



Standard of Care: Osteoarthritis of the Knee

Case Type / Diagnosis: Knee Osteoarthritis. ICD-9: 715.16, 719.46

Osteoarthritis/Osteoarthrosis (OA) is the most common joint disease causing disability, affecting more than 7 million people in the United States¹. OA is a disease process of axial and peripheral joints. It is characterized by progressive deterioration and loss of articular cartilage and by reactive bone changes at the margins of the joints and in the subchondral bone. Clinical manifestations are characterized by slowly developing joint pain, stiffness, and joint enlargement with limitations of motion. Knee osteoarthritis (OA) results from mechanical and idiopathic factors that alter the balance between degradation and synthesis of articular cartilage and subchondral bone.

The etiology of knee OA is not entirely clear, yet its incidence increases with age and in women.¹ The etiology may have genetic factors affecting collagen, or traumatic factors, such as fracture or previous meniscal damage. Obesity is a risk factor for the development and progression of OA. Early degenerative changes predict progression of the disease. Underlying biomechanical factors, such as varum or valgum of the tibial femoral joint may predispose people to OA. However Hunter et al² reported knee alignment did not predict OA, but rather was a marker of the disease severity. Loss of quadriceps muscle strength is associated with knee pain and disability in OA.

Clinical criteria for the diagnosis of OA of the knee has been established by Altman³ Subjects with examination finding consistent with any of the three categories were considered to have Knee OA. The sensitivity of 89% and a specificity of 88% has been established.

- Knee pain and crepitus with active range of motion (AROM) and morning stiffness ≤ 30 min and age ≥ 38 years
- Knee pain and crepitus with AROM and morning stiffness ≥ 30 min and bony enlargements.
- Knee pain and bony enlargements and no crepitus.

The American College of Rheumatological classification criteria for OA of the knee includes radiographic evidence for osteophytes and at least one of the following three items:³

Standard of Care: Osteoarthritis of the Knee

Copyright © 2009 The Brigham and Women's Hospital, Inc., Department of Rehabilitation Services. All rights reserved

- Age \geq 50yrs
- Morning stiffness \leq 30 min in duration
- Crepitus on motion

Kellgren and Lawrence also defined a widely utilized grading system for radiographic evidence of knee OA.⁴

- Grade 1: doubtful narrowing of joint space and possible osteophytic lipping
- Grade 2: definite osteophytes, definite narrowing of joint space
- Grade 3: moderate multiple osteophytes, definite narrowing of joint space, some sclerosis and possible deformity of bone contour
- Grade 4: large osteophytes, marked narrowing of joint space, severe sclerosis and definite deformity of bone contour.

Indications for Treatment:

- Increased Pain
- Impaired Range of Motion (ROM)
- Impaired functional mobility
- Impaired gait
- Impaired balance

Contraindications / Precautions for Treatment:

- **Joint mobilization** is contraindicated in patients involved in a rheumatic flare when both OA and rheumatoid arthritis are present.
- **Modes of exercises** should be chosen to minimize joint reaction forces.
- **Modalities:** Please see appropriate modality procedures for contraindications and precautions for modality use.

Evaluation:

Medical History: Review patients past medical history questionnaire intake form and medical history available in the longitudinal medical record (LMR) when available. Review diagnostic imaging in centricity or report in LMR. Note any possible trauma or history of fracture and previous surgical interventions.

Standard of Care: Osteoarthritis of the Knee

Copyright © 2009 The Brigham and Women's Hospital, Inc., Department of Rehabilitation Services. All rights reserved

History of Present Illness: Patients typically complain of morning stiffness and a “deep ache” in the joint. Pain is commonly aggravated by dampness or changes in barometric pressure. Patients will report stiffness and or pain after prolonged sitting or standing. Patients will typically have difficulties with squatting and bending activities and with stair negotiation.

Social History: Therapists should review patients work, home, social and recreational activities and environments. Areas of focus would be on weight-bearing activities, squatting activities, excessive walking, running, standing and carrying loads.

Medications: Acetaminophen is widely prescribed and considered to be low risk, yet studies have shown minimal benefit for pain reduction. Non steroidal (NSAIDS) are commonly prescribed, but they have significant side effects. Topical diclofenac has been shown to decrease the pain of knee OA with fewer GI side effects. Cyclooxygenase-2-selective inhibitors (COXIBS) have been shown to have side effects to the GI, cardiovascular, renal and hepatic systems. Glucosamine supplements are widely used with controversy with regard to their efficacy and long-term benefits.¹ Patients may also present having undergone injections, and using transdermal patches or narcotics for pain management.

Examination :

This section is intended to capture the most commonly used assessment tools for this case type/diagnosis. It is not intended to be either inclusive or exclusive of assessment tools.⁵

Pain: Measure on the Numeric rating scale (NRS), and body chart. Note activities that increase and decrease symptoms.

Palpation: Joint line pain is a common finding especially the medial compartment. Palpation should include, but not limited to, quadriceps and patellar tendons, hamstring tendons, pes bursa, patella, lateral retinacular tissue and ilio-tibial band.

ROM: arthro and osteo kinematics assessment, with passive and active ROM. Contractures and capsular patterns should be noted. Capsular pattern for the knee is flexion greater than extension.

Strength: Use of Manual muscle testing, Resisted isometrics, endurance and functional testing, i.e., step ups/downs, squatting etc., and hand held dynamometry as appropriate.

Sensation: Dermatome neurological screen with light touch.

Standard of Care: Osteoarthritis of the Knee

Copyright © 2009 The Brigham and Women's Hospital, Inc., Department of Rehabilitation Services. All rights reserved

Posture/alignment: Note pelvic positional faults. Note leg length discrepancy. Lateral compartment OA produces genu valgum and medial compartment OA produces genu varum. Note possible patellar positional faults. Note foot positional faults.

Functional Outcomes: Lower Extremity Functional Scale (LEFS) is used for outcome measures.

Functional Tests:

Assess weight bearing activities, transfers and stairs

Assess gait and assistive device needs.

Balance and Proprioception Tests

Rhomberg, Berg or Tinetti at therapist discretion.

Differential Diagnosis^{5,6}

- Osteonecrosis and/or Fracture of the femur, tibia or patella
- Bursitis
- Meniscal tear
- Hip or ankle pathology
- Lyme Disease
- Tumor
- Mid- Lumbar radiculopathy
- Septic arthritis
- Patellar tendonitis

Assessment:

Establish Diagnosis and Need for Skilled Services

Problem List: (Identify Impairment(s) and/ or dysfunction(s))

Impaired ROM

Impaired Strength

Impaired Gait

Impaired balance

Impaired proprioception

Impaired joint mobility

Impaired knowledge

Impaired functional mobility

Standard of Care: Osteoarthritis of the Knee

Copyright © 2009 The Brigham and Women's Hospital, Inc., Department of Rehabilitation Services. All rights reserved

Prognosis:

The effects of OA of the knee joint are irreversible and ultimately the patient may choose to undergo elective knee joint arthroplasty, however the incorporation of physical therapy treatment can assist to minimize the chronic symptoms of OA and facilitate improved functional capabilities of the patient.

Goals: (Measurable parameters and specific timelines to be included on evaluation form)

- Decreased pain as measured on numeric rating scale (NRS) or elimination of pain on body chart and or independent self pain management strategies.
- Increased ROM all impaired joint planes
- Increased Strength all impaired muscle groups
- Maximize gait quality and quantity, use appropriate assistive devices and orthosis as needed.
- Maximize functional mobility as measured by outcome measure or patient centered goal.
- Improved balance /proprioception
- Independence with home exercise program

Treatment Planning / Interventions:

Established Pathway	<input type="checkbox"/> Yes, see attached.	<input checked="" type="checkbox"/> No
Established Protocol	<input type="checkbox"/> Yes, see attached.	<input checked="" type="checkbox"/> No

Interventions most commonly used for this case type/diagnosis.

This section is intended to capture the most commonly used interventions for this case type/diagnosis. It is not intended to be either inclusive or exclusive of appropriate interventions.

- Aqua therapy- where available, currently not offered at BWH.
- Bracing: In some cases medial or lateral compartment unloader braces can be effective. Jamtvedt et al report that the evidence is unclear regarding the effect of braces in their systematic review⁷
- Strengthening: Non weight bearing progressive resistance exercise, with progression to functional or closed chain exercises as patients' pain allows. Jamtvedt et al found that there is high-quality evidence that exercise improves physical function and reduces pain.⁷

Standard of Care: Osteoarthritis of the Knee

Copyright © 2009 The Brigham and Women's Hospital, Inc., Department of Rehabilitation Services. All rights reserved

- Stretching and normalizing muscle imbalances
- Gait training- assess for assistive devices and promote proper gait mechanics.
- Education in activity modification and home exercise/gym based programs and encouragement for weight reduction.
- Low impact conditioning exercise- swim. Bike, elliptical etc.
- Modalities- Jamtyedt et al report there is moderate-quality evidence that TENS stimulation reduces pain compared with placebo. Ultrasound effect is unclear as the evidence is of low quality. The effect of thermotherapy is unclear secondary to low-quality evidence.
⁷ See standards of care for all modalities

Frequency & Duration:

1-2 X/wk for 4-6wks

Patient / family education:

- Home therapeutic exercise program
- Joint protection techniques
- Proper use of assistive devices, braces and or orthotic use
- Appropriate foot wear
- Weight loss considerations

Recommendations and referrals to other providers:

- Orthopedist
- Orthotist
- Rheumatologist
- Nutritionist

Re-evaluation / assessment:

Standard Time Frame- 30 days or less if appropriate

Other Possible Triggers- a significant change in signs and symptoms or acute trauma.

Standard of Care: Osteoarthritis of the Knee

Copyright © 2009 The Brigham and Women's Hospital, Inc., Department of Rehabilitation Services. All rights reserved

Discharge Planning:

Commonly expected outcomes at discharge:

Patients who undergo treatment should be independent with self pain management skills, independent with a home/gym based program that facilitates increased strength, flexibility, endurance, proprioception and functional mobility. Patients should be independent with the indications for and the application of all assistive devices and or equipment dispensed.

Transfer of Care:

Send patients back to the referring physician if symptoms do not change or “red flags” are present during the examination/re-examination.

Patient’s discharge instructions :

Patients should continue with home therapeutic program indefinitely as OA is a chronic disease process. If symptoms change or worsen patients should follow up with their referring physician.

Authors:

Amy Butler
Kenneth Shannon 6/2003

Reviewed by:

Adele Gagne
Barbara Odaka
Reginald Wilcox

Revised:

Amy Butler PT, 3/2009

Reviewed by:

Michael Cowell PT
Stephanie Boudreau, PT
Leigh De Chaves, PT

Standard of Care: Osteoarthritis of the Knee

Copyright © 2009 The Brigham and Women's Hospital, Inc., Department of Rehabilitation Services. All rights reserved

Reference:

1. Deyle GD, Allison SC, Matekel RL, et al. Physical therapy treatment effectiveness for osteoarthritis of the knee: A randomized comparison of supervised clinical exercise and manual therapy procedures versus a home exercise program. *Phys Ther.* 2005;85(12):1301-1317.
2. Hunter DJ, Niu J, Felson DT, et al. Knee alignment does not predict incident osteoarthritis: The framingham osteoarthritis study. *Arthritis Rheum.* 2007;56(4):1212-1218.
3. Hochberg MC, Altman RD, et al. Guidelines for the medical management of osteoarthritis. *Arthritis and Rheumatism.* 1995;38:1541-1546.
4. KELLGREN JH, LAWRENCE JS. Radiological assessment of osteo-arthrosis. *Ann Rheum Dis.* 1957;16(4):494-502.
5. Magee DJ. *Orthopedic Physical Assessment.* Saunders; 2002.
6. Frontera WR SJ. Essentials of physical medicine and rehabilitation". In: Hanley and Belfus, INC.; 2002.:334-339.
7. Jamtvedt G, Dahm KT, Christie A, et al. Physical therapy interventions for patients with osteoarthritis of the knee: An overview of systematic reviews. *Phys Ther.* 2008;88(1):123-136.

Standard of Care: Osteoarthritis of the Knee

Copyright © 2009 The Brigham and Women's Hospital, Inc., Department of Rehabilitation Services. All rights reserved