NewYork-Presbyterian
Columbia Orthopaedics
Affiliated with Columbia University College of Physicians and Surgeons

INSIDE SPRING 2008

SAVE THE DATE

Biomet Pediatric Trauma & Spine Lecture Series
New York City
October 24-25, 2008

73rd NYOH Alumni Meeting
New York City
May 8-9, 2009

For more information on Columbia Orthopaedics' services, visit
www.nyp.org/columbiaortho

RESOURCES FOR PROFESSIONALS

- Webcasts
- CME Activities
- Medical Presentations
- Specialty Briefings
- Newsletters

Visit nyp.org/pro

Case Study: Modeling Shoulder Replacement

Computer modeling and simulation can help customize and optimize the techniques of total shoulder replacement (TSR). An ongoing investigation at the Center for Shoulder, Elbow and Sports Medicine at NewYork-Presbyterian Hospital/Columbia University Medical Center that began with retrospective studies in the laboratory has moved to the operating room. Experts believe that the technology could ultimately be transferred throughout the orthopaedic community and assist in surgical decision making.

The key to successful TSR involves proper reaming of the glenoid and placement of the artificial socket. The innovative use of digitized images derived from computed axial tomography (CAT) scans of the glenoid vault and surrounding structures in this process has several advantages, according to Louis U. Bigliani, MD. "The computer reformatting in 360-degree views gives precise dimensions of the glenoid allowing precise preoperative planning for glenoid implant insertion, especially in difficult cases with deformed bone stock," he noted.

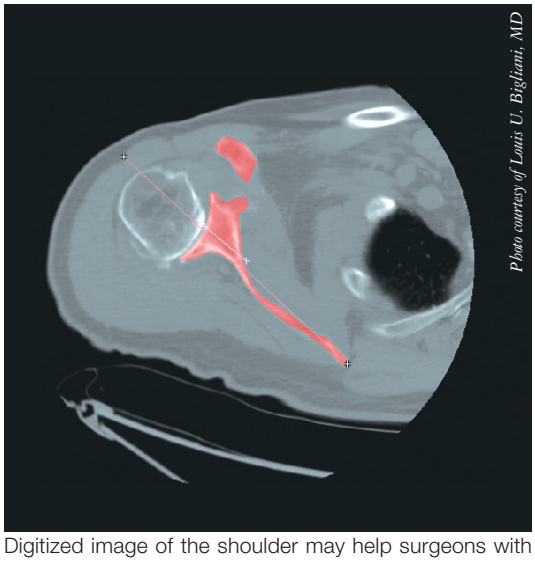


Photo courtesy of Louis U. Bigliani, MD

Digitized image of the shoulder may help surgeons with preoperative planning for total shoulder replacement.

Case History

Ronald T., an 81-year-old retiree, came to NewYork-Presbyterian/Columbia from his home in Florida. Active, in robust health, he had severe osteoarthritis of the right shoulder. He was unable to raise his arm above his head. Pain interfered with sleep and multiple tasks in daily life.

Imaging showed a normal rotator cuff, but with a large osteophyte on the humeral head. The glenoid had significant asymmetrical wear, with diminished volume and surface area. "This made for a difficult shoulder arthroplasty," said Dr. Bigliani.

Discussion

In general, TSR can be a demanding procedure because the glenoid socket is relatively small, deformed by pathology, and exposure is difficult. "With asymmetrical wear and posterior bone loss of the glenoid, it is very difficult to accurately assess the glenoid vault," noted Dr. Bigliani.

Computer manipulation of CAT scan images informs surgeons with added precision and provides simulations of implant position and size to maximize bony containment and support of the glenoid without obscuring deforming osteophytes.

"Computer simulation enables us to understand the anatomy better and identify the bony landmarks," explained Dr. Bigliani. "We know where we

see Shoulder, page 6

Case Study: The Two-Windows Approach

A 57-year-old woman presented to the Center for Shoulder, Elbow and Sports Medicine at NewYork-Presbyterian Hospital/Columbia University Medical Center with an intra-articular fracture in the left distal humerus, resulting from a fall in her home. This active and healthy woman played tennis at a competitive level.

Her surgeons—Christopher S. Ahmad, MD, and Melvin P. Rosenwasser, MD—saw the patient as an ideal candidate for the 2-window paratricipital approach to expose and fix her comminuted and unstable distal articular fracture. This technique provides excellent exposure of the intercondylar humeral fracture, creating windows through intermuscular planes at the medial and lateral aspects of the triceps tendon while leaving the extensor mechanism intact. This eliminates the need for an olecranon osteotomy

see Elbow, page 5

Microsurgery Lab Expands Technologies, Capabilities

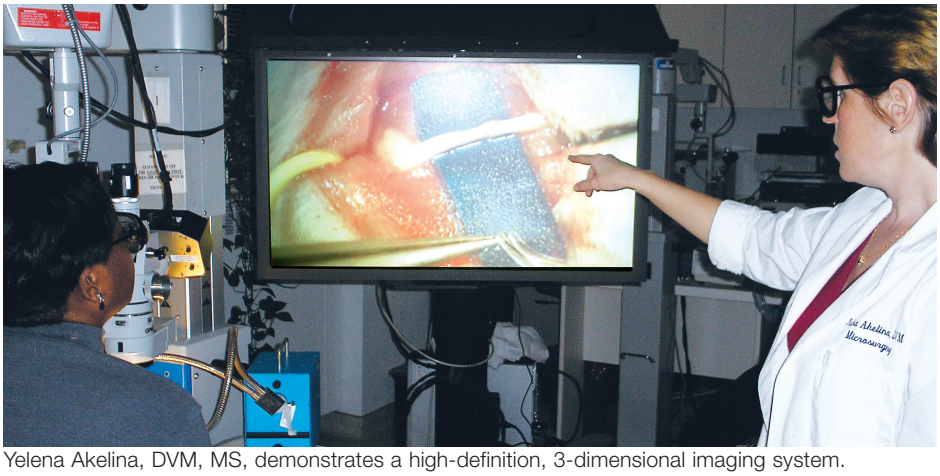
The Columbia University Microsurgery Research and Training Laboratory at NewYork-Presbyterian Hospital offers medical students, residents, and fellows the opportunity to acquire skills at a state-of-the-art teaching facility, and apply that expertise in basic and applied clinical research. In the nearly 30 years since the laboratory was founded, the number of trainees has grown to more than 90 students per year from more than 25 national postgraduate programs and more than 15 countries.

"This is a skill acquisition laboratory," explained Yelena Akelina, DVM, MS. "Microsurgery is a technically demanding and precise skill that requires structured training and a lot of practice to achieve proficiency, and even more for mastery. There are few teaching laboratories of this size and scope in the country. What sets the Columbia Research Lab apart is that it teaches both the technical surgical skills as well as the methodology for translational research, which is so important in surgical therapeutics. The laboratory has trialed and invested in a number of new technologies that are advancing the core knowledge of microsurgery as it trains the next generation of surgical subspecialists from many fields in microsurgery."

"We have one of the best teaching microsurgery laboratories in the United States," added Melvin P. Rosenwasser, MD. "It attracts surgeons in training throughout the country in multiple specialties which require this special expertise. One prime example is in the field of limb salvage after devastating injury. We now have many more surgeons available to perform sophisticated soft-tissue or bone-vascularized free tissue transfer, which may save patient limbs and shorten disability. Didactics and technology have changed greatly since I finished my training."

For example, the laboratory tested a unique high-definition, 3-dimensional real-time imaging system for teaching microsurgery. The laboratory beta tested the system for 1 year and observed students learning in a different "heads-up display" style not unlike the video games that many young surgeons know full well. Extensions of this technology may fuel new advances in microsurgery.

Traditionally, microsurgery is taught with dual-head microscopes, allowing only the instructor and 1 student access to the surgical field. With the investigational system, Dr. Akelina taught multiple students at the same time, showing the procedures in a unique and more realistic 3-D view.



Yelena Akelina, DVM, MS, demonstrates a high-definition, 3-dimensional imaging system.

The system replaces the binocular eyepieces of standard microscopes, and the captured images from the left and right eyepieces are projected onto a 40-inch screen as a 3-D image. A surgeon can work by looking straight ahead at the screen wearing special polarized glasses without being "fixed" to the eyepiece; the assistant can still use the second eyepiece if needed.

"The system allowed the instructor to explain and demonstrate the specific teaching points more easily on a large-format screen," Dr. Akelina said. The company that developed the system continues to refine it for use in orthopaedic microsurgery.

"The imaging system was valuable in the teaching setting," added Robert Strauch, MD, citing the ability to allow many people access to the surgical field in 3-D as a key benefit of the system. "Although plug-ins are currently available to project images from microscope eyepieces onto screens, this is the first system to do so in 3-D."

The laboratory's research capability has expanded over the years, thanks to the generous support of the Orthopaedic Research and Scientific Foundation initiated and directed by Robert E. Carroll, MD. For example, such funding was used to purchase a data-acquisition system that measures blood/fluid flow in vessels in animal models as small as 1 mm. The flow meter "has opened a world of opportunity for microvascular research projects in animal models," Dr. Akelina said.

One such investigation studies the adjunct use of a collagen conduit wrap following arterial reconstruction with a vein graft in a rat model to diminish the incidence of aneurysmic dilation and early thrombosis. This study has important clinical indications for vascular surgery in increasing long-term patency of bypass grafts, which employ an intercalary vein graft. Another useful research tool is the nerve stimulator probe, which allows electrodiagnostic testing, including electromyography, to assess the nerve injury and repair projects such as treatment of neuroma.

The microsurgery research lab has matured by the corpus of ongoing work to offer a 1-year research fellowship. "This fellow's presence has increased the amount and sophistication of the research output," Dr. Akelina said.

Maria Codreanu, MD, a general surgery resident, is the present research fellow and has augmented her clinical training while satisfying her research interests.

"Residents at different levels of training can be challenged by the intellectual and technical rigors of the laboratory," Dr. Codreanu said. "The microsurgical techniques mastered in the laboratory have a wide range of applications, starting with the careful handling of tissue, and performance of different vascular anastomoses, and acquiring knowledge of anesthesia and monitoring its effects in vivo." Surgeons who are interested in this full-year fellowship should contact Dr. Akelina.

The laboratory offers shorter focused technical courses for residents, fellows, practicing physicians, and other allied medical professionals who wish to acquire basic knowledge and the fundamental skills of microvascular surgery. These courses may be viewed at http://columbiaortho.org/microlab.

Contributing faculty for this article:
Yelena Akelina, DVM, MS; Maria Codreanu, MD; Melvin P. Rosenwasser, MD; Robert Strauch, MD

Sports Medicine Center Boasts Elite Squash Coverage

Since 2001, the Center for Shoulder, Elbow and Sports Medicine at NewYork-Presbyterian Hospital/Columbia University Medical Center has provided medical coverage for the "Tournament of Champions," the most prestigious annual squash contest held in the United States.

Set amid the landmark Vanderbilt Hall of New York City's Grand Central Terminal, the tournament exposes hundreds of thousands of commuters to this fast, athletic, exciting, and ascendant but still relatively uncommon sport. Squash is truly an international game with the top 20 male players in the world hailing from Egypt, the United Kingdom, Australia, France, Scotland, Malaysia, Finland, and the Netherlands.

Orthopaedic care for the tournament each year is provided by William N. Levine, MD, and Christopher S. Ahmad, MD. Dr. Levine, the Director of Sports Medicine at NewYork-Presbyterian/Columbia, recognizes that squash players are subject to the typical array of musculoskeletal injuries, but that contact injuries, including lacerations, are also seen. These professional players rarely wear protective glasses, so catastrophic eye injuries are possible but rare.

Gregory Gaultier of France stretches for the ball at the 2008 Tournament of Champions in New York City. Canada's Shawn Delierre looks on.

> **"Elite players after years of play develop hip arthritis, which is unique and differs from the normal degenerative pattern found in other sports, like tennis."**
>
> —William N. Levine, MD

Squash players sustain "a fair amount of tennis elbow, overuse injuries to the shoulder, rotator cuff injuries, and meniscal tears," according to Dr. Levine. He should know; he is a player himself. "Elite players after years of play develop hip arthritis, which is unique and differs from the normal degenerative pattern found in other sports, like tennis," he noted. "It's caused by the frequent lunging seen in championship play. Global cartilage loss often results. The only salvage is total hip replacement or, in some younger players, the bone-preserving hip resurfacing option is possible and may allow return to play, albeit at a lower intensity."

Contributing faculty for this article:
Christopher S. Ahmad, MD; William N. Levine, MD

NewYork-Presbyterian Columbia Orthopaedics

is a semi-annual newsletter published by NewYork-Presbyterian Hospital. The articles in this newsletter represent the work of the Columbia University College of Physicians and Surgeons faculty at NewYork-Presbyterian Hospital/Columbia University Medical Center, who are at the forefront of research and practice in the diagnosis, treatment, and rehabilitation of musculoskeletal conditions in adults and children.

Hand Surgery Recruit Brings Contact Biomechanics Expertise

Peter Tang, MD, MPH, embodies the modern-day definition of a hand surgeon. As such, he considers the upper extremity as a functional unit that requires holistic care rather than the historical and nonanatomic approach, which focuses treatment from the wrist down.

The most recent addition to the Hand Surgery Service in the Department of Orthopaedic Surgery at NewYork-Presbyterian Hospital/Columbia University Medical Center, Dr. Tang epitomizes innovation, finding novel research targets in difficult and controversial areas of hand surgery.

"Modern-day hand surgeons are trained to deal with upper-limb anatomy, physiology, and mechanics," said Dr. Tang. "It is obvious that the functionality of the hand depends on the health and integrity of all the organ systems within the limb envelope. In severe crushing, for example, the treatment algorithm is complex. Is the limb viable? What is the vascular status and is there a need for repair? Is there nerve injury and is there need for repair? Is there a compartment syndrome and do the compartments need to be released to save muscle and nerve function? If we salvage the limb, how can we get bony stability, and is there a need for ligament reconstruction to obtain joint stability? Lastly, how are the soft tissues? Can we get primary wound closure or is there a need for a local or free flap?"

Dr. Tang's current research studies shed new light on accepted procedures like the proximal row carpectomy (PRC) for severe osteoarthritis. He has conducted several studies to determine the "contact biomechanics" after PRC. Dr. Tang has evaluated the contact pressure, area, and kinematics of the intact and PRC wrist in a cadaveric model. His findings demonstrate that the wrist after PRC is a biomechanically disadvantaged joint, with high contact pressure on a small contact area, compared with the intact wrist (Figure). However, the PRC wrist has increased translation compared with the intact wrist, which may explain the satisfactory clinical results reported. The findings "confirm a hypothesis that has been cited but unproven," Dr. Tang said.

Using similar laboratory methodology in the Center for Orthopaedic Research at NewYork-Presbyterian/Columbia, he will study the mechanics of another scapholunate advanced collapse (SLAC) salvage procedure—scaphoid excision and 4-bone fusion.

Figure. X-ray showing an arthritic wrist following proximal row carpectomy.

> **"What attracted me to the field was the intricate anatomy of the upper extremity and the complex surgeries including microsurgery, which allows replantation of amputated fingers."**
>
> —Peter Tang, MD, MPH

Dr. Tang attended Harvard as an undergraduate and medical school at Weill Cornell Medical College. Dr. Tang completed his orthopaedic residency training at the University of Pittsburgh Medical Center (UPMC). He then spent a postgraduate fellowship in hand surgery at UPMC.

"What attracted me to the field was the intricate anatomy of the upper extremity and the complex surgeries including microsurgery, which allows replantation of amputated fingers," he said. At UPMC, he was mentored by Joseph E. Imbriglia, MD, who was a hand fellow of Robert E. Carroll, MD, a founding father of hand surgery and now a professor emeritus at Columbia University College of Physicians and Surgeons.

"Dr. Carroll has trained a generation of hand surgeons, and now I am at the same institution after being trained by one of his students," Dr. Tang said. "I was thrilled to have this opportunity. NewYork-Presbyterian/Columbia has a legendary history in orthopaedics and hand surgery, and I am honored to be part of its legacy. I have the oppor-

see Hand, page 6

Case Study: Chondroblastoma Afflicts an Adolescent Male

Chondroblastomas, locally destructive but nonmalignant tumors that tend to arise in the epiphyses, are fairly rare. Still, as a specialist in pediatric orthopaedic surgery at Morgan Stanley Children's Hospital of NewYork-Presbyterian/Columbia University Medical Center, Joshua E. Hyman, MD, sees several cases each year. Adolescent males are most often affected. According to Dr. Hyman, the diagnosis is typically made because the osteolytic growth causes worsening pain as it destroys and deforms bone.

Classical symptom recognition helps differentiate this disease from more common complaints of mechanical knee pain. Imaging can distinguish the chrondroblastoma from giant cell tumors, aneurysmal bone cysts, and clear cell chondrosarcomas. The following case illustrates how successful treatment of chondroblastoma relies on the expertise of many specialists: pediatric orthopaedic surgeons and musculoskeletal oncologists, as well as adult orthopaedic surgeons.

Case History

Charles B., 15, presented at Morgan Stanley Children's Hospital with a 5-month history of knee pain. He reported swelling in the front of his right knee that radiated over the distal femur. The knee was tender, without visible skin changes.

No trauma was implicated and the remainder of the exam was noncontributory. "There was nothing remarkable in the history," recalled Dr. Hyman, who saw Charles B. at his initial visit. "He was entirely healthy."

Because the swelling in the knee suggested the existence of a tumor, Dr. Hyman called for X-rays and a magnetic resonance imaging (MRI) of the patient's knee. The X-ray clearly suggested a lesion within the distal femur while the MRI provided additional information concerning its extent and characteristics.

"There are subtle findings on MRI you might not see on plain X-ray," said Dr. Hyman. "If there's evidence of a soft-tissue tumor or soft-tissue extension of the tumor, you will see it on MRI but not on the X-ray."

Based on the patient's age, location of the lesion, and the advancing symptoms, chondroblastoma became the likely diagnosis. This was confirmed via tissue biopsy. Dr. Hyman informed the patient's father and referred the patient to Francis Y. Lee, MD, who specializes in pediatric orthopaedic surgery and in treating complex musculoskeletal tumors such as chondroblastomas. The obvious advantage of cooperation between experts permitted seamless treatment of both tumor excision and an elegant reconstruction of the damaged limb and cartilage.

When Dr. Lee saw the patient, he noted the tumor's rapid progression and the articular joint destruction. "The tumor involved the articular surface, and the articular cartilage was destroyed," Dr. Lee recalled. He scheduled surgery as the patient had lost the mobility of his knee.

Discussion

In chondroblastoma, surgery involves both excising the tumor and reconstruction of the joint surface using allograft articular constructs. The graft healed; function was restored; and Charles B., was soon able to return to full activity.

With chondroblastoma, there is a small but not insignificant chance (~5%) of recurrence. At 2-year follow-up, however, Charles B., remains healthy.

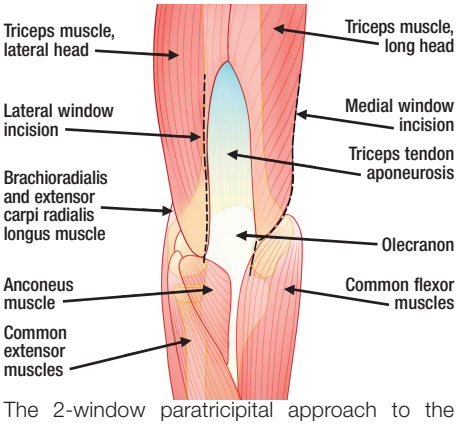
Contributing faculty for this article:
Joshua E. Hyman, MD; Francis Y. Lee, MD

continued from Elbow, page 1

with its known and not insignificant complication rates of nonunion, malunion, and hardware migration.

This injury was closed, with no nerve deficits. This is the type of fracture that is typically explored through an olecranon osteotomy. X-rays and computed tomography scans confirmed the trans-olecranon fossa T-condylar type with trochlear comminution.

In the 2-window paratricipital approach, the window is created by elevating the long head of the triceps from its attachments on the medial ulna. Capsulotomy is performed along the medial olecranon margin through division of the transverse and posterior medial collateral ligament (MCL). Care is taken to preserve the anterior band of the MCL, which is necessary for elbow stability. The lateral window is created by making an incision along the triceps aponeurosis and lateral head of the triceps. Capsulotomy is performed along the olecranon margin without cutting the lateral collateral ligaments, elbow extensors, or anconeus. Following these releases, the gentle



The 2-window paratricipital approach to the distal humerus.

rotation of the forearm will access the anterior and posterior trochlea for anatomic reassembly of fragments.

The surgeons used this approach to obtain exposure and anatomic reduction of the articular surface and then applied precontoured column plates for fixation.

Outcome

The ulnar nerve was released and transposed in a subcutaneous location and restrained with a fasciocutaneous flap. Stable alignment and fixation were achieved allowing early motion. Within 6 weeks of surgery, the patient had regained mobility of 15 degrees to 120 degrees. "This patient had an amazing result. She is back to playing tennis and [performing] all her daily routines and is extremely satisfied with the surgery," noted Dr. Ahmad.

Discussion

"Intra-articular elbow fractures are a common presentation and are becoming increasingly complex given the aging of the population and the rising rates of high-energy injuries from motor vehicle accidents and sports injuries," explained Dr. Rosenwasser.

Although intra-articular humeral fractures are traditionally treated with olecranon osteotomy, there are known complications, even with perfect technique. These include delayed or non-union of the olecranon, malunion with incongruence, and hardware migration with pain.

see Elbow, page 7

continued from Hand, page 4

tunity to work on the Hand Surgery Service with my experienced colleagues, Dr. Melvin P. Rosenwasser and Dr. Robert J. Strauch. NewYork-Presbyterian/Columbia has a great tradition of research and I am excited to contribute at this special institution."

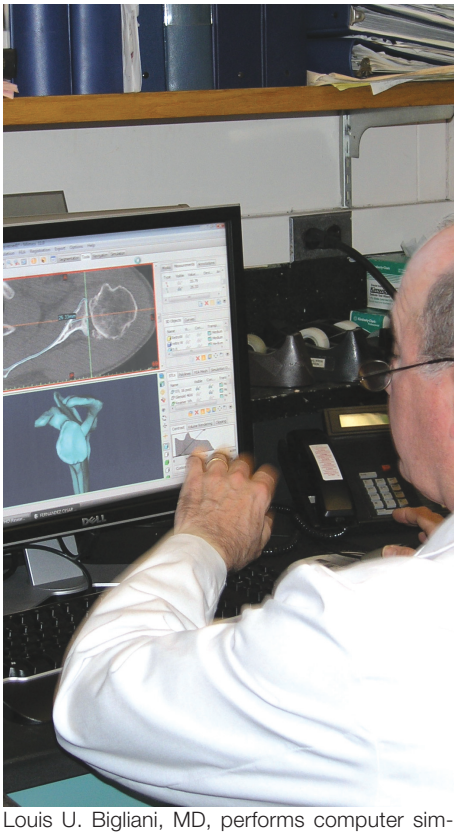
He listed such resources as the Microsurgery Research and Training Laboratory, initiated by retired Chief, Dr. Harold M. Dick, and the Trauma Training Center, developed by Dr. Rosenwasser, as factors that attracted him to the Department. "The Department of Orthopaedic Surgery has great resources for research," noted Dr. Tang. "Part of our goals as an academic institution is to perform research and advance the field to improve patient care."

"Dr. Tang is joining the tradition of hand surgery at Columbia, which has always been forward-thinking and modern in its approach," added Dr. Rosenwasser. "He fits this category both by training and by temperament. He is among the group who will become the next leaders in hand surgery in America."

Contributing faculty for this article:
Melvin P. Rosenwasser, MD; Peter Tang, MD, MPH

Peter Tang, MD, MPH, and his team perform hand surgery at NewYork-Presbyterian/Columbia.

continued from Shoulder, page 1



Louis U. Bigliani, MD, performs computer simulation for total shoulder replacement surgery.

want to enter on the surface, and we know which angle we can go in at, and that helps us a great deal."

Computer modeling is used for TSR surgery, according to Dr. Bigliani, and it can be used to predict situations where the procedure might not succeed due to mechanical failure. Software can be used to teach the procedure details, and these simulation tools developed here can help to train the greater orthopaedic community performing shoulder arthroplasty.

"It's not quite virtual reality because we don't get the tactile feel, for example," said Christopher S. Ahmad, MD, who participated in developing the teaching module. "But, we do simulate the steps of the operation realistically."

William N. Levine, MD, the other member of the surgical and research team, added that "computer navigation has recently become popular in hip and knee surgery, and our novel computer-generated research lays down a foundation for transferring this exciting technology from the bench to the OR over the next several years."

Outcome

Ronald T. had just the type of pathology that was facilitated by the computer modeling before surgery. Exposure of the glenoid proved difficult, and the asymmetrical bone loss required reaming on the anterior surface to level for implantation of the prosthesis. The critical amount of retroversion, between 0 and 5 degrees, must be achieved.

"Computer simulation enables us to understand the anatomy better and identify the bony landmarks."

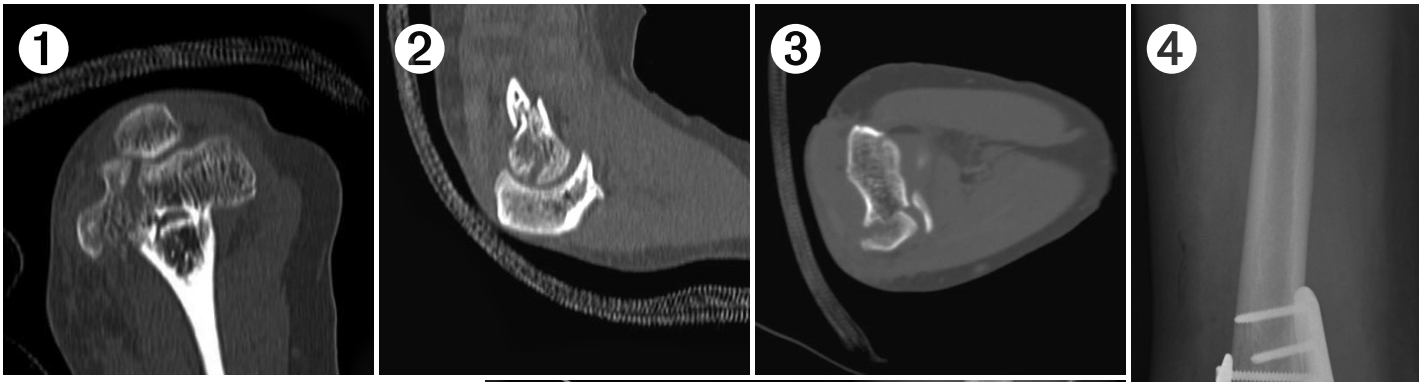
—Louis U. Bigliani, MD

"We were able to ream down to that position," said Dr. Bigliani. Three peg holes were drilled to receive the artificial glenoid. Their placement was guided by the computer simulation.

After surgery, Ronald T. had an excellent

see Shoulder, page 8

continued from **Elbow,** page 5



❶ AP computed tomography scan of low intercondylar fracture.

❷ Lateral computed tomography scan of low intercondylar fracture.

❸ Axial computed tomography scan of low intercondylar fracture.

❹ AP X-ray at union.

❺ Lateral X-ray at union.

Soft-tissue exposure alone, such as triceps splitting, "doesn't give an adequate exposure because it is too central and doesn't allow you to fully see the articular surface," according to Dr. Ahmad. Triceps reflection is another option but is mostly used for total elbow replacement and often leads to deficiencies in the extensor mechanism. Variations and combinations of these techniques have been described in the literature (*J Am Acad Orthop Surg* 2006;14[13]:754-765), but they are mostly advocated for simpler extra-articular fractures.

With the paratricipital 2-windows approach, surgeons do not "have to violate the triceps mechanism of the elbow and we don't have to create a new fracture," Dr. Ahmad said. The approach developed by Dr. Rosenwasser is similar to that published by Schildhauer (*J Orthop Trauma* 2003;17[5]:374-378), but combines a paratricipital posteromedial access with splitting of the triceps lateral to the deep central head of the triceps. The advantage of this exposure is easy conversion to olecranon osteotomy if necessary.

"Our continual study of anatomy allows us to evolve techniques based on experience, which can improve clinical outcomes while reducing complications in the treatment of challenging articular fractures of the distal humerus," said Dr. Rosenwasser.

This technique and case cohort series was presented at the 24th annual American Shoulder and Elbow Surgeons Meeting in Dallas, TX, in October 2007.

Contributing faculty for this article:
Christopher S. Ahmad, MD; Melvin P. Rosenwasser, MD

Contributing Faculty

The following is a list of the practitioners quoted in this issue of the NewYork-Presbyterian Columbia Orthopaedics Newsletter. For more information on their work, please contact them at the e-mail addresses provided.

NewYork-Presbyterian Hospital
Columbia University College of Physicians and Surgeons

Christopher S. Ahmad, MD
Director of Biomechanics Research
Center for Orthopaedic Research
Director of the Center for Pediatric
and Adolescent Sports Medicine
Morgan Stanley Children's Hospital
Associate Professor of Clinical Orthopaedic Surgery
E:mail: csa4@columbia.edu

Yelena Akelina, DVM, MS
Associate Director, Microsurgery Training
and Research Laboratory
Associate Research Scientist
Instructor of Clinical Microsurgery
E:mail: ya67@columbia.edu

Louis U. Bigliani, MD
Chief, Orthopaedic Surgery Service
Director, Center for Shoulder, Elbow and
Sports Medicine
President, Medical Board
Frank E. Stinchfield Professor
and Chairman
Department of Orthopaedic Surgery
E-mail: lub1@columbia.edu

Maria Codreanu, MD, PGY3
General Surgery Resident
E-mail: mariamd@gmail.com

Joshua E. Hyman, MD
Associate Attending Physician
Associate Professor of Clinical Orthopaedic Surgery
E-mail: jh736@columbia.edu

Francis Y. Lee, MD
Chief, Tumor and Bone Disease Service
Associate Professor of Clinical Orthopaedic Surgery
Vice Chairman for Research
Director, Center for Orthopaedic Research
E-mail: fl127@columbia.edu

William N. Levine, MD
Director, Sports Medicine
Associate Director, Center for Shoulder,
Elbow and Sports Medicine
Vice Chairman of Education and Professor
of Clinical Orthopaedic Surgery
E-mail: wnl1@columbia.edu

Melvin P. Rosenwasser, MD
Director, Orthopaedic Hand and Trauma, and
Microsurgery Services
Robert E. Carroll Professor of Hand Surgery
E-mail: mpr2@columbia.edu

Robert J. Strauch, MD
Attending Orthopaedic Surgeon
Professor of Clinical Orthopaedic Surgery
E-mail: rjs8@columbia.edu

Peter Tang, MD, MPH
Assistant Attending Orthopaedic Surgeon
Assistant Professor of Orthopaedic Surgery
E-mail: pt2214@columbia.edu

continued from **Shoulder,** page 6

functional outcome and is free of pain, with active forward elevation to 165 degrees. He has returned to playing golf and is so satisfied that he is preparing for TSR on the contralateral shoulder.

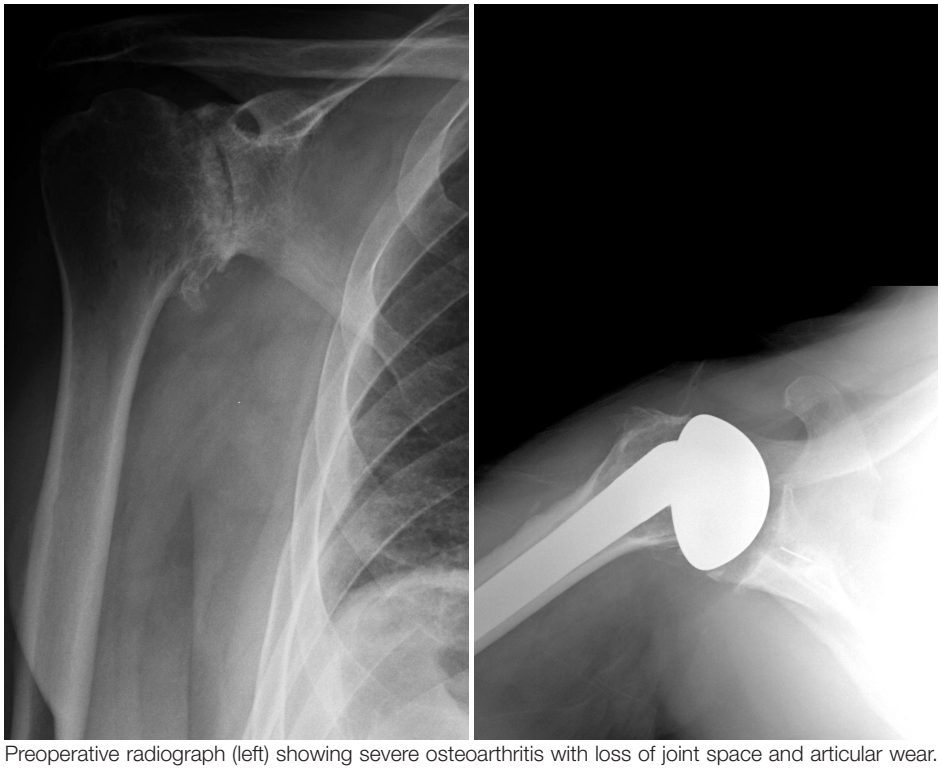
In the final analysis, TSR remains a complex procedure that requires more skill and experience than humeral head replacement, a simpler alternative. Indeed, computer simulation may impact the continuing controversy over which procedure is best. A 2007 article in the *Journal of Shoulder and Elbow Surgery,* authored by Drs. Ahmad, Bigliani, Levine, and other colleagues at the Center, found that the total shoulder arthroplasty is clearly superior (16[4]:396-402). The review, "Total Shoulder Replacement Compared with Humeral Head Replacement for the Treatment of Primary Glenohumeral Osteoarthritis," examined 23 studies and 1,952 patients.

"At our institution," said Dr. Ahmad, "we strongly feel that resurfacing the entire socket affords better pain relief."

Contributing faculty for this article:
Christopher S. Ahmad, MD; Louis U. Bigliani, MD; William N. Levine, MD.

"At our institution, we strongly feel that resurfacing the entire socket affords better pain relief."

—Christopher S. Ahmad, MD



Preoperative radiograph (left) showing severe osteoarthritis with loss of joint space and articular wear. Postoperative radiograph (right) revealing centralization of head correcting posterior wear and subluxation.

NewYork-Presbyterian Columbia Orthopaedics

Affiliated with Columbia University College of Physicians and Surgeons

Important news from NewYork-Presbyterian/Columbia Orthopaedics—at the forefront of research and clinical care in the diagnosis, treatment, and rehabilitation of musculoskeletal conditions in adults and children.

NewYork-Presbyterian Hospital
622 West 168th Street
New York, NY 10032

NONPROFIT ORG.
U.S. Postage PAID
Permit No. 37
Utica, NY