An introduction to

KNEE PAIN

prevention and treatment

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FROM THE EDITOR

It would be unfair to suggest that there is consensus among scientists on the design flaws of the human knee, but you can't help thinking that if you could re-engineer this particular joint, you wouldn't start from here. Backs, necks and shoulders all cause their share of problems, but knees just seem to be permanently problematic. It is a rarity to find a seriously active or sporty person whose knees have never given them grief. We at Peak Performance's sister publication Sports Injury Bullet in are all too well aware of this, and our multi-disciplinary team of writers – physios, osteopaths, physicians, conditioning coaches – have between them probably written more about knees than any other single subject. We do have something of an advantage: SIB's editorial consultant Fares Haddad is also one of the world's leading knee specialists. Thanks to the dedication and professional curiosity of his team, we get some privileged insights into how surgical techniques are developing in astonishing ways. Indeed, the fact that surgical knee repair has been transformed in the past 10 years is a cause for great cheer among all sports people. While the horror of a single career-ending incident does still happen among elite athletes,f or the vast majority of us, these days, knee injuries may bring pain, disruption and frustration, but not disaster. This latest addition to the Peak Performance library will give you a thorough education in the mysteries of the knee, glimpses of what will soon be possible in repair techniques, and of course, most importantly of all, lots of self-help tools to assist you in tackling your own niggling knee pain andi njuries. It was never our intention to cover every known sporting knee injury – but you will find all of the major ones here. And if your knees tend to grumble but you're not sure why, Cate Streeten's specially written guide on on page 85 is a simply invaluable starting point for sorting them out.

Jane Taylor
Editor, Sports Injury Bulletin

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KNEE PAIN
PREVENTION & TREATMENT

A SPECIAL REPORT FROM SPORTS INJURY BULLETIN – ARTICLE ONE

CLICKING, LOCKING AND GIVING WAY.

The menisci are two crescent shaped pads of cartilage present in both knees. The pad on the inner side of the knee is the medial menisci.

- The menisci improve the knee function in four ways:
- They spread the load across the joint
- They improve joint congruency or stability
- They help to circulate synovial (joint) fluid around the knee

Menisci are made from a specialised type of fibro cartilage, the high water content of which allows them to resist the forces they must withstand.

Menisci injuries are fairly common, with the medial menisci being more likely to suffer damage.

Typical signs of a menisci tear will include swelling and difficulty moving through the full range.

Sometimes a mobile segment of torn menisci can lodge in the joint and you may feel frequent locking of you knee or be unable to full extend your leg. This is sometimes referred to as a bucket handle tear.

Other symptoms may include rising pain when you squat right down.

You should always get your menisci injury looked at by a specialist or orthopaedic surgeon. It is best not to leave it unattended if it is causing you problems because this may result in further damage to the cushioning ends of the main leg bones at the knee.

If your injury did need an operation it would be carried out in the form of key hole surgery known as arthroscopy.

Results for meniscal repair are very good, especially when carried out along side reconstruction of the ACL.

It is very important to undertake a post operative rehabilitation programme, supervised by a physiotherapist.

PATELLAR TENDINOPATHY

Patellar tendinitis is the most common form of knee disorder found among competitive athletes. Known as 'jumpers knee', it is most likely to affect you if you play high impact sports involving bursts of intense or repeated stress, notably basketball and volleyball.

Classically patellar tendinitis has been explained as chronic inflammation of the tendon connecting the patella to the tibia. Recent research has however changed its terminology: and it is more correct to refer to the condition as tendinosis. This reflects the understanding that the tendon pain does not come from inflammation, but rather degeneration and fibrosing of the collagen that makes up the tendon, due to the fact that microscopic damage has failed to heal over time.

Resent research has shifted focus of blame away from environmental factors and towards more individual causations. In an American study of healthy competiive atheltes used a series of body measurements to try and detect ta link between intrinsic risk factors and the development of tendinosis.

The only identifiable common risk factors were poor flexibility of the hamstrings and quadriceps muscles groups. This research shows that you may be able to reduce risk with a good stretching program

Another recent US study supports these findings and shows that a higher incident of tendinosis among subjects whose kneecaps naturally had a higher tilt when they did knee bends.

Likewise the greater your Q angle (this is an estimate of the alignment of the knee in relation to the angle of the thigh and lower leg) the more strain is likely on the knee.

TREATMENT

Physiotherapy can stabilise the condition and this is always a preferred option compared to surgery. Research has shown that a regime made up of Single leg decline performed 3x 15reps twice a day can make great progress.

KNEE PAIN PREVENTION & TREATMENT

A SPECIAL REPORT FROM SPORTS INJURY BULLETIN – ARTICLE TWO

A PROMISING NEW ACL SURGERY TECHNIQUE

The ACL (anterior cruciate ligament) is responsible for maintaining the correct anatomical relationship between the femur and tibia through out the range of knee movement.

Its main role is to stop the tibia from sliding forwards against the femur, but it is a secondary restraint against side to side forces and tibial rotation. Anatomical studies have shown that it is able to do both things because it is made of two separate fibre bundles, the antero-medial (AM) and postero-lateral (PL) bundles, each of which has different attachment points on the tibia and femur.

Re constructive surgery at present focuses on replacing the AM bundles and thereby stabilising the knee against forward slippage of the tibia.

If you have damaged several knee ligaments in the same injury you may be more susceptible to rotational instability and may therefore also benefit from double-bundle reconstruction.

Double bundle reconstruction results in two separate replacements grafts existing within the knee which theoretically has several advantages, in the form of added strength and back up if either graft fails.

There is however little evidence to support the use of the double bundle techniqure in preference to traditional reconstruction.

ARTICULAR CARTILAGE – THE ENDS OF BONES

The ends of the body's bones are covered with articular cartilage. This highly specialised tissue is principally made up of hyaline cartilage secreted by chondrocytes. Because of the poor blood supply at the end of the bones, these cells work in a low oxygen environment and are vulnerable to injury.

CHONDRAL DAMAGE

Articular cartilage can be damaged by excessive shearing (sliding) forces, and is common feature of sports injuries to the knee.

High impact combined with twisting can generate a shearing force at the chrondal (articular cartilage) surface, as one surface impacts against the other.

Higher energy trauma can lead to fissuring or partial thickness loss of cartilage, and full thickness injuries may result in osteochondral fractures: breaks that run through the whole thickness of cartilage to damage the underlying bone.

Knee injuries that cause tears to a menisci or anterior cruciate ligament may well also have damaged articular cartilage.

Chrondal damage is usually graded 1 (superficial) to 5 (most serious), arthroscopy (key hole surgery) allows the surgeon to examine the surface of the lesion and carry out therapeutic work.

For lesions that involve the full thickness of the articular cartilage and the bone beneath it there are techniques to repair the damage. The defected loose edges are trimmed back and new repair and growth factors can be stimulated by the technique of microfactors.

Stem cell research also offers potential treatment options. One of the properties of stem cells that make them attractive is their ability to multiply almost without limit. This expansion allows potentially large areas of defects to be treated. However this treatment is still in the early stages of development.

KNEE PAIN
PREVENTION & TREATMENT
A SPECIAL REPORT FROM SPORTS INJURY BULLETIN – ARTICLE THREE

THE KNEE & THE KINETIC CHAIN

The kinetic chain is the term we use to describe the inter dependent operation of the body's:
Soft Tissue System (muscles, tendons, ligament, fascia)

- Nervous System
- Articular System (joints)

THE KNEE IN CONTEXT

A case history that reveals recurrent niggling injuries over the years, especially on the same side of the body, is a big hint that core stability may be at the heart of a problem, because of poor functioning of the kinetic chain and lumbo-pelvic hip complex (core area)

How well the muscles in the kinetic chain are working together to produce force, help decelerate and maintain stability is known as the 'neuromuscular efficiency' of the kinetic chain.

Neuromuscular efficiency and good core strength protect us physically by allowing optimal shock absorption and the body to decelerate against gravity without injury.

A number of signs to note on a patient seen together may give more clues, e.g. A hollow back, a slightly swayed-back posture, protruding abdomen and when relaxed feet pointed outwards slightly.

When the patient performs an overhead squat test watch to check if his feet turn out, his weak knee buckles inwards and lower back arches inwards during the squat.

This demonstrates problems in the weak leg in the form of: weak calves, weak buttocks and a tight front hip. Strains increase on the knee due to a inhibited gluteal muscles (buttocks).

The weak gluteal muscles may also cause overloading on the calf muscles, leading to a similar strain which can cause achilles tendinitis and plantar fasciitis.

REHAB FOR PRESENTING SYMPTOMS

It is important to improve the patients neuromuscular efficiency and enable him to engage his gluteal muscles and keep his lower back and front hip muscles well stretched. The following exercises could be prescribed; (please refer to the full Sports Injury Bulletin Knee Report for details)

- Prone Hip Extension
- Swiss Ball Bridge
- Lunge
- Step Ups

TO SUMMARISE

Due to the way that the kinetic chain responds to critical weaknesses both mechanically and neurologically, injuries arise that may initially seem to have little or no connection to core strength but are in fact a direct consequence of the lack of it.

It is very important to remember that your postural problems may have very little to do with your sport – as they are just as likely to emanate from poor posture when you are at work or simply relaxing at home.

SPORTS SCIENTISTS KNEE DISCOVERIES

WOMEN AND THEIR ACL

It is widely accepted that women and girls are more vulnerable to ACL injuries than men. Here are a few tips to prevent these injuries from happening.

Ensure the coach or trainer to assesses and corrects the athletes landing technique when jumping. And in particular make sure that as the athlete is:

- a. positioning her hips, knees and ankles correctly when landing
- b. Is aware of the sound of her impact

A well researched 9 week program (full details in the Sports Injury Bulletin full Knee report) can help female athletes prevent the problems of ACL injury.

Exercises includes, wall jumps, jump tucks, standing broad jumps, bound in place, 180 turns, double leg hops, single leg lateral hop, single leg forward hop, combo, single leg lateral hops

Part of the reason as to why women are more prone than men to ACL injury and patello-femoral pain is thought to lie in gender difference in leg biomechanics.

SELF HELP

The key to self management of knee pain lies in listening to your body. If it feels wrong, don't do it. Don't be tempted into the no pain no gain ethos.

Patello-femoral joint meniscal pain in the knee will respond well to self help approach.

SELF HELP EXERCISES

Aim to do three formal blocks or sessions of exercise daily, but do what suits you best. A lot of these exercises can be incorporated into daily activities. (Again please refer to the full Sports Injury Bulletin Special Report for complete details.

STATIC QUADS CONTRACTION WITH VMO FOCUS

- Muscles targeted – Quadriceps especially VMO (vastus medialis oblique)

MODIFIED THIGH STRETCH

- Muscles targeted – Quadriceps and hip flexors

HAMSTRING STRETCH

- Muscles targeted – Hamstrings and popliteus

CALF STRETCH

- Muscles targeted – Gastrocnemius

SQUATS

Progressions of the squat may be:

- increase depth
- try to make squat sport specific
- hold weights in your hand
- perform squat with arms out straight and up on your toes
- Muscles targeted – Quadriceps and gluteals

LUNGES

- Muscles targeted – Quadriceps and gluteals
- Progressions of the lunge maybe:
    - Increase depth of lunge
    - hold weights by your side
    - start from a standing position and step into the lunge
    - make it sport specific e/g/ stepping into the lunge on an angle

STEP UPS AND STEP DOWNS

- Muscles targeted – Quadriceps especially VMO

BALLET BAR EXERCISE

- Muscles targeted – Gluteals, especially gluteal medius and Quadriceps especially VMO

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Knee pain is the most common of all sports injuries – and not only for those athletes whose activities involve running flat out and changing direction at speed. Indeed, virtually every sport has its share of knee injuries and related problems.

So if you've played sport for any sustained period of time, chances are you've already experienced at least one bout of knee pain – be it a temporary and mild nuisance you've shrugged off, or a debilitating injury that forced you to seek specialist help. And if not, chances are you're likely to suffer knee pain in the not-too-distant future.

But there's good news for athletes, coaches and sports injury professionals alike.

Thanks to some important recent work in this area, sports scientists now know more than ever about the diagnosis, treatment and prevention of knee injuries. And now you too can share in these insights, courtesy of our brand new special report – Knee Pain: Prevention & Treatment.

Knee Pain: Prevention & Treatment has been put together by Jane Taylor, Editor of Sports Injury Bulletin. It's a thorough, yet accessible distillation of the best practice thinking of twelve leading practitioners in this area – not mere theoreticians but highly-trained specialist professionals, each of whom deals with sports injury and rehabilitation on a daily or weekly basis.

The bottom line? This 101-page timely guide for serious athletes, coaches and sports injury professionals gives you the benefit of literally decades of combined knowledge and experience in the treatment of sports injury.

Indeed, each individual chapter is worth more than the cover price of the report. (After all, imagine what it would cost just for a 30-minute consultation with any of the consultants, surgeons and other professionals listed above…)

Knee Pain: Prevention & Treatment dissects the major current debates in sports injury circles, analyses the very latest scientific findings about the causes and treatment of knee pain – then spells out in plain English their significance for the serious athlete, coach and sports injury professional.

Every page of this brand new report draws on the latest evidence-based thinking in sports science research – new findings that probably won't percolate through to the general sporting press for many,

many months, if they make it at all…
It's a rare opportunity to assess the latest thinking on knee injuries for yourself, and decide how best to integrate it into your training and conditioning programme.

NB: the report even includes some handy 'self-help' tools for the serious athlete wanting to tackle their own niggling knee pain without necessarily having to go to all the expense of retaining a specialist physician or physiotherapist.

Minimise your chances of knee injury with this special report:

www.sportsinjurybulletin.com/knee