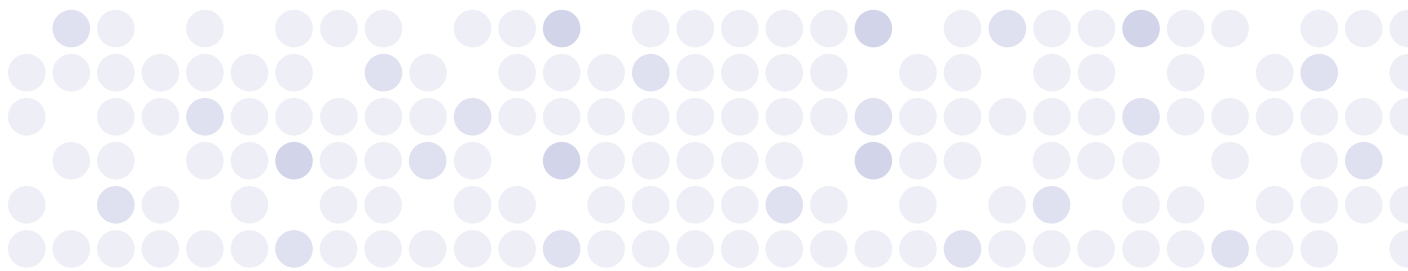


Clinical guidelines for the Queensland workers' compensation scheme

Knee





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Foreword

Clinical guidelines for the Queensland workers' compensation scheme is a selection of clinical guidelines or 'treatment protocols' used by other jurisdictions and medical bodies.

Q-COMP compiled this selection to create a resource for clinicians treating injured workers in Queensland.

Over the course of our research it became clear what type of guidelines are successfully applied to practice and what we should include.

They include guidelines where:

- medical providers were consulted
- nurse and allied health providers identified relevant areas to include
- medical specialty groups endorsed the guidelines
- an effective promotion program was used
- patient education brochures or fact sheets for General Practitioners to provide to their patients were developed
- an education strategy included the Continuing Professional Development (CPD) program
- frameworks for evaluating the guidelines effectiveness were developed ahead or simultaneously with the guidelines themselves.

I am looking forward to receiving your feedback on *Clinical guidelines for the Queensland workers' compensation scheme* and your support in achieving the best outcomes for injured workers in Queensland.

Elizabeth Woods
Chief Executive Officer

Relevance to the workers compensation sector

Each item is rated on a 5-point scale ranging from 5 “Strongly Agree” to 1 “Strongly Disagree”. The scale measures the extent to which a criterion (item) has been fulfilled.

	1	2	3	4	5	6	7	8
	AAOS clinical guideline on osteoarthritis of the knee	Review criteria for knee surgery	Knee pain or swelling; acute or chronic	Knee Complaints	Knee & leg (acute & chronic)	Diagnosis and treatment of adult degenerative joint disease (DJD) of the knee.	AAOS clinical guideline on osteoarthritis of the knee (phase II)	The diagnosis and management of soft tissue knee injuries: internal derangements
<i>Functional Restoration</i>								
Does the guideline consider graded increases in activity and function?	2	1	1	4	4	5	3	5
<i>Psychosocial Factors</i>								
To what degree does the guideline consider psychosocial factors that may influence recovery?	1	1	1	1	1	1	1	1
<i>Return to Work Process (vocational rehabilitation)</i>								
To what degree does the guideline consider the Return to Work Process (vocational rehabilitation)?	1	1	1	5	5	1	1	1
<i>Risk Factors for Recovery</i>								
To what degree does the guideline consider Risk Factors for Recovery?	1	2	1	5	4	1	4	4
Total Score	5	5	4	15	14	8	9	11

Rating criteria

Agree appraisal

Each item is rated on a 5-point scale ranging from 5 "Strongly Agree" to 1 "Strongly Disagree". The scale measures the extent to which a criterion (item) has been fulfilled. The aggregate scores are then converted into a percentage scale ranging from 100% "Strongly Agree" to 1% "Strongly Disagree".

	1	2	3	4	5	6	7	8
	AAOS clinical guideline on osteoarthritis of the knee	Review criteria for knee surgery	Knee pain or swelling; acute or chronic	Knee Complaints	Knee & leg (acute & chronic)	Diagnosis and treatment of adult degenerative joint disease (DJD) of the knee.	AAOS clinical guideline on osteoarthritis of the knee (phase II)	The diagnosis and management of soft tissue knee injuries: internal derangements
Scope and Purpose	78%	67%	72%	56%	50%	56%	72%	67%
Stakeholder Involvement	46%	33%	54%	54%	29%	63%	33%	63%
Rigour of Development	36%	31%	43%	26%	43%	21%	33%	74%
Clarity and Presentation	63%	58%	67%	63%	100%	96%	83%	92%
Applicability	0%	6%	6%	6%	6%	11%	6%	22%
Editorial Independence	17%	7%	58%	25%	17%	67%	17%	83%

Register of clinical practice guidelines for knee

CPG	Name	Source	Developed by
1	AAOS clinical guideline on osteoarthritis of the knee	National Guideline Clearinghouse www.guideline.gov	American Academy of Orthopaedic Surgeons. AAOS clinical practice guideline on osteoarthritis of the knee. Rosemont (IL): American Academy of Orthopaedic Surgeons; 2003.17 p. [114 references]
2	Review criteria for knee surgery	National Guideline Clearinghouse www.guideline.gov	Washington State Department of Labor and Industries. Review criteria for knee surgery. Provider Bull 2003 Dec; (PB 03-16):1-7. [8 references]
3	Knee pain or swelling; acute or chronic	National Guideline Clearinghouse www.guideline.gov	University of Michigan Health System. Knee pain or swelling: acute or chronic. Ann Arbor (MI); University of Michigan Health System;2005 Apr.13 p.
4	Knee Complaints	National Guideline Clearinghouse www.guideline.gov	Knee complaints. Elk Grove Village (IL): American College of Occupational and Environmental Medicine (ACOEM); 2004.31 p. [87 references]
5	Knee & leg (acute & chronic)	National Guideline Clearinghouse www.guideline.gov	Work Loss Data Institute . Knee & leg (acute & chronic). Corpus Christi (TX); Work Loss Data Institute 2006.181 p. [214 references]
6	Diagnosis and treatment of adult degenerative joint disease (DJD) of the knee.	National Guideline Clearinghouse www.guideline.gov	Institute for Clinical Systems Improvement (ICSI). Diagnosis and treatment of adult degenerative joint disease (DJD) of the knee. Bloomington (MN): Institute fro Clinical Systems Improvement (ICSI); 2004 Nov. 43 p. [50 references]
7	AAOS clinical guideline on osteoarthritis of the knee (phase II)	National Guideline Clearinghouse www.guideline.gov	American Academy of Orthopaedic Surgeons. AAOS clinical guideline on osteoarthritis of the knee (phase II). Rosemont (IL): American Academy of Orthopaedic Surgeons; 2003. 15p. [75 references]
8	The diagnosis and management of soft tissue knee injuries: internal derangements	National Guideline Clearinghouse www.guideline.gov	New Zealand Guidelines Group (NZGG). The diagnosis and management of soft tissue knee injuries: internal derangements. Wellington (NZ); New Zealand Guidelines Group (NZGG); 2003 Jul.100 p. [229 references]



AAOS clinical guideline on osteoarthritis of the knee

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1. Developed by

American Academy of Orthopaedic Surgeons. AAOS clinical practice guideline on osteoarthritis of the knee. Rosemont (IL): American Academy of Orthopaedic Surgeons; 2003.17 p. [114 references]

2. Guideline status

This is the original release of this guideline

This guideline updates a previous version; American Academy of Orthopaedic Surgeons. Clinical guideline on knee pain. Rosemont (IL): American Academy of Orthopaedic Surgeons; 1996.12 p.

3. Where located/how accessed

National Guideline Clearinghouse www.guideline.gov

Electronic copies: Available from the American Academy of Orthopaedic Surgeons Web site

Print copies: Available from the American Academy of Orthopaedic Surgeons, 6300 North River Road, Rosemont, IL 60018-4262; Tel (800) 626-6726, (800 346-AAOS); Fax:(487)823-8125; Web site www,aaos.org

The following companion document is available:

- Universe of adult patients with osteoarthritis of the knee—Phase 1. Rosemont (IL): American Academy of Orthopaedic Surgeons; 2003. 1 p.

Electronic copies: Available in Portable Document Format (PDF) from the American Academy of Orthopaedic Surgeons Website.

Print copies: Available from the American Academy of Orthopaedic Surgeons. Address and other contact details as above. Tel: (847) 823-7186, (800) 34-AAOS.

4. Description/scope

Disease/condition(s)

- Osteoarthritis of the knee

Guideline category

- Diagnosis
- Evaluation
- Management
- Treatment

Clinical speciality

- Family Practice
- Internal Medicine
- Orthopaedic Surgery
- Physical Medicine and Rehabilitation
- Rheumatology

Intended users

- Physicians



Guideline objectives

To guide qualified physicians through a series of diagnostic and treatment decisions in an effort to improve the quality and efficiency of care in patients with osteoarthritis of the knee

Target population

Adults (skeletally mature individuals) with confirmed osteoarthritis of the knee

Note: The guideline does not address the treatment of children or the skeletally immature.

Interventions and practices considered

Diagnosis

Differential diagnosis of osteoarthritis of the knee is based on patient history and physical findings

Treatment/management

- Analgesics (e.g., acetaminophen) or nonsteroidal anti-inflammatory medication (NSAIDs) including cyclooxygenase-II (COX-II) inhibitors
- Activity modification
- Ongoing monitoring of complete blood count, renal and liver function tests, and stool guaiac
- Ongoing assessment of response to treatment, with medication change as needed
- Radiography, including standing anteroposterior (AP) view, lateral view, tangential view of the patella-femoral joint ("sunrise" view), and standing posteroanterior (PA) view
- Patient education (counselling about weight loss, avoidance of aggravating activities and support groups)
- use of durable medical equipment (e.g., assistive devices, modified footwear, bracing)
- Physical therapy including general conditioning, muscle strengthening, and range of motion
- Aspiration of synovial fluid to assess for infection
- Arthrocentesis with intraarticular steroid injection
- Viscosupplementation
- Glucosamine and chondroitin sulphate treatment (considered but no recommendation given)
- Referral to musculoskeletal specialist

5. Outcomes considered

- Patient satisfaction
- Symptomatic relief (control of pain)
- Range of motion
- Physical functioning
- Complications associated with treatment

6. Agree appraisal

- Scope and Purpose 78%
- Stakeholder Involvement 46%
- Rigour of Development 36%
- Clarity and Presentation 63%
- Applicability 0%
- Editorial Independence 17%



7. Relevance/appropriateness of use in workers' compensation sector

a) Functional progression

Clinical algorithm(S)

A detailed algorithm is presented in the original guideline document on Universe of Adult Patients with Osteoarthritis of the Knee – Phase I

Treatment/management

- Analgesics (e.g., acetaminophen) or nonsteroidal anti-inflammatory medication (NSAIDs), including cyclooxygenase-II (COX-II) inhibitors
- Activity modification
- Ongoing monitoring of complete blood count, renal and liver function tests, and stool guaiac
- Ongoing assessment of response to treatment, with medication change as needed
- Radiography, including standing anteroposterior (AP) view, lateral view, tangential view of the patella-femoral joint ("sunrise" view), and standing posteroanterior (PA) view
- Patient education (counseling about weight loss, avoidance of aggravating activities, and support groups)
- Use of durable medical equipment (e.g., assistive devices, modified footwear, bracing)
- Physical therapy including general conditioning, muscle strengthening, and range of motion
- Aspiration of synovial fluid to assess for infection
- Arthrocentesis with intraarticular steroid injection
- Viscosupplementation
- Glucosamine and chondroitin sulfate treatment (considered but no recommendation given)
- Referral to musculoskeletal specialist

Major recommendations

Diagnosis

Osteoarthritis of the knee

Definition of the Problem

Osteoarthritis of the knee is an increasingly common problem due to a more active society, often leading to prior knee injuries; an increasingly elderly population; and a growing percentage of the population that is overweight. Osteoarthritis of the knee should be suspected when a patient presents with knee pain that has been longstanding, increases with activity, particularly weight bearing and stairs, and improves with rest. Onset of pain and dysfunction is often insidious. Deformity, fixed contracture, crepitance and effusion are common findings. The differential diagnoses include inflammatory arthritis, bursitis or tendonitis, anterior knee pain and internal derangement.

Recommendations

For patients presenting to the first contact physician with knee pain, those with incapacitating instability, deformity or pain should be referred immediately to a musculoskeletal specialist. For the remainder, initial treatment should include activity modification and trial of an analgesic or non-steroidal anti-inflammatory medication (NSAID). Acetaminophen has been shown to be as effective a pain reliever as NSAIDs in patients with osteoarthritis (OA) of the knee. Selective cyclooxygenase II (COX-II) inhibitors should only be used in those patients with renal or GI risk factors. Patients that respond well to initial treatment should be monitored. Those that use NSAIDs for 6 months should have a complete blood count (CBC), renal and liver function tests and a stool guaiac every 6 months.



Patients should be re-assessed within 1 to 4 weeks, based on the severity of the presenting problem. For patients that fail to respond to the initial treatment, or for whom pain returns, radiographs should be obtained . A standing anteroposterior (AP) and a lateral view should be taken initially. A tangential view of the patella-femoral joint (“sunrise” view) and a standing posteroanterior (PA) view taken in 40 degrees of flexion can be useful . Radiographic feature of OA include: narrowing of the cartilage space, marginal osteophytes, subchondral sclerosis, and beaking of the tibial spines. For those patients with radiographic OA, subsequent treatment should include consideration of: changing to a different NSAID, patient education , physical therapy, and possibly durable medical equipment (DME) . Patient education includes counselling about weight loss, avoidance of aggravating activities, and support groups such as the Arthritis Foundation . Physical therapy should include general conditioning, muscle strengthening, particularly the quadriceps, and range of motion. Durable medical equipment that can reduce pain includes: assistive devices for ambulation such as a cane, appropriate and occasionally modified footwear, and bracing.

Patients should again be reassessed within 1 to 4 weeks. The final treatment intervention involves consideration of aspiration and cortisone injection. If the patient has an effusion and the physician is technically proficient at aspiration, the knee joint should be aspirated in a sterile manner, and the fluid sent for appropriate studies. If the synovial fluid does not show signs of hemarthrosis or infection, the knee joint should be injected with corticosteroid. If the physician is not technically proficient at arthrocentesis, or a hemarthrosis or infection is suspected or confirmed, referral to a musculoskeletal specialist is recommended. In patients without an effusion, a cortisone injection may be indicated if there are signs of inflammation such as: synovial thickening, pain that is diffuse or felt at night or rest, or improved with NSAIDs. Localized knee pain that is felt only with weight bearing is less likely to respond to cortisone injection.

Clinical Outcomes

Control of pain and maintenance of activity correlate well with satisfactory quality of life. If the patient is not satisfied with the outcome due to continued pain and limitation of activity, more aggressive intervention may be warranted. Referral to a musculoskeletal specialist is warranted.

Alternative Approaches

Viscosupplementation may have a role in the treatment of knee pain due to osteoarthritis during the initial 12 weeks in the hands of physicians technically proficient in arthrocentesis. The role of ‘Chondroprotective’ agents such as Glucosamine (GA) and Chondroitin Sulfate (CS) in treatment of osteoarthritis is not yet clear. There is a need for unbiased studies to clarify the issue.

b) Physical/psychiatric rehabilitation

As mentioned above:

Physical therapy should include general conditioning, muscle strengthening, particularly the quadriceps, and range of motion. Durable medical equipment that can reduce pain includes: assistive devices for ambulation such as a cane, appropriate and occasionally modified footwear, and bracing.

c) Risk factor/recovery

Potential harms

Risks and complications of treatment options (i.e., side effect profiles of analgesics and nonsteroidal anti-inflammatory drugs [NSAIDs]). Serious bleeding or renal dysfunction can occur with nonsteroidal anti-inflammatory drugs.

Subgroups of patients most likely to experience these harms

Use of cyclooxygenase-II (COX-II) inhibitors is controversial in patients with known heart disease or hypertension. For certain high-risk patients, including pregnant women, nonsteroidal anti-inflammatory drugs (NSAIDs) are best avoided.

Risk factors for gastrointestinal or renal toxicity are as follows:

- Gastrointestinal risk factors: Age >65; history of peptic ulcer disease or gastrointestinal bleed; concomitant use of glucocorticoids or anticoagulants; smoking; significant ethanol use; comorbid medical conditions
- Renal risk factors: renal disease (creatinine >2.0); hypertension; congestive heart failure; concomitant use of diuretic or angiotensin-converting enzyme (ACE)-inhibitor

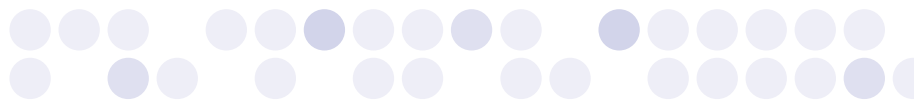
d) Return to work

Not discussed

8. Priority for Q-COMP

Rating criteria

Functional restoration Does the guideline consider graded increases in activity and function?	2
Psychosocial factors To what degree does the guideline consider psychosocial factors that may influence recovery?	1
Return to work process (vocational rehabilitation) To what degree does the guideline consider the Return to Work Process (vocational rehabilitation)?	1
Risk factors for recovery To what degree does the guideline consider Risk Factors for Recovery?	1
Total rating	5



Review criteria for knee surgery

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1. Developed by

Washington State Department of Labor and Industries. Review criteria for knee surgery. Provider Bull 2003 Dec; (PB 03-16):1-7. [8 references]

2. Guideline status

This is the current release of the guideline.

This guideline updates a previous version: Washington State Department of Labor and Industries. Criteria for knee surgery. Olympia (WA); Washington State Department of Labor and Industries: 1999 Jun (republished Aug 2002)

3. Where located/how accessed

Electronic copies: Available for the Washington State Department of Labor and Industries Web site.

Print copies; L&I Warehouse, Department of Labor and Industries, P.O. Box 44843, Olympia, Washington 98504-4843

The following companion documents are available:

- Washington State Department of Labor and Industries. Utilization Review Program. New UR Firm. (Provider Bulletin: PB 02-04). Olympia (WA): Washington State Department of Labor and Industries; 2002 Apr. 12 p.

Electronic copies: Available from the Washington State Department of Labor and Industries Web site.

- Grannemann TW (editor). Review, regulate, or reform? What works to control workers' compensation medical costs? In: Medical treatment guidelines. Olympia (WA): Washington State Department of Labor and Industries, 1994 (republished 2002). p. 3-19.

Electronic copies: Available from the Washington State Department of Labor and Industries Web site.

Print copies are available from the L&I Warehouse, Department of Labor and Industries, P.O. Box 44843, Olympia,

4. Description/scope

Disease/condition(s)

- Injuries of the knee for which surgery is indicated

Guideline category

- Evaluation
- Treatment

Clinical speciality

- Orthopedic Surgery

Intended users

- Health Care Providers
- Health Plans
- Physicians
- Utilization Management



Guideline objectives

To provide the criteria that will be used by the department's Utilization Review vendor to review knee surgery requests

Target population

The injured worker with knee injury

Interventions and practices considered

Evaluation

1. Evaluation of subjective clinical findings (rest/sitting or night pain, joint pain, locking or clicking, knee stability, effusion, swelling, range of motion)
2. Evaluation of objective clinical findings (Lachman's sign, McMurrays' sign, pivot shift, anterior drawer, KT1000 measurements, pain with patellar/femoral movement, recurrent dislocations, loss or erosion of knee cartilage)
3. Imaging studies (arthrogram, magnetic resonance imaging [MRI], arthroscopy, x-ray, computed tomography [CT])

Knee Surgery

- Anterior cruciate ligament (ACL) repair
- Lateral retinacular release, patella tendon re-alignment, or Maquet procedure
- Knee joint replacement
- Diagnostic arthroscopy
- Meniscectomy or meniscus repair
- Chondroplasty
- Subchondral drilling or microfracture
- Osteochondral autograft (mosaicplasty or osteochondral autograft transfer system [OATS] procedure)
- Autologous chondrocyte implantation
- Meniscal allograft transplantation

5. Outcomes considered

None stated

6. Agree appraisal

- Scope and Purpose 67%
- Stakeholder Involvement 33%
- Rigour of Development 31%
- Clarity and Presentation 58%
- Applicability 6%
- Editorial Independence 17%

7. Relevance/appropriateness of use in workers' compensation sector

Functional progression

Procedure	Conservative Care	Clinical findings		
			Subjective	Objective
ANTERIOR CRUCIATE LIGAMENT (ACL) REPAIR	(Not required for acute injury with hemarthrosis) Physical therapy OR Brace	AND	Pain alone is not an indication for surgery Instability of the knee, described as "buckling or give way" OR Significant effusion at the time of injury OR Description of injury indicates rotary twisting or hyperextension incident	AND Positive Lachman's sign OR Positive pivot shift OR Positive anterior drawer OR Positive KT 1000 >3–5 mm = +1 >5–7 mm = + 2 >7mm = +3
LATERAL RETINACULAR RELEASE OR PATELLA TENDON REALIGNMENT OR MARQUET PROCEDURE	Physical therapy (not required for acute patellar dislocation with associated intra-articular fracture) OR Medications	AND	Knee pain with sitting OR Pain with patellar/femoral Movement OR Recurrent dislocaitons	AND Lateral tracking of the patellar OR Recurrent effusion OR Patellar apprehension OR Synovitis with or without crepitus OR Increased Q angle >15 degrees



Procedure	Conservative Care	Clinical findings		
			Subjective	Objective
<p>KNEE JOINT REPLACEMENT</p> <p>If only 1 compartment is affected, a unicompartmental or partial replacement is indicated.</p> <p>If 2 of the 3 compartments are affected, a total joint replacement is indicated.</p>	<p>Medications</p> <p>OR</p> <p>Visco Supplementation injections</p> <p>OR</p> <p>Steroid injections</p>	<p>AND</p> <p>Limited range of motion</p> <p>OR</p> <p>Night time joint pain</p> <p>OR</p> <p>No pain relief with conservative care</p>	<p>AND</p> <p>Over 50 years of age</p> <p>AND</p> <p>**BMI of less than 35</p>	
<p>DIAGNOSTIC ARTHROSCOPY</p>	<p>Medications</p> <p>OR</p> <p>Physical therapy</p>	<p>AND</p> <p>Pain and functional limitations continue despite conservative care</p>		
<p>MENISCETOMY OR MENISCUS REPAIR</p>	<p>(Not required for locked/blocked knee)</p> <p>Physical therapy</p> <p>OR</p> <p>Medication</p> <p>OR</p> <p>Activity modification</p>	<p>AND</p> <p>Joint pain</p> <p>OR</p> <p>Swelling</p> <p>OR</p> <p>Feeling of give way</p> <p>OR</p> <p>Locking, clicking, or popping</p>	<p>AND</p> <p>Positive McMurray's sign</p> <p>OR</p> <p>Joint line tenderness</p> <p>OR</p> <p>Effusion</p> <p>OR</p> <p>Limited range of motion</p> <p>OR</p> <p>Locking, clicking, or popping</p> <p>OR</p> <p>Crepitus</p>	
<p>CHRONDOPLASTY</p> <p>(Shaving or debridement of an articular surface)</p>	<p>Medication</p> <p>OR</p> <p>Physical therapy</p>	<p>AND</p> <p>Joint pain</p> <p>AND</p> <p>Swelling</p>	<p>AND</p> <p>Effusion</p> <p>OR</p> <p>Crepitus</p> <p>OR</p> <p>Limited range of motion</p>	



Procedure	Conservative Care	Clinical findings		
			Subjective	Objective
sUBCHONDRL DRILLING OR MICROFRACTURE	Medication OR Physical therapy	AND	Joint pain AND Swelling	AND Small full thickness chondral defect on the weight bearing portion of the medial or lateral femoral condyle AND Knee is stable with intct, fully functional menisci and Ligaments AND Normal knee alignment AND Normal joint space AND Ideal age 45 or younger
OSTEOCHONDRAL AUTOGRAFT (MOSAICPLASTY OR OSTEOCHONDRAL AUTOGRAPH TRANSFER SYSTEM [OATS] PROCEDURE)	Medication OR Physical therapy	AND	Joint pain AND Swelling	AND Failure of previous subchondral drilling or microfracture Large full thickness chonrral defects that measures less than 3cm in diameter and 1cm in bone depth on the weight bearing portion of the medial or lateral femoral condyle AND Knee is stable with intact, fully, functional menisci and ligaments AND Normal knee alignment AND Normal joint space AND **Body Mass Index of less than 35



Procedure	Conservative Care	Clinical findings		
			Subjective	Objective
aUTOLOGOUS CHONDROCYTE IMPLANTATION (ACI)	Physical therapy for a minimum of 2 months	AND	Injured worker (IW) is capable and willing to follow the rehabilitation protocol.	<p>AND</p> <p>Failure of traditional surgical intervention (i.e., microfracture drilling, abrasion, osteochondral graft). Debridement alone does not constitute a traditional surgical intervention for ACI</p> <p>AND</p> <p>Single, clinically significant, lesion that measures between 1 to 10sqcm in area that affects a weight-bearing surface of the medial femoral condyle or the lateral femoral condyle.</p> <p>AND</p> <p>Full thickness lesion (*Modified Outerbridge Grade III-IV) that involves only cartilage</p> <p>AND</p> <p>Knee is stable with intact, fully functional menisci and ligaments.</p> <p>AND</p> <p>Normal knee alignment</p> <p>AND</p> <p>Normal joint space</p> <p>AND</p> <p>IW is less than 60 years old.</p> <p>AND</p> <p>**Body Mass Index of less than 35</p>

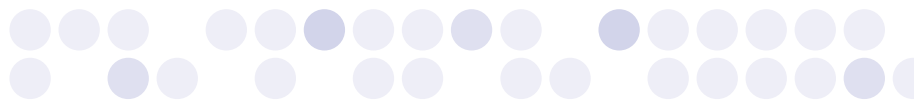


ACI exclusion criteria

ACI is not a covered procedure in any of the following circumstances:

- Lesion that involves any portion of the patellofemoral articular cartilage, bone, or is due to osteochondritis dissecans
- A “kissing lesion” or *Modified Outerbridge Grade II, III, or IV exists on the opposite tibial surface.
- Mild to severe localized or diffuse arthritic condition that appears on standing x-ray as joint space narrowing, osteophytes, or changes in the underlying bone
- Unhealthy cartilage border; the synovial membrane in the joint may be used as a substitute border for up to 1/4 of the total circumference.
- Prior total meniscectomy of either compartment in the affected knee. Must have at least 1/3 of the posterior meniscal rim.
- History of anaphylaxis to gentamycin or sensitivity to materials of bovine origin
- Chondrocalcinosis is diagnosed during the cell culture process.

Please refer to Provider Bulletin 03–02 for additional coverage information. Surgeon should have performed or assisted in 5 or more ACI procedures; or will be performing the ACI under the direct supervision and control of a surgeon who has experience with 5 ACI procedures.



Procedure	Conservative Care	Clinical findings			
			Subjective	Objective	
MENISCAL ALLOGRAFT TRANSPLANTATION	Physical therapy	AND	Capable and willing to follow the rehabilitation protocol	AND	Previous meniscectomy with at least two-thirds of the meniscus removed
	OR Nonsteroidal anti-inflammatory drugs (NSAID)		AND Knee pain has not responded to conservative treatment		AND If *Modified Outerbridge Scale III then debridement must first produce an articular surface sufficiently free of irregularities to maintain the integrity of the transplanted meniscus.
	OR Activity modification				AND Stable knee with intact ligaments, normal alignment and normal joint space AND Ideal age 20-45 years (too young for total knee) AND ** Body Mass Index of less than 35

Meniscal allograft transplantation exclusion criteria

Meniscal Allograft Transplantation is not a covered procedure in any of the following circumstances:

- Mild to severe localized or diffuse arthritic condition that appears on standing x-ray as joint space narrowing, osteophytes, or changes in the underlying bone
- Articular cartilage in the affected compartment demonstrates a chondrosis classified by the *Modified Outerbridge Scale as Grade III that has not undergone debridement; Grade III with debridement that has not produced an articular surface that can maintain the integrity of the transplanted meniscus; or Grade IV.

Please refer to Provider Bulletin 03–02 for additional coverage information.

Surgeon should have performed or assisted in 5 or more meniscal allograft transplantation procedures; or will be performing the meniscal allograft transplantation under the direct supervision and control of a surgeon who has experience with 5 procedures. (Refer to the original Guideline for a listing of the knee surgeries that will and will not require utilization review).

*Modified outerbridge classification

- I. Articular cartilage softening
- II. Chondral fissures or fibrillation <1.25 cm in diameter
- III. Chondral fibrillation >1.25 cm in diameter (“crabmeat changes”)
- IV. Exposed subchondral bone

****Body mass index:** The equation for calculating the Body Mass Index (BMI) = (Weight in pounds ÷ Height in inches ÷ Height in inches) x 703. For example, a 14 of 19 person weighing 210 pounds and 6 feet tall would have a BMI of (210 pounds ÷ 72 inches ÷ 72 inches) x 703 = 28.5.

b) Physical/psychiatric rehabilitation

Not discussed.

c) Risk factor/recovery

None stated.

d) Return to work

Not discussed.

8. Priority for Q-COMP

Rating criteria

Functional restoration Does the guideline consider graded increases in activity and function?	1
Psychosocial factors To what degree does the guideline consider psychosocial factors that may influence recovery?	1
Return to work process (vocational rehabilitation) To what degree does the guideline consider the Return to Work Process (vocational rehabilitation)?	1
Risk factors for recovery To what degree does the guideline consider Risk Factors for Recovery?	2
Total rating	5



Knee pain or swelling; acute or chronic

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1. Developed by

University of Michigan Health System. Knee pain or swelling: acute or chronic. Ann Arbor (MI) ; University of Michigan Health System;2005 Apr.13 p.

2. Guideline status

This is the current release of the guideline.

This guideline updates a previous version; University of Michigan Health System. Knee pain or swelling:acute or chronic. Ann Arbor (MI) University of Michigan Health System; 2002 Aug [rev.2004 Oct].13 p.

3. Where located/how accessed

National Guideline Clearinghouse www.guideline.gov

Electronic copies ; Available in Portable Document Format (PDF) from the University of Michigan Health System Web site.

The following companion document is available:

Continuing Medical Education (CME) information is available from the University of Michigan Health System Web site

The following patient resource is available:

- Patellofemoral pain syndrome rehabilitation exercises. University of Michigan Health System; 2002 Aug. Various p. Electronic copies: Available from the University of Michigan Health System Web site. Spanish version also available from the University of Michigan Health System Web site.

4. Description/scope

Disease/condition(s)

- Knee pain or swelling (acute or chronic)

Guideline category

- Diagnosis
- Management
- Treatment

Clinical speciality

- Emergency Medicine
- Family Practice
- Internal Medicine
- Orthopedic Surgery
- Paediatrics
- Rheumatology

Intended users

- Physicians



Guideline objectives

To facilitate a comprehensive, yet efficient evaluation of knee pain

To recommend appropriate use of knee x-rays and magnetic resonance imaging (MRI)

To provide optimal treatment of knee pain

To identify indications for consultation

Target population

Children, adolescents, and adults with knee pain.

Interventions and practices considered

Diagnosis

Comprehensive history and physical

Laboratory and ancillary tests

- Blood studies (e.g., complete blood count, sedimentation rate, fungal, tuberculosis or bacterial cultures)
- Synovial fluid analysis (e.g., cell count, crystals, fungal, tuberculosis, or bacterial cultures)
- Arthrocentesis/aspiration
- X-ray
- Magnetic resonance imaging (MRI)
- Vascular studies

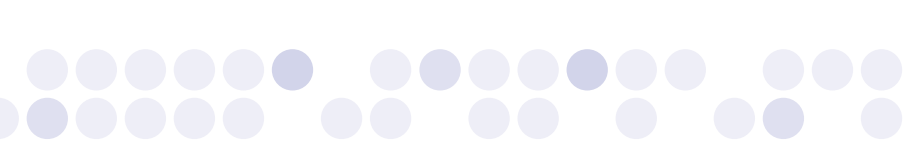
Treatment/management

1. Pain/inflammation control

- Topical treatment
 - Ice
 - Capsaicin
- Oral
 - Acetaminophen
 - Salicylates
 - Traditional non-steroidal anti-inflammatory drugs (NSAIDS)
 - Cyclooxygenase-2 (COX-2) inhibitors
 - Combination preparations such as diclofenac sodium & misoprostol
 - Alternative medicine such as glucosamine and chondroitin
- Intraarticular injection
 - Hydraulic acid (HA) injections
 - Anaesthetics
 - Corticosteroids

2. Activity modification

- Biomechanical assessment
- Restriction and/or rest
- Knee padding
- Extension splints
- Crutches

- 
3. Therapeutic exercises
 - Quadriceps strengthening
 - Hamstring and calf stretching
 - Knee strengthening
 - Low impact aerobics
 4. Referral to specialist

5. Outcomes considered

- Utility of diagnostic tests for evaluating knee pain
- Degree of pain relief
- Physical functioning
- Drug interactions and side effects

6. Agree appraisal

- Scope and Purpose 72%
- Stakeholder Involvement 54%
- Rigour of Development 43%
- Clarity and Presentation 67%
- Applicability 6%
- Editorial Independence 58%

7. Relevance/appropriateness of use in workers' compensation sector

a) Functional progression

Clinical algorithm(s)

The original guideline document contains clinical algorithms for:

- Knee Pain without Constitutional Symptoms
- Knee Pain with Constitutional Symptoms
- Traumatic Knee Pain
- Knee Effusion that is Not Grossly Bloody

Interventions and practices considered

Diagnosis

1. Comprehensive history and physical
2. Laboratory and ancillary tests
 - Blood studies (e.g., complete blood count, sedimentation rate, fungal, tuberculosis, or bacterial cultures)
 - Synovial fluid analysis (e.g., cell count, crystals, fungal, tuberculosis, or bacterial cultures)
 - Arthrocentesis/aspiration
 - X-ray
 - Magnetic resonance imaging (MRI)
 - Vascular studies



Treatment/management

1. Pain/inflammation control

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- Ice
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- Restriction and/or rest
- Knee padding
- Extension splints
- Crutches

3. Therapeutic exercise

- Quadriceps strengthening
- Hamstring and calf stretching
- Knee strengthening
- Low impact aerobics

4. Referral to specialist

Major recommendations

Note from the National Guideline Clearinghouse (NGC): The following key points summarize the content of the guideline. Refer to the full text of the original guideline document for additional information, including detailed information on dosing, possible side effects, and cost of medications; risk factors; and subspecialty referrals.

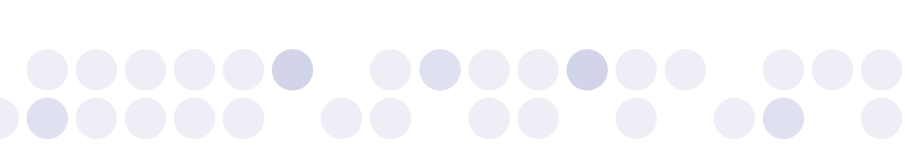
Diagnosis

The majority of knee pain is caused by patellofemoral syndrome and osteoarthritis.

Magnetic resonance imaging (MRI) of the knee has been proven not to be superior to the clinical exam by an experienced examiner in the evaluation of acute knee injuries.

Magnetic resonance imaging may be useful to assess bone pathology underlying chronic knee pain .

Differentiating between knee pain without constitutional symptoms, knee pain with constitutional symptoms, and traumatic knee pain is helpful in determining a diagnosis (refer to Figures 1, 2, and 3 in the original guideline document for details).



Patients with knee pain and swelling who have non-bloody aspirates may also have serious knee pathology (refer to Figure 4 in original guideline document for details).

Treatment

Exercises are important. Many knee conditions will improve with conservative treatment consisting of low-impact activities and exercises to improve muscular strength and flexibility. Patellofemoral dysfunction is best treated with vastus medialis strengthening and hamstring and calf stretching.

In most cases a home treatment program should be explained in detail to the patient, including specific guidelines for activity modification and exercises. Initially, formal physical therapy is usually not required.

All patients with mild to moderate knee osteoarthritis who do not have medical contraindications should be offered an exercise program that includes lower extremity strengthening and stretching exercises combined with low impact aerobic exercises (e.g., swimming, biking, walking, cross-country skiing).

The initial drugs of choice for the treatment of the pain of knee osteoarthritis are acetaminophen and/or topical capsaicin. If a traditional non-steroidal anti-inflammatory drug (NSAID) is indicated, the choice should be based on cost (refer to Table 6 in original guideline document for details). Cyclooxygenase-2 (COX-2) inhibitors are no more effective than traditional NSAID agents; they may offer a short-term but probably no long-term advantage in gastrointestinal (GI) tolerance for some patients. Due to cost and increased heart attack risk, COX-2 inhibitors should be reserved for carefully selected patients (refer to Table 7 in the original guideline document for details).

Follow-up

Symptoms should not be allowed to persist for more than 12 weeks before a reevaluation of the condition, along with possible consultation with physical therapy or a musculoskeletal specialist (e.g., orthopedic surgeon, rheumatologist, physiatrist, or sports medicine specialist).

b) Physical/psychiatric rehabilitation

As stated above:

Major recommendations

Treatment

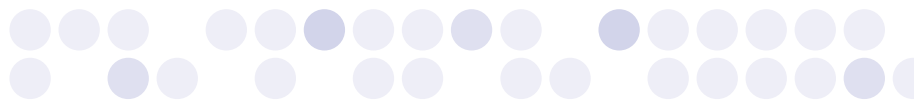
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All patients with mild to moderate knee osteoarthritis who do not have medical contraindications should be offered an exercise program that includes lower extremity strengthening and stretching exercises combined with low impact aerobic exercises (e.g., swimming, biking, walking, cross-country skiing).

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Symptoms should not be allowed to persist for more than 12 weeks before a reevaluation of the condition, along with possible consultation with physical therapy or a musculoskeletal specialist (e.g., orthopedic surgeon, rheumatologist, physiatrist, or sports medicine specialist).



c) Risk factor/recovery

Potential harms

Adverse treatment effects

- *Non-steroidal anti-inflammatory drugs (NSAIDs) and cyclooxygenase-2 (COX-2) inhibitors:* There is a potential for gastrointestinal side effects, including gastrointestinal bleeding, with both classes of drugs. Analyses of major trials of COX-2 inhibitors demonstrate an increase in cardiovascular event rates for patients taking COX-2 inhibitors.
- *COX-2 inhibitors* should be used with caution in patients at high risk for atherosclerotic disease until further studies clarify the potential risks.
- Both *glucosamine* and *chondroitin* appear to be quite safe with few side effects, particularly in comparison to NSAIDs. The chondroitin sulfate molecule is similar in structure to heparin, and may interact with anticoagulation medications.
- *Intraarticular injection:* Potential side effects include introduction of infection, skin necrosis, tendon and cartilage weakening, and systemic effects of corticosteroids (especially hyperglycemia).
- *Hyaluronic acid injection:* Adverse effects with intraarticular hyaluronic acid injections occur in about 8% of patients and are limited usually to a mild, self-limiting local reaction.

Contraindications

Non-steroidal Anti-inflammatory Drugs (NSAIDs)

Traditional NSAIDs should not be given to patients with documented intolerance to traditional NSAIDs or risk factors for gastrointestinal bleeding, such as: (1) a history of upper gastrointestinal bleeding, (2) receiving chronic, high dose systemic corticosteroids, or (3) presence of a bleeding disorder.

Cyclooxygenase-2 (COX-2) Inhibitors

- Celecoxib is contraindicated in sulfa-allergic patients.
- COX-2 inhibitors should usually be avoided in patients with cardiac risk factors.
- Do not prescribe COX-2s to patients with known coronary heart disease.

d) Return to work

Not discussed.

8. Priority for Q-COMP

Rating criteria

Functional restoration Does the guideline consider graded increases in activity and function?	1
Psychosocial factors To what degree does the guideline consider psychosocial factors that may influence recovery?	1
Return to work process (vocational rehabilitation) To what degree does the guideline consider the Return to Work Process (vocational rehabilitation)?	1
Risk factors for recovery To what degree does the guideline consider Risk Factors for Recovery?	1
Total rating	4



Knee complaints

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1. Developed by

Knee complaints. Elk Grove Village (IL): American College of Occupational and Environmental Medicine (ACOEM); 2004.31 p. [87 references]

2. Guideline status

This is the current release of the guideline.

This guideline updates a previous version: Harris, J, ed. Occupational Medicine Practice Guidelines; American College of Occupational and Environmental Medicine. Beverly Farms, MA: OEM Press; 1997

3. Where located/how accessed

National Guideline Clearinghouse www.guideline.gov

Electronic version and print copies are available from ACOEM, 25 Northwest Point Boulevard, Suite 700, Elk Grove Village, IL 60007; Tel: 847-818-1800 x399

4. Description/scope

Disease/condition(s)

- Knee complaints

Guideline category

- Diagnosis
- Evaluation
- Management
- Treatment

Clinical speciality

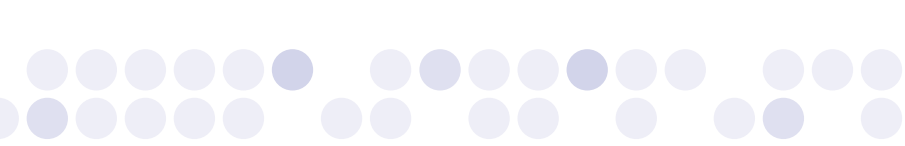
- Family Practice
- Internal Medicine
- Orthopaedic Surgery
- Physical Medicine and Rehabilitation
- Preventative Medicine
- Surgery

Intended users

- Advance Practice Nurses
- Physicians Assistants
- Physicians
- Utilization Management

Guideline objectives

To provide information and guidance on generally accepted elements of quality care in occupational and environmental medicine



To improve the efficiency with which the diagnostic process is conducted, the specificity of each diagnostic test performed, and the effectiveness of each treatment in relieving symptoms and achieving cure

To present recommendations on assessing and treating adults with potentially work-related knee complaints

Target population

Adults with potentially work-related knee complaints seen in primary care settings

Interventions and practices considered

Note from the *National Guideline Clearinghouse (NGC)*: The following general clinical measures were considered. Refer to the original guideline document for information regarding which specific interventions and practices under these general headings are recommended, optional, or not recommended by the American College of Occupational and Environmental Medicine.

1. History
2. Physical exam
3. Patient education
4. Medication
5. Physical treatment methods
6. Aspirations and injections
7. Rest and immobilization
8. Activity and exercise
9. Detection of neurologic abnormalities
10. Radiography
11. Imaging
12. Surgical considerations

5. Outcomes considered

Missed work days

6. Agree appraisal

- Scope and Purpose 56%
- Stakeholder Involvement 54%
- Rigour of Development 26%
- Clarity and Presentation 63%
- Applicability 6%
- Editorial Independence 25%



7. Relevance/appropriateness of use in workers' compensation sector

a) Functional progression

Not specifically stated

The following clinical algorithms are provided in the original guideline document:

- American College of Occupational and Environmental Medicine Guidelines for care of acute and subacute occupational knee complaints
- Initial evaluation of occupational knee complaints
- Initial and follow-up management of occupational knee complaints
- Evaluation of slow-to-recover patients with occupational knee complaints (symptoms >4 weeks)
- Surgical considerations for patients with anatomic evidence of torn meniscus or ligament and persistent knee symptoms
- Further management of occupational knee complaints

b) Physical/psychiatric rehabilitation

Summary of recommendations for evaluating and managing knee complaints (refer to the original guideline document for more detailed information)

Clinical measure	Recommended	Optional	Not recommended
History	Basic history, with careful search for mechanism of injury		
Physical exam	Focused physical exam, including ligament testing and careful search for any swelling		
Patient education	Patient education Full disclosure of diagnostic accuracy, prognosis, and expectations of treatment		
Medication (See Chapter 3 in the original guideline document)	Acetaminophen Aspirin	Opioids for severe pain Non-steroidal anti-inflammatory drugs (NSAIDs)	Use of opioids for more than 2 weeks

Clinical measure	Recommended	Optional	Not recommended
Physical treatment methods	<p>Nonoperative rehabilitation for medial collateral ligament injuries</p> <p>Short postoperative rehabilitation for anterior cruciate ligament (ACL) repair prior to home exercise program</p> <p>Conservative treatment for selected ruptures of the ACL</p> <p>Exercises for cases of anterior knee pain or ligament strain</p>		Passive modalities without exercise program
Aspirations and injections	Aspiration of tense prepatellar bursa		
Detection of neurologic abnormalities	Electromyography (EMG) to clarify nerve root dysfunction in cases of suspected disk herniation preoperatively or before epidural injection	Repeated aspirations or corticosteroid injections	Aspiration through infected area
Rest and immobilization	Short period of immobilization after an acute injury to relieve symptoms	Functional bracing as part of a rehabilitation program	<p>Prophylactic braces</p> <p>Prolonged bracing for ACL deficient knee</p>
Activity and exercise	<p>Stretching</p> <p>Aerobic exercise</p> <p>Maximal activity of other parts while recovering from knee injury</p>		Excessive rest (may lead to generalized debilitation)
Detection of neurologic abnormalities			Electrical studies (contraindicated for nearly all knee injury diagnoses)
Radiography	Plain-film radiographs for suspected red flags	Plain-film radiographs for tense hemarthroses	Routine radiographic film for most knee complaints or injuries
Imaging	Magnetic resonance imaging (MRI) study to determine extent of ACL tear preoperatively		MRI for ligament collateral tears



Clinical measure	Recommended	Optional	Not recommended
Surgical considerations	<p>Arthroscopic meniscectomy or repair for severe mechanical symptoms and signs or serious activity limitations if MRI findings are consistent for meniscal tear</p> <p>ACL repair for symptomatic instability (i.e., serious activity limitation) if results of Lachman and pivot-shift tests and MRI are positive (C, D)</p>	ACL reconstruction before rehabilitation has been attempted	<p>Surgical repair of isolated medial collateral ligament (MCL) ruptures</p> <p>Immediate surgical reconstruction of all ACL tears on basis of MRI findings without physical findings confirming diagnosis or worker life demands requiring high knee performance</p>

c) Risk factor/recovery

- False-positive or false-negative diagnostic tests
- Risks and complications of surgical procedures and imaging studies (e.g., infection, radiation)

Contraindications

Electrical studies are contraindicated for nearly all knee injury diagnoses

d) Return to work

Not stated



8. Priority for Q-COMP

Rating criteria

Functional restoration Does the guideline consider graded increases in activity and function?	4
Psychosocial factors To what degree does the guideline consider psychosocial factors that may influence recovery?	1
Return to work process (vocational rehabilitation) To what degree does the guideline consider the Return to Work Process (vocational rehabilitation)?	5
Risk factors for recovery To what degree does the guideline consider Risk Factors for Recovery?	5
Total rating	15



Knee & leg (acute & chronic)

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1. Developed by

Work Loss Data Institute . Knee & leg (acute & chronic). Corpus Christi (TX); Work Loss Data Institute 2006.181p. [214 references]

2. Guideline status

This is the current release of the guideline.

This guideline updates a previous version: Work Loss Data Institute. Knee & Leg (acute & chronic). Corpus Christi (TX); Work Loss Data Institute; 2005.190p.

3. Where located/how accessed

National Guideline Clearinghouse www.guideline.gov

Electronic copies: Available to subscribers from the Work Loss Data Institute web site

Print copies: Available from the Work Loss Data Institute, 169 Saxony Road, Suite 210, Encinitas, CA 92024; Phone: 800-488-5548, 760-753-9992, Fax:760-753-9995; www.worklossdata.com

The following companion documents are available:

- Background information on the development of the Official Disability Guidelines of the Work Loss Data Institute is available from the Work Loss Data Institute Web site.
- Appendix A. ODG Treatment in Workers' Comp. Methodology description using the AGREE instrument. Available to subscribers from the Work Loss Data Institute Web site

The following patient resource is available:

- Appendix B. ODG Treatment in Workers' Comp. Patient information resources. 2006.

Electronic copies: Available to subscribers from the Work Loss Data Institute Web site.

Print copies: Available from the Work Loss Data Institute, 169 Saxony Road, Suite 210, Encinitas, CA 92024; Tel: 800-488-5548, 760-753-9992; Fax: 760-753-9995; www.worklossdata.com

Description/scope

Disease/condition(s)

- Work-related knee and leg ailments, including anterior cruciate ligament (ACL) tears, collateral ligament tears, meniscus tears, osteochondral defects, patellofemoral syndrome (PFS), and arthritis

Guideline category

- Diagnosis
- Evaluation
- Management
- Treatment

Clinical speciality

- Family Practice
- Internal Medicine



- Orthopaedic Surgery
- Physical Medicine and Rehabilitation

Intended users

- Advanced Practice Nurses
- Health Care Providers
- Health Plans
- Nurses
- Physician Assistants
- Physicians

Guideline objectives

- To offer evidence-based step-by-step decision protocols for the assessment and treatment of workers' compensation conditions

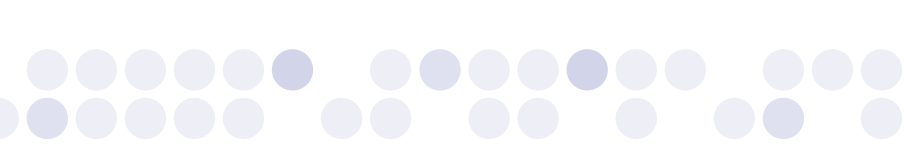
Target population

- Workers with knee and leg ailments

Interventions and practices considered

The following interventions/procedures were considered and recommended as indicated in the original guideline document;

1. Activity restriction/Work modifications
2. Anterior cruciate ligament (ACL) repair
3. ACL diagnostic tests
4. Acupuncture
5. Bone-growth stimulators
6. Cetylated fatty acids (CFA) topical cream
7. Chondroplasty
8. Cold/heat packs
9. Continuous-flow cryotherapy in postoperative setting
10. Continuous passive motion (CPM) combined with physical therapy
11. Corticosteroid injections
12. Diagnostic arthroscopy
13. Diagnostic ultrasound
14. Exercise
15. Glucosamine/ Chondroitin
16. Hyaluronic acid injections (Synvisc Hyalgan)
17. Knee brace
18. Knee joint replacements
19. KT 1000 arthrometer as an option to the Lachman test
20. Lateral retinacular release
21. Magnetic resonance imaging (MRI)
22. Meniscal allograft transplantation
23. Meniscectomy

- 
24. Occupational and physical therapy
 25. Osteochondral autograft transplant system (OATS)
 26. Osteotomy
 27. Pharmacotherapy (acetaminophen and non-steroidal anti-inflammatory drugs [NSAIDs])
 28. Prostheses (artificial limb)
 29. Radiography
 30. Return to work
 31. SAME (S-adenosylmethionine)
 32. Static progressive stretch (SPS) therapy (Dynasplint)
 33. Transcutaneous electrical neurotransmission (TENS)
 34. Ultrasound fracture healing (bone-growth stimulators)
 35. Walking aids (canes, crutches, braces, orthoses, and walkers)

The following interventions/procedures are under study and are not specifically recommended.

1. ACL injury rehabilitation
2. Deep transverse friction massage (DTFM)
3. Interferential current therapy (IFC)
4. Lateral pull test and patellar tilt test
5. Microprocessor-controlled knee prosthesis
6. Non-surgical intervention for patellofemoral pain syndrome (PFPS)
7. Patient education for knee replacement
8. Posterior cruciate ligament (PCL) repair
9. Post-op ambulatory infusion pumps (local anaesthetic)
10. Prolotherapy
11. Pulsed magnetic field therapy (PMFT)
12. Stretching and flexibility
13. Therapeutic knee splint

The following interventions were considered, but are not recommended:

1. Autologous cartilage implantation (ACI)
2. Electromyographic biofeedback treatment
3. Immobilization as primary treatment
4. Low level laser therapy (LLLT)
5. Magnet therapy
6. Manipulation/chiropractic
7. Mosaicplasty
8. Single photon emission computed tomography (SPECT)
9. Therapeutic ultrasound

5. Outcomes considered

Effectiveness of treatment in relieving pain and improving function



6. Agree appraisal

- Scope and Purpose 50%
- Stakeholder Involvement 29%
- Rigour of Development 43%
- Clarity and Presentation 100%
- Applicability 6%
- Editorial Independence 17%

7. Relevance/appropriateness of use in workers' compensation sector

a) Functional progression

Major recommendations

Initial diagnosis

Knee ailments are among the ten most common causes of reported work-related complaints and workers' compensation claims. Initially, the practitioner should make sure that there are no indications of a potentially serious disease or condition (red flags), the presence of which would require that the patient be referred immediately to a specialist. In the absence of such red flags, the occupational provider can safely manage the healing process.

Initial evaluation

First visit: with Primary Care Physician MD/DO (100%)

- Check for serious underlying conditions often indicated by deformity or bone crepitation (fractures); displaced patella, tibia, or fibula (dislocation); severe pain with motion; infection; additional pain in the back or hip; excessive swelling; nontender mass (possibly indicating tumor); or neurovascular symptoms such as pale, cold skin; painless swelling; and/or paralysis. Determine the incident or incidents that caused the complaint especially torsion, fixed foot "pop", external lateral force, or forward force with abrupt halt in gait.
- Determine whether the problem is acute, subacute, chronic, or of insidious onset.
- Determine the severity and specific anatomic location of the pain.
- Describe location and severity of pain.
- Assess the ability of the patient to lift and carry weight, from no to full lifting ability.
- Assess the ability to climb stairs and hills and walk on uneven ground.
- Determine any present medication.
- Determine any previous medical history, history of systemic disease, or history of previous knee injury, discomfort, or related disability.
- Investigate non-industrial reasons that commonly exacerbate knee complaints (e.g., recreational sports or other exercise that aggravates the knee, degenerative disorders, and past acute injury).
- Compare clinical exam findings of injured knee to opposite knee.

Presumptive diagnosis

- Observe the patient's walk and stance for abnormalities, including swelling, deformity, discoloration, inability to extend, and difficulty walking.
- Examine the knee in an extended position for tenderness and range of motion.
- Check for ligament stability while applying pressure with the joint slightly flexed.
- Pull the tibia forward to examine the knee at 30 degrees (Lachman test)
- Problems with both flexion and extension at once could indicate the need for surgery.

- Aspiration can be used on initial atraumatic effusions but only if there is no sign of infection.
- Anterior knee pain, popping and clicking, and possible cartilage loss (shown through magnetic resonance imaging [MRI]) are indicators of patellofemoral syndrome.
- Other anterior knee pains, along with tenderness over the patellar tendon, could be signs of patellar tendonitis.
- Swelling over the tibial tubercle could indicate Osgood-Schlatter disease, a congenital condition (common in adolescents – not work related).
- Prepatellar bursitis and contusion/periostitis could be caused by direct force, prepatellar bursitis by repetitive friction force.
- Unexplained knee pain, semi-locking, catching, and swelling could be patellofemoral instability, which is often mistaken for a ligament injury.
- Patellofemoral instability is successfully treated with physical therapy.
- Neurologic condition should be assessed, especially in regard to evidence of lumbar disk disease with possible radiation to the knee.
- Immediate referral is recommended for patients with neurologic symptoms, infections, tumor, or deformity.

Initial therapy

The first step is to reduce pain and make the patient feel comfortable, usually with nonprescription analgesics or prescribed pharmaceuticals if necessary. At-home exercises, such as bicycling and straight leg lifting, or other retraining and weightbearing activities may aid in rehabilitation, although a physical therapist may be necessary depending on patient motivation and degree of pain. Exercise and movement have been shown to be more beneficial than total rest, but care must be taken not to overload the knee during weight bearing exercises.

Imaging

If a fracture is considered, patients should have radiographs if the Ottawa criteria are met. Among the 5 decision rules for deciding when to use plain films in knee fractures, the Ottawa knee rules (injury due to trauma and age >55 years, tenderness at the head of the fibula or the patella, inability to bear weight for 4 steps, or inability to flex the knee to 90 degrees) have the strongest supporting evidence. Diagnostic performance of magnetic resonance imaging is recommended for the menisci and cruciate ligaments of the knee.

Surgery

Immediate emergency surgery is usually unnecessary with knee injuries unless there is a need to drain acute effusions. Otherwise, most knee problems are greatly improved with physical methods alone. Only when exercise programs are unable to increase strength and range of motion in the knee after more than a month should surgery be considered, and even then it may not be necessary.

Surgery may be considered in the following cases:

- **Anterior Cruciate Ligament (ACL) Tears:** The decision on whether or not to surgically repair an ACL tear should take into account the patient's work and life needs. For those whose life does not include active use or load of the knee, surgery may be unnecessary. The rehabilitation process following surgery involves six months of very intense therapy, so non-surgical recovery should be allowed to occur as much as possible before any surgery takes place. Confirmation of a complete tear in the ligament through MRI findings, clear signs of instability confirmed through the Lachman and pivot tests, and a history of frequent falls or giving way are consistent with this condition.
- **Collateral Ligament Tears:** Surgery is usually unnecessary; healing often occurs with rehabilitative exercises alone.
- **Meniscus Tears:** Patients with meniscus tears that are not severely limiting or progressive may not need surgical attention. In patients younger than 35, arthroscopic meniscal repair can preserve meniscal function, although the recovery time is longer compared to partial meniscectomy. Arthroscopy and meniscal surgery may not be as beneficial for older patients who are exhibiting signs of degenerative changes, possibly indicating osteoarthritis.



- **Osteochondral Defects:** Studies are still being done to test the effectiveness of osteochondral autograft transplant system (OATS) procedures for osteochondral defects. Patients under 40 years old with active lifestyles may benefit from OATS, and the procedure may delay the development of osteoarthritis.
- **Patellofemoral Syndrome:** While commonly treated with arthroscopic patellar shaving, this procedure is not proven in terms of long-term improvement. In cases of severe patellar degeneration, surgery is usually not helpful. For patients with rheumatoid conditions, patellectomy and patellar replacements are sometimes performed on active patients. Other possible surgeries for patellofemoral syndrome are lateral arthroscopic release and surgical realignment of the extensor mechanism.
- **Arthritis:** Therapeutic exercises are beneficial for knee osteoarthritis. Acetaminophen is an effective agent for relief of knee pain. Although safer, it is less effective than nonsteroidal anti-inflammatory drugs (NSAIDs). For safety reasons acetaminophen should be the first line treatment, with NSAIDs reserved for those who do not respond. Glucosamine provides effective symptomatic relief for patients with osteoarthritis of the knee. In addition, glucosamine has shown promising results in modifying the progression of arthritis over a 3-year period. Glucosamine has a tolerability profile similar to that of placebo and is better tolerated than ibuprofen or piroxicam. Intraarticular injection of hyaluronic acid (e.g., Synvisc) can decrease symptoms of osteoarthritis of the knee. The short-term benefit of intra-articular (IA) corticosteroids in treatment of knee osteoarthritis is well established, and few side effects have been reported. Longer-term benefits have not been confirmed. Total knee arthroplasties are well accepted as reliable and suitable surgical procedures to return patients to function.

Definition of Sprain/Strain Severity Grade: In general, a Grade I or mild sprain/strain is caused by overstretching or slight tearing of the ligament/muscle/tendon with no instability, and a person with a mild sprain usually experiences minimal pain, swelling, and little or no loss of functional ability. Although the injured muscle is tender and painful, it has normal strength. A Grade II sprain/strain is caused by incomplete tearing of the ligament/muscle/tendon and is characterized by bruising, moderate pain, and swelling, and a Grade III sprain/strain means complete tear or rupture of a ligament/muscle/tendon. A sprain is a stretch and/or tear of a ligament (a band of fibrous tissue that connects two or more bones at a joint). A strain is an injury to either a muscle or a tendon (fibrous cords of tissue that connect muscle to bone).

b) Physical/psychiatric rehabilitation

As mentioned above:

Initial therapy

The first step is to reduce pain and make the patient feel comfortable, usually with nonprescription analgesics or prescribed pharmaceuticals if necessary. At-home exercises, such as bicycling and straight leg lifting, or other retraining and weightbearing activities may aid in rehabilitation, although a physical therapist may be necessary depending on patient motivation and degree of pain. Exercise and movement have been shown to be more beneficial than total rest, but care must be taken not to overload the knee during weight bearing exercises.

Surgery

Immediate emergency surgery is usually unnecessary with knee injuries unless there is a need to drain acute effusions. Otherwise, most knee problems are greatly improved with physical methods alone. Only when exercise programs are unable to increase strength and range of motion in the knee after more than a month should surgery be considered, and even then it may not be necessary. Surgery may be considered in the following cases:

c) Risk factor/recovery

None stated

d) Return to work

Official Disability guidelines (odg) return-to-work pathways

Severe (tear), Grade III1, ACL repair, sedentary/modified work: 35 days

Severe (tear), ACL repair, manual/standing work: 180 days

(See *ODG Capabilities & Activity Modifications for Restricted Work* under “Work” in the Procedure Summary in the original guideline document)

ODG Return-to-work pathways

Without surgery, clerical/modified work: 0–2 days

Without surgery, manual/standing work: 21 days

With arthroscopy, clerical/modified work: 14 days

With arthroscopy, manual/standing work: 42 days

With arthrotomy, clerical/modified work: 28 days

With arthrotomy, manual/standing work: 56 days

With arthrotomy, heavy manual/standing work: 84 days

ODG Return-to-work pathways

Arthroscopy, clerical/modified work: 7–10 days

Arthroscopy, manual work: 28 days

Arthroscopy, debridement of cartilage, clerical/modified work: 7–14 days

Arthroscopy, debridement of cartilage, manual work: 30 days

Arthrotomy, clerical/modified work: 21 days

Arthrotomy, manual work: 49 days

ODG Return-to-work pathways

Medical treatment: 0 days

Visco injection, knee: 7 days

Partial arthroplasty, knee: 28 days

Arthroplasty, knee, clerical/modified work: 42 days

Arthroplasty, manual work: 84 days

Obesity comorbidity (body mass index [BMI] >30), multiply by: 1.31

8. Priority for Q-COMP

Rating criteria

Functional restoration Does the guideline consider graded increases in activity and function?	4
Psychosocial factors To what degree does the guideline consider psychosocial factors that may influence recovery?	1
Return to work process (vocational rehabilitation) To what degree does the guideline consider the Return to Work Process (vocational rehabilitation)?	5
Risk factors for recovery To what degree does the guideline consider Risk Factors for Recovery?	5
Total rating	15



Diagnosis and treatment of adult degenerative joint disease (DJD) of the knee

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1. Developed by

Institute for Clinical Systems Improvement (ICSI). Diagnosis and treatment of adult degenerative joint disease (DJD) of the knee. Bloomington (MN): Institute for Clinical Systems Improvement (ICSI); 2004 Nov. 43p. [50 references]

2. Guideline status

This is the current release of the guideline.

This guideline updates previously released version; Diagnosis and treatment of adult degenerative joint disease (DJD) of the knee. Bloomington (MN): Institute for Clinical Systems Improvement (ICSI); 2003 Nov. 43p.

3. Where located/how accessed

National Guideline Clearinghouse www.guideline.gov

Electronic copies : Available from the Institute for Clinical Systems Improvement (ICSI) Web site.

Print copies: Available from ICSI, 8009 34th Avenue South, Suite 1200, Bloomington, MN 55425; Tel: (952) 814-7060; Fax: (952)858-9675; Web site: www.icsi.org; e-mail: icsi.info@icsi.org

The following companion document is available:

ICSI pocket guidelines. April 2004 edition. Bloomington (MN): Institute for Clinical Systems Improvement, 2004. 404 p.

Print copies: Available from ICSI, 8009 34th Avenue South, Suite 1200, Bloomington, MN 55425; Tel: (952) 814-7060; Fax: (952) 858-9675; Web site: www.icsi.org; e-mail: icsi.info@icsi.org.

4. Description/scope

Disease/condition(s)

- Adult degenerative joint disease (DJD) of the knee

Guideline category

- Diagnosis
- Evaluation
- Treatment

Clinical speciality

- Family Practice
- Internal Medicine
- Orthopaedic Surgery
- Physical Medicine and Rehabilitation
- Rheumatology



Intended users

- Advanced Practice Nurses
- Allied Health Personnel
- Health Plans
- Hospitals
- Managed Care Organisations
- Nurses
- Occupational Therapists
- Physical Therapists
- Physician Assistants
- Physicians

Guideline objectives

- To improve the efficacy of diagnostic imaging for evaluating degenerative joint disease (DJD)
- To increase the use of recommended conservative approach as first-line treatment for degenerative joint disease
- To increase patient education for patients with degenerative joint disease

Target population

Established patients (one who has been seen at his or her primary clinic or medical group at least once) who complain of a painful knee that may be due to degenerative joint disease

Interventions and practices considered

Triage

1. Phone follow-up
2. Schedule provider visits according to urgency criteria
3. Provide patient with education on home self-care
4. Home self-care including rest, ice, compression, elevation and analgesics (acetaminophen [Tylenol™], ibuprofen [Advil™, Motrin™], aspirin, and naproxen sodium [Aleve™])

Diagnosis

1. Differential diagnosis via history, physical examination, laboratory test, x-rays, joint taps, magnetic resonance imaging (MRI), bone scan, computed tomography (CT) and additional studies as applicable
2. Laboratory testing including gram stain and bacterial culture, crystal analysis, cell count and differential, synovial fluid, and Lyme test, as applicable
3. Assessments for osteoarthritis as appropriate :iron studies; calcium; phosphorous; and alkaline phosphatase; features of acromegaly; serum and urine homogentistic acid; liver function tests; and diabetic testing
4. Referral to a specialist

Treatment

1. Patient education
2. Pain management with;
 - Joint protection (weight reduction, knee stress avoidance)
 - Physical modalities (cold, heat)
 - Medications (acetaminophen, non-steroidal anti-inflammatory drugs, COX-2 inhibitors, glucosamine, chondroitin sulphate, and narcotics)
 - Miscellaneous pain relievers (electrical stimulation, massage, and acupuncture, wedge insoles, unloader braces, knee sleeves)
 - Cognitive restructuring, stress management, and relaxation
 - Education regarding basic sleep hygiene measures
3. Exercise including active range of motion, progressive walking, and quadriceps strengthening
4. Assistive devices including a splint, brace, cane, crutch or walker
5. Physical therapy
6. Follow – up including medication changes, injections (intra-articular corticosteroids such as triamcinolone, hyaluronan injections [Synvisc[®]]), exercise, and referral to specialty providers

5. Outcomes considered

- Diagnosis of degenerative joint disease
- Pain and inflammation rates
- Range of motion
- Patient functioning and safety
- Adverse reaction to treatment

6. Agree appraisal

- Scope and Purpose 56%
- Stakeholder Involvement 63%
- Rigour of Development 21%
- Clarity and Presentation 96%
- Applicability 11%
- Editorial Independence 67%

7. Relevance/appropriateness of use in workers' compensation sector

a) Functional progression

The recommendations regarding adult degenerative joint disease (DJD) of the knee are presented in the form of algorithms with 13 components, accompanied by detailed annotations. Algorithms are provided for Diagnosis and Treatment of Adult Degenerative Joint Disease of the Knee – Triage and Diagnosis and Treatment of Adult Degenerative Joint Disease of the Knee; clinical highlights and selected annotations (numbered to correspond with the algorithm) follow.



Major recommendations

The recommendations regarding adult degenerative joint disease (DJD) of the knee are presented in the form of algorithms with 13 components, accompanied by detailed annotations. Algorithms are provided for Diagnosis and Treatment of Adult Degenerative Joint Disease of the Knee – Triage and Diagnosis and Treatment of Adult Degenerative Joint Disease of the Knee; clinical highlights and selected annotations (numbered to correspond with the algorithm) follow.

Clinical highlights

1. Schedule a same day appointment if a patient reports the following: hot, swollen joint with or without fever and/or feeling ill, cannot bear weight on leg, leg or foot is cool or blue, deformity, severe pain, locked knee, and/or patient demands to be seen the same day. (*Annotation #1c*)
2. For patients who are not scheduled for a same day visit, provide advice on basic techniques to reduce pain and inflammation in the knee. These include rest, ice, compression, elevation, and the use of appropriate over-the-counter analgesics. (*Annotation #1e*)
3. When a patient is diagnosed with DJD of the knee, avoid obtaining an x-ray on the first visit unless specifically indicated. (*Annotation #4*)
4. Educate the patient regarding overall goals of treatment. These include education regarding the disease and self-management, pain reduction, exercise that promotes joint health, and improvement in patient functioning and safety. (*Annotation #8.1*)

Diagnosis and treatment of adult degenerative joint disease of the knee

Triage algorithm annotations

1c. Does patient need to be seen today?

The time frame in which a patient may be seen can be determined by asking a series of triage questions. The questions are intended to determine which symptoms require more urgent treatment by a physician and which ones can be managed through phone advice.

Phone follow-up is one way to ensure that patients keep appointments. These follow-ups can provide additional slots for patient appointments for capitated products. They increase revenue generation for fee-for-service products. Some clinics, however, may not have the staff to support this activity.

The patient should receive an immediate urgent care, emergency department, clinic, provider visit if he or she meets any of the following criteria:

- Hot, swollen joint, with or without fever and/or feeling ill
 - This criterion captures the patient with a possibility of an acute bacterial joint or periarticular infection, either of which would require immediate attention.
- Cannot bear weight on leg
 - This criterion captures the patient with:
 - a. atypical bacterial infection
 - b. atraumatic fracture
 - c. traumatic fracture or derangement
- Leg or foot is cool and/or blue
 - This criterion captures the patient with an acute vascular occlusive event.
- Deformity
 - This criterion captures the patient with a fracture.

- Severe pain
 - This criterion captures the patient with an acute vascular occlusive event. Refer to the National Guideline Clearinghouse (NGC) summary of the Institute for Clinical Systems Improvement (ICSI) guideline Venous Thromboembolism.
- Locked knee (unable to bend or extend)
 - This criterion suggests torn cartilage or a loose body.
- Patient demands to be seen today
 - This criterion captures the patient with other conditions for which immediate attention may be required.

If the patient meets any of the following criteria, a provider should review the triage decision and determine when the patient should be scheduled for a visit:

- Now taking chemotherapy for cancer
 - This criterion requires review of the patient who may be on immunosuppressant medications (and who therefore may not demonstrate typical manifestations of infection).
- Now taking immunosuppressive drugs
 - This criterion requires review of the patient who may be on immunosuppressant medications (and who therefore may not demonstrate typical manifestations of infection).
- History of diabetes
 - This criterion requires review of the patient who may have poor sensation (diabetic neuropathy) and who therefore may not be able to accurately report symptoms of conditions which may require immediate attention.
- Sickle cell anemia
 - This criterion requires review of the patient who may have a sickle cell crisis or acute vascular occlusive event.
- On prednisone
 - This criterion requires review of the patient who may not demonstrate typical manifestations of infection.

1d. Schedule visit according to urgency

The patient should receive an appointment within the next 3 days if he or she meets any of the following criteria:

- Unable to go to work or school due to pain
 - The provider will need to appropriately assess disability status.
- Swelling
 - Swelling suggests conditions for which medical care positively affects morbidity (i.e., sprain, strain)

Patients with other types of knee pain should be scheduled for a routine visit.

The patient should be seen at the next available visit for all other types of knee pain.

1e. Provide appropriate patient education

When a patient is scheduled for an appointment within 3 days or several weeks, recommendations for home self-care should be given by the medical information nurse or other appropriate personnel. This pre-appointment education does not take the place of a provider visit, but is only interim advice.

Education should include advice on basic techniques to reduce pain and inflammation in the affected joint. Such techniques include rest, ice, compression, elevation, and the use of appropriate over-the-counter analgesics as follows:

Rest: Reduce or avoid activities that aggravate the pain. Alternate work with rest throughout your day.



Ice: Ice pack applied to the affected joint for 10–15 minutes several times a day. Protect the skin with clothing or a towel.

Compression: If swelling is present, a compression such as Ace™ wrap dressing or sleeve may be used. It should be unwrapped and rewrapped three to four times per day.

Elevation: Elevate the affected extremity above the level of your heart to help reduce swelling.

Analgesics: Recommend acetaminophen (Tylenol™) in standard over-the-counter doses for pain if the patient has no signs of liver disease or excessive intake of alcohol. Over-the-counter anti-inflammatories (NSAIDs) such as ibuprofen (Advil™, Motrin™, etc.), naproxen sodium (Aleve™), or acetylsalicylic acid (aspirin, Ecotrin™, etc.) may be used if the patient has no history of ulcer disease, diabetes, renal disease, liver disease, or bleeding diathesis; is not currently using anticoagulants such as warfarin (Coumadin®) or heparin, has no sensitivity to these medications, and is not pregnant. Caution should be exercised in recommending chronic NSAID use in persons over age 65 due to the high risk of gastrointestinal (GI) hemorrhage in this population over time.

The following over-the-counter medications may be recommended by the triage person at the clinic. These medications and dosages will provide analgesic and/or anti-inflammatory effects.

- Acetaminophen 500 mg extra strength tablets, 1–2 tablets up to 4 times per day, but do not exceed 8 tablets per day
- Ibuprofen 200 mg tablets, 1–2 tablets up to 4 times per day
- Aspirin 350 mg tablets (enteric coated preferable), 1–2 tablets up to 3 times per day
- Naproxen sodium 220 mg tablets, 1–2 tablets up to 2 times per day

These medications need to be taken on a full stomach and on an as needed basis (PRN). Should a patient choose to take the highest dosage, he or she may achieve an anti-inflammatory effect from ibuprofen, aspirin, or naproxen sodium. Acetaminophen has only analgesic effects.

Since there is no data that one NSAID is more efficacious than another, the use of ibuprofen or naproxen sodium would be most cost effective. It is suggested that NSAID use should be prioritized on the basis of cost.

A patient education brochure or other written information to reinforce home self care instruction may be offered to the patient. This information may be given over the phone, or the patient may be able to pick it up at the clinic if the clinic has the information available in a handout or brochure. Recommended patient education resources are listed in the Support for Implementation section of this guideline.

In certain systems, telephone follow-up may be used to confirm appointments or to allow patients to cancel appointments if home self-care has resolved the initial problem.

Diagnosis and treatment of adult degenerative joint disease of the knee

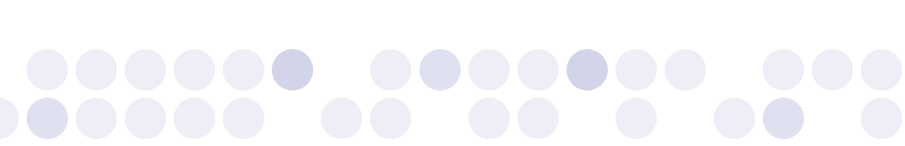
Algorithm annotations

Provider visit

The provider visit should focus on diagnosis of degenerative joint disease of the knee rather than the differential diagnosis of knee pain.

History

1. Age at first sign of painful symptoms. Have you had this pain before? Is it continuous or episodic?
2. How did the pain present? (Sudden onset or slow worsening over time?)
3. How would you classify the pain? (Sharp, dull, pinching, episodic, tight?)
4. How would you rate your average pain over the last month (0–10)?
5. What activity reproduces the pain? What makes it go away?

- 
6. Where is the pain?
 7. Are there any associated symptoms? (Locking, swelling, giving way, stiffness)
 8. Activity history: What are you doing for exercise? What have you changed about your exercise regimen? What kind of work do you do?
 9. Previous treatments/surgery/diagnostic studies.
 10. Do you have any chronic medical illnesses? Any allergies?
 11. Ask differentiating questions (e.g., does patient have a history of blood clots, psoriasis, gout, liver disease, or a recent deer tick bite?)

Physical examination

Typical physical examination findings in degenerative arthritis of the knee include:

1. Swelling due to effusion with little synovial thickening, usually with little warmth
2. Atrophy of the surrounding muscles
3. Active and passive range of motion may both be restricted
4. Crepitus
5. Pain and muscle spasm at the extremes of existing range of motion
6. Joint deformity

The physical examination may include some or all of the following components as appropriate:

1. Inspection for deformity or abnormalities
2. Check foot pulses
3. Tenderness
4. Presence and location of warmth or erythema
5. Presence and location of swelling or effusion
6. Range of motion, active and passive
7. Assess stability, varus, valgus, anterior drawer, Lachman
8. Meniscal compression (McMurray's test)
9. Crepitus
10. Assessment of patellar function
11. Evaluation of gait

3. History and physical examination indicate dJD?

A history and physical examination may produce a nonspecific result. The practitioner may wish to get laboratory tests, x-rays, or other tests to help diagnose the patient's condition. It is possible that a patient has both DJD and another diagnosis.

In general, the following are consistent with the diagnosis of degenerative joint disease of the knee:

- less than 30 minutes of morning stiffness
- long-standing pain that increases with weight bearing or stairs and lessens with rest
- insidious onset
- bony deformity (osteophyte)
- contracture
- crepitation on movement
- effusions which are not warm as in inflammatory arthritis



The following are inconsistent with DJD of the knee:

- fever or chills
- erythema
- warmth
- large effusions
- locking or giving way

4. Further diagnostic testing

If history and physical examination are not conclusive for DJD alone, further diagnostic testing is indicated. For the purposes of this guideline, diagnostic testing includes x-rays, joint taps, magnetic resonance imaging (MRI), bone scan, computed tomography (CT), and laboratory tests.

X-Rays

With a diagnosis of DJD of the knee, avoid obtaining an x-ray on the first visit unless it is specifically indicated. Indications for x-rays in the evaluation of joint pain may include:

- History of trauma to rule out fracture
- Presence of significant effusion – especially monarticular arthritis
- After physical examination, the pain cannot be explained by ligamentous strain or bursitis, and the patient has not had a prior xray of that joint done
- Loss of joint range of motion without an established pre-existing condition
- Severe joint pain – even with known pre-existing diagnosis at that joint
- Pre-referral to an orthopedist – if surgery is contemplated
- Persistent significant knee pain, especially in a young patient
- Conservative treatment failed

If the physician chooses to obtain an x-ray, standing anteroposterior (AP) (weight bearing), lateral (possibly weight bearing) and (tangential) patellar are recommended.

When a diagnosis of DJD of the knee is made, computed tomographies, bone scans and magnetic resonance imagings are not recommended.

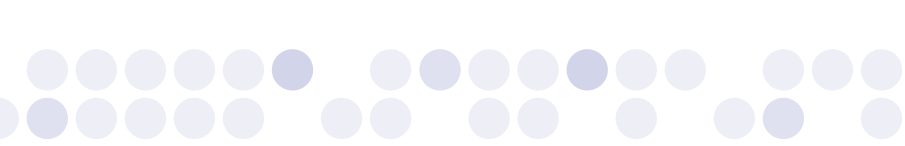
Indications for laboratory testing in DJD

1. Nontraumatic monarticular effusions with swelling generally require aspiration with the following tests performed on the fluid (if the fluid is not straw colored and clear):
 - Gram stain and bacterial culture
 - Crystal analysis
 - Cell count and differential
 - Not recommended: glucose, protein

The synovial fluid in osteoarthritis (OA) should be noninflammatory (i.e., less than 200 white blood cells [wbc]/mm³), but in a flare could rise to 1,000–2,000 white blood cells/mm³. Fluid should be clear to only faintly turbid.

Consider a Lyme test in the presence of monarticular arthritis with joint swelling if the patient gives a history of deer tick bite, erythema chronicum migrans (ECM) rash or possible exposure to ticks.

2. Consider referral or further evaluation for infection, inflammation, neoplastic or toxic etiologies. Lyme serology and synovial fluid analysis are suggested in inflammatory disease.

- 
3. If a patient has osteoarthritis by x-ray that is not due to past trauma or known process and if the patient is younger than 50, the following may be considered:
 - Iron studies (Fe/TIBC) – less than 75 percent saturation and/or ferritin greater than 300 to rule out hemochromatosis
 - Calcium, phosphorus and alkaline phosphatase to evaluate for hyperparathyroidism
 - Features of acromegaly: check phosphorus, glucose, consider plasma growth hormone level.
 - Dark urine on standing or black shards in synovial fluid: check serum and urine homogentisic acid
 - Abnormal liver function tests (LFT): consider Wilson’s disease or hemochromatosis
 - Diabetes may accelerate the osteoarthritis process and elevated blood sugar should raise the question of hemochromatosis or acromegaly in the appropriate clinical setting

5. Referral to specialty providers

When specialty referral is indicated, coordinated management by the primary care provider and a musculoskeletal specialty provider is desirable. On the initial visit, the provider may reach a diagnosis that requires further evaluation or treatment by a specialty provider. Referral to rheumatologist, orthopedic surgeon, physical medicine and rehabilitation specialist, or another musculoskeletal specialist may be recommended for patients:

1. With a systemic rheumatic disease such as rheumatoid arthritis, systemic lupus erythematosus, scleroderma, vasculitis, inflammatory myopathy, and severe osteoporosis
2. With functional deterioration due to a rheumatic disease
3. With septic arthritis or osteomyelitis
4. With trauma such as a fracture or ligament injury that may require surgery or other treatment that the primary care physician is unable to provide
5. With a primary or metastatic malignancy
6. With a laboratory abnormality if uncertainty exists about its interpretation
7. With chronic musculoskeletal problems who are responding poorly to treatment
8. Whose function is impaired enough to significantly impact either vocational or avocational interests
9. Who have fallen or are at risk of falling or who have other safety issues
10. With a misalignment which might benefit from orthotics

A patient may not respond after standard therapy options. Consideration may then be given to referral to an arthritis specialist–rheumatologist, physical medicine and rehabilitation specialist, or orthopedic surgeon.

8. Treatment of DJD of the knee

The overall goals of treatment are to:

1. Provide the patient with an understanding of the disease and self management
2. Reduce pain
3. Instruct in exercises to promote joint health
4. Improve overall patient functioning and safety

Treatment should include the following components in a progressive fashion over time. A follow-up visit should be scheduled 3–6 weeks after the initial visit.



1. Patient education

Treatment at the initial visit begins with education. A discussion of the disease and its natural history will allow realistic goals for treatment to be established. The patient should be instructed in methods of proper body mechanics and joint protection. Lifestyle or environment changes should be suggested to eliminate excessive and recurrent trauma. Weight reduction should be recommended for overweight individuals. Moderate exercise should be encouraged. Vigorous activities that produce prolonged pain and inflammation should be avoided. A healthy, balanced diet with adequate vitamin intake is also recommended.

Some providers may wish to use the patient education outline found in the implementation section of the original guideline document as a checkoff sheet to allow quick documentation of educational components and simultaneously provide the patient with a written summary of recommendations. Other brochures or handouts to reinforce education about the disease, exercise, or medications are listed in the implementation section of the original guideline document under educational resources. An excellent brochure, "Osteoarthritis," is available from the National Institutes of Health (NIH). It is listed in the Support for Implementation section of the original guideline document under "Recommended Website Resources." The provider may wish to consider a referral to education classes for self-management of arthritis. There are some computer-based education programs and several self-help books that may be appropriate. If the patient seems to need more help in problem solving to implement self-care, consider referral to a nurse for medication instruction, physical therapy for exercise instruction, or an occupational therapist for joint protection instruction.

Patient education should, in general, be reinforced with further written or verbal instruction.

2. Pain management

a. Joint protection.

The patient should be instructed to avoid prolonged standing, kneeling, squatting, and stair climbing.

If obese, the patient should lose weight through modification of diet and a consistent low impact aerobic conditioning program such as walking 30–60 minutes a day. If a patient with DJD of the knee is unable to walk, consider referral to a physiatrist or physical therapist to assist in identifying appropriate alternative aerobic conditioning exercises.

If work or home activities seem to aggravate the problem, consider an outside evaluation by an appropriate health care professional.

b. Physical modalities – see the patient education implementation tool under pain relief using heat and cold.

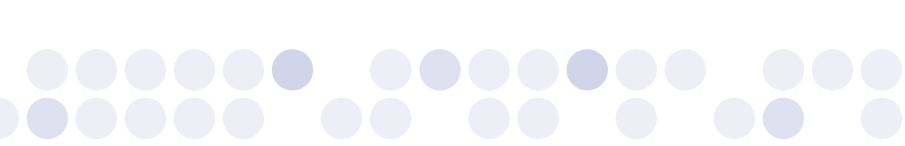
1. Cold: ice packs, ice massage. These can be applied every three to four hours as needed for 15–20 minutes at a time.

2. Heat: warm bath or shower for 15–20 minutes, heat lamp, heating pad, warm compresses.

c. Medications

The patient may be started on a course of acetaminophen or, if not effective, a nonsteroidal anti-inflammatory drug (NSAID) in appropriate analgesic doses if there are no contraindications to those medications. Since there is no proven efficacy of one NSAID over another, unless the patient has a history of peptic ulcer disease or is on anticoagulants, a less expensive one should be tried initially. A cyclooxygenase-2 (COX-2) inhibitor may be preferred for patients over age 65, those with a history of dyspepsia while taking COX-1-NSAIDs, or those with increased risk factors for gastrointestinal hemorrhage.

The nutraceutical agents glucosamine (1500 mg qD) and chondroitin sulfate (1200 mg qD) are widely available and tried by patients. A systematic quality assessment and meta-analysis of double-blind, placebo-controlled trials that tested glucosamine or chondroitin for hip or knee osteoarthritis concluded that some degree of efficacy appears probable for these preparations. It is reasonable to recommend a 60-day trial of the combination of glucosamine and chondroitin sulfate, leaving the decision for ongoing (continuing) therapy to patients on an individual basis.



Narcotic medications are not advised as first-line treatment. Carefully monitored narcotic dosing may be considered for patients who are intolerant of NSAIDs and have not received sufficient benefit from physical therapy (PT), occupational therapy (OT) and other modalities. Dosing should begin in a progressive fashion. Systemic administration of adrenocorticosteroids is of no value. The American College of Rheumatology advocates the use of nonpharmacologic methods first and addition of medication only when additional analgesia is necessary.

d. Miscellaneous pain relievers

When heat, cold, or medications are contraindicated or ineffective, the following may also be considered:

- Electrical stimulation such as transcutaneous electrical nerve stimulation (TENS)
- Massage
- Acupuncture
- Wedge insoles
- Upladder braces
- Knee sleeves

e. Cognitive restructuring, stress management, relaxation

These are covered in pain management classes and support groups, the Arthritis Self-Help Course, and stress management classes. Consider referral to one of these classes if they are available.

f. Ensure adequate restorative sleep

Provide instruction in basic sleep hygiene measures. Assess causes of nonrestorative sleep (pain, nocturia, depression, psychosocial stress, poor sleep hygiene, sleep disorder, congestive heart failure [CHF], etc.) and treat appropriately (relaxation before bed, instruct in use of sleep hygiene, amitriptyline, etc.)

3. Exercise

Exercise should include the following:

- a. Active range of motion for the hip, knee and ankle for maintaining and regaining range of motion and for promoting joint health and nutrition.
- b. Progressive walking. Begin walking for a duration that is well tolerated as a baseline such that it does not produce accelerating knee pain over successive days. Gradually increase the walk duration to a goal of 30–60 minutes five to seven days per week for closed chain strengthening and endurance training of the legs and for management of obesity. It may also contribute to a sense of well-being and pain control. Patients with limited tolerance for walking may prefer to start by walking in a pool, pushing a shopping cart, using an exercise bike, or other exercise equipment. Many patients do not have access to a pool or exercise equipment, however.
- c. Quad sets with VMO (vastus medialis oblique) activation at 15 degrees flexion to full knee extension in external hip rotation. If the patient has difficulty walking, has contractures, has severe exercise intolerance, has fallen, or has other reasons for being unable to carry out this exercise program, consider referral to a physiatrist or physical therapist (PT) for a supervised program 2 or 3 times a week until the patient can perform an independent exercise program. A physical therapist may focus on the use of other modalities and more specific exercises to regain range of motion, strengthen the lower extremities, and improve endurance. If there is severe loss of function, a physiatrist may be helpful in supervising treatment for complex loss of function.

Exercise should be recommended for patients with DJD of the knee.

[Conclusion Grade I: See , Conclusion Grading Worksheet – Appendix A – Annotation #8.3 (Exercise Recommended), in the original guideline document.]



4. Assistive devices

In some cases an assistive device such as a splint, brace, cane, crutch or walker may be an appropriate component of initial treatment. Although anyone with appropriate training may instruct in the use of assistive devices, it may be most efficient to refer to a PT, OT, ergonomist, or other professional who is trained to select and instruct in the use of these devices. A physical therapist can teach most patients to use a knee sleeve, cane or walker in 1–2 visits. Other assistive devices such as reachers, bath benches, raised toilet seats, grab bars, etc. may be suggested by an OT, sometimes in a visit to the home, where other safety issues may also be addressed. In the workplace, an OT, PT, or ergonomist may suggest modifications. Sport-specific trainers may provide the best advice regarding athletic activities.

5. Physical therapy

Some patients may benefit from a supervised exercise program or from specific therapeutic modalities the therapist can provide.

9. Follow-up provider visits

The response to initial treatment should be assessed at follow-up visits. If the patient is responding well to initial treatment, key points of the treatment plan should be reviewed and reinforced and the following pain rating question should be repeated: How would you rate your average pain over the past month (0–10)? If the patient has had little improvement in symptoms or function or has had complications the provider may consider progressive and/or escalated use of the approaches in Annotation #8.

1. Medication change

- A. Trial of a different anti-inflammatory medication. (Patient should be kept on medication for 2 to 4 weeks before trying a different one.)
- B. Injections
 - 1. Local intra-articular corticosteroid injections may provide short-term or long-term relief of pain and may be appropriate at this point for some patients. A suggested dose is 40 mg triamcinolone.
 - 2. A series of injections of hyaluronan preparation (Synvisc®) may also be appropriate to relieve pain at this point in some patients.

While corticosteroids require a single injection, hyaluronan is given in a series of injections – generally 3–5.

Synthetic hyaluronates may be effective treatment for pain in selected patients with mild to moderate DJD of the knee.

[Conclusion Grade II: See Discussion Appendix B Conclusion Grading Worksheet Annotation #9.1 (Synthetic Hyaluronates), in the original guideline document.]

2. Exercise

The issue of exercise should be readdressed comprehensively at this time. Exercise may include a plan given through instruction at the clinic or a program supervised by a PT, athletic trainer, or other comparable professional.

3. Referral to specialty providers

A patient may not respond after standard therapy options. Consideration may then be given to referral to an arthritis specialist – Rheumatology, Physical Medicine and Rehabilitation, or Orthopedic Surgery. (See Annotation #5, “Referral to Specialty Providers.”)



b) Physical/psychiatric rehabilitation

As mentioned above:

Exercise

Exercise should include the following:

- a. Active range of motion for the hip, knee and ankle for maintaining and regaining range of motion and for promoting joint health and nutrition.
- b. Progressive walking. Begin walking for a duration that is well tolerated as a baseline such that it does not produce accelerating knee pain over successive days. Gradually increase the walk duration to a goal of 30–60 minutes five to seven days per week for closed chain strengthening and endurance training of the legs and for management of obesity. It may also contribute to a sense of well-being and pain control. Patients with limited tolerance for walking may prefer to start by walking in a pool, pushing a shopping cart, using an exercise bike, or other exercise equipment. Many patients do not have access to a pool or exercise equipment, however.
- c. Quad sets with VMO (vastus medialis oblique) activation at 15 degrees flexion to full knee extension in external hip rotation. If the patient has difficulty walking, has contractures, has severe exercise intolerance, has fallen, or has other reasons for being unable to carry out this exercise program, consider referral to a physiatrist or physical therapist (PT) for a supervised program 2 or 3 times a week until the patient can perform an independent exercise program. A physical therapist may focus on the use of other modalities and more specific exercises to regain range of motion, strengthen the lower extremities, and improve endurance. If there is severe loss of function, a physiatrist may be helpful in supervising treatment for complex loss of function.

Exercise should be recommended for patients with DJD of the knee.

[Conclusion Grade I: See , Conclusion Grading Worksheet – Appendix A – Annotation #8.3 (Exercise Recommended), in the original guideline document.]

Physical therapy

Some patients may benefit from a supervised exercise program or from specific therapeutic modalities the therapist can provide

Follow-up provider visits

Exercise

The issue of exercise should be readdressed comprehensively at this time. Exercise may include a plan given through instruction at the clinic or a program supervised by a PT, athletic trainer, or other comparable professional.

c) Risk factor/recovery

Potential benefits

- Accurate diagnosis of degenerative joint disease of the knee Pain and inflammation reduction
- Increased range of motion
- Phone follow-up can help ensure patient appointments, which can increase revenue generation for fee-for-service products
- Education may lead to increased understanding of the disease and self management
- Exercise may promote joint health
- Overall improved patient functioning and safety



Potential harms

- Concerns have been raised about the effects of the chronic use of acetaminophen on renal function and hepatic function (particularly in patients who consume alcohol).
- Analgesics or nonsteroidal anti-inflammatory drugs may change the patient’s ability to sleep, work, perform household activities and adult daily living skills as a result of the use of the medication. Equally important are adverse effects such as drowsiness, gastrointestinal upset (or bleeding), and fluid retention.
- Heat and/or ice: Although rare, frostbite and burns can occur, and are occasionally severe, so patients should be advised to avoid these complications. Warm baths or showers can produce significant vasodilation; therefore, the patient should be cautioned about orthostatic symptoms.
- Recent reports have shown that glucosamine may raise blood insulin levels in patients with diabetes.
- Chondroitin sulfate may affect coumadin levels.

Subgroups most likely to be harmed

- Over-the-counter analgesics or nonsteroidal anti-inflammatory drugs have possible side effects in the elderly including gastrointestinal bleeding, renal toxic effects, and central nervous system effects.
- Caution is urged in the chronic use of acetaminophen in patients who consume alcohol.

Contraindications

- Nonsteroidal anti-inflammatory drugs are contraindicated in patients on anticoagulants or with a bleeding diathesis.
- Warm baths and showers (15–20 minutes at 100–105 degrees F) may be contraindicated in patients with cardiovascular disease because of the possibility of orthostatic symptoms.
- Ice packs and ice massage are contraindicated in patients at risk of vasospasm or ischemia.

d) Return to work

Not discussed

8. Priority for Q-COMP

Rating criteria

Functional restoration Does the guideline consider graded increases in activity and function?	5
Psychosocial factors To what degree does the guideline consider psychosocial factors that may influence recovery?	1
Return to work process (vocational rehabilitation) To what degree does the guideline consider the Return to Work Process (vocational rehabilitation)?	1
Risk factors for recovery To what degree does the guideline consider Risk Factors for Recovery?	1
Total rating	8



AAOS clinical guideline on osteoarthritis of the knee (phase II)

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1. Developed by

American Academy of Orthopaedic Surgeons. AAOS clinical guideline on osteoarthritis of the knee (phase II). Rosemont (IL): American Academy of Orthopaedic Surgeons;2003. 15p.[75 references]

2. Guideline status

This is the current release of the guideline.

3. Where located/how accessed

National Guideline Clearinghouse www.guideline.gov

Electronic copies: Available from the American Academy of Orthopaedic Surgeons Web site.

Print copies: Available form the American Academy of Orthopaedic Surgeons 6300 North River Road, Rosemont, IL 60018-4262; Tel: (847) 823-8125; Web site: www.aaos.org

The following companion document is available:

Universe of adult patients with osteoarthritis of the knee – Phase II. Rosemont (IL): American Academy of Orthopaedic Surgeons; 2004. 1p.

Electronic copies: Available in Portable Document Format (PDF) from the American Academy of Orthopaedic Surgeons Web site.

Print copies: Available from the American Academy of Orthopaedic Surgeons, 6300 North River Road, Rosemont, IL 60018-4262; Tel: (847) 823-7186, (800) 346-AAOS; Fax: (847) 823-8125; Web site: www.aaos.org.

4. Description/scope

Disease/condition(s)

- Osteoarthritis of the knee

Guideline category

- Evaluation
- Management
- Treatment

Clinical speciality

- Orthopaedic Surgery
- Physical Medicine and Rehabilitation
- Rheumatology

Intended users

- Physicians

Guideline objectives

To guide qualified physicians through a series of diagnostic and treatment decisions in an effort to improve the quality and efficiency of care in patients with osteoarthritis of the knee



Target population

Skeletally mature individuals with confirmed osteoarthritis of the knee for whom conservative treatment has been ineffective

Interventions and Practices Considered

Evaluation

1. Evaluation of patient (i.e., age, level of symptomology, impact of knee dysfunction or pain on quality of life, medical comorbidity, suitability for surgery)
2. Tests as indicated (magnetic resonance imaging [MRI] scan of knee; radiography of knee)

Management/treatment

1. Patient education and counselling on surgical procedures (i.e., expected outcomes, potential for risks, and complications)
2. Surgical options:
 - Total knee replacement
 - Knee fusion
 - Arthroscopic debridement
 - Total knee arthroplasty
 - Tibial ostoeotomy
 - Unicompartamental arthroplasty of the medial compartment of the knee
 - Distal femoral varus osteotomy
 - Procedure to elevate the tibial tubercle or a patellectomy
 - Patellofemoral arthroplasty

5. Outcomes considered

Efficacy of surgical treatment including:

- Quality of life
- Short-term and long-term success rates
- Patient satisfaction
- Pain relief
- Return of prior knee function (e.g., range of motion measurement, weight bearing, ambulation)

6. Agree appraisal

- Scope and Purpose 72%
- Stakeholder Involvement 33%
- Rigour of Development 33%
- Clarity and Presentation 83%
- Applicability 6%
- Editorial Independence 17%



7. Relevance/appropriateness of use in workers' compensation sector

a) Functional progression

A detailed algorithm is presented in the original guideline document on Universe of Adult Patients with Osteoarthritis of the Knee – Phase II

Major recommendations

Diagnosis

Osteoarthritis

Definition of the problem

Osteoarthritis of the knee is an increasingly common problem due to a more active society, often leading to prior knee injuries, an increasingly elderly population, and a growing percentage of the population that is overweight. Osteoarthritis of the knee should be suspected when a patient presents with knee pain that has been longstanding, increases with activity, particularly weight bearing and stairs, and improves with rest. Onset of pain and dysfunction is often insidious. Deformity, fixed contracture, crepitance, and effusion are common findings. The differential diagnoses include inflammatory arthritis, bursitis or tendonitis, anterior knee pain, and internal derangement. Patients entering Phase II of the guideline have failed to respond to conservative treatment. Pain, instability and function have not improved to a satisfactory level despite conservative treatment rendered, as outlined in Phase I of the guideline (see the National Guideline Clearinghouse (NGC) summary of the American Academy of Orthopaedic Surgeons [AAOS] guideline AAOS Clinical Guideline on Osteoarthritis of the Knee). This treatment may have included analgesics or nonsteroidal anti-inflammatory medications, activity modification including weight reduction, and therapeutic exercise. It may have included trial of durable medical equipment such as knee braces, ambulatory assistive devices, or orthoses. The patient may have undergone intra-articular injection in the knee with steroid or viscosupplementation.

Recommendations

For patients with osteoarthritis of the knee presenting to a musculoskeletal specialist, conservative treatment measures should have been exhausted. The age of the patient, level of symptomology, impact of knee dysfunction or pain on quality of life, and medical comorbidity should be assessed. If there is a medical contraindication to surgery, conservative treatment should be continued. The diagnosis of neuropathic arthropathy should be considered. The role for surgical intervention, including arthroplasty, is not well defined for a neuropathic joint.

If a patient without a medical contraindication to surgery or neuropathic joint remains dissatisfied with the outcome of conservative care and has significant knee dysfunction, pain, or both, surgical alternatives should be considered. Evaluation by an orthopaedic surgeon is appropriate. Referral by a rheumatologist or physiatrist to an orthopaedic surgeon is indicated.

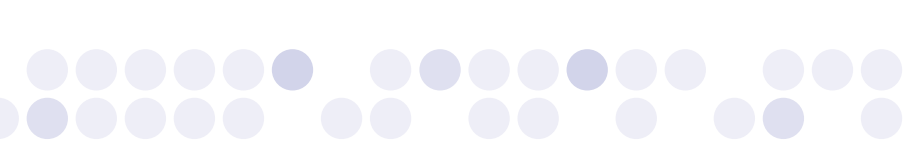
Previous knee infection or osteomyelitis

For a patient with osteoarthritis that has failed to respond to conservative treatment and had a previous infection involving the knee, staged total knee replacement or knee fusion should be considered. The choice to proceed with surgery, and between the two options, should be based on the patient's age, activity level, occupation, and a discussion. The discussion should include the natural history of the underlying condition including short- and long-term pain and physical impairment expectations with and without surgery.

The efficacy of the proposed surgical procedure should be discussed. The risks and possible complications of each treatment option and reasonable expectation and timeframe to accomplish the expected outcome should be discussed.

Total joint replacement is contraindicated in the presence of active infection.

When there is a history of infection, preoperative aspiration is often indicated. The risk of infection remains 10% or



greater when total knee arthroplasty is performed even in the presence of infection in the distant past . In a young patient with history of chronic infection, knee fusion should be considered . Good results have been reported in total knee arthroplasty in patients under 55 years of age.

Knee fusion may be considered in young, active, high demand patients with isolated bi- or tri-compartmental degenerative arthritis, particularly when associated with severe knee instability.

Patients without significant joint space narrowing

Weight bearing standing anterior to posterior (AP) radiographs of the knee should be taken . A lateral view of the knee joint and view tangential to the patellofemoral joint should be obtained. A standing radiograph,taken from posterior to anterior, with the knee flexed 45 degrees can show loss of cartilage in the posterior aspect of the knee.

If there is suspicion of avascular necrosis (AVN) involving the knee, a magnetic resonance imaging (MRI) scan may be performed. If MRI confirms the presence of avascular necrosis in older patients, with extensive involvement of the condyle, total knee arthroplasty is often indicated . Younger patients with more localized involvement may be candidates for a lesser procedure .

If avascular necrosis is not present and there is not significant joint space narrowing, arthroscopic debridement can be considered. Arthroscopic debridement may be indicated for the treatment of patients with degenerative arthritis with mechanical symptoms . Neither arthroscopic lavage nor debridement is indicated for patients without mechanical symptoms . Results of arthroscopic debridement in patients with mechanical symptoms are variable, but high success rates are reported when there is not gross malalignment or instability, there is some articular cartilage remaining, and symptoms are well localized .

Abrasion or drilling has not been shown to have added benefit . Careful patient selection is required. “For the subgroup of knees with loose bodies or flaps of meniscus or cartilage that are causing mechanical symptoms, especially locking, catching, or giving way of the joint, there is a consensus that arthroscopic removal of these unstable tissues improves joint function and alleviates symptoms.” (Felson DT, Buckwalter J; Editorial:Debridement and lavage for osteoarthritis of the knee, New Eng J Med, 347(2):132-3.)

If arthroscopic debridement for osteoarthritis of the knee is considered, a discussion with the patient should include the natural history of the underlying condition including short- and long-term pain and physical impairment expectations with and without surgery. The efficacy of the proposed surgical procedure should be discussed. The risks and possible complications of each treatment option and reasonable expectation and timeframe to accomplish the expected outcome should also be discussed.

Bi-compartmental or Tri-compartmental Arthritis

Patients with bi- or tri-compartmental arthritis of the knee who have failed to respond to conservative treatment should be considered for total knee arthroplasty . The decision to proceed with total knee arthroplasty is shared by the patient and surgeon, and is based largely on quality of life issues. The choice to proceed with surgery should be based on the patient’s age, activity level, occupation and a discussion. The discussion should include the natural history of the underlying condition including short- and long-term pain and physical impairment expectations with and without surgery. The efficacy of the proposed surgical procedure should be discussed. The risks and possible complications of each treatment option and reasonable expectation and timeframe to accomplish the expected outcome should be discussed.

Total joint replacement is contraindicated in the presence of active infection. Good results have been reported in total knee arthroplasty in patients under 55 years of age.



Medial compartment arthritis

Young, active patients with varus alignment that have failed to respond to conservative treatment should be considered for tibial osteotomy . Prerequisites for predictable results from proximal tibial osteotomy include: a range of motion of 5 to 90 degrees or greater, maintenance of some articular cartilage medially, minimal involvement of the lateral and patellofemoral compartments, and no more than minimal instability or lateral subluxation.

Patients who are less active may be considered for unicompartmental arthroplasty of the medial compartment of the knee . Pain should be well localized to the medial compartment, and radiographs should demonstrate minimal involvement of the lateral and patellofemoral compartments. Reasonable weight and a functionally intact anterior cruciate ligament are associated with favorable outcome.

Patients with predominantly medial compartment arthritis who are not candidates for a tibial osteotomy or unicompartmental arthroplasty may be candidates for total knee arthroplasty .

A discussion with the patient should include the natural history of the underlying condition including short- and long-term pain and physical impairment expectations with and without surgery. The efficacy of the proposed surgical procedure should be discussed. The risks and possible complications of each treatment option and reasonable expectation and timeframe to accomplish the expected outcome should also be discussed.

Lateral compartment arthritis

Young, very active patients with isolated narrowing of the lateral compartment may be candidates for a distal femoral varus osteotomy . Distal femoral varus osteotomy is indicated when there is 10degrees or more of tibiofemoral valgus, particularly when the joint line is oblique.

Patients who are not candidates for a distal femoral varus osteotomy may be candidates for total knee arthroplasty or, occasionally, unicompartmental arthroplasty of the lateral compartment .

Isolated patellofemoral arthritis

Young, very active patients with symptoms and radiographic changes isolated to

the patellofemoral joint may be considered for a procedure to elevate the tibial tubercle or a patellectomy. The role of patellectomy is not well defined and indications are limited. Results of tibial tubercle elevation have been variable with a significant complication rate.

A patient who is not young or very active may be a candidate for total knee arthroplasty . A patellofemoral arthroplasty may also be considered, but the role for this surgical procedure is not well defined and indications are limited.

A discussion with the patient should include the natural history of the underlying condition including short- and long-term pain and physical impairment expectations with and without surgery. The efficacy of the proposed surgical procedure should be discussed. The risks and possible complications of each treatment option and reasonable expectation and timeframe to accomplish the expected outcome should also be discussed.

Alternative Approaches

Continued conservative care for osteoarthritis of the knee may result in continued pain, dysfunction, and limitation in function. This often results in a diminution in quality of life. The avoidance of the risk and discomfort of surgery, for some patients, is desirable. There is some evidence that a long delay before arthroplasty is performed may result in a slightly poorer outcome, possibly due to worsening of muscle function and joint motion .

b) Physical/psychiatric rehabilitation

Not discussed.

c) Risk factor/recovery

Potential harms

Risks and complications of surgery

Contraindications

Total joint replacement is contraindicated in the presence of active infection. QUING STATEMENTS

d) Return to work

Not discussed.

8. Priority for Q-COMP

Rating criteria

Functional restoration Does the guideline consider graded increases in activity and function?	3
Psychosocial factors To what degree does the guideline consider psychosocial factors that may influence recovery?	1
Return to work process (vocational rehabilitation) To what degree does the guideline consider the Return to Work Process (vocational rehabilitation)?	1
Risk factors for recovery To what degree does the guideline consider Risk Factors for Recovery?	4
Total rating	9



The diagnosis and management of soft tissue knee injuries: internal derangements

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1. Developed by

New Zealand Guidelines Group (NZGG). The diagnosis and management of soft tissue knee injuries: internal derangements. Wellington (NZ); New Zealand Guidelines Group (NZGG); 2003 Jul.100 p. [229 references]

2. Guideline status

This is the current release of the guideline.

3. Where located/how accessed

National Guideline Clearinghouse www.clearinghouse.gov

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Print copies: Available from the New Zealand Guidance Group Inc., Level 30, Grand Plimmer Towers, 2–6 Gilmer Terrace, PO Box 10–665, Wellington, New Zealand; Tel: 64 4 471 4188; Fax: 64 4 471 4185; E-mail: info@nzgg.org.nz

The following companion documents are available:

- New Zealand Guidelines Group (NZGG). Guideline summary. Wellington (NZ): New Zealand Guidelines Group (NZGG); 2003 Jul. 2 p. Available from in Portable Document Format (PDF) from the New Zealand Guidelines Group Web site.
- New Zealand Guidelines Group (NZGG). Evidence-based guidelines for the diagnosis and management of soft tissue knee injuries. Terms of reference. Wellington (NZ): New Zealand Guidelines Group (NZGG); 2003. 4 p.

Print copies: Available from the New Zealand Guidelines Group Inc., Level 30, Grand Plimmer Towers, 2–6 Gilmer Terrace, PO Box 10–665, Wellington, New Zealand; Tel: 64 4 471 4188; Fax: 64 4 471 4185; E-mail: info@nzgg.org.nz.

4. Description/scope

Disease/condition(s)

Internal derangements of the knee including injuries to the major knee ligaments (the anterior and posterior cruciate ligaments, the medial and lateral collateral ligaments) and the medial and lateral menisci

Guideline category

- Diagnosis
- Evaluation
- Management
- Rehabilitation
- Treatment

Clinical speciality

- Family Practice
- Internal Medicine
- Orthopedic Surgery
- Physical Medicine and Rehabilitation



Intended users

- Advanced Practice Nurses
- Allied Health Professionals
- Health Care Providers
- Physical Therapists
- Physician Assistants
- Physicians

Guideline objectives

To provide an evidence-based summary of the diagnostic management and treatment options available for internal derangements of the knee to assist health practitioners and consumers make informed decisions to improve health outcomes.

Target population

Patients in New Zealand (over age 15 with internal derangements of the knee).

Interventions and practices considered

Diagnosis

1. Patient history and physical examination
2. Diagnostic tools;
 - Ottawa knee rules
 - Abduction stress tests
 - McMurray test
 - Loss of end range extension
 - Lachman test
 - Pivot shift test
 - Posterior drawer test
3. Imaging
 - Plain x-ray films
 - Magnetic resonance imaging (MRI)

Management

Non – Operative

1. Rest, ice, compression, elevation (RICE) protocol
2. Medications
 - Paracetamol
 - Non-steroidal anti-inflammatory drugs (NSAIDS)
3. Aspiration
4. Open kinetic chain exercises
5. Use of support person or advocate for Maori or Pacific Island patients
6. Specialist referral as indicated



Surgical

1. Anterior cruciate ligament reconstruction
2. Meniscectomy

Rehabilitation

1. Physiotherapy
 - Proprioceptive Training
2. Electrotherapy modalities (considered but not recommended)
 - Ultrasound
 - Laser therapy
 - Various forms of electrical stimulation
 - Transcutaneous electrical nerve stimulation (TENS)
 - Neuromuscular electrical stimulation (NMES)
 - Biofeedback
3. Bracing
4. Osteopathy, chiropractic, acupuncture and other complimentary therapies are not recommended

5. Outcomes considered

- Functional outcomes, such as return to previous activity levels and return to work
- Validated functional outcome scoring systems, including Lysholm, Tegner, International Knee Documentation Committee (IKDC)
- Objective tests, such as stability testing (clinical tests and arthrometry), one leg hop
- Subjective assessments including visual analogue scale (VAS) functional and satisfaction assessments
- Harm or adverse reactions
- Cost-effectiveness

6. Agree appraisal

- Scope and Purpose 67%
- Stakeholder Involvement 63%
- Rigour of Development 74%
- Clarity and Presentation 92%
- Applicability 22%
- Editorial Independence 83%

7. Relevance/appropriateness of use in workers' compensation sector

a) Functional progression

Major recommendations

Diagnosis

Excluding fractures

The Ottawa Knee Rules should be applied in the evaluation of acute knee injuries to assist clinicians in making



decisions about the need for radiography to exclude fractures.

People with a haemarthrosis should be x-rayed to exclude fractures.

People with significant fractures should be referred immediately to an orthopaedic surgeon. For people with a minor undisplaced fracture, orthopaedic surgeons need to review the films only.

The routine use of x-rays is generally not recommended.

Initial management and referral

People with no evidence of ligament laxity or meniscal damage should be treated with R.I.C.E. (rest, ice, compression, elevation) and paracetamol, if required, and advised to resume usual activities when pain and swelling have settled, and return for follow-up if symptoms persist after 7 days.

Urgent referral to an orthopaedic surgeon is required for people with:

- red flag signs and symptoms (see original guideline document for “Red Flags”)
- severe knee injuries
- significant fracture on x-ray

Early referral to a specialist is recommended for people with:

- injury to the anterior cruciate ligament (ACL), posterior cruciate ligament (PCL), or posterolateral complex
- a locked knee due to suspected meniscal entrapment
- equivocal diagnosis

Subsequent referral to a specialist for people:

- with a suspected meniscal tear if symptoms persist after a trial of rehabilitation for 6 to 8 weeks
- at any stage of the rehabilitation process where symptoms persist and clinical milestones are not being achieved

Referral for rehabilitation is recommended for people with:

- suspected meniscal tears
- injuries to the medial collateral ligament (MCL)
- other ligament injuries to manage symptoms until seen by a specialist

Imaging

Magnetic resonance imaging (MRI) may be considered by specialists where further information is required to make a diagnosis and decide appropriate subsequent management.

Clinical evaluation

Medial collateral ligament

A positive valgus stress test performed in extension and 30 degrees of flexion is reasonably accurate in the diagnosis of an MCL tear.

Tenderness along the course of the MCL is suggestive of MCL injury.

Medial and lateral meniscus

In the context of an appropriate history the McMurray test, well localised joint line tenderness, and a block to end range extension may have some additional diagnostic significance.



Anterior cruciate ligament

The Lachman test when correctly performed is reasonably accurate in the diagnosis of complete ruptures of the ACL.

The Lachman test is more accurate when acute pain, swelling, and muscle spasm have subsided at about 10 days.

The pivot shift test is best performed by experienced practitioners.

Loss of end range extension should alert the clinician to the possible involvement of the ACL.

Posterior cruciate ligament

The posterior drawer test is the most sensitive test for evaluating the integrity of the PCL.

Posterolateral complex

Primary care providers should refer any people with suspected injury of the posterolateral complex to an orthopaedic surgeon for further evaluation.

General management

R.I.C.E (Rest, Ice, Compression, Elevation)

There is insufficient evidence in the literature to support the use of R.I.C.E.; however, it is commonly accepted practice for the self-management of a mild soft tissue knee injury in the first 48 to 72 hours. Refer to the original guideline document for R.I.C.E. protocol.

Pharmacology

Paracetamol is probably the most cost-effective and potentially least harmful choice of analgesic for soft tissue knee injuries.

Nonsteroidal anti-inflammatory drugs (NSAIDs) may be beneficial for treating a persistent effusion that has not responded to the R.I.C.E. protocol.

Topical NSAIDs are effective and safe for acute sprains, strains, and sports injuries.

Haemarthrosis

Aspiration is not generally indicated for diagnosis.

Aspiration is indicated for a severe and painful suspected haemarthrosis of the knee joint following an acute knee injury.

For practitioners who are not experienced in the procedure, people should be treated with usual R.I.C.E. and referred to a specialist, local Base Hospital, or another practitioner who has more experience.

b) Physical/psychiatric rehabilitation

Physiotherapy

There is insufficient evidence in the literature to establish the relative effectiveness of the various approaches and methods currently used by physiotherapists in the conservative management of soft tissue knee injuries.

Proprioceptive training may be beneficial in improving outcomes for people with ACL-deficient knees, and its inclusion in rehabilitation programmes for both the conservative and post-operative management of ACL tears is recommended.



Electrotherapy modalities

Ultrasound is of little benefit in the treatment of soft tissue knee injuries.

At present there is insufficient evidence to support the use of neuromuscular electrical stimulation (NMES), transcutaneous electric nerve stimulation (TENS), or biofeedback in the post-operative rehabilitation following meniscectomy or ACL reconstruction.

Bracing in the non-operative management of knee injuries

Bracing is generally not required for the conservative management of soft tissue knee injuries.

Bracing is appropriate for isolated Grade III and severe Grade II injuries to the MCL for 4 to 6 weeks to stabilise the knee so that rehabilitation can be initiated.

Bracing may be indicated in selected cases where recurrent instability exists, but concurrent medical conditions or other factors preclude surgery.

Bracing may be indicated in selected cases where there is a psychological benefit associated with wearing a brace which enhances a person's ability to undertake tasks in work and sport.

Osteopathy, chiropractic and acupuncture

No recommendations can be made about the use of acupuncture, chiropractic, osteopathy, or other complementary therapies for the treatment of soft tissue knee injuries due to a lack of good quality evidence.

Specific management

Operative versus non-operative

Non-operative management is recommended for all grades of isolated medial collateral ligament injuries.

Anterior cruciate ligament

In general, ACL reconstruction has the most to offer those people with recurrent instability who must perform multidirectional activity as part of their occupation or sport.

Age should not be considered a barrier to reconstructive surgery in the older athlete, providing there are appropriate indications.

An active functional treatment programme supervised by a physiotherapist is recommended following ACL reconstruction.

Open kinetic chain exercises can be introduced from 4 to 6 weeks between 90 and 45 degrees of knee flexion. Bracing in the immediate post-operative period following ACL reconstruction is not recommended.

Medial and lateral meniscus

Physiotherapy is not routinely advocated following meniscectomy.

Posterior cruciate ligament

There is general agreement that Grade I and II isolated PCL tears are best managed nonoperatively.

There is insufficient evidence to establish the relative benefits of operative versus nonoperative management of isolated Grade III PCL tears.

Practitioners should follow the post-operative rehabilitation protocol recommended by the orthopaedic surgeon.

Posterolateral complex

Practitioners should follow the protocol recommended by the orthopaedic surgeon.

Special groups

Health practitioners providing care for Maori and Pacific Island peoples should be sensitive to their particular needs and encourage the use of a support person or advocate.

c) Risk factor/recovery

Potential harms

Diagnostic arthroscopy and Magnetic Resonance Imaging (MRI)

Based on figures supplied by Accident Compensation Corporation (ACC) the current rate of arthroscopy in New Zealand is 0.8% of all claims for soft tissue injuries of the knee, and 7.7% of all specialist procedures. The current rate of MRI is 3% of all claims for soft tissue injuries of the knee, but over 16% of specialist claims. Savings from diagnostic arthroscopies avoided may be balanced by increases in expenditure for MRIs.

Nonsteroidal Anti-Inflammatory Drugs (NSAIDS)

The rationale for using non-steroidal anti-inflammatory drug (NSAIDs) for acute sports injuries is based on the belief that controlling the inflammatory response following injury will speed the recovery process. However, there has been debate about how long treatment should continue and concerns about possible detrimental effects to the healing process in the later stages. In addition, NSAIDs are associated with significant morbidity mostly in the form of gastrointestinal symptoms.

d) Return to work

Not discussed.

8. Priority for Q-COMP

Rating criteria

Functional restoration Does the guideline consider graded increases in activity and function?	5
Psychosocial factors To what degree does the guideline consider psychosocial factors that may influence recovery?	1
Return to work process (vocational rehabilitation) To what degree does the guideline consider the Return to Work Process (vocational rehabilitation)?	1
Risk factors for recovery To what degree does the guideline consider Risk Factors for Recovery?	4
Total rating	11