Understanding Knee Pain

Forward by **Ranjan Vhadra** MBBS, FRCS, FRCS (Trauma & Orthopaedics)

Kneease

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Ranjan Vhadra MBBS, FRCS, FRCS (Trauma & Orthopaedics) is a practising consultant orthopaedic surgeon who specialises in hip and knee surgery. After graduating in medicine from St. Bartholomew's Medical School in London Mr Vhadra trained at the RJAH Orthopaedic Hospital in Oswestry, a centre of excellence for orthopaedics. He is also a Fellow of the Royal College of Surgeons of England and an international member of the American Academy of Orthopaedic Surgeons.

"As an orthopaedic surgeon specialising in knee problems the majority of my patients suffer from osteoarthritis and although knee replacement surgery is generally successful, over 70% of patients who are referred to me are not suitable for surgery. These patients are managed with conservative treatment, mainly painkillers and anti-inflammatories, weight loss and exercise.

Each treatment has its own advantages and disadvantages. In general, I have found that many of my patients simply do not like the idea of having to take long term medication in any form for their knee pain due to the side effects.

Because of this I've looked at a large amount of devices on the market to see if I could find something which was inexpensive, effective and safe to use at home.

Studies have shown that a reduction of pain and increase in mobility is often the best way to have greater quality of life. Before and after a patient has a knee replacement a device like Kneease can help to manage the pain without resorting to medication

I now recommend Kneease to many of my patients to help them manage the pain of osteoarthritis.

I thoroughly recommended you try Kneease if you are suffering with knee pain."

Ranjan Vhadra, MBBS, FRCS, FRCS (Trauma & Orthopaedics)

Sufferers of osteoarthritis can purchase Kneease without the VAT, saving 20%
More information online at kneease.com

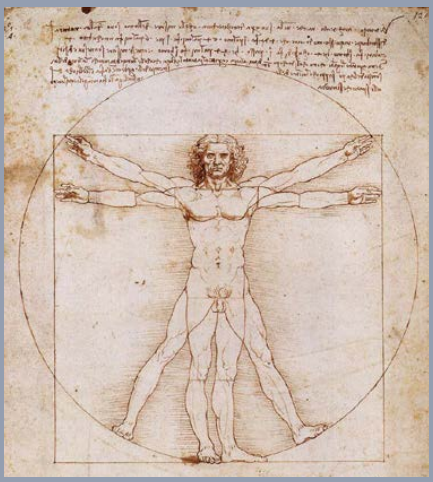
The early years of treating pain

The treatment of pain has a long history. The Greeks and Romans were the first to advance a theory of sensation, the idea that the brain and nervous system have a role in producing the perception of pain. It was not until well into the 1400's and 1500's that evidence began to accumulate in support of these theories.

Leonardo Da Vinci and his contemporaries came to believe that the brain was the central organ responsible for sensation. Da Vinci also developed the idea that the spinal cord transmits sensations to the brain. In 1664, the French philosopher René Descartes described what to this day is still called a "**pain pathway.**"

In recent years researchers have shown that blocking the signals along this "pain pathway" to the brain from its source can provide a level of analgesia (pain reduction) for a patient. The majority of pain relieving medicine now works in this way in that it treats the 'message' from the source of the pain to the brain rather than the source of the pain at the injury site. Anti-inflammatory medicine is one exception to this as it also reduces inflammation at the injury site itself.

There are a number of ways of interfering with the pathway from **chemical** (drugs) to **electrical** (TENS machines) and **vibration,** and modern medicine now gives us many options for treating a patient's pain.



Knee pain in the over 50s

Most patients referred to a surgeon by their General Practitioner will have knee pain caused by osteoarthritis which is the most common cause in the over 50's age range. They usually complain of pain in the knee which is made worse by activity, such as walking a long distance. After a busy day, many patients complain that their knee is still hurting when they go to bed and occasionally can keep them awake.

Knee replacements

When the osteoarthritis is very severe many patients are offered a **total knee replacement.** This is a major operation with the potential for complications. As the artificial joint replacement has a finite life, often as little as 10 years. Doctors often encourage patients to go as long as possible before undergoing a total knee replacement.

Replacing the knee joint is major surgery and involves removing the ends of the femur and tibia and replacing them with metal components. A plastic insert is put between the two metal pieces. The operation is good at relieving the pain of osteoarthritis but not as good as a normal knee. Satisfaction rates for knee replacements are only 60-70%.

Osteoarthritis

The knee joint is the largest joint in the body. It is described as a hinge joint between the femur (thigh bone) and the tibia (shin bone). The patella (kneecap) also makes a small joint over the front of the knee joint called the patellofemoral joint. There are two menisci (cartilage) in the knee, the medial (inside) and lateral (outside). These menisci acts like rubber washers in the knee. They are made of collagen and have a texture like that of rubber and are quite flexible. The function of the minisci is to provide stability to the joint especially when bending and twisting the knee. Occasionally with an injury these menisci can become torn causing locking (jamming) in the knee.

The ends of the bones (femur and tibia) that make the knee joint are coated with a special material called the articular cartilage. It is only a few millimetres thick and made of long protein chains and mostly water. When you stand on your knee, some of the water is squeezed out of the articular cartilage on both sides and this allows the surfaces of the knee to glide over each other with a film of water between. Called hydro dynamic lubrication, this is why when a knee is working well, you do not feel any sensation in the joint and there is no pain or friction.

The articular cartilage is very delicate and can become damaged. As it has no blood supply to itself the body cannot heal it. This early damage is called chondropathy but essentially it is early osteoarthritis. As the damage progresses, the gliding ability of the knee reduces. Eventually the underlying bone will rub on the bone which is not as good as the articular cartilage. This bone rubbing causes inflammation of the knee and this is the pain that patients with osteoarthritis feel.

This rubbing together also produces extra fluid in the knee which causes the effusion (swelling) that patients can see and feel in their knee. With time, this fluid is pushed out the back of the knee causing a ganglion cyst. This cyst is called a Baker's cyst and can suddenly rupture causing increased pain to the knee.

Unfortunately there is no known cure for osteoarthritis. The wear and tear of the cartilage becomes worse over time until there is no cartilage left. The bone simply rubs on the bone causing great pain and discomfort.

There are two ligaments (strands of tissue) in the middle of the knee. They cross over each other and are therefore called the cruciate (from the word crucifix) ligaments. The one in front is the anterior cruciate ligament and the one behind is the posterior cruciate ligament. With an injury to the knee these ligaments can be torn and make the knee feel unstable. Anterior cruciate ligament tears are more common than the posterior ones.

When is keyhole surgery appropriate?

Very little can be done for the osteoarthritis itself by keyhole surgery. Some patients will have locking symptoms (the knee can 'jam' up and become stuck). This is caused by a tear in the cartilage of the knee joint. The wear and tear on the surface of the knee due to osteoarthritis can cause this tear in the meniscus (cartilage). For these patients with a torn or degenerate meniscus, an arthroscopic (keyhole) operation to the knee can relieve the symptoms of locking.

For patients who have osteoarthritis and no locking, arthroscopic surgery is not recommended by **NICE** (the National Institute for Health and Care Excellence). **NICE** is a professional body that issues guidelines on best practice in clinical care and considers arthroscopy suitable for torn or floating cartilage in the knee or for trimming damaged cartilage but not suitable for the degenerative condition of osteoarthritis.

Conservative management

Those patients who have knee pain but where surgery is not an option are treated with what doctors call conservative management. This entails prescribing anti-inflammatory drugs and painkillers to help with the pain, advising weight loss to help reduce the stresses through the knee and gentle exercises to keep the knee supple.

Very many patients find this conservative management unsatisfactory. They are usually disappointed at the prospect of continuing with painkillers and anti-inflammatory drugs. The anti-inflammatory drugs have side effects such as stomach upsets and when used over the long term can cause ulcers and bleeding. Every year many patients suffer with gastric ulcers due to over use of these treatments.

Patients also find losing weight difficult especially with a painful knee. Exercising is problematic as it can aggravate the knee symptoms so patients are often trapped in a vicious circle. Unable to exercise their weight increases. This in turn aggravates the symptoms of the condition. More localised treatments include cortico-steroid injections into the knee joint and this is a fairly common treatment but the effects are short lived and not effective for many.

Development of vibration therapy as a treatment for pain

What is needed for successful conservative treatment is a form of pain relief which is not drug based, is easy and convenient to use and effective in managing patient's symptoms of Osteoarthritis. For many years pain relief has been given by blocking the pain pathway by introducing vibration at the point of the pain.

The mechanism by which this effect was produced would not be discovered until the early 1960's when two scientists Merzack and Wall discovered the process and named it the 'gate theory of pain'. They found that stimulating the vibration sensors in the body causes the pain signal to be blocked on its way to the brain, producing a pain relieving effect. This is due to the spinal column being unable to carry both the pain signal and the vibration signal together. The introduction of the vibratory signal 'closed the gate' to the pain signal.

Later research in the 1980's by a Professor Lundeberg discovered that the level of analgesia (pain relief) was dependent on the frequency of the vibration applied to the point of the pain. Various frequencies were tested on groups of patients and the technology developed over time until it became an established option to allow some hospital patients to be treated in this way for certain conditions.

Because of the physical size of the machines used and their relatively high cost it was historically considered more cost effective to supply medicinal pain treatments to patients instead of using these alternative pain relief

Development of vibration therapy as a treatment for pain continued...

methods and vibration therapy has always been a relatively small part of the armoury of the doctor or pain nurse.

In recent years and with the increasing focus on the benefits of non pharmacological (drug free) treatments, the alternative treatments of vibration therapy, TENS (transcutaneous electrical nerve stimulation) and ECS (extracorporeal shockwave therapy) are now becoming more commonly used. They are safer for long term pain relief and often equally as successful as medicinal treatments.

Another benefit of non pharmacological treatments is their use as a complementary therapy. Used in conjunction with a standard medicinal treatment they allow the patient to reduce the amount of drugs needed to obtain satisfactory pain relief. This means a safer side effect profile for the patient.

In 1862 during the American civil war a technique was discovered that gave pain relief to the injured without the need for drugs. With only small quantities of anaesthetics available for battlefield use it was discovered that injured soldiers with painful amputation stumps could obtain pain relief by having the painful stump 'drummed' with drumsticks at a particular frequency. This produced pain relief lasting for many hours. By 1865 nearing the end of the conflict, drummer boys, when not leading the troops into battle, were often employed to provide pain relief in field hospitals using this technique.

How Kneease was developed

Portable devices called **Tenease** were launched a few years ago for tennis elbow, a painful tendon condition of the arm which results in lower grip strength and pain in the elbow joint. As the first successful treatment for tennis elbow, this method of treating pain became the standard for treating the condition and is now used widely across the world.

The success of this type of device has led to the technology now being used for knee pain and the development of the Kneease system. The device is a battery operated unit which delivers a precise frequency of vibration using a nozzle direct to the point of pain.

The device is strapped to the knee with a velcro strap and turned on with a simple on/off button. Each session takes around 10 minutes. The patient can wear the device under clothes and remain mobile.

Kneease is now becoming established as a useful alternative to medicinal treatments and is widely available for home use.

- Recommended by many doctors
- Helps to manage knee pain
- Designed by UK orthopaedic surgeons
- Safe to use in the home or at work
- Light enough to wear under clothes or at night
- Powered by 1 x AAA battery for long life
- Quick and easy 10 minute treatments
- Available in both standard and pulsed options

The applied vibration is at 150Hz, the frequency identified as most effective in the Lundeberg research in the 1980's

Try Kneease for yourself

Kneease is available in **major pharmacies** for only **£49.99**.

Order online at **https://kneease.com**

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