

CMEARTICLE

Outpatient management of knee osteoarthritis

Yiyang Liow¹, MBBS, Wilson Wang^{2,3}, MBBS, FRCS, Victor Weng Keong Loh^{1,2}, MCFP, MHPE

Mdm Goh walked into your clinic with an antalgic gait. She complained of gradually worsening right medial knee pain for the past two years, which worsened with activity and got better with rest. Examination revealed a mild varus deformity, a small effusion and crepitus on passive range of motion. Over-the-counter paracetamol was initially effective for her, but no longer provided relief. Mdm Goh had seen advertisements in magazines promoting glucosamine joint supplements and wondered if they would help with her pain.

HOW RELEVANT IS THIS TO MY PRACTICE?

Osteoarthritis (OA) is a leading cause of disability worldwide. In 2015, the World Health Organization estimated that a total of 8,000 years had been lost to disability from OA in Singapore.⁽¹⁾ As a major weight-bearing joint, the knee is one of the most common sites affected. Besides the obvious direct costs, knee OA imposes substantial indirect and intangible costs on patients.⁽²⁾ Recognising the increasing burden of disease in our ageing population, the Ministry of Health, Singapore, released clinical practice guidelines on the management of knee OA more than ten years ago.⁽³⁾ Since then, new research and major international guidelines have emerged to guide physicians in managing this ubiquitous disease.

Knee OA can be diagnosed clinically. A history of gradually worsening mechanical knee pain and deformity is typical. Patients may reveal a previous traumatic knee injury, particularly meniscal tears. Pain that is worse on going down stairs is classically suggestive of patellofemoral involvement. Quadriceps wasting and mild effusion are common examination findings. Occasionally, a Baker's cyst is palpable in the popliteal fossa. Morning stiffness lasting longer than 30 minutes with significant joint effusion and warmth should prompt consideration of an inflammatory joint disorder. Box 1 shows the criteria for diagnosis of knee OA from the American College of Rheumatology (ACR).

Plain radiography is not routine, but is a useful adjunct to confirm the diagnosis. Weight-bearing radiographs characteristically demonstrate a loss of joint space in conjunction with other classic changes. Skyline views are useful when suspecting patellofemoral OA. However, it is notable that knee pain can precede radiographic changes by years.⁽⁴⁾ Box 2 shows the radiological signs of OA.

Laboratory testing is performed if there are concerns about inflammation or other causes of joint disease. Erythrocyte sedimentation rate and C-reactive protein are serum inflammatory markers that may be mildly raised, but significant elevation is not expected in knee OA. Rheumatoid factor and anti-cyclic citrullinated peptide are frequently used to screen for rheumatoid

Box 1. American College of Rheumatology criteria for clinical diagnosis of idiopathic OA of the knee.⁽⁵⁾

Knee pain with ≥ 3 out of the following six criteria (sensitivity 95%, specificity 69%):

- Age > 50 yr
- Stiffness < 30 minutes
- Crepitus
- Bony tenderness
- Bony enlargement
- No palpable warmth

Box 2. Radiological hallmarks of OA:⁽⁶⁾

- Non-uniform loss of joint space
- Osteophyte formation
- Subchondral sclerosis
- Subchondral cysts

arthritis, while raised serum uric acid levels may be consistent with gouty arthritis.

WHAT CAN I DO IN MY PRACTICE?

Weight loss and exercise

For overweight patients, weight loss reduces the load imposed on the knees and has been shown to improve symptoms and function. This positive effect has been described following weight loss of more than 5% over a five-month period.⁽⁷⁾ Combining caloric restriction with exercise appears to be the most effective strategy to achieve weight loss and symptomatic improvement.⁽⁸⁾

Exercise has also been shown to significantly reduce pain and improve quality of life.⁽⁹⁾ Both the 2013 American Academy of Orthopedic Surgeons (AAOS) and the 2012 ACR recommendations on exercise for knee OA concur on this, strongly recommending muscle strengthening and low-impact aerobic exercises.^(10,11) Additionally, the ACR also recommends aquatic exercises.⁽¹¹⁾ Exercises commonly suggested to patients include brisk walking, swimming, cycling and tai-chi. Ideally, the

¹Division of Family Medicine, National University Health System, ²Yong Loo Lin School of Medicine, ³Department of Orthopaedic Surgery, National University Hospital, Singapore
Correspondence: Dr Yiyang Liow, Resident, Family Medicine Residency Programme, Division of Family Medicine, National University Health System, 1E Kent Ridge Road, NUHS Tower Block, Level 9, Singapore 119228. yiyang_liow@nuhs.edu.sg

activity should be one that patients will continue to enjoy doing after the treatment period is over.

Instructional handouts are available on the Internet to guide patients in performing lower limb muscle-strengthening exercises on their own.⁽¹²⁾ Referral to a physiotherapist should be considered for those who are deconditioned and require a personalised and structured exercise programme. Due to fear of pain or progression of disease, some patients may limit or stop exercise altogether. As this can lead to a vicious cycle of inactivity, muscle weakness, weight gain, more pain and functional impairment, it is critical to identify and address these concerns early on.

Analgesia

Pain control is the cornerstone of pharmacological treatment of knee OA. The 2012 ACR guidelines for the management of OA conditionally recommend the use of paracetamol, oral or topical nonsteroidal anti-inflammatory drugs (NSAIDs) and tramadol for pharmacological management of knee OA.⁽¹¹⁾

When prescribing the full dosage of paracetamol of 4,000 mg per day (i.e. eight 500-mg tablets), physicians should advise patients to avoid other paracetamol-containing products such as over-the-counter cold remedies. However, NSAIDs should be avoided in patients with significant gastrointestinal bleeding, renal impairment or cardiovascular disease. Proton-pump inhibitors should be prescribed for their gastroprotective effects when NSAIDs are used for chronic pain management for knee OA.^(13,14) If pain control is still not achieved, tramadol is added.

Glucosamine and chondroitin

Glucosamine and chondroitin are commercially available oral supplements that have long been marketed as providing joint cartilage support, with the purported benefits of pain relief and slowing disease progression. Both products, alone or in combination, have been extensively studied, but there has been no convincing evidence of benefit to date.⁽¹⁵⁻¹⁸⁾ Neither the AAOS nor ACR guidelines support their routine use in the treatment of knee OA.^(10,11)

Despite the lack of evidence, these supplements are still commonly prescribed by physicians, probably owing to their reputation for being 'harmless'. Although major adverse events are rare, gastrointestinal effects such as heartburn and dyspepsia are common. If prescribed, they should be taken with meals to minimise such symptoms.

Intra-articular injections

Often described as a simple process of wear and tear, OA actually has a complex disease mechanism driven by inflammatory mediators within the affected joint.⁽¹⁹⁾ Intra-articular corticosteroid injections have traditionally been used to reduce local inflammation in the hope of improving pain and function. Current evidence suggests that intra-articular corticosteroid injections may provide short-term reduction in pain for up to six weeks.^(20,21) The ACR guidelines support their conditional use, but the AAOS workgroup interpreted the evidence to be inconclusive and was unable to make a recommendation for or against their use.^(10,11)

Hyaluronic acid is a naturally occurring component of joint cartilage matrix and synovial fluid. It lubricates joint movements and acts as a shock absorber. Intra-articular injections of hyaluronic acid are thought to restore such viscoelastic properties. Published meta-analyses have generally shown positive results, but controversy regarding its efficacy remains.⁽²²⁻²⁵⁾ There are also additional concerns about cost-effectiveness, and studies evaluating its efficacy reflect a high percentage of industry authorship.⁽²⁶⁾ The AAOS does not recommend the use of hyaluronic acid injections in knee OA treatment, while the ACR guidelines make no recommendations.^(10,11)

Orthoses and patellar taping

Lateral wedge insoles and valgus-directed braces have been prescribed for patients with medial compartment knee OA. However, the evidence generally does not support their use.⁽²⁷⁻²⁹⁾ Conversely, medial patellar taping has been shown to be useful for patients with patellofemoral OA.⁽³⁰⁻³³⁾ This simple intervention exerts a medially directed force to realign the patella in the intertrochlear groove, thereby reducing pain. During application, the patient should be lying down with the knee extended and thigh muscles relaxed. Tape is applied to the superior aspect of the patella, pulled medially and fixed to the medial side of the knee. Additionally, a second and third tape is applied to the tibial tubercle and pulled to the medial and lateral joint lines, respectively (Fig. 1). This unloads the infrapatellar fat pad, which can be aggravated by stretching of tissue.⁽³⁴⁾ A commercially available adhesive, non-stretch sports tape is typically used. A hypoallergenic underlay tape can be applied in combination.

Taping can be performed regularly by a physiotherapist, but self-taping is recommended, as it empowers patients to care for their own knees.

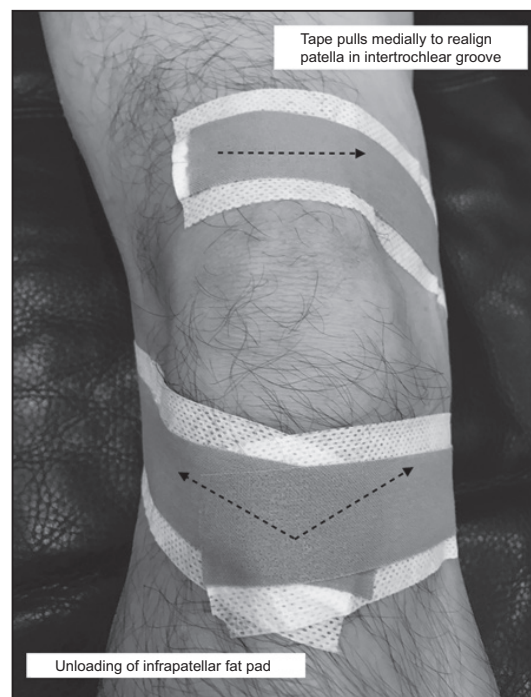


Fig. 1 Photograph shows the application of medial patellar taping on the right knee.

Walking aids

Walking aids decrease the load transmitted through the knees and thereby reduce pain and improve function.⁽³⁵⁾ Patients with unilateral or asymmetrical OA should use a walking stick on the contralateral side. The tip of the stick should be placed on the ground at the same time that the foot of the symptomatic knee lands on the ground.⁽³⁶⁾ The stick should also be appropriately customised for the patient. Those with bilateral or more symmetrical disease can consider the use of a walking frame. Box 3 shows the steps to take when customising a walking stick.

Box 3. Steps in customising a walking stick:⁽³⁶⁾

1. Stand comfortably in low-heeled shoes.
2. Keep arms relaxed alongside the body.
3. Place the tip of the walking stick on the floor 10 cm lateral to the foot, in line with the metatarsals.
4. Adjust the stick height so that the stick reaches the distal wrist fold, which should result in 20°–30° of elbow flexion.

Acupuncture and transcutaneous electrical nerve stimulation

Traditional Chinese acupuncture has long been used as an alternative therapy in the treatment of knee OA. A recent meta-analysis of ten randomised controlled trials published through March 2015 investigated the effect of acupuncture on chronic knee pain. It concluded that acupuncture improves short- and long-term function, but provides only short-term pain relief.⁽³⁷⁾ Transcutaneous electrical nerve stimulation (TENS) involves transcutaneously applied electric currents to modulate nociceptive receptors and reduce pain. Studies have largely suggested that it can be a useful adjunct to reduce pain in knee OA patients.^(38–40)

The ACR guidelines conditionally recommend both treatment modalities for patients who have at least moderate knee OA but are unable or unwilling to undergo total knee replacement.⁽¹¹⁾ Conversely, the AAOS does not recommend acupuncture, based on a lack of efficacy in the studies it analysed, and was inconclusive on electrotherapeutic modalities.⁽¹⁰⁾

Referral for surgery

Early consultation with an orthopaedic surgeon should be undertaken when adequate conservative treatment has failed to provide the patient satisfactory pain relief, stability or functional improvement.

TAKE HOME MESSAGES

1. Knee OA is a major cause of disability worldwide.
2. The burden of disease is expected to increase locally as our population ages.
3. A clinical diagnosis is sufficient to identify knee OA, but plain radiography and laboratory tests are useful adjuncts.
4. Weight loss of more than 5% over a five-month period can improve pain and function for overweight patients.
5. Low-impact aerobic exercises have significant benefits and should be encouraged.
6. Referral to a physiotherapist is indicated for deconditioned patients or those who will benefit from a structured exercise programme.

7. Adequate analgesia is paramount to prevent a vicious cycle of pain, activity limitation and weakness or weight gain. Paracetamol, NSAIDs and tramadol are recommended agents.
8. Beneficial management adjuncts include walking aids, medial patellar taping, acupuncture and TENS.
9. Interventions for knee OA that do not show clear evidence of benefit are glucosamine, chondroitin, intra-articular hyaluronic injections, lateral sole wedges and valgus-directed braces.
10. Early consultation with an orthopaedic surgeon is warranted when an adequate trial of conservative management has failed.

Mdm Goh returned to your clinic in six weeks and was happy to report improvements in pain control. She had lost 1.5 kg by modifying her diet and taking 30-minute brisk walks every morning. After mulling over your advice during the last consultation, she had decided not to take glucosamine supplements. Naproxen gave adequate relief when the pain arose and had not caused any gastric troubles. You applauded her efforts and reiterated the far-reaching benefits of her lifestyle changes.

ABSTRACT Osteoarthritis of the knee is a common disease that causes significant disability. Most patients can be managed conservatively in the outpatient setting. A small minority require surgery. The cornerstones of treatment are weight loss, exercise and analgesia. Walking aids, medial patellar taping, acupuncture and transcutaneous electrical nerve stimulation are useful management adjuncts. Current evidence does not support routine prescription of glucosamine and chondroitin supplements. Early consultation with an orthopaedic surgeon should be made when conservative measures fail.

Keywords: knee, osteoarthritis, treatment

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SINGAPORE MEDICAL COUNCIL CATEGORY 3B CME PROGRAMME

(Code SMJ 201710A)

	True	False
1. As a major weight-bearing joint, the knee is a common site of osteoarthritis (OA).	<input type="checkbox"/>	<input type="checkbox"/>
2. Meniscal tears are a common predisposing injury.	<input type="checkbox"/>	<input type="checkbox"/>
3. Pain on climbing stairs suggests tibiofemoral disease.	<input type="checkbox"/>	<input type="checkbox"/>
4. Knee OA never presents with a joint effusion.	<input type="checkbox"/>	<input type="checkbox"/>
5. Morning stiffness with a duration of more than 30 minutes should prompt consideration of an inflammatory joint disease.	<input type="checkbox"/>	<input type="checkbox"/>
6. Erythrocyte sedimentation rates and C-reactive protein levels may be mildly elevated in knee OA.	<input type="checkbox"/>	<input type="checkbox"/>
7. Radiographic changes are always present in symptomatic knee OA.	<input type="checkbox"/>	<input type="checkbox"/>
8. Radiographs characteristically show symmetrical loss of joint space in primary knee OA.	<input type="checkbox"/>	<input type="checkbox"/>
9. Weight loss can improve symptoms and function in knee OA.	<input type="checkbox"/>	<input type="checkbox"/>
10. Exercise kicks off a vicious cycle of events that worsens the disease and should not be recommended.	<input type="checkbox"/>	<input type="checkbox"/>
11. Quadricep-strengthening exercises should only be performed under the supervision of a physiotherapist.	<input type="checkbox"/>	<input type="checkbox"/>
12. If taken for chronic pain management, nonsteroidal anti-inflammatory drugs (NSAIDs) should be prescribed with a proton-pump inhibitor.	<input type="checkbox"/>	<input type="checkbox"/>
13. Tramadol is added if adequate analgesia is not achieved with paracetamol and NSAIDs.	<input type="checkbox"/>	<input type="checkbox"/>
14. There is strong evidence that glucosamine is an effective treatment for knee OA.	<input type="checkbox"/>	<input type="checkbox"/>
15. There is no role for intra-articular corticosteroid injections in the management of knee OA.	<input type="checkbox"/>	<input type="checkbox"/>
16. Medial patellar taping realigns the patella in the intertrochlear groove and is a useful adjunct in the management of patellofemoral OA.	<input type="checkbox"/>	<input type="checkbox"/>
17. Walking sticks should be used on the patient's symptomatic side.	<input type="checkbox"/>	<input type="checkbox"/>
18. The height of the walking stick should be adjusted to reach the distal palmar crease.	<input type="checkbox"/>	<input type="checkbox"/>
19. Acupuncture is a useful alternative therapy for knee OA.	<input type="checkbox"/>	<input type="checkbox"/>
20. Early consultation with an orthopaedic surgeon is warranted should the patient fail an adequate trial of conservative treatment.	<input type="checkbox"/>	<input type="checkbox"/>

Doctor's particulars:

Name in full: _____ MCR no.: _____
 Specialty: _____ Email: _____

SUBMISSION INSTRUCTIONS:

Visit the SMJ website: <http://www.smj.org.sg/current-issue> and select the appropriate quiz. You will be redirected to the SMA login page.

For SMA member: (1) Log in with your username and password (if you do not know your password, please click on 'Forgot your password?'). (2) Select your answers for each quiz and click 'Submit'.

For non-SMA member: (1) Create an SMJ CME account, or login with your SMJ CME username and password (for returning users). (2) Make payment of SGD 21.40 (inclusive of 7% GST) via PayPal to access this month's quizzes. (3) Select your answers for each quiz and click 'Submit'.

RESULTS:

(1) Answers will be published online in the SMJ December 2017 issue. (2) The MCR numbers of successful candidates will be posted online at the SMJ website by 4 December 2017. (3) Passing mark is 60%. No mark will be deducted for incorrect answers. (4) The SMJ editorial office will submit the list of successful candidates to the Singapore Medical Council. (5) One CME point is awarded for successful candidates.

Deadline for submission: (October 2017 SMJ 3B CME programme): 12 noon, 27 November 2017.