Updated evidence review of osteoarthritis management

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Abstract:

This review will highlight areas of recent developments in our understanding of pain in OA. We discuss potential therapeutic options for OA pain management including nonpharmacological, pharmacological and surgical approaches. We searched electronic databases PubMed, Embase, and google scholar, updated to November, 2017. for all the publications on the osteoarthritis management. The search terms were; “osteoarthritis”, “treatment”, “management”. Osteoarthritis is a significant cause of discomfort and impairment in the basic population. Presently, most patients with osteoarthritis are taken care of in primary care. In summary, in patients identified with OA, conservative management alternatives need to be implemented involving a combination of education, exercise and physiotherapy, weight loss, basic analgesia and neutraceuticals. There are assuring very early information for some illness modifying medicines but refresher courses are needed. Functional aids and orthotics might likewise be suggested. As symptoms intensify, strategies involving anti-inflammatories and intra-articular steroids can be used. In a patient that continuouslies have pain, loss of function and/or disability regardless of optimal conservative management, surgery needs to be taken into consideration.

Introduction:

Osteoarthritis (OA) is the most common type of arthritis and the leading root cause of chronic impairment among older individuals. More than 50% of individuals over the age of 65 years have radiological proof of OA, with around 10% of men and 18% of females experiencing symptomatic OA [1].In a current population-based accomplice study, the life time danger of symptomatic knee OA was 45% [2].

Cartilage is a complex tissue consisted of an extensive extracellular matrix of water, kind II collagen and aggrecan surrounding the cellular part, chondrocytes. A complicated network of cytokines and development factors produced by synovial lining cells and chondrocytes manages the degree of matrix synthesis and degradation [3]. A loss of homeostasis in the upkeep of healthy articular cartilage results in the pathologic deterioration of articular cartilage in OA [4].Although cartilage destruction is a main attribute in OA, this is a condition of the whole joint in which all articular structures are affected. Hyaline cartilage loss is accompanied by bony improvement, capsular stretching and weakness of peri-articular muscles [5]. In some patients, synovitis, ligamentous laxity and bone marrow lesions can be observed.

While synovial inflammation in OA is not as considerable as that observed in the traditional inflammatory forms of arthritis such as rheumatoid arthritis, there is installing evidence that cartilage damage in OA is the outcome of cartilage inflammation at the molecular level [6]. The deterioration is not merely wear and tear, although the mechanical issues are very crucial [4]. It is the mix of molecular damage and inability to effectively manage physical pressures that causes pathology. Unusual mechanical forces stimulate the chondrocyte to create a host of inflammatory moderators which include cytokines and chemokines [5].

OA usually affects the knee, hip, cervical and lumbar spinal column, distal interphalangeal, proximal interphalangeal, carpometacarpal, and metatarsophalangeal joints. Nearly everybody

has structural proof of OA on radiographs in a minimum of one joint by the age of 70 [3]. Nonetheless, only a percentage of those with radiographic illness have symptoms. On the other hand, early unpleasant OA may be unaccompanied by radiographic modification. Furthermore, the seriousness of symptoms may not straight correlate with the seriousness of structural disease

This review will highlight areas of recent developments in our understanding of pain in OA. We discuss potential therapeutic options for OA pain management including nonpharmacological, pharmacological and surgical approaches.

Methodology:

We searched electronic databases PubMed, Embase, and google scholar, updated to November, 2017. for all the publications on the osteoarthritis management. The search terms were; “osteoarthritis”, “treatment”, “management”. Language restrictions were used to only English language for the search. More articles were included through scanning the references list of included studies.

Discussion:

- **Pathophysiology**

OA is an arthropathy of synovial joints that is identified by cartilage loss where there is typically evidence of a periarticular bone reaction [7]. In the early stages of condition, cartilage develops abnormalities at the surface area where it ends up being fibrillated and appears moderately hypercellular [8].As the condition progresses, deep clefts form in the cartilage, with loss of

aggrecan and kind II collagen within the cartilage extracellular matrix (Figure 1). Chondrocytes additionally glob within cartilage, surrounded by regions of extreme staining product showing increased proteoglycan. As continuous cartilage damage happens, the articular joint surface area is harmed, causing loss of joint function. Recent work has revealed that cartilage is not the only structure going through pathological adjustment in OA, and various other vital frameworks in the OA joint, for instance, bone marrow lesions (BMLs) [9] and synovitis [10] have an impact on discomfort perception and OA pathophysiology, which will certainly be discussed in additional information in this article.

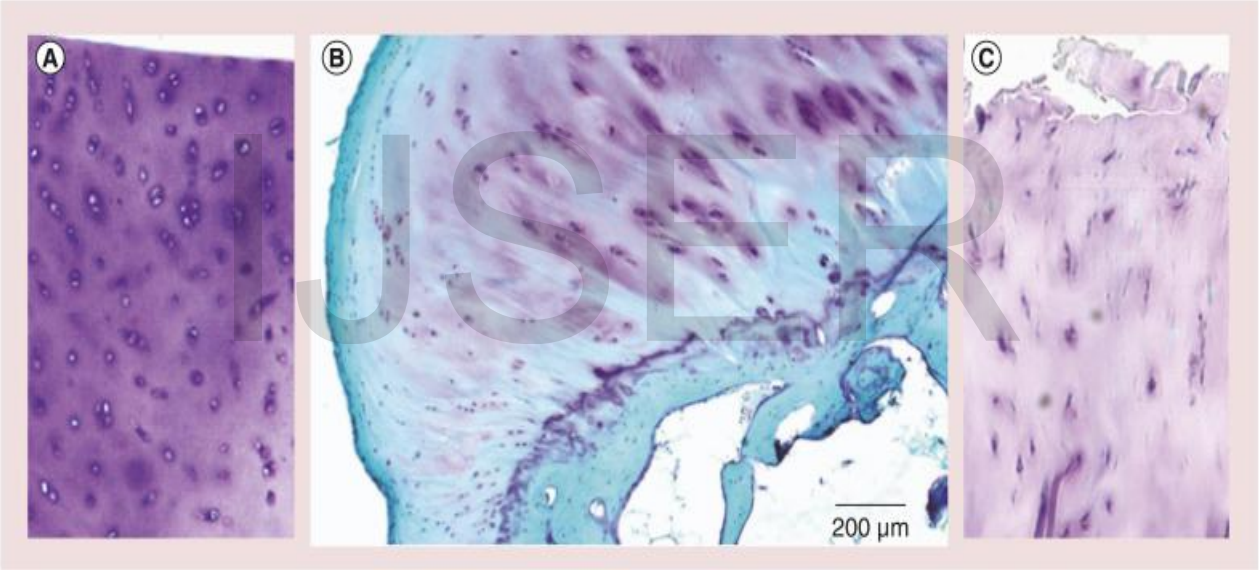

Figure 1. Histological features of tissue damage in osteoarthritis [11].
(A) There is abundant staining of proteoglycans within cartilage with chondrocytes visible **(B)** Early osteoarthritic cartilage showing loss of cartilage extracellular matrix staining, reduction in chondrocytes and early fibrillation **(C)** Severely damaged osteoarthritic cartilage showing profound loss of proteoglycans

- **Diagnosis**

The most common signs and symptom of osteoarthritis is joint pain. The pain tends to intensify with activity, specifically following a duration of rest; this has been called the gelling phenomenon. Osteoarthritis could trigger early morning tightness, yet it typically lasts for less

than 30 minutes, unlike rheumatoid joint inflammation, which causes rigidity for 45 mins or even more [12].Patients could report joint locking or joint instability. These signs and symptoms lead to loss of function, with patients limiting their activities of everyday living due to pain and tightness.

The joints most generally impacted are the hands, knees, hips, and back, yet nearly any type of joint can be entailed. Osteoarthritis is typically uneven. A patient might have severe, incapacitating osteoarthritis of one knee with almost normal function of the other leg.

Physical examination is necessary in making the medical diagnosis. Pain on range of movement and restriction of series of activity are common to all types of osteoarthritis, however each joint has unique physical examination findings (Table 1).

Table 1. Signs and Symptoms of Osteoarthritis [14].

1.Hand	**2.Shoulder**	**3.Knee**
Pain on range of motion	Pain on range of motion	Pain on range of motion
Hypertrophic changes at distal and proximal interphalangeal joints	Limitation of range of motion, especially external rotation	Joint effusion
Tenderness over carpometacarpal joint of thumb	Crepitus on range of motion	Crepitus on range of motion
4.Spine	**5.Foot**	Presence of popliteal cyst (Baker cyst)

Pain on range of motion	Pain on ambulation, especially at first metatarsophalangeal joint	Lateral instability
Limitation of range of motion	Hallux valgus deformity	Valgus or varus deformity
Lower extremity sensory loss, reflex loss, motor weakness caused by nerve root impingement	Limited range of motion of first metatarsophalangeal joint, hallux rigidus	**6.Hip**
Pseudoclaudication caused by spinal stenosis		Pain on range of motion
		Pain in buttock
		Limitation of range of motion, especially internal rotation

Due to the fact that osteoarthritis is mostly a medical diagnosis, doctors could with confidence make the medical diagnosis based upon the history and health examination. Plain radiography can be valuable in confirming the diagnosis and eliminating various other conditions [15]. Advanced imaging methods, such as computed tomography or magnetic vibration imaging, are

seldom required unless the diagnosis is in uncertainty and there is a strong suspicion for one more etiology, such as a meniscal injury.

Laboratory screening usually is not required to make the medical diagnosis. Markers of inflammation, such as erythrocyte sedimentation rate and C-reactive protein degree, are generally normal. Immunologic examinations, such as antinuclear antibodies and rheumatoid element, need to not be gotten unless there is proof of joint inflammation or synovitis, that makes autoimmune arthritis a most likely medical diagnosis. A uric acid level is recommended just if gout pain is thought. Since false-positive outcomes are possible, purchasing a few of these tests could add unneeded complication if the pretest likelihood of gout or an autoimmune arthritis is low [16]. Rheumatic panels (e.g., erythrocyte sedimentation rate, rheumatoid factor, antinuclear antibodies, uric acid, Lyme serology in some locations) have a particularly high rate of false-positive cause health care populaces. An American College of Rheumatology clinical guideline suggests against the routine ordering of arthritis panels for patients with joint issues [16].

- **Treatment**

Non-pharmacological treatment:

Physical therapy

Physical therapy is an essential of the therapy of osteoarthritis. 2 main approaches are applied by physiotherapists: muscle strengthening programmes certain for certain joints and basic aerobic conditioning. Both of these regimens have been plainly shown to enhance pain and impairment in osteoarthritis of the knee [17].A single research has presented that the method of medial taping in

patellofemoral osteoarthritis reduces pain [18].Physical procedures such as diathermy and ultrasound have limited value [17]. In contrast, three tests of trancutaneous electric nerve stimulation (TENS) suggest modest discomfort relief when compared with placebo stimulation [17].It is approximated that osteoarthritis makes up 50% of the work of traditional acupuncturists. The use of acupuncture is sustained by instance series and uncontrolled studies, yet trials that have contrasted arbitrary needling with acupuncture have failed to show measurable benefit for real acupuncture. Ideally, all freshly diagnosed patients with osteoarthritis of the hip or knee should be seen by a physiotherapist.

Weight loss

Because obesity is considered a major danger variable for osteoarthritis, studies have explored whether weight loss boosts patient outcomes. A meta-analysis of weight reduction and knee osteoarthritis ended that weight-loss of 5 percent from standard sufficed to reduce disability [17]. Additionally, pain and disability were decreased if patients lost greater than 6 kg (13.2 pound) [18]. Aerobic exercise is very important for weight loss, but can be testing face to faces with osteoarthritis of weight-bearing joints. Swimming, elliptical training, cycling, and upper body workout may aid in such situations.

Pharmacological Treatment:

Analgesics, non-steroidal anti-inflammatory drugs, and cyclo-oxygenase-2 (COX-2) inhibitors

The evidence sustaining use analgesics and non-steroidal anti-inflammatory medicines in osteoarthritis was lately evaluated [19]. Paracetamol is safe and effective. There is a minor gain from the enhancement of dextropropoxyphene, however this is counterbalanced by the wider

range of negative effects. Numerous short term researches (under six months) have revealed that non-steroidal anti-inflammatory medications are more effective compared to placebo in decreasing discomfort and boosting function, yet there have been few studies that have lasted longer compared to 2 years [20]. Inference from these is difficult as adherence rates with non-steroidal anti-inflammatory medicines are poor as a result of negative results, while those with paracetamol are poor as a result of suboptimal pain alleviation. As lots of as 20-30% of all admissions to health center and deaths from peptic ulcer illness in elderly individuals might be related to use of non-steroidal anti-inflammatory medications [21]. There is evidence that misoprostol and proton pump preventions decrease the threat of severe top intestinal injury induced by non-steroidal anti-inflammatory medications. Adjunctive use H2 blockers has been shown only to decrease the occurrence of duodenal ulceration. The price utility of prophylactic use any one of these agents, nevertheless, is controversial [20]. It is recommended that non-steroidal anti-inflammatory medications are launched only after consideration of negative effects and therapy of the patient; the prescription ought to be reviewed every 6 months.

Topical treatment

Topical treatment is an additional alternative for patients with osteoarthritis who have inadequate pain relief or who could not tolerate systemic therapy. Both best assessed topical agents in the treatment of the condition are non-steroidal anti-inflammatory drugs and capsaicin. A current meta-analysis concluded that 65% of patients allocated to active treatment with topical non-steroidal anti-inflammatory medications had a great reaction compared to just 30% of patients obtaining placebo [22]. Although the element tests were frequently little and of variable top

quality there is sensibly strong proof to conclude that topical non-steroidal anti-inflammatory drugs are effective and safe for patients with osteoarthritis.

Capsaicin is a naturally taking place substance that reversibly diminishes the stores of the neurotransmitter material P from sensory nerve endings; it thereby attenuates the transmission of painful stimuli from the peripheral nerve fibers to greater centres. A meta-analysis of the three placebo controlled trials of capsaicin in osteo arthritis reported that the agent is well endured and has substantially better analgesic impacts than placebo [23].

Intra-articular therapy:

Corticosteroids

Intra-articular corticosteroids are commonly used in the management of patients with osteoarthritis of the knee, most typically in those that have appreciable effusion or various other indicators of active inflammation. Numerous little randomized regulated tests validate premium short-term efficacy to intra-articular placebo in this setting [20] the additional benefits lasting two to 4 weeks. There are, however, essential and maintained responses to the intra-articular placebo injections and arthrocentesis integrated in these researches, such that the team treated with corticosteroids frequently show continual advantage over standard for several months. There is good evidence to support the sensible use of intra-articular corticosteroids in patients with knee osteo arthritis, however as a result of the possibility for multiple intra-articular injections to speed up cartilage damages, they need to not make up the only therapy of patients with chronic, secure osteoarthritis.

Hyaluronic acid

Hyaluronic acid is a straight polysaccharide located naturally in synovial fluid, where it is believed to facilitate shock absorption and lubrication. In individuals with osteoarthritis there is a decreased focus of hyaluronic acid, causing low viscosity synovial liquid and a rise in cartilage filling [24]. Numerous prep work of hyaluronan are currently available for the treatment of osteoarthritis, the main differences remaining in their molecular weight and programs for management. The outcomes of many randomized controlled tests suggest exceptional discomfort alleviation to placebo and equal alleviation to corticosteroid injections but with a greater period of action [25]. The high molecular weight prep work seem to produce higher advantage than the low molecular weight prep work, although this observation requires verification in an identical team randomized regulated test. A considerable proportion of patients (up to 20%) experience a joint flare after shot, which, although transient, may trigger substantial discomfort.

Tidal irrigation

Irrigation of the knee joint with saline by utilizing a broad bore needle emerged as a possible treatment for osteoarthritis after clinical reports sustained the value of arthroscopic lavage. A solitary regulated test has shown significant enhancement hereafter treatment when compared to typical medical management [26].A 2nd trial that contrasted the use of tidal irrigation with formal arthroscopic lavage suggested similar renovations suffering and function at 3 months, but the existence of a meniscal tear anticipated a better feedback to arthroscopic intervention [27].

Surgical

Surgical procedure needs to be reserved for patients whose symptoms have not responded to other therapies. The well-accepted indicator for surgery is continued pain and disability in spite of traditional therapy. The most effective medical intervention is overall joint substitute, with excellent patient results complying with complete joint substitute of the hip, knee, and shoulder

[28].Several prosthetic devices are readily available; nonetheless, controlled tests contrasting the different gadgets are lacking. Patients could expect that a lot of existing joint prostheses will certainly function well for 15 to 20 years [28].

There are various other medical methods to osteoarthritis treatment, yet they have not equated to the success of overall joint substitute. Randomized trials of arthroscopic debridement for osteoarthritis of the knee have constantly cannot reveal an advantage over optimum medical therapy integrated with physical therapy [29].

Conclusion:

Osteoarthritis is a significant cause of discomfort and impairment in the basic population. Presently, most patients with osteoarthritis are taken care of in primary care. In summary, in patients identified with OA, conservative management alternatives need to be implemented involving a combination of education, exercise and physiotherapy, weight loss, basic analgesia and neutraceuticals. There are assuring very early information for some illness modifying medicines but refresher courses are needed. Functional aids and orthotics might likewise be suggested. As symptoms intensify, strategies involving anti-inflammatories and intra-articular steroids can be used. In a patient that continuouslies have pain, loss of function and/or disability regardless of optimal conservative management, surgery needs to be taken into consideration.

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