Introduction

Osteoarthritis of the knee – an introduction

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Abstract

Osteoarthritis of the knee is common, and a major cause of disability in older people that is likely to increase over time. Some patients progress rapidly to needing surgery, whereas others will have persistent pain for many years. The aims of conservative treatment are to reduce pain and disability.

There is evidence that several non-pharmacological therapies such as exercise, education and weight loss can have an effect in patients with knee pain, though the effect is usually only modest. Ultrasound and short wave diathermy are widely available, but not supported by evidence. Particular preparations of topical treatments are effective, as too is oral paracetamol (acetaminophen). Glucosamine is popular but not all trials have found it to have any effect.

Non-steroidal anti-inflammatory drugs (NSAIDs) are effective, though their effect is modest and their longterm value is not established. They are associated with significant adverse events, particularly gastrointestinal haemorrhage, which has a substantial mortality. They are particularly dangerous in the elderly. Cyclooxygenase-2 (COX-2) inhibitors cause fewer gastrointestinal problems but increase the risk of vascular events including myocardial infarction and stroke. Herbal therapies have only sparse evidence in support. Intra-articular injections of steroids may be effective, at least for a short period, but hyaluronan has a longer duration of action.

Patients prefer treatments that are safe, and are willing to forgo some effectiveness in favour of safety. In this context, acupuncture is a potentially valuable treatment for OA knee, and the evidence on effectiveness, safety and cost should be considered carefully.

Keywords

Osteoarthritis, knee, therapy, acupuncture.
age, to about one in three people over age 75. Figures for the prevalence of OA in Europe and the US are reported to be slightly lower than the UK, but knee pain was the most common site of pain complaints in elderly Chinese, and in Japan, a recent study found that 75% of women and 54% of men over 50 years old had OA of the knee, according to x-ray film diagnosis (News Report, Asahi Shinbun 13 June 2006). Post-mortem examination of joints of people who die aged 60 to 79 years show that 60% of men and 70% of women have cartilage erosions and osteophytes in some joints.

Knee osteoarthritis is a significant health problem
People with chronic knee pain may have significant restriction in their activities. In a survey of UK residents over the age of 55 years, 10% of respondents reported themselves disabled by OA of the knee, and a quarter of these were severely disabled according to validated measures. More than half of the patients with knee pain also have pain in another joint to contend with. Pain in hips and knees is the main factor responsible for disability in the elderly, and on average this group of patients would enjoy the health status of people under 65 years of age if they did not have these symptoms. This disability due to OA is reflected in a reduction in many areas of quality of life, and is likely to affect the person’s ability to live independently, or to care for a disabled spouse.

Although in some patients OA of the knee progresses rapidly to cause severe disability requiring surgery to replace the knee joint, in many others the condition remains relatively stable for many years. As many as 40% of patients with significant x-ray film changes in the knee show no deterioration when they have x-ray films taken again 20 years later. Therefore, many patients with knee pain have significant, long-term pain and disability and will require conservative treatments for many years to control their symptoms.

Treatment strategies
The main aims of treatment are to reduce pain and disability; prevention of further joint damage is also desirable but not achievable with our present knowledge. Several treatments are available for OA of the knee, but none of these is both highly effective and free from adverse effects. Treatment guidelines generally recommend that the approach should be tailored to the individual, and that safer and simpler treatments should be tried before progressing to stronger, but more risky, options if pain is not well controlled.

Figure 1 The prevalence of knee pain and disability (%) in the UK population aged over 55 years. Reproduced from Peat et al, Ann Rheum Dis 2001;60:91-7.
controlled.\textsuperscript{11-15} Most guidelines recommend combining physical and pharmacological approaches,\textsuperscript{10-15} but one reviewer commented on the temptation to do the simple thing and prescribe oral non-steroidal anti-inflammatory drugs.\textsuperscript{11} Another commented: ‘Too often the simpler first steps are forgotten, to the patient’s detriment’.\textsuperscript{11}

The following summary of evidence on the effectiveness of treatments for OA is based on both the above reviews,\textsuperscript{1,11-14,15} and additional database searches for recent systematic reviews or controlled trials. In view of the longterm nature of the problem, evidence of longterm benefit was of particular interest.

### Non-pharmacological treatments

There is now evidence that several non-pharmacological therapies can have an effect on knee pain, though the effect is usually only modest. Exercise – including both general aerobic training and specific leg strengthening exercises – is effective in reducing pain and improving function,\textsuperscript{19} as confirmed by a recent meta-analysis.\textsuperscript{19} Education in self care has psychological benefits but apparently not objective improvements to physical health;\textsuperscript{18} it may reduce the demand for health care over the following year.\textsuperscript{18} In one large clinical trial, a weight reducing diet in combination with exercise was more effective than a healthy lifestyle control in improving function and reducing pain, though the weight reducing diet on its own showed only a trend.\textsuperscript{18} Telephone support from a healthcare practitioner, and support from relatives, may result in reduced morbidity.\textsuperscript{19} There is also evidence that knee braces improve pain, function and quality of life.\textsuperscript{19}

Reviews of ultrasound,\textsuperscript{20} and short wave diathermy,\textsuperscript{21} found no evidence that either of these treatments is effective, even though they seem to be widely available. More recent trials of short wave treatment have also found no effect.\textsuperscript{22,23} By contrast, transcutaneous electrical nerve stimulation (TENS) was found to be effective for pain and stiffness, though the quality of studies reviewed was not high.\textsuperscript{22,23}

### Topical treatments

Topical non-steroidal anti-inflammatory drugs (NSAIDs) are effective at reducing pain over two weeks;\textsuperscript{24} and one particular preparation of topical diclofenac is clearly superior to placebo in the longterm.\textsuperscript{28} Topical capsaicin is also effective, but the associated burning sensation from applying the ointment caused 13% of patients to withdraw from one study.\textsuperscript{27}

### Oral pharmacological treatments

Treatment guidelines universally recommend the use of paracetamol (acetaminophen) which is known to be effective and has a good safety profile in clinical doses.\textsuperscript{10-15}

Glucosamine, with or without chondroitin, is popular with patients, though the evidence on its effectiveness is not consistent, and high quality studies do not show it to be superior to placebo for pain and function, though one particular preparation may have benefit.\textsuperscript{28} Glucosamine might be presumed to be safe because it is a natural product, but it causes reactions in people with seafood allergies, and it interacts with warfarin and with drugs that cause drowsiness (www.mhra.gov.uk).

There is good evidence that oral NSAIDs are more effective for pain reduction than placebo, but there is a notable absence of evidence of the longterm effectiveness.\textsuperscript{29} One longterm study found no benefit of two NSAIDs compared with placebo in 812 patients over five years,\textsuperscript{29} and another study over two years found very little benefit of NSAIDs compared with paracetamol, with many dropouts from the NSAID group on account of adverse events.\textsuperscript{29} There has been some doubt whether NSAIDs are more effective than paracetamol. A review of head to head trials showed a modest advantage of NSAIDs for pain, but concluded that, in view of the side effects of NSAIDs, they should be reserved for patients who cannot be controlled by paracetamol alone.\textsuperscript{15}

NSAIDs have a poor safety profile, causing gastrointestinal haemorrhage,\textsuperscript{30} renal damage,\textsuperscript{30} hypertension, heart failure, and allergic reactions.\textsuperscript{30} They are particularly dangerous in the elderly.

The NSAIDs act by inhibiting the enzyme cyclooxygenase (COX), responsible for prostaglandin synthesis. This enzyme exists in two forms, and inhibition of COX-1 is believed to be the main cause of unwanted gastrointestinal effects, while inhibition of COX-2 is responsible for the anti-inflammatory effects. Misopristol is a prostaglandin analogue which reduces the risk of serious gastrointestinal events with NSAIDs,\textsuperscript{31} as do proton pump inhibitors.\textsuperscript{31} These
drugs are therefore co-prescribed with NSAIDs, but neither of them reduces the other side effects of NSAIDs.

Selective COX-2 inhibitors were developed in an attempt to reduce the effect of NSAIDs on the stomach mucosa, but have been found to be associated with significant increased rate of vascular events including myocardial infarction and stroke.37,38 Some have been withdrawn, and the remainder are used much more cautiously, stimulating the comment: ‘We will best serve our patients by thinking creatively about other approaches to their pain’.39

Opioid peptides are increasingly considered for patients with pain from OA, but their use is limited by side effects.12

Herbal therapy
A review of placebo controlled trials of herbal therapies found sparse evidence: two studies found avocado-soybean unsaponifiables effective for pain, function and reducing NSAID use, one study showing a slight effect of willow bark on pain, and one study on Petiveries alliacea (tipi tree) was inconclusive.41 The risks associated with these preparations could not be assessed from the present literature.

Invasive treatments
The evidence on intra-articular injections of steroids suggests that their effects on pain and function only last a few weeks.42 Intra-articular injection of hyaluronic acid derivatives are given with the intention of supplementing the viscoelasticity of the synovial fluid, and there is evidence that they improve pain and function.43 This treatment seems to be rarely used in the UK.44 The effect is similar in size to that of intra-articular steroid injections but longer lasting.42

Surgical intervention by arthroscopy is widely available,44 but one high quality study showed that debridement and lavage were not superior to placebo surgery for pain control or functional improvement, though produced some benefit when loose bodies or flaps of meniscus were causing mechanical symptoms.45

Knee replacement surgery has generally been reserved for patients with severe daily pain and evidence of joint narrowing. The operation has good to excellent results in 95% of patients, with 95% survival of the implant at five years.46 However, many patients are unwilling to consider this procedure,47 and of those that do up to 30% experience a suboptimal outcome.47

Patient preferences for treatment
Patient preferences for treatment of OA knee have rarely been studied directly. Patients in the UK who can afford the cost certainly seem willing to pay for treatment that is not available within the health service, for example glucosamine (70%), osteopathy/chiropractic (31%) and acupuncture (19%).48

The treatment preferences of 100 patients who were attending clinic for knee pain in the US were analysed using conjoint theory: patients were asked to state how acceptable they would find a range of different treatments when they were given information of the effectiveness, side effects and cost of the treatments. Many patients were willing to forgo treatment effectiveness for a lower risk of adverse events, and the authors commented that these results were in conflict with the current widespread use of NSAIDs in older patients with arthritis.49

Acupuncture as a treatment option
One of the main forces stimulating patients to seek complementary health care is reported to be dissatisfaction with the available treatments for chronic conditions, because they are ineffective and risky.50 The use of acupuncture is increasing worldwide, evidence being provided by repeated surveys undertaken among the public in Scotland51 and the US,52 and among primary health care teams in the UK.53 Acupuncture is the most commonly used complementary therapy in the UK health service, and is available from a member of the primary care team in 20% of practices;53 it is also used in 84% of chronic pain clinics,54 often administered by doctors.55

The main indication for acupuncture is treatment of musculoskeletal pain in the UK,56 and China and the US.57,58 Reports of perceived benefit are high.59
In conclusion, OA of the knee is a common disorder leading to disability, and in many cases the symptoms persist for many years. None of the conventional therapies is totally satisfactory. Safe treatments are not very effective, and effective treatments are not very safe – and often not as effective as they may be presumed. The place of acupuncture in treating OA of the knee should now be considered. Other articles in this journal supplement will present evidence of its benefits, safety, cost effectiveness and mechanisms.

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Reference list
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