Cleveland Clinic Secure Online Services

Cleveland Clinic uses state-of-the-art digital information systems to offer secure online services such as online medical second opinions, medical record access, patient treatment progress for referring physicians (see below), and imaging interpretations by our subspecialty trained radiologists. For more information, please visit eclevelandclinic.org.

MyChart  This secure online tool connects patients to their own health information from the privacy of their home any time, day or night. Some features include renewing prescriptions, reviewing test results and viewing medications, all online. For the convenience of physicians and patients across the country, MyChart now offers a secure connection to Google™ Health. Google Health users can securely share personal health information with Cleveland Clinic, and record and share the details of their Cleveland Clinic treatment with the physicians and healthcare providers of their choice. To establish a MyChart account, visit clevelandclinic.org/mychart.

DrConnect  Whether you are referring from near or far, DrConnect streamlines communication from Cleveland Clinic physicians to your office. This complimentary online tool offers secure access to your patient’s treatment progress at Cleveland Clinic. With one-click convenience, you can track your patient’s care using the secure DrConnect website. To establish a DrConnect account, visit clevelandclinic.org/drconnect or email drconnect@ccf.org.

MyConsult  Online Medical Second Opinion  This secure online service provides specialist consultations from our Cleveland Clinic experts and remote medical second opinions for more than 1,000 life-threatening and life-altering diagnoses. MyConsult is particularly valuable for people who wish to avoid the time and expense of travel. For more information, visit clevelandclinic.org/myconsult, email eclevelandclinic@ccf.org or call 800.223.2273, ext 43223.

Critical Care Transport: Anywhere in the world

Cleveland Clinic’s critical care transport team serves critically ill and highly complex patients across the globe. The transport fleet comprises mobile ICU vehicles, helicopters and fixed-wing aircraft. The transport teams are staffed by physicians, critical care nurse practitioners, critical care nurses, paramedics and ancillary staff, and are customized to meet the needs of the patient. Critical care transport is available for children and adults.

To arrange a transfer for STEMI (ST elevated myocardial infarction), acute stroke, ICH (intracerebral hemorrhage), SAH (subarachnoid hemorrhage) or aortic syndromes, call 877.279.CODE (2633).

For all other transfers, call 216.444.8302 or 800.553.5056.

CME Opportunities: Live and Online

Cleveland Clinic’s Center for Continuing Education’s website, clevelandclinicmeded.com, offers hundreds of convenient, complimentary learning opportunities, from webcasts and podcasts to a host of medical publications including the Disease Management Project Online Medical Textbook, with more than 150 chapters. The site also offers a schedule of live CME courses, including international summits that focus on key areas of translational research. Many live CME courses are hosted in Cleveland, an economical option for business travel. Physicians can manage their CME credits by using the myCME Web Portal. Available 24/7, the site offers CME opportunities to medical professionals across the globe.
To promote quality improvement, Cleveland Clinic has created a series of Outcomes books similar to this one for many of its institutes. Designed for a physician audience, the Outcomes books contain a summary of our surgical and medical trends and approaches, data on patient volume and outcomes, and a review of new technologies and innovations.

Although we are unable to report all outcomes for all treatments provided at Cleveland Clinic — omission of outcomes for a particular treatment does not mean we necessarily do not offer that treatment — our goal is to increase outcomes reporting each year. When outcomes for a specific treatment are unavailable, we often report process measures associated with improved outcomes. When process measures are unavailable, we may report volume measures; a volume/outcome relationship has been demonstrated for many treatments, particularly those involving surgical techniques.

In addition to our internal efforts to measure clinical quality, Cleveland Clinic supports transparent public reporting of healthcare quality data and participates in the following public reporting initiatives:

- Joint Commission Performance Measurement Initiative (www.qualitycheck.org)
- Centers for Medicare and Medicaid (CMS) Hospital Compare (www.hospitalcompare.hhs.gov)
- Leapfrog Group (www.leapfroggroup.org)
- Ohio Department of Health Service Reporting (www.odh.ohio.gov/healthStats/hlthserv/hospitaldata/hospperf.aspx)

Our commitment to providing accurate, timely information about patient care will also help patients and referring physicians make informed healthcare decisions. We hope you find these data valuable. To view all our Outcomes books, visit Cleveland Clinic’s Quality and Patient Safety website at clevelandclinic.org/quality/outcomes.
Dear Colleague,

On behalf of Cleveland Clinic, I am pleased to present our 2008 Outcomes books. The primary purpose of our annual Outcomes book initiative is to promote quality improvement at Cleveland Clinic, thereby optimizing the care we provide to our patients. Measuring and reporting outcomes reflects our organizational commitment to accountability, transparency and results.

Each year, external stakeholders are requiring hospitals to report more and more quality and patient safety data. We view our Outcomes books as voluntary supplements to the required public reporting and an opportunity to share selected innovations with colleagues across the country.

Designed for the physician reader, each book in the annual series focuses on care provided by one of our patient-centered clinical institutes. We hope you find the content informative.

Sincerely,

Delos M. Cosgrove, MD
CEO and President
Chairman’s Letter

The 2008 Outcomes book reflects our growing emphasis and effort to measure the functional outcome of a wide range of surgical procedures and non-surgical treatments performed by the faculty in our Institute. This publication reflects the surgical care of patients treated on the main campus and at our outpatient surgical centers by the Orthopaedic Surgery Department. Our Rheumatology Department cares for patients with a wide range of arthritic conditions and systemic immunologic diseases resulting in vasculitis and inflammatory arthritis, and we provide the outcomes of care for these patients as well.

Our focus this year is on a broader range of pathologies, corrective interventions and outcomes than last year. We report outcomes of surgical treatment of osteoarthritis in the hip, knee and shoulder, and of prosthesis failure (revisions); and the results of correction of anterior cruciate ligament and rotator cuff problems, treatment in the diabetic foot clinic, and ankle arthroplasty and arthrodesis. For the first time, we show results of selected corrective procedures in the pediatric population.

This publication reports length of stay, frequency of re-operation up to 90 days after discharge and probability of subsequent failure of the original corrective procedure. We also present short-term and mid-term patient-reported outcomes — pain VAS score, msROS scores, and general (SF10, SF12 or SF36) and joint-specific (PENN Shoulder Score, HOOS, KOOS) quality-of-life measures. We also report, for some commonly performed procedures, the effect of patient baseline sociodemographic and medical characteristics (age, gender, smoking history and co-morbidity) on short-term functional outcomes after surgery. We report our patient satisfaction scores, as well.

We will continue to expand our Institute’s efforts in the next year to include clinical outcome data collection for other outpatient and inpatient clinical care sites within the Cleveland Clinic health system. We also will add other database registries for other subspecialty areas of orthopaedic surgery and rheumatology.

We hope that you find the 2008 publication informative and of even greater value than the 2007 publication. We look forward to your comments and feedback.

Joseph P. Iannotti, MD, PhD
Chairman, Orthopaedic & Rheumatologic Institute
The mission of the Orthopaedic & Rheumatologic Institute is to provide world-class compassionate care and service to all patients seeking treatment at Cleveland Clinic. Serving patients is our first and most important priority. We provide care for patients with the most complex clinical problems from around the country and the world. Our current full-time faculty includes 46 orthopaedic surgeons (41 orthopaedic and five spine), 29 rheumatologists, 11 musculoskeletal radiologists, six podiatrists, seven office-based sports medicine physicians, three office-based, nonoperative physicians, three doctoral-level research staff, one chiropractor and 10 basic science research staff members with secondary appointments in our Orthopaedic Surgery Department.

Our Institute is dedicated to the education and training of residents and fellows, as well as colleagues both within and outside of Cleveland Clinic. Our goal is to select and train individuals interested in remaining academically productive so that they contribute back to our profession through their own teaching and research. Our Institute also is dedicated to the development of new knowledge and innovation through both basic science and clinical research activities. The clinical research infrastructure within the Orthopaedic & Rheumatologic Institute includes 19 staff members. Our Clinical Outcomes Research Center (CORC) is staffed by 10 full-time and 11 part-time employees. The Research Rheumatology Group (RRG) has three full-time and three part-time employees. These combined groups manage 33 clinical research projects, 52 registry/chart review/databases and 27 clinical trials in many areas of orthopaedic surgery and rheumatology. These centers also are responsible for the collection, management and analysis of the data presented in this year’s Outcomes book.

The Orthopaedic Department has centers focused on Pediatric Orthopaedic Surgery, Hand and Upper Extremity, Musculoskeletal Tumors, Foot and Ankle, Adult Reconstruction (Hip and Knee) Surgery, Sports Medicine and Spine. All centers have active programs in translational and clinical outcomes research in the areas of cartilage, tendon and bone tissue-engineering through multiple funding mechanisms, including the AFIRM (Armed Forces Institute of Regenerative Medicine) program. These centers are also very active in prosthetic design and performance, knee ligament research, athletic performance and wound healing.

Our Rheumatology Department is a leader in the evaluation and treatment of connective tissue diseases, including vasculitis, autoinflammatory diseases, metabolic bone diseases, and scleroderma, and coordination of care with cardiovascular medicine, orthopaedics, pathology, imaging and surgery. The Vasculitis Center is conducting studies of novel treatment protocols utilizing randomized clinical trials. The Fasenmyer Center for Clinical Immunology has promoted innovative research in vasculitis and viral-associated immune disorders, education and training for clinical immunology, and community outreach and awareness of public health issues. The Center for Osteoporosis and Metabolic Bone Diseases is evaluating novel biologic and anabolic therapy for osteoporosis. Pediatric Rheumatology has started a combined fellowship program with Case Western Reserve University’s rheumatology program, and established links with the National Institutes of Health and the autoinflammatory disease clinic. Cardiovascular outcomes in patients with rheumatic diseases are an ongoing focus of research. This year’s Outcomes book highlights the clinical outcomes of patients with osteoporosis, CNS vasculitis, juvenile arthritis, HIV and fibromyalgia.
### Surgery

- Shoulder, Open
- Shoulder, Arthroscopy
- Forearm, Wrist, Hand and Fingers
- Spine
- Tumor
- Pelvis and Hip Joint
- Femur and Knee Joint, Open
- Femur and Knee Joint, Arthroscopy
- Leg and Ankle Joint
- Foot and Toes

### Anesthesia

### Imaging

Newly opened *Arthritis and Musculoskeletal Treatment Center* aims to streamline multi-disciplinary care for patients with arthritis and related musculoskeletal problems.

Newly opened *Cleveland Clinic Sports Health Center*:

- 50,000 square feet of space
- 12 sports physicians
- 6 state-of-the-art operating rooms
Total Shoulder Arthroplasty in Patients with Osteoarthritis in Shoulder

Patients report highly improved shoulder-specific quality of life (QoL) between three and 12 months after surgery. The results are stable for more than four years. Some 93 percent of patients realize at least a 15-point improvement in the total score (this change is described in literature as clinically significant). Data for the shoulder-specific QoL for the first three months after surgery are not available.

Functional outcomes during the early postoperative period were measured on a 10-point visual analog scale of self-reported arm-related physical limitations. Some improvement is observed during the first three months after surgery and 93 of 116 patients (80 percent, p<0.000) report more than two-point improvement at the end of the first year.

The most relevant domains of general health-related quality of life (as reported by patients, the SF12 questionnaire, higher scores correspond to better quality of life) demonstrate initial decrease of the Role-Physical score, though patients report less pain during the same time period. Subsequent follow-up shows persistent improvement in all relevant domains of quality of life. A small decrease of scores after the second year of follow-up is most likely associated with the progression of other medical conditions or the occurrence of new medical conditions in this older patient population. The decrease is unlikely to be associated with the index surgery because the shoulder-specific QoL demonstrates a positive trend.

Shoulder-specific QoL in Patients with Osteoarthritis in Shoulder Prior to and After Total Shoulder Arthroplasty (N=133) 2002 – 2007

Score
0 - worst possible, 100 - best possible
Arm-related Physical Limitations in Patients with Osteoarthritis in Shoulder Prior to and After Total Shoulder Arthroplasty (N=116)

2006 – 2008

Score
0 - worst possible, 10 - best possible

General QoL in Patients with Osteoarthritis in Shoulder Prior to and After Total Shoulder Arthroplasty (N=144)

2002 – 2008

Score
0 - worst possible, 50 - non-patient control group mean
Hemiarthroplasty in Patients with Osteoarthritis in Shoulder

Patients report highly improved shoulder-specific quality of life (QoL) during the first three months after surgery, though this improvement is less prominent than in patients with total shoulder arthroplasty. Scores continue to improve gradually in the subsequent four years. Some 91 percent of patients realize at least a 15-point improvement in the total score.

Pre-operative arm limitations in this group are higher than in patients who undergo total shoulder arthroplasty. Some improvement is observed during the first three months after surgery and 18 of 21 patients (86 percent, p<0.001) report more than a two-point improvement at the end of the first year.

The most relevant domains of general health-related QoL demonstrate an initial decrease in the Role-Physical score. During the same time period, patients report less pain. Subsequent follow-up shows persistent improvement in all relevant domains of QoL. A small decrease of scores after the second year of follow-up is most likely associated with the progression of other medical conditions or the occurrence of new medical conditions in this older patient population. The decrease is unlikely to be associated with the index surgery because the shoulder-specific QoL demonstrates a positive trend.

Shoulder-specific QoL in Patients with Osteoarthritis in Shoulder Prior to and After Hemiarthroplasty (N=41)
2002 – 2007

Score
(0 - worst possible, 100 - best possible)
Arm-related Physical Limitations in Patients with Osteoarthritis in Shoulder Prior to and After Hemiarthroplasty (N=21)

2006 – 2008

Score
0 - worst possible, 10 - best possible

General QoL in Patients with Osteoarthritis in Shoulder Prior and After Hemiarthroplasty (N=41)

2002 – 2008

Score
0 - worst possible, 50 - non-patient control group mean
Revision of Total Shoulder Arthroplasty

Patients who need revision surgery report more severe limitations in their shoulder than those who undergo primary shoulder replacement. Shoulder-specific quality of life (QoL) clearly improves between three and 12 months after surgery, though much less than in patients with primary shoulder arthroplasty. After the second year, scores of shoulder-specific QoL remain stable. Some 85 percent of patients realize at least a 15-point improvement in the total score.

Pre-operative limitations in the arm in this group are higher than in patients who undergo total shoulder arthroplasty. Some improvement is observed during the first three months after surgery. Recovery of the arm function develops relatively slowly and only 32 of 43 patients (74 percent, p<0.001) report more than a two-point improvement at the end of the first year.

The most relevant domains of general health-related QoL demonstrate slow but significant increase of all reported scores. At the end of the fourth year of follow-up, general QoL is still much lower than four years after primary arthroplasty.

Shoulder-specific QoL Prior to and After Total Shoulder Arthroplasty Revision (N=48)

2002 – 2007

Score
0 - worst possible, 100 - best possible

- Pre-op
- 0-3 months post-op
- 3-12 months post-op
- 1-2 years post-op
- 2-4 years post-op
- 4+ years post-op

<table>
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<th>Pain</th>
<th>Satisfaction</th>
<th>Total Score</th>
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<td>0</td>
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</table>

Score 0 - worst possible, 100 - best possible
Arm-related Physical Limitations Prior to and After Total Shoulder Arthroplasty Revision (N=43)

2006 – 2008

Score
0 - worst possible, 10 - best possible

General QoL Prior to and After Total Shoulder Arthroplasty Revision (N=48)

2002 – 2008

Score
0 - worst possible, 50 - non-patient control group mean

Orthopaedics: Surgery: Shoulder, Open

Role Physical
Bodily Pain
Physical Component Score

Score
0 - worst possible, 10 - best possible

Score
0 - worst possible, 50 - non-patient control group mean
**Open Rotator Cuff Repair**

Patients with rotator cuff tears who undergo an open corrective procedure have less severe limitations in their shoulder than patients with osteoarthritis. Shoulder-specific quality of life (QoL) of patients clearly improves three months after open rotator cuff repair and does not deteriorate in subsequent years. Approximately 85 percent of patients realize at least a 15-point improvement in the total score.

Pre-operative limitations in the arm in this group are lower than in patients with osteoarthritis. Some improvement is observed during the first three months after surgery. Arm function recovers relatively slowly and only 49 of 62 patients (74 percent, p<0.000) report more than a two-point improvement at the end of the first year.

The most relevant domains of general health-related QoL demonstrate that Role-Physical deteriorates during the first three months despite improvement in Bodily Pain scores. All analyzed scores show steady improvement in subsequent years. At the end of the reported follow-up period, all scores of general quality of life are at the level of scores of non-patient population. Maintenance of normal non-patient SF-12 scores most likely reflects the younger and healthier population of patients with rotator cuff surgery than patients undergoing joint replacement.

**Shoulder-specific QoL Prior to and After Open Rotator Cuff Repair (N=63)**

2002 – 2007

<table>
<thead>
<tr>
<th>Score</th>
<th>0 - worst possible, 100 - best possible</th>
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</table>

![Graph showing the improvement of shoulder-specific QoL scores from pre-operative to 4+ years post-operative.](graph)
Arm-related QoL Prior to and After Open Rotator Cuff Repair (N=123)

2006 – 2008

Score
0 - worst possible, 10 - best possible

General QoL Prior to and After Open Rotator Cuff Repair (N=62)

2002 – 2008

Score
0 - worst possible, 50 - non-patient control group mean
Open Capsulorrhaphy in Patients with Shoulder Instability

Data on shoulder-specific and general health-related quality of life (QoL) are not yet available in this group of patients. Pre-operative arm-related functional limitations in this group are higher than in patients with rotator cuff problems. Positive effect of surgery is clearly seen during the first three months; by the end of the first year, 16 of 20 patients (80 percent, p<0.001) improve by more than two units on a 10-level scale.

Arm-related Physical Limitations in Patients with Shoulder Instability Prior to and After Open Capsulorrhaphy

2006 – 2008

Score
0 - worst possible, 10 - best possible

Pre-op 0-3 months post-op 3-12 months post-op
**Arthroscopic Capsulorrhaphy in Patients with Shoulder Instability**

Data on shoulder-specific quality of life (QoL) are not yet available. Arm-related QoL does not improve during the first three months; it starts to improve later. At the end of the first year, 21 of 30 patients (70 percent, p<0.05) show improvement over the pre-operative level by two or more units. General QoL demonstrates a small decrease during the first three months but approaches the level of the non-patient population by the end of the first year.

**Arm-related Physical Limitations in Patients with Shoulder Instability Prior to and After Arthroscopic Capsulorrhaphy (N=30)**

2006 – 2008

**Score**

0 - worst possible, 10 - best possible

![Graph showing improvement in arm-related physical limitations](image)

2002 – 2008

**Score**

0 - worst possible, 50 - non-patient control group mean

![Graph showing general QoL improvement](image)
**Arthroscopic Rotator Cuff Repair**

Shoulder-specific quality of life (QoL) significantly improves after the first three months of observation and continues to get better in the subsequent four years. At the end of this period, 88 percent of patients demonstrate improvement of more than 15 units. Arm-related QoL steadily improves during the first year of observation and, at the end of the first year, 100 of 135 patients (74 percent, p<0.000) demonstrate gain in scores of two or more units. Physical component score of general QoL improves steadily and achieves the level close to that of the non-patient population at the end of the observation period. Maintenance of a near-normal non-patient SF-12 score most likely reflects the younger and healthier population of patients with rotator cuff surgery than patients undergoing joint replacement.

**Shoulder-specific QoL Prior to and After Arthroscopic Rotator Cuff Repair With Partial Acromioplasty (N=113)**

**2002 – 2007**

**Score**  
0 - worst possible, 100 - best possible

---

**Arm-related Physical Limitations Prior to and After Arthroscopic Rotator Cuff Repair with Partial Acromioplasty (N=135)**

**2006 – 2008**

**Score**  
0 - worst possible, 10 - best possible
General QoL Prior to and After Arthroscopic Rotator Cuff Repair with Partial Acromioplasty (N=112)

2002 – 2008

Score
0 - worst possible, 50 - non-patient control group mean

- Role Physical
- Bodily Pain
- Physical Component Score

Pre-op
0-3 months post-op
3-12 months post-op
1-2 years post-op
2-4 years post-op

Score
0 - worst possible, 50 - non-patient control group mean
Arthroscopic Repair of SLAP Lesion

Data on the outcomes of arthroscopic repair of SLAP lesion are currently available for the one-year follow-up only. Some 34 of 48 patients (71 percent, p<0.005) improve their reported scores of arm-related limitations by two or more units. After the initial decrease, the general quality of life scores achieve the level that is observed in healthy population.

Arm-related Physical Limitations Prior to and After Repair of SLAP Lesion (N=48)

<table>
<thead>
<tr>
<th>Score</th>
<th>Pre-op</th>
<th>0-3 months post-op</th>
<th>3-12 months post-op</th>
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</thead>
<tbody>
<tr>
<td>0 - worst possible, 10 - best possible</td>
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</table>

General QoL Prior to and After Repair of SLAP Lesion (N=51)

<table>
<thead>
<tr>
<th>Score</th>
<th>Pre-op</th>
<th>0-3 months post-op</th>
<th>3-12 months post-op</th>
</tr>
</thead>
<tbody>
<tr>
<td>0 - worst possible, 50 - non-patient control group mean</td>
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</table>

Role Physical  | Bodily Pain  | Physical Component Score

Pre-op | 0-3 months post-op | 3-12 months post-op
Tendon Sheath Incision

Despite relatively low pre-operative physical limitations in the upper arm (average score is 4.9 on a 10-level scale) and application of relatively general measure of outcomes (entire upper extremity – from shoulder to fingers), 22 of 26 patients (85 percent, p<0.000) demonstrate some improvement during the first year after surgery and 69 percent of patients demonstrate improvement of more than two units (p<0.05).

Arm-related Quality of Life in Patients with Tenosynovitis of Trigger Finger Prior to and After Tendon Sheath Incision (N=26)

2006 – 2008

<table>
<thead>
<tr>
<th>Score</th>
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<tbody>
<tr>
<td>Pre-op</td>
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<td>0-3 months post-op</td>
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<tr>
<td>3-12 months post-op</td>
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Surgical Fixation of Scoliosis and Kyphosis in Children

Surgical fixation of spine deformity (scoliosis and kyphosis) in children is followed by decreased Physical Health scores and increased spine-related Physical Limitations (as assessed by proxies) during the first two months after surgery. At the end of the first year, all scores return to their pre-operative values. Scores of Psychosocial Health do not change during the entire period of observation.

Spine-related Physical Limitations Prior to and After Surgical Fixation of Spine Deformity in Children (N=81)

2007 – 2008

Score
0 - worst possible, 10 - best possible

General QOL Prior to and After Surgical Fixation of Spine Deformity in Children (N=97)

2007 – 2008

Score
0 - worst possible, 50 - non-patient control group mean
The Center for Spine Health is dedicated to developing new technology and decreasing the cost of surgery. Digital X-ray equipment dramatically decreases the time it takes to perform an intraoperative localizing X-ray for anterior cervical fusions (100 seconds instead of 823). In addition, the cost of a digital X-ray is just 10 percent that of a conventional radiograph.
Spine Surgical Cases 2008

Number of Procedures

- Lumbar: 1,000
- Cervical: 600
- Thoracic: 200

Distribution of 2008 Spine Surgical Cases by Disease Category

Number of Procedures

- Degenerative: 1,400
- Deformity: 400
- Fracture/Trauma: 200
- Tumor: 23
- Other: 23
Dr. Michael Joyce is Co-chair of the Committee overseeing a web-based registry called Transplantation Transmission Sentinel Network.

Tumor Board Review

Over the last three years, the number of patients and cases studied in the Tumor Board Review has increased dramatically.

Patients Studied in Tumor Board Review

<table>
<thead>
<tr>
<th>Patients/Cases</th>
<th>2006</th>
<th>2007</th>
<th>2008</th>
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<td>Total Patients Studied</td>
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</tr>
<tr>
<td>Total Cases Studied</td>
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</table>
Total Hip Arthroplasty in Patients with Osteoarthritis

Improvement in leg-related physical limitations starts during the first three months after discharge; at the end of the first year, 464 of 554 patients (84 percent, p<0.000) demonstrate improvement by more than two units. Steady improvement of general quality of life (QoL) is observed for two years after discharge. At the end of two-year period, these scores are close to those observed in the non-patient population.

Leg-related Physical Limitations in Patients with Osteoarthritis in Hip Prior to and After Total Hip Arthroplasty (N=554)

2006 – 2008

Score
0 - worst possible, 10 - best possible

---

General QoL in Patients with Osteoarthritis Prior to and After Total Hip Arthroplasty (N=1249)

2002 – 2008

Score
0 - worst possible, 50 - non-patient control group mean

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Orthopaedics: Surgery: Pelvis and Hip Joint
Total Hip Arthroplasty in Patients with Aseptic Necrosis

Improvement in leg-related physical limitations starts during the first three months after discharge; at the end of the first year, 48 of 52 patients (92 percent, p<0.000) demonstrate improvement by more than two units. Slow but steady improvement of general quality of life (QoL) is observed for two years after discharge. Lower general QoL scores, when compared to patients with osteoarthritis, most likely reflect the systemic diseases associated with hip aseptic necrosis.

Leg-related Physical Limitations in Patients with Aseptic Necrosis Prior to and After Total Hip Arthroplasty (N=52)

2006 – 2008

Score
0 - worst possible, 10 - best possible

General QoL in Patients with Aseptic Necrosis Prior to and After Total Hip Arthroplasty (N=63)

2002 – 2008

Score
0 - worst possible, 50 - non-patient control group mean
Revision of Total Hip Arthroplasty, Both Components

Improvement in leg-related physical limitations starts during the first three months after discharge and continues during the following year; at the end of the first year, only 47 of 75 patients (62 percent, p<0.02) demonstrate improvement by more than two units. Slow steady improvement of general quality of life (QoL) is observed for two years after discharge. At the end of the two-year period, these scores are still lower than those observed in the non-patient population.

Leg-related Physical Limitations Prior to and After Revision of Total Hip Arthroplasty, Both Components (N=75)

2006 – 2008

Score
0 - worst possible, 10 - best possible

General QoL Prior to and After Revision of Total Hip Arthroplasty, Both Components (N=171)

2002 – 2008

Score
0 - worst possible, 50 - non-patient control group mean
Revision of Total Hip Arthroplasty, One Component

Improvement in leg-related physical limitations starts during the first three months after discharge and continues during the following year; at the end of the first year, 44 of 46 patients (96 percent, p<0.000) demonstrate some improvement and 31 of them demonstrate improvement by more than two units (p<0.05). Steady improvement of general quality of life (QoL) is observed for two years after discharge. At the end of two-year period, these scores are still lower than those observed in the non-patient population.

Leg-related Physical Limitations Prior to and After Revision of Total Hip Arthroplasty, One Component (N=46)

2006 – 2008

Score
0 - worst possible, 10 - best possible

General QoL Prior to and After Revision of Total Hip Arthroplasty, One Component (N=58)

2002 – 2008

Score
0 - worst possible, 50 - non-patient control group mean
One-Compartment Arthroplasty in Patients with Osteoarthritis

Leg-related physical limitations in this group of patients improve significantly during the first three months after surgery (p<0.001). The scores continue to improve and, at the end of the first year, 45 of 51 patients (88 percent) report improvement by more than two units (p<0.000). General quality of life (QoL) steadily improves during the period of observation and, between the first and the second year, the scores are similar to those observed in the non-patient population.

Leg-related Physical Limitations Prior to and After Knee Arthroplasty (One Compartment) in Patients with Osteoarthritis (N=51)

2006 – 2008
Score
0 - worst possible, 10 - best possible

![Graph showing improvement in physical limitations over time.]

General QoL Prior to and After Knee Arthroplasty (One Compartment) in Patients with Osteoarthritis (N=37)

2002 – 2008
Score
0 - worst possible, 50 - non-patient control group mean

![Graph showing improvement in general quality of life scores over time.]
Total Knee Arthroplasty in Patients with Osteoarthritis, Unilateral

Leg-related physical limitations in this group of patients improve significantly during the first three months after surgery (p<0.000). The scores continue to improve and, at the end of the first year, 554 of 660 patients (83 percent) report improvement by more than two units (p<0.000). General quality of life (QoL) steadily improves during the period of observation and, between the first and the second year, the scores are close to those observed in the non-patient population.

Leg-related Physical Limitations Prior to and After Total Knee Arthroplasty in Patients with Osteoarthritis (N=660)

2006 – 2008

Score
0 - worst possible, 10 - best possible

General QoL Prior to and After Total Knee Arthroplasty in Patients with Osteoarthritis (N=1334)

2002 – 2008

Score
0 - worst possible, 50 - non-patient control group mean
Total Knee Arthroplasty in Patients with Osteoarthritis, Bilateral

Leg-related physical limitations in this group of patients improve significantly during the first three months after surgery (p<0.001). The scores continue to improve and, at the end of the first year, 91 of 112 patients (81 percent) report improvement by more than two units (p<0.000). General quality of life (QoL) starts to improve after the first three months and between the first and the second year, the scores are at the same level as in the non-patient population.

Leg-related Physical Limitations Prior to and After Bilateral Total Knee Arthroplasty in Patients with Osteoarthritis (N=112)

2006 – 2008

Score
0 - worst possible, 10 - best possible

General QoL Prior to and After Bilateral Total Knee Arthroplasty in Patients with Osteoarthritis (N=313)

2002 – 2008

Score
0 - worst possible, 50 - non-patient control group mean
Revision of Total Knee Arthroplasty, One Component

Leg-related physical limitations in this group of patients improve significantly during the first three months after surgery (p<0.01). The average scores do not change during the subsequent months and, at the end of the first year, 30 of 43 patients (70 percent) report improvement by more than two units (p<0.007). General quality of life (QoL) steadily improves during the entire period of observation, though it happens much slower than after primary arthroplasty.

Leg-related Physical Limitations Prior to and After Revision of Total Knee Arthroplasty (One Component) (N=43)

2006 – 2008

Score
0 - worst possible, 10 - best possible

General QoL Prior to and After Revision of Total Knee Arthroplasty (One Component) (N=40)

2002 – 2008

Score
0 - worst possible, 50 - non-patient control group mean
Revision of Total Knee Arthroplasty, Both Components

Pre-operative scores of leg-related physical limitations in this group of patients are lower than in patients who undergo one-component revision. The three-month improvement is significant (p<0.01). At the end of the first year, improvement by more than two units is reported by 98 of 126 patients (78 percent, p<0.000). Improvement in general quality of life (QoL) is similar to that observed after one-component revision.

Leg-related Physical Limitations Prior to and After Revision of Total Knee Arthroplasty (Both Components) (N=126)

2006 – 2008

Score
0 - worst possible, 10 - best possible

General QoL Prior to and After Revision of Total Knee Arthroplasty (Both Components) (N=127)

2002 – 2008

Score
0 - worst possible, 50 - non-patient control group mean
**Orthopaedics: Surgery: Femur and Knee Joint, Arthroscopy**

**ACL Reconstruction**

The three-month improvement of leg-related physical limitations is significant (p<0.05). At the end of the first year, improvement by more than two units is reported by 38 of 56 patients (68 percent, p<0.005). Despite seemingly moderate improvement, the scores at end of the first year are high (7.0). The scores of general quality of life (QoL) get worse during the first three months and then return to “healthy” scores during the first year.

**Leg-related Physical Limitations Prior to and After ACL Reconstruction (N=56)**

**2006 – 2008**

**Score**

0 - worst possible, 10 - best possible

![Graph showing changes in physical limitations](image)

**General QoL Prior to and After ACL Reconstruction (N=73)**

**2006 – 2008**

**Score**

0 - worst possible, 50 - non-patient control group mean

![Graph showing changes in QoL](image)
Knee Debridement

The three-month improvement of leg-related physical limitations is significant (p<0.05). Average scores during the first year improve moderately (5.5). Nevertheless, at the end of the first year, improvement by more than two units is reported by 36 of 51 patients (71 percent, p<0.002). The scores of Physical Functioning and Role-Physical get worse during the first three months but they return to pre-operative scores during the first year.

Leg-related Physical Limitations Prior to and After Knee Debridement (N=51)

2006 – 2008

Score
0 - worst possible, 10 - best possible

General QoL Prior to and After Knee Debridement (N=53)

2006 – 2008

Score
0 - worst possible, 50 - non-patient control group mean
**Meniscectomy, Medial or Lateral**

The three-month improvement of leg-related physical limitations is highly significant ($p<0.000$). Average scores during the first year improve moderately (6.0). Nevertheless, at the end of the first year, improvement by more than two units is reported by 363 of 499 patients (73 percent, $p<0.000$). The scores of general quality of life (QoL) steadily improve, though do not achieve the level of the non-patient population.

**Leg-related Physical Limitations Prior to and After Knee Meniscectomy (Medial or Lateral) (N=499)**

2006 – 2008

**Score**

0 - worst possible, 10 - best possible

![Graph showing score improvement over time](image)

**General QoL Prior to and After Knee Meniscectomy (Medial or Lateral) (N=207)**

2006 – 2008

**Score**

0 - worst possible, 50 - non-patient control group mean

![Graph showing QoL improvement over time](image)
Meniscectomy, Medial and Lateral

The three-month improvement of leg-related physical limitations is highly significant (p<0.000). Average scores during the first year improve moderately (5.5). Nevertheless, at the end of the first year, improvement by more than two units is reported by 105 of 141 patients (74 percent, p<0.000). The scores of general quality of life (QoL) fluctuate randomly, except improvement in Bodily Pain scores.

Leg-related Physical Limitations Prior to and After Meniscectomy (Medial or Lateral) (N=141)

2006 – 2008

Score
0 - worst possible, 10 - best possible

General QoL Prior to and After Knee Meniscectomy (Medial or Lateral) (N=83)

2006 – 2008

Score
0 - worst possible, 50 - non-patient control group mean
Ankle Arthrodesis in Patients with Osteoarthritis

Pre-operative level of leg-related limitations in this group of patients is low (1.7). Average scores steadily improve during the first year; improvement in scores by more than two units is reported by 24 of 28 patients (86 percent, p<0.000).

Leg-related Physical Limitations Prior to and After Ankle Arthrodesis in Patients with Osteoarthritis (N=28)

2006 – 2008

Score
0 - worst possible, 10 - best possible

<table>
<thead>
<tr>
<th></th>
<th>Pre-op</th>
<th>0-3 months post-op</th>
<th>3-12 months post-op</th>
</tr>
</thead>
<tbody>
<tr>
<td>Score</td>
<td>2</td>
<td>3</td>
<td>9</td>
</tr>
</tbody>
</table>
Great Toe Arthrodesis

Average scores of leg-related limitations during the first year after surgery improve moderately (from 3.5 to 6.8). Nevertheless, at the end of the first year, improvement by more than two units is reported by 27 of 33 patients (82 percent, p<0.000).

Leg-related Physical Limitations Prior to and After Arthrodesis of Great Toe (N=33)

2006 – 2008

Score
0 - worst possible, 10 - best possible

---

<table>
<thead>
<tr>
<th>Time Period</th>
<th>Score</th>
</tr>
</thead>
<tbody>
<tr>
<td>Pre-op</td>
<td></td>
</tr>
<tr>
<td>0-3 months post-op</td>
<td></td>
</tr>
<tr>
<td>3-12 months post-op</td>
<td></td>
</tr>
</tbody>
</table>
Postoperative Nausea and Vomiting

Representatives of the Department of General Anesthesiology evaluate total joint replacement in-patients on their second postoperative day. One outcomes measure is postoperative nausea or vomiting, which is collected from medical record review. The department features the management of postoperative nausea and vomiting in its clinical quality improvement program. The proportions of total joint replacement patients experiencing postoperative nausea or vomiting are shown below.

**Nausea and Vomiting Within 24 Hours After Total Joint Arthroplasty (N=1,740)**

<table>
<thead>
<tr>
<th>Year</th>
<th>1Q 466</th>
<th>2Q 475</th>
<th>3Q 433</th>
<th>4Q 366</th>
</tr>
</thead>
<tbody>
<tr>
<td>Percent</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Neither nausea or vomiting</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Nausea only</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Vomiting</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
**Patient Satisfaction**

A question in the interview obtained during rounds on postoperative day two asks for the patient’s response to the statement, “I was satisfied with my anesthesia care.” The percentages by calendar quarter of total joint replacement patients responding “Agree very much,” the highest rating, are shown below.

**Satisfaction with Anesthesia Care for Total Joint Arthroplasty (N=1,121)**

![Bar chart](chart.png)

- **1Q**: 288 patients
- **2Q**: 332 patients
- **3Q**: 284 patients
- **4Q**: 217 patients
Over the last three years, the number of X-ray interpretations remains high and stable; the number of advanced procedures steadily increases.

**Muskuloskeletal Imaging: Procedures**

<table>
<thead>
<tr>
<th>Number</th>
<th>2006</th>
<th>2007</th>
<th>2008</th>
</tr>
</thead>
<tbody>
<tr>
<td>X-ray</td>
<td>100,000</td>
<td>80,000</td>
<td>60,000</td>
</tr>
<tr>
<td>Advanced Modalities and Procedures</td>
<td>10,000</td>
<td>8,000</td>
<td>6,000</td>
</tr>
</tbody>
</table>

Magnetic resonance is the most broadly used advanced procedure.

**Muskuloskeletal Imaging: Advanced Procedures, MRI**

<table>
<thead>
<tr>
<th>Number</th>
<th>2006</th>
<th>2007</th>
<th>2008</th>
</tr>
</thead>
<tbody>
<tr>
<td>MRI</td>
<td>6,000</td>
<td>4,000</td>
<td>2,000</td>
</tr>
</tbody>
</table>
Though more rare, other advanced procedures increased two to three times in volume during the last three years (note: excludes MR).

**Muskuloskeletal Imaging: Advanced Procedures, Other**

<table>
<thead>
<tr>
<th>Procedure</th>
<th>2006</th>
<th>2007</th>
<th>2008</th>
</tr>
</thead>
<tbody>
<tr>
<td>CT</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>CT Guided Procedures</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>US</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>US-Guided Procedures</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>X-Ray-Guided Procedures</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Number of procedures increased over the years.
Treatment with Osteoporosis Medication after Hip and Wrist Fracture

Numerous studies have documented the low rate of drug use for secondary prevention of osteoporotic fractures. It is important to identify patients with fractures and institute treatments to prevent subsequent fractures. Wrist fractures should result in evaluation for osteoporosis treatment, yet studies report new treatment after fracture in only 5 to 23 percent of patients. More than 340,000 hip fractures occur in the U.S. every year. These patients are at high risk for second fractures and have up to a 40 percent one-year mortality. Survivors have a significant functional decline.

Since 2000, the Center for Osteoporosis and Metabolic Bone Disease at Cleveland Clinic has increased awareness though educational programs to primary care and orthopaedic physicians and electronic medical record-generated best practice alerts. Between July 1, 2007, and June 30, 2008, there were 585 patients identified with a wrist fracture and 122 with hip fracture. For wrist fracture, 50.6 percent were on an antiresorptive or anabolic agent (59.8 percent of women) at Cleveland Clinic. For reference groups, the treatment rate ranges from 17 to 23 percent for other published series. For hip fracture, 58.2 percent were on medication (70.7 percent of women) at Cleveland Clinic. The treatment rate ranges from 14.4 to 23 percent for other published series.


Percent of Patients Receiving Antiresorptive Agents after Hip Fracture (N=122)

2000 – 2008

Percent

Cleveland Clinic | PACE | HMO | Canada

Percent of Patients Receiving Antiresorptive Agents after Wrist Fracture (N=585)

2000 – 2008

Percent

Cleveland Clinic | PACE | HMO | Olmsted
Compliance with Osteoporosis Therapy

High compliance with prescribed therapy is a prerequisite of its ability to lower the risk of subsequent fractures in patients with osteoporosis. Compliance is measured as medical possession ratio (MPR) - percent of time the patient is in possession of medication from the first to last prescription. An MPR of greater than 80 percent is a commonly used definition of high compliance to medication. With an MPR less than 50 percent, there is little anti-fracture efficacy.

It has been shown that adherence to oral bisphosphonate therapy one year after initiation is frequently less than 50 percent (Reference 1, 2, 3) and this decreases in subsequent years. Intravenous application of zolendronic acid ensures 100 percent compliance for one year after infusion. The long-term compliance is a function of the ability of the infusion center to schedule subsequent yearly infusions.

Infusions of zolendronic acid have been used since 2003 at the Center for Osteoporosis and Metabolic Bone Disease. Reminders to patients and physicians were generated automatically by the electronic medical record system. There were 95 patients with postmenopausal osteoporosis who received two to six infusions of zolendronic acid. We achieved a high compliance (MPR >80 percent) in 82.1 percent of patients. Comparative data extracted from published studies are used as three reference groups.


Percent of Patients Highly Compliant (MPR>80%) with Osteoporosis Therapy (N=93)

2003 – 2008

<table>
<thead>
<tr>
<th></th>
<th>Percent</th>
</tr>
</thead>
<tbody>
<tr>
<td>Cleveland Clinic</td>
<td>80</td>
</tr>
<tr>
<td>Reference 1, Oral</td>
<td>40</td>
</tr>
<tr>
<td>Reference 2, Oral</td>
<td>40</td>
</tr>
<tr>
<td>Reference 3, Oral</td>
<td>40</td>
</tr>
</tbody>
</table>
Rates of Joint Replacement Surgery for Juvenile Arthritis

Modern aggressive treatment of patients with juvenile rheumatoid arthritis (JRA) leads to known improvement in short-term outcomes such as joint swelling, joint function and pain. Less is known about long-term outcomes of this treatment. We hypothesize that this treatment can prevent joint damage and lower the need for joint-replacement surgery.

Our institute is one of the few in the country in which there is a continuum of care between pediatric and adult rheumatology and joint replacement surgery is performed by orthopedists within the institute. This allowed us to evaluate longitudinal changes in large joint replacement rates among all patients diagnosed with JRA from 1990 to 2007.

Forty-one patients (32 female, nine male) with JRA underwent 75 joint replacements from 1990 to 2007. Thirty-two patients had polyarticular, seven pauciarticular and two systemic JRA. Treatment regimens in these patients included non-steroidal anti-inflammatory drugs (90 percent), systemic or intra-articular steroids (83 percent), hydroxychloroquine (51 percent), gold (24 percent), methotrexate (56 percent) and biologics (39 percent). There were 34 hip, 29 knee and 12 shoulder replacements. The decrease in the proportion of patients who underwent joint replacements from 1990 to 2007 was significant (P = 0.006).

This study documents a significant decrease in the rate of joint replacements for JRA parallel (with some delay) to a period of dramatic therapeutic advances in treatment.
Rate of Joint Replacement Surgery in Patients with Juvenile Rheumatoid Arthritis (N=41)

1990 – 2007

Dr. Brian Mandell is Editor-in-chief of the Cleveland Clinic Journal of Medicine.

Dr. Gary Hoffman is Editor of Current Opinion in Rheumatology.
Differentiation of Reversible Cerebral Vasoconstriction Syndromes from CNS Vasculitis

Reversible cerebral vasoconstriction syndromes (RCVS) comprise a group of diverse conditions characterized by reversible multifocal narrowing of the cerebral arteries with no evidence of vasculitic brain pathology. It is essential for clinicians involved in the evaluation of patients with CNS vasculitis to be aware of RCVS and to distinguish it from pathologically documented CNS vasculitis, since treatment of RCVS does not involve the immunosuppressive medications required in CNS vasculitis.

We studied 55 RCVS patients seen at Cleveland Clinic between 1990 and 2008, using the Modified Rankin Scale (MRS), which is an outcome measure used in strokes. MRS scale of zero indicates no disability; 1 and 2 - mild disability; 3 and 4 - moderate disability; 5 - severe disability; and 6 - death. The majority of RCVS patient have favorable outcomes: 53 percent demonstrate no disability, and 36 percent have mild disability on the MRS. Most of these patients were treated with calcium channel blockers and short-term steroids.

Outcomes of Treatment of Patients with Reversible Cerebral Vasoconstriction Syndromes (N=55)

1990 – 2008

- 2% Severe
- 9% Moderate Disability
- 36% Mild Disability
- 53% No Disability
Annual RPR Screening in HIV+ Patients

Coinfection of HIV and syphilis is common due to shared risk factors related to sexual behavior. Coinfection is detrimental since syphilis can increase HIV RNA levels, and, by altering normal immune responses, HIV may adversely affect the natural course of syphilis. The Infectious Disease Society of America recommends a nontreponemal test (RPR) for syphilis for HIV+ patients at baseline and repeated periodically. The CDC’s 2006 sexually transmitted diseases treatment guidelines recommend yearly syphilis screening for all sexually active HIV+ patients.

Of 88 HIV+ clinic patients seen in 2008, 74 (84.1 percent) had RPRs tested; four were positive, and appropriate treatment was initiated.

Annual RPR Screening in HIV+ Patients

2008

Number of Patients

<table>
<thead>
<tr>
<th></th>
<th>0</th>
<th>20</th>
<th>40</th>
<th>60</th>
<th>80</th>
<th>100</th>
</tr>
</thead>
<tbody>
<tr>
<td>HIV+ patients</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>RPR done</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>RPR positive</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
Anal Pap Screening in Eligible HIV+ Patients

High-risk strains of human papilloma virus (HPV) are a causative agent of anal carcinoma. Rates of anal cancer in men who have sex with men are 35 per 100,000. Routine anal Pap tests for HIV-positive men with a history of genital warts and/or anal intercourse have been recommended since mid-2008. Our clinic started a screening program in August of 2008 and identified 65 patients who fit the screening criteria. Of those, 37 were tested in the last four months of 2008. Screening continues into 2009. Twenty-four patients were HPV-positive and 18 had abnormal cytology. All 18 patients with abnormal cytology were referred to colorectal surgery for high resolution anoscopy.

Anal Pap Screening in Eligible HIV+ Patients

2008 – 2009

Number of Patients

<table>
<thead>
<tr>
<th>Patients eligible for anal Pap</th>
<th>Pap done</th>
<th>HPV+</th>
<th>Abnormal cytology</th>
</tr>
</thead>
<tbody>
<tr>
<td>70</td>
<td>40</td>
<td>20</td>
<td>10</td>
</tr>
</tbody>
</table>

Patients eligible for anal Pap: 70
Pap done: 40
HPV+: 20
Abnormal cytology: 10
Dr. Elaine Husni

is Editor of the Rehabilitation
Section for *Current Opinion in Rheumatology*, 2008.
Hospital Compare: Surgical Care Improvement Project (SCIP)

Hospital Compare is a consumer-oriented website hosted by the Centers for Medicare & Medicaid Services (CMS) in collaboration with the Hospital Quality Alliance (HQA). Hospitals that have agreed to public reporting submit process-of-care data showing how consistently they provide recommended care to adult patients, irrespective of payer. (These results also are posted on The Joint Commission's website.) Thirty-day risk-adjusted all-cause mortality rates are outcomes based on Medicare claims and enrollment information. Cleveland Clinic’s 2008 surgical care performance appears below.

SCIP - Prophylactic Antibiotic Received within 1 Hour Prior to Surgical Incision (N = 902)

Discharges January – December 2008

<table>
<thead>
<tr>
<th></th>
<th>Percent of Patients</th>
</tr>
</thead>
<tbody>
<tr>
<td>National Average*</td>
<td>86</td>
</tr>
<tr>
<td>Cleveland Clinic</td>
<td>95</td>
</tr>
</tbody>
</table>

SCIP - Prophylactic Antibiotic Discontinued within 24 Hours After Surgery End Time (N = 813)

Discharges January – December 2008


SCIP - Appropriate Prophylactic Antibiotic Selection for Surgical Patients (N = 937)

Discharges January – December 2008

SCIP - Surgery Patients with Recommended Venous Thromboembolism Prophylaxis Ordered (N = 677)

Discharges January – December 2008


SCIP - Surgery Patients Who Received Appropriate Venous Thromboembolism Prophylaxis within 24 Hours Prior to Surgery to 24 Hours after Surgery (N = 677)

Discharges January – December 2008

SCIP - Surgery Patients with Appropriate Hair Removal (N = 1,386)

Discharges January – December 2008

* Source: www.hospitalcompare.hhs.gov, discharges January - June 2008
The American College of Surgeons’ National Surgical Quality Improvement Project (NSQIP) is a national program that objectively measures surgical outcomes. Based on a defined sampling and abstraction methodology, risk-adjusted 30-day mortality and morbidity outcomes are reported. Cleveland Clinic recently expanded NSQIP participation to include certain subspecialties. At this time, two months of 2008 orthopaedic surgery outcomes data are available and shown above. There was no statistically significant difference between the observed and expected rates.
Cleveland Clinic has placed a renewed emphasis on improving the patient experience by establishing the role of Chief Experience Officer. Recognizing that patients seek more than solely a successful clinical outcome, the mission of the Office of Patient Experience is to create an environment that enhances the well-being of our patients, families and employees in a way that elevates Cleveland Clinic’s reputation as one of the world’s best hospitals.

In 2008, the Office of Patient Experience dedicated teams within the institutes to research and implement innovative patient- and family-based programs that support this mission.

**Outpatient – Orthopaedic and Rheumatologic Institute**

**Overall Rating of Outpatient Care and Services**

2007 – 2008

<table>
<thead>
<tr>
<th>Percent</th>
<th>Excellent</th>
<th>Very Good</th>
<th>Good</th>
<th>Fair</th>
<th>Poor</th>
</tr>
</thead>
<tbody>
<tr>
<td>2007 (N = 4,119)</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>2008 (N = 4,211)</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Source: Quality Data Management, a national hospital survey vendor
Rating of Outpatient Provider

2007 – 2008

Percent

Source: Quality Data Management, a national hospital survey vendor

Recommend Outpatient Provider

2007 – 2008

Percent

Source: Quality Data Management, a national hospital survey vendor
Inpatient – Orthopaedic and Rheumatologic Institute

With the support of the Centers for Medicare and Medicaid Services (CMS) and its partner organizations, the first national standard patient experience hospital survey (HCAHPS) was implemented in late 2006. Results collected for reporting are available at www.hospitalcompare.hhs.gov.

HCAHPS Overall Assessment

2007 – 2008

<table>
<thead>
<tr>
<th>Percent</th>
<th>Rate Hospital</th>
<th>% respondents choosing 9 or 10</th>
<th>Would Recommend</th>
<th>% respondents choosing 'definitely yes'</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td>57%</td>
<td>68%</td>
<td>69%</td>
</tr>
</tbody>
</table>

Source: Quality Data Management and Press Ganey, national hospital survey vendors

For comparison purposes, 2007 and Q1 2008 HCAHPS scores have been adjusted to account for a survey mode administration change as recommended by CMS.
HCAHPS Domains of Care

2007 – 2008

Respondents choosing ‘always’ or ‘yes’

Source: Quality Data Management and Press Ganey, national hospital survey vendors

For comparison purposes, 2007 and Q1 2008 HCAHPS scores have been adjusted to account for a survey mode administration change as recommended by CMS.
Dual-purpose Orthopaedic Minimum Data Set (OrthoMiDaS) Information System

Boris Bershadsky

According to contemporary paradigm, evidence-based evaluation of new treatments requires supplementing physician-driven and objective clinical data with patient-reported outcomes. These subjective measures are especially important in orthopaedic studies that evaluate new treatments aimed at improving health-related quality of life of patients with a broad range of musculoskeletal problems. Taking into account measurement errors associated with subjective data, large samples crossing multiple institutions are needed to obtain reliable estimates.

Existing methods of collecting patient-reported outcomes were developed to fit conditions of clinical trials with several hundred patients and closely monitored environments. If these conditions are not met, traditional methods lead to either very expensive studies or low quality of collected data. As a result, they have limited value in observational studies with many thousands of patients. Enabling low-cost collection of large volumes of patient-reported data would dramatically expand the spectrum of extra-large functional registries in orthopaedics. These registries would enable reliable identification of factors that increase risk of treatment failure, exploring indications for surgical treatment, managing patients’ expectations, comparing providers from the viewpoint of achieved outcomes, etc. In general, low-cost extra-large repositories of patient-reported outcomes would provide a good supplement to existing methods of developing evidence-based orthopaedics.

Three years ago, we hypothesized that low-cost extra-large repositories of patient-reported outcomes could be achieved by embedding collection of research data into standard-of-care activities of orthopaedic providers (dual-purpose system).

To obtain truly complementary operations, research processes should benefit clinical operations and clinical information should benefit research. We tested the feasibility of such a low-cost dual-purpose system by developing its working prototype for one orthopaedic institution with multiple locations.

The Orthopaedic Minimum Data Set (OrthoMiDaS) barebone system (paper-based in-office data collection) was initiated in January 2006 as a research system. The initial version 1.0 was inspired by how these systems are organized in clinical trials. The day-to-day operations of the initial version were prohibitively expensive (one location, 4,000 visits/month, $10-20/visit); it also did not deliver sufficient quality of data. The current dual-purpose version 5.0 (13 locations, 13,000 visits/month, $2/visit) delivers data of much better quality. The system automatically prints questionnaires that fit patient conditions (the library contains nine forms) at all 13 locations; it also generates “patient history” reports and uploads them into the electronic medical record. Data are downloaded into the research database and scored in real time. The system collects information related to general and joint-specific health-related quality of life, pain scores, comorbidity, history of treatment, socio-demographic information and patient motivation. The current database contains information on more than 150,000 visits.
The Effect of TNF-alpha Treatment on Lipid Profiles of Patients with Systemic Rheumatic Disease

Rheumatology: Husni ME and Calabrese L
Cardiology: Cho L, Hoar B and Hazen S

Cardiovascular morbidity and mortality appear to be increased in patients with systemic rheumatic diseases. Tumor necrosis factor-alpha (TNF-alpha) is a pivotal proinflammatory cytokine implicated in the pathogenesis of rheumatoid arthritis (RA), and may be involved in the development of the altered lipid profile observed in these patients. Increased levels of total cholesterol (TC), low-density-lipoprotein (LDL)-cholesterol (LDL-C) and a decreased level of high-density lipoprotein (HDL) cholesterol (HDL-C) are associated with an increased incidence of cardiovascular disease in the general population. However, they remain less well-studied in patients with rheumatic disease.

Our aim was to investigate whether anti-TNF therapy modifies the lipid profile in these patients. We used PreCIS (preventative cardiology information system) to collect lipid profile and CRP data from 265 patients with a systemic rheumatic disease (RA, systemic lupus erythematosus, vasculitis and ankylosing spondylitis) who were treated with and without anti-TNF therapy. Family history of coronary heart disease, current smoking status, diabetes history, aspirin use, hypertension history, statin use and BMI were obtained on all patients.

A total of 265 patients were included (mean age 52.6 ± 14.9 years, 28.7% were male) with 95 patients on anti-TNF therapy and 170 patients not on TNF therapy. Cardiovascular risk factors were not statistically different between the two groups. Cholesterol levels were similar in both groups. Triglyceride levels were significantly different in the TNF-treated vs non-TNF-treated groups (119 vs 149, p 0.05). CRP concentrations were not different in the two groups (5.02±10.8 vs 5.38 ± 9.7, p=0.09).

Anti-TNF treated patients had lower TG levels than the non-TNF-treated patients, however HDL, LDL and CRP values were not different in the two groups. Thus, anti-TNF therapy may improve the cardiovascular risk profile of these patients by having a more favorable triglyceride profile.
<table>
<thead>
<tr>
<th></th>
<th>Anti-TNF treated (n=95)</th>
<th>Non Anti-TNF treated (n=170)</th>
<th>P-value</th>
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<tbody>
<tr>
<td><strong>Total Cholesterol (mg/dL)</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Baseline</td>
<td>201.5 ± 37.0</td>
<td>209.1 ± 49.6</td>
<td>0.385</td>
</tr>
<tr>
<td>Follow up</td>
<td>185.3 ± 43.9</td>
<td>183.4 ± 39.4</td>
<td>0.990</td>
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<tr>
<td><strong>HDL - Cholesterol (mg/dL)</strong></td>
<td></td>
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<tr>
<td>Baseline</td>
<td>60.1 ± 16.4</td>
<td>61.6 ± 18.4</td>
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<tr>
<td>Follow up</td>
<td>55.2 ± 15.3</td>
<td>54.1 ± 17.1</td>
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<td><strong>LDL - Cholesterol (mg/dL)</strong></td>
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<td>Baseline</td>
<td>116.8 ± 33.3</td>
<td>117.1 ± 39.9</td>
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<tr>
<td>Follow up</td>
<td>109.0 ± 34.2</td>
<td>98.57 ± 36.1</td>
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<tr>
<td><strong>Triglycerides (mg/dL)</strong></td>
<td></td>
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</tr>
<tr>
<td>Baseline</td>
<td>123.1 ± 59.5</td>
<td>149.2 ± 93.5</td>
<td>0.117</td>
</tr>
<tr>
<td>Follow up</td>
<td>106.4 ± 42.4</td>
<td>156.9 ± 105.9</td>
<td>0.027</td>
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<tr>
<td><strong>us-C Reactive Protein (mg/dL)</strong></td>
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<td></td>
</tr>
<tr>
<td>Baseline</td>
<td>5.39 ± 9.7</td>
<td>5.05 ± 10.8</td>
<td>0.089</td>
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<tr>
<td>Follow up</td>
<td>1.98 ± 1.8 (n=16)</td>
<td>1.33 ± 3.0 (n=39)</td>
<td>0.012</td>
</tr>
</tbody>
</table>

Values of TC, TG, LDL-C, HDL-C and us-CRP were expressed in mg/dL ± standard deviation (sd).
* CRP Lab value >50mg/dL was simplified to 3.0, so not to skew results.

**Goal Values:**
TC: 100-199 mg/dL for those over age 21.
HDL: > 40 mg/dL
LDL: < 130 mg/dL
TG: < 150 mg/dL
us-CRP(mg/dL): <1.0=low risk, 1.0-2.9=med risk, >3.0=high risk.
The Use of Navigation in Total Knee Arthroplasty for Patients with Extra-Articular Deformity

Bottros J, Klika AK, Lee HH, Polousky J, Barsoum WK

Computer-assisted navigation for total knee arthroplasty provides high technology instrumentation that may improve the technique for restoring the normal lower limb mechanical axis. This study evaluated the use of computer-assisted navigation in seven patients (nine total knee arthroplasties) with a radiographic femoral extra-articular deformity. Postoperatively, the mechanical axis deviated medially by a mean of 1.3 degrees ± 0.9 degrees (range, -0.2 degrees to 2.5 degrees). Early patient outcomes showed an increase in the average Knee Society Scores (from 62 before surgery to 92 after surgery, P < .05), function scores (from 52 to 83, P < .05) and range of motion (from 4 degrees -74 degrees to 0.6 degrees -98 degrees, P < .05). These results support the use of computer-assisted navigation as effective high technology instrumentation in recreating an acceptable mechanical axis in patients with distorted anatomical landmarks.
The Three-dimensional Glenoid Vault Model Can Estimate Normal Glenoid Version in Osteoarthritis

Scalise JJ, Codsi MJ, Bryan J, Iannotti JP

Glenohumeral arthroplasty can involve correcting pathologic glenoid tilt or version. Predicting the physiologic glenoid version for a particular individual can be difficult. We propose using a previously validated, three-dimensional glenoid vault model as a template to predict normal glenoid version. Computed tomography scans of both shoulders were obtained in 14 subjects with unilateral glenohumeral osteoarthritis. Custom-developed graphic software was used to create a three-dimensional reconstruction of each scapula. Within the software, the vault model was placed in a best-fit orientation into each glenoid vault independently by three observers who were blinded to the contralateral scapula. Measurement differences between the glenoid and vault model were analyzed by repeated-measures analysis of variance. Standard errors of measurement (SEM) were calculated. Interobserver and intraobserver reliabilities were assessed. The healthy glenoid version averaged -7.0 degrees (SEM, 0.7 degrees; range, 0 degrees to -14 degrees). The arthritic glenoid version averaged -15.6 degrees (SEM, 0.7 degrees; range, 1 degrees to -33 degrees; P < .0001). The version of the implanted vault model measured -7.1 degrees (SEM, 0.7 degrees; range, -1 degrees to -15 degrees) on the healthy side and -7.2 degrees (SEM, 0.7 degrees; range -2 degrees to -11 degrees) on the arthritic side. Measurements between observers were not significantly different (P = .98). Interobserver and intraobserver correlation coefficients were 0.79 (P < .001) and 0.80 (P < .001). In the arthritic glenoid, the vault model reproducibly closely approximated the version of the normal contralateral glenoid, -7.2 degrees vs -7.0 degrees (P = .99) and is a novel and accurate method of estimating the normal glenoid version. This technique may be valuable in correcting pathologic glenoid version due to arthritis.
Comparison of Coronary Atherosclerosis Progression in Patients With and Without Systemic Inflammation: An IVUS Study

Khasnis A, Shao M, Nicholls S, Husni ME

Accelerated atherosclerosis has been well-documented in certain systemic inflammatory autoimmune diseases. Mechanisms related to accelerated atherosclerosis in patients with systemic inflammatory diseases remain unclear. IntraVascular UltraSound (IVUS) is an established technology that provides direct and detailed imaging of coronary plaque progression and vascular remodeling in atherosclerosis. Our study compared coronary atherosclerotic disease progression in patients with and without systemic inflammation using IVUS. We used IVUS to evaluate progression of coronary atherosclerosis in patients with systemic inflammatory diseases while on traditional anti-atherosclerotic medications. Adjustments were made for traditional cardiovascular risk factors among both groups. Clinical and laboratory baseline and follow-up data were available on 3282 patients (265 in systemic inflammatory and 3017 in non-systemic inflammatory group). Over 18 months, patients on immunosuppressive medications for systemic inflammatory diseases had a 2.5-fold higher rate of coronary atherosclerosis progression as demonstrated by IVUS reflecting the role of inflammation in plaque progression in these patients.

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<th>Parameter</th>
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<th>Non-inflammatory</th>
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<td>2330</td>
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<tr>
<td>Percent Atheroma Volume</td>
<td>Mean ± SD</td>
<td>0.9 ± 3.58</td>
<td>0.3 ± 3.77</td>
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<td>Least square mean</td>
<td>0.87 ± 0.45</td>
<td>0.38 ± 0.39</td>
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<tr>
<td></td>
<td>± SE</td>
<td></td>
<td></td>
<td></td>
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<tr>
<td>Total Atheroma Volume</td>
<td>Mean ± SD</td>
<td>-3.9 ± 23.18</td>
<td>-4.6 ± 25.37</td>
<td>0.303</td>
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<td>Least square mean</td>
<td>-3.60 ± 3.49</td>
<td>-3.96 ± 3.18</td>
<td>0.817</td>
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<td></td>
<td>± SE</td>
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<td></td>
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<tr>
<td>Lumen Volume</td>
<td>Mean ± SD</td>
<td>-15.2 ± 36.27</td>
<td>-11.0 ± 36.27</td>
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<td></td>
<td>Least square mean</td>
<td>-14.68 ± 2.63</td>
<td>-10.53 ± 1.18</td>
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<tr>
<td></td>
<td>± SE</td>
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<tr>
<td>External Elastic Membrane Volume</td>
<td>Mean ± SD</td>
<td>-19.0 ± 46.22</td>
<td>-15.6 ± 45.89</td>
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<td>Least square mean</td>
<td>-17.74 ± 4.61</td>
<td>-14.20 ± 3.53</td>
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The PRECISION Trial
Elaine Husni

Non-steroidal anti inflammatory drugs (NSAIDS) are the most widely prescribed pain reliever in the United States. Recent safety concerns about cardiovascular toxicity of one NSAID, rofecoxib (Vioxx), led to its removal from the market worldwide. The relative cardiovascular safety of the remaining NSAIDs such as naproxen or ibuprofen and the selective COX-2 inhibitor celecoxib remains unclear.

The Prospective Randomized Evaluation of Celecoxib Integrated Safety versus Ibuprofen Or Naproxen (PRECISION) trial will evaluate the cardiovascular safety of celecoxib, ibuprofen and naproxen. Approximately 20,000 patients with symptomatic osteoarthritis or rheumatoid arthritis at high risk for, or with, established cardiovascular disease will be randomly assigned in this double-blind, triple dummy, multinational, multicenter study. The primary end point is the composite of cardiovascular death, nonfatal myocardial infarction or nonfatal stroke. The trial will continue until 762 primary events occur with at least 18 months follow-up. Noninferiority of any of the regimens will require a 97.5 percent upper CI of the hazard ratio (HR) ≤ 1.12 for both intent-to-treat (ITT) and modified ITT populations. This is an academically driven trial with a unique governance primarily directed by an multidisciplinary executive team and the Cleveland Clinic Cardiovascular Coordinating Center.

PRECISION, the first study of patients with high cardiovascular risk chronically treated with a COX-2 selective inhibitor or nonselective NSAID, will define the relative cardiovascular safety profile of celecoxib, ibuprofen and naproxen and provide data to help guide NSAID use for pain management for this population.
Use of Cyclo-Oxygenase-2 Inhibitors is not Associated with Accelerated Progression of Coronary Atherosclerosis

Rheumatology: Khasnis A and Husni ME
Cardiology: Nicholls SJ, Shao M, Tuzcu EM and Nissen S

Non-steroidal anti-inflammatory drugs (NSAIDs) including the COX-2 inhibitor are the most widely prescribed pain reliever in the United States. Recently, the FDA has added a “black box warning” to both prescription and over-the-counter NSAIDs regarding potential cardiovascular (CV) risks. The exact mechanism underlying this increased CV risk is an area of intense clinical investigation. Serial IVUS imaging was used to evaluate whether accelerated atherosclerotic plaque progression is responsible for the observed increased cardiovascular risk in these patients. Systematic analysis of trials employing IVUS to study plaque progression in patients with angiographic coronary artery disease (REVERSAL, CAMELOT, ACTIVATE, ASTEROID, ILLUSTRATE) was performed. Patients treated with a COX-2 inhibitor (n=464) or only NSAIDs (n=473) were compared with regard to clinical characteristics, CV outcome and progression of coronary atherosclerosis determined by serial intravascular ultrasound. Clinical and laboratory characteristics were comparable between groups at baseline and follow up. At baseline examination, use of COX-2 inhibitors was not associated with greater percent atheroma volume

(PAV, 38.1±9.6 v 38.1±9.2%, p=0.10) or total atheroma volume (TAV, 189.9±84.6 v 186.5±80.6 mm³, p=0.11). On serial evaluation, use of COX-2 inhibitors did not result in accelerated progression of either PAV (+0.31±0.43 v +0.38±0.42%, p=0.78) or TAV (−3.9±3.4 v −5.3±3.4 mm³, p=0.20). Based on serial IVUS imaging, use of COX-2 inhibitors does not modify the rate of atheroma progression and associated arterial remodeling compared to NSAIDs in patients with coronary artery disease. This suggests that the mechanism underlying any potential increase in CV events is likely to result from other factors such as thrombosis.

IVUS images (below) show change in plaque volume (yellow) at baseline and after treatment with rosvastatin for 24 months. Note that the luminal volume remains almost unchanged. Conventional angiography (that mainly assesses the lumen) would not be able to detect this change in plaque volume.
Arthroscopic Assisted, Meniscal Sparing Tibiofemoral Knee Resurfacing

Anthony Miniaci

Tibiofemoral joint arthrosis has debilitating effects, particularly for active middle-aged patients who have failed conservative and biological procedures commonly used to treat mono-compartmental arthrosis. In order to provide continuing joint preservation for knee arthrosis, an innovative, FDA-approved, meniscal-sparing tibiofemoral resurfacing technology was introduced to the market in March 2008. Anthony Miniaci, MD, Executive Director of Sports Health at Cleveland Clinic, is a co-inventor of this technology. The benefits of Arthroscopically assisted Knee Resurfacing (AKR) are based on the use of a three-dimensional intraoperative surface mapping technology and the implantation of patient-specific congruent inlay components. The low-profile articular implants accurately reconstruct a load-sharing surface without altering the volume or natural biomechanics of the knee. Bone and cartilage removal is kept at a minimum through precision reamed implant beds with minimal impact on future conversion to standard joint arthroplasty, should the need arise. Conservation of healthy meniscal, articular and ligamentous tissues preserves a more natural feel of the knee. The arthroscopic tibial approach and small femoral arthroscopy, combined with unaltered joint surface dimensions, enable a faster recovery. The target patient has mono-compartmental arthrosis, ligamentous stability, adequate mechanical alignment, satisfactory meniscal function and a normal body mass index. Particular consideration needs to be given to the effect of combined risk factors when determining patient indications.

The prosthetic design consists of a femoral resurfacing model and a tibial inlay component. The femoral resurfacing module is composed of a bone-anchoring fixation post and a large range of femoral articular components, permitting contoured and patient-specific inlay resurfacing of condylar defects with a coverage area of 40 x 20 mm. The circular, tibial, all-polyethylene inlay component allows localized tibial surface reconstruction (20 mm diameter) while preserving healthy meniscal and articular structures.

A multicenter review of 51 implantations in 48 patients (three bilateral cases) demonstrated encouraging results in patient and surgeon satisfaction, pain relief and recovery at an average follow-up of three months following the procedure (range 1-10 months). Patients who were not retired during the follow-up period returned to work at an average time of six weeks. Future studies are necessary to determine the medium- and long-term benefits of the procedure and provide detailed guidance in regard to positive and negative outcome predictors.
Arthroscopic Treatment of Femoroacetabular Impingement

Ryan Goodwin

Femoroacetabular impingement can be devastating for active young people. It can cause significant pain and severely limit participation in everyday activities. Prolonged impingement may lead to early degenerative changes within the hip joint. Newer techniques via hip arthroscopy can reduce pain and improve range of motion by treating the bony impingement (removing the bone causing the impingement). Impingement-related changes, such as labral tears, can be addressed easily at the time of arthroscopy.

The procedure begins with a thorough inspection of the hip joint, including the articular cartilage, labrum and any pathoanatomy related to femoroacetabular impingement. Bony CAM impingement lesions then can be resected with a bur under both fluoroscopic guidance as well as direct visualization. Associated labral pathology can be addressed at the same setting with debridement or repair. The procedure can be performed as an outpatient basis, using two portals, with significantly less morbidity than similar open procedures, thus allowing a much faster recovery and return to more normal function.
Molecular Identification of Bacteria from Aseptically Loose Implants

Kobayashi N, Procop GW, Krebs V, Kobayashi H, Bauer TW

Polymerase chain reaction (PCR) assays have been used to detect bacteria adherent to failed orthopaedic implants, but some PCR assays have had problems with probable false-positive results. We used a combination of a Staphylococcus species-specific PCR and a universal PCR followed by DNA sequencing to identify bacteria on implants retrieved from 52 patients (92 implants) at revision arthroplasty.

We addressed two questions in this study: (1) Is this method able to show the existence of bacterial DNA on presumed aseptic loose implants?; and (2) What proportion of presumed aseptic or culture-negative implants was positive for bacterial DNA by PCR? Fourteen implants (15 percent) were believed infected, whereas 74 implants (85 percent) were believed aseptic. Each implant was sonicated and the resulting solution was submitted for dual real-time PCR assay and culture. All implants believed to be aseptically loose were culture-negative, but nine of the 74 (12 percent) had bacterial DNA by PCR; two (2.7 percent) were PCR-positive and also showed histologic findings suggestive of infection. Uniquely developed PCR and bacterial sequencing assays showed bacterial DNA on 12 percent of implants removed for presumed aseptic loosening.

Additional studies are needed to determine the clinical importance of bacterial DNA detected by PCR but not by conventional culture.

LEVEL OF EVIDENCE: Level III, diagnostic study
Orthopaedic Surgery


Brooks PJ. The jumbo cup: the 95% solution. *Orthopedics.* 2008 Sep;31(9):913, 915.


Owings TM, Woerner J, Frampton J, Cavanagh PR, Botek G. Custom therapeutic insoles based on both foot shape and plantar pressure measurement provide enhanced pressure relief. Diabetes Care. 2008 May;31(5):839-844.


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216.445.0096 or 800.223.2273, ext. 50096

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001.216.444.8184
or visit clevelandclinic.org/gps

Cleveland Clinic in Florida
866.293.7866

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800.890.2467
<table>
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<th>Institute Locations</th>
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<td><strong>Main Campus</strong></td>
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<tr>
<td>A40/A41 Orthopaedics</td>
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<tr>
<td>A50 Rheumatology</td>
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<tr>
<td>9500 Euclid Avenue</td>
</tr>
<tr>
<td>Cleveland, OH 44195</td>
</tr>
<tr>
<td>216.445.0096</td>
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<tr>
<td><strong>Beachwood Family Health and Surgery Center</strong></td>
</tr>
<tr>
<td>26900 Cedar Road</td>
</tr>
<tr>
<td>Beachwood, OH 44122</td>
</tr>
<tr>
<td>216.839.3000</td>
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<tr>
<td><strong>Broadview Heights Family Health Center</strong></td>
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<tr>
<td>2001 East Royalton Road, Suite B</td>
</tr>
<tr>
<td>Broadview Heights, OH 44147</td>
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<tr>
<td>440.717.6125</td>
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<tr>
<td><strong>Brunswick Family Health Center</strong></td>
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<tr>
<td>3574 Center Road</td>
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<tr>
<td>Brunswick, OH 44212</td>
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</tr>
<tr>
<td><strong>Euclid Hospital</strong></td>
</tr>
<tr>
<td>Medical Office Building</td>
</tr>
<tr>
<td>99 Northline Circle, Suite 100</td>
</tr>
<tr>
<td>Euclid, OH 44119</td>
</tr>
<tr>
<td>216.692.7750</td>
</tr>
<tr>
<td><strong>Independence Family Health Center</strong></td>
</tr>
<tr>
<td>5001 Rockside Road</td>
</tr>
<tr>
<td>Crown Center II</td>
</tr>
<tr>
<td>Independence, OH 44131</td>
</tr>
<tr>
<td>216.986.4000</td>
</tr>
<tr>
<td><strong>Lutheran Hospital</strong></td>
</tr>
<tr>
<td>1730 West 25th Street</td>
</tr>
<tr>
<td>Cleveland OH 44113</td>
</tr>
<tr>
<td>216.444.5632</td>
</tr>
<tr>
<td><strong>Sports Health at the Mandel JCC</strong></td>
</tr>
<tr>
<td>26001 South Woodland Road</td>
</tr>
<tr>
<td>Beachwood, OH 44122</td>
</tr>
<tr>
<td>216.378.6240</td>
</tr>
<tr>
<td><strong>Mentor (Rehab Only)</strong></td>
</tr>
<tr>
<td>7215 Center Street</td>
</tr>
<tr>
<td>Mentor, OH 44060</td>
</tr>
<tr>
<td>440.205.1714</td>
</tr>
<tr>
<td><strong>Solon Family Health Center</strong></td>
</tr>
<tr>
<td>29800 Bainbridge Road</td>
</tr>
<tr>
<td>Solon, OH 44139</td>
</tr>
<tr>
<td>440.519.6800</td>
</tr>
<tr>
<td><strong>Sports Health Center</strong></td>
</tr>
<tr>
<td>5555 Transportation Boulevard</td>
</tr>
<tr>
<td>Garfield Heights, OH 44125</td>
</tr>
<tr>
<td>216.518.3444</td>
</tr>
<tr>
<td><strong>Strongsville Family Health and Surgery Center</strong></td>
</tr>
<tr>
<td>16761 SouthPark Center</td>
</tr>
<tr>
<td>Strongsville, OH 44136</td>
</tr>
<tr>
<td>440.878.2500</td>
</tr>
<tr>
<td><strong>Westlake Family Health Center</strong></td>
</tr>
<tr>
<td>30033 Clemens Road</td>
</tr>
<tr>
<td>Westlake, OH 44145</td>
</tr>
<tr>
<td>440.899.5555</td>
</tr>
<tr>
<td><strong>Willoughby Hills Family Health Center</strong></td>
</tr>
<tr>
<td>2570 SOM Center Road</td>
</tr>
<tr>
<td>Willoughby Hills, OH 44094</td>
</tr>
<tr>
<td>440.943.2500</td>
</tr>
</tbody>
</table>
In 2007, Cleveland Clinic restructured its practice, bundling all clinical specialties into integrated practice units called institutes. An institute combines all the specialties surrounding a specific organ or disease system under a single roof. Each institute has a single leadership and focuses the energies of multiple professionals onto the patient. From access and communication to billing and point-of-care service, institutes will improve the patient experience at Cleveland Clinic.

Cleveland Clinic’s main campus, with 50 buildings on 166 acres in Cleveland, Ohio, includes a 1,000-bed hospital, outpatient clinic, specialty institutes and supporting labs and facilities. Cleveland Clinic also operates 15 family health centers; eight community hospitals; one affiliate hospital; a rehabilitation hospital for children; a 150-bed hospital and clinic in Weston, Fla.; and health and wellness centers in Palm Beach, Fla., and Toronto, Canada. Cleveland Clinic Abu Dhabi (United Arab Emirates), a multispecialty care hospital and clinic, is scheduled to open in late 2012.

At the Cleveland Clinic Lerner Research Institute, hundreds of principal investigators, project scientists, research associates and postdoctoral fellows are involved in laboratory-based, translational and clinical research. Total annual research expenditures exceed $244 million from federal agencies, non-federal societies and associations, endowment funds and other sources. In an effort to bring research from bench to bedside, Cleveland Clinic physicians are involved in more than 2,400 clinical studies at any given time.

Now in its fifth year of existence, Cleveland Clinic Lerner College of Medicine of Case Western Reserve University offers all students full tuition scholarships. The program will graduate its first 29 students as physician-scientists in 2009.

Cleveland Clinic is consistently ranked among the top hospitals in America by *U.S. News & World Report*, and our heart and heart surgery program has been ranked No. 1 since 1995.

For more information about Cleveland Clinic, please visit clevelandclinic.org
Cleveland Clinic Secure Online Services

Cleveland Clinic uses state-of-the-art digital information systems to offer secure online services such as online medical second opinions, medical record access, patient treatment progress for referring physicians (see below), and imaging interpretations by our subspecialty trained radiologists. For more information, please visit eclevelandclinic.org.

MyChart This secure online tool connects patients to their own health information from the privacy of their home any time, day or night. Some features include renewing prescriptions, reviewing test results and viewing medications, all online. For the convenience of physicians and patients across the country, MyChart now offers a secure connection to Google™ Health. Google Health users can securely share personal health information with Cleveland Clinic, and record and share the details of their Cleveland Clinic treatment with the physicians and healthcare providers of their choice. To establish a MyChart account, visit clevelandclinic.org/mychart.

DrConnect Whether you are referring from near or far, DrConnect streamlines communication from Cleveland Clinic physicians to your office. This complimentary online tool offers secure access to your patient’s treatment progress at Cleveland Clinic. With one-click convenience, you can track your patient’s care using the secure DrConnect website. To establish a DrConnect account, visit clevelandclinic.org/drconnect or email drconnect@ccf.org.

MyConsult Online Medical Second Opinion This secure online service provides specialist consultations from our Cleveland Clinic experts and remote medical second opinions for more than 1,000 life-threatening and life-altering diagnoses. MyConsult is particularly valuable for people who wish to avoid the time and expense of travel. For more information, visit clevelandclinic.org/myconsult, email eclevelandclinic@ccf.org or call 800.223.2273, ext 43223.

Critical Care Transport: Anywhere in the world

Cleveland Clinic’s critical care transport team serves critically ill and highly complex patients across the globe. The transport fleet comprises mobile ICU vehicles, helicopters and fixed-wing aircraft. The transport teams are staffed by physicians, critical care nurse practitioners, critical care nurses, paramedics and ancillary staff, and are customized to meet the needs of the patient. Critical care transport is available for children and adults.

To arrange a transfer for STEMI (ST elevated myocardial infarction), acute stroke, ICH (intracerebral hemorrhage), SAH (subarachnoid hemorrhage) or aortic syndromes, call 877.279.CODE (2633).

For all other transfers, call 216.444.8302 or 800.553.5056.

CME Opportunities: Live and Online

Cleveland Clinic’s Center for Continuing Education’s website, clevelandclinicmeded.com, offers hundreds of convenient, complimentary learning opportunities, from webcasts and podcasts to a host of medical publications including the Disease Management Project Online Medical Textbook, with more than 150 chapters. The site also offers a schedule of live CME courses, including international summits that focus on key areas of translational research. Many live CME courses are hosted in Cleveland, an economical option for business travel. Physicians can manage their CME credits by using the myCME Web Portal. Available 24/7, the site offers CME opportunities to medical professionals across the globe.