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Editor's Message

The focus of this issue of CHARM is osteoarthritis, a degenerative condition that will eventually affect each of us clinically and subclinically. Osteoarthritis has been a medical issue with our already aging population. Joint supplements like glucosamine and chondroitin are popular among public who may or may not be symptomatic. Is there evidence-based medicine to support the use of these "drugs"? Is biologic agent applicable to treatment of osteoarthritis? As majority of subjects with osteoarthritis are aged and are likely to have other co-morbidities, risk of gastrointestinal bleeding associated with chronic use of non-steroidal anti-inflammatory drugs is a definite concern. An appropriate approach to pain management in these patients is of prime importance.

In this issue of CHARM, specialists from rheumatology and orthopaedic surgery will provide us with updated information on the various treatment modalities for subjects with osteoarthritis of different levels of severity. We will learn about guideline on management of these patients from the Osteoarthritis Research Society International (ORSI). A multi-disciplinary approach in pain management involving occupational therapists and physiotherapists should not be underscored.

From this issue onwards, we are going to have a new column on "What's there in the history of Rheumatology?" contributed by Dr Daniel Ng, our rheumatologist co-editor. Dr Ng will share with us interesting pieces on people, knowledge, medications, management and anything relevant to the field of rheumatology without borders in time.

CHARM is an official publication of the Hong Kong Arthritis & Rheumatism Foundation (HKARF). We hope that you can proactively participate in the various activities organized by our charitable Foundation and contribute to our rheumatic patients with better living and health care!

What's there in the history of Rheumatology

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Sir John Robert Vane: from willow tree to Nobel Prize

Aspirin, a well-known analgesic useful in the relief of headache, muscle and joint pain with additional cardiovascular protective effect. The drug has been invented for more than a hundred years. In 1982, Sir John Vane (1927 – 2004) was awarded the Nobel Prize for his work on aspirin. Here is the timeline that shows the history of aspirin and the contribution from some other people involved in its development:

400 BC

Greek physician Hippocrates prescribed the bark and leaves of the willow tree (rich in a substance called salicin) to help heal headache, pain and fever.

1828

Johann Buchner, a German professor of pharmacology, isolated a tiny amount of bitter tasting yellow, needle-like crystal, which he called salicin.

1838

Raffaele Piria, an Italian chemist, succeeded in obtaining the salicylic acid in its pure state.

1897

A chemist, Felix Hoffmann, at Bayer company in Germany, chemically synthesized a stable form of powder that relieved his father from the pain of arthritis. The compound later became the active ingredient in aspirin named "a" from acetyl, "spir" from the spirea plant (which yields salicin) and "in", a common suffix for medications.

What's there in the history of Rheumatology

1899
Bayer distributed aspirin powder to physicians to dispense to their patients. Aspirin was soon the number one drug worldwide.

1915
The tablet form of aspirin was made.

1920s
Aspirin was used to treat symptoms of pain related to rheumatism, lumbago and neuralgia.

1948
Dr. Lawrence Craven, a California general practitioner, noted that the 400 men he prescribed aspirin to had not suffered any heart attacks. He regularly recommended to all patients and colleagues that "an aspirin a day" could dramatically reduce the risk of heart attack.

1952
Children's chewable aspirin was introduced.

1969
Bayer aspirin tablets were included in the self-medication kits taken to the moon by the Apollo astronauts.

1971
John Vane, a British pharmacologist began his work on aspirin and conceived that aspirin might work by inhibiting the generation of prostaglandins.

1982
John Vane shared the Nobel Prize in Physiology or Medicine with Sune Bergstrom and Bengt Samuelsson for discovering aspirin's effect on inhibition of prostaglandin biosynthesis.

Osteoarthritis- Pharmacotherapy

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Introduction

Osteoarthritis (OA) is the most common form of chronic arthritis in the elderly population resulting in pain, functional impairment and physical disability. Overall, OA of the knee is more prevalent than OA of the hip or hand. It is estimated that around 40-50% of the population older than 65 suffers from OA. The prevalence increases with age and with a female preponderance.

OA is defined by focal lesions of the articular cartilage combined with hypertrophic reaction (sclerosis) in the subchondral bone and new bone formation (osteophytes) at the joint margins. Symptoms include pain on usage, brief morning stiffness and functional limitation. Typical physical signs include crepitus, restricted movement and bony enlargement. OA hands are characterised by the classical Bouchard's and Heberden's nodes. Advanced disease can cause pain at rest, deformity and restricted movement. A subset of patients with erosive OA may show signs of synovitis with effusion.

OA can be classified as primary or secondary. Secondary OA results from other co-morbidities including metabolic disease, crystal arthropathy, anatomical defect, trauma or underlying inflammatory arthritis such as rheumatoid arthritis. Besides old age and female gender, risk factors for OA include overweight, prior injury, overuse or positive family history. Classical radiographic features include focal joint space narrowing, osteophyte, subchondral bone sclerosis and subchondral cysts. One may diagnose knee OA without the need of a radiograph but this is often performed as baseline. Also, there is no correlation between the severity of radiographic changes and clinical symptoms.

The ideal treatment for OA is one that can relieve pain, improve mobility and prevent further structural progression. The Osteoarthritis Research Society International (OARSI) guideline provided an up-to-date, evidence-based consensus recommendation for the management of hip and/ or knee OA.

Treatment of OA comprises a combination of pharmacological and non-pharmacological treatments. Non-pharmacologic therapies include education, weight reduction, exercise, muscle strengthening, use of walking aids, thermotherapy and acupuncture.

Osteoarthritis- Pharmacotherapy

Analgesics

Paracetamol up to 4 g /day is recommended as the first choice oral analgesic for mild to moderate pain relief in knee or hip OA. It is the preferred long term oral analgesic if effective in view of its safety profile.

For non-responsive patients, oral non-steroidal anti-inflammatory drugs (NSAIDs) are commonly prescribed. With their significant gastrointestinal (GI) complications, NSAIDS should be used cautiously at the lowest effective dose and shortest duration. The risk of GI and/ or renal toxicity increases with age, concurrent use of other medications and comorbidities. Use of selective COX-2 inhibitors or non-selective NSAIDs combined with proton pump inhibitor (PPI) or misoprostol can reduce upper GI side effects. Both conventional and COX-2 inhibitors should be avoided in patients with cardiovascular risk.

Topical NSAIDs or capsaicin are alternatives to oral analgesic for OA of the knee. Weak opioids can be considered for patients with refractory pain who are contraindicated to NSAIDs like renal impairment.

Glucosamine/ chondroitin sulphate

Glucosamine and chondroitin sulphate are natural constituents of cartilage proteoglycans. Glucosamine, prepared from exoskeletons of shellfish, is a popular dietary supplement in the United States.

The 24-weeks Glucosamine/ chondroitin Arthritis Intervention Trial (GAIT) showed no effect in pain relief for glucosamine hydrochloride alone, chondroitin sulphate alone or in combination for knee OA. However, subgroup analysis showed some benefit for the combination therapy in the group with moderate to severe OA knee. The 6-months GUIDE trial showed that glucosamine sulphate 1500mg daily is more effective than placebo in relieving knee OA symptoms. Evidence from a few placebo controlled randomised controlled trials (RCTs) suggest that glucosamine sulphate and chondroitin sulphate may have some structural modifying effects in knee OA by retarding radiographic progression.

Despite inconsistent evidence and modest effect on pain reduction, it is recommended that if there is no symptomatic response after a 6 months' trial with glucosamine and/ or chondroitin sulphate for moderate to severe OA of the knee, the therapy should be discontinued. Glucosamine sulphate should be used instead of the hydrochloride form as most reported beneficial trials generally used the former preparation.

Intra-articular steroid or hyaluronate

Intra-articular steroid can be used in refractory symptomatic knee OA, particularly with signs of inflammation such as effusion. It is recommended that the number of injections should be limited to less than 3-4 times annually.

Hyaluronic acid (HA) is a large molecular weight glycosaminoglycan, a constituent of the synovial and cartilage extracellular matrix. Its visco-elastic property helps to lubricate the joint and enables its therapeutic use as a form of viscosupplementation. Intra-articular hyaluronate showed a delayed onset of action with prolonged duration of symptomatic benefit in OA hip and knee compared to intra-articular steroid.

Diacerein

Research has shown that interleukin-1-beta (IL-1β) plays a key role in cartilage degradation, subchondral bone remodelling, chondrocyte apoptosis and joint inflammation. Diacerein, an IL-1β inhibitor, acts by down regulating the activity of IL-1β through decreasing the number of cell surface IL-1β receptors and increasing the release of soluble IL-1 receptor antagonist. Studies showed a slow onset of efficacy but a long carry-over effect despite treatment was interrupted. Meta-analysis of RCTs showed that diacerein had a small and consistent benefit in pain relief. It was significantly superior to placebo with similar efficacy compared with NSAIDs but with a better safety profile. This can be an option for patients not fit for surgical treatments.

The choice of medical therapy in treating OA should be individualised. The clinical consideration involves a balance between benefit of pain relief and functional improvement and toxicity, particularly in the elderly population.

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Osteoarthritis – Pain Management

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The learning objective of this article is to help clinicians understand the perspective of a pain specialist towards a patient with pain from osteoarthritis (OA).

The International Association for the Study of Pain (IASP) has declared the year; October 2009 until September 2010 as the Year against Musculoskeletal Pain[1]. The IASP website contains a number of fact sheets for the year against musculoskeletal pain which would be useful for the reader. The IASP defines pain as an unpleasant physical and emotional experience associated with actual or potential tissue damage. This definition helps to explain the bio-psycho-social model of pain. Pain is more than a physical event but will impact on all aspects of a patient's life. OA is often used as an example of nociceptive pain where there is ongoing tissue damage due to the degenerated joint. However, the relationship between symptoms and underlying pathology is far from straightforward. The concordance between radiological changes of OA and symptoms is poor. Up to 40% of people with severe radiological changes of OA are symptom free[2]. Bilateral OA is common but often pain is experienced only on one side. There are many factors that affect whether a person will seek medical help for their OA. Psychological factors may be more important in the functional impairment than radiological evidence of OA[2].

Pain pathophysiology

The joint's intra-articular and periarticular structures, menisci, adipose tissue, synovium and periosteum are innervated with nociceptors, while cartilage is aneural[1]. Synovial inflammation has been demonstrated in OA and may have a role in the pathogenesis of pain. Raised intraosseous pressure arising from impaired venous drainage has been linked with pain in OA[2].

There may be genetic role in OA. The COMT polymorphism val 158met was demonstrated to be associated with pain in OA[1]. In addition, there is heightened pain sensitivity in OA attributed to:

(1) Peripheral Sensitisation: increased sensitivity of nociceptors to mechanical stimuli applied to the joint. This results in primary hyperalgesia with spontaneous pain, and pain with normally innocuous movement. This is due to inflammatory mediators such as bradykinin, prostaglandins and cytokines[1].

(2) Central Sensitisation: changes in the central nervous system enhance sensitivity to mechanical stimuli which develop outside the area of injury – secondary hyperalgesia. This is manifested by referred or radiating pain and reduced pain thresholds in unaffected joints. OA is associated with muscle hyperalgesia. People with OA of the knee experience stronger pain and large referred pain areas to experimental muscle stimulation outside the affected joint[3].

Clinical Features

Use-related pain is characteristic, although rest pain and night pain are also reported. Whilst symptoms are mostly experienced in or near the affected joint, referred pain and tenderness may also occur. Pain is often described as being aching or throbbing in character, interspersed by activity-related episodes of sharp and stabbing pain.

Psychological variables are the strongest predictors of pain severity and include anxiety, depression, hypochondriasis and negative emotion. Not all individuals seek medical care for joint pain and the decision to do so may be related more to coping skills than to the magnitude of joint pain or severity of anatomical change[2].

Treatment

Systematic reviews showed that opioid agonists, paracetamol, non-steroidal anti-inflammatory drugs (NSAIDS), and interleukin-1 inhibitors reduce pain and in some cases improve function in people with OA. Both NSAIDs and paracetamol are better than placebo, however there is concern over the long term use of NSAIDs in the elderly population. Although widely used, glucosamine and chondroitin have not been shown to be superior to placebo[1]. Topical NSAIDs and capsaicin offer potential benefit for some. Intra-articular injection of corticosteroids or hyaluronic acid improve pain and function in OA.

Lifestyle modification, particularly exercise and weight reduction are core component of the management of OA. Systematic reviews of aerobic and strengthening exercises have shown benefits to both pain reduction and improved function in people with knee and hip OA. There is an association of obesity and OA. Weight reduction reduces pain and improves physical activity. Psychological management using cognitive behavioural therapy reduces pain with effects that are maintained through a 6 month follow up[1]. Total joint replacement is considered when there is moderate to severe pain that is not adequately relieved by medical approaches, significant radiographic joint damage and diminished quality of life.

Osteoarthritis – Pain Management

Interdisciplinary care

Interdisciplinary care is defined as treatment from different disciplines that integrate together as a team through communication and common goals. Compared to unimodal approaches or no treatment, interdisciplinary care results in return to work (68% vs. 32%), pain reduction (37% vs. 4%), medication reduction (63% vs. 21%) and increases in activity (53% vs. 13%) respectively in musculoskeletal pain[1]. The biopsychosocial approach views pain and disability as a complex and dynamic interaction among physiological, psychological and social factors that may even worsen the patient's clinical presentation.

Cognitive aspect of pain management

In acute pain, rest promotes recovery. However, when the injury has healed, dysfunctional beliefs about pain and fear in excess of the actual risk of harm can lead to avoidance of activities (physical, social and vocational) adding to the social cost of pain, absenteeism and health care utilisation. In a group of people with OA the level of pain and level of pain-related fear are significantly associated with functional limitations[4].

An effective strategy is graded activity which may have positive effect on cognition and psychology. In exposure therapy patients engage in supervised activities that they rate as fear provoking until they become convinced that the movement can be done without the expected catastrophe. Thus their fear is challenged and they correct their fear expectancies. Catastrophizing is an individual's tendency to ruminate, magnify or feel helpless about pain. Improvements in psychological variables related to catastrophizing such as one's sense of self control over pain and self efficacy are associated with reduction in pain in patients suffering from arthritis[5].

Summary

Pain is a cardinal feature of OA. Our common understanding of OA pain is that it is nociceptive due to joint degeneration and inflammation. There are features associated with peripheral and central sensitisation. Psychological features such as fear avoidance and catastrophizing may account for the presentation of pain in patients with OA and need to be addressed in an interdisciplinary approach to the management of pain.

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Update in Orthopaedic Management of Osteoarthritis of Knee

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Introduction

Many people have the misconception that total knee replacement (TKR) is the only orthopaedic treatment for osteoarthritis (OA) of the knee due to its significant clinical effectiveness. Management of knee OA requires a multi-disciplinary approach involving family physicians, rheumatologists, orthopaedic surgeons, physiotherapists and occupational therapists. In addition, other orthopaedic interventions can be offered to patients with knee OA in different severity of disease.

Assessment to tailor the treatment

1. Assessment of the level of symptoms

The typical symptoms of knee OA are knee pain and stiffness. The pain is generally brought on after activities such as walking and standing. Stiffness is usually experienced when patients start to walk after prolonged sitting. The typical history is that these patients need to stand up a few minutes to "warm up" the knees before they get off the bus at their destination. Locking and give way are two mechanical symptoms commonly observed in patients with knee OA. Locking means sudden interruption of knee movement during flexion that is usually associated with significant pain. The knee can be straightened again after rest and

manipulation. Give way means sudden losing control over the knee or buckles while walking. Both symptoms point to mechanical lesions in the knee such as loose bodies or torn meniscal fragment. Loose bodies in the supra-patellar pouch may be palpable as tender mobile nodules which can be seen in X-ray (Figure 1). For meniscal tear, a clunk may be felt in the corresponding tibia-femoral joint (positive McMurry test). The exact position of loose bodies and the status of the menisci are better shown in MRI scan. Mechanical symptoms together with recurrent effusion are best indicators for the need of arthroscopic debridement surgery.

Figure 1. Loose bodies in supra-patellar pouch and posterior knee

2. Determine the extent of knee compartment involvement

In our locality most knee OA starts from the medial tibio-femoral (TF) compartment. Isolated medial TF compartmental arthritis usually occurs in patients younger than 60 years old. They presented with medial knee pain after standing and walking on level ground. Local tenderness is only elicited over the medial TF joint line. Standing antero-posterior X-ray of the knee shows decrease in medial TF joint space with adjacent OA changes (Figure 2). One should differentiate this from patients with patello-femoral (PF) joint involvement. PF arthritis is associated with anterior knee pain during stairs and slope. Local tenderness is palpated over the PF joint line. While isolated PF arthritis can occasionally be seen, most PF arthritis are associated with TF compartments involvement or known as tricompartmental arthritis. In unicompartmental involvement such as medial TF arthritis, treatment options may include orthosis, high tibial osteotomy and unicompartmental knee replacement. However, if more than one compartment is affected, total knee replacement would be the mainstay of surgical treatment.

Figure 2. Standing XR shows decrease in medial TF joint space and medial osteophytes

Non-operative treatment for unicompartmental arthritis

1. Lateral-wedge insole

By altering foot and ankle alignment, lateral-wedge insole (Figure 3) has been shown to reduce the load on the medial knee and improve knee pain. Proper patient selection of early cases and careful fitting by prosthetic and orthotic colleagues are the keys to good outcome.

Figure 3. Lateral-wedge insole

2. Unloading knee brace

Semi-rigid knee brace (Figure 4) has been used to “unload” the affected compartment through the application of valgus (medial compartment OA) or varus (lateral compartment OA) stress according to the three-point bending principle. Only patients who have early unicompartment arthritis without soft tissue contractures would benefit from this treatment. The limitations of this form of therapy include cost, compliance and difficult fitting in patients with short and obese lower limbs.

Figure 4. Valgus unloading knee brace

Surgical treatment

1. Arthroscopic surgery

Arthroscopic surgery includes joint lavage, removal of loose bodies, debridement of mobile cartilage fragments and unstable torn menisci. The procedure is indicated for patients who have mechanical symptoms of knee locking, give way and effusion caused by loose bodies and / or torn meniscus. Patients who have end-stage arthritis and severe mal-alignment may not benefit from this intervention.

2. High tibial osteotomy

High tibial osteotomy (HTO) has been an established procedure for treatment of medial unicompartmental arthritis since 1960s. As the medial articular surface worn away, the lower limb adopts a varus alignment (Figure 5a) further increasing the medial loading, causing a viscous cycle. The goal of HTO involves correcting the mal-alignment of the lower limb, shifting the load from the diseased medial compartment to the intact lateral compartment, achieving pain relief and delaying the degeneration process. The procedure involves a bone cut in the proximal tibia, correct the mal-alignment and fix the bone by metal implants. The lower limb is corrected from varus to slight valgus alignment (Figure 5b).

Figure 5a. Varus mal-alignment of lower limb in medial unicompartmental OA

Figure 5b. Alignment corrected to slight valgus after HTO

HTO is indicated in medial compartment OA with satisfactory range of movement (<10° flexion contracture and >90° flexion). Contraindications include lateral compartment arthritis and symptomatic PF arthritis. The ideal candidates are those who are young and active, usually less than 60 years old. Unlike joint replacement, patients who underwent HTO can resume physically demanding activities.

Accurate correction of the lower limb alignment is the key to success in HTO. The 10-year "survival" of accurate corrected HTO has been reported to be up to 90% which can be improved further by recent introduction of the computer navigation technology (Figure 6). New angle-stable locking plate (Figure 7) can provide better fixation and eliminate post-operative plaster immobilization. Patients can perform early knee mobilization and regain better range of movement.

Figure 6. Accurate assessment of limb alignment in different planes under navigation

Figure 7. Locking plate provide rigid fixation of bone

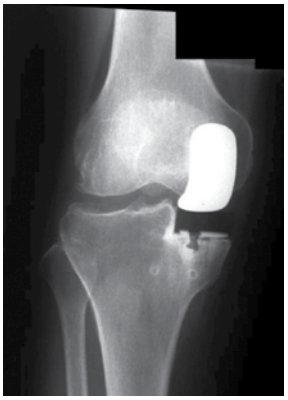

Figure 8. Unicompartment knee

3. Unicompartmental knee replacement

Unicompartmental knee arthroplasty (Figure 8) is indicated when one knee compartment is affected. The principle is to replace the isolated diseased compartment while preserving the adjacent intact joint. Prerequisites are correctable deformity, intact knee ligaments and satisfactory range of movement. Both unicompartmental knee replacement and HTO are indicated in unicompartmental arthritis while HTO is more suitable for those who need high demanding activities Unicompartmental knee intervention leaves a smaller surgical wound, allowing more efficient rehabilitation.

4. Total knee replacement

Total knee replacement is the gold standard for end-stage knee OA with durable alleviation of pain and functional improvement. The diseased surfaces are resected and replaced by metal prosthesis. One can correct significant lower limb mal-alignment and soft tissue contracture. The aim is to restore a painless and stable joint with good range of movement.

Conclusions

Different surgical interventions can be offered to patients who have various severity of knee OA. One should also consider the patient's age and the level of demand for activity according to his/her occupation in the decision making.

Home Management for patients with Osteoarthritis

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As osteoarthritis (OA) is a common degenerative disease affecting predominantly the elderly, the goals of occupational therapy (OT) include maintenance or enhancement of their ability for self care and home management and improvement in their quality of life. OT employs various means of therapeutic modalities to assist them in home management: e.g. use of assistive devices, home environment assessment and modification, education of joint protection and energy conservation principles. Special care to assist patients to resume their activities of daily living is needed for those who undergo total joint replacement for advanced OA.

Application of assistive device in home management

Most patients with OA have limitations in performing domestic work due to pain. It is important not to overload the affected joints by excessive mechanical stress. The application of assistive device can minimize physical stress exerted during daily activities and to avoid further damage to joints. There is a wide range of assistive devices which can lessen the stress on pain, stiffness and joint deformity[1].

Fig. 1 Long-handled sponge, dressing stick, reacher, and sock aids (top to bottom)

Patients with knee OA have difficulty bending or squatting while performing self care tasks such as picking up objects from the floor and getting up from a low stool. Some assistive devices are useful to minimize loading over the knees during bending. Long-handled reachers (Fig. 1) can help picking up things from the floor.

Patients are advised to sit on a high stool to relieve the load off the knees and to avoid prolonged standing e.g. while cooking or ironing, which is not advisable. The application of assistive devices in conjunction with joint protection and exercise training can maximize functional performance[2].

Fig. 2 Handrail for toilet transfer

Patients with knee OA may have reduced stability and poor balance. Home assessment can allow assessment of risk of fall at home. Simple adaptations of toilets and bathing area such as handrails are often prescribed to support the weak knee joint and minimize the risk of fall during toileting (Fig. 2) and minimize loads over the weight bearing joints. A bath board (Fig. 3) facilitates patient transfer into the bath tub without excessive bending. A sitting posture for showering or bathing instead of prolonged standing is advisable.

Fig. 3 Bath board

Habituation of joint protection techniques into daily activities

A routine daily schedule can help establish a habit for physical activity in addition to pain management. Occupational therapists can help design a daily schedule for OA patients with recommended activities that carry minimal load on the joints. Physical inactivity causes reduced muscle strength. Thus, maintenance of muscle strength and endurance, joint flexibility and range of motion through structured daily exercises are important. Vigorous, strenuous and repetitive activities should be avoided. Balance between rest and exercise is also essential. Recognition of onset of pain during an activity is a signal to cessation of exercise[1].

Joint protection and energy conservation are effective for pain management as well as preservation of physical function. Table 1 showed the guiding principles of these techniques. For example, using a small trolley instead of a hand-carried bag for shopping helps reduce strain on weight bearing joints. Frequently-used objects should be put within reach. Daily activities are restructured so that heavy, medium and light activities are done alternatively to allow rest.

Cognitive-behavioural approach (CBA) has also been shown to significantly improve joint protection, functional ability and reduction of pain[3]. CBA emphasises active learning, problem solving, behavioural approaches, frequent practice and home programs. The active group practising CBA was found to have fewer hand deformities in a 4-year follow up study[3].

Post surgical management of persons with OA

Total joint replacement may be needed for patients with severe OA. The rehabilitation program should be commenced soon after surgery to achieve earlier functional improvement. Special precautions may be needed. For instance, elevated toilet seat is recommended in the early rehabilitation phase after total hip replacement to avoid excessive flexion of the hip joints[4].

Home Management for patients with Osteoarthritis

Conclusions

Occupational therapy aims to enhance quality of life of patients with OA through prescription of assistive devices, home modification, education and application of joint protection and energy conservation principles. OT may also be involved in the post-surgical management for those who have undergone total joint replacement in order to preserve the artificial joints from excessive manipulation and to maximize the functional performance of these patients.

Table 1 Joint Protection and Energy Conservation Principles

Joint Protection

- Respect pain: use this as a signal to alter activities
- Distribute load over several joints
- Reduce the force and effort required to perform activities by altering working methods, using assistive devices and reducing the weight of objects
- Use the joint in its most stable anatomical or functional plane
- Avoid position of deformity
- Use the largest and strongest joint
- Avoid static position
- Maintain muscle strength and range of motion
- Avoid poor body position and posture, as well as poor handling techniques

Energy Conservation

- Pace activities by balancing rest and activities, alternating heavy and light tasks and performing activities more slowly
- Simplify work methods
- Modify the environment to suit ergonomic and joint protection techniques

(College of Occupational Therapists, 2003)[5]

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Why, What, and How to Prescribe Exercises to Individuals with Knee Osteoarthritis Living in the Community?

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Impact of Osteoarthritis of the knee

Osteoarthritis (OA) is the most common joint disease causing disability worldwide, affecting more than 7 million people in the US[1]. OA of the knee causes most disability[2] resulting in pain, stiffness, reduced range of movement, quadriceps muscle strength, slowness in walking and inability in rising from chair and doing slopes. Muscle weakness correlates best with functional limitation in knee OA[3]. Our recent study (unpublished data) on 36 community dwelling female with knee OA demonstrated decreased quadriceps strength in 26%, reduced range of knee flexion in weight bearing position in 32%, and increased time-up-and-go test in 22% of subjects. The range of knee flexion was found to be related moderately to the number of chair-rise. This study suggested that joint pain, muscle weakness and functional impairment are key features to be considered in the management of OA.

Why, What, and How to Prescribe Exercises to Individuals with Knee Osteoarthritis Living in the Community?

Can exercises help?

Can exercise help to alleviate symptoms and improve function in patients with OA of the knee? Selected exercises are considered to be one of the most important treatment modalities for patients with mild to moderate knee OA[4]. Improvement in pain control, proprioception, strength, instability, and endurance has been reported with exercises which also contribute to improvement in functional independence[5] and is cost-effective[6].

Why can exercises modulate impairment and dysfunction associated with knee OA?

Exercises can have direct or indirect modulating effects on pain. The mechanisms of OA knee pain include ischaemia, entrapment or irritation of nerve, as well as muscle hypertonus. Muscle hypertonus can be initiated by the afferent inputs from the nociceptors to the spinal cord via the spinal reflex loop. Both agonist and antagonist muscles could be affected and lead to increased joint stiffness. Hitherto, reduced mobility would further compromise vascularity to the joint and could aggravate pain. Aside from setting up the vicious cycle, prolonged immobilisation may also lead to joint contracture and muscle weakness. Such changes would not only alter the normal mechanics of the joint but also induce added loading to the diseased joint. Appropriate exercises may break the vicious cycle by facilitating venous and lymphatic return, decreasing joint stiffness, and improving muscle strength. Joint mechanics can then be restored with even distribution of joint loading for better function.

What are the recommended exercises for individuals with OA?

As pain, joint stiffness, muscle weakness, and functional impairment are interrelated, the goal of a rehabilitation program should aim at improving pain, joint mobility, muscle strength, and functional ability. The effects of isotonic, isometric or isokinetic quadriceps training for 4 to 16 weeks on daily to weekly intervals have been found to increase muscle strength, endurance, pain, and functional ability. Joint stability requires co-contraction and coordination of the agonist and antagonist muscles. In addition to weakness of the quadriceps muscle, reduction in hamstring muscle strength was also reported in 20-30% of patients with knee OA. Training to both muscle groups is recommended. The hip muscles, in particularly, and the glutei muscles work in synergy with the knee muscles to absorb lower limb loading during activity. Comprehensive exercise programmes involving mobilising and strengthening exercises to the whole lower limb in both open and closed chain are effective to alleviate pain, improve joint range, muscle strength and daily function in patients with knee OA. Pool activities, Tai Chi and walking exercises are also recommended for these patients. Nevertheless, poor compliance may occur if there is fear of "pain" induced by the exercise. Exercises prescribed to patients with knee OA should strive for a balance with appropriate type and intensity to the appropriate muscles. These patients need to be supported and encouraged.

Tele-rehabilitation – an adjunct to face-to-face intervention

Self-management programmes for arthritis have been evaluated in the United States and the United Kingdom. Pain, depression, exercise, communication with doctors, as well as participants' perception of ability to self-manage have been found to improve when patients were supported. Self-monitoring using objective measurements might further motivate patients to become pro-active in their own treatment. Our group has developed a user-friendly hardware (SMOK) for measuring pain, range of knee motion, quadriceps muscles strength, time-up-and-go test, as well as number of chair-rise in 30 seconds. Our preliminary findings on 31 female community dwellers with knee OA indicated that continued support from assessment using the SMOK system and weekly communication with a physiotherapist would improve pain, muscle strength and physical performance in a 6-month follow-up after a standardised exercise programme.

Summary

OA of the knee is a common chronic rheumatic conditions. Patients need to learn how to manage their own disease. Strengthening exercises have been found to be beneficial in alleviating pain and improving physical function in these patients while continued support via self-monitoring system, tele-communication may encourage and guide patients in self management.

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An Action Research on the Needs of Rheumatology Patients

A patient conference themed "Exploring Rheumatology from Various Perspectives" was held in July at the Hong Kong Convention Center. This event is a joint effort of the Hong Kong Arthritis and Rheumatism Foundation (HKARF), the Hong Kong Society of Rheumatology (HKSR) and the Community Rehabilitation Network (CRN) of the Hong Kong Society for Rehabilitation. The conference was also joined by 6 rheumatology patient self help groups.

A patient forum was held during the conference with the theme "Patient Expectation and Future Service Development". The survey finding of an action research on the needs of rheumatology patients in Hong Kong was reported by the organizing committee. A total of 311 questionnaires were collected from patients and their caregivers including 111 with ankylosing spondylitis, 37 with systemic lupus erythematosus, 37 with psoriatic arthropathy, 33 with rheumatoid arthritis and 31 with juvenile arthritis.

Representatives from the various patient self help group reported survey results and expressed most concern over the following aspects:

- Early diagnosis before rheumatic conditions get worse
- Rheumatic conditions to be evaluated by experienced specialists each year.
- Shorter waiting time for referral to other specialist clinics
- Detailed explanation and advice in regard to blood test results by medical staff during consultation
- Detailed explanation of treatment plan and advice on patient self care by medical specialists
- More subsidization on medications from the government such that patients would not be declined expensive drugs with good efficacy
- Offer of price reduction of medications by pharmaceuticals, particularly to patients who need long-term treatment
- Early consultation when patient condition gets worse and financial support for impaired work capability

Representatives of the HKARF, HKSR and the CRN were invited to reply to these issues raised at the patient forum. The forum concluded that each participating groups will follow up on these issues and the organizing committee of the patient conference will prepare a report to be submitted to the Hospital Authority for their further action.

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