

Trends in Knee Osteoarthritis

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Abstract

Knee osteoarthritis is a degenerative disorder characterized by progressive cartilage erosion and bony changes resulting in a wide range of presentation that progress in severity up to complete disability prevalence studies indicates that by 2030 20% of Americans (about 70 million people) > 65 years of age are at risk for OA. Global statistics reveal over 100 million people worldwide suffer from OA, which is one of the most common causes of disability. This urged researches to search for effective modalities for management of this disease, different modalities emerged in the last few decades aiming at reducing the disease progression and improving the patient quality of life through limitation of pain and maintenance of joint mobility, this modalities included (a) non-pharmacological modalities starting with physical therapy and going through hydro-therapy, and acupuncture, (b) pharmacological modalities including anti-inflammatories, nutrition supplementation and platelet rich plasma, (c) surgical modalities including both osteotomies and total knee replacement surgery, in this article I tried to have a rapid review of recent updates concerned with the application and outcomes of the different modalities mentioned above.

Keywords: *Knee Osteoarthritis; Articular cartilage*

Introduction

In 2005, the estimated prevalence of osteoarthritis among adults in the United States, was approximately 27 million cases [1]. OA is characterized by a repetitive inflammatory response of the articular cartilage due to focal loss or erosion of the articular cartilage and a hypertrophy of osteoblastic activity or a reparative bone response known as osteophytosis [2]. Both of these defining characteristics result in a joint space narrowing or subchondral sclerosis, leading to pain, immobility, and often disability [3,4]. The symptoms of OA, such as pain and stiffness of the joints and muscle weakness, are serious risk factors for mobility limitation and lead to impaired quality of life for the affected population [5]. The condition is often associated with pain and disability and symptomatic subjects often seek medical advice. As there is no known cure for OA, current treatment aims at controlling pain, and improving function and health-related quality of life [6]. Current treatments include a wide range of non-pharmacological, pharmacological, and surgical modalities. Evidence to support the effectiveness of individual treatments, however, is variable [7].

Rehabilitation Centered Approach

Data from large randomized, controlled trials (RCTs) and systematic reviews of the literature indicate that exercise provides small to modest benefits (effect sizes ranging from 0.2 to 0.4) for pain relief, improved function, and reduced disability [4,8-17]. The common equipment used is based on fundamentally different movement progression and resistance patterns such as isotonic (unchanged tension but change in length), isometric (no change in length or angle), and isokinetic (constant resistance with variation in speeds) [9,10]. Typically, the programs last for 6 - 24 weeks with an average of 8 weeks, while working at an average frequency of three sessions per week for an average duration of 30 min each [4]. The goal of the program should be to decrease pain, increase the range of motion, increase the

overall functional strength, educate about posture and gait, as well as to improve physical fitness levels and mobility [6,18]. Physiotherapy has proved to be useful in helping patients with pain and mobility [6,19].

Pharmacological Treatment of Osteoarthritis

Traditionally, non-steroidal anti-inflammatory drugs (NSAIDs) have been the agents of choice for the treatment of pain in patients with OA, including hip OA [20]. Acetaminophen, aspirin and non-steroidal anti-inflammatory drugs (NSAIDs) are commonly used as pain relief medicines to treat OA, Excessive use of NSAIDs can lead to gastric complications, ulcers, increased risk for hospitalization, adverse side effects, and death [12,13]. Glucosamine and chondroitin sulfate are the most widely used dietary supplements for osteoarthritis, with estimated sales in 2004 approaching \$730 million [21]. As glucosamine and chondroitin are produced within the body and are used in the manufacture or repair of cartilage, it is suggested that the synthetic versions work the same way [13]. Although thought to have worked with arthritis, it was found that intra-articular hyaluronic acid, at best, has a small effect in the treatment of knee OA compared with an intra-articular placebo [14]. Significant improvements were seen in other patient-reported outcome measures, with results favoring PRP over HA. Preceding a significant difference in subjective outcomes favoring PRP, there was a trend toward a decrease in 2 proinflammatory cytokines, which suggest that the anti-inflammatory properties of PRP may contribute to an improvement of symptoms [16] a multi-center randomized controlled trial compared Intra-articular injection of two different doses of autologous bone marrow mesenchymal stem cells versus hyaluronic acid in the treatment of knee osteoarthritis found The single intraarticular injection of *in vitro* expanded autologous BM-MSCs together with HA is a safe and feasible procedure that results in a clinical and functional improvement of knee OA, especially when 100×10^6 cells are administered [17].

Surgical Management of Osteoarthritis

Total knee arthroplasty is one of the most common orthopaedic procedures performed. In 2001, 171,335 primary knee replacements and 16,895 revisions were performed [22]. In the recent years, this invasive surgery has become less critical with smaller incisions and less time spent in the hospital [7]. However critical the surgery may seem, it has been shown that both TKA and total knee arthroplasty revision (TKAR) are associated with improved function. The evidence is clear when follow-up period of up to 2 years indicates positive results including studies that extend to 5 and even 10 years of follow-up [15].

In AAOS Treatment of Osteoarthritis of The Knee Evidence-Based Guideline 2nd Edition several guidelines with strong evidence was published [11]

1. Strong evidence supports that obese patients have less improvement in outcomes with total knee arthroplasty (TKA).
2. Strong evidence supports that the use of peri-articular local anesthetic infiltration in total knee arthroplasty (TKA) decreases pain and opioid use compared to placebo.
3. Strong evidence supports that tourniquet use in total knee arthroplasty (TKA) increases short term post-operative pain.
4. Strong evidence supports that, in patients with no known contraindications, treatment with tranexamic acid decreases postoperative blood loss and reduces the necessity of postoperative transfusions following total knee arthroplasty (TKA).
5. Strong evidence supports no difference in outcomes or complications between posterior stabilized and posterior cruciate retaining arthroplasty designs.
6. Strong evidence supports no difference in pain or function with or without patellar resurfacing in total knee arthroplasty.
7. Strong evidence supports not using a drain with total knee arthroplasty (TKA) because there is no difference in complications or outcomes.

8. Strong evidence supports that CPM after knee arthroplasty (KA) does not improve outcomes.
9. Strong evidence supports that rehabilitation started on the day of the total knee arthroplasty (TKA) reduces length of hospital stay.
10. Strong evidence supports the use of tibial component fixation that is cemented or cementless in total knee arthroplasty due to similar functional outcomes and rates of complications and reoperations.

Conclusion

Due to the fact that OA is affecting millions worldwide, measures need to be developed to prevent early progression of the disease. The combination of glucosamine and chondroitin sulfate may have some efficacy in patients with moderate-to-severe symptoms is interesting but must be confirmed by more trials, (NSAIDs) have been the agents of choice for the treatment of pain but Excessive use of NSAIDs can lead to gastric complications, ulcers, increased risk for hospitalization, adverse side effects, and death, the benefits of exercise for the management of OA, particularly knee OA, are evident. Regardless of mode, delivery, or duration, exercise demonstrates small to moderate positive effects for pain relief, function, and disability. , it has been shown that both TKA and total knee arthroplasty revision (TKAR) are associated with improved function.

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