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How To Manage Knee Arthritis: Best Practices for Treatment Prior to Orthopaedic Referral

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Introduction

Osteoarthritis (OA) of the knee is a debilitating disease in which degeneration of the joint space cartilage can lead to life-altering pain and stiffness. The prevalence of OA has a strong correlation with age, with evidence of radiographic knee OA found in 37.4% of persons older than 60 years of age.^{1,2} According to the Agency for Healthcare Research and Quality's (AHRQ) 2013 report, osteoarthritis was ranked the second most expensive condition for Medicare and private insurers, with over 90% of the hospitalizations for OA involving a knee or hip replacement.³ It is projected that by 2030 the number of primary total knee arthroplasties will increase by 525% and the number of primary hip arthroplasties by 101%.⁴ Proper diagnosis and treatment of all stages of osteoarthritis, is essential to increase value and reduce costs for all stakeholders including patients, physicians and payers. In this article, only the non-operative management of knee OA is discussed. We present a simple algorithm that combines expert opinion, the American Academy of Orthopaedic Surgeon's (AAOS) Clinical Practice Guidelines, and Medicare requirements.^{5,6}

Anatomy

For simplicity's sake, we divide the knee into three compartments: the lateral tibiofemoral compartment, the medial tibiofemoral compartment, and the patellofemoral compartment. OA can affect one (unicompartmental disease), two (bicompartamental), or all three (tricompartamental) compartments.

Should non-operative management fail, non-arthroplasty options include (a) osteotomy (where the limb is realigned, i.e. by turning a varus knee with medial OA into a valgus knee and thus making the weight-bearing forces go through the un-diseased part of the limb) and (b) arthroscopy (where the joint can be debrided and various cartilage restoration techniques used). Arthroplasty options include (a) unicompartmental, (b) bicompartamental, and (c) tricompartamental (total knee) arthroplasty, where the diseased portions are replaced. Let us examine the history, physical exam, radiographic findings, and non-operative treatment options for this patient population.

History

Initially, patients typically complain of pain in the affected compartment and are able to point with one finger to the pain. Global pain in all compartments, where patients put their entire palm on their knee, is a sign of advanced disease or an inflammatory component to their problem. Pain is initially with activity only. As the disease progresses, patients complain of pain at rest and then pain that wakes them up from sleep.

Physical Exam

Hallmarks of the physical exam include crepitus with joint motion, which is best felt by cupping one's hand over the entire anterior aspect of the knee while the patient moves the joint in extension and flexion; crepitus is most easily noted in patients with patellofemoral disease.⁷ Swelling or effusion can be appreciated if the patient's knee is thin and/or if effusion is significant in quantity; a "ballotable" patella has been described in patients with a large effusion. A Baker's cyst, which is commonly found

in the posterior aspect of the knee laterally, may be appreciated. Effusion and cysts change in size depending on the level of activity and disease. As OA tends to be an asymmetric disease, varus (bow legged) and valgus (knock-kneed) deformities can be appreciated with significant medial tibiofemoral and lateral tibiofemoral disease, respectively.

Radiographic Findings

Radiographic signs of OA include osteophytes (spurs), asymmetric narrowing, subchondral sclerosis (thickening of the bone on the affected side manifesting as a thick, white line on x-rays), and intra-articular cysts (Figures 1 & 2). As the disease progresses, not only is the cartilage worn away, but the bone also wears away (Figure 3). Properly ordered and positioned radiographs are essential to reduce the need for repeating radiographs once an orthopaedic referral is obtained. Unless contraindicated by severe pain or history of trauma, x-rays need to be weight-bearing. Only weight-bearing will close the affected compartment and show the true extent of the disease and deformity. In fact, it is not uncommon for a radiologist's report to state "mild or moderate osteoarthritis" in a patient with severe OA, as arthritic joints can be supple and the affected compartment may open in a non-loaded setting (Figure 3). X-rays also need to be taken on a long (chest-x-ray size) cassette. This allows the evaluation of a much larger segment of the long bones and gives a true sense of the angular deformity. Also,

Figure 1. AP X-ray of Left Knee showing valgus deformity of the knee with severe lateral joint space narrowing, subchondral sclerosis (black arrows) and osteophyte formation (white arrows).

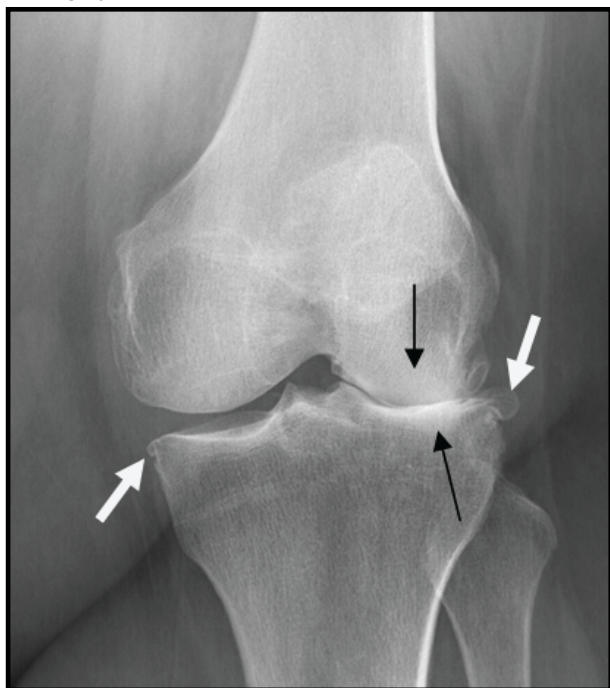


Figure 2. AP X-ray of Left Knee showing multicompartamental osteoarthritis with severe joint space narrowing on the medial side, moderate to severe joint space narrowing on the lateral side. Subchondral cystic changes are also seen, most notably on the medial side, another finding commonly seen in the arthritic knee



old fractures, various tumors, hardware, and ends of hip or ankle arthroplasties that the patient may have forgotten to mention will be discerned.

Standard radiographs should include a total of four views to properly evaluate all three compartments; a typical order set can state: "Weight bearing on a large cassette: AP, Lateral, Sunrise, and 45° flexion PA." The sunrise view makes the patella look like the sun rising between two mountains, which are the femoral condyles making up the sides of the femoral trochlear groove. There are many names, i.e. Merchant view, for this particular x-ray, depending on the technical way the limb and x-ray tube are positioned. The ultimate goal is to evaluate the tracking of the patella between the femoral condyles, i.e. subluxed or tilted, and the amount of cartilage left between the patella and the groove (Figure 4). As the wear in most osteoarthritis patients is posterior and an AP in full extension can mask the true wear of the medial or lateral compartments, the flexion PA taken as shown in the figure, can show the true degree of wear in the patient's knee. (Figures (5)-AP with joint not closed and (6)-45° flexion PA with joint closed laterally) Make sure to document specific abnormalities

Figure 3. AP X-rays of a knee depicting the worsening progressive erosions that are seen in osteoarthritis, with initial loss of joint space from cartilage wear that progressed to osseous erosion of the medial tibial plateau.

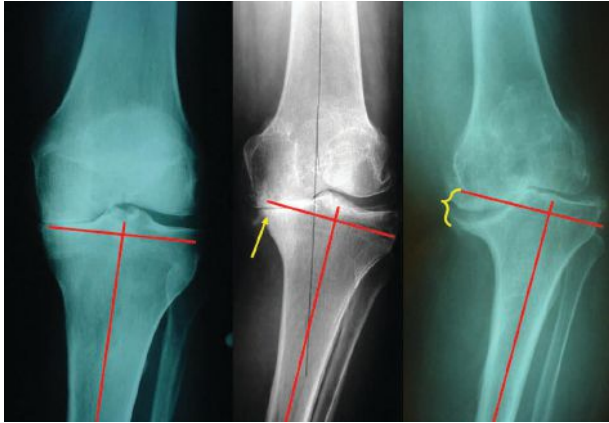


Figure 4. Sunrise view is used to visualize the patellofemoral compartment. In this X-ray, we see lateral patellofemoral narrowing with lateral tilt and subluxation of the patella.



on the radiographs with a particular emphasis on subchondral cysts, subchondral sclerosis, periarticular osteophytes, and joint subluxation.

Non-operative Management

Patients should have exhausted all non-operative measures prior to undergoing any surgical management. We generally talk to patients about all these modalities in our first encounter (Table 1).

Self-Managed Exercise Program

Exercise programs can help alleviate localized joint pain for knee OA. Significant improvements have been shown with both weight-bearing and non-weight-bearing strengthening exercises; no difference in outcomes has been shown amongst isometric, isotonic, or isokinetic exercises.⁸⁻¹²

Course	Goal	Note
Initial assessment	<ul style="list-style-type: none"> Diagnose knee arthritis Educate & discuss all treatment options Address comorbidities Consideration of non-invasive modalities 	<ul style="list-style-type: none"> Image knee, joints above and below, assess misalignment, localize pain Document two of the following: subchondral cysts or sclerosis, peri-articular osteophytes, and joint subluxation
Non-invasive interventions	<ul style="list-style-type: none"> NSAID's or acetaminophen Knee Sleeve Physical Therapy Weight Loss *Glucosamine and chondroitin 	<ul style="list-style-type: none"> Weight loss: 10% if BMI \geq 25 NSAID: Oral or topical/selective if comorbidities -- document 3 week or greater trial of NSAIDs/acetaminophen
Injections (Consider if pain continues and/or limits activities of daily living)	<ul style="list-style-type: none"> Steroids Hyaluronic acid Combine with lidocaine for immediate relief 	<ul style="list-style-type: none"> Steroids: \leq 3 injections per year with 3 months between Hyaluronic acid: If history of benefit and steroids fail
Surgical intervention (Requires documentation of failures of non-surgical treatments)	<ul style="list-style-type: none"> Refer to orthopaedist if symptoms remain intractable or worsen with non-surgical options (document contra-indications) 	<ul style="list-style-type: none"> Payer documentation requires description of failed treatments (NSAIDs, weight loss, PT, IA injections and braces/orthotics or assistive devices -- home exercises or PT and activity modification for 12 weeks or greater)

Figure 5. AP X-ray without flexion showing moderate joint space narrowing on the medial and lateral compartments.



Figure 6. PA X-ray with 45° flexion shows true amount of degeneration of lateral compartment as the posterior femoral wear in OA begins to articulate with the proximal tibial plateau.



Programs should include strengthening, low-impact aerobic exercises, neuromuscular education, and regular physical activity.¹³

Benefits include improved walking pain, walking time, stair walking time, and Western Ontario and McMaster Universities Osteoarthritis Index (WOMAC) function scores.¹⁴ As patients only get a limited amount of PT allotment per year by insurance companies, we ask that they see their therapist once or twice for a home, self-managed program. Lastly, AAOS guidelines have strongly recommended against the use of acupuncture, and have been inconclusive for use of electrotherapeutic modalities.

Weight Loss

Even a modest weight loss is beneficial for patients with symptomatic OA of the knee and a BMI >25. One study has shown significant improvement in

WOMAC function and pain scores with a 10% weight loss from a combined exercise regimen and diet.¹⁵

Bracing

Guidelines for bracing are equivocal. As such, we offer patients a simple pull-over knee sleeve to be worn when active. Unloader braces should be used sparingly due to lack of supporting evidence and an increased cost.

NSAIDs and Analgesics

Oral or topical nonsteroidal anti-inflammatory drugs (NSAIDs), or tramadol, have been strongly recommended by the AAOS as a conservative treatment for patients with symptomatic osteoarthritis of the knee. There is an abundance of literature to support NSAIDs as a modality that provides statistical improvement in the symptoms of OA. Recently, the benefit of acetaminophen or opioids in treatment of symptomatic OA was listed as inconclusive by the AAOS group. Moreover, please note the recent change of maximum dosage to 3000 mg per day from 4000 mg.¹⁶ In order to reduce the risk of side-effects that oral NSAIDs may produce, topical treatments such as diclofenac solution have been shown to effectively provide site-specific treatment for osteoarthritic pain in some studies.¹⁷ AAOS guidelines are strongly against recommending oral glucosamine and chondroitin supplements, although we all have patients that “swear” by the perceived results of this medication.

Injections

Although the AAOS group has found inconclusive evidence to support the intra-articular corticosteroid injections, we use this as a means of reducing patients’ pain, particularly those patients with an acute exacerbation of their chronic knee OA pain.¹⁸ Although variable amongst practices, we give each patient up to three injections of cortisone per year if the last injection has provided great relief for longer than six weeks. Hyaluronic acid (HA) injections are used in patients without inflammatory arthritis, those with mild or moderate OA, those with severe OA who have had a history of a good response to HA, or rare patients who are not surgical candidates for major health risks. Some studies have shown high molecular weight HA’s to have more efficacy than lower weight ones.

Documentation

Documenting the medical necessity for major joint replacement is critical. The Centers for Medicare & Medicaid Services (CMS) provides an online educational guide.⁶ To minimize the likelihood for a denial of claim, the medical record must document that symptoms have not responded

to non-surgical treatments and specifically document a complete description of the patients' historical and clinical findings as listed below:

History

- Description of the pain (onset, duration, character, aggravating, and relieving factors);
- Limitation of Activities of Daily Living (ADLs) – specify;
- Safety issues (e.g. falls);
- Contraindications to non-surgical treatments;
- Listing and description of failed non-surgical treatment such as:
 - o Trial of medications (e.g. NSAIDs);
 - o Weight loss;
 - o Physical therapy;
 - o Intra-articular injections;
 - o Braces, orthotics or assistive devices.

Physical Examination:

- Deformity;
- Range of motion;
- Crepitus;
- Effusion;
- Tenderness;
- Gait description (with/without mobility aides).

Investigations

- Results of applicable investigations (e.g. plain radiographs).

Clinical Judgment

- Reasons for deviating from a stepped-care approach.

An example denial letter from November 2014 is shown highlighting the importance of following the CMS outline.

WV Medicaid Policy applied

Adult InterQual criteria was not met for Total Joint Replacement, Knee due to medical necessity has not been established. Specifically, there is no documentation of pain with range of motion, limited range of motion, and joint effusion or swelling. Imaging does not document two of the following: subchondral cysts, subchondral sclerosis, periarticular osteophytes, and joint subluxation. Conservative treatment does not include non-steroidal anti-inflammatory drugs (NSAIDs) or acetaminophen for 3 weeks or greater and home exercise or physical therapy and activity modification for 12 weeks or greater.

Conclusion

Osteoarthritis is a prevalent condition that can cause severe pain, stiffness, and disability. As such, proper diagnosis and treatment can provide significant quality to patients' lives. Non-operative management should consist of proper use of medications, bracing, exercise regimen, weight loss, and occasional injections. Once those have failed in a symptomatic patient, operative treatment

should be considered with an emphasis on appropriate documentation of medical necessity.

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