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# Bone & Joint Journal

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**Michael J. Harris M.D.**

## The Next Frontier in Total Joint Replacement

by **Michael J. Harris M.D.**

The field of total joint replacement has evolved over the last 40 years. Initially, the focus of much research and dedication was the biomechanics of the knee and hip as well as the best materials to use in joint replacements. Once those aspects were elucidated, increased focus was placed on how the implants were fixed to the bone. Surgical techniques were then refined to help decrease the size of skin incisions and to decrease the rehabilitation times that patients had to endure.

The most recent advances in total joint replacement have revolved around pain management programs that have been largely successful and have been employed at the Dorr Arthritis Institute Medical Associates for several years. Also, the utilization of computer-guided surgical techniques have been validated at our institute.

Now, we are embarking on what we believe is the next frontier in total joint replacement: robotically-guided joint replacement. We have paired with Mako Surgical Corporation to start performing robotic uni-compartmental knee replacement in Los Angeles. By combining CT-based imaging, state-of-the-art computer analysis and robotic precision, we will be able to perform the most accurate surgery available in the United States.

However, before discussing the robotic controlled surgery, one must discuss the proper patient selection for uni-compartmental knee replacement. Not all patients are candidates for uni-compartmental replacement, and not all uni-compartmental replacement candidates can have robotic-guided surgery.

Uni-compartmental knee replacement is reserved for patients who have osteoarthritis of the knee that involves either the lateral or medial compartment of the knee. There must not be an inflammatory element to the arthritis (for example, rheumatoid arthritis patients are not candidates for this surgery). *Continued on page 3*

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## Save The Date: Saturday November 15th, 2008

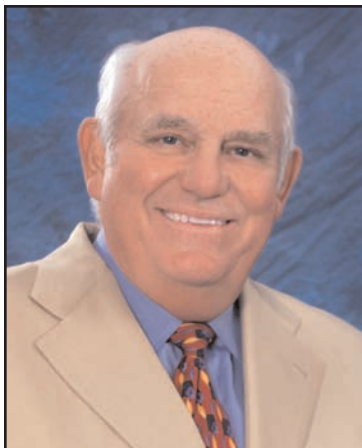
We will have our annual fundraiser for Operation Walk  
at the California Club in downtown Los Angeles.

Invitations will be mailed in September.

For more information call Jeri Ward at 213-977-2511  
or email at [jward@goodsam.org](mailto:jward@goodsam.org).

# Precision Surgery

by Lawrence D. Dorr, M.D.



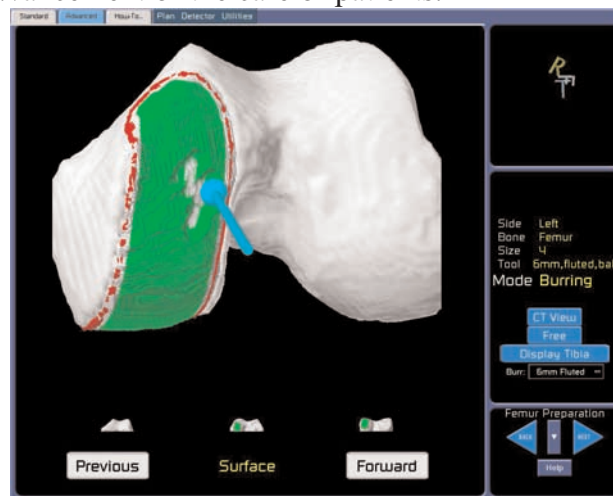
I have watched, and participated in, the marvelous improvements in total hip replacement and total knee replacement. After all, when I began my practice of total joint replacement 30 years ago, we brought patients into the hospital two days prior to surgery and kept our patients for two weeks. No one got out of bed

**Lawrence D. Dorr M.D.** for three days. Today, patients less than 65 years-old can go home the same day (depending on their insurance carrier) and most patients under 70 years of age stay one night. This fantastic improvement in the recovery has eliminated deaths from blood clots (pulmonary embolism) and postoperative problems like pneumonia, urinary tract infection, and poor bowel function<sup>1</sup>. The pain management program we have published for both total hip replacement and total knee replacement has revolutionized pain control by eliminating morphine and its attendant problems of nausea and vomiting<sup>2,3</sup>.

Implants that we use now have predictable fixation with over 10 years results published<sup>4,5</sup>. We have had unfortunately poor results with a new metal-on-metal cup named Durom which seems to have design deficiencies. We reported the failure of this cup to other orthopedic surgeons. This experience has made us pessimistic about large diameter head metal-on-metal articulations. The metal-on-metal design we used in the 1990s and still use with smaller diameter heads has performed well for us and many of our patients have over 15 years longevity and counting with this articulation.

The frontier for total joint replacement surgery is to make the operations have the same repeatability for all surgeons. Even expert surgeons, as we have here, benefit from a quantitative knowledge in the operating room provided by computer navigation<sup>6</sup>. It has made our results repeatable for all patients with total hip replacement (computer navigation is much less sophisticated for total knee replacement). Our research is educating the orthopedic community on the benefits of this technology. It has allowed us to stop traditional inhibitory precautions postoperatively. It has allowed safety with a rapid recovery program.

Now we raise the bar one level higher. July 2008 we began using the robot to precisely place total hip and total knee components. The robot is made by MAKO Surgical. The robot arm is controlled by the surgeon, but it is programmed before surgery so that the bone preparation cannot have error. When the bone preparation would exceed the prescribed limit, the robot stops. It will not permit the error, which humans can make. Our first use of the robot will be with unicompartmental knee replacement (see article by Dr. Michael Harris). This is expensive technology and we at the Arthritis Institute would like to thank Good Samaritan Hospital, and its president Andrew B. Leeka, for being progressive in the advancement of the care of patients.



The precision provided by the MAKO Tactile Guidance System™ and 3-D visualization helps surgeons accurately sculpt the joint and properly align the implant.

We will be the principal center for development of a Robotic hip program. There will be four surgeons working with us – one from Mayo Clinic, one from Hospital for Special Surgery in New York, one from Miami, and one from England. This is an honor for us to be chosen to be a developer. It is confirmation of our computer navigation development and our leadership in total hip replacement surgery.

Robotic surgery is the new standard in precision surgery. I am sure many of you are familiar with the DiVinci robot by Intuitive Surgical which is used for prostate and heart surgery. The robot is the surgeon's assistant. It does not replace a surgeon's judgment, instinct, and intuition, which always sets apart superior surgeons. But for certain, quantitative knowledge in the operating room, and bone preparation within defined limits every time, makes the best orthopedic surgeon better.

This robotic advance is the most exciting development that I have seen for the act of bone preparation in the performance of total hip replacement. What a thrill for us to be one of the pioneers!

*Please see footnotes on page 7*

## The Next Frontier in Total Joint Replacement

*Continued from page 1*

The patient must have near full extension of the knee and over 90 degrees of flexion (i.e. bending). The ligamentous structures of the knee must be intact and functioning with rare exception. The pain pattern the patient exhibits must be focal, meaning that the pain the patient has must be localized over the damaged compartment of the knee. The “entire” knee should not be painful. Also, there should be no significant angular deformity, meaning that the patient should not be significantly “bow-legged” or “knock-kneed.” If these requirements are met, in general, a patient can expect a successful surgery with moderate rehabilitation needs and decreased pain in comparison to total knee replacement.

Patients who have lateral compartment osteoarthritis who are candidates for uni-compartmental knee replacement, are not candidates for robotic surgery because as of yet, the procedure is not FDA approved for use in lateral compartment surgery. However, if patients have medial compartment osteoarthritis and are candidates for uni-compartmental surgery, they are candidates for robotic uni-compartmental knee replacement, or “MAKOplasty®.”

Once you have been identified for a MAKOplasty®, the pre-operative process is basically same as it is for total knee or hip patients. The patient will discuss surgical times with the surgical schedulers, attend the pre-operative class, and be pre-operatively cleared for surgery by our Pulmonary/Critical Care specialist colleagues.



The MAKO Tactile Guidance System™

The only additional item that must be done prior to surgery is a specialized CT-scan of the knee in question. This must be done at Good Samaritan Hospital in Los Angeles because the CT-scanner is specially configured to work in concert with the MAKO Surgical robot software. Once the CT-scan is complete, the CT scan will be “uploaded” into the MAKO computer, and I will personally plan your up and coming surgery on the computer, aligning the components and planning the bone resections prior to surgery.

In the operating room, you will receive outstanding anesthesia, and we will then prep the affected knee and leg for surgery. There will be an approximately 3-5 inch incision over the knee, two small incisions in the middle leg, and two small incisions in the lower thigh. The small incisions are for robotic trackers that will be affixed to the tibia and femur respectively to help the computer to “visualize” your knee in space. After the surgery is started, the anatomy of the knee is registered into the computer. At that point, the robot arm engages your knee, and I guide the arm to precisely remove the amount of bone needed in order to place the components of the partial knee replacement exactly where they need to be placed as dictated by the pre-operative planning. The parts are cemented into place with a bone cement in the standard fashion.

Post-operatively, you will be seen by our committed team of physical therapists who will instruct you on your rehabilitation program that will start the same day of surgery. We expect that due to the smaller incisions, and the precise nature of this surgery that many patients may want to and are allowed to go home the same day of surgery. This will be discussed and implemented on a case by case basis.

We will continue to follow all of our patients very closely after surgery in order to monitor their progress and to evaluate for possible complications. As time goes on, we will report our success with Makoplasty in scientific journals. You will be asked to participate in such studies at your discretion.

The surgeons at the Arthritis Institute are confident that this is truly the next frontier in joint replacement surgery. We see this technology being applied in the future to lateral compartment replacement, total hip replacement, and total knee replacement as well. This is an exciting time for our patients who will be able to benefit from this technology. Please feel free to contact the Arthritis Institute and make an appointment for evaluation if you are interested in this procedure.

# Return to Fitness After Joint Replacement- Part III

by William T. Long, M.D.



**William Long, M.D.**

Nothing beats a great pair of legs. After hip or knee replacement surgery it is possible to greatly improve the lower extremities muscle mass, strength, and form. The arthritic limb is almost always smaller and weaker than the unaffected limb. This limb atrophy is not the result of muscle or bone disease. The healthy muscle envelope that once protected and moved the limb wasted away because painful arthritis prevented normal movement. When joint pain and stiffness is relieved then the healthy tissues can become strong and flexible again.

A well designed lower extremity weight training program is an effective way to rebuild functional strength and mobility. A patient who can work out for approximately one hour three times per week can make remarkable progress. The basic conditioning workout described here is designed to build a solid foundation that can benefit both the patient who has never been to a gym and the patient with a wealth of athletic experience.

Basic conditioning is an important phase of training that organizes the muscles into groups. Each muscle group moves the joint through a range of motion against added resistance. The workout is designed to balance the strength of opposing muscle groups so that no one group is over worked or neglected. Most hip replacement patients will be ready to begin gym workouts about six weeks after surgery. Knee replacement patients have more swelling and they may be ready to start between six weeks and three months after surgery. It is important to include the physical therapist in the plan to return to the gym because they can teach good body mechanics and technique and help the patient prepare for weight training exercises.

The key to a safe workout is clean and precise technique with every repetition. The number of quality workouts per year is more important than the number of workouts per week. Older athletes must listen to their body and take rest days when the body asks for recovery time. Overuse injuries are common and they can devastate a training program. Time taken for rest should not be viewed as a setback.

For simplicity, the lower extremity weight training circuit organizes muscles into three groups that control three joints. Four muscle groups move each hip joint, two groups control the knee joint, and two groups control the ankle. Each of the muscle group is used to move the joint

through a single functional range of motion. In between each weight lifting circuit stretching or calisthenic exercises help to keep blood circulating while the muscles recover.

Before lifting any weights the warm up can begin with 15 minutes of aerobic exercise or core exercise that work on the trunk and abdomen. The first circuit begins with shallow squats (also known as quarter squats) that bend the knees approximately 25% of the depth of a full squat. One should start with 15 smooth, controlled repetitions with a very light weight. Move immediately to the leg press machine and begin with 15 repetitions using a light weight. The last repetition should be as technically precise as the first. If the technique breaks down then the amount of weight or number of repetitions must be decreased. Finish the first circuit with stretching range of motion, or stepping drills for approximately one minute. This will help keep blood circulating by using the skeletal muscles as pumps instead of making the heart do all the work. Repeat this circuit two or three times (2-3 sets). Circuit one builds the quadriceps, calf muscles, and gluteus maximus.

Circuit two builds strength in the hamstring muscles and gluteal muscles. Single leg hamstring curls should begin with 15 repetitions on each leg. This is followed immediately by hip extensions that bring the thigh behind the body 15 times. Many gyms have no machine designed for hip extension. Pulleys are often available and can be attached to the feet or ankles for hip extension exercises. Move immediately to calisthenic exercises such as step-ups, lunges, or knee lifts that keep the legs moving while recovering for the next set. Complete this circuit two or three times.

The third circuit strengthens the inner thigh muscles or groin, and the hip abductor muscles or gluteus medius muscles. A machine that allows one to separate the thighs and open the knees against resistance works the hip abductors. Complete 15 repetitions and then move immediately to the hip adductor machine that allows one to bring the open thighs together against resistance. This builds strength in the relatively weak groin muscles. Ten to 15 repetitions is sufficient to improve these muscles. Walking or lower extremity stretching should immediately follow to complete the circuit. This circuit should be repeated 2-3 times.

These exercises will allow one to evaluate the strength of each major muscle group and the workouts can be adjusted to achieve balance. As patients become stronger the muscles will grow and the amount of weight can be increased. With desire, determination and help from the team that includes the surgeon, physical therapists, and personal trainers, it is possible to return to a fit lifestyle.

# Letters to the Editor



**Allison Nappe**

Since early June I have successfully transitioned from a small, rural college town in Iowa (Cornell College) to one of the largest, busiest cities in the world. Needless to say, there are probably more people in one LA city block than the entire town of Mount Vernon, Iowa! As a result, it was with great trepidation that I began an internship at the Dorr Arthritis Institute in Los Angeles, California.

Under the expert tutelage of some of the most dedicated health professionals imaginable, I have grown by leaps and bounds. By observing examinations in the clinic I not only learned to detect abnormalities in a healthy hip/knee by reading x-rays, I was exposed to a wide variety of patients, all with different backgrounds and stories. It became apparent to me that in order to obtain a comprehensive history of the patient, the physician must be caring and attentive without interruptions or time constraints. While observing in the operating room I became familiar with the anatomy of the hip and knee, surgical procedures, terminology and implants. My days with physical therapy were valuable in that I gained a knowledge of the exercises administered, precautions and the recovery process. My days assisting in medical records opened my eyes to the never-ending amount of paper work which only glimpses the amount of time and care devoted to each individual patient.

Coming from an environment where the deer outnumber the automobiles to the tangle known as the LA freeway system, it has forced me to adapt and grow in ways I never thought possible. I have come to realize life is about opportunities. Many thanks to the caring staff of the Dorr Arthritis Institute for granting me the privilege of witnessing first hand how a group of individuals can make a profound difference in the lives of others. For the past two months I have been mentored in more ways than I thought possible. It is clear that experience and observation are key to learning. These two short months have taught me more than any class available. After this priceless summer experience, I feel more certain than ever about my desire to enter the medical field. My sincere thanks to all. I will never forget you!

*Allison*

Dear Jeri

Since early June I have successfully transitioned from a small, rural college town in Iowa (Cornell College) to one of the largest, busiest cities in the world. Needless to say, there are probably more people in one LA city block than the entire town of Mount Vernon, Iowa! As a result, it was with great

trepidation that I began an internship at the Dorr Arthritis Institute in Los Angeles, California.

Hello. My name is Dan Delight, and I have suffered from osteoarthritis in my hips for most of my adult life, but especially the last 6 or 8 years. My hip difficulties started when my dad was born, because he had terrible affects from his own hip problems, and unfortunately, passed them on to me.

I've known for a long time that I would have to have my hips replaced, because the pain and immobility was getting too severe to live with, and since my dad never had his own replaced, he suffered terribly until his death at age 88. I certainly didn't want his level of pain and suffering.

So on December 14, 2007, just 6 short months ago, Dr. Long from the Arthritis Institute operated on me and replaced both my left and right hips. The next day, I started my rehabilitation and walked my first steps with the new titanium, cobalt-chrome hip joints.

I have worked hard at my strength, stretching and walking exercises, and now have worked my way back to riding my bicycle 5 times a week. My rides currently involve up to 50 miles with 2 or 3 hill climbs on Palos Verdes, and I am averaging in the neighborhood of about 160 to 180 miles a week.

Why am I training so hard? Well, this September I will be traveling to San Francisco for the Arthritis Foundation California Coast Classic bike tour down the coast to Los Angeles. I'll be riding 525 miles over 8 days, all with the goal of raising money for the Arthritis Foundation and of course completing this monumental bike ride. To date I personally have raised over \$10,000 to help support the Arthritis Foundation's work to help fight this disease. I have also ridden a total of about 1600 miles in preparation for the event.

I still have 3 more months to train and fundraise. I figure that I'll need another 2,000 or 3,000 more miles to be in peak condition for the ride, and I hope to add another \$2,000 in donations as well.

Before the surgeries, I could barely tie my shoes, and hardly lift my leg over the bike to get on it. The pain was pretty bad. But now I'm on my way to riding my bicycle 525 miles down the California coast, but more importantly, pain free. Thank you Dr. Long, and all the people at the Dorr Arthritis Institute that made this possible.



## Letters Continued

My name is Kenneth Lee Gray. I am 62 years-old. On February 18, 2006 I was diagnosed with severe osteoarthritis of my right hip. My doctor recommended a hip replacement. I had that operation on October 11, 2007 by Dr. William T. Long. It was a very successful operation.

In the middle of 2004 I started learning Tai Chi. Until this day I practice Tai Chi at least three days a week. Back in the late 70s I practiced yoga where I did a head stand which, from what I read, is good for blood circulation and is also good for some back problems and back pain. It did work for me.

Over the years I have gained some weight which now makes it hard for me doing the yoga head stand, but a couple of months ago I saw this man who is up in age doing sit ups while hanging from a jungle-gym. That is where I got the idea to hang myself upside down. I do the move for about one minute at a park I go to every Monday morning before going to my Tai Chi class. Hanging upside down from the bar allows me to stretch and improve my circulation like the headstand did, but it is easier for me to do. Dr. Long has allowed me to do this after my surgery and I feel that the upside hanging and the Tai Chi have made a big difference in my strength and recovery. Thanks to everyone at the Arthritis Institute who helped me during my surgery.



## "4 Scar General" Chuck Johnson becomes patient with oldest prosthetic hip since his recent revision surgery by Dr. Dorr

It was the Los Angeles Olympic year 1984 when Chuck Johnson earned his first TITANIUM MEDAL--- HIP. This was noteworthy as one of the first "bone in-growth" surgeries performed by Dr. Dorr at the Kerlan Jobe Clinic and Centinela Hospital. For a RECORD-BREAKING 24 YEARS (and 6 Olympic Games later) this prosthetic right hip admirably performed it's job.

Later that year came surgery on Chuck's left hip, also at Centinela Hospital, and then it's revision ten years later, at (USC) University Hospital.

Fast forward to the present Olympic year 2008. On January 9, Dr. Dorr (now back at Centinela Hospital,) performed the revision of the original 1984 implant---giving Chuck his 4th TITANIUM MEDAL ---hip!

What changes have we seen in hip surgery over these years, 1984 to present?

1. Pre-Surgery classes now taught to patients and their family members
2. Computer-assisted surgery developed by Dr. Dorr
3. Length of incision much shorter
4. Larger/stronger titanium prostheses with greater surface area for bone in-growth success
5. Much shorter periods for post-op physical therapy at home.
6. Fewer modifications needed in the patient's home environment (bed, chairs, shower, car seat., etc.)

The only regret Chuck had was having to use two, then only one crutch, combined with a strict walking/exercise routine for a few post-op months at home to gain strength and flexibility (sometimes required after revision surgeries.)

The QUESTION is, will Dr. Dorr ever, in the future, perform an amazing "RE-REVISION SURGERY" on one of Chuck's already bionic hips? And if so, during which Olympic Year???

by Janet Johnson, Chuck's wife



# Meet The Staff Vi Gabule R.N.

by Jeri Ward R.N.



## Vi Gabule, R.N. and Lariza Lagahit, R.N.

Vi joined the Arthritis Institute team in 1992 as a floor nurse at USC University Hospital. She quickly became our Orthopedic Nurse Coordinator and has followed us to Centinela Hospital and Good Samaritan Hospital. Vi has outstanding clinical assessment skills so she was chosen to be a liaison between the hospital, the clinic, and the physicians. She sees the patients through the continuum of care.

Your first encounter with Vi will be in the preop class. She will join Jeri Ward, R.N. (Arthritis Institute Director) in helping you fill out your pre-admission paperwork, gets to know you and your history, your medication, and your postoperative needs.

Next you will see Vi in the hospital. She will make rounds with the physician assistants and surgeon keeping current on your recovery and helping to assess your discharge needs. After you are discharged Vi can be contacted for questions and again act as a liaison between you and your surgeon.

And, don't think you are seeing double! Vi's twin sister (Lariza) is one of our night nurses. We are fortunate to have these outstanding nurses as part of our team. Also, Vi's two daughters, Ariane and Aira are both aspiring to become registered nurses. This family has a true talent for nursing care and compassion!

## Arthritis Institute Staff Speaking Engagements

Do you know that the Arthritis Institute staff is willing to give talks to groups? It can be your rotary club, retired teachers association, bridge club, bowling league, etc. If you want someone to talk about what is new in joint replacement, we are happy to help out. Talks can be arranged during the day with **Jeri Ward, R.N.** and an evening talk by the physicians can also be arranged. If you would like more information or to arrange a talk for your group, please call **Jeri Ward at 213-977-2511.**

# Choose the Best!

L.A.'s Five-Star Joint Replacement  
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If you're considering knee or hip replacement, consider this: surgeons and hospitals with more experience in joint replacement procedures produce better outcomes. The Dorr Arthritis Institute Medical Associates at Good Samaritan Hospital is a prime example. We've performed over 10,000 joint replacement surgeries over the last two decades, and this year Good Samaritan Hospital was recognized with a five-star rating in joint replacement by HealthGrades™, the nation's largest independent health care ratings company.

For more information and to schedule an appointment call us at 1 (800) GS-CARES or visit us at [www.dorrarthritisinstitute.org](http://www.dorrarthritisinstitute.org).



Good Samaritan Hospital  
Los Angeles  
[www.goodsam.org](http://www.goodsam.org)



### *Precision Surgery continued from page 2*

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# Tuesday Night Seminars

The Dorr Arthritis Institute Medical Associates and Good Samaritan Hospital are proud to sponsor a series of free “Tuesday Night Seminars” covering the latest information on arthritis and arthritis treatments.

## Physicians will discuss:

What is arthritis and its causes • Non-surgical treatment of arthritis • Pain Management • Minimally Invasive hip and knee replacement • Computer Navigated Surgery • Robotic Knee Surgery • Short Stay Hip Replacement

## Come join us:

Sept. 23rd in Manhattan Beach, • Oct. 21 in Culver City, • Nov. 18th in Downey.

Reservations are required. Please RSVP to 1 (800) GS CARES, 1-(800)-472-2737

Check our website for news and current information about joint replacement and the Arthritis Institute.

[www.dorrrarthritisinstitute.org](http://www.dorrrarthritisinstitute.org)

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## The Dorr Arthritis Institute Medical Associates

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