Management of Osteoarthritis (OA)

NON-PHARMACOLOGICAL

EDUCATION

Patient education programs are tailored according to the individual needs, goals, and functional capabilities. Patients who have an understanding of the disease tend to cope better and report less pain. The most important goal is:

to instill a positive attitude

LIFESTYLE MODIFICATION

Weight Reduction

Obesity is an important modifiable risk factor for the development and progression of knee OA. Weight reduction is beneficial to:

- **reduce pressure on your joints**
- **ease pain**
- **reduce inflammation**
- **slows cartilage degeneration**

Exercise

Exercise is effective in reducing pain in hip and knee OA.

The exercise must be **personalized according to the patient's preferences and abilities**, the training programs can be individual, in groups, at home, or in the gym. A mixed approach (aerobic and strengthening) is recommended to reduce pain, improve proprioception (sense of movement) and joint function.

In knee OA, **aerobic training** (walking) is effective in reducing pain and improving physical function Regular non-competitive exercise does not exacerbate OA nor increase the likelihood of requiring joint replacement

PHYSIOTHERAPY

Thermotherapy

In OA, the cartilage that protects the ends of the bones breaks down and causes pain and swelling. Thermotherapy involves **applying heat or cold to joints to improve the symptoms of osteoarthritis** and can be done with packs, towels, wax, etc.

Heat → **to improve circulation & relax muscles**

Cold → **to numb the pain, decrease swelling, constrict blood vessels & block nerve impulse to the joint**

Transcutaneous Electrostimulation (TENS)

TENS is a method of pain relief involving the use of a mild electrical current. It is useful for some OA patients, in which neuromodulation treatments can **ease pain with minimal risks** and offer an alternative to medication for treating arthritis pain.

Therapeutic Ultrasound

Ultrasound (sound wave) is applied using the head of an ultrasound probe placed in direct contact with your skin via a transmission coupling gel. Therapeutic ultrasound **may increase the healing rates, tissue relaxation, tissue heating, local blood flow, and scar tissue breakdown.**

OCCUPATIONAL THERAPY

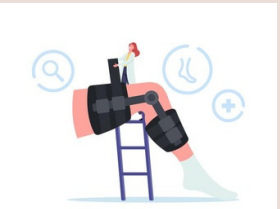
Occupational therapy aims to improve health, prevent disability and help individuals to achieve their optimum functional level and independence in performing daily activities.

The evidence suggests that people with pain, difficulty, and frustration in performing daily activities and work tasks should be **referred early to an occupational therapist** for splinting, joint protection training and assistive device provision.

ORTHOSES

Orthoses are defined as **any medical device added to a person's body to support, align, position, immobilize, prevent or correct deformity, assist weak muscles or improve function.** In knee OA, the general purpose is to decrease pain and improve physical function.

Walking shoes can reduce or eliminate foot pain, which has a huge impact on the body's function and mobility while knee braces are supports worn on the knees to provide joint stability and help to correct joint alignment problems.



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Management of Osteoarthritis (OA)

PHARMACOLOGICAL

ORAL TREATMENT

Oral treatment is the medicines that are taken by mouth. Medications for OA mostly come with the effect of reducing inflammation and relieving pain. OA patients should follow the doctors' instructions in getting the medications as patients may encounter some side effects after taking drugs or even addiction.

Simple analgesics
(e.g. Paracetamol)

Paracetamol is prescribed for analgesia at an early stage in the management of OA, but the evidence suggests the efficacy of paracetamol for OA pain is low.

Weak Opioid Analgesics
(e.g. Tramadol)

Tramadol is as an alternative treatment option for OA for people who have failed treatment with NSAIDs or other medications. However, taking tramadol may lead to some common side effects like dizziness, nausea, vomiting, constipation and drowsiness

Analgesics with anti-inflammatory properties
(e.g. NSAIDs and COX2 inhibitors)

NSAIDs are effective for overall pain from OA. Combination therapy with more than one NSAID/COX-2 inhibitor should never be used. There is no benefit in combination therapy and the incidence of side effects may be additive.
Caution is required when prescribing NSAIDs to those with renal, cardiac or hepatic impairment, hypertension and in the elderly.

Nutraceutical
(e.g. glucosamine, chondroitin, diacerein)

A nutraceutical is defined as any substance that is a food or part of a food and provides medical or health benefits, including the prevention and treatment of disease. Nutraceutical have also been used by patients for OA with uncertain efficacy.

INTRA-ARTICULAR TREATMENT

IA treatment is a non-surgical treatment option which the substances are injected into the joints to relieve pain.

Corticosteroids

Intra-articular corticosteroids may be used for **short-term pain relief** in an acute exacerbation of knee osteoarthritis. They are **potent, fast-working anti-inflammatories**.

An injection of a corticosteroid (sometimes combined with a local anesthetic) directly into an individual joint can reduce inflammation and pain due to arthritis. The effect may last for several months, but **repeated injections can increase cartilage loss**.

Viscosupplementation

Viscosupplementation is a procedure in which a thick fluid called hyluronic acid (HA) is injected into the knee joint.

HA is a naturally occurring substance found in the synovial fluid surrounding joints. It acts as a **lubricant to enable bones to move smoothly** over each other and as a **shock absorber** for joint loads.

TOPICAL TREATMENT

Topicals come in sprays, creams, gels and patches and can be made with various ingredients, is directly apply on the skin.

The commonly used topical treatment includes NSAIDs, capsaicin, and methylsalicylate. A topical NSAID, which can be used to replace oral NSAIDs, is rubbed on the skin over sore joints to relieve pain, without the stomach upset or cardiovascular risks of oral medication.

However, topical NSAIDs are not suitable for patients with sensitive skin and multiple joint problems.

Methylsalicylates

Methylsalicylates contain the same pain-relieving substance in aspirin and have a mild anti-inflammatory effect. People who have aspirin allergies or take blood thinners for heart disease may be at higher risk.

Capsaicin

Capsaicin is what makes chili peppers spicy. Topicals with this active ingredient produce a mild tingling, burning sensation. It works by blocking pain signals to your nerves. Studies about its effectiveness are limited and mixed.

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ALTERNATIVE TREATMENT

Alternative treatments are extensively used in the treatment of OA however it is not based on evidence gathered using scientific methods.

ACUPUNCTURE

Acupuncture is a traditional treatment that involves inserting needles into meridian points with the intention of influencing energy flow.

A well-placed needle sets off a cascade of events, producing a signal that travels along the spinal cord to the brain, **triggering a release of neurotransmitters called endorphins and enkephalins**, which scientists believe reduce the sensation of pain. Research also shows that inserting an acupuncture needle **induces the production of cortisol**, a hormone that helps control inflammation. Acupuncture may stimulate the activity of other pain-relieving chemicals in the body as well.

In a Cochrane SR, acupuncture significantly improved pain and function in patients with knee OA compared to sham acupuncture. No serious adverse events were reported to be associated with acupuncture. Minor side effects were bruising and haematoma.

AVOCADO SOYBEAN UNSAPONIFIABLES (ASU)

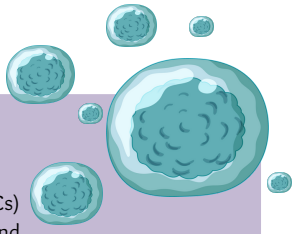
Avocado and soybean unsaponifiables (ASU) constitute vegetable extracts made from fruits and seeds of avocado and soybean oil. Characterized by its **potent anti-inflammatory effects**, this ASU mixture is recommended to act as an adjuvant treatment for osteoarthritic pain and slow-acting symptomatic treatment of hip and knee osteoarthritis.

GINGER

Ginger has been commonly prescribed by herbalists for sufferers of OA due to its **anti-inflammatory and circulatory stimulant effects.** Some studies show that ginger have moderate effect in reducing arthritis pain with less side effects.

According to the results of one 2015 study, ginger extract is able relieves joint pain and improves problematic symptoms, and improves the quality of life in osteoarthritis knees during a 12-week treatment.

RECENT ADVANCES

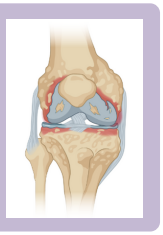


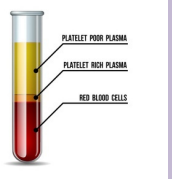
INTRA-ARTICULAR STEM CELLS

Stem cells are immature cells that can divide and specialized into different kinds of cells. Stem cells, especially mesenchymal stem cells (MSCs) and their secretomes possess **anti-inflammatory, regenerative and immunomodulatory effects** that can suppress the joint inflammation and promote the worn-out cartilage to regenerate.

AUTOLOGOUS CHRONDROCYTES IMPLANTATION (ACI)

The idea of an ACI procedure is to take a few cartilage cells from the knee, grow them in the lab, and once millions of cells have been grown they are implanted into the area of cartilage damage. However, a common complication of ACI is the formation of scar tissue at the joint, which may cause the patient to have further surgery to remove scar tissues. This treatment still has some limitations and post-operative rehabilitation is required for the patient to get optimum recovery from OA.





PLATELET-RICH PLASMA (PRP)

PRP is defined as a volume of plasma with a platelet concentration higher than the average in peripheral blood. PRP contains concentrate autologous blood growth factors which has been shown **to repair the damaged tissues by new cells formation.** The preliminary short-term results within 3 to 6 months indicate that treatment with autologous PRP intra-articular injections may be useful for early OA, aiming to reduce pain and improve knee function and quality of life.

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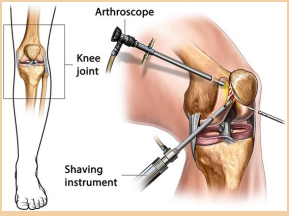
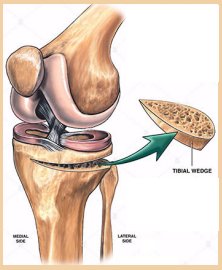
SURGICAL TREATMENT

Surgery is considered if the symptoms of the affected joints significantly affect the quality of patients' life and their daily activities.

ARTHROSCOPIC SURGERY

In arthroscopic surgery, an orthopedic surgeon makes a small incision in the patient's skin, then inserts pencil-sized instruments that contain a small lens and lighting system to magnify and illuminate the structures inside the joint. This surgery can be performed for meniscus repair, torn cartilage, cartilage transfer and etc. Arthroscopy is considered a low-risk procedure with fewer complications may be encountered.





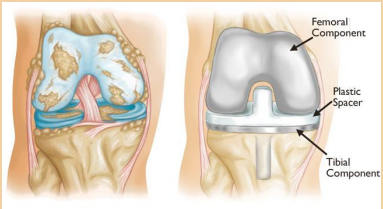
HIGH TIBIAL OSTEOTOMY (HTO)

HTO is a surgical procedure that is performed to correct angular deformities of the knee to prevent the development or progression of unicompartmental OA. For some people, OA damages one side of the knee more than another side. This can cause your knee to bow inward or outward. **Removing or adding a wedge of bone in your shinbone or thighbone can help straighten out this bowing and shift your weight to the undamaged part of your knee joint.**

HTO relieves pain and may delay the progression of OA. However, the disadvantages of this procedure are that the knee may look asymmetrical and may pose a more technically challenging procedure if Total Knee Replacement (TKR) is eventually required.

TOTAL JOINT REPLACEMENT

Total joint replacement is a procedure that involves **removing all of the damaged joints and replacing them with artificial implants.** This may result in a dramatic reduction in pain and a significant improvement in daily activities However, patients are still advised to avoid certain activities, including jogging and high-impact sports, for the rest of their life following surgery, to ensure longevity of the implant.



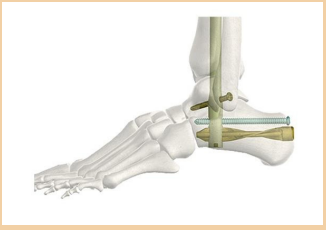
PARTIAL JOINT REPLACEMENT

In partial joint replacement, **only a portion of the knee is resurfaced.** The advantages of partial knee replacement over total knee replacement are less blood loss intra-operatively and less pain post-surgery with faster recovery and better range of motion. The disadvantage of partial knee replacement compared with total knee replacement is the potential need for more surgery. For example, a total knee replacement may be necessary in the future if arthritis develops in the parts of the knee that have not been replaced.

ARTHRODESIS

Arthrodesis refers to **the fusion of two or more bones in a joint.** In this process, the diseased cartilage is removed, the bone ends are cut off, and the two bone ends are fused into one solid bone with metal internal fixation. There is no further movement in the joint, but it is stabilized and, most importantly, pain caused by instability is eliminated. The aim of arthrodesis or joint fusion is to fuse the diseased joint in an optimal position. This would make the joint stiff but stable. Risks include breakage of metal implants, failure of the fusion site, and infection.

In general, arthrodesis is not the preferred surgical option in OA. This procedure is commonly performed on joints in the foot, ankle, spine, and hand that were damaged by traumatic arthritis from a severe injury.



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