

Review Article:

Knee Osteoarthritis Evidence Based Guidelines Management: The Missing Truth

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Abstract

Today, knee osteoarthritis (KOA) is the most prevalent arthropathies, affecting up to 251 million people worldwide. In Egypt, recent epidemiologic studies reported that KOA prevalence was 29.2 per 1000, and embodies an enormous public health burden. To enhance remediation this ubiquitous condition, numerous authoritative evidence based guidelines have been developed, with roughly fifty-one clinical guidelines currently exist representing national, international, and several stakeholder organizations. Surprisingly, a current systemic review that critically appraises these guidelines revealed that there is a relative consensus on a lot of KOA management recommendations. This disagreement may be partially explained by the research evidence examined and population characteristics. Ironically, there is no explicit Egyptian guideline available for managing KOA heretofore. Nevertheless, the paramount commonality among all guidelines was a tenet identified as a core intervention encompassing education and self-management, exercise, and weight control. Additionally, to optimize the treatment a coordinated multidisciplinary team approach was strongly supported. Considering these facts, nurses are in a unique position to inform and support their KOA patient's management. Furthermore, given such core interventions are inherent in nursing science, nursing led modalities are envisioned to have substantial positive health outcomes. Therefore, nurses must be aware about their critical role in handling this disease, and must be encouraged to actively participate in evolving effective strategies targeted these core elements. To sum, the significance of this paper stem from at least three reasons. First, it highlighted the lack of agreement in guideline's recommendations. Second, it acknowledged the imperative need for discrete Egyptian KOA guideline. Third, it emphasized the importance of nursing role in counter this disease.

Keywords: Knee Osteoarthritis; Evidence Based Guidelines; Management.

Introduction

Globally, knee osteoarthritis (KOA) is the most prevalent arthropathies, affecting up to 251 million of the adult population. It is a main contributor to impaired mobility and chronic pain, with estimation of being the fourth leading cause of Year Lived with Disability (YLDs) throughout the world^(1,2). Therapeutically, heretofore, there is no treatment option available for KOA that can reverse or halt the inexorable disease progression. For that reason, existing

therapy principally aims to alleviate the symptoms, optimize functional status, enhance patient's quality of life and retard the disease progression. To this end, there are a variety of therapeutic options from which to choose⁽³⁻⁵⁾.

Further, to promote remediation this condition, numerous authoritative evidence based guidelines have been developed, with roughly fifty-one clinical guidelines currently exist representing national, international, and several stakeholder organizations^(6,7). Surprisingly, there are

relative consensus on a lot of KOA management recommendations across these guidelines⁽⁸⁾. To spotlight on this disagreements, a summarize information from currently published treatment guidelines or recommendations will be presented, as well as the controversial therapeutic modalities will be highlighted. Also, to clarify the differences, therapeutic spectrum for KOA was conceptualized into four broad categories; core interventions, nonpharmacological, pharmacological and surgical interventions.

I- Core Interventions:

Core interventions are a set of general nonpharmacological modalities that considered as basis treatments by the most popular clinical guidelines. They should be initiated early for all patients irrespective of KOA severity and reinforced continuously as an integral part of the KOA therapeutic plans. This group of modalities is dominated by education and self management programs, therapeutic exercise, and weight control⁽⁹⁾.

Patient education and self management programs. The large number of treatment guidelines for KOA agrees that patient education and involved in self management programs should be the first step in any treatment plan. As per the guidelines, such programs typically cover specific issues including; clarify the nature of the ailment, nonpharmacological management of pain, medications management, exercise and rest, weight control, and the principles of joint protection. Interestingly, despite the widespread recommendation for these programs, they have small effect sizes on physical outcomes. However, evidence indicates that patient's education can enhance the practice of healthy behaviors, help manage and cope with the disease, improve self efficacy, and allow to be fully involved in shared decision making. Considering this evidence, patient education and self management programs have now become the standard of care^(10,11).

Therapeutic exercise is an essential aspect of management the patients with KOA. As a whole, the supporting evidence suggests that both strengthening and aerobic fitness exercise can effectively relieve pain and reduce activity limitations. Beside its effects on pain and disability from KOA, therapeutic exercise improves the reduced muscle strength, promotes functional independence and ameliorates psychological health⁽¹²⁾.

Weight control. Patients should be advised on the importance of weight control. Also, they should be advised to maintain Body mass index (BMI) within the 20-25 g/m² range. Whereas, if the patient is overweight or obese, weight loss should be a priority, and should be achieved by a combination of diet modification and regular exercise. A more recent systematic review suggests that weight reduction has a positive effect on pain, stiffness, and functional improvement. Therefore, weight loss has been a key recommendations in current guidelines for the management of KOA^(12,13).

II- Nonpharmacological Interventions:

Nonpharmacological interventions are a set of specific treatment modalities for the affected knee, and often considered as adjunct to core interventions. In that sense, they should be undertaken depending on individual patient requirements. This group of modalities consists of physiotherapy and biomechanical interventions⁽¹⁴⁾.

Physiotherapy. A variety of physiotherapy approaches can be utilized to manage KOA, with ultimate aim to control pain and maximize function. Among forty physiotherapy modalities were identified, therapeutic ultrasound, acupuncture, transcutaneous electrical nerve stimulation, temperature modalities and manual therapy are the most commonly featured in clinical practice⁽¹⁵⁾.

- **Therapeutic ultrasound (US)** is the local application of sound waves in the affected knee, which is usually

recommended for manage acute pain. Remarkably, the efficacy of therapeutic US for KOA treatments seems questionable, with limited support to its use from systematic reviews⁽¹⁶⁾. As a result, the Osteoarthritis Research Society International (OARSI) guidelines and American Academy of Orthopaedic Surgeons (AAOS) guidelines were unable to make recommendation for its use^(17,18). The Dutch physiotherapy practice guideline in hip and knee osteoarthritis (HKOA) guidelines recommend against its use in patients with KOA⁽¹⁹⁾. While, therapeutic US is only recommended in the Turkish League Against Rheumatism (TLAR) guidelines⁽²⁰⁾.

- **Acupuncture** involves penetrating the skin at anatomical points on the body with thin, solid, metallic needles that most commonly used for pain relief. Although acupuncture may provide relief to some patients, the evidence is weak^(20,21). Consequently, it nevertheless recommended by the AAOS and the National Institute for Health and Clinical Excellence (NICE) guidelines^(18,23). The OARSI were neither recommending for or against it⁽¹⁷⁾. Whereas, the American College of Rheumatology (ACR) guideline advocate its use for patients who meet a certain such as patient with absolute contraindication to surgery⁽²⁴⁾.
- **Transcutaneous electrical nerve stimulation (TENS)** involves electrical stimulation of cutaneous nerve fibers, which in turn inhibit the transmission of painful stimuli to the spinal cord via gate control theory. It is often used as an adjunct treatment for instant pain relief^(25,26). Again, there is controversy around its utilization, the OARSI guidelines

recommend that TENS should not be used for patients with multi joint OA, and uncertain about its use for KOA only⁽¹⁷⁾. Alike, the AAOS and HKOA guidelines were unable to recommend for or against its use for KOA^(18,19). Conversely, the ACR and NICE guidelines support its use for patients with KOA^(23,24).

- **Temperature modalities**, also known as hot or cold therapy, involve local applications of heat or cold to the affected knee. This can be implemented through the use of hot or cold packs, damp towels, wax baths or hot showers. Locally applied heat can ameliorate discomfort, induce muscle relaxation and facilitate the exercise program. Whereas, applying cold can abate pain and swelling resulting in a convincing beneficial effect on joint range of motion, knee strength and function. Given this advantages, relative safety and low cost, there is universal support for its use^(27,28).
- **Manual therapy** refers to the hands on treatment of a trained therapist, designed to reduce pain by passively facilitating normal functioning of restricted joints. Importantly, the most guidelines recommended manual therapy in combination with exercise for KOA in cases of pain and reversible limitation in joint mobility^(29,30).

Biomechanical Interventions include a broad range of apparatus and appliances that are intended to improve patients' function, relieve pain and potentially reduce disease progression. The main mechanism underlying these approaches is to support and correct biomechanical deficits, reducing stress on the knee by redistributing load and to enhance joint stability. For KOA, walking aids, footwear, braces and insoles are the most of interest in clinical practice^(31,32).

- **Walking aid** such as cane, crutch or wheeled walker can reduce mechanical loading through the knee, relieve pain and improve function. Thus, the most guidelines recommended its use for patients with KOA⁽³³⁾.
- **Appropriate footwear** can be of benefit in patients with KOA because of the reduction of pain and activity limitations. That is, a shoe with soft thick soles and no raised heel is recommended in many guidelines⁽³⁴⁾.
- **Knee braces** includes the use of taping, knee sleeves and unloading knee braces. They are designed to modulate increased focal stresses on the knee compartments and provide mechanical support, are often used in patients with varus and valgus deformities^(35,36). Although there appears good face validity for using braces, the National Health and Medical Research Council (NHMRC) and the European League Against Rheumatism (EULAR) guidelines provided a recommendation against its use^(37,38). The AAOS and the ACR guidelines were unable to recommend for or against its use. Conversely, the NICE, the OARSI and TLAR guidelines advocate its use for patients with KOA^(17,20,23).
- **Insoles** designed to shock absorption leading to reduce knee load, pain and improve function in patients with KOA. Medially wedged insoles are used in the case of lateral compartment OA and laterally wedged insoles are used in the case of medial compartment OA⁽³⁹⁾. However, the recommended use of insoles in patient with KOA was controversial. On the one hand, the NICE, ACR, TLAR and the OARSI guidelines support its use for patients with KOA^(17,20,23,24). On the other hand, The AAOS, the NHMRC and

the EULAR guidelines were not recommending their use^(18,37,38).

III- Pharmacological Interventions:

First of all, pharmacological treatments of KOA are principally adjuncts to core treatments that undertaken when the nonpharmacological interventions are not adequate to induce constant reduction in pain. As such, the chief purposes of pharmacologic management of KOA are to combine pain relief and decrease knee inflammation. Pharmacologic options includes the following^(40,41);

- **Paracetamol (acetaminophen)** is a favorable first line oral analgesic in patient with KOA, because of its safety profile compared with oral NSAIDs. Nevertheless, the relative safety of paracetamol has currently come into question, as recent data suggest that it shares the same spectrum of side effects as oral NSAIDs, and a possible overestimation of the magnitude of pain relief⁽⁴²⁾. Consequently, paracetamol was not the first line oral analgesic in the OARSI guidelines⁽¹⁷⁾. As well, in the NICE guidelines, it was prorogued pending a safety review⁽⁴³⁾.
- **Topical agents** are regarded as alternative first line analgesic in patient with KOA in many guidelines, particularly for those with comorbidity. The two most commonly recommended types are preparations containing capsaicin and those containing topical NSAIDs. Capsaicin is extracted from hot chili peppers with potential anti-inflammatory and relief pain properties. Whereas, topical NSAIDs have been shown to be as efficacious as oral NSAIDs and with a lower incidence of gastrointestinal events. Unfortunately, topical agents frequently cause local skin irritation, eruptions, burning, itch and rash⁽⁴⁴⁾.

- **Nonsteroidal anti-inflammatory drugs (NSAIDs).** Oral NSAIDs such as ibuprofen, naproxen and diclofenac are widely prescribed as a second line treatment option in patients for whom previous treatment has failed to provide sufficient pain relief. Oral NSAIDs are generally quite effective for the management of KOA pain. However, they have substantial and frequent side effects including GI pathologic changes, renal toxicity and potential increased cardiovascular risk. Therefore, they should be used at the lowest effective dose and for the shortest possible duration to avoid such adverse events⁽⁴⁵⁾.
- **Duloxetine.** Duloxetine is a serotonin norepinephrine reuptake inhibitor and is traditionally used as an antidepressant. However, it is believed that KOA pain perception can have a central sensitization component, duloxetine is putatively inhibit centrally mediated pain pathways. Duloxetine has minor adverse effects including nausea, insomnia, dizziness, dry mouth, constipation and fatigue⁽⁴⁶⁾.
- **Opioids.** In many modern KOA guidelines, opioid analgesics e.g., tramadol and codeine are recommended only for manage refractory pain that is unresponsive to prior therapies or when other analgesics are contraindicated. Opioids can be used alone or in formulations together with acetaminophen or aspirin. Undoubtedly, the long term utility of these agents are limited owing to the frequent gastrointestinal side effects and the potential for addiction⁽⁴⁷⁾.
- **Slow acting drugs for osteoarthritis (SADOA)** refers to a heterogeneous group of nutritional products that claim to be beneficial for KOA, with distinctive interest focused on glucosamine and chondroitin sulfate⁽⁴⁸⁾;
 - **Glucosamine and chondroitin sulfate** are both an important constituent of the cartilage matrix. Orally supplementing of these agents, either individually or in combination, are thought to possibly alleviate pain or retard the KOA progression. Although the definite mechanism of action of these agents remains ambiguous, they potentially inhibit inflammation and alter the viscoelastic properties of cartilaginous tissue. Nevertheless, evidence supporting the clinical benefits of these preparations used alone or in combination was inconsistent^(49,50). Accordingly, they utilization of these agents remains conflicting, with recommendation against its use by the NICE guidelines⁽²³⁾. While, the OARSI, the ACR and the EULAR guidelines were unable to recommend for or against its use for KOA^(17,24,38).
- **Intra articular injections (IAI).** The most common IAI agents used to treat KOA include corticosteroids and hyaluronic acid⁽⁵¹⁾;
 - **Intra articular steroid injections (IASI).** Corticosteroids are excellent anti-inflammatory agents, which are injected directly into the knee space. They commonly indicate in case of persistent pain not responded to oral analgesics, painful knee effusion and crystal synovitis. Importantly, a more recent systematic review confirmed the effectiveness of IASI in pain relief was usually short and did not appear to have appreciable long term effects on KOA progression. As well, there was a propensity to decreasing effectiveness with

repeated injections^(52,53). Consequently, the OARSI and the NICE guidelines recommend that IASI for the treatment of OA should be performed in the short term only^(17,23).

- **Intra articular injections of hyaluronic acid (IAHA).** IAHA involve direct injection of exogenous hyaluronic acid (HA) into the knee space. It has been approved for manage of KOA that hasn't responded to pharmacologic treatment. The proposed mechanism of action of HA includes protection of the chondrocytes, improving HA production by synovial fibroblasts and restore normal viscoelastic properties to synovial fluid. Paradoxically, most trials have shown that IAHA are only minimally better than IAI of saline in improving pain and function in patients with KOA. Moreover, a recent cost effectiveness analysis revealed that IAHA higher than any other treatment category^(54,55). As a result, the NICE guidelines has advised against its use⁽²³⁾. In parallel, the OARSI and AAOS guidelines were unable to recommend IAHA as a treatment option^(17,18).

IV- Surgical Interventions:

Principally, surgery is the final treatment option in patients with persistent pain and reduced function impairing their quality of life for whom all conservative treatments have been exhausted. Indeed, there are a variety of evidence based surgical options for KOA including arthroscopic lavage and debridement, osteotomy, conserving surgery and knee arthroplasty. Whereas, deciding which of these procedures is the most appropriate relies on various factors such as the patient's age, comorbidities and the severity of the disease. Importantly, the timing of surgery is critical,

and it should be undertaken before decreased function has become advanced as this may compromise a good outcome⁽⁵⁶⁾.

- **Arthroscopic lavage and debridement** are an arthroscopy based procedures permit direct inspection and treatment of intraarticular conditions of the knee. Arthroscopic lavage involves simply irrigating the knee joint to rid the debris and inflammatory cytokines. While, arthroscopic debridement refers to the procedure of removing calcified loose bodies, smoothing off the roughened cartilage surfaces and shaving osteophytes. However, these measure appears to be of questionable value, since substantial body of evidence now indicates they did not have appreciable effect on patient symptoms⁽⁵⁷⁾.
- **Osteotomy** involves excision of bone and reorienting the alignment of the knee. The goals of the procedure are to relieve pain, slow the degenerative process and postpone arthroplasty. This procedure has generally been suited to younger patients with uni-compartmental KOA accompanied by a varus or valgus deformity. However, it is worth noting that cutting the bone during this procedure may make subsequent joint replacement a more complicated process⁽⁵⁸⁾.
- **Conserving surgery.** Recently, a number of joint conserving surgeries have improved including chondral defect drilling, abrasion chondroplasty and microfracture. These approaches are intended to invoke the body's own repair mechanisms to regenerate new tissue to heal the damaged articular cartilage and subchondral bone. Other methods such as autologous chondrocyte implantation and autologous osteochondral

transplantation are designed to promote regeneration of damaged articular tissues. While appealing in concept, the successful of these modalities is inconsistent^(59,60).

- **Knee arthroplasty** also known as knee replacement, is by far the most common surgical modality for patients with advanced KOA. It include either unicompartmental knee arthroplasty or total knee arthroplasty. Generally, this procedure involves resecting the ends of the bones of the knee and replacing them with a combination of metal and plastic. Although the lives of patients can be transformed by successful knee replacement, many patients are not candidates for this procedure. Further, up to 15 % of patients reported persisting complaints as well as the need for revision is an important issue. Finally, this procedure is highly expensive^(61,62).

Discussion

In this review, the recommendations of contemporary guidelines for KOA management from numerous stakeholder organizations were summarized. On balance, there were a great controversy regarding the efficacy and cost effectiveness of several treatment modalities. These discrepancies may partially explained by the research evidence examined, populations characteristics difference, variance in the guidelines development methodology, and the expert consensus⁽⁶³⁾.

However, these guidelines concur that core interventions such as education and exercise should be given initially for all patients, whereas nonpharmacological and pharmacological modalities should consider on an individual basis. Unquestionably, surgery is regarded as the final option that is reserved for patients with unremitting pain and loss of function impairing their quality of life which are not responded satisfactorily to conservative treatments⁽⁶⁴⁾.

Remarkably, it is very difficult to arrange these modalities in a fixed or stepwise treatment algorithm owing to the heterogeneous clinical nature of KOA. Therefore, an individualized approach is recommended in which the core interventions are given initially for all patients and the other treatment options are considered depending on patient requirements^(65,66). Finally, given the long term as well as waxes and wanes nature of the KOA, the successful management necessitates collaborative working with various professional groups. In this respect, nurses are key assessors of and navigators in the overall management of patients with KOA. Furthermore, the roles of nurses have been expanded to embrace a much larger spectrum of activities such as patient education and counselling, pain management, exercise provision, nutritional support, and running specialist clinics^(67,68).

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