

An Arthroscopic Treatment Regimen for Osteoarthritis of the Knee

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Purpose: The purpose of this study was to evaluate the functional and subjective outcomes of patients with moderate to severe osteoarthritis of the knee who underwent a comprehensive arthroscopic treatment regimen. **Methods:** Between August 2000 and November 2001, 69 knees in 61 patients were treated with an arthroscopic regimen. Inclusion criteria included severe osteoarthritis and a minimum 2-year follow-up. Arthroscopic treatment included joint insufflation, lysis of adhesions, anterior interval release, contouring of cartilage defects to a stable rim, shaping of meniscus tears to a stable rim, synovectomy, removal of loose bodies, and removal of osteophytes that affected terminal extension. Exclusion criteria included the treatment of chondral defects with microfracture. Failure was defined as knees requiring arthroplasty because this was what patients were trying to avoid. **Results:** The average patient age was 57 (range, 37-78), with 35 men and 26 women. Patients had an average of 1.5 previous surgeries (range, 0-12). The average preoperative Lysholm score was 49 (range, 14-79). On average, knees were insufflated with 170 mL of lactated Ringer's solution (range, 120-240). Nine knees failed, with survivorship of 83% at 3 years. At an average follow-up of 31 months (range, 24-41), the average Lysholm score was 74 (range, 37-100), with an average improvement of 25 points. The average Tegner score was 4 (range, 0-8). Average patient satisfaction was 8 (range, 1-10). The average Western Ontario and McMaster University Osteoarthritis Index (WOMAC) pain score was 4 (range, 0-14), WOMAC stiffness was 2 (range, 0-4), and WOMAC function was 11 (range, 0-44). Independent predictors of improvement in Lysholm score included a shift in the weight-bearing axis and preoperative Lysholm score. **Conclusions:** This arthroscopic treatment regimen can improve function and activity levels in patients with moderate to severe osteoarthritis. Of 69 patients, 60 (87%) patients had a satisfactory result. However, in this group of 60, 11 patients needed a second procedure, resulting in a 71% satisfactory result after 1 surgery. **Level of Evidence:** Level IV, therapeutic case series. **Key Words:** Osteoarthritis—Arthroscopic treatment—Outcomes—Malalignment.

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Arthroscopic procedures have been commonly performed for osteoarthritis of the knee, but the efficacy of such procedures remains unclear. Numerous studies have suggested their benefit¹⁻⁶; however, other studies have documented modest and even minimal rates of improvement.⁷⁻¹⁰ The variety of techniques and the different methods of assessment that have been used make comparison of studies difficult. Recently, the usefulness of arthroscopy for the degenerative knee has been challenged.¹⁰

Although arthroplasty provides predictable results for advanced degenerative joint disease of the knee, many patients seek to avoid or delay this surgery because they wish to maintain a high level of activity.

Furthermore, the increased morbidity of these procedures and the limited lifetime of joint replacements make these procedures less desirable for some patients.

Many of the arthroscopic studies have used techniques that include lavage, debridement, and abrasion arthroplasty.^{1-3,5-8,10-15} However, these studies have not emphasized increasing joint volume and treating capsular contracture. Furthermore, most of these studies have not emphasized the role of postoperative rehabilitation.

We hypothesized that in knees with severe osteoarthritis increasing joint volume with arthroscopy and maintaining it with rehabilitation would provide symptomatic relief by relieving joint-contact pressures. The purpose of the present study was to investigate the functional and subjective outcome of a comprehensive arthroscopic treatment and physical therapy regimen when applied to patients with severe osteoarthritis of the knee.

METHODS

Patient Selection

Between August 2000 and November 2001, 865 knee arthroscopies were performed by the senior author (J.R.S.). Our study group was composed of patients who underwent comprehensive arthroscopic treatment of their knee for generalized knee osteoarthritis. Each patient had failed a conservative treatment and was sent to the senior author (J.R.S.) for arthroscopic consideration. Typical conservative regimens included at least one of the following: activity modification, anti-inflammatory medications, physical therapy, weight reduction, viscosupplementation, oral glucosamine, or corticosteroid injections. Post-traumatic arthritis was included. Inclusion criteria included patients with a Kellgren-Lawrence radiographic grade of 3 or 4. Patients had to have an abnormal (moderate) or severely abnormal (severe) radiographic grade according to the International Knee Documentation Committee (IKDC). Patients with diffuse chondral damage who were not microfracture candidates were included in this study. Exclusion criteria included knees with traumatic chondral lesions, mild osteoarthritis (Kellgren-Lawrence grade 0-2), or incomplete radiographic studies. Patients with normal alignment and adequate cartilage rim surrounding the defect who underwent microfracture for chondral damage were also excluded. Seventy-four patients (82 knees) met these criteria.

Radiographic Analysis

The following radiographic studies were obtained of the knee: weight-bearing anteroposterior (AP) films with the knee in extension; weight-bearing posteroanterior films with the knee at 45° of flexion; lateral views; patellar views at 30° and 60° of flexion; and a long-standing lower-extremity view to include the pelvis, hip, knee, and ankle. We graded the degree of osteoarthritis by the radiographic definition of the IKDC, which is used by the International Cartilage Repair Society Cartilage Injury Evaluation Package. To be included in this study, patients had to have an abnormal (moderate) or severely abnormal (severe) IKDC radiographic grade. Moderate grade is defined as small osteophytes, slight sclerosis, and joint space narrowing (e.g., a joint space of 2-4 mm or up to 50% joint-space narrowing). Severe changes include sclerosis, osteophytes, and a joint space of less than 2 mm or greater than 50% joint-space narrowing. We also graded the degree of osteoarthritis by examining the AP knee films as described by Kellgren and Lawrence¹⁶ (Table 1). In 1961, the Kellgren-Lawrence grading system was accepted by the World Health Organization as the gold standard for cross-sectional and longitudinal epidemiologic studies of the knee.

We determined the lower-extremity mechanical axis on the long-standing films. A line from the center of the femoral head to the center of the ankle joint was drawn. A 0° mechanical axis was defined as intersecting the center of the knee joint. A shift in the mechanical axis (SMA) was calculated as the ratio of the distance between the center of the knee joint to the point the axis intersected the knee and the width of the compartment through which the axis crossed. Therefore, if the axis intersected the edge of the joint, the shift was calculated as 100%. The hip-knee-ankle (HKA) angle was used as another marker of the mechanical axis and

TABLE 1. *The Kellgren Lawrence Scale*

Grade	Description
0	Normal
1	Doubtful narrowing of joint space and possible osteophytic lipping
2	Definite osteophytes and possible narrowing of joint space
3	Moderate multiple osteophytes, definite joint-space narrowing, some sclerosis, and possible deformity of bony ends
4	Large osteophytes, marked joint-space narrowing, severe sclerosis, and definite deformity of bony ends

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