a figure which includes a high number awaiting osteoarthritic knee surgery.

On average, more than 70,000 NHS knee replacement operations are carried out in England each year. But when the pandemic struck four years ago, many non-urgent elective surgery cases were delayed. The inevitable backlog this brought about is still being worked through today.

Despite the maximum waiting time for knee replacement surgery hospital referral being 18 weeks, according to the latest NHS England data at the start of 2024, still only 54 per cent of those awaiting orthopaedic and trauma surgery were seen within this timescale.⁹

It's clear that for most people with osteoarthritis of the knee, there is a lot to consider when deciding the best way to deal with it. Although it's a very common condition – and becoming even more so – we know it can have a serious impact on the quality of everyday life, mental health, and the ability to work, as well as being the cause of other physical health issues.

Worryingly, research has shown that people with osteoarthritis are at a higher risk – more than 10 per cent – of dying prematurely, with a lack of walking being a key issue behind this.¹⁰

But are there any other options out there? Arthrosamid[®] believes there is.



CASE STUDY:

Les Goldhawk, 66, a farmer from Bedfordshire

FARMER Les Goldhawk has spent around 45 years working on his family farm doing all manner of arduous tasks.

Sadly, this manual work has taken its toll on his body, particularly his knees and hips.

"Farming is really intense, physical labour, working with heavy machinery day in, day out," says Les, 66. "So, over the years, my joints have begun to suffer. I've also had a couple of accidents at work, making my right knee particularly sore and swollen. Until recently, I was experiencing pain in my knees every day, so I was taking painkillers to take the edge off the pain and help me get through my working day."

Spending many hours wearing wellies on rugged, unforgiving surfaces around the Bedfordshire farm in all weathers hasn't helped his knees either. Nor did his sideline business of hiring out a horse-drawn carriage for weddings. He admits it was extremely hard clambering up into the driver's seat of the carriage each time.

As a solution, Les considered knee replacement surgery, but was worried about the recovery time impacting on his work. After reading a newspaper article about Arthrosamid[®] and encouraged by his wife Debbie, he booked an appointment to have both knees injected with it in December 2022.

"I was only at the clinic for an hour," recalls Les. "I did experience some discomfort in the 24 hours after the injection but since then, my recovery has been very positive. The constant pain in my knees has gone and I'm so much more mobile."

"As well as improvement to my mobility issues, there's been a huge impact on my sleep. Due to the agonising pain I'd been experiencing, I wasn't able to sleep properly. In fact, I hadn't had a decent night's sleep for over three years which was really affecting my quality of life. The difference in how I feel on a day-to-day basis is huge. It's one of the best things I've done."

Chapter 2

Science And Research

Why some people develop osteoarthritis in their knees while others do not is still not fully understood. What we do know is that this degenerative disease appears to be brought on by a combination of factors, the significance of each varying between individuals.

These can include genes – the unique mix of DNA which we inherit from our parents – which make some people more predisposed to osteoarthritis. Age and gender (it's more common in women than men) play a part too. But lifestyle factors such as diet, how much we exercise and whether we're carrying excess weight appear hugely significant.

A trauma or injury to the knee can also mean some people are more likely than others to suffer with osteoarthritis. If the cartilage – which acts like a shock absorber in the knee – is damaged for example, this can bring on osteoarthritis later on. This was illustrated in a study published in *The Lancet Rheumatology* in 2021 involving 150 participants aged between 16 and 50 who had all suffered a knee injury. Despite being a fairly young cohort, between 15-20 per cent were showing signs of osteoarthritis two years after their injury.¹

More recently, osteoarthritis experts have moved away from simply regarding osteoarthritis as a natural consequence of our knees getting 'worn out' as we get older. Instead they believe it's much more complicated than that.

"I think we have now realised that osteoarthritis is not just wear and tear and there are actually many different types of osteoarthritis – called phenotypes – which might explain why some treatments work better for some patients than other ones do," says Andrew Pearse, a consultant orthopaedic surgeon specialising in knee issues at Worcestershire Acute Hospitals NHS Trust.

Professor Martyn Snow, a consultant orthopaedic surgeon at Royal Orthopaedic Hospital in Birmingham, with an honorary post at The Robert Jones and Agnes Hunt Orthopaedic Hospital in Oswestry, Shropshire, agrees. "We used to consider that there were two types of arthritis. There was your inflammatory arthritis such as the rheumatoid type, while we would classify the other type, namely osteoarthritis, in terms of wear and tear and lump it all together. But we're now realising that there may actually be five or six different types of osteoarthritis, and we're more focused on how the arthritis behaves in someone's knees. Some people might suffer more pain while others have a more inflammatory form of it and so on. We are only really at the beginning of understanding this."

Mr Pearse says that although we associate pain and stiffness with osteoarthritis, swelling plays a bigger role for some people than others. This is because the synovium, the soft membrane which lines and protects the knee joint, can become irritated. This then affects the synovial fluid inside the synovium which contains various chemicals and enzymes which nourish the joint, helping it to function smoothly.

"The more inflammatory type of osteoarthritis which we associate with swelling appears to be moderated by the synovium," explains Mr Pearse. "Although the synovium is not damaged, it reacts to the conditions inside the knee. In the case of osteoarthritis, the knee joint contains two major irritating components which negatively impact on the synovium. The first are the small pieces of cartilage which shear off the damaged cartilage surface and then float around inside it. This causes more excessive fluid to be produced in a bid to clear these pieces of damaged cartilage. The second is the internal toxic chemical make-up of the knee joint fluid (it becomes toxic due to chemicals which are subsequently produced due to the arthritis in this joint) which irritates the synovium by making it red and raw while producing yet more fluid. It becomes a vicious circle."

Andrew Miller, a consultant orthopaedic surgeon working in South Wales, shares this view.

"Some people at a really early stage of osteoarthritis get a very swollen joint caused by a build-up of these fluids, which is very painful," he says. "What's happening in the synovium is one of the drivers of pain. So we think if you can stop the synovium making inflammatory molecules, this would stop it becoming painful."

One way to reduce the inflammatory environment inside the synovium is to use Arthrosamid®, an injectable treatment which appears to have a calming effect inside the knee.



A trauma or injury to the knee can also mean some people are more likely than others to suffer with osteoarthritis

Arthrosamid® is what's called a hydrogel that has been developed over the past 20 years by Danish medical device company Contura International Ltd. The majority of it – 97.5 per cent – is made up of water while the remaining 2.5 per cent is a polyacrylamide, which is a carbon-based molecule.

Those patients seen as suitable to have it will first be given a local anaesthetic. Then the Arthrosamid® is injected into their articular cavity of the knee joint under ultrasound visualisation to check it's being delivered correctly. The procedure takes about 15 minutes and patients can carry on with their normal life straight afterwards with no recovery time.

"Once inside the knee, the large polyacrylamide molecules are so hydrophilic [meaning they can mix and interact with water] that they remain a gel even when imbedded in the synovial lining," explains Mr Pearse. "But rather than the water it is injected with, it is instead exchanged with the pre-existing synovial fluid." As the gel is inert, the body does not reject it. The knee's natural 'hoover' cells which are called macrophages try to eat up this gel but fail. So instead these hoover cells morph into fibroblast cells which form a new layer of synovium on top of the irritated synovium."

Only a single 6ml injection of Arthrosamid® – equivalent to just over a teaspoon – is needed. The hydrogel is described as non-migratory, meaning it will not be dispersed around the body, instead remaining inside the arthritic knee.

"To understand how Arthrosamid® works, you need to almost imagine the lining of the joint being very red, inflamed and sore," says Mr Pearse. "When Arthrosamid® is injected, it imbeds itself on to this irritated synovium

lining forming a new layer, meaning the swelling and pain can finally be switched off. It could prove to be a real game changer."

"Arthrosamid® is like a barrier to stop inflammation," says Mr Miller. "Whatever the initial cause of someone's osteoarthritis, in the end, everyone's osteoarthritis becomes inflammatory. So if we can get to their knee osteoarthritis at an early stage, it might respond really well to this new type of therapy. We know that not everyone benefits from it if their osteoarthritis is driven instead by bone or cartilage issues, but for those with inflammation, it seems a good option."

In 2021, Arthrosamid® was given in European regulatory CE approval for treating patients with the symptoms of osteoarthritis in the knee.

It is currently the subject to both a long-term ongoing clinical study and a new UK trial, the first of its type here to examine how Arthrosamid® can be best used for patients.

Last year (2023) at the Orthopaedic Research Society International (OARSI) World Congress in Denver, Colorado, delegates heard how Arthrosamid® was continuing to work for patients who had undergone injections three years earlier. This was the latest update of Contura Orthopaedics research² which initially included 49 patients (31 female, 18 male) with an average age at treatment of around 70 (overall the age range was 44-86 years old). Earlier data from this open label study (meaning the patients were aware what treatment they were given) had already shown that Arthrosamid® was effective in reducing pain after six, 12 and 24 months.^{3,4,5}

When the most recent set of results were presented at the congress in the US, it showed that with 29 participants still on the trial from when it began, they were still benefiting from it three years later.² Overall, patients on the trial reported a continued reduction in pain, stiffness and an improvement in their mobility (based on established scales to evaluate this) since having Arthrosamid®. The study has now been extended, allowing the long-term safety and efficacy of this hydrogel to be further reported on after five years.



CASE STUDY:

Lorraine Dawkins, 60, a keen dancer,
from Staines, Surrey.

Lorraine Dawkins has always been extremely active. From athletics when younger to netball, badminton and dancing ever since, she's always enjoyed keeping fit and having fun.

But in her 40s, she first began experiencing pain in her left knee. While playing in a netball match, she said it felt as if it was 'on fire'. After seeing a specialist about it, she was shocked to be diagnosed with osteoarthritis in the joint at such a relatively young age.

"The pain got progressively worse over the next few years," says Lorraine, now 60, a medical PA from Staines, Surrey. "It was impacting on my day-to-day life. I would struggle to walk up and down stairs and in the mornings it took much longer for my knees to 'wake up'.

Despite her growing discomfort, she was reluctant to undergo knee surgery as she saw at first hand her two sisters' long recovery from hip surgery. Instead she continued to take ever-stronger painkillers, although they were having less effect on easing her pain. By now Lorraine's knee was so bad, she could no longer dance which was something she loved doing with friends.

By chance, one of Lorraine's sisters mentioned Arthrosamid®. She said it had been used to treat lame horses, joking that it was a shame Lorraine wasn't a horse.

So, Lorraine decided to find out more about Arthrosamid®. Coincidentally in her role as a medical PA, she even met some orthopaedic patients who had successfully been treated using it. As a result, she decided to try the treatment last September (2023). Within two weeks of the injection, she felt she had a 'new' knee. With her improved mobility she was able to enjoy a cruise only a month later without using the stick she had become reliant on.

Now, less than a year later, she says she is raring to go.

"I'm back to enjoying dancing again," says Lorraine. "I've also set a date with my granddaughter to play a badminton match."

Meanwhile, a £150,000 research grant is currently funding pioneering NHS research at The Robert Jones and Agnes Hunt Orthopaedic Hospital where Professor Snow is overseeing an ongoing trial.

This study is looking at how Arthrosamid® treatment would be beneficial in an NHS setting. Already 60 patients have been recruited for the trial.

"By January (2024) we had injected all of our participants," Professor Snow explains. "At the same time we are removing some of the synovium fluid which is present when their knee has become inflamed. At three months those on the trial had another small amount of their synovium fluid taken so our researchers at Keele University can analyse it. This will hopefully give us a picture of what biological pathways have been affected by this injection."

Once all 60 participants' synovium fluid has been studied at the six-month period following their injection, the ten people who responded 'best' and the ten who responded 'worst' will be directly compared.

"It will hopefully give us a better idea of why some people with osteoarthritis respond well to Arthrosamid® while others do not," adds Professor Snow. "By doing it this way we can hopefully narrow it down, so in future we will know which types of patients will not have such good results and which are really likely to benefit from an injection of Arthrosamid®."

Chapter 3

Are our knees buckling under the UK health crisis?

A stream of studies, statistics and plenty of anecdotal evidence over the past few years have shown that as a population, we are becoming heavier. With an increasing number of people being overweight, or in many cases obese, it's easy to see this as one of the major reasons why more people are suffering osteoarthritis in their knees.

According to recent government figures, 26 per cent of adults are obese (which means they have a body mass index (BMI) of 30 or above), while 38 per cent are classed as overweight (a BMI between 25 and 29.9).¹ Meanwhile, with around 22 per cent of Year 6 children (age 10-11) classed as obese, the future for our knees – along with our overall health – appears somewhat depressing.² To place this current snapshot into context, in just over 30 years the proportion of adults who are obese has almost doubled.³

“Every time we go up and downstairs, between three to five times our bodyweight goes through the anterior (the front of the) knee joint,” says consultant Andrew Miller. “It’s a huge amount of force going through the knees doing an everyday activity. So even losing a small amount of weight would have a massive benefit on your joints. In many ways, I feel my main job is to tell people to lose weight; that’s the single biggest factor, meaning there will then be less knee issues leading to fewer knee replacement operations.”

Research has shown that if someone is very overweight or obese, they are at three times greater risk of developing osteoarthritis than the rest of the population. But it’s not only carrying excess weight which is putting constant strain on the knee joint. There’s also a complex ‘battle’ going on at a cellular level, experts believe.

“Your joint health is predetermined by the amount of overall inflammation in the body, so it’s really important to make sure this is kept in check by keeping your weight within healthy levels,” says Dr Sarah Davies, a consultant in musculoskeletal, sport and exercise medicine based at Chiswick Medical Centre, London.

“A simple way of describing this is that cartilage cells in the knee and the fat cells in the body are enemies of each other. So this means if you’re overweight, you have a lot of fat hanging around. Although we don’t know yet how this process works, there is certainly research evidence to suggest that fat cells are quite caustic; they irritate the cartilage, causing cellular damage through the constant release of inflammatory proteins. These proteins then cause damage to the cartilage, including that inside the knee joint.”

Mr Miller says it more directly. “Being fat will cause the activation of inflammation in the fatty cells. So it’s not just that people are obese, it’s that more of us are fat and it is the fat which is causing this inflammation. This is what we believe is happening in our knee joints, leading to many of the cases of osteoarthritis we see.”

But it’s a double whammy: a poor diet is making us gain more weight and we are also living a more sedentary lifestyle.

According to Sport England, one in four people in England does less than 30 minutes of physical activity a week.⁴ That’s way off the 150 minutes of moderate intensity exercise the government recommends we do weekly. One eye-catching statistic from a different source is that as a population, we’re 20 per cent less active than we were in the 1960s. If this trend continues, we’ll be 35 per cent less active by 2030.⁵

Meanwhile, only 47 per cent of children and young people in the UK meet the chief medical officer’s guidelines of 60 minutes of physical activity a day, according to the Sport Youth Trust.⁶ This is not helped by a 12 per cent cut in PE and sport at secondary school since the 2012 London Olympics, the event which aimed to ‘inspire a generation’.⁷

“Non-impact sports such as swimming, cycling or going on the cross trainer are amazing for health and do not cause any damage to the knees, which can lead to osteoarthritis,” says Mr Miller. “If you can keep the weight off and do more exercise, it can do wonders for your knees and mean you’re not looking at having knee replacement surgery in the future.”

Dr Davies says patients often tell her they think that playing a lot of sport in their youth has caused knee issues. “But I suspect it’s more to do with bad biomechanics, their body composition, genetics or if they had suffered an injury. You do not just wear your cartilage out by too much sport – there are always other factors at play.”



“If you can keep the weight off and do more exercise, it can do wonders for your knees and mean you’re not looking at having knee replacement surgery in the future.”

**Mr Andrew Miller
Consultant Orthopaedic Surgeon
South Wales**

CASE STUDY:

Nick Gregg, 60, from Tenby, South Wales.

It was a vet rather than a doctor who helped keen golfer Nick Gregg fix his painful knees.

When Nick, 60, felt a 'ping' in his right knee while playing golf about 18 months ago, he feared he might finally have to undergo knee replacement surgery. He'd been avoiding it for more than a decade as he knew there was a slow recovery time.

In a bid to ease his discomfort, he used painkillers, ice packs and rest after it continued to worsen. By early 2023, he knew he'd have to seek professional help as his knee had 'completely gone'.

But surprisingly, it was a local vet who had been treating one of his wife's lame horses who first told Nick about Arthrosamid®. It had been used in the equine world since 2009 and in 2021 was given European approval for use in human knees too.

Nick found a consultant in Cardiff who carried out these injections. Once it was established that he was a suitable candidate, he underwent the 15-minute procedure.

"I had a local anaesthetic into the knee joint and after that I didn't feel a thing," says Nick. "I watched on a monitor as it was inserted via a syringe. I stood up and the result was unbelievable. In fact, I assumed it must have been the effects of the anaesthetic but as it wore off over the next few hours, I remained pain free."

Nick was back playing golf a week later, although his consultant said he could have returned to the course within a couple of days.

"Not only had the pain totally disappeared, but I was also no longer feeling any stiffness in my knee joint," says Nick a semi-retired CEO. "I hadn't experienced as much movement and flexibility in 25 years."

Around six weeks later, Nick had his left knee injected with Arthrosamid®.

"Of course, I've heard all the gags at the golf club about 'being able to run the Grand National like a racehorse,'" says Nick. "In my opinion, the results are nothing short of a miracle. It's no exaggeration to say that it can give you back your life particularly if a large part revolves around playing golf."

Various approaches can attempt to dampen down swelling in the osteoarthritic joint. But the results are mixed.

"Diet can make a big difference in some cases," says Dr Davies. "If you have a very poor diet, improving it could make a big difference while if you already have a good, fairly balanced diet, any changes might make less difference. Although these are marginal gains, together they can add up to big changes. Adding the likes of turmeric – which has mild anti-inflammatory properties – or taking omega-3 supplements for joints might help, but often we simply don't know how much it will help with your own osteoarthritis."

The state of our knees can have wide-ranging implications for overall health. Painful knees which make us less active can be a cause of cardiovascular disease, coronary heart disease and strokes. It can also have a big impact on mental health as you may not be able to do what you want or what you enjoy.

Supports and braces to take the stress off knees can also be a bit hit and miss.

"I believe knee braces can play a part in helping with knee osteoarthritis," says Dr Davies. "But it's not the cheaper ones you might see online that I feel are really going to help. Instead it's the bespoke ones which off-load your weight from one part of the knee where the cartilage is worn. Sadly they don't come cheap. They can be really helpful, though quite bulky and awkward to put on and take off."

But Mr Miller believes that supports – even the less pricey ones – can play some role and he even wears them himself at the gym.

"There's a role for bracing, especially if there is instability due to muscle or ligament problems meaning there is a mechanical issue which needs to be addressed," he says.

"An off-the-shelf support can still apply some slight downwards pressure and improve the flow of synovium in the knees which can be preventative. Although no one says an inexpensive brace or support will help with aggressive arthritis, it can be of some use in less severe cases."

In a more desperate approach to ease severe discomfort, some people progress to strong opioids including morphine. "There is no evidence they are beneficial for osteoarthritis," says Mr Miller. "It doesn't help osteoarthritis at all if you take them long term, and you could get addicted to them which does not help anything."

Although our knees have never been under so much strain, there's now hope on the horizon. Several of our leading clinicians who treat patients with osteoarthritis on a daily basis believe Arthrosamid® might offer some welcome relief for our knees.

Chapter 4

KNEE OSTEOARTHRITIS: THE STATISTICS AND PUBLIC OPINION



Chapter 5

Keeping knee health on track

WE are all familiar with the message: keeping fit by doing regular sport or exercise is good for our overall health. But what's the impact of all that activity on our knees?

“Sport in itself is good for our knees by keeping the joints lubricated,” says consultant Dr Sarah Davies. “But fast, impact, multi-directional sports such as football, rugby or long-distance running increase the sheer forces going through the cartilage. This can increase the likelihood of trauma to the cartilage and injury.”

Often people think the frequent, repetitive action of these high impact activities will cause osteoarthritis. But that's not the case at all says, Dr James Thing, a sport and exercise medicine consultant.

“It's a bit of a common misconception that running is going to cause damage to your knees and accelerate arthritis,” says Dr Thing, who runs the Joint Injection Clinic in London. “From the evidence we have got, we can say that there's evidence to show that if you have a perfectly normal knee, if you then start running, you're at no greater risk of developing or accelerating any arthritic changes than anyone else in the general population.

“Exercise including weight bearing ones are important for maintaining a normal balance of the processes which go on inside the knee. So if you take that exercise out, it's going to have a negative impact on the health of your knee.

However, he does issue one warning. “If you have had a knee injury – for example a meniscal tear or cruciate ligament injury – and you then take up running, then you are likely to accelerate that arthritic change.”

Often someone's osteoarthritis may have been caused years earlier due to suffering such an injury, even if at the time they felt they had overcome it, experts say.

“If you look for the origins of someone's arthritis it can very complex, although you can often find there was an injury to the affected knee somewhere along the line,” says Professor Martyn Snow. “Common injuries caused by exercising can certainly lead to osteoarthritis. For example, if the meniscus becomes damaged, it can cause the person with it to modify how they later move.

“This is why you often see that people who do regular sport can become a bit bow-legged as they age as they've suffered an injury and had to adapt how they run or walk. It's often down to suffering that initial injury,

so they have had to change how they move which then puts extra wear on their cartilage due to a change in their biomechanics. This first injury can be the start of their osteoarthritis.

“In other patients with osteoarthritis, they might have had a broken bone in the past and after this acute injury, the bone was never quite put back in exactly the same position so it's no longer correctly aligned; this too can cause damage to the cartilage, again leading to osteoarthritis.”

Our sex can also affect biomechanics. This has been highlighted in recent years by the increase in the number of female footballers suffering serious injuries to their anterior cruciate ligament (ACL) which is a key ligament for keeping the knee stable.

It has been referred to as a 'crisis' in the sport as more women players at all levels and ages are being sidelined by this type of injury which can take them out of the game for around nine months or more as they recover. Studies have shown that the risk of suffering an ACL injury is more than six times higher in female athletes than their male counterparts.¹ Although the cause is thought to be multi-factorial, a difference in the biomechanics is thought to play a part in this worrying trend in the women's game.

“Female footballers are more likely to suffer an ACL injury than male footballers because their quad muscles are more dominant, so they have different biomechanics which causes an imbalance,” says consultant Andrew Miller. “Any trauma to the knees can cause osteoarthritis that is only seen at a later stage in their life. It's very much a case that the die is cast for osteoarthritis at the time of injury and therefore it's the injury which produces later stage arthritis not simply that they play football.”

Many of us do not take enough care of our knees, which can lead us into a whole world of pain caused by osteoarthritis, some experts strongly believe.

“The truth is that most people who play sport at grassroots level only come and see me or a physiotherapist or other injury therapist once they have suffered a knee problem,” says Mr Miller. “Obviously elite level sports people are a

CASE STUDY:

Sharron Davies MBE, 61, from Wiltshire

After injuring her right knee in a school running race aged 11, former swimmer Sharron Davies never imagined that almost 50 years later it would still be a source of discomfort.

"I did a 100m running race and tripped after my foot went down a pothole, badly twisting my knee which swelled up like a balloon," says Sharron, now 61, an Olympic medallist at the 1980 Moscow games aged 17.

Although it healed, when she later starred in the original Gladiators game show back in the 1990s, a contestant fell on the same knee causing her ACL to "snap". She developed osteoarthritis from these injuries. In total, she had nine operations on her right knee, including full reconstruction surgery, as well as numerous cartilage removal arthroscopies, none of which fixed it properly.

Ever since she has avoided high impact sports, but even a long dog walk would leave her hobbling with a swollen knee.

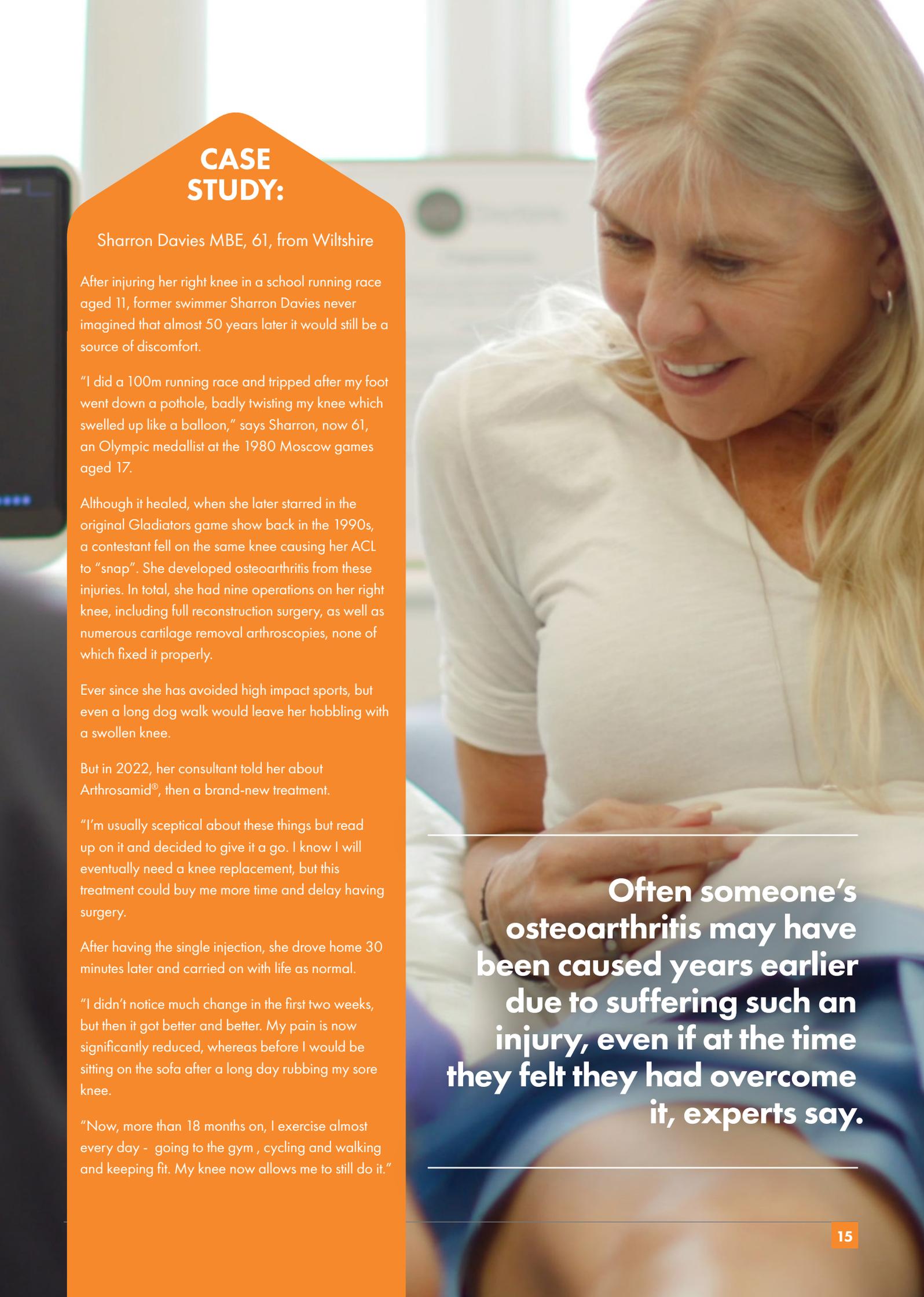
But in 2022, her consultant told her about Arthrosamid[®], then a brand-new treatment.

"I'm usually sceptical about these things but read up on it and decided to give it a go. I know I will eventually need a knee replacement, but this treatment could buy me more time and delay having surgery.

After having the single injection, she drove home 30 minutes later and carried on with life as normal.

"I didn't notice much change in the first two weeks, but then it got better and better. My pain is now significantly reduced, whereas before I would be sitting on the sofa after a long day rubbing my sore knee.

"Now, more than 18 months on, I exercise almost every day - going to the gym, cycling and walking and keeping fit. My knee now allows me to still do it."



Often someone's osteoarthritis may have been caused years earlier due to suffering such an injury, even if at the time they felt they had overcome it, experts say.

bit different – they have the facilities and experts on hand to help them do strength and conditioning exercises to work on them avoiding knee problems. But for your recreational sports person, thinking specifically about helping your knees is very rare until something goes wrong.”

Although sports people doing a ‘prehab’ programme at the higher levels is very common as a way to prevent overuse injuries by doing specific exercises, it’s not so common at the more recreational end.

“What people probably don’t realise is that it’s important to maintain a healthy balance by exercising regularly which is good for your joints,” says Dr Thing. “But if say, on a skiing holiday or a game of tennis you have a bit of a twist, you might tear your meniscus or rupture your cruciate ligament. Later people are quite shocked when I tell them that no matter what we do now, whether we operate or use more conservative treatment, whatever happens you are going to have an acceleration of arthritis on that injured knee. But Dr Thing is still keen for us to continue to exercise despite this potential risk. He says it can bring so many other benefits, ranging from cardiovascular health to good mental wellbeing.

“What I tend to say to patients is that there’s no evidence of good or bad sports if you have a normal knee,” he says. “But if you have had a knee injury and the patient asks if they are at risk of arthritis, I normally say to them it might be better to focus on the lower impact sports. By those I mean swimming, cycling and using the cross trainer rather than the higher impacts ones such as long-distance running, tennis, football or rugby. In those latter ones there’s going to be more force going through your knee and therefore the theory is that this will accelerate any arthritic change.

“I do tend to say you can still be doing some of those sports, but they have got to be done with a little more caution. The reality is you probably are going to accelerate change if you continue to do say ultra marathon running as opposed to cycling or swimming.”

It’s certainly a fine balance of not exposing yourself to the risk of osteoarthritis at some point in the future but also doing what you enjoy in life, as Dr Davies acknowledges.

“We are likely to collect traumas to our body as we go through life,” she says. “Avoiding sport will not stop that happening. The appropriate strength training beforehand – with the likes of squats, lunges and deadlifts (with suitable weights) can build up support and mobility of the knee. This could help you remain active longer. But it’s a case that you should never take your knees for granted.”



Chapter 6

Innovations in treatment

Is there room for another treatment for those living with osteoarthritis in their knees? Several experts believe that there is.

“We can’t just go on replacing people’s joints,” says consultant Andrew Miller. “We need a better way than this. In 20 years’ time, replacing someone’s joint with metal and plastic will probably be laughed at. ‘What were you doing?’ we will be asked. This surely can’t be the best way to treat someone because their knees are worn out. Even when I do this in surgery, I sometimes think this is crazy although it works very well and is a successful operation. As there are no drugs to stop osteoarthritis, it’s the only option we have if other treatments have not worked.”

Like other experts, he’s well aware of the limitations of the commonly used intra-articular injectables already out there to ease patient misery.

“For many years, steroid injections – the only injectable the NHS currently recommends – were commonly used for patients, including by me,” explains Mr Miller. “But the effects can be very short lived, and after the first injection, you may not even receive any further response, so it can be a waste of time and effort. This has meant I now don’t use them as I did in the past.

“There’s also quite a high complication rate (such as pain, discomfort and infection for example). One recent study said that for every cortisone (also known as a steroid) injection, the patient is 57 times more likely to need a knee replacement than those who do not have one.”¹

The Radiological Society of North America reported that steroid injections into the knee caused a progression of osteoarthritis in parts of the joint.²

Although joint lubricating hyaluronic acid has played a role in keeping the joint moving and reducing pain, it’s thought to only be effective for about six months. Mr Miller says in recent years it has fallen out of favour and NICE does not currently recommend it as a treatment for osteoarthritis.

More recently, platelet rich plasma (PRP) therapy has increased in popularity. It uses the natural healing properties found in patients’ own blood to treat an injured joint or tendon including arthritic knees. A sample of blood is taken from the patient’s arm before being rapidly spun in a centrifuge. This separates out the sample, creating a rich concentration of platelets in the plasma, containing natural growth factors and anti-inflammatory products. It is then injected into the knee joint. But

the results from this as a treatment are not conclusive, although there’s evidence that some patients have benefited from this pioneering approach.

“The theory is that PRP can help with a degree of regeneration of the knee,” says Dr Thing. “The evidence for this is very good when the osteoarthritis is at a very early stage but not when well advanced. But there’s no value in doing it for arthritis at the other end of the scale, when for example it’s a case of bone rubbing on bone. At that much later stage, PRP will not help a patient.”

With the other injectables which are already widely used each having their own drawbacks, Arthrosamid® has now become an option for patients by offering something different.

Even the story of how it became a potential treatment is a little unusual. It was originally developed for use by vets to treat lameness in horses, with the first horse receiving an injection in 2009. Today around 100,000 horses worldwide have been treated with it and in 80 per cent of cases, they are moving freely again.

Experts realised it might also work in humans, prompting further research. Since the first human injection in the UK in 2021, it has shown promising results.

Professor Martyn Snow believes that because Arthrosamid® is consistent in how it is manufactured, it makes it easier to assess its impact on different patients.

“The problem with other injections out there is they’re all very different even within the type of treatments they belong to,” Professor Snow explains. “By that I mean that in the case of PRP for example, when treating my knee with it, I’m using my blood; but for your knee, you would use your own blood. So the two products being injected are not the same, meaning it’s hard to judge one against the other. But when it comes to Arthrosamid®, it’s exactly the same product you are injecting into everyone’s knees. There is only one type of it which is made. It means it’s easier to see if it works or not.”

He welcomes the arrival of Arthrosamid®.



"I think when you boil down the options to treat osteoarthritis, they're quite limited if we're honest," he says. "We could certainly do with some more treatments to try. In the past, this has certainly caused a degree of frustration, especially if you are a younger patient. For this group, often a knee replacement does not appeal at that stage of your life because it's limiting and will eventually need replacing."

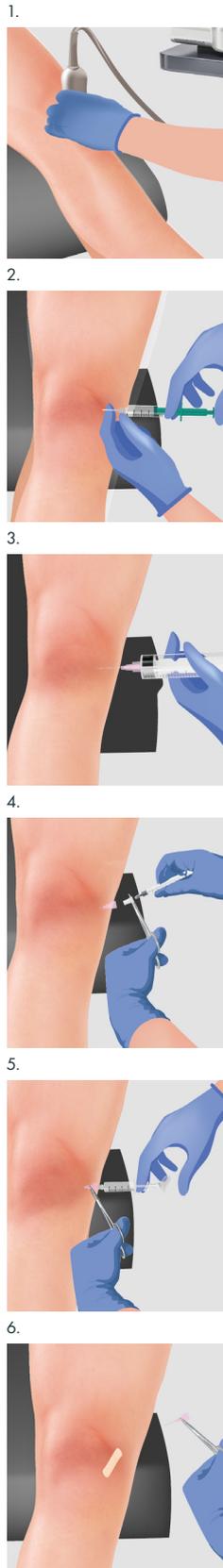
Professor Snow also wonders if newer therapies such as Arthrosamid® are at a disadvantage when trying to become a viable option for patients.

"I think the evidence threshold is a bit higher here in the UK than in the US where you only have to get it through the stipulations set by the FDA [the Food and Drug Administration, the body responsible for protecting public health, including approving new medical products and devices]," he says.

"Here NICE [National Institute for Health and Care Excellence] insist that before such a therapy is used in a universal way in the public health system (as is the case with the NHS here) you have to have accumulated a substantial amount of evidence. The threshold seems higher here than in the US, so it's difficult for the smaller companies like Contura International Ltd, who make Arthrosamid®, to compete. They might struggle to have big enough budgets to do the scale of testing that NICE insist on. It makes it more complicated and harder to bring these newer products like this into the NHS."

Professor Snow adds: "It means if you asked me whether there's enough help in the non-operative space for patients with knee osteoarthritis, I would probably say 'no'. I think if you are a younger patient and were told your only options were to lose weight or have the likes of a steroid injection which only has a short-term effect, you might feel a bit stuck of what to do next."

Professor Henning Bliddal, a Danish researcher and author of key studies into Arthrosamid®, is based at



the Parker Institute, Bispebjerg Frederiksberg Hospital, Copenhagen. He thinks it has qualities which make it stand out against some other injectables.

"The product is different to anything else we test," he says. "It's non-biodegradable, which means the body won't move it. This is important because once it is injected and becomes embedded into the synovium membrane, it should last there forever."

Professor Bliddal says that he would one day like to see Arthrosamid® tested in a clinical study against a placebo to really see how effective it is.

"What really matters from our research so far is that it does offer an alternative to knee surgery," he says. "Knowing how long this surgery can be delayed is important, as although Arthrosamid® is expensive, some people will pay for it if they know it will offer them a surgery-free alternative for several years."

Arthrosamid® has an even wider reach than some doctors realised when it was first launched.

"At first I thought it would be a product for people in their 40s and 50s with osteoarthritis as a way of getting them through the next few years, so delaying them needing a knee replacement," says consultant Andrew Pearse.

"But I've since realised that it would also work for older patients who may not be able to have surgery (due to other health issues) or want to undergo knee surgery for whatever reason. I think there's a large group of patients who could benefit from it."

"It's giving people a choice and that's what it is all about," he adds. "As I see it, the key is that Arthrosamid® doesn't disadvantage people further down the line. So if you have this injection and it doesn't work for you, you can still have a knee replacement. I feel at worst it will buy you some more time and ideally last in your knee for a very long time."



Arthrosamid® has an even wider reach than some doctors realised when it was first launched.

Professor Henning Bliddal

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