

Why Knee Pain is on the increase

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Article 1:

Introduction

Knee pain is becoming a new epidemic. A recent paper from New Zealand stated that the rate of knee replacement for 2004-2005 was set to double (<http://www.progressive.org.nz/modules.php?name=News&file=article&sid=935>) and the news regarding treatment of knee pain is not all good either. There are many potential reasons why knee pain is increasing; we will mention just 5 of them and give some commonsense tips for how to avoid becoming one of the growing statistics.

It was only last year that Dr Joseph Mercola reported that knee surgery (arthroscopy) was ineffective. A study presented at the American Academy of Surgeons Annual Conference in 2001 described how 180 patients who had been diagnosed as needing surgical intervention. They were split them into 2 groups to see what the effects were of surgery. The first group underwent the routine arthroscopy to trim torn cartilage, while the second group had "sham surgery" performed on them. "Sham surgery" means that the second group were cut by the surgeon, not actually operated on in terms of going into the knee joint itself, bandaged up and given the same rehabilitation as the first group.

The result? One year later, there was no difference in symptom profile between the 2 groups. In fact, the group that did not receive surgery reported better short-term functioning compared with those that actually were operated upon.

This is a major concern and suggests that conservative management – such as physical therapy, exercise and nutritional measures should be used – and what's more, are likely to be effective in most cases of knee pain. This also means avoiding the risks associated with surgery, hospital stays, and general anaesthesia.

Deconditioning is perhaps the biggest villain in the onset of knee pain. Deconditioning can result in a number of different scenarios commonly associated with knee pain:

1. abdominal wall dysfunction
2. altered pelvic position
3. quadriceps dominance
4. decreased proprioception
5. toxic lifestyle

As you may have noticed amongst the jargon, not all of the factors associated with knee pain are to do with mechanics – commonly nutrition and lifestyle factors play a major role in arthritis and degeneration. We will deal with each of the factors listed above in a series of short articles coming up this week. Today we will start with abdominal wall dysfunction.

Abdominal wall dysfunction

Whilst it may seem a long way geographically from the knee, full function of the abdominal wall is critical for good function of the knee. Many of the links between the two are simple, many are highly technical, but essentially it all comes down to the fact that the abdominal wall stabilises the low back and pelvis. The low back is where the nerves come from that feed the knees, and the pelvis is the base to which all the muscles that stabilise the knees attach.



Figure 1: Paul Chek's Lower Abdominal 2 exercise is one of a series of exercise progressions to condition the abdominal wall. If you are reasonably active, you should be able to start at this level – though if you are fairly deconditioned you should start with Lower Abdominal 1 (locate a CHEK practitioner at www.chekinstitute.com). In this picture, the client is using a pressure cuff to ensure he is keeping his spine neutral as he alternately lifts his legs up and down.

Hence if the muscles of the abdominal wall are not firing due to underlying medical problems in the abdominal cavity, such as irritable bowel, or premenstrual symptoms, or if the muscles are deconditioned due to too much sitting and too little exercise, there is potential for irritation in the low back, decreased stability at the knees (due to poor control from the muscles) and increased wear and tear.

A simple but effective exercise used to safely condition the abdominal wall back to full function is Paul Chek's "Lower Abdominal 2" exercise (see above)

Article 2

Pelvic Position

Yesterday we discussed how abdominal wall dysfunction could result in increased risk of knee pain; today we will take that a step further and explain a bit more about pelvic position and knee pain.

Being bipedal, the Human Being is like a finely tuned sky-scraper, as opposed to being akin to a cantilever bridge as are our 4-legged cousins. This means that we have a relatively narrow frame of reference within which our mechanics can operate efficiently.

Imagine, for a moment, the pelvis as a bowl of soup... if you tilt it forwards, soup spills out down the front of the legs, and conversely, a backward tilt results in soup spilling down the back of the legs.

If the pelvis tilts too far forward, for example, this means that our knees roll inwards and more pressure is put onto the inside of the knees creating a more "knock-kneed" posture. Individuals who have this posture (more commonly women) have a greater load going through the inside of the knee – stressing the cartilage and the "medial collateral ligament". This is colloquially known as a "Donald Duck" posture.

The antithesis of the "Donald Duck" posture is the "Pink Panther" posture – where the pelvis is tilted backwards; this is more common in men, *but* is also common in those who spend a lot of time sitting in chairs – hence it is rife in Western society. People with this posture have more stress going through the outside of their knees again stressing the cartilage, but this time the "lateral collateral ligament".



Figures 1 & 2: The Prone Jack-knife. This exercise is great for people who have knee pain due to a pink panther posture – where the pelvis is tilted backwards. Such a posture results in short tight hamstrings and long weak hip flexor muscles; which can put undue stress on the knees. The Prone Jack-knife is designed to counteract this muscle imbalance and restore biomechanical function. (Note: to learn an effective corrective exercise to counteract the Donald duck posture see tomorrow's article and use Paul Chek's Lower Abdominal 2 exercise described yesterday)

Whilst neither of these postures necessarily means you're in imminent danger of ligament or cartilage damage, what they do mean is that you're putting a repetitive load into the relevant tissues which, just like any other repetitive stress, will eventually result in strain. Once strain has occurred, the common long term result is degeneration.

Article 3

Quadriceps Dominance

In our series on the causes of knee pain we have discussed how abdominal wall function and pelvic position are critical factors in good knee function. A further aspect of good knee function is having the appropriate balance of strength between the large quadriceps muscles on the front of the thighs and the gluteal muscles of the buttock.

It is women, in particular, who tend to develop a dominance of the quadriceps muscles over the gluteal muscles. This is partly due to the female anatomy being slightly more prone to this imbalance – if you read yesterday's article then it is true to say that the female anatomy is more inclined toward a "Donald duck posture", while it is more of a male pattern to have a pelvic position like the Pink Panther!

Interestingly, it is when too much weight is put through the toes and not enough through the heels, that the quadriceps muscles tend to increase in activation and the gluteal muscles relatively become weak. This can mean that those who are ambitious and always on their toes ready for action may become more quadriceps dominant, while those who are more grounded may be less likely to develop this imbalance. Additionally of course, those who wear high-heels – which tends to be the female gender – have their weight thrown forward on their toes and quadriceps dominance can be the result.

It is not surprising that the typical anterior tilt of the pelvis which accompanies wearing of high heels and is viewed by potential suitors as a sexual signal - this same tilt of the pelvis occurs in females as a secondary response to sexual excitement.

The unfortunate consequence is that more women have this muscle imbalance and are more prone to injuries at the knee such as ligament damage. The exercise below, when performed properly, will help to correct quadriceps dominance by isolating and working the gluteal (buttock) muscle group.



Article 4

Proprioception

Thus far we have discussed mechanical factors that may be causative in the increase in knee pain in our society, and the likelihood that a general deconditioning syndrome may be to blame. In this article we will discuss how the proprioception – or feedback that the brain receives from the joints - may contribute to the increased incidence of knee problems.

Proprioception is critical to our ability to move efficiently, without too much stress or damage to our joints. In fact, it only takes 0.2 seconds for information to be sent from the knee to the brain and back to the muscles again. In the case of tripping on a raised paving slab, or missing a step, a well conditioned nervous system will respond quickly and effectively enough to firstly stop you falling and creating other damage, but also to minimise any stress on the underlying support tissues (such as tendons, ligaments and cartilage) in the joints.

The knee joint being the largest joint in the body and one of the most complex is particularly dependent on good proprioception. Just like any other factor in performance, proprioception can be trained, or de-trained.

To illustrate how widespread the problem of decreased proprioception is, take the example of an average day for "average Jo". Most people arise from bed, wash, *sit* down for breakfast and then get in the car, on the bus or train and *sit* all the way to work. At work, they *sit* for most of the morning, then go to lunch and *sit* down in the café or canteen. Returning to work, they *sit* for the rest of the afternoon, then *sit* down to get back home again and when they get home, they tend to *sit* down for dinner, then *sit* watching TV to relax for the rest of the evening. Even the more active of the population may head to the gym and *sit* on the weights machines there, *sit* down on the bike, or *sit* on the rowing machine before retiring for bed in the evening.

Of course, the point is that the vast majority of us spend the vast majority of our time sitting in more or less the same position for most of our waking hours. This results in very little firing of nerve impulses from the receptors in the knee, as well as a general deconditioning of muscle tone and ability to react to the unforeseen.

Seeing as when we walk we spend 85% of the time on 1 leg, it is critical that we have good proprioception and therefore good control of the stability of the knee. Without this control, the repetitive loading of your entire body weight though one knee at a time as you walk between work and the car will lead to adverse wear and tear and early degeneration.



Figure 1: The toe-touch drill is an exercise that is performed almost entirely on one leg and is therefore similar to walking. The key to success of this exercise is to maintain the centre of the knee cap above the foot on the weight bearing leg while stretching as far out as you can with the non weight bearing leg. This trains strength in the hip rotator muscles, in particular, (which control knee position) as well as heightening the proprioception from the knee joint.

Use of the Swiss ball to exercise (as demonstrated in the other articles in this series) also helps to train proprioceptive skills in the knee.

Article 5

Toxic Overload

In the first 4 articles we have discussed mechanical factors that contribute to the rising levels of knee pain in the UK, as well as how a general deconditioning of the muscles and nervous system can leave us vulnerable to knee injury.

In this final article we will discuss how toxic overload should be a major concern if we want our knees and joints in general to stay healthy throughout our lives.

Toxins have always been a part of our environment and we are relatively well equipped to deal with them – without too many serious side effects. However, as our environment becomes increasingly polluted with chemical residues, hormones, noise, light and electromagnetic instruments, our systems are struggling more and more to provide adequate protection to our health.

The master detoxifier in the body is the liver. This amazing organ uses a series of different techniques to detoxify various poisons we consume in the way of traffic pollution, cigarette smoke, medical drugs, colourings, sweeteners, pesticides, preservatives and other toxins we consume in our food. In fact, just to look one set of toxins we're exposed to; the food additives, it is now estimated that the average American consumes approximately his or her bodyweight (around 150lbs) of food additives per year (see the book "Eat, move and be healthy" by Paul Chek, for more information). It is also a truism that in Spain, where family burial sites are a tradition, this practice has had to be revised because human corpses are no longer decomposing – due to the level of preservatives in our tissues by the time we die. Even the bugs don't want to eat our toxic flesh!

So the bottom line is that the liver has a lot more work to do today than it would have even only 50 or 100 years ago. Seeing as it's estimated to take 100, 000 years for the Human genome to change 1 tenth of 1 percent, it is fair to say that it's unlikely that we have adapted to this level of toxins in our daily environment (nor that we're likely to for some time yet)!

One of the major means by which the liver detoxifies these poisons in our environment is to put them through the process of "sulphation". This requires sulphur – which we get in our diet. However, anyone with a good understanding of human health and physiology knows that the body is a dynamic system of working parts and nutrient reservoirs. For example, we store fluids in our joints, in the discs in our backs, in our digestive juices, while we store calcium in our bones and sulphur in our joint cartilage.



Figure 1: The alternating superman exercise is useful for knee pain as firstly it is a "horizontal exercise" therefore it doesn't load the knee joints. Secondly it helps to correct a Pink Panther posture; which is associated with disrupted mechanics around the knee (see Article 2 of this series).

In Western society, we tend to drink tea, coffee and alcohol as our social drinks – which is an interesting observation for a couple of reasons. Firstly, all three drinks (particularly non-organic varieties) are highly packed with toxins – as well as some occasional "good stuff" such as anti-oxidants. Secondly, all three drinks are diuretics – meaning they actually deplete us of water rather than hydrate us, as is desirable.

The implications of this for knee pain and arthritis should be fairly self-evident. If the liver becomes overloaded and / or the sulphur intake in the diet is low, the detoxification process of sulphation cannot occur. If this is the case, to avoid intoxication and death, the body will borrow sulphur from its natural reservoirs; the joint cartilage. This of course results in early degeneration. This is also part of the reason that people with arthritic symptoms often do well on food supplements such as glucosamine sulphate or chondroitin sulphate; this is because they are sulphur-based compounds.

The dehydrating effect of these commonly consumed drinks also results in us borrowing fluids from our fluid reservoirs - our joints - to allow vital processes, such as digestion, to continue. Of course, this also results in increased wear and tear within the joint as a result of decreased lubrication.

To conclude this series on knee pain then, if you want to avoid the discomfort and debilitation of knee pain in your middle to older age, as well as preventing many other degenerative conditions, it is critical for you to consider not just the mechanics of your body, but also its biochemistry.

Avoid general deconditioning by performing the exercises described in this series that are relevant to you. Minimise your exposure to toxins by drinking good, clean water (mineral is best), good, clean food (organic) and minimising exposure to other toxins such as cigarette smoke, car fumes, medical drugs, plastics etc. Keep your nervous system sharp by challenging it from time to time – avoid too much sitting and use balance devices, such as Swiss balls, to prevent sluggishness and potential injury.

If you require further information with regard to knee pain, performance, rehabilitation, or any of the factors discussed in this series, please feel free to contact a practitioner at the CHEK clinic on 01372 374530 or email us at info@chekclinic.com. For more information see www.chekclinic.com.

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