



# COPING WITH THE WORN KNEE

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Options for  
the Young  
Worn Knee

# Introduction and the 'ladder' of treatment

This booklet aims to outline the options for treating knee pain caused by wear and tear or injury of the normally smooth joint surfaces. Often there is no single best option and a balanced decision must be made as to what is likely to be best or most appropriate and the options are structured as a ladder of potential treatments.

Excessive sport or an energetic youth is not necessarily the cause of a worn knee. Whilst it is true that football is associated with a higher risk of getting knee damage, marathon runners have no higher risk than anyone else, meaning it is more than just sport that leads to wear. To get joint surface problems, there also needs to be some form of weakness of the joint surface leading to early wear (this is where inherited problems fit in), some form of injury to the joint surface, or an alignment problem in the leg. In other words, joint surface problems can be related to the analogy of having a bad batch of rubber in tyres, taking a divot out of a nice neat lawn or having tyres wear down unevenly because the wheels are out of balance.

The options for treating the worn knee are structured as a ladder and this document details those options and the decision making. The term *arthritis* is avoided as for most people this conjures up the wrong image and spells too much doom and gloom. Instead the term wear and tear is used as this more accurately describes the situation.



## Ladder of Treatment for Knee Osteoarthritis

### Operations

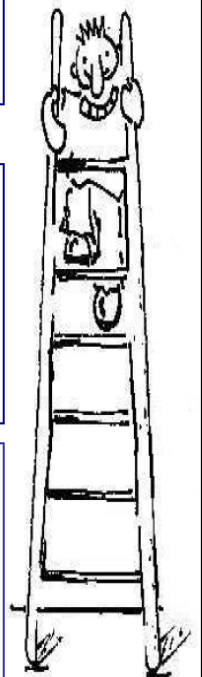
- Knee replacement (Arthroplasty)
- Bone re-alignment (Osteotomy)
- Keyhole surgery to wash out & tidy (Arthroscopy)

### Medical treatment & physiotherapy

- Steroid injection into the knee
- Visco-supplement injection into the knee
- Anti-inflammatory tablets
- Walking aids & off-loading knee braces
- Physiotherapy

### Self management

- Healthy eating for healthy weight
- Make lifestyle changes to normal activities to help you cope.
- Regular exercise
- Painkillers
- Glucosamine supplements



# Non-Surgical Options

## UNLOADING BRACES

When the knee is worn more on one side of the joint than the other, then unloading braces can be used to try and reduce pressure on the affected side of the knee.



Unloading braces work by pushing on one side of the knee to prevent the leg bowing more as weight is taken on it. Braces are useful when the leg is 'bandy (bow) legged' or 'knock-kneed' and when pain is more on one side of the knee.

Because they work by pushing on the knee, braces can be uncomfortable and some people

cannot tolerate wearing them. The brace should only be worn during activities which would normally cause overloading type pain such as prolonged standing at work or undertaking sporting activities. The picture is one of many styles of brace available.



## PHYSIOTHERAPY

Physiotherapy aims to improve balance control around the knee and to reduce the sudden forces that go through the joint. The smooth weight-bearing surface in the knee doesn't mind repetitive low loads but it does mind high impact forces. Muscles work to move the knee but even more importantly their function is to control the shock forces that go through the joint – like creeping down wooden stairs without making a noise or carefully putting a full drink down without spilling it.



## WEIGHT LOSS

If it is imagined carrying a back pack all day filled with 2 – 3 bricks and not taking it off, then it is easy to imagine feeling the strain on the knees. Losing weight is not the easiest thing to do, but knowing that the risk of osteoarthritis is tripled in the overweight person, then it is easy to see how important weight control is, in managing the worn painful knee.



## Visco-Supplementation INJECTIONS (SYNVISC)

When the joint is worn the normal lubricant fluid becomes thinner and does not provide the same shock absorbing and lubrication function. The injection boosts the natural lubrication and the benefit can last several months. This seems to work best in patients with mild to moderate arthritis, where probably 60% of patients will notice an improvement. A mild allergic reaction may occur in 2-3% of patients, causing brief increase in pain. This does not seem to affect the result. There are other forms of this injection but the main scientific data is related to Synvisc and this is the preferred product.



## PAINKILLERS

Taking regular painkillers is a simple way of coping with pain from the worn knee. Some people fear the side effects of taking regular medication, but in reality there is only a very low risk from the medication. Regular anti-inflammatory medication such as Ibuprofen (Nurofen, Brufen) or Diclofenac (Voltarol) can upset the stomach and cause ulceration but this is a very low risk. These are usually prescribed by the GP who understands the relevant risks for each individual.

Medications such as regular Paracetamol carry minimal risk and two tablets 2 – 4 times a day can build to give very effective control of symptoms. On top of this there are stronger analgesics such as Tramadol, which can be used for the severe episodes of pain or perhaps taken at night to help with sleeping.

# Surgical Options

There are several surgical options that can be offered to try to improve a joint that is beginning to wear, ranging from a simple keyhole surgery tidy up procedure, through straightening the bowed leg that is overloading one side of the knee, to replacing the lining of the joint using metal and plastic.

## ARTHROSCOPY

'Key hole' surgery can improve joints where there are symptoms such as clicking, catching or locking in the knee. During the operation, a small camera is used to look inside the joint and then small instruments are used to remove torn or damaged parts from the knee. During the procedure it is possible to release tight structures or bands of inflamed tissue that could be causing symptoms, or remove build-up of bone that may be blocking movement, or smoothing rough parts of the joint surface. The analogy here is the carpet in a house that is looking a bit thin where an edge has lifted up causing catching. Arthroscopy smooths that rough edge, thereby reducing the symptoms – even though the carpet is still worn and looking a bit thin.

Sometimes it is stiffness in the knee joint that causes symptoms of discomfort associated with sitting for prolonged periods or walking. Improving the stiffness can often reduce the level of discomfort. Arthroscopy is generally not of value when the pain is primarily due to overloading and if there are no clicking, catching, or grating symptoms.

## OSTEOTOMY OR REALIGNMENT SURGERY

Osteotomy is the surgical procedure for straightening legs, correcting alignment. This is like correcting wheel alignment when the tyres are wearing out unevenly. For the knee this means correcting bowlegged or knock-kneed appearance so the weight is more evenly distributed across the main two compartments of the knee. Ideally the weight bearing axis of the leg, which is a line from the centre of hip to the centre of ankle should pass directly through the middle of the knee distributing the load across both halves. When bowlegged more weight is taken on the inner (medial) compartment of the knee leading to overload pain, and this side is more likely to wear out. Osteotomy for the bowleg is achieved by cutting through the upper part of the shin bone just below the knee, correcting the position under x-ray control and then holding the new position with a plate and screws. Crutches are needed for the first six weeks or so while the bone heals, then gradual return to activity takes place as the bone strengthens. The total downtime before getting back to any impact activity can be up to six months.

Realigning the knock-kneed leg involves an operation on the thigh bone side of the knee joint, again holding it with a plate and screws before allowing full weight on the leg at six weeks.

Overall osteotomy is recommended for patients under the age of 60 who are keen on undertaking energetic activities. Patients must be prepared to endure the rather long recovery period and should understand the purpose of investing in the effort in order to buy time before possibly undergoing knee replacement. The operation is not ideal in patients who have significant restriction in their knee movement or who are substantially overweight, as in these situations the operation unfortunately simply does not improve function or buy any time.

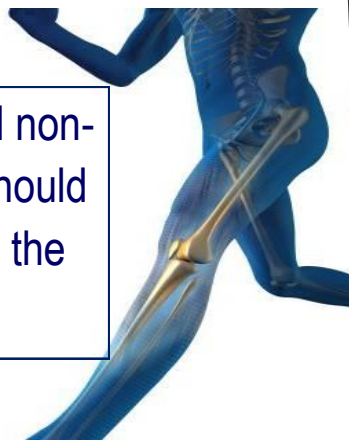


## ARTICULAR CARTILAGE REPAIR PROCEDURES

In general, when the smooth articulating bearing surface of the thigh bone and shin bone are damaged, then it does not regenerate or repair itself. Once the smooth surface (ARTICULAR CARTILAGE) is lost, it seems the body detects the increased pressure and signals this as pain.

There are however some techniques for repairing the surface by trying to regenerate the normal slippery joint surface but these are usually only effective in small areas of damage and not when the whole knee is worn. Also the techniques rely on the body's own ability to heal, and that unfortunately reduces with age. This means that when the joint is worn

Surgical techniques and non-surgical management should be combined to achieve the best possible outcome.



### LIMITATIONS OF CARTILAGE REPAIR SURGERY

The aim of cartilage repair surgery is to try and re-grow the normal articulating surface. Unfortunately the body is not good at healing this surface and it is very difficult to get back to a high level of impact type sporting activity such as full contact football or high impact running sports. This means that cartilage repair surgery is less reliable for the individual who wants to get back to these activities, as the quality of repair may simply not be good enough. The aim of surgery is to get individuals back to work, sedentary activities and possibly light sport. The state of the meniscus (footballers cartilage) is also important and these factors are combined together to lead to a decision.

There is a significant downtime after this surgery as the new tissue has to regrow and commitment is needed to the rehabilitation program; in general sport is not advised for 6-9 months after repair surgery and sometimes 12 months depending on the technique. Again these factors need to be discussed with the surgeon when making the decision.

on both articulating surfaces then these repair techniques are not really going to help. Effectively we are talking about trying to re-grow the weight-bearing surface known as articular cartilage, not the footballers cartilage or meniscus as it is properly termed. There are two main ways to do this. One is stimulating the knee to produce a repair surface and the other is to try and grow a new surface in the laboratory from the knee's own cells and then to reattach it. The techniques are described below.

**MICROFRACTURE** This is where small holes are made in the worn surface, allowing healthy cells (stem cells) from the underlying bone marrow to regenerate a smooth bearing surface. This is like raking a worn lawn down to a healthy base and hoping new grass grows. Such surgery is usually indicated for the smaller areas of damage but it can be used in larger areas.

### The MACI Graft – Matrix Induced Chondrocyte Implantation

This technique grows tissue from the knee's own cells – known as chondrocytes – and involves two operations. The first is to take a sample of healthy articular cartilage at arthroscopy. This is then grown in the laboratory into a new tissue which is inserted at a second open operation. There are several methods for this and surgery is usually performed as part of ongoing studies. Recovery time is long while the new tissue matures over 1 – 2 years.

**TRUFIT PLUGS** These are plugs made of a synthetic material which acts as a scaffold, allowing the body's own bone marrow cells to generate a new articular surface; while holding the cells in place. The plugs come in various diameters (5, 7, 9 and 11mm) and can be inserted during keyhole arthroscopic surgery. This technique is indicated for small lesions only.

## RECONSTRUCTION OF THE MENISCUS

The meniscus or 'Footballers cartilage' is the protective shim in the knee between bearing articular cartilage surfaces of the thigh bone and shin bone. When this is removed, either partially or totally, then the pressure on the articular cartilage increases and this can lead to early wear.

Rebuilding the meniscus is possible using a synthetic implant (Actifit or Menaflex) as a scaffold for partial defects, or a meniscus transplant for when the whole meniscus needs replacing. The techniques are arthroscopic and the rehabilitation period lasts several months as the new tissue heals.

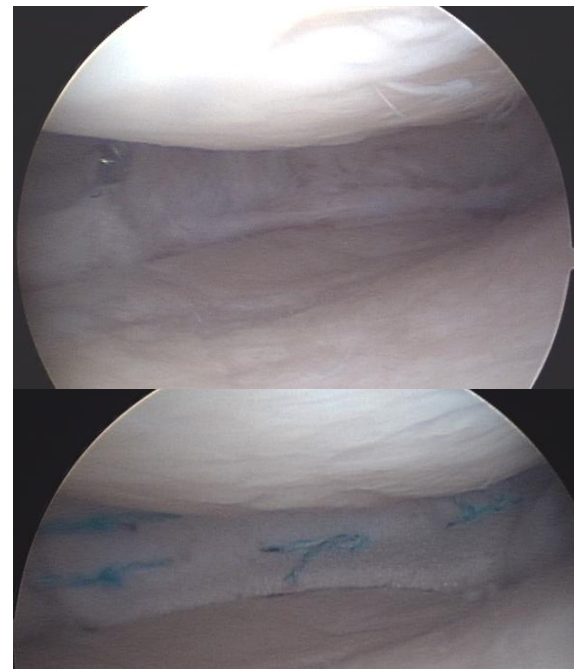
The procedure is ideal where there is little in the way of wear on the joint surfaces but is less effective when the joint surfaces are already worn.



The ACTIFIT implant is indicated when part of the meniscus has been removed and when there is pain associated with the lack of cushioning tissue. It acts as a scaffold for the body to grow new resilient meniscus like tissue and eventually the scaffold implant is replaced by the body.



Meniscus transplant prepared, marked and ready for implantation



Meniscus reconstruction using the synthetic ACTIFIT implant. Images before and after implantation.

## BIOLOGICAL RESURFACING OF THE KNEE

It is possible to combine the procedures that have been described, as the success of each is in part influenced by other factors affecting the knee. For example repairing the surfaces will not last if the knee remains out of alignment. Articular cartilage repair is therefore often combined with the osteotomy procedure. The same applies to the rebuilding of the meniscus as the cushioning needs to be protected by reducing the load across the knee. If the knee is unstable due to a ligament injury then the ligament needs to be reconstructed in addition to rebuilding the joint articular cartilage surface.

The combination of procedures has been termed 'Biological Resurfacing'. Such surgery is by its very nature complex and not indicated for everyone. The downtime and recovery period can be very long and this surgery is only undertaken after extensive discussions with the surgeon.

# Knee Resurfacing (Knee Replacement)

At the top of the ladder for treatment is knee replacement. More strictly we should describe this as knee resurfacing with metal and plastic, as the operation involves replacing the worn surfaces of the knee with a shaped metal surface on the thigh bone and a plastic surface on the shin bone. Knee replacement options range from resurfacing part of the joint through to resurfacing the whole knee joint (total knee replacement).

**Indications for Knee Replacement** Because knee replacement carries risks and because the end result is a “metal and plastic” articulation rather than a “normal” knee, the procedure is reserved for a significant level of symptoms when the risks are acceptable. Examples of when a knee replacement is indicated include: not being able to walk a mile, pain at night and feeling that life is on hold because of symptoms.

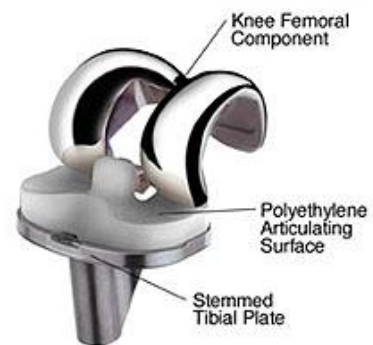
Age is also important. Patients who are over 60 tend to use their knee less and it is expected that the new knee will then last 20 – 25 years, whereas under 60 the results of knee replacements are less good with only 60 – 70% still working well after ten years. Knee replacements tend to loosen if over used and therefore sport or impact type activities such as may occur with heavy manual work should be avoided after surgery. The plastic surface may wear, or the bond between the metal and the bone may loosen requiring the procedure to be redone. Second or third “revision” procedures are all technically possible but the functional results cannot be expected to be as good as first time surgery due to more scarring around the knee causing joint stiffness and tightness.

## Recovery and expectations after Knee Replacement

Following knee replacement, hospital stay is generally 4 – 5 days and crutches are used for up to 4-6 weeks. It takes 2 – 3 months to fully get over knee replacement, before swelling has fully settled and ease of movement has returned. Improvement is still better at a year after the operation.

Functionally it is expected patients to be able to play golf, walk 2 or 3 miles or more, walk up and down hills and undertake light sport such as tennis - but certainly not impact sports such as running or football. Some people have described knee replacement as resulting in the knee function of a 70 year old. This probably fairly accurately summarises the expectations and emphasises how it is important to be in sufficient trouble before considering knee replacement.

From our own analysis we know that after first time knee replacement, 8 or 9 out of 10 patients are very happy declaring a whole new lease of life. 1 or 2 in 10 will be unhappy due to either persistent significant discomfort, dissatisfaction with their level of activity or occurrence of a major complication such as infection (1%) or major cardiac or stroke type complications (1 to 2%). Having said all that there is no doubt knee replacement is an extremely successful operation when undertaken for the right indications.



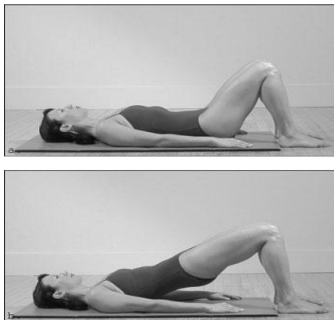
# LOOKING AFTER YOUR KNEES

**What about Exercises?** Most people think that by exercising the front and back muscles (Quadriceps and Hamstrings) they are doing the best for their knees. Look at the picture on the right- you can imagine that repeated weight bearing on the knee in this position, walking, running, going down stairs, could make your knee pain worse. Check your knee control now- standing up tall on one leg (you can hold something to balance). Do a small squat so your knee goes past your toes. You should still be able to see your big toe- this is good control as demonstrated in the first picture. If your knee goes across your big toe and looks like the second picture you need to work on the muscles in your bottom.



In addition to your normal exercises try these to improve your knee control

**Bridging – works your bottom, tummy, legs and back.**



You can make the exercise harder by crossing your arms across your chest and raising one leg out straight when you are in the bridge position. Then try performing the bridge exercise just using one leg to push up and lower down. You can also use a gym ball or unstable surface under both legs as shown below.

Again this can be made harder by not using your arms for support then you can try pulling the ball towards you in one movement then slowly returning to the start position. This exercise can also be performed just using one leg- this is very challenging.



**Clam Shell Exercise- works the outside bottom muscles.**



Make sure you keep your pelvis rolled slightly forwards. You should open your top leg out as far as you can without your pelvis moving, use your tummy muscles to help.

You can make this exercise harder by placing a cushion or folded towel between your feet. Very lightly rest your top foot on top but don't take any weight through it. This is to help you keep control of your foot while you do the exercise. Repeat the same movement as shown above.

**Always try to maintain a straight line through your pelvis when in the bridge position, squeeze your bottom especially if you are getting cramp in your hamstrings. Do not arch your back and always lower with control and finally, KEEP BREATHING!**

**A PHYSIOTHERAPIST CAN ADVISE YOU FURTHER REGARDING EXERCISES TO LOOK AFTER YOUR KNEES**



About this booklet

This booklet aims to answer questions about what can be done for the worn knee.

I believe that if you have knee problems, then it helps if you are aware of the options of treatment and how all the options are interlinked. It is the overall package of treatment that results in improvement in pain and function.

It is important to know that some people can have horribly worn looking knees and yet have minimal or no pain at all. Others who have a small worn area in just the wrong place can have substantial symptoms and limitations in what they can do.

Also, it is possible to have had worn surfaces for a long time before experiencing symptoms, then something extra happens and the knee now pops over the radar and on to the screen registering as pain and discomfort.

Further information on the surgical procedures described in this leaflet is available on: [www.timspalding.com](http://www.timspalding.com)

Feedback is Welcome!

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