PHOENIX CHILDREN'S Hospital®

100% FOR CHILDREN

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"BREAK"ING NEWS

PROGRAM HIGHLIGHTS

By Lee S. Segal, MD, Chair of Pediatric Orthopaedics

When I was in my orthopaedic residency training, I helped care for many adult patients undergoing total hip replacement who had previous childhood hip disorders. There are several conditions that affect children from infancy to adolescence such as developmental dysplasia of the hip (DDH), Legg-Perthes disease, and slipped capital femoral epiphysis (SCFE). All of these conditions may lead to progressive osteoarthritis of the hip, which result in pain and limited motion. In the United States each year, over one million people who turn 50 will likely require a hip replacement. Hip replacement surgery is less successful when performed at an early age (they don't last as long). Fortunately, we live in a time where new concepts, techniques, and advances in orthopaedic surgery for our patients occur at a rapid pace.

Femoral acetabular impingement and its treatment with hip preservation procedures are some of these advances that we are able to offer adolescents and young adults at Phoenix Children's Hospital, which we believe will minimize the risks of osteoarthritis of the hip joint in our "young" patients as they get older. Two of these techniques include the use of surgical hip dislocation and the peri-acetabular pelvic osteotomy, both developed in Switzerland by Professor Reinhold Ganz. The peri-acetabular osteotomy is a new biologic procedure that preserves the patient's own hip joint rather than replacing it with an artificial hip joint. These procedures were developed to prevent the various abnormal hip anatomy around the hip before osteoarthritis sets in.

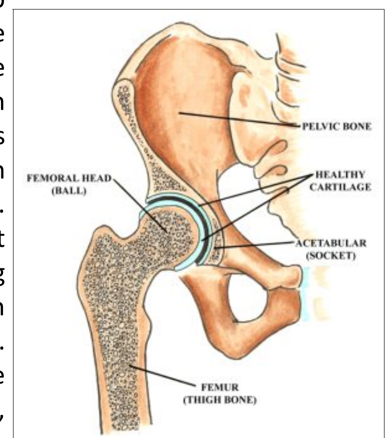
Judson Karlen, MD and M. Wade Shrader, MD lead our hip pain and preservation program here at Phoenix Children's Hospital, one of only a few offered in Arizona. Dr. Karlen trained with Professor Ganz in Zurich, Switzerland to learn these cutting edge techniques following his fellowship, and is able to offer these new procedures to our patients.

The hip pain and preservation program is just one of many unique programs that the Center for Pediatric Orthopaedics is able to offer to our patients. We will continue to offer new programs and novel techniques in our continued efforts to improve the quality and access of care for children in the southwest region.

WHAT YOU SHOULD KNOW ABOUT ...

Surgical Hip Dislocation by Judson Karlen, MD

With the success of hip replacement surgeries, we have also been able to see their limitations. In particular, hip replacements do not perform well in children or young adults. Therefore, a premium must be placed on returning damaged hips to function without replacing them. Innovative techniques have been developed to this end, and have been called "hip preservation" surgery. While these techniques are complex, and require specialized training, tools, and personnel, they allow patients to make exciting improvements in function.



Traditionally, orthopaedic surgeons have been taught to

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approach the hip joint with caution. In the past, consideration of dislocating the hip joint to attempt reconstruction of the joint and avoid a hip replacement in the future was dismissed. The risk of causing injury to the tenuous blood supply of the hip joint was quite high and could lead to a condition called avascular necrosis or AVN. If AVN occurs, this would result in a painful disabling condition and poor outcome.

The class of conditions that affect the shape of the hip joint has been termed femoro-acetabular impingement (FAI). Conditions which deform the joint surface of the hip, such as Slipped Capital Femoral Epiphysis (SCFE) and Legg-Calve-Perthes disease (LCP or Perthes) are relatively rare and severe examples of FAI, but have serious consequences for affected children. These often lead to poor motion of the hip, and therefore limited function.

Advances have been made possible by establishing clearly the path of the vascular supply to the hip. In 2001, this allowed a group of surgeons in Bern, Switzerland, led by Dr. Reinhold Ganz, to devise an approach to the hip joint that not only allows total access to the joint surface, but recognizes and protects that critical blood supply. They have termed this approach "Safe surgical dislocation of the hip," and this allows a multitude of new options in hip deformity correction, because the area within the joint capsule can be manipulated and shaped. This is often combined with other procedures to address severe deformities.

Since the surgical dislocation technique was introduced, it has been applied to many patients with FAI, including SCFE and Perthes. Encouraging results have been reported, noting decreased pain, and increased motion and ability to participate in activities. Our experience at Phoenix Children's Hospital has been equally exciting, and we look forward to providing the best and most up to date care to our patients.

PATIENT PROFILE **by Judson Karlen, MD**

Kasandra is an 11 year-old girl. She was surgically treated 10 years ago to help her right hip be placed back into position, and though the treatment was difficult, including a body cast, she and her family had been happy with the results. However, she started having problems with her left leg. First, the side of the hip became very tender and painful, and then the knee started hurting. X-rays showed that her left hip had developmental dysplasia, the same condition she had been treated for on the right. In addition, her labrum, a cartilage structure in the hip, was torn. Kasandra needed another surgery.

While the surgery she needed, a periacetabular osteotomy (PAO), was significant, Kasandra was happy that she would not need a cast this time. Her surgery was performed at Phoenix Children's Hospital by Dr. Judson Karlen and Dr. M. Wade Shrader, and she did very well. She has had time for recovery and rehabilitation, and now reports that she has no pain or discomfort, and has been able to resume her activities.

PHYSICIAN HIGHLIGHTS

Judson Karlen, MD, Orthopaedic Surgeon

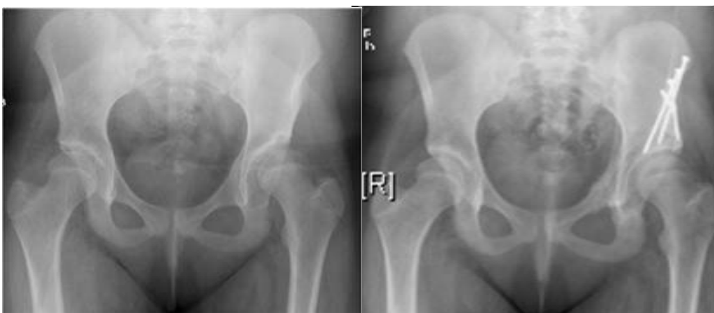
In this issue of the newsletter, we will highlight Dr. Judson W. Karlen, who heads the hip program at the Center for Pediatric Orthopaedics at PCH. Dr. Karlen was recruited from California to PCH to help build the hip deformity program. He grew up there, attended college at the University of Southern California, and medical school at the University of California, San Francisco. He completed orthopaedic residency through the University of Hawaii, and fellowship at Children's Hospital Los Angeles to complete training for Pediatric Orthopaedic Surgery. After this, he had an opportunity to engage in an observational fellowship in Switzerland with Drs Michael Leunig and Reinhold Ganz, who have developed innovative and ground-breaking techniques in hip surgery. Dr. Karlen is a member of the American Academy of Orthopaedic Surgeons, Pediatric Orthopaedic Society of North America, and Scoliosis Research Society. Dr. Karlen's practice focuses on hip, spine, and limb deformities.

PERI-ACETABULAR OSTEOTOMY (PAO) By M. Wade Shrader, MD

We now know that many of the hip replacements done for adult hip arthritis are necessary because of problems in the hip that begin in childhood. Many of these problems are congenital, meaning that they were present at birth. Some of these problems are developmental, meaning that they develop over the course of time as the child grows and matures, and hip problems themselves become more pronounced with age.

Dysplasia of the hip is both a congenital and developmental disorder. Dysplasia means that the hip has not formed normally. Many times, the hip socket (acetabulum) is shallow or too vertically oriented. Also, the ball of the "hip ball and socket" (femoral head) slides out of the side of the joint, and is not completely covered by the socket. These abnormalities lead to a change of the normal range of motion of the hip joint. The increased loads and stresses across the hip joint cause the hip cartilage to wear abnormally, and cause premature arthritis. Hip arthritis is a progressively painful disorder, that ultimately needs to be treated with a hip replacement.

Hip dysplasia in children and adolescent usually is not symptomatic initially. Only later, as some of the wearing process begins do the patients begin to have symptoms. Severe forms of the disease require treatment as infants and children. However, the more subtle, milder form of the disease will be present for many years before it is detected. The first symptoms are often groin pain that is worse after extended activity, and usually does not start until the teenage years or young adulthood. Sometimes the pain may shoot down the thigh or be present in the knee. It is important for any child, adolescent, or young adult who begins to have any symptoms in the hip to be promptly evaluated by an orthopedic surgeon with experience in hip preservation techniques. A thorough physical exam and radiographs usually are able to diagnose hip dysplasia.



In the past, early hip dysplasia was treated expectantly, treating on the symptoms with oral medications and activity modifications, with the knowledge that progressive hip arthritis and ultimately the need for hip replacement was inevitable. There was no feasible treatment to prevent the development of hip arthritis. When surgery was used, it involved multiple incisions, with significant muscle damage, and the results really did not lower the rate of arthritis. However, that has significantly changed in the past few years.

We now have a new, powerful procedure to alter the natural course of hip dysplasia in adolescents and young adults. The Ganz, or Peri-acetabular osteotomy (PAO), is a new technique that surgeons at Phoenix Children's Hospital's Center for Pediatric Orthopedic Surgery (CPOS) have special training and expertise. This procedure allows for the correction of the abnormal anatomy of the hip, making the loads and stresses across the hip more normal. Ultimately, this improvement in the hip geometry allows for the native hip joint to last longer (prolonging or eliminating the need for hip replacement), and eliminates the patient's pain. The surgery itself is typically done through a single, muscle -sparing, incision. The early results show a significant improvement in the patient's symptoms, and seem to allow the patient to return to a very active, normal lifestyle, while delaying the need for a hip replacement.

M. Wade Shrader, MD
Pediatric Orthopaedic Surgeon
& Director of Research

SAFETY AND INJURY PREVENTION

All-terrain vehicles (ATVs) are fun, but they may also cause severe injuries in children. There have been several studies that have highlighted the significant risks associated with children riding ATV's. More than 254,000 ATV-related injuries were treated in hospitals and doctors' offices in the year 2000, according to the U.S. Consumer Product Safety Commission (CPSC). A recent study published in the September issue of Journal of Pediatric Orthopaedics (JPO) (Sawyer JR, et al) evaluated trends in ATV related spinal injuries in children and adolescents. From a national trauma database, over 4400 children were hospitalized from ATV related accidents in 2006. Spinal injury occurred

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in 7% of patients. These injuries occurred at all levels of the spine, from the neck to the base of the spine near the pelvis. Fractures of the pelvis were associated with spine fractures in nearly half of the injuries. Other common injuries were femur and forearm fractures. The risk of spinal injury was greater for girls and in older children.

There has been a 240% increase in ATV-related injuries since 1997, and a 476% increase in spine injuries during the same time frame despite educational and legislative efforts. This in part was due to the expiration of the Consumer Product Safety Commission (CPSC) ban on the sale of adult size ATV's intended for use by children under 16 years of age. They cost the United States more than $6.5 billion in medical, legal and work loss expenses. Few states require a license to operate an ATV and there are no nationally mandated safety standards. With their large, soft tires and high center of gravity, ATVs can reach speeds of up to 50 mph or more. Almost 60 percent of accidents involving ATVs result from tipping and overturning.

The American Academy of Orthopaedic Surgeons (AAOS) considers ATVs to be a significant public health risk. To help reduce the numbers of injuries and deaths, particularly among young people, the AAOS recommends that:

- All ATV operators should be licensed and undergo a hands-on training course. According to the CPSC, inexperienced drivers in their first month of using an ATV have 13 times the average risk of injury.
- The minimum age for operating an ATV on or off the road should be at least 16 years old.
- ATVs should be used during daylight hours only.

ATVs should be used by only one person at a time, no riders.

The CPSC reminds parents that ATVs are not toys. Children under 12 years of age should not operate any ATV. Younger children do not have adequate physical size and strength to control these vehicles, nor do they have the thinking, motor, and perceptive skills to operate a vehicle safely. Children under 16 years of age should not operate ATVs that have an engine size of 90 cc or greater.

Here are some other safety tips for ATV use. Following these guidelines could help reduce your risk of injury.

- Read all instruction manuals and follow the manufacturers' recommendations for use, maintenance, and pre-use checks.
- Never operate an ATV on pavement or on a public road. Almost 10 percent of injuries and over 25 percent of deaths occurred while the ATV was on a paved road.
- Always wear protective gear. Helmets are especially important in reducing the risk of head injury. Protective gloves and heavy boots can also help reduce injuries.
- Do not operate at excessive speeds or after dark. ATVs are difficult to control and collisions with other vehicles can result in severe injuries or death.
- Do not operate an ATV if you have taken drugs or alcohol. According to the CPSC, 30 percent of all fatal ATV accidents involved alcohol use.
- Never operate a 3-wheeler.

HELPING OTHERS

The Center for Pediatric Orthopaedics is pleased to announce that several organizations in the greater Phoenix area have been awarded $7,500 from the Herbert S. Louis Endowment for Pediatric Orthopaedics. These organizations are dedicated to the promotion and quality of life for children with musculoskeletal disorders. It is in the spirit of the Louis Endowment that these inaugural awards will be given to the following organizations:

- Spina Bifida Association of Arizona
- Ballet Academy of Arizona
- United Cerebral Palsy of Central Arizona
- The Upward Foundation