Pain management in osteoarthritis

Osteoarthritis is the most common cause of disability in older people, and diseased hip and knee joints cause most difficulty for older individuals because activities of daily living are significantly affected. Verbal and numerical rating scales best quantify pain intensity in older patients, including those with mild-to-moderate cognitive impairment. Non-drug therapies include educating patients, occupational therapy, weight reduction, and exercise. Pharmacological strategies include simple analgesia, non-steroidal anti-inflammatory drugs, and topical agents, progressing to weak then strong opioid painkillers for chronic severe pain. Surgery is an option for some patients to avoid the chronic pain cycle.

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Osteoarthritis is the most common cause of disability in older people, with painful knee osteoarthritis affecting 10% of people older than 55 years in the UK.\(^1\) 85% of all knee replacements are done because of osteoarthritis.\(^2\) Osteoarthritis of the knee and hip joints causes most difficulty in older people because it significantly affects activities of daily living, such as walking, cooking, bathing, dressing, using the toilet, and doing household chores.\(^4\) Joints can become painful, stiff, and swollen. The resulting chronic pain causes limited motion, restriction of social activities, and compromised work capacity. Physical deconditioning sets in when the affected joints are less exercised with resultant loss of muscle tone and strength. The interaction of these factors—pain, disability, loss of social roles, and diminished income—can contribute to loss of self-esteem and emotional distress, which further contribute to the chronic pain cycle (figure 1).

### Assessment of pain

Pain has sensory, affective, psychosocial, and functional dimensions.\(^5\) Assessment and management of pain therefore needs to take into account all these factors. Unfortunately pain is often unrecognised, inadequately assessed, and undertreated, especially in older people. The American Pain society has advocated that pain be considered the fifth vital sign\(^6\) (ie, doctors and nurses should routinely seek out and monitor for the presence of pain, as much as vital signs such as temperature, pulse, respiratory rate, and blood pressure are monitored). Pain self-reports in older people are valid. Because of the high prevalence of osteoarthritis and comorbidities, older people...
should routinely be asked about the presence of pain (box 1).

Verbal and numerical rating scales best quantify pain intensity in older people, including those with mild-to-moderate cognitive impairment. People who lack verbal or numerical skills may be able to respond to pictorial rating scales. Those with severe cognitive or communicative impairment may not report pain even with full assistance. In these difficult situations, observing for behavioural responses to pain becomes more important. However, none of the observational changes associated with pain is specific to pain, so they have to be interpreted with caution (box 2).

Box 2: Observational changes associated with pain

Facial expressions
- Grimacing
- Eyelid tightening

Body movements
- Altered gait
- Pacing and bracing

Interpersonal interactions
- Aggression
- Withdrawal
- Resistive behaviour

Changes in activity patterns
- Wandering
- Altered sleep
- Altered rest pattern

Changes in mental status
- Confusion
- Crying
- Distress
- Irritability

Verbalisations and vocalisations
- Sighing
- Grunting
- Moaning
- Offensive speech

Autonomic changes
- Pallor
- Sweating
- Tachypnoea
- Tachycardia

Non-pharmacological management

Patient’s education
Patient’s education is a crucial therapeutic intervention in osteoarthritis. Regular telephone contact from a health-care worker produces significant improvement in pain and functional status. Furthermore, education of family members can improve their ability to provide support to the patient.

Occupational therapy
Occupational therapy assessment has an important role in helping patients to achieve their activities of daily living despite the limitations of osteoarthritis. Assistive devices or adaptations that may be useful include raised toilet seats, dressing aids for putting on socks, and grab rails for getting out of the bath. Orthoses, braces, and splints may be useful in osteoarthritis of certain joints such as valgus bracing for the knee, which can reduce pain and improve function.

Weight reduction
Epidemiological studies have recorded that obesity is strongly associated with osteoarthritis. The Framingham study found increased risk of osteoarthritis of the knee in people with a high body-mass index. Conversely, losing weight reduces the risk of osteoarthritis. An observational study found that a weight loss of 10 pounds over 10 years decreased the odds of developing the disorder by 50%.

Exercise
Exercise is important for management of pain and improving muscle flexibility and strength, thus supporting the affected joints. These interventions are thought to unload the joint by improving mechanical forces during use. General aerobic conditioning has also been shown to be beneficial. A systematic review of aerobic walking or home-based quadriceps strengthening exercises compared with a non-exercise control group recorded that both interventions reduced pain and disability from knee osteoarthritis.

Other physical therapies
One study has demonstrated that the technique of medial taping in patellofemoral osteoarthritis reduces pain. Taping the medial aspect of the joint is thought to relieve pressure on the damaged lateral facet of the patellofemoral joint and improve tracking of the patella. Ultrasound is of limited value only. Transcutaneous electrical nerve stimulation is a non-invasive modality used in physiotherapy for control of pain. A systematic review of seven studies using this intervention in people with osteoarthritis of the knee noted benefit in reducing pain and stiffness for at least 4 weeks. Heat and cold modalities have been used for many years in the treatment of osteoarthritis and should be considered as adjunctive therapy.

Moist superficial heat can raise the threshold for pain, produce analgesia by acting on free nerve endings, and decrease muscle spasm. It is estimated that osteoarthritis constitutes 50% of the workload of traditional acupuncturists. The use of acupuncture is supported by case series and uncontrolled studies, controlling for placebo effects being problematic in trials of acupuncture. A 2006 meta-analysis of acupuncture trials in
Musculoskeletal osteoarthritis of the peripheral joints concluded that manual acupuncture is more efficacious than sham-control interventions particularly in the knee, but electro-acupuncture lacks data.18

Pharmacological strategies

WHO developed an analgesia ladder for chronic pain, illustrated in figure 2.

Step 1: simple analgesia
Simple analgesics are the first step in pharmacological management of pain. Paracetamol has very few adverse effects but patients should not exceed 4 g/day. A meta-analysis of 15 randomised trials found that paracetamol is superior to placebo but is less effective than non-steroidal anti-inflammatory drugs in relieving pain due to osteoarthritis of the hip and knee.19

Non-steroidal anti-inflammatory drugs (NSAIDs)
Non-steroidal anti-inflammatory drugs (NSAIDs) are used by more than 13 million patients with arthritis but are not well tolerated by older people, and are the leading cause of hospital admissions due to adverse drug reactions,20 accounting for 30,000 hospital admissions each year among older people and about 2000 deaths.21 Upper gastrointestinal side-effects are the most common serious adverse effect, but NSAIDs also increase blood pressure and impair renal, hepatic, and bone-marrow function. Therefore, these drugs should be avoided in patients with a history of peptic ulcers and a proton-pump inhibitor should be coprescribed in high-risk groups; older than 65, smokers, heavy alcohol consumers, and those on antiplatelet or anticoagulation therapy. In view of the high side-effects of NSAIDs in older people, other therapeutic agents should be considered.

COX-2 inhibitors
COX-2 inhibitors have a better gastrointestinal profile than traditional NSAIDs but have serious adverse cardiovascular effects. The relative risk of myocardial infarction associated with rofecoxib was increased more than two-fold (relative risk 2.24, 95% CI 1.24–4.02) in a meta-analysis of 18 trials, which included a total of 25,273 patients.22 Hence COX-2 inhibitors should be avoided in patients with ischaemic heart disease or risk factors for heart disease. Of note, excess cardiovascular risk is not confined to COX-2 inhibitors; in observational studies, traditional NSAIDs also appear to confer some risk.23

Topical agents
Topical NSAIDs appear to be better tolerated than oral dosing. However, randomised controlled trials have been of short duration only.24 Capsaicin is a naturally occurring compound that reversibly depletes the stores of the neurotransmitter, substance P, from sensory nerve endings; it thereby attenuates the transmission of painful stimuli from the peripheral nerve fibres to higher centres. A meta-analysis of three placebo controlled trials of capsaicin in osteoarthritis, reported that this agent is well tolerated and has significantly greater analgesic effects than placebo.25

Step 2: weak and moderate strength opioids
Opioids are underused in older people for a variety of reasons including fear of side-effects, drug interactions, and the fear of addiction. Several opioids are available.

Codeine
Codeine and dihydrocodeine are weak opioids. Codeine is metabolised to the analgesically active morphine by the cytochrome P450 enzyme CYP2D6, which has genetic polymorphisms causing differing rates of metabolism. A person with two non-functional alleles (7–10% of Caucasians) has poor drug metabolism and hence will not have any analgesic benefit with codeine.26 Codeine is commonly associated with vomiting and constipation,27 therefore a laxative should be co-prescribed.

Figure 2: WHO steps of analgesia
Tramadol
Tramadol is indicated for moderate-to-severely severe pain and is a suitable choice for osteoarthritis pain not relieved by paracetamol. It is more appropriate than other opioids for patients suffering from constipation and renal problems and it has only low dependency potential. However, in some patients it can cause confusion and lower the seizure threshold.

A meta-analysis of 11 randomised controlled trials of tramadol in osteoarthritis recorded that tramadol was associated with 12% decreased pain intensity from baseline and 37% increased likelihood of improved function. However, participants who received tramadol had 2.27 times increased risk of minor adverse events and 2.6 times greater risk of major adverse events, compared with placebo. Of every eight people who receive tramadol or tramadol with paracetamol, one will stop taking the medication because of adverse events, with a number needed to harm of 8 for major adverse events.

Buprenorphine patches
Transdermal buprenorphine is available in Europe for the treatment of moderate-to-severe chronic pain. Doses of 35 µg/h, 52.5 µg/h, and 70 µg/h are beneficial for moderate-to-severe chronic cancer and non-cancer pain in three randomised, double-blind, placebo-controlled trials, each of short duration.

In an open-label follow-up study of transdermal buprenorphine 35 µg/h and sublingual buprenorphine tablets, in 239 patients (134 patients with cancer-related pain and 105 with pain of non-cancerous origin), 78.7% patients adhered to therapy. Most (65.9%) managed their pain with the patch alone or took no more than one additional sublingual tablet daily for breakthrough pain. The most common systemic adverse drug reaction was nausea. Prescription of an antiemetic is recommended during the first week of treatment.

Step 3: strong opioids
Strong opioids can be effective for relief of moderate-to-severe pain, but their use is limited by side-effects, especially in frail older people.

Oxycodone
Oxycodone is a strong opioid, effective in persistent moderate-to-severe pain. In studies of severe osteoarthritis pain not controlled with paracetamol or NSAIDs. controlled-release oxycodone was significantly superior to placebo in decreasing average pain intensity and pain-induced interference with general activity, mood, and sleep.

Fentanyl
Transdermal fentanyl delivers pain relief for 72 hours or longer in older people. It is indicated for severe osteoarthritis and can be useful in patients who cannot tolerate oral medications or who have compliance problems. Results of a randomised trial in 400 patients with osteoarthritis showed that pain relief was significantly greater with fentanyl than placebo. However, there was a high dropout rate because of side-effects especially nausea, vomiting, somnolence, and dizziness.

Morphine
In severe osteoarthritis pain that is difficult to control, slow-release morphine can be used, and immediate-release morphine is useful for breakthrough pain. Table 1 summarises the pros and cons of opioids.

Adjuvant therapy

Lidocaine patches
Topical lidocaine is a new analgesic agent with potential for osteoarthritis pain. Primary afferent neurons located in affected joints express abnormally functioning sodium channels on their surface in response to inflammation. A study of 5% lidocaine patches in osteoarthritis of the knee, recorded significant improvements in pain relief and quality of life; however, this was a small open-label study with no control group.

Intra-articular glucocorticoids
Intra-articular injections may have a role in monarticular or pauciarticular osteoarthritis, especially for patients in whom NSAIDs are contraindicated. A meta-analysis in 2004 found good short-term benefits with glucocorticoid injections in osteoarthritis of the knee.

Surgery
Surgery is indicated for people with osteoarthritis who have insufficient pain relief from medical treatment and physiotherapy and have significant loss of cartilage. Surgery relieves severe, disabling pain and may restore joint function and mobility. Referral for surgery should be considered before the cycle of chronic severe pain and functional limitation has become established.

An Australian study comparing health-related quality of life before and after primary hip and knee surgery found patients including those older than 75 years had significant improvements in health-related quality of life, physical functioning, and pain.

However, surgery is associated with greater risks in older patients, and comorbidities must be considered. Specifically, older patients have a significantly higher
risk of pulmonary oedema, heart attack, abnormal heart rhythms, bacterial pneumonia, respiratory failure, and in-hospital mortality. Patients aged 70–79 are twice as likely and patients 80 years and older are three times as likely to have postoperative complications or to die after surgery compared with patients aged 50–59. Older patients also have longer hospital stays regardless of sex, ethnicity, preoperative clinical characteristics, functional status, and type of procedure.

**Conclusion**

Osteoarthritis is common and causes considerable disability especially in older people. Much can be done to improve both symptoms and outcomes. Patients should be assessed comprehensively bearing in mind pain is multidimensional in its effects. A holistic strategy which uses both non-pharmacological and pharmacological approaches is most likely to succeed.

**We have no conflict of interest.**

**References**

6. Veterans Health Administration Memorandum. Pain as the fifth vital sign. 1 March 1999

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**Table 1:** Characteristics of opiate drugs
Osteoarthritis is the most common cause of pain and disability in older people.

Pain in osteoarthritis has sensory, affective, psychological, and functional dimensions. Assessment needs to be multifactorial including patient’s function, mood, and leisure activities.

Pain can result in reduced physical function, restricted social activity, and low mood. This leads to the chronic pain cycle.

Patient’s education is crucial in the management of osteoarthritis.

Non-pharmacological treatment includes exercise, weight reduction, occupational therapy, and assistive devices.

Pharmacological treatment is based on WHO’s analgesia ladder. First-line treatment is simple analgesia such as regular paracetamol. If still in discomfort consider topical non-steroidal anti-inflammatory drugs or capsaicin.

Non-steroidal anti-inflammatory drugs should be used with caution in older people, because of a high risk of adverse drug reactions.

Opioids should be considered if pain continues, despite step 1 of the WHO ladder.

New topical treatments such as buprenorphine and lidocaine patches seem promising and fairly well tolerated.

Consider intra-articular steroids in patients with osteoarthritis of large joints.

Joint replacement should be considered in patients experiencing symptoms (pain, stiffness, and reduced function) despite treatment. Referral should be early before the chronic pain cycle is established.


Key points

- Osteoarthritis is the most common cause of pain and disability in older people.
- Pain in osteoarthritis has sensory, affective, psychological, and functional dimensions. Assessment needs to be multifactorial including patient’s function, mood, and leisure activities.
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- Patient’s education is crucial in the management of osteoarthritis.
- Non-pharmacological treatment includes exercise, weight reduction, occupational therapy, and assistive devices.
- Pharmacological treatment is based on WHO’s analgesia ladder. First-line treatment is simple analgesia such as regular paracetamol. If still in discomfort consider topical non-steroidal anti-inflammatory drugs or capsaicin.
- Non-steroidal anti-inflammatory drugs should be used with caution in older people, because of a high risk of adverse drug reactions.
- Opioids should be considered if pain continues, despite step 1 of the WHO ladder.
- New topical treatments such as buprenorphine and lidocaine patches seem promising and fairly well tolerated.
- Consider intra-articular steroids in patients with osteoarthritis of large joints.
- Joint replacement should be considered in patients experiencing symptoms (pain, stiffness, and reduced function) despite treatment. Referral should be early before the chronic pain cycle is established.

