

**Arthroscopic Surgery
and
Osteoarthritis of the
Knee**

**A REPORT FOR THE CENTERS FOR MEDICARE
AND MEDICAID SERVICES, COVERAGE
ANALYSIS GROUP**

December 2002

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Endorsements

The following musculoskeletal specialty societies endorse the contents of this report:

American Academy of Orthopaedic Surgeons (AAOS)

American Association of Hip and Knee Surgeons (AAHKS)

Arthroscopy Association of North America (AANA)

American Orthopaedic Society of Sports Medicine (AOSSM)

The Knee Society

Background

In July 2002, the article, “A controlled trial of arthroscopic surgery for osteoarthritis of the knee,” was published in the *New England Journal of Medicine* (NEJM). The article presented a randomized, placebo-controlled trial that evaluated the efficacy of arthroscopic debridement and arthroscopic lavage for osteoarthritis of the knee. The authors concluded that in their series, the outcomes of patients who underwent arthroscopic lavage or arthroscopic debridement were no better than the outcomes of those patients that underwent placebo surgery.

In October 2002, shortly after the results of the study were published, the Centers for Medicare and Medicaid Services (CMS) initiated the coverage review process for specific arthroscopic procedures. In particular, tracking sheet #CAG-00167N stated that a Medicare national coverage determination (NCD) was pending to “evaluate the scientific evidence to determine the indications for which arthroscopic lavage and/or debridement for the treatment of the osteoarthritic knee is reasonable and necessary.” CMS noted that “recent evidence published in the *New England Journal of Medicine* suggests that arthroscopic lavage and/or debridement in patients with osteoarthritis of the knee without other specific indications is no better than placebo surgery.” The NEJM article appears to be the primary basis for instituting the NCD on arthroscopy for the osteoarthritic knee.

In response to CMS’ initiation of the coverage review process on this issue, representatives from the American Academy of Orthopaedic Surgeons (AAOS), American Association of Hip and Knee Surgeons (AAHKS), Arthroscopy Association of North America (AANA), American Orthopaedic Society of Sports Medicine (AOSSM), and the Knee Society, met with CMS representatives from the Coverage and Analysis Group. The purpose of the meeting was to provide CMS with clinical and scientific information on certain arthroscopic procedures and osteoarthritis of the knee.

At the meeting, orthopaedic representatives emphasized the following key points:

- 1) There are many patients with osteoarthritis of the knee that can be significantly helped with appropriate arthroscopic surgery.
- 2) It is well recognized in the orthopaedic community that pain alone is not a specific indicator for arthroscopy. The AAOS, AANA, AOSSM, AAHKS, and the Knee Society have educated their members to recognize that unless there are other specific indicators, arthroscopic lavage and debridement is not recommended for patients with osteoarthritis of the knee.

- 3) With proper selection, patients with early degenerative arthritis and mechanical symptoms can derive significant benefit from arthroscopic surgery.
- 4) Careful selection of patients on the basis of a combination of variables, such as mechanical symptoms, limb and knee joint alignment, and severity of arthritis, are important factors that can lead to positive responses to arthroscopic surgery and better patient outcomes.
- 5) There are a number of well-established indicators for arthroscopic debridement in patients with osteoarthritis of the knee.

In addition to oral presentations, orthopaedic specialty society representatives provided several recent clinical and scientific articles to CMS. A bibliography of these materials is listed in **Appendix A** of this report. The original NEJM article was referenced along with editorials and other comments. Also included was a current review of arthroscopic management in osteoarthritis along with an AAOS evidenced-based document addressing the burden of disease of osteoarthritis of the knee (IMCA).

Definitions

Arthroscopy is a surgical procedure in which a small fiber optic telescope (arthroscope) is inserted into a joint. Fluid is inserted into the joint to distend it and to allow for visualization of the structures within that joint. The NEJM article focused on the two specific procedures of lavage and debridement. The definitions for the terms lavage, debridement, and meniscectomy are listed below.

LAVAGE:* Irrigation of the joint to remove or decrease free particles and calcium pyrophosphate crystals that arise from damaged cartilage, both of which may stimulate inflammation. This inflammatory response is considered to cause joint effusion, an increased level of proteolytic enzymes, and an increase in collagenolytic activity causing friability of the articular cartilage.

* This definition is given in the context of the osteoarthritic knee. In another circumstance, arthroscopic lavage is used in the treatment of an infected (septic) joint in conjunction with appropriate antibiotics, and initial rest followed by range of motion exercises.

References:

- Evans CH, Mazzocchi RA, Nelaon DD, Rubash HE. Experimental arthritis induced by intraarticular injection of allogenic cartilaginous particles in to rabbit knee. *Arthritis Rheum* 1984;27:200-207.
- Livesley PJ, Doherty M, Needoff M, Moulton A. Arthroscopic lavage of osteoarthritic knees. *J Bone Joint Surg Br* 1991;73:922-926.
- Swan A, Chapman B, Heap P, Seward H, Dieppe P. Submicroscopic crystals in osteoarthritic synovial fluids. *Ann Rheum Dis* 1994;53:467-70.

DEBRIDEMENT: Removal of: 1) damaged and loose areas of articular cartilage in order to achieve a stable surface, 2) cartilaginous or bony loose bodies, 3) osteophytes from the articular margin or the intercondylar notch that impinge upon the joint and impede motion, and 4) hypertrophied synovium.

MENISCECTOMY: ** Removal or torn mobile fragments of the medial and/or lateral menisci.

** This definition is applied to the removal of symptomatic meniscus tears associated with localized pain.

References:

- Bonamo JJ, Kessler KJ, Noah J: Arthroscopic meniscectomy in patients over the age of 40. *Am J Sports Med* 1992;20:422-429.

- Burks RT. Arthroscopy and degenerative arthritis of the knee: A review of the literature. *Arthroscopy* 1990;6:43-47.
- Fond J, Rodin D, Ahmad S, Nirschl RP. Arthroscopic Debridement for the Treatment of Osteoarthritis of the Knee: 2- and 5- Year Results. *Arthroscopy* 2002; 18:829-834.
- Hanssen AD, Stuart MJ, Scott RD, Scuderi GR. Surgical Options for the Middle-Aged Patient with Osteoarthritis of the Knee Joint. *J Bone and Joint Surg Am.* 2000;82:1768-1781.
- Hunt SA, Jazrawi LM, Sherman OH. "Arthroscopic Management of Osteoarthritis of the Knee," *JAAOS*, Vol. 10, No. 5, September/October 2002:356-363.
- Merchan ECR, Galindo E. Arthroscope guided surgery versus nonoperative treatment for limited degenerative osteoarthritis of the femorotibial joint in patients over 50 years of age: a prospective comparative study. *Arthroscopy* 1993;9:663-667.
- Ogilvie-Harris DJ, Ftsialos BP. Arthroscopic management of the degenerative knee. *Arthroscopy* 1991;7:151-157.

Treatment Options

NON-OPERATIVE TREATMENT OPTIONS

Commonly, orthopaedic surgeons will consider non-operative treatments for osteoarthritis of the knee before surgical treatment is considered. Patient education, physical therapy and exercise, pharmacologic treatments (e.g. NSAIDs, temporary use of opiates, and oxycodones), corticosteroid injections, and viscosupplementation (intra-articular injections of hyaluronate) are examples of non-operative treatment options. Weight loss, ambulatory aids, and knee braces may also be useful in non-operative treatment of osteoarthritis of the knee.

References:

Patient Education

- Lorig K, Feigenbaum P, Regan C, et al. A comparison of lay-taught and professional-taught arthritis self-management courses. *J Rheumatol* 1986;13-4:763-767.
- Lorig K, Holman H. Arthritis self-management studies: a twelve-year review. *Health Education Quarterly* 1993;20-1:17-28.
- Lorig K, Chastain RL, Ung E, Shoor S, Holman HR. Development and evaluation of a scale to measure perceived self-efficacy in people with arthritis. *Arthritis and Rheumatism* 1989; 32-1:37-44.

Physical Therapy and Exercise

- Van Baar ME. The effectiveness of exercise therapy in patients with osteoarthritis of the hip or knee: A randomized clinical trial. *J Rheumatol* 1998;25:2432-9.

Weight Loss

- Toda Y. Change in body fat, but not body weight or metabolic correlates of obesity, is related to symptomatic relief of obese patients with knee osteoarthritis after a weight control program. *J Rheumatol* 1998;25:2181-6.

Knee Bracing

- Kirkley J. The effect of bracing on varus gonarthrosis. *J Bone Joint Surg Am* 1999 Apr;81(4):539-48.

Pharmacologic Treatment

- Brandt KD. Should the initial drug used to treat osteoarthritis pain be a nonsteroidal anti-inflammatory drug? *J Rheumatol* 2001; Mar;28(3):467-73.
- Caldwell JR, Hale Me, Boyd RE, et al. Treatment of osteoarthritis pain with controlled release oxycodone or fixed combination oxycodone plus

acetaminophen added to nonsteroidal anti-inflammatory drugs: A double blind, randomized, multicenter, placebo-controlled trial. *J Rheumatol* 1999;26-4:862-869.

- Holzer SS. Development of an economic model comparing acetaminophen to NSAIDs in the treatment of mild-to-moderate osteoarthritis. *Am J Managed Care* 1996;2 Suppl:515-26.
- Towheed TE. Glucosamine and chondroitin for treating symptoms of osteoarthritis. *JAMA* 2000;283(11);1483-4.

Corticosteroid Injections

- Creamer P. Intra-articular corticosteroid injections in osteoarthritis: Do they work and if so, how long? *Ann Rheum Dis* 1997;56:634-6.

Viscosupplementation

- Altman RD. Intra-articular sodium hyaluronate (Hyalgan) in the treatment of patients with osteoarthritis of the knee: a randomized clinical trial. *J Rheumatol* 1998;25:2203-12.

OPERATIVE TREATMENT OPTIONS

If a patient with osteoarthritis of the knee does not respond to non-operative treatment, operative treatment may be considered. Common operations for osteoarthritis of the knee include: arthroscopy, osteotomy, and arthroplasty (partial or total knee replacement).

References:

Osteotomy

- Choi HR, Hasegawa Y, Kondo S, Shimizu T, et al. High tibial osteotomy for varus gonarthrosis: A 10- to 24-year follow-up study. *J Orthop Sci.* 2001;6(6):493-7.
- Cole BJ. Degenerative arthritis of the knee in active patients: Evaluation and management. *J Am Acad Orthop Surg* 1999 Nov-Dec;7(6):389-402.

Arthroplasty

- McGuigan FX, Hozack WJ, Moriarty L, et al. Predicting quality-of-life outcomes following total joint arthroplasty. Limitations of the SF-36 Health Status Questionnaire. *J Arthroplasty.* 1995 Dec;10(6):742-7.
- Newman JH, Ackroyd CE, Shah NA: Unicompartamental or total knee replacement? Five-year results of a prospective, randomized trial of 102 osteoarthritic knees with unicompartamental arthritis. *J Bone Joint Surg Br.* 1998 Sep;80(5):862-5.

Specific Indicators and References

When arthroscopic surgery is indicated, there are well-recognized specific indicators that are predictors of good outcome. The table below lists the specific indicators for which there is clinical consensus that arthroscopic surgery is reasonable and necessary.

Specific Indicator	References*
X-ray of no or minimal degenerative arthritis	<ol style="list-style-type: none"> 1. Lotke PA, Lefkoe RT, Ecker ML: Late results following medical meniscectomy in an older population. <i>J Bone Joint Surg Am</i> 1981;63:115-119. 2. Wouters E, Bassett SH, Hardaker WT, Garrett WE. An algorithm for arthroscopy in the over 50 age group. <i>Am J Sports Med</i> 1992;20:141-145. 3. Ogilvie-Harris DJ, Fitsialos BP. Arthroscopic management of the degenerative knee. <i>Arthroscopy</i> 1991;7:151-157. 4. Merchan ECR, Galindo E. Arthroscope guided surgery versus nonoperative treatment for limited degenerative osteoarthritis of the femorotibial joint in patients over 50 years of age: a prospective comparative study. <i>Arthroscopy</i> 1993;9:663-667.
Normal alignment or minimal mal-alignment	<ol style="list-style-type: none"> 1. Ogilvie-Harris DJ, Fitsialos BP. Arthroscopic management of the degenerative knee. <i>Arthroscopy</i> 1991;7:151-157. 2. Salisbury RB, Nottage WM, Gardner B. The effect of alignment on results in arthroscopic debridement of the degenerative knee. <i>Clin Orthop</i> 1985;198:268-172. 3. Hanssen AD, Stuart MJ, Scott RD, Scuderi GR. Surgical Options for the Middle-Aged Patient with Osteoarthritis of the Knee Joint. <i>J Bone and Joint Surg Am</i>. 2000;82:1768-1781. 4. Osteoarthritis of the Knee. Improving Musculoskeletal Care in America (IMCA) Project. American Academy of Orthopaedic Surgeons. Section 5:25-27.
Recent onset of symptoms within one year of presentation along with other indicators	<ol style="list-style-type: none"> 1. Baumgaertner MR, Cannon WD, Vittori JM, Schmidt ES, Maurer RC. Arthroscopic debridement of the arthritic knee. <i>Clin Orthop</i> 1990;253:197-202.

Specific Indicator	References*
	<ol style="list-style-type: none"> <li data-bbox="699 233 1559 338">2. Osteoarthritis of the Knee. Improving Musculoskeletal Care in America (IMCA) Project. American Academy of Orthopaedic Surgeons. Section 5:25-27.
<p data-bbox="232 380 586 415">Mechanical symptoms **</p> <ul data-bbox="285 436 626 579" style="list-style-type: none"> <li data-bbox="285 436 444 472">• Locking <li data-bbox="285 489 461 525">• Catching <li data-bbox="285 541 626 579">• Giving way, buckling 	<ol style="list-style-type: none"> <li data-bbox="699 380 1550 485">1. Baumgaertner MR, Cannon WD, Vittori JM, Schmidt ES, Maurer RC. Arthroscopic debridement of the arthritic knee. Clin Orthop 1990;253:197-202. <li data-bbox="699 527 1479 632">2. McGinley BJ, Cushner FD, Scott WN. Debridement arthroscopy. 10 year followup. Clin Orthop. 1999;367:190-194. <li data-bbox="699 674 1487 779">3. Ogilvie-Harris DJ. Fitsialos BP. Arthroscopic management of the degenerative knee. Arthroscopy 1991;7:151-157. <li data-bbox="699 821 1536 926">4. Osteoarthritis of the Knee. Improving Musculoskeletal Care in America (IMCA) Project. American Academy of Orthopaedic Surgeons. Section 5:25-27.
<p data-bbox="232 968 558 1037">Loose bodies (bone or cartilaginous)</p>	<ol style="list-style-type: none"> <li data-bbox="699 968 1550 1115">1. Hanssen AD, Stuart MJ, Scott RD, Scuderi GR. Surgical Options for the Middle-Aged Patient with Osteoarthritis of the Knee Joint. J Bone and Joint Surg Am. 2000;82:1768-1781. <li data-bbox="699 1157 1536 1325">2. Merchan ECR, Galindo E. Arthroscope guided surgery versus nonoperative treatment for limited degenerative osteoarthritis of the femorotibial joint in patients over 50 years of age: a prospective comparative study. Arthroscopy 1993;9:663-667. <li data-bbox="699 1367 1536 1472">3. Osteoarthritis of the Knee. Improving Musculoskeletal Care in America (IMCA) Project. American Academy of Orthopaedic Surgeons. Section 5:25-27.

Specific Indicator	References*
Unstable flaps of articular cartilage	<ol style="list-style-type: none"> 1. Merchan ECR, Galindo E. Arthroscope guided surgery versus nonoperative treatment for limited degenerative osteoarthritis of the femorotibial joint in patients over 50 years of age: a prospective comparative study. <i>Arthroscopy</i> 1993;9:663-667. 2. Osteoarthritis of the Knee. Improving Musculoskeletal Care in America (IMCA) Project. American Academy of Orthopaedic Surgeons. Section 5:25-27.
Symptomatic meniscus tears associated with localized pain	<ol style="list-style-type: none"> 1. Jackson RW, Rouse DW. The results of partial arthroscopic meniscectomy in patients over 40 years of age. <i>J Bone Joint Surg Br</i> 1982;64:481-485. 2. Bonamo JJ, Kessler KJ, Noah J: Arthroscopic meniscectomy in patients over the age of 40. <i>Am J Sports Med</i> 1992;20:422-429. 3. Rand JA. Arthroscopic management of degenerative meniscus tears in patients with degenerative arthritis. <i>Arthroscopy</i> 1985;1:253-8.
Impinging osteophytes	<ol style="list-style-type: none"> 1. Fond J, Rodin D, Ahmad S, Nirschl RP. Arthroscopic Debridement for the Treatment of Osteoarthritis of the Knee: 2- and 5- Year Results. <i>Arthroscopy</i> 2002; 18:829-834.

* The references provided above do not represent all the existing literature for each specific indicator. Instead, the references are a representative sample of the existing literature for each specific indicator.

** Definitions for mechanical symptoms:

- Locking — the knee becomes fixed in a single position or cannot continue in the motion intended
- Catching — a momentary sensation of locking but overcome by persistent muscle contraction or joint pressure
- Giving way, buckling — the knee, under the presence of any of the above may, through a reflex arc of involuntary control, fail to support the patient.

Conclusion

Osteoarthritis of the knee is a degenerative joint disease that affects a large number of Medicare beneficiaries. It is a chronic disease characterized by pain and inflammation that frequently requires medical and/or surgical treatment .

There are a number of treatment options for osteoarthritis of the knee. Medical treatment options include physical therapy and pharmacologic treatments. In the event that medical treatments fail, or if specific indicators are present, arthroscopic surgery is a reasonable and necessary treatment option for properly selected patients.

When arthroscopic surgery is considered, orthopaedic surgeons look for well-recognized specific indicators that are predictors of good outcome. Some examples of specific indicators include mechanical symptoms (locking, catching, and buckling), normal limb alignment or minimal mal-alignment of the joint, and the presence of loose bodies. Arthroscopic surgery is appropriate when these or other specific indicators, as discussed earlier in this report, are present. Orthopaedic surgeons recognize that with careful patient selection, patients with osteoarthritis of the knee can benefit from arthroscopic surgery.

The NEJM article, “A controlled trial of arthroscopic surgery for osteoarthritis of the knee” appears to be the primary basis for instituting a Medicare national coverage determination on such arthroscopic treatment. As with any single study, corroborative research should include control groups without selection bias and appropriate stratification for severity of arthritis, body weight, mechanical symptoms and limb alignment. This report provides the current scientific evidence requested by CMS that support the indications of arthroscopic debridement for the treatment of the osteoarthritic knee as being “reasonable and necessary.”

The musculoskeletal specialty societies will continue to work with CMS on this issue and assess the benefits of arthroscopic surgery as it relates to patients with osteoarthritis of the knee.

Appendix A

Burkhart, S. "Do Statistics Ever Lie?" *Arthroscopy*, Vol. 18, No.8 (October), 2002:823.

Chambers, K et al. "Letters-to-the-Editor re 'A Controlled Trial of Arthroscopic Surgery for Osteoarthritis of the Knee," *Arthroscopy*, Vol. 18, No. 7 (September), 2002:686-687.

Felson, DT and Buckwalter J. "Debridement and Lavage for Osteoarthritis of the Knee," *N Engl J Med* 347, No. 2, 2002:132-133.

Fond, J. "Arthroscopic Debridement for the Treatment of Osteoarthritis of the Knee: 2- and 5- Year Results," *Arthroscopy*, Vol. 18, No. 8 (October), 2002:829-834.

Horng, S and Miller FG. "Is Placebo Surgery Unethical?" *N Engl J Med* 347, No. 2, 2002:137-139.

Hunt, SA et al. "Arthroscopic Management of Osteoarthritis of the Knee," *JAAOS*, Vol. 10, No. 5, September/October 2002:356-363.

Moseley, JB et al. "A controlled trial of arthroscopic surgery for osteoarthritis of the knee," *N Engl J Med* Vol 347, No. 2, 2002:81 - 88.

Osteoarthritis of the Knee. Improving Musculoskeletal Care in America (IMCA) Project. American Academy of Orthopaedic Surgeons, September 2002.