



Connections 2008



**A Newsletter from the Pediatric Orthopedic
Training Program
Rady Children's Hospital and University of California – San Diego**

Issue 4 – 2008



Mubarak

Wenger

Chambers

Newton

Wallace

Pring

Yaszay

Message from the Director

Dennis R. Wenger, M.D.

Introduction

As Spring evolves, we present our 2008 edition of Connections, the newsletter of the Rady Children's Hospital-San Diego/University of California-San Diego children's orthopedic program. The newsletter aims to keep former fellows, residents, friends and colleagues updated on the activities of the department, as well as on future plans for our education and research program.

We continue our mission of providing world class patient care, outstanding resident, fellow and medical student education, as well as focused research related to children's orthopedic conditions. As

we expand, this mission includes the education and development of nurse practitioners and physician assistants who are dedicated to the field of children's orthopedics and who also are becoming involved in education and research.

Activities

Many traditions remain, however we continue to have transition and evolution. We are experiencing a growing group of orthopedic residents who choose a fellowship in children's orthopedics, thus our program continues to be highly competitive for filling fellowship positions. Having outstanding applicants assures us an ideal environment for patient care as well as education and research.

Four current fellows will complete their fellowship year at the end of July, 2008, with four new fellows beginning on August 1 (all are featured later in this newsletter). The group of four 2009/2010 fellows has already been selected in a com-

petitive interview process.

The residency program continues and includes residents from the University of California-San Diego, the San Diego Naval Training Center, and the Wilford Hall Air Force orthopedic program in San Antonio, Texas. These rotations bring us in contact with the nation's best orthopedic residents who are a pleasure to teach, and who reciprocally receive an ideal education in children's orthopedics, with a focus on both acute and reconstructive orthopedic care.

In addition to fellows and residents, we have an active international fellowship training program and each year have one or two international fellows who study with us.

Our nurse practitioner/physician assistant group continues to grow, allowing us to meet increasing patient care demands, which are significant, considering that we

serve 3.0 million people in San Diego county, with thousands more from Riverside, Orange and Imperial counties who regularly use Children's Hospital-San Diego as their base for orthopedic care. Additionally, we continue to have referrals from throughout the United States and the world who seek orthopedic care in our center.

Staff Addition

2007 brought an addition to our academic orthopedic staff here at Children's Hospital. Dr. Burt Yaszay grew up in Southern California, attending UCSD for undergraduate school, followed by medical school at Stanford and orthopedic residency at the University of Washington. Following a spine fellowship in New York he has joined our academic team with a main focus on scoliosis surgery. He is already actively involved in both the clinical and research aspects of the scoliosis team, directed by Dr. Newton. Additional details regarding Dr. Yaszay are included later in the newsletter.

Research Leadership

Peter Newton continues his outstanding direction of our comprehensive research program, with Tracey Bastrom providing overall administrative leadership. We had a transition of our scientific staff over the last year. Andrew Mahar, director of the orthopedic biomechanics laboratory, left our center to pursue a career with another organization. Andrew has been replaced by Tucker Tomlinson, who had worked with Andrew, and who has the education, experience and skills to provide leadership for our biomechanics research program.

Our research program benefits from the immense legacy of the University of California (UCSD) research philosophy, whose orthopedic efforts, initiated by Dr. Wayne Akeson, continue to guide our intellectual inquiry. The enclosed article on Vid Upasani (orthopedic resident – UCSD – now on two year research rotation in our laboratories) exemplifies this visionary approach. Dr. Steve Garfin, current Chair of Orthopedics at UCSD, continues the tradition.

The result is incredible research interest and productivity. As an example, of the 90 podium presentations at the forthcoming POSNA meeting in Albuquerque, 6 are from our program (more than 5% of all papers). This productivity confirms the wisdom of the San

Diego research philosophy.

Hospital News

Just this year ground breaking was carried out for the new Rady Children's Hospital main patient care building, and we are now experiencing the actual construction of the \$350 million dollar project. This will incorporate inpatient beds and new operating rooms. The project provides a dynamic change and improvement for children's care in Southern California.

National and International Activities

Each of our staff members continues to be active in orthopedic education, teaching and research. Many have had leadership positions in national organizations, including Dr. Peter Newton, Treasurer of the Pediatric Orthopedic Society of North America, Dr. Hank Chambers, President of the American Academy for Cerebral Palsy and Developmental Medicine, and Dr. Scott Mubarak, President of POSNA.

As a result of our academic activities, many of us travel throughout the world to share our knowledge. This information is further detailed in the section "Spreading the Word – Global Outreach".

Summary

The children's orthopedic education and research program at Children's Hospital-San Diego continues its national and international prominence. Our growth requires constant change, and the addition of an entirely new Children's Hospital building should further improve our overall productivity. Also, the region and nation's understanding of the need for further research in all areas of orthopedics assures the continued growth of our research program. We appreciate the support of our growing alumni group and all who are interested in our mission.

Dennis R. Wenger, M.D.

Director,
Pediatric Orthopedic
Training Program
Children's Hospital
San Diego

Clinical Professor of
Orthopedic Surgery
UCSD





New Orthopedic Staff



Burt Yaszay, M.D.

We welcome our newest orthopedic staff member, Dr. Burt Yaszay, who has returned to San Diego where he previously received his undergraduate degree (UCSD). Following college, Burt began his journey up the west coast, earning his medical degree from Stanford University, followed by orthopedic residency training at the University of Washington and Children's Hospital of Seattle. This was followed by a pediatric and adult spine fellowship at New York University/Hospital for Joint Diseases.

Dr. Yaszay was recruited to focus on the pediatric spine and research. In addition to scoliosis, he plans to build a practice that will manage all pathologies of the pediatric spine: cervical instability, trauma, tumor, and infection. He will also participate in fellow and resi-

dent education. While building his spine practice, Dr. Yaszay has been active in the management of pediatric trauma. He is also devoted to better understanding the treatment of scoliosis, and has already received a grant to build a database at Children's Hospital-San Diego that will produce an outcome tool for scoliosis secondary to cerebral palsy.

Dr. Yaszay comes to San Diego with his wife, Susan, and young daughter, Brianna, who are all excited with the move. He grew up in Orange County, where his parents continue to live, while Susan's family lives in San Diego and El Centro. The entire family now has the opportunity to watch and raise Brianna. In moving to San Diego, Dr. Yaszay has fulfilled a promise he made to his wife ten years ago.



Burt, Susan and Brianna Yaszay

Connections – Images from the Orthopedic Program

(also see page 24)



“Southern California suits me just fine”
Francois Lalonde (Orange Co.-prior fellow), Tamir Bloom (Newark-prior fellow) and Ryan Goodwin (Cleveland-prior fellow) - POSNA – Miami – 2007



“Well, that’s amazing”
Kevin Shea (Boise - prior fellow) and Jill Chambers – POSNA – Miami – 2007



“This is how I get the spine really straight”
Peter Newton (San Diego) and Todd Ritzman (Akron – prior fellow)
POSNA – Miami – 2007



Discussing the “old times”
Scott Beck (Chicago-prior fellow) and Dennis Wenger – (San Diego)
POSNA – Miami – 2007



“So tell us about academics in the eastern Mediterranean”
Muharrem Inan (Turkey – prior fellow), Lisa Crabb Wallace and Peter Newton (San Diego) POSNA – Miami – 2007



Valerie and Dr. Alain DiMeglio (Montpellier, FR) – Sandy and Dr. Scott Mubarak – visit to Children’s Orthopedic Dept, Univ. of Montpellier Medical School – Montpellier, FR – April 2007



“Team Leaders – RCHSD”
Rhonda Sparr-Perkins (director of ortho-rehab) and Lisa Crabb Wallace (ortho fellowship coordinator)
POSNA – Miami – 2007

New Construction at Rady Children's Hospital - San Diego

Rady Children's Hospital is planning for the future with a new 279,000 square foot Patient Care Pavilion. The \$350 million Pavilion will include 16 new state-of-the-art operating rooms, with the latest technology to conduct pediatric surgeries. The facility will also have 72 new private patient rooms, outfitted with fold-out sofa beds, Internet connections, and other amenities that will allow parents to be closer to their children. The Patient Care Pavilion, due to be completed in 2010, will be environmentally friendly with "green" technology and will be one of the only Leadership in Energy and Environmental Design (LEED) certified hospital buildings in California.

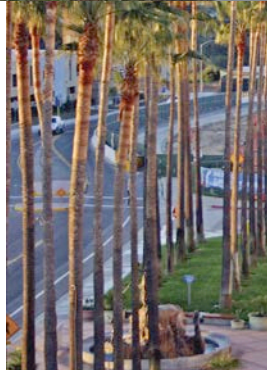


Current Rady Children's Hospital - San Diego



The new parking garage was opened in Dec 2007 and provided many new and larger spaces (view to south from orthopedic office).

"They're digging and construction is underway"
March 2008 (view to south from orthopedic office)



Architects projection - New Rady Children's Hospital - San Diego
(to open mid 2010)



Notes from the Research Team

Tracy Bastrom

This past year has been one of great success. We managed to surpass our 2006 publication rate with 30 manuscripts printed in peer-reviewed journals. Our 2006-2007 fellows were extremely active, and many of their studies will be featured at this year's POSNA meeting.

Tamir Bloom worked closely with the Orthopedic Biomechanics Research Center and Dr. Newton in evaluating the effects of pin configuration on supracondylar humerus stability when the fracture was slightly malreduced. The results were presented in e-poster form at POSNA 2007 in Florida, and were recently presented as a podium talk at the AAOS meeting in San Francisco, with manuscript accepted by JPO.

Christine Caltoun worked with Drs. Wenger and Pring on a study evaluating the outcome of triple innominate osteotomy for Legg-Calve-Perthes disease. The analysis focused on the influence of age at surgery and lateral pillar grade on patient outcome as defined by Stulburg classification. Christine will be presenting this study at the POSNA meeting in Albuquerque this year. She also worked with Dr. Newton and our research resident, Vidyahdar Upasani, on two spine projects, both of which have been accepted for publication in Spine.

Todd Ritzman's interest was in pediatric spine deformity, which resulted in 3 successful projects with Dr. Newton. Two of the studies utilized the adolescent idiopathic scoliosis database of the Harms Study group, and both of these projects will be presented at POSNA in Albuquerque. Todd also initiated and completed a study with Dr. Newton's guidance which looked at the anatomic parameters of the iliac column in cerebral palsy patients with scoliosis to identify the safest screw size for use in iliac bolt fixation. For more information on this study, check out the e-poster in Albuquerque.

Current Fellows (2007-2008)

Our current fellows are focused on preparing for our Visiting Professor. I've really enjoyed working with this group and look forward to reporting on their studies in next year's newsletter.

Team

This past year was also one of great change. In December both Jeff Pawelek and Andrew Mahar announced that they were moving on to new positions. While we lost 2 great colleagues and good friends, change brings opportunity.

Valerie Ugrinow accepted the challenge of supporting our many ongoing prospective spine research studies. We hired an additional research associate, Molly Moor, to support fellow and resident research. Reid Chambers is filling a dual role of assisting Christy with Elliot Field and also aiding our clinical research efforts. We still work "closely" with Michelle Marks via her office in Tucson, since both Maty Petcharaporn and I have roles in helping her and Dr. Newton with the Harms Study Group.

I hope this newsletter finds you all well, and I'm looking forward to catching up with many of you in New Mexico!

Tracey Bastrom, MA
Orthopedic Research Program Manager



Orthopedic Research Team

Orthopedic Biomechanics Research Center

Tucker Tomlinson



The Orthopedic Biomechanics Research Center (OBRC) at the Rady Children's Hospital – San Diego was founded in November of 1998 with an initial research focus towards adolescent idiopathic scoliosis. With the approach of the 10th anniversary of the OBRC's founding the facility has grown in capabilities and scope of work, expanding to encompass work in all areas of spinal deformity and trauma as well, expanding into other areas of orthopedics such as hip and knee pathologies as well as sports medicine.

Research Focus

While adolescent spinal deformity remains the major focus of the Center, with projects ranging from the characterization of spine mechanics to the material properties of implant systems the OBRC continues to foster connections with local surgeons to support their research needs. Currently the OBRC has collaborative work in progress with the Department of Orthopedic surgery at the University of California – San Diego, and the Navy Medical center at Balboa Park.

Staffing

Andrew Mahar, who has served as the OBRC's director since the early days of the facility, resigned at the beginning of this year to pursue a career in industry. Andrew's efforts were instrumental in building the lab into the capable center that it has become, and we wish him the best of luck with his career. The OBRC is currently staffed by two full time engineers, as well as three engineering interns, who will continue to build upon the OBRC's past history of research excellence. The OBRC staff works closely with orthopedic surgeons, residents, fellows and medical students to ensure high standards of clinical relevance and quality in research.

Publications

Teaming engineers and clinicians has and continues to yield great success in publishing. The OBRC continues to actively pursue the publication of manuscripts

based on original research with such journals as Spine, Journal of Pediatric Orthopedics, Clinical Orthopedics and Related Research, and the American Journal of Sports Medicine.

Industry Relations

The reputation of the OBRC for quality research continues to attract the interest of the medical device industry. This has led to collaborations with such entities as Alphatec Spine, DePuy Spine, Integra Life Sciences, KFx Medical, Medtronic Sofmor Danek, Stryker Medical, VQ Orthocare, and Zimmer. The OBRC continues to serve as an objective center for the rigorous evaluation of current medical devices in all fields of orthopedics.

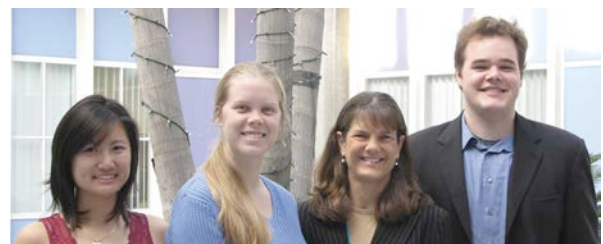
New Interests

The OBRC is constantly pursuing new avenues of research. One current area of interest is investigating the mechanical properties of new metal rods used for spinal fusion. We hope that a thorough exploration of the new metals will allow clinicians to make more informed choices in the spinal implants that they select.

The future of the OBRC appears to be strong as we continue our focused mission of being a center for quality mechanical research in orthopedic applications.

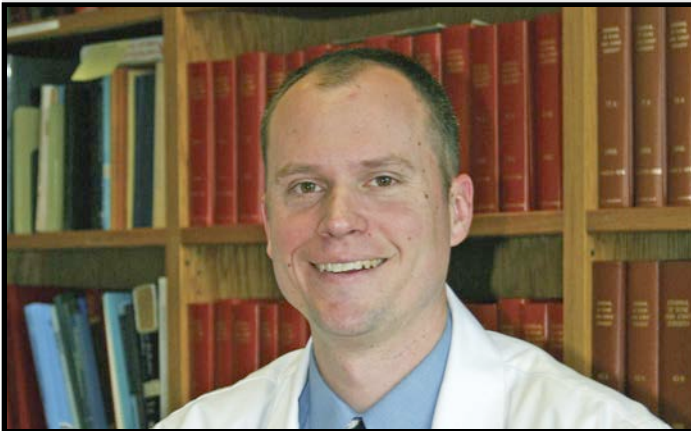
Tucker Tomlinson, M.S.

Biomechanical Engineer, Laboratory Manager



Biomechanics Research Team (left to Right)
Deborah Lee, BS; Claire Robertson, BS; Christy Farnsworth, MS; Tucker Tomlinson, MS

Current Fellows - Children's Hospital-San Diego



Eric W. Edmonds, M.D.

Eric, a native of Fresno, California, attended Johns Hopkins for his undergraduate education. He returned to California for medical school at UC Davis, followed by orthopedic residency at the Carolinas Medical Center in Charlotte, North Carolina. Eric has a broad interest in all of children's orthopedics, with a special focus on sports medicine.

Patrick C. Henderson, M.D.

Pat was born in Laguna Beach, California, and received his undergraduate degree from Stanford University. He attended UCSD medical school, where we came to know him during his clerkship here at Children's. He took his orthopedic residency at the University of Arizona in Tucson. His research interests include hip disorders in childhood.



Daniel Figueiredo, M.D.

Daniel is from Mato Grosso do Sul, Brazil, and is spending this year performing research in cerebral palsy with Dr. Hank Chambers. He completed his orthopedic residency training at the University of Mato Grosso do Sul in Campo Grande, Brazil, and did his fellowship with Dr. Luiz Cunha in Curitiba. Daniel plans to return to Brazil at the end of his fellowship to continue his career in pediatric orthopedics in Campo Grande.

Current Fellows - Children's Hospital-San Diego



John A. Schlechter, D.O.

Born in New Hyde Park, New York, John received his B.S. in microbiology from Arizona State University, and then returned to New York where he received his D.O. from the College of Osteopathic Medicine. John completed his orthopedic residency at the Riverside County Regional Medical Center, and was directed to our fellowship by Dr. Scott Nelson, one of our prior fellows. He has a strong interest in international orthopedics, inspired by Dr. Scott Nelson in the Dominican Republic.

Vineeta T. Swaroop, M.D.

Vineeta, a native of Illinois, completed her undergraduate education at Duke University and received her medical degree from Georgetown University. She took her orthopedic residency at Northwestern University in Chicago. Vineeta has an interest in all of children's orthopedics with a special interest in cerebral palsy. She will return to Chicago to an academic position that includes working at both Children's Memorial Hospital and the Rehabilitation Institute of Chicago.

Fellowship Life



Vineeta Swaroop (Chicago - current fellow) and Chris Jaeger (Chicago) - Fellows' welcome party - August 2007



Scott Mubarak (San Diego), John Schlechter (current fellow) and wife Beth - Fellows' welcome party - August 2007



Todd Ritzman (fellow) and Peter Newton at 2007 fellow graduation

Arriving Fellows

(2008/2009)



Humberto Guzman, M.D.
University of Puerto Rico
San Juan, Puerto Rico



Meghan Imrie, M.D.
Stanford University
Stanford, California



Jun Takahashi, M.D., Ph.D.
Shinshu University
Matsumoto, Japan
(International Fellow)



Abigail Lynn, M.D.
Emory University
Atlanta, Georgia



Alison Rozansky, M.D.
Akron General Medical Center
Akron, Ohio



Enbo Wang, M.D.
China Medical University
Shengyang City, China
(International Fellow)

Future Fellows (2009/2010 Academic Year)

Robert Cho, M.D.
Drexel/Hahnemann, Philadelphia

George Gantsoudes, M.D.
Mt. Sinai School of Medicine, NY

Robert Lark, M.D.
Duke University, Durham

Raymond Liu, M.D.
Case Western Reserve, Cleveland



Notes from a Former Fellow

Karl Rathjen, M.D.

Texas Scottish Rite Hospital

Children's Medical Center Dallas

University of Texas Southwestern Medical School

As I reflect on the course of my seemingly brief career there is no question that my year at Children's Hospital San Diego was one of the "keystones". I arrived in 1995, after completing medical school and residency at UT Southwestern in Dallas. It was clearly time for my horizons to be broadened and San Diego proved to be the perfect location for this to happen.

The commitment to patient care, research and education that I was exposed to in San Diego has served as the foundation for the development of my practice. During my fellowship the faculty included Scott Mubarak, Dennis Wenger, Hank Chambers, Peter Newton and Doug Wallace (fresh out of fellowship). All five truly led by example, displaying both a commitment to excellent patient care as well as a global approach to education that included quality research supported by remarkably strong ancillary staff. I was fortunate enough to share my fellowship experiences with two wonderful physicians: Marc Cardelia from Robert Wood Johnson Medical College (now in Norfolk, Virginia) and Chris Comstock from Stanford (now in Corpus Christi, Texas). There is no doubt in my mind that the San Diego program's ability to recruit a strong fellowship class adds considerably to the experience. I consider all seven of these surgeons colleagues and friends, and visiting with them is a highlight of every academic meeting.

Personally, our year in San Diego was truly unforgettable. My wife and I both come from large families in Dallas, so our time in San Diego represented the first opportunity we had to establish ourselves (with our

first "child", a three year old Labrador Retriever) as a nuclear family. This task was made easier by the warmth with which the staff and their families embraced us. To this day we often reflect on what a special time this was in our lives.

I left San Diego to return to the program where I trained. Texas Scottish Rite Hospital (TSRH) is a specialty hospital which only provides pediatric orthopaedic inpatient care. It is closely affiliated with UT Southwestern, which also has a relationship with Children's Medical Center (CMC) a full service pediatric hospital. When I returned to Dallas, CMC was just opening an emergency room and hoped to become a Level I trauma center. Obviously, this would require pediatric orthopaedic coverage. I was assigned the task of melding the expertise at TSRH with the growing need at CMC, which had traditionally been staffed by the adult traumatologist from the county hospital. This experience has been both challenging and educational. Through UT Southwestern we have added five additional pediatric orthopaedists (including San Diego alumnus Phil Wilson) who practice full time at CMC Dallas where I now serve as the Chief of the Orthopaedic Service - although my clinical practice remains at TSRH.

My experience as a Pediatric Orthopaedic Fellow at Children's Hospital San Diego remains one of the strongest influences in my professional life. I do not think a week goes by when I do not relay some aspect of my "San Diego experience" to one of our resident or fellows...and it is always with a smile.

Complex Cases at Rady Children's Hospital - San Diego

Development of New Surgical Methods

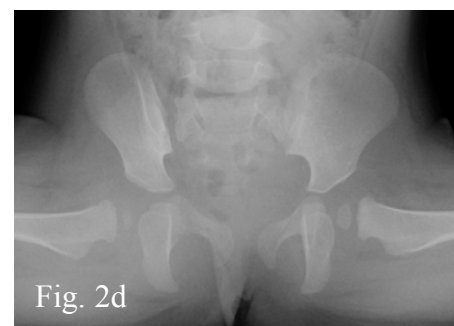
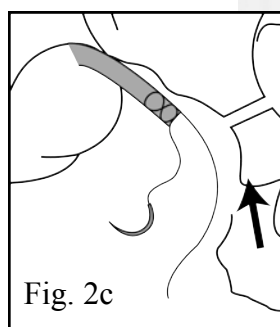
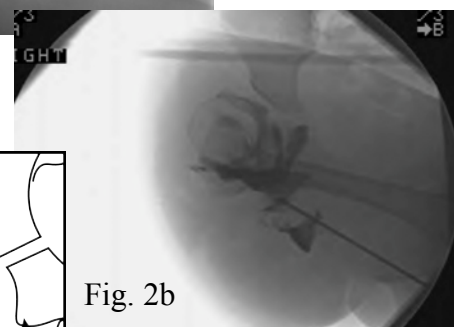
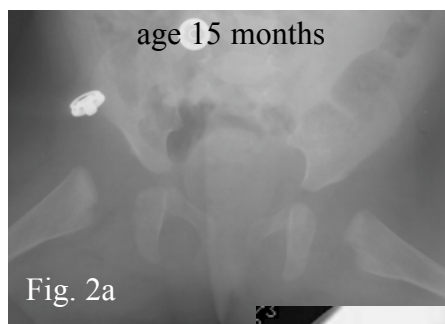
Children's Hospital-San Diego has a strong history of biomechanical research, as well as the development of new implants and methodology, to treat children's hip disorders. An example is our development of a surgical procedure to maintain the ligamentum teres, an important ligament within the hip joint, to assure successful reduction in children with complex developmental dislocation of the hip.

Our study began in the biomechanics laboratory, where Drs. Miyanji, Wenger and colleagues developed methods for testing and understanding the strength of the ligamentum teres (Fig 1). This knowledge was then transferred to the clinical environment. The clinical problem that required better solutions was that of children who had early surgical open reduction but then had early re-dislocation in their hip spica cast, a difficult circumstance both for the family and the treating surgeon.



A child who benefited from the new surgical method is illustrated here. This 15 month old child had hip dysplasia on the left and complete dislocation of the hip on the right. Prior attempts to treat with a Pavlik harness and abduction brace had failed. It was felt that even at age 15 months, the best procedure for the right hip would be an open reduction via a medial Ludloff approach.

Following an intra-operative arthrogram of the hip, a Ludloff open reduction of the right hip was performed, including ligamentum teres shortening and transfer to stabilize the hip. Follow-up radiographs demonstrate the secure reduction that was gained (Fig 2).



This procedure has been applied in more than 30 hips at Children’s Hospital-San Diego and is the subject of a scientific paper that will be presented as the lead-off paper at the Pediatric Orthopedic Society of North America meeting in Albuquerque in early May, 2008.

The attached drawings clarify the method we have developed for both the Ludloff approach plus ligamentum teres transfer (Fig 3) as well as the more complex maintenance of the ligamentum teres with anterior open reduction, which includes a separate medial incision and use of a suture anchor to shorten and maintain the ligament as a stabilizer (Fig 4).

This case exemplifies how our biomechanics laboratory, research center, and clinical program continue to develop methods that improve the predictability of orthopedic care for children.

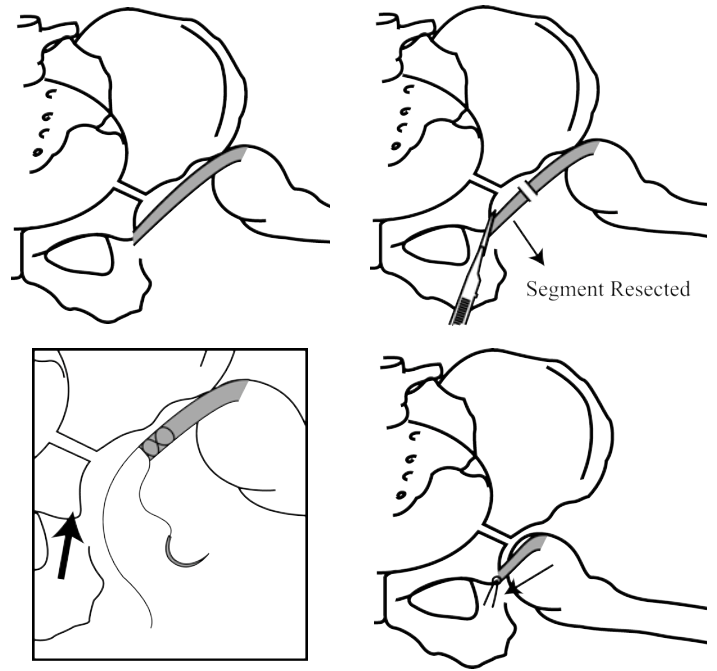


Fig. 3

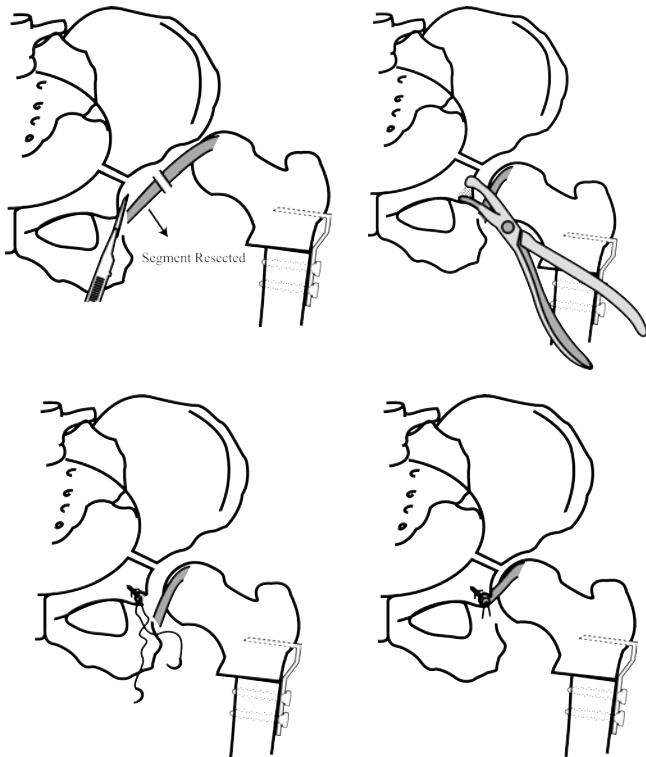


Fig. 4



Rady Children’s Hospital San Diego

The surest way to corrupt a young man is to teach him to esteem more highly those who think alike than those who think differently. – NIETZSCHE



University of California – San Diego



UCSD Orthopedic Surgery and the Development of Clinician-Scientists

Vid Upasani, M.D.

The UCSD Orthopedic Surgery department has a rich tradition of training its residents to develop an interest in clinical and basic science orthopedic research. Since 1974 the UCSD orthopedic program has had a special requirement of a one-year research fellowship to be completed after the general surgery internship year. During this year, residents learn basic research techniques, how to critically analyze and evaluate scientific articles, and how to apply statistical methods to design and develop project ideas. This program was initiated by the fabled founder of the UCSD orthopedic department, Dr. Wayne Akeson and enthusiastically perpetuated by our current chair Dr. Steve Garfin.

In addition, our program also has the option of a two-year post-doctoral research fellowship program supported by the NIH. This opportunity provides residents who are interested in pursuing a career in academic medicine to spend additional time in the laboratory.

In June 2008, Vid Upasani will complete his second year of research in pediatric orthopedics and scoliosis under Peter Newton at Rady Children's Hospital San Diego. Over the past two years he has been involved in a variety of projects, including spinal deformity research in an in vivo pig model, biomechanical assessment of spinal and hip instrumentation, clinical outcomes research in adolescent idiopathic scoliosis, and a diagnostic assessment of calcaneonavicular coalitions using 3-dimensional computed tomography.

Vid will have co-authored more than 15 peer-reviewed manuscripts, as well as multiple book chapters, review articles, and research grants. He received funding support from the Orthopedic Research and Education Foundation and the Scoliosis Research Society and has been recognized by the Western Orthopedic

Association, the California Orthopedic Association and the American Academy of Pediatrics for his research presentations.



Working in the Biomechanics Lab



Participating in WOA evening event
(2007 Visiting Professor)

Lena Sefton Clark Endowed Fellowship in Pediatric Orthopedics



Dr. Swaroop accepting the Lena Sefton Clark symbolic “white coat” from Kathleen Sellick, CEO of RCHSD.

Early in 2008, the Rady Children’s Hospital Foundation announced a new sponsorship of the widely recognized children’s orthopedic fellowship at Children’s Hospital – San Diego. Mrs Mary Sefton Clark, originally from Columbus Georgia and now from San Diego made the decision to provide funding for the Lena Sefton Clark Endowed Fellowship in Pediatric Orthopedics to honor her mother. Dr. Vineeta Swaroop, one of our current fellows, was selected to be the first Lena Sefton Clark Fellow.

A presentation program was held in the motion analysis lab conference center with Mrs. Clark in attendance. A new tradition of providing a special white coat for the Lena Sefton Clark Fellow was introduced at the conference, and was presented to Dr. Swaroop, who then gave her paper on the pre and post office ultrasound approach to DDH at Children’s Hospital-San Diego. This paper will also be on the POSNA program in Albuquerque

Of particular interest, we learned that Mrs. Mary Clark had lived in Columbus, Georgia, for much of her life, and that her best friends included Dr. and Mrs. Jack Hughston. Dr Hughston is one of the founders of sports medicine in North America. Mrs Clark’s life-long friendship with the Hughstons (she always stays at the Hughston house on her visits to Columbus, GA) made the award ceremony a special orthopedic event.

Mrs. Clark had a special interest in Dr. Wenger’s presentation on the evolution of Children’s orthopedics, with a special focus on the handicapped child. Mrs. Clark’s accurate understanding of the polio era made the program even more poignant.

We look forward to working with the Clark family in making the fellowship in children’s orthopedics an even more valuable experience.



Mrs. Clark (left) receives the “chair” earned by her gift to our program. Presented by Mr. Charles Day, Senior Managing Director for Major and Planned Gifts. Enjoying the event was Lenita van der Werff, Mrs. Clark’s daughter.



34th Annual David H. Sutherland Visiting Professorship

Professor H. Kerr Graham Royal Children's Hospital-Melbourne

Our David H. Sutherland Visiting Professor in 2007 was Professor Kerr Graham, of Melbourne, Australia. Dr. Graham is the University Professor of Orthopaedic Surgery, University of Melbourne, and Director of the Hugh Williamson Gait Laboratory at The Royal Children's Hospital in Melbourne. His clinical and research interests are in neuromuscular disease, particularly cerebral palsy.

Professor Graham was recruited by The Royal Children's Hospital in Melbourne to design and commission the first gait laboratory affiliated with a major children's hospital in Australia. The Hugh Williamson Gait Laboratory opened in 1994 and has since been awarded the status of a "Clinical Centre of Research

Excellence" by the National Health and Medical Research Council of Australia, in conjunction with a network of three other gait laboratories in Melbourne. Dr. Graham's research team was awarded the Richmond prize from the American Academy of Cerebral Palsy and Developmental Medicine in 1993 and 1995. In 2001 he was awarded the John Mitchell Crouch Fellowship, the highest research award from the Royal Australasian College of Surgeons.

Dr. Graham brought a definite international flavour to our meeting, and entertained us at the WOA dinner with his wonderful talk and slide show describing the difference between life in his native Ireland and his current career in Australia.



Professor Kerr Graham and Orthopedic Staff – May 2007

Visiting Professor - 2007



Prof. Kerr Graham and fellows



Lisa Miller (San Diego) Bill Oppenheim (UCLA) and Hank Chambers (RCHSD) at 2007 Visiting Professorship



Dennis Wenger and Kerr Graham enjoy the orthopedic discourse



Rhonda Sparr-Perkins – Director of Ortho-Rehab, Doug Wallace – Director of Orthopedic Trauma, and Christine Caltoun – Fellow



Dennis Wenger, Kerr Graham and Steve Garfin (Chair of Orthopedics – UCSD) at Western Orthopedic Association Meeting – 2007 Visiting Professorship



Rady Children's Hospital Orthopedic Physician Assistant/Nurse Practitioner Group – 2007 Visiting Professorship

Documentation (Our Publications)

Our progress as a center directed to the future mandates both research and publications that document our work. We continue as one of the top children's hospitals in the world for publications in the orthopedic literature.



Mehlman CT, Wenger DR: The top 25 at 25: Citation classics in the Journal of Pediatric Orthopaedics. J Pediatr Orthop. 2006 Sep-Oct;26(5):691-4.

An important event in the modern history of pediatric orthopaedics was the establishment of a journal dedicated to the subspecialty in 1981. Twenty-five years' worth of articles within the Journal of Pediatric Orthopaedics was subjected to citation analysis with the intention of identifying the 25 most frequently cited articles. The most common study design was retrospective in nature, and the most common subject matter was cerebral palsy and trauma-related topics.

Wenger DR, Kishan S, Pring ME. Impingement and childhood hip disease. J Pediatr Orthop B. 2006 Jul;15(4):233-43. Review.

Hip impingement is now recognized as a relatively common cause for hip pain in young adults. The early evolution of impingement begins in childhood in several common hip disorders (slipped capital femoral epiphysis, Perthes, early avascular necrosis due to other causes). Recognition and treatment of childhood impingement may prevent the evolution to early hip arthritis.

Mubarak SJ, Frick S, Sink E, Rathjen K, Noonan KJ. Volkmann contracture and compartment syndromes after femur fractures in children treated with 90/90 spica casts. J Pediatr Orthop. 2006 Sep-Oct;26(5):567-72

Nine pediatric patients (mean age 3.5 yrs) with low energy femur fractures were treated with 90/90 spica casts and developed leg compartment syndromes, Volkmann contracture, and ankle skin loss. These cases are detailed and a proposed mechanism leading to this devastating complication is explained.

Rohmiller MT, Gaynor TP, Pawelek J, Mubarak SJ. Salter-Harris I and II fractures of the distal tibia: does mechanism of injury relate to premature physal closure? J Pediatr Orthop. 2006 May-Jun;26(3):322-8.

The distal tibial physis is the second most commonly injured physis in long bones. Recent reports demonstrate a high rate of premature physal closure (PPC) in Salter-Harris (SH) type I or II fractures of the distal tibia. We report a PPC rate of

39.6% in SH type I or II fractures of the distal tibial physis. Operative treatment may decrease the frequency of PPC in some fractures. Regardless of treatment method, we recommend anatomic reduction to decrease the risk of PPC

Varni JW, Burwinkle TM, Berrin SJ, Sherman SA, Artavia K, Malcarne VL, Chambers HG. The PedsQL in pediatric cerebral palsy: reliability, validity, and sensitivity of the Generic Core Scales and Cerebral Palsy Module. Dev Med Child Neurol. 2006 Jun;48(6):442-9.

This investigation determined the measurement properties of the Pediatric Quality of Life Inventory (PedsQL) 3.0 Cerebral Palsy (CP) Module. PedsQL 4.0 Generic Core Scales and 3.0 CP Module in 245 families. The PedsQL 4.0 distinguished between healthy children and children with CP. Construct validity of the CP Module was supported. Sensitivity of the PedsQL was demonstrated among children with different diagnostic categories and gross motor function.

Mahar AT, Brown DS, Oka RS, Newton PO. Biomechanics of cantilever "plow" during anterior thoracic scoliosis correction. Spine J. 2006 Sep-Oct;6(5):572-6. Epub 2006 Jul 24.

Anterior instrumentation is often used for correction of thoracic scoliosis. Loss of spinal correction may occur after failure at the bone-implant interface, and forces on the bone-implant interface during scoliosis correction remain unclear. CONCLUSIONS: The 280% increase in cadaveric failure loads when a staple was added in the unconstrained testing method exceeds previous reports. Supplemental vertebral body staples may be clinically indicated, particularly at the ends of the construct where residual deforming forces remain the greatest.

Moroz LA, Launay F, Kocher MS, Newton PO, Frick SL, Sponseller PD, Flynn JM. Titanium elastic nailing of fractures of the femur in children. Predictors of complications and poor outcome. J Bone Joint Surg Br. 2006 Oct;88(10):1361-6.

Between 1996 and 2003 six institutions in the United States and France contributed a consecutive series of 234 fractures of the femur in 229 children which were treated by titanium elastic nailing. Minor or major complications occurred in 80 frac-

tures. There was a statistically significant relationship ($p = 0.003$) between age and outcome, and the odds ratio for poor outcome was 3.86 for children aged 11 years and older compared with those below this age. A poor outcome was five times more likely in children who weighed more than 49 kg.

Goodwin RC, Mahar A, Wedemeyer M, Wenger D: Abductor Length Alterations in Hips with SCFE Deformity. Clin Orthop Relat Res Jan; 454:163-168, 2007.

Proximal femoral osteotomy may improve clinical outcomes in patients with residual deformity after slipped capital femoral epiphysis. We hypothesized that abductor lengths would be shorter in patients with slipped capital femoral epiphysis compared with normal controls, and a femoral neck base osteotomy would create more normal abductor lengths than an osteotomy performed below the greater trochanter. Abductor muscle lengths were measured in normal, mild, and severe slipped capital femoral epiphyses sawbone models and after two methods of surgical correction. The femoral neck base osteotomy restored the hip abductor relationship better than an osteotomy performed below the greater trochanter.

Jouve JL, Kohler R, Mubarak SJ, Nelson SC, Dohin B, Bollini G. Focal fibrocartilaginous dysplasia ("fibrous periosteal inclusion"): an additional series of eleven cases and literature review. J Pediatr Orthop. 2007 Jan-Feb;27(1):75-84. Review.

Focal fibrocartilaginous dysplasia (FFCD) is a benign condition first described in 1985 as a cause of tibia vara. We are reporting on 11 cases. We believe that this entity represents a bony anchor preventing natural sliding of the periosteum during growth (an "epiphysiodesis-like" effect). We are suggesting that this entity be called a "fibrous periosteal inclusion." Treatment indications result from this concept: (1) for tibial lesions with a metaphyseal-diaphyseal angle less than 20 degrees observation for 6 to 12 months; (2) if the deformity improves, the tether likely broke spontaneously, and no treatment is required; and (3) early curettage if the deformity worsens.

Aguinaldo AL, Buttermore J, Chambers H. Effects of upper trunk rotation on shoulder joint torque among baseball pitchers of various levels. J Appl Biomech. 2007 Feb;23(1):42-51.

High rotational torques during baseball pitching are believed to be linked to most overuse injuries at the shoulder. This study investigated the effects of trunk rotation on shoulder rotational torques during pitching. Results suggest that a specific pattern in throwing can be utilized to increase the efficiency of the pitch, which would allow a player to improve performance with decreased risk of overuse injury.

Kishan S, Bastrom T, Betz RR, Lenke LG, Lowe TG, Clements D, D'Andrea L, Sucato DJ, Newton PO. Thoracoscopic scoliosis surgery affects pulmonary function less than thoracotomy at 2 years post-surgery. Spine. 2007 Feb 15;32(4):453-8.

Prospective evaluation of pulmonary function before and 2 years after surgery following anterior scoliosis instrumentation. RESULTS: Thoracoscopic instrumentation affected pulmonary function 2 years after surgery minimally. This is in contrast to the patients treated with a thoracotomy, who had a greater

persistent reduction in PFTs at follow-up.

Marks M, Petcharaporn M, Betz RR, Clements D, Lenke L, Newton PO. Outcomes of surgical treatment Spine. 2007 Mar 1;32(5):544-9.

This research was part of a multi-center study of the surgical treatment of adolescent idiopathic scoliosis (AIS). We compared the radiographic and perioperative surgical treatment outcomes of male AIS patients with female AIS patients. The data for 547 (449 females and 98 males) patients were included in this analysis. CONCLUSION: Male AIS patients had slightly more rigid primary curves compared to females but a similar degree of postoperative scoliosis correction. The results were comparable between the genders.

Berrin SJ, Malcarne VL, Varni JW, Burwinkle TM, Sherman SA, Artavia K, Chambers HG. Pain, fatigue, and school functioning in children with cerebral palsy: a patho-analytic model. J Pediatr Psychol. 2007 Apr;32(3):330-7.

This study tests a model of how pain and fatigue, independently or in combination, relate to school functioning in pediatric cerebral palsy (CP). METHODS: One hundred eighty-nine parents of children with CP completed the Pediatric Quality of Life Inventory (PedsQL) 4.0 Generic Core Scales and the PedsQL 3.0 Cerebral Palsy Module. CONCLUSIONS: Pain and fatigue represent potentially modifiable targets for interventions designed to improve school functioning in children with CP.

Goodwin RC, Mahar AT, Oswald TS, Wenger DR. Screw head impingement after in situ fixation in moderate and severe slipped capital femoral epiphysis. J Pediatr Orthop. 2007 Apr-May; 27(3):319-25.

In situ stabilization remains the standard of care in the treatment of stable slipped capital femoral epiphysis (SCFE). A prominent screw head may produce femoral acetabular impingement and pain after in situ fixation in severe SCFE. We performed a biomechanical study to establish whether screw head impingement occurs after in situ fixation of SCFE and to define the anatomy of slip severity and screw head position that may lead to impingement. Screw head impingement occurred with in situ fixation perpendicular to the physis in simulated moderate and severe SCFEs. Alternative in situ fixation techniques may decrease the rate of screw head impingement in moderate and severe SCFEs.

Adameczyk MJ, Odell T, Oka R, Mahar AT, Pring ME, Lalonde FD, Wenger DR: Biomechanical stability of bioabsorbable screws for fixation of acetabular osteotomies. J Pediatr Orthop. 2007. Apr-May; 27(3): 314-318.

The purpose of this study was to compare the biomechanical stability of triple innominate osteotomies fixed with either bioabsorbable or stainless steel screws. Triple innominate osteotomies were performed on composite hemipelvises and fixed with either three 4.5-mm bioabsorbable screws or three stainless steel 4.5-mm screws. Bioabsorbable screws demonstrate comparable biomechanical stability to stainless steel screws in anatomical and spica positions at physiological loads.

Upasani VV, Tis J, Bastrom T, Pawelek J, Marks M, Lonner B, Crawford A, Newton PO. Analysis of sagittal alignment in

thoracic and thoracolumbar curves in adolescent idiopathic scoliosis: how do these two curve types differ? *Spine*. 2007 May 20;32(12):1355-9.

Relative anterior overgrowth has been suggested as the possible patho-mechanism behind thoracic scoliosis. The authors postulate that pelvic incidence may influence the location of vertebral column collapse associated with different AIS curve types. Pelvic incidence was significantly greater in both groups of AIS patients compared with normal adolescents. **CONCLUSION:** An increased pelvic incidence, associated with both thoracic and thoracolumbar curves when compared with the normal adolescent population, does not appear to be the potential determinant of the development of thoracic versus thoracolumbar scoliosis, but may be a risk factor for the development of adolescent idiopathic scoliosis.

Bode KS, Newton PO. Pediatric non-accidental trauma thoracolumbar fracture-dislocation: posterior spinal fusion with pedicle screw fixation in an 8-month-old boy. *Spine*. 2007 Jun 15;32(14):E388-93.

Case report of pedicle screw fixation in an infant with non-accidental spine trauma. **CONCLUSIONS:** Pedicle screw fixation can be used in infants with unstable traumatic spinal injuries, allowing earlier rehabilitation and return to normal activity level.

Van Valin SE, Wenger DR: Value of the False-Profile View to Identify Screw-tip Position During Treatment of Slipped Capital Femoral Epiphysis. *JBJS 89-A (3):643-648, 2007.*

Despite extensive teaching and better imaging methods, it is still possible to end up with the screw tips in the hip joint after pinning for SCFE. This case report demonstrates the difficulty in interpreting plain films and also demonstrates the benefit of the false profile view as a further adjunct for post-operative study in a patient who continues to have hip pain and stiffness despite pinning.

Wenger D, Miyanji F, Mahar A, Oka R. The Mechanical Properties of the Ligamentum Teres: A Pilot Study to Assess Its Potential for Improving Stability in Children's Hip Surgery. *J Pediatr Orthop*. 2007 Jun;27(4):408-410.

Although excision is the current standard in treating complete developmental hip dysplasia, we developed an interest in maintaining, shortening, and reattaching the ligament to assure early postoperative stability in developmental hip dysplasia. To analyze its potential for providing hip joint stability, we investigated the biomechanical properties of the ligamentum teres in an in vitro porcine model. In the setting of dysplasia, preservation and transfer of the ligamentum teres should be considered as an adjunct to open reduction.

Wenger, DR: Spine Surgery at a Crossroads. *SPINE Vol 32(20) pp:2158-2165, 2007.*

Spine surgery has become a popular fellowship selection for orthopedic residents. This paper (summarizing points made at the Presidential Guest Lecture of the Scoliosis Research Society Meeting – 2007) presents the ethical, cultural, and economic issues of choosing a career in spine surgery.

Goodwin R, Mahar AT, Oka R, Steinman S, Newton PO.

Biomechanical evaluation of retrograde intramedullary stabilization for femoral fractures: the effect of fracture level. *J Pediatr Orthop*. 2007 Dec;27(8):873-6.

Retrograde stabilization of mid-diaphysis adolescent femur fractures has shown excellent biomechanical stability. However, it is unclear whether adequate stability is maintained for distal femur fractures using the retrograde approach compared with the clinically recommended antegrade approach. The purpose of this study was to evaluate the biomechanical stability of retrograde and antegrade nailing for mid-diaphyseal and distal diaphysis femoral fractures. **CONCLUSIONS:** For maximum stabilization of a distal femur fracture, c- and s-shaped nails placed in the antegrade position is suggested.

Sanders JO, Harrast JJ, Kuklo TR, Polly DW, Bridwell KH, Diab M, Dormans JP, Drummond DS, Emans JB, Johnston CE 2nd, Lenke LG, McCarthy RE, Newton PO, Richards BS, Sucato DJ; Spinal Deformity Study Group. The Spinal Appearance Questionnaire: results of reliability, validity, and responsiveness testing in patients with idiopathic scoliosis. *Spine*. 2007 Nov 15;32(24):2719-22.

We report the development and testing of the Spinal Appearance Questionnaire (SAQ) for reliability, validity, and responsiveness in patients with idiopathic scoliosis. **CONCLUSION:** The SAQ is reliable, responsive to curve improvement, and shows strong evidence of validity. It provides more detail than the SRS in the appearance domain, and provides explanation of spinal deformity's concerns and improvements.

Upasani VV, Newton PO. Anterior and thoracoscopic scoliosis surgery for idiopathic scoliosis. *Orthop Clin North Am*. 2007 Oct;38(4):531-40.

Surgical management of idiopathic scoliosis is based on the natural history of this spinal disorder and on the likelihood of developing a worsening deformity. Anterior surgical treatments continue to evolve and provides advantages over posterior procedures in specific instances. Although the indications and contraindications for anterior versus posterior surgical intervention (for thoracic and thoracolumbar curve patterns) have been defined to some degree, there remains appropriate flexibility in the decision-making process, allowing the surgeon to make an optimal recommendation for each patient based on surgeon experience and patient needs.

Baitner AC, Perry A, Lalonde FD, Bastrom TP, Pawelek J, Newton PO. The healing forearm fracture: a matched comparison of forearm refractures. *J Pediatr Orthop*. 2007 Oct-Nov;27(7):743-7.

Forearm fractures in children usually heal rapidly after closed treatment. Recent studies report forearm refracture rates of 5%. The purpose of this study was to identify risk factors for refracture based on radiographic variables. **CONCLUSIONS:** Proximal and middle one third forearm fractures are at greater risk of refracture compared with distal one third forearm fractures. There was a trend toward incomplete healing seen more commonly in those that refractured, emphasizing the importance of longer immobilization in these fractures.

Petcharaporn M, Pawelek J, Bastrom T, Lonner B, Newton PO. The relationship between thoracic hyperkyphosis and the

Scoliosis Research Society outcomes instrument. Spine. 2007 Sep 15;32(20):2226-31.

A retrospective chart review and radiographic analysis to evaluate the association between thoracic hyperkyphosis and patient quality of life measures as determined by the Scoliosis Research Society (SRS) outcomes instrument. These findings indicate that higher kyphosis magnitudes were associated with increased pain, lower self-image, and decreased function and activity. Patients with thoracic hyperkyphosis were significantly more symptomatic than normal subjects in all domains.

Newton PO, Perry A, Bastrom TP, Lenke LG, Betz RR, Clements D, D'Andrea L. Predictors of change in postoperative pulmonary function in adolescent idiopathic scoliosis: a

prospective study of 254 patients. Spine. 2007 Aug 1;32(17):1875-82.

A multi-center study of prospectively collected pulmonary function testing and radiographic measures in patients surgically treated for adolescent idiopathic scoliosis (AIS). The objectives of this study were 1) to identify the factors that determine pulmonary function more than 2 years after surgery for AIS; and 2) to determine what factors, if any, can predict an increase or decrease in the percent predicted 2-year pulmonary function. CONCLUSION: Aside from preoperative PFT values, open anterior approaches predict the largest percent of variance in 2-year PFT. Additionally, a clinically significant reduction in the predicted 2-year pulmonary function is more likely when performing a thoracoplasty.

Wedding in the Mountains

Summer of 2007 brought a wonderful event for a prior fellow, Dr. Ernie Sink, who was a fellow in children's orthopedics and scoliosis surgery here at Children's Hospital-San Diego from 1999-2000. Ernie is now a faculty member at the University of Colorado Medical Center Department of Orthopedic Surgery and at the new Children's Hospital in Denver, where he has become a recognized leader in the treatment of hip impingement disorders.

Ernie and Paula Giblin, originally of Atlanta, were married in Vail Valley, Colorado, on Sept 15, 2007.



The "Event" – Vail, CO



Prior fellows, Drs Scher and Sink, Dr. Wenger and the lovely bride



Dr. Wenger and the happy bride and groom

Ernie and Paula's wedding was a spectacular event, held in the mountains near Vail, and attended by Dr. Wenger, Director of the Orthopedic Training Program, as well as one of Dr. Sink's "fellow" fellows, Dr. David Scher, who now practices at the Hospital for Special Surgery and Cornell University in New York City.

The enclosed photographs document the event. We wish Ernie and Paula the best as they proceed in their busy life in the Rocky Mountain west.



New Denver Children's Hospital (spectacular) which opened in Sept. 2007. Dr. Sink will continue his clinical and research studies here.

Spreading the Word – Global Outreach

The Children's Hospital – UCSD orthopedic faculty continue to be involved in education and research throughout the world.



Jill Catterall (London), Kathy Wenger (San Diego), guide, Marilyn Letts (Abu Dhabi), Christian Hefti (Basel)
Intl Peds Ortho Symposium – King Faisal Hosp, Riyadh, Saudi Arabia - Nov 2007



Andre and Carol Kaelin (Geneva, Switzerland) – Hosts (and frequent visitors to RCHSD)
IPOTT Mtg – Lugano, Switzerland – Sept 2007



Cathy and Peter Newton
IPOTT Mtg – Lugano, Switzerland – Sept 2007



Michael Bensen (Oxford), Scott Mubarak (San Diego), Lynn Staheli (Children's Hospital-Seattle), IPOTT Mtg – Lugano, Switzerland – Sept 2007



Pediatric Orthopedic Society of India/POSNA Meeting – Coimbatore, India – Jan 2008 – Vince Mosca (Seattle), Min Kocher (Boston) and his father, Hank Chambers (San Diego), Richard Bowen (Wilmington) and his wife, Sanjeev Sarbahal (Newark) and Richard Gross (Charleston)



Peter Newton (San Diego) and Andre Kaelin (Geneva)
IPOTT Mtg – Lugano, Switzerland – Sept 2007



International Colleagues
Peter Newton, Muharrem Inan (Turkey – prior fellow), Dennis Wenger, Scott Mubarak - POSNA – Miami – 2007



Jim Kasser (Boston Children’s), Dennis Wenger (San Diego), Fritz Hefti (Children’s Hospital – Basel) – Sept. 2007 conference at Children’s Hospital – Basel, Switzerland



Zayed-al-Zayed (Riyadh) D. Wenger (RCHSD), unidentified doctor Intl Peds Ortho Symposium – King Faisal Hosp, Riyadh, Saudi Arabia - Nov 2007



Dennis Wenger (San Diego), Zayed-al-Zayed (Riyadh) Intl Peds Ortho Symposium – King Faisal Hosp, Riyadh, Saudi Arabia - Nov 2007



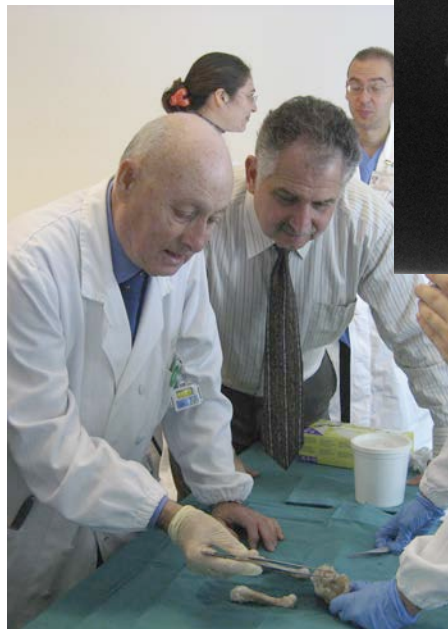
Edel and Klaus Parsch – Stuttgart, Germany (prior Visiting Professor at RCHSD) IPOTT Mtg – Lugano, Switzerland – Sept 2007



Dr. Marco Ortolni (Padua, Italy) – son of Dr. Mario Ortolani, who first described the Ortolani test for DDH – and Dr. Mubarak (San Diego) – University of Padua – Padua, Italy – Sept. 2007



Top Fellowships and Top Fellows
Peter Newton (San Diego), Tony Herring (Chief of Staff – TSRH – Dallas), Amy Macintosh (fellow – TSRH) and Christine Caltoun (fellow – RCHSD) - POSNA – Miami – 2007



Also, x-ray taken of infant skeleton with left DDH (from the collection of Dr. Mario Ortolani). These specimens were demonstrated to Dr. Mubarak on his visit to the Univ. of Padua in Sept 2007.

Connections - Images from the Orthopedic Program



“So how’s Chicago?”
Hank Chambers (San Diego) and Chris Sullivan (U. Chicago – prior fellow) – POSNA – Miami – 2007



“I like this relaxation time!”
Maya Pring (San Diego) and husband Dan Gallivan – Fellows’ welcome party – August 2007



“Yes, life is good at Duke”
Prerana Patel (Duke - prior fellow) and Tamir Bloom (Newark - prior fellow) - POSNA – Miami – 2007



Prior fellows discuss practice life – Laura Meyers (St. Louis-prior fellow) and Francois Lalonde (Orange Co.-prior fellow) POSNA – Miami – 2007



Scott and Sandy Mubarak
POSNA – Miami – 2007



Discussing “the San Diego way”
Tamir Bloom (Newark – prior fellow), Scott Mubarak (San Diego), Bruce Gillingham (U.S. Navy) POSNA – Miami – 2007



“Researchers”
Tracey Bastrom (RCHSD ortho research program manager) and Klane White (prior UCSD ortho resident – now pediatric orthopedist and researcher – Children’s Hospital-Seattle) POSNA – Miami – 2007

(also see pg 4)