The Paul R. Lipscomb ALUMNI SOCIETY presents the 2010 Grand Rounds and Graduate Research Symposium

Thursday, June 17, 2010
Friday, June 18, 2010

with special guest speaker Joseph Borrelli, Jr., MD

sponsored by University of California, Davis Health System DEPARTMENT OF ORTHOPAEDIC SURGERY
Welcome to the 2010 Paul R. Lipscomb Alumni Society Graduate Research Symposium

This outstanding meeting is an opportunity for our department to highlight scientific and clinical research, and to reconnect with clinical faculty and alumni who have served our department over the years. Our special guest this year is Joseph Borrelli, Jr., MD, Professor and Chair of the Department of Orthopaedic Surgery at the University of Texas Southwestern Medical Center at Dallas.

Most importantly, this is an occasion to commemorate the graduation of thirteen exceptional men and women - six residents and seven fellows - into the ranks of orthopaedic surgery. While always a bittersweet occasion, this day validates the wonderful camaraderie and continuity of our field.

Thank you for being part of this memorable event.
Visiting Professors

1982 - Robert B. Winter, MD  
1983 - Anthony Catterall, MD  
1984 - Eugene E. Bleck, MD  
1985 - Paul P. Griffin, MD  
1986 - M. Mark Hoffer, MD  
1987 - Robert B. Salter, MD  
1988 - Colin F. Moseley, MD  
1989 - James R. Gage, MD  
1990 - James F. Kellam, MD  
1991 - David S. Braddock, MD  
1992 - Adrian E. Flatt, MD  
1993 - Augusto Sarmiento, MD  
1994 - M. Mark Hoffer, MD  
1995 - James R. Andrews, MD  
1996 - James R. Urbaniak, MD  
1997 - Stuart L. Weinstein, MD  
1998 - Robert A. Mann, MD  
1999 - Joseph M. Lane, MD  
2000 - Andrew J. Weiland, MD  
2001 - Joel M. Matta, MD  
2002 - Terry R. Trammell, MD  
2003 - Kaye E. Wilkins, MD  
2004 - Richard Gelberman, MD  
2005 - Robert H. Hensinger, MD  
2006 - James Heckman, MD  
2007 - Thomas A. Einhorn, MD  
2008 - Joseph A. Buckwalter, MD  
2009 - Peter J. Stern, MD  
2010 - Joseph Borrelli, Jr., MD
Joseph Borrelli, Jr., MD, is an internationally recognized surgeon and innovative leader and educator in Orthopaedic Surgery. He is Professor and Chairman of the Department of Orthopaedic Surgery at the University of Texas Southwestern Medical Center at Dallas, and is Board Certified by the American Board of Orthopaedic Surgery.

Dr. Borrelli completed his undergraduate education with distinction at the University of Maine, Orono. He received his medical degree from the University of South Florida College of Medicine, Tampa; completed his orthopaedic surgery residency at the University of South Florida and the Hospital for Special Surgery and his trauma fellowship at Tampa General Hospital.

Dr. Borrelli is a member of the American Association of Orthopaedic Surgeons (AAOS), the American Orthopaedic Association (AOA), the Orthopaedic Trauma Association (OTA), and the Orthopaedic Research Society (ORS).

Dr. Borrelli has been actively involved in clinical, translational, and basic science research over the past 20 years. His clinical interests and most recent publications have focused on the assessment of patients after fractures involving a joint. He has investigated the advantages of CT scans in the evaluation of hip socket (acetabular) fractures, as well as techniques for assessing outcomes after these fractures and treatment. As an extension of this clinical interest, he has developed an in vivo articular cartilage model and has been using this model to investigate the causes of posttraumatic osteoarthritis.
ROBERT H. ALLEN, MD  
Health Sciences Associate Clinical Professor, Hand and Upper Extremity

KYRIACOS ATHANASIOU, PhD  
Distinguished Professor and Chair of Biomedical Engineering

DANIEL R. BENSON, MD  
Professor, Adult and Pediatric Spine Surgery

BLAINE CHRISTIANSEN, PhD  
Assistant Professor in Residence

PAUL E. DI CESARE, MD, FACS  
Professor and Chair, Adult Reconstructive Surgery  
Michael W. Chapman Chair

TANIA A. FERGUSON, MD  
Assistant Professor, Trauma Service

DAVID P. FYHRIE, PhD  
Professor and Director, Orthopaedic Research Laboratories

ERIC GIZA, MD  
Assistant Professor, Foot and Ankle Service

MUNISH C. GUPTA, MD  
Professor, Chief of Spinal Deformity Service  
Adult and Pediatric Spine Surgery

DOMINIK R. HAUDENSCHILD, PhD  
Assistant Professor in Residence, Orthopaedic Research Laboratory

AMIR A. JAMALI, MD  
Heal Sciences Clinical Associate Professor, Adult Reconstructive Surgery

SUNNY KIM, PhD  
Assistant Professor, Orthopaedics Clinical Outcomes Research

ERIC O. KLINEBERG, MD  
Assistant Professor, Adult and Pediatric Spine Surgery

CASSANDRA A. LEE, MD  
Assistant Professor, Sports Medicine

MARK A. LEE, MD  
Associate Professor, Trauma Service

KIRK J. LEWIS, MD  
Health Sciences Associate Clinical Professor, Sports Medicine
RICHARD A. MARDER, MD
Health Sciences Clinical Professor, Chief of Sports Medicine

JOHN P. MEEHAN, MD
Health Sciences Associate Clinical Professor, Chief of Adult Reconstructive Surgery

DEBRA J. POPEJOY, MD
Assistant Professor, Pediatric Orthopaedics

GEORGE T. RAB, MD
Professor, Pediatric Orthopaedics

A. HARI REDDI, PhD
Distinguished Professor, Lawrence J. Ellison Chair of Molecular Biology

ROLANDO F. ROBERTO, MD
Health Sciences Assistant Clinical Professor, Adult and Pediatric Spine Surgery

PETER B. SALAMON, MD
Health Sciences Clinical Professor, Pediatric Orthopaedics

ROBERT M. SZABO, MD, MPH
Professor, Chief of Hand, Upper Extremity and Microvascular Surgery

ROBERT M. TAMURIAN, MD
Assistant Professor, Orthopaedic Oncology

JAMES VAN DEN BOGAERDE, MD
Health Sciences Assistant Clinical Professor, Sports Medicine

PHILIP R. WOLINSKY, MD
Professor, Chief of Trauma Service

JASPER YIK, PhD
Adjunct Professor, Orthopaedic Research Laboratory

BRAD J. YOO, MD
Health Sciences Assistant Clinical Professor, Trauma Service

Faculty
Shriners Hospital for Children
Northern California

JENNETTE BOAKES, MD
Clinical Professor, Pediatrics

MICHELLE A. JAMES, MD
Clinical Professor, Chief of Orthopaedics Pediatric Surgery

JOEL LERMAN, MD
Assistant Clinical Professor, Pediatrics
Thursday, June 17, 2010

Grand Rounds
*Medical Education Building*

5:30 pm - Refreshments
Third Floor Bridgeway

6:00 pm
Lecture Hall 2222
Guest Speaker - Joseph Borrelli, Jr, MD
“Evolving Treatment in Acetabular Fractures”

Friday, June 18, 2010

Resident and Fellow Research Presentations

*Shriners Hospital for Children Auditorium*

7:30 AM  Continental Breakfast

7:45 AM  WELCOME - Department Chair, Paul Di Cesare, MD, FACS

7:50 AM  Joseph Borrelli, Jr., MD
University of Texas Southwestern Medical Center at Dallas
“The Development of a Posttraumatic Osteoarthritis Animal Model”

8:45 AM  Jerry Labson, MD
“Accuracy of Needle Placement into the Sub-Acromial Space of the Shoulder”

9:00 AM  Jaspaul Gogia, MD
“Biomechanical Consequences of Anterior Femoral Notching in Cruciate Retaining Versus Posterior Stabilized Total Knee Arthroplasty Designs”

9:15 AM  Safdar Khan, MD
“Early and Mid Term Histological Events During Single Level Posterolateral Intertransverse Process Fusion with rhBMP-2/ACS and a Ceramic Bulking Agent in a Non-Human Primate Model: Implications for Bone Graft and Fusion Bed Preparation”

9:30 AM  Randall Farac, MD
“A Biomechanical Study of Cadaveric Achilles Tendon Repair Augmentation using a Polyurethane Urea Membrane”
9:45 AM  Christopher Kreulen, MD  
“MRI’s Role in the Diagnosis of SLAP Lesion”

10:00 AM  BREAK

10:20 AM  Timothy Bray, MD, Clinical Professor, UCD School of Medicine and President of the Orthopaedic Trauma Association

10:45 AM  Kyle Mitsunaga, MD  
“Atlanto-axial Kinematics: Is Motion Preservation at C1-C2 Possible in Cases of Congenital or Acquired Atlanto-axial Instability?”

11:00 AM  Yeukkei Cheung, MD  
“The Kinematics and Stability Profiles of Single Radius Femoral Component Versus Multiradius Femoral Components in Total Knee Arthroplasty”

11:15 AM  Anto Fritz, MD  
“Misrepresentation of Publications Among Orthopaedic Surgery 2007 Residency Applicants”

11:30 AM  Michael Leslie, DO  
“Biomechanical Analysis of Fixation of Unstable Pelvic Ring Injuries”

11:45 AM  Jason Lowe, MD  
Surgeon Accuracy of Identifying Single Plane Hemi-Pelvis Motion

12:00 PM  Mario Luna, MD  
“The Incidence of Venous Thromboembolism After Different Types of Spinal Surgery”

12:15 PM  Teresa Mosqueda, MD  
“Kinematic Assessment of the Upper Extremity in Brachial Plexus Birth Palsy”

12:30 PM  Shima Sokol, MD  
“The Biomechanical Properties of Hybrid and Volar Locking Plate Fixation in Normal and Osteoporotic Distal Radius Sawbone Models”
Jerry Labson, MD  
Resident

Education
University of California, Santa Barbara, BA, Microbiology, 1989
Saint Louis University School of Medicine, MD, 1995
David Grant Medical Center, Family Medicine Residency, 1998
University of California, San Diego, Primary Care Sports Medicine Fellowship, 2002

Career Objective
To serve a tour of duty in the US Air Force at Osan Air Force Base, Republic of Korea

Spouse
The love of my life, Amy P. Labson

Children
The other love of my life, my son, Kai P. Labson

Personal Statement
My life and education have been filled with great experiences and opportunities. My time at UCD has been the icing on the cake. I have many to thank for this, most notably Drs. Marder, Lewis, Van den Bogaerde, and Cassandra Lee for their guidance and patience. Thanks to all the residents who have provided great times and friendship throughout the years. Thanks to all the men and women of the US Armed Forces, both past and present, with whom I am honored to serve. Of course, I am grateful to my parents and siblings who have always been a great support and inspiration to me. Lastly, I thank my wife and son for all the love and joy they bring into my life and for the sacrifices they make daily for me to pursue my dreams.

Accuracy of Needle Placement into the Subacromial Space of the Shoulder
Richard A. Marder, MD; Jerry D. Labson, MD; Sunny Kim, PhD; John Hunter, MD

Background: Subacromial bursa injections are a common procedure in patients with shoulder pain from subacromial bursitis, shoulder impingement, and rotator cuff tendinopathy. Injection of anesthetic (lidocaine) and/or various corticosteroids into this space has been shown to provide some relief for these patients. Common
sites for injection are a posterior, lateral, or anterior approach into the subacromial space. The optimal injection site has been debated. Errant injections can inadvertently enter unintended structures such as the deltoid muscle, rotator cuff tendon or muscle. We evaluate the accuracy of these three different approaches. Our null hypothesis is that there is no difference in accuracy among the three injection sites.

Methods: The accuracy of needle placement was assessed in a prospective, randomized series of 72 shoulder injections in 61 patients with signs and symptoms consistent with shoulder impingement. The injections were performed by a senior orthopaedic surgeon (R.A.M) using a 2 inch, 22-gauge needle through one of three commonly used injection sites: anterior, lateral, and posterior. Accuracy rates for needle placement were confirmed by post-injection radiographs, reviewed by a blinded musculoskeletal radiologist, documenting the dispersion pattern of the injected contrast material. In addition to injection accuracy, body-mass index (BMI), visual analog pain scores pre- and post-injection were evaluated.

Results: Of the seventy-two injections performed, fifty-three were confirmed to be in the subacromial bursa (overall accuracy rate of 73.6%). Accuracy rates for the individual injection groups were: 1) anterior: eighteen of twenty-three (an accuracy rate of 78%); 2) posterior: thirteen of twenty-five (an accuracy rate of 52%); and 3) lateral: twenty-two of twenty-four (an accuracy rate of 92%). BMI’s for the patients with injections in vs. out of the bursa were 28.08 vs 27.44, respectively. Average BMI for the anterior, posterior, and lateral groups were 28, 27, and 29, respectively. The mean improvement in VAS pain scores was 5 in the group with intrabursal injections and 3 in the extra-bursal injection group. The mean improvement in VAS pain scores for the anterior, posterior, and lateral groups were 4, 4, and 5 respectively.

Conclusions: Our data demonstrate a distinct improvement in accuracy using a lateral approach for subacromial bursa injections. We reveal that the lateral approach delivered the injected material intra-bursally 92% of the time and was more accurate than an anterior or posterior approach performed by the same orthopaedic surgeon. BMI did not seem to affect accuracy rates. Immediate post-injection pain scores all improved with a trend toward greater improvement in the lateral group. Statistical analysis of the data is ongoing and will be presented.
Jaspaul Gogía, MD
Resident

Education
Undergrad - University of Southern California
Medical School - University of California, San Francisco School of Medicine

Next Step
Hospital for Special Surgery Spine Fellowship

Career Objective
Comprehensive orthopedic practice with an emphasis on degenerative conditions of the spine.

Personal Statement
While the journey is not yet over, the last five years have formatively influenced my life as well as my career. I truly feel lucky and honored to have worked with all of the residents here, current and past. I am privileged to have developed friendships with all you guys, and Suzie. I have been constantly amazed at the passion that my attendings have for their specialties and their eagerness to invite me to participate in developing my own interests. Someone jokingly told me a saying ten years ago; “It is better to be mediocre among geniuses, than a genius among idiots”. For the last five years, I have been surrounded by intellectual giants. I hope that I have achieved mediocrity amongst you.

My two brothers, Shawn and Ravi, are definitely the reason I have made it this far. There’s no older sibling that looks up to his younger brothers more than I do. You two have guided me on every good decision I’ve made, and tried relentlessly to prevent me from making the bad ones. You know which one’s I’m talking about! You two are real, real cool.

Finally, I feel extremely lucky to have spent the last five years in the company of my parents, Harjinder and Surinder. You are absolutely my best friends. There is no doubt in my mind that I would not have completed residency without your love and support. My goal in life is to repay you in kind.
Introduction: Anterior femoral notching during knee arthroplasty has been implicated as a cause for periprosthetic supracondylar fractures. Prior studies have shown that unintended notching of the anterior femoral cortex occurs in almost 30% of all total knee arthroplasties. While the vast majority of arthroplasties performed in the US utilize posterior-substituting (PS) designs, prior biomechanical studies have only investigated cruciate-retaining (CR) femoral components. The purpose of our study is to compare the strength of notched femurs with two different prosthetic designs, namely CR and PS.

Methods: A full thickness anterior cortical defect was created in each of 12 large left femoral polyurethane models by making an anterior cut with an undersized posterior referencing guide. Six femora were instrumented with CR implants and six femora were instrumented with PS implants. Implants were placed using standardized cuts (DePuy, Warsaw, IN). Three cycles of 1 to 18 Nm were applied at 0.5 deg/s prior to determining stiffness and torque to fracture at the same rate. Notch depth, distance from the notch to the implant, fracture patterns, torsional stiffness, and torque to failure were recorded.

Results: No statistically significant differences were found in the two groups of femora. The average notch depth was 6.03mm (±1.27) for CR and 4.92mm (±1.03) for PS (p=0.13). The torsional stiffness at failure was also similar for both groups; 6.51 Nm/deg ±0.65) for CR and 7.06 Nm/deg (±0.85) for PS (p=0.24). This provided a final torque at failure of 62.36 Nm (±9.37) for CR and 62.74 Nm (±12.20) for PS (p=0.95). All fractures in both groups were identical both in location of origin as well as fracture pattern.

Conclusions: There does not appear to be a statistical difference in torsional stiffness or torque to failure in either the notched CR or PS groups. Moreover, examination of the fracture pattern demonstrated that the fracture itself is independent of the area from which bone is removed for the PS design. However, our study has insufficient power to definitively claim that there is no statistical difference between the two implants. Clinically this indicates that neither design appears to confer additional strength to the femur once notching has occurred.
Education
Undergraduate -
FSc - Government College,
Lahore Medical School
Medical School -
MD, Aga Khan University
Medical College, Karachi,
Pakistan

Next Step
Spine and Scoliosis
Reconstructive Fellowship,
Rush University Medical
Center, Chicago

Career Objective
Academic spine surgery with a clinical focus on complex adult and pediatric spine deformity and a research focus on biologic enhancement of fusion/fracture healing and tissue engineering.

Spouse
Sabrina Khan, PhD

Children
Alexander Khan

Personal Statement
Il destino da le carte, ma chi le deve giocare siamo noi (Fate deals the cards, but we have to play them).

In October 1998, I arrived at JFK Airport in New York City with my entire life packed tightly within 2 battered suitcases, $400 in cash that my father had borrowed to give me for my trip and the phone number of someone I had never met, who was going to give me shelter that night. My desire to leave Pakistan, (my land, my home and my people) was so I could become an orthopaedic surgeon in the United States – a dream I had carried within my heart since childhood.

Now, nearly 12 years after that blustery October day, I have finally achieved my goal.

Along the way, on this incredible journey I have met some of the most amazing people here at UC Davis. I have to thank the dedication and perseverance of my teachers and professors who have contributed immensely to my education in the last 6 years. Their dedication to teaching is
matched only by my respect for them and their craft. They have taught me countless lessons in the operating room and in the clinic but perhaps more importantly, led by example on the principle of commitment to excellence. The support staff also deserve a special thanks for their patience and kindness to me over the years - in the labs and the clinics; on the floors and in the ORs.

It has been an absolute privilege to be a co-resident with some of the finest people I have ever met. From my original resident class (Billy, Ravi, Cale and Jerry) to my graduating class today and all the residents in this program – thank you for 6 years of incredible memories. I am honored to be counted among you, I am grateful to have been a part of this legacy with you and I feel fortunate to have made friends for a lifetime with you.

Family is not necessarily who you are born into but where you find it. Harvinder and Sonia Sandhu are truly such a family. They have been with me at every peak and every valley and their love and trust; devotion and caring has changed my life. I love you both.

I thank my parents for instilling the love of knowledge, education and research in me, my uncle Tariq and Nanci for being such loving surrogates and my sister for always loving me unconditionally. I hope I have made you proud today.

Finally, Sabrina – you have nurtured me, sustained me, seen me falter, and helped me grow. The last 6 years have been an immense challenge and at every step you have astounded me with your understanding, support and humor. Your intellect humbles me and your perseverance inspires me. You have shown me how to face the world while being my biggest (and fiercest!) supporter. Best of all, you have given me the greatest gift – that of our son, Alexander. Ti amo piu di ieri ma meno di domani.

(Abstract on following page)
Early and Mid Term Histological Events During Single Level Posterolateral Intertransverse Process Fusion with rhBMP-2/ACS and a Ceramic Bulking Agent in a Non-Human Primate Model: Implications for Bone Graft and Fusion Bed Preparation

Safdar N. Khan, MD; Jeffrey M. Toth, PhD; Steven D. Glassman, MD; Munish C. Gupta, MD

Purpose: To utilize a non-human primate posterolateral fusion model to assess early radiographic and histologic healing when combining a single dose of rhBMP-2 with different preparations of ceramic bulking agents.

Methods: Twelve rhesus monkeys underwent single level posterolateral arthrodesis at L4-L5. A hydroxyapatite (HA)/Tricalcium Phosphate (β-TCP) composite bulking agent in two formulations was used: Granules (15% HA/85% β-TCP) and Matrix (cross linked type I bovine collagen impregnated with Granules). Four treatment groups (n=3 sides/treatment/time point) were (1) Iliac crest (2) rhBMP-2 wrapped around Matrix, (3) rhBMP-2 wrapped around Granules and (4) rhBMP-2 morselized and mixed with Granules. Animals were sacrificed and histology performed at 4 weeks and 12 weeks. CT scans were performed post-op and at every 4 weeks.

Results: 4 week time point: Iliac crest group showed new bone formation limited to the transverse process (TP) surfaces. Minimal residual collagen carrier was noted in the rhBMP-2 groups and very little new bone was noted adjacent to the posterior muscle bed. The rhBMP-2 Granule wrap demonstrated a greater degree of cellular infiltration toward the center of the graft while the rhBMP-2-Granule mix demonstrated the greatest amount of intramembranous bone formation.

12 week time point: Significant remodeling of all the graft materials was observed between 4 and 8 weeks on CT scans. For all rhBMP-2 groups, bone formation extended from the area of decortication along the transverse processes and along the ventral surface of the developing fusion bed, implying that direct contact of rhBMP-2 onto bleeding bone insured fusion progression.
**Discussion:** Use of bulking agents with more rapid resorption rates may limit new bone formation as the collagen carrier resorbs early on. A majority of early bone formation in the rhBMP-2 groups occurred adjacent to the TPs and not dorsally adjacent to the posterior muscles. Thus, placing rhBMP-2/ACS directly next to bleeding bone may encourage robust bone formation at early time points during the fusion cascade.
Career Objective
General Orthopaedics with a focus on Sports Medicine and Shoulder Arthroplasty

Personal Statement
My time at UC Davis is highlighted by the tremendous opportunity we share to learn from a group of mentors and patients that afford us the time and guidance to become practitioners of orthopaedic surgery. I’d like to thank the faculty for their patience and wisdom - they have shown me why there are a few occupations as privileged as ours.

I would not be here if it wasn’t for the love and support of my parents. Thank you for your dedication to being great parents for so many years.

Education
Bachelor of Science in Geology, University of British Columbia, Vancouver, Canada
MD, Albany Medical College, Albany, NY

Next Step
Sports Medicine Fellowship, Southern California Orthopaedic Institute, Van Nuys, CA
A Biomechanical Study of Cadaveric Achilles Tendon Repair Augmentation using a Polyurethane Urea Membrane
Eric Giza, MD; Lauren Frizzell, BS; Randall Farac, MD; Joel Williams, MD; Sunny Kim, PhD

Background: Missed or chronic Achilles tendon ruptures may have muscle atrophy and tendon retraction, and a defect that must be augmented with endogenous or exogenous materials. The Artelon® Tissue Reinforcement (ATR) scaffold is readily available synthetic degradable poly (urethane urea) material used to augment tendon repair.

Materials and methods: Eighteen fresh frozen human cadaver limbs were dissected to isolate the triceps surae-Achilles tendon-calcaneus complex and a rupture was simulated 2 cm proximal to the calcaneal insertion. The control group of nine-specimens were repaired with #2 ultra high weight polyethylene sutures using two rows of four Krackow locking loops on each side. In the experimental group of nine, the rupture was also repaired with two rows of four Krackow locking loop sutures on each side, then reinforced with a 4 x 4 cm patch of ATR tubularized over the repair and then secured to the tissue using three horizontal mattress 2-0 ultra high weight polyethylene sutures on the proximal and distal ends of the rupture. Specimens were tested for ultimate load to failure in an Instron machine after preloading to 10 N followed by cyclic loading for 20 cycles from 2-30 N.

Results: The ultimate load to failure in the control group was a mean of 248.1 N ± 19.6 (202-293 at 95% CI) versus 370.4 N ± 25.2 (312-428 at 95% CI) in the ATR group.

Clinical Significance: The ATR is a readily available material that can be used to augment chronic or acute Achilles tendon ruptures. The material is less bulky than currently available allograft or xenograft alternatives and provides a statistically significant improvement in load to failure when compared to control specimens in a cadaver model. This finding may allow for development of more aggressive rehabilitation techniques following chronic Achilles tendon repairs.
Christopher Kreulen, MD
Resident

Next Step
2010-11: UCLA Sports Medicine Fellowship
2011-2012 (6 months): Martin Sullivan Foot and Ankle Fellowship, Sydney, Australia

Personal Statement
I would first like to thank Dr. Roberto for allowing me to transfer to this program after being orphaned by the academic divorce at Wayne State. It truly was a step in the right direction to advance my knowledge, career, and personal development. I would like to thank my fellow classmates in making me feel like a part of the family over the past few years. The transition was more difficult than I expected and you guys helped make it easier to refer to UC Davis as “my program”.

I also want to thank all the residents for helping me get through this past year. The last 10 months have been quite a humbling journey and you guys were there to help pull me through the tough times and I will never forget the encouragement and support you gave me. It meant more than you know.

I would like to thank my parents, Dave and Grace, for your encouragement on this long path to becoming a surgeon. Through the ups and downs, you continued to show me unconditional love and support. You challenged my faith and personal growth, and helped me to remember there is more to life than what I do in the hospital. I hope one day to provide for my family in the ways you have provided for me. Thank you.

Finally, I would like to thank those who have helped me take the next step in my career. Thank you to Dr. Marder and Dr. Lewis for your guidance and expertise in Sports Medicine and for helping me obtain a great fellowship. And thank you to Dr. Giza for doing a great job in teaching and helping me to

Education
Undergraduate: Calvin College, Grand Rapids, MI
Graduate School: University of Arizona, Tucson, Masters of Physiology
Medical School: Wayne State University School of Medicine
Internship: Wayne State/Detroit Medical Center, Dept of Orthopaedics
continue my training in Australia. I am very excited about what the future holds and I know I am well prepared.

**MRI May Not Be the Proper Screening Test for SLAP Lesions?**
Christopher Kreulen M.D. M.S.; Sunny Kim Ph.D; Walter Mak M.D.; Kent Sheridan M.D.; Kirk Lewis M.D.; Richard Marder M.D.

**Background:** Superior labral anterior posterior (SLAP) lesions are infrequent injuries, and diagnosis by magnetic resonance imaging (MRI) is difficult and controversial.

**Hypothesis:** Based on our clinical experience, the accuracy of the MRI to diagnose a SLAP lesion is less than previously reported.

**Study Design:** Diagnostic Retrospective Study.

**Methods:** Between January 2006 and December 2008, 444 patients who had both shoulder arthroscopy and an MRI (non-contrast or MR arthrography) at our institution prior to surgery were identified and were included in the study. The radiologic diagnosis and the surgical evaluation were compared to determine the accuracy of diagnosing a SLAP lesion by MRI. Using arthroscopy as the standard; sensitivity, specificity, accuracy, positive predictive value (PPV), and negative predictive value (NPV) were calculated for all MRIs, the non-intra-articular contrast MRI group, and the MR arthrography group.

**Results:** Of the 444 patients, 121 had a SLAP diagnosis by MRI and 44 had a SLAP diagnosis by arthroscopy. Overall, MRI had an accuracy of 76%, a PPV of 24%, and a NVP of 95%. Sensitivity was 66%, and specificity was 77%. MR arthrography had an accuracy of 69%, sensitivity of 80% and a PPV of 29%. Noncontrast MRI had an accuracy of 85%, sensitivity of 36%, and a PPV of 13%.

**Conclusions:** In our retrospective study of 444 patients, sensitivity, specificity, and accuracy were all lower than previously reported in the literature for diagnosing SLAP lesions. Our data suggests that while MRI could exclude a SLAP lesion (NPV=95%), MRI alone was not an accurate clinic tool. MR arthrography had a large number of false positive readings in this study. We conclude that even with intra-articular contrast, MRI has limitations in the ability to diagnose surgical proven SLAP lesions.
Career Objective
To be a great spine surgeon

Personal Statement
‘A’ohe pau ka īke i ka halau
All knowledge is not taught in school. The best medicine is not always prescribed by a doctor. Sometimes the most effective prescription comes from the love and support of those around you. Sincerest thank you to family, friends, and faculty for inspiring me, sustaining me, mentoring me, and giving me the wisdom of their experiences. To my co-residents, it has been a pleasure and privilege working with you.

Atlanto-axial Kinematics: Is Motion Preservation at C1-C2 Possible in Cases of Congenital or Acquired Atlano-axial Instability?
David Fyhrie, PhD; Robert Hart, MD, MS; Enoch Leung, MB, PhD Candidate; Kyle Mitsunaga, MD; Rolando Roberto, MD; Nesryn Sarigul-Klign, PhD

Scientific Aims: 1. To better define the true axis of rotation of the C1-C2 segment, and 2. To develop and validate a nonfusion motion-sparing technique that would preserve axial rotation at the C1-C2 segment, but limit anterior-posterior translation in cases of atlanto-axial instability.

Significance and Goals: Given the relative lack of normative biomechanical data for C1-C2 segmental motion, it is our goal to determine the limits of rotation and anterior-posterior and medial-lateral displacement of an intact human C1-C2 specimen under physiologic loading conditions. Furthermore, we will seek to establish the radius of curvature and arc of displacement of the posterior elements, as well as an instantaneous axis of rotation for the atlanto-axial complex.
Based on previous work published by Crawford et al., we performed a biomechanical study using human cadaveric cervical spines. Motion at C1-C2 was recorded during spine loading using digital video cameras. LED markers affixed to the C1 and C2 posterior elements were digitized using the method of Crawford to create an anatomical axis coordinate system and to study the aforementioned motion parameters.

Nine human cadaveric specimens were obtained after protocol approval from the anatomic donor program. Testing was performed using occipito-cervical specimens spanning the occiput through C3, without constraints to motion at O-C1, C1-C2, C2-C3. A 50N axial load was applied using the Instron 5800 and Bluehill software to simulate the weight of the head. A FUQU torque cell was used to apply a rotational movement to the specimens using a custom Labview control panel, limiting the rotational movement to less than 1.5 Nm and 30 degrees of rotation in each direction leftward and rightward. LED triplets were rigidly attached to the midpoint of the C1 ring and C2 spinous processes using K-wires. Motion was recorded with stereo videographic methods with high speed cameras (Basler) and recorded using a custom Labview control panel and Daqbook data input module. Resultant video data was converted to a local spine coordinate system using SIMI motion analysis program and custom software.

Results: Counterclockwise and clockwise rotational movements were accompanied by significant flexion and extension and lateral bending motions (pitch and yaw).

30 degrees of axial head rotation to the left produced 22 degrees of C1 rotation which was accompanied by 4 degrees of C2 lateral bending (yaw) in the opposite direction and an average arc of 10 degrees total flexion and extension motion (pitch) between C1 and C2. The average arc of total motion was 43.3 degrees total axial rotation, 9.9 degrees of total flexion and extension and 8.7 degrees of lateral bending at the atlanto-axial joint.

Conclusions: Coupled motion at C1 and C2 have been described. Motion preserving stabilization at the atlanto-axial joints will require significant accommodation of the lateral bending and flexion extension that occurs with axial rotation.
Career Objective
I would like to be an exceptional adult reconstructive surgeon.

Spouse/Children
Pending

Personal Statement
This year has gone by very quickly. It has been an incredible educational experience for me. I would like to thank Drs. Di Cesare, Meehan and Jamali for teaching me their craft. I would also like to thank the nursing staff in the ORs and the clinic for being so nice and helpful, and finally I would like to thank the residents for making this the most enjoyable year.

Education
Medical School - Boston University School of Medicine
Residency - Orthopaedic Surgery, Westchester Medical Center, New York Medical College

Next Step
Private Practice, California
The Kinematics and Stability Profiles of Single Radius Femoral Component Versus Multiradius Femoral Components in Total Knee Arthroscopy

Yeukkei Cheung, MD; Edward Shin, MD; Blaine Christiansen, PhD; Shane Curtiss; Paul Di Cesare, MD

Introduction: Following total knee arthroplasty (TKA), mid-flexion instability could cause lead to premature failure. Because mid flexion instability is related to curvature of the femoral component, one possible remedy is to implant a femoral component with a single radius (SR) of curvature in the sagittal plane. The goal of current study was to determine the stability profile of an SR femoral component versus that of a multi-radius (MR) component.

Materials and Methods: Four cadaveric knee specimens fixed in a custom apparatus implanted with SR and MR components underwent varus/valgus, anterior/posterior and internal/external rotation stress testing. A 3-dimensional camera system was used to detect the relative motions between the tibia and femur utilizing LED markers on the specimen. The knees also underwent an extension testing utilizing an Instron machine.

Results: At all flexion angles, varus/valgus stress for the two implants differed by less than 2 degrees. Anterior/posterior displacement and internal/external rotation were also similar for the two implants (SR vs MR: 35.7 vs. 39.8 mm, AP displacement; 33.1 vs. 35.7 degrees, internal/external rotation). For the active extension test, a 9-15% higher quadricep tendon force was required to reach flexion angles of 75, 60, 45, 30, or 15 degrees with SR compared to MR implants.

Discussion: Since the difference in the kinematics between the implants could be subtle, more specimens may be required to show a difference. Moreover, the protocol and apparatus used in this study could become a model of all subsequent studies of the stability of TKA.
Personal Statement
It is my great pleasure to write this note. The past year has been an invaluable experience for me. I have learned not just the nuances of spine surgery, but also the importance of work ethic by interacting with patients and valuing their trust, and knowing that I can never be satisfied with the amount of knowledge I have gained. Many thanks to Drs. Roberto, Di Cesare, and Jamali, without whose guidance I wouldn’t be here. Thanks to the attendings, residents, fellows and administrative staff, for making my spine surgery fellowship a success, and who are amongst the best people I have worked with. I hope to be in touch with everyone throughout my life. My special thanks to my parents and my wife for supporting me through this entire process.

Education
Medical School -  
Madras Medical College, Chennai, India
Residency -  
Dr. Jeyasekharian Medical Trust, Tamil Nadu, India

Spouse
Mary Malarvizhi

Children
Amalvin Aloysius Fritz

Anto Thanagaraj
Aldous Fritz, MD
Spine Fellow
Background- Studies have been done to see if misrepresentation of publications exists among applicants to orthopaedic surgery residency. All the studies done earlier were single center studies which is likely to have sample bias. The objective of this study was to estimate if such misrepresentation exists among the applicants for orthopaedic surgery residency programs nationally for the year 2007, especially since published data on this phenomenon exists.

Methods- The variables collected from each application include, age, gender, ethnicity, college, interval between college and medical school, graduate degree, medical school, type of publication, status of publication, United States Medical Licensing Examination [USMLE] Scores. Publications reported were verified against PubMed, ISI Web of Science, and Google Scholars. The non-verifiable publications were submitted to medical librarian for final verification.

Results- A total of 125 of the 844 applicants (14.8%) had either one non-verifiable publication or at least one variation or both. There were 145 publications with 221 errors including order of authors, number of authors, title, pages, volume/issue, journal, date, duplication, author name not found, author name misspelling and/or author named differently there. A total of 698 publications were listed in the applications reviewed, of which 497 [71.2%] could be verified, 99 [14.2%] couldn’t be verified and 145 [20.8%] had errors in the details provided regarding the publications.

Conclusions- The identification of misrepresented publications should be part of the selection process for interviewing candidates for residency positions. Program directors should make use of the PubMed identifier for publications provided by the applicants through ERAS. Residency programs may want to request copies of all publications and letters of acceptance for manuscripts ‘in press’ or ‘accepted’ with residency applications at the time of interview. Institutions with the help of professional organizations should develop policies to address this problem so that the program directors can act when they identify such problems.
Next Step
Assistant Professor, Department of Orthopaedics and Rehabilitation, Yale University School of Medicine, New Haven, CT

Spouse
Jennifer Leslie

Children
Cameron Rose Leslie

Personal Statement
I would like to thank everyone at the University of California at Davis Department of Orthopaedic Surgery for their guidance, education and support during this year. In particular, the Trauma Faculty, who have shared with me their evidence-based expert opinions, technical expertise and patient-centered care on a daily basis. As I begin my career as a trauma surgeon, I hope to bring all that I have learned during this year to serve the needs of patients in Connecticut and to maintain the values and compassion that the Trauma Faculty has imparted upon me.
Unstable fractures of the pelvic ring can be devastating injuries, leading to significant disability in polytraumatized patients. Although these injuries comprise only 3% of all fractures of the pelvic ring, nonoperative treatment and anterior ring fixation alone lead to a poor outcome. Optimal fixation of these injuries remains under investigation.

Historically iliosacral screw fixation after reduction was populated; however, some authors report a rate as high as 13% for failure of fixation. A novel concept of transsacral screw fixation has been utilized as a revision option for failed treatment. The hope is that the vector utilized for transsacral screws will decrease the cantilever bending moment associated with iliosacral screw fixation utilized for sacral fractures.

The present study critically analyzes the resistance to and mode of failure of multiple constructs of fixation of an unstable pelvic ring injury. The model is comprised of a comminuted complete Zone II sacral fracture in the presence of ipsilateral superior and inferior rami fractures in a composite bone model. Six pelves underwent load to failure of 1000N in a single leg stance model for 24 different fixation constructs. An Optotrak motion capturing device was utilized to detect displacement of the hemipelves relative to each other.

A review of the load to failure data revealed that transsacral screw fixation increased construct stability over iliosacral screw fixation at one level. The addition of anterior ring fixation did not provide a similar increase with a single iliosacral screw. Overall load to failure was increased with the addition of a second level of fixation whether iliosacral or transsacral and also with compression of the posterior ring fracture.

The biomechanical study suggests that a single iliosacral screw in an unstable pelvic ring fracture does not provide equal resistance to load when compared to transsacral screw or multi-level posterior ring fixation, even in the presence of anterior external ring fixation.
Fellowships -
Traveling Fellowship in Orthopaedic Trauma Surgery, China
AO Orthopaedic Trauma Fellowship, University of California, Davis
Deformity Correction Fellowship, Lecco, Italy

Next Step
Assistant Professor of Orthopaedic Trauma Surgery and Director of Fragility Fracture Center at the University of Alabama

Spouse
Cassidy Dawn Lowe

Personal Statement
It is with a great sense of pride that I will begin my career as a UCD orthopaedic trauma fellow graduate. To Drs. Lee, Wolinsky, Yoo, and Ferguson, my profound sense of gratitude for your mentorship cannot be fully expressed here. I thank you for your tutelage in both the art and the science of medicine and I look forward to future collaborations in the years to come.
Surgeon Accuracy of Identifying Single Plane Hemi-Pelvis Motion
Jason Lowe, MD; Sean Nork, MD; Mark Reilly, MD; Tânia Ferguson, MD

Hypothesis: Single plane hemi-pelvis translation and rotation can be accurately determined by fellowship trained orthopaedic surgeons.

Background: Standard radiographic evaluation of the injured pelvis includes the AP pelvic radiograph, the multi-planar inlet and outlet projections of Pennal and Sutherland. It has been previously suggested that the outlet image is the most accurate projection for evaluation of cranial displacement and sagittal plane rotation; however, these measurements have not been validated nor has the specific technique of measurement been described. While rotational injuries (lateral compression, anterior-posterior compression) have been classified, a method of quantifying the axial rotation of the hemi-pelvis has not been described. The purpose of this study is to determine if fellowship trained trauma surgeons can accurately determine single plane deformities of a hemi-pelvis, and determine which radiographic views consistently reveal single plane motion.

Methods: Fresh-frozen skeletally mature human cadaveric pelves and proximal femurs will be dissected of all soft tissue attachments except for the sacroiliac, sacrospinous and sacrotuberous ligaments as well as the hip capsular attachments. A right zone II sacral fracture and pubic symphysis disruption are created and the hemi-pelvis fixed to the testing jig with trans-iliac carbon fiber rods. The right hemi pelvis is moved through six degrees of freedom in single plane motion at 5mm/5 degree increment from neutral to 15mm/degrees (cranial/caudal, anterior/posterior, flexion/extension, and external rotation). At each point of translation/rotation the pelvis is radiographed (AP, Inlet, Outlet). Images are archived onto a PACS system and sent to two orthopaedic trauma surgeons for evaluation. Images are sorted into a random pattern from which each surgeon is asked to identify the deformity. Accuracy of identifying hemi-pelvic motion is determined as a function of radiologic projection and degree of projection.
Next Step
Private practice in Southern California

Career Objective
To provide excellent spine and orthopaedic care to patients in the community and to continually improve my fund of knowledge and skills to grow as a surgeon. My career interests include the treatment of a variety of spine conditions, including adult and pediatric deformity, degenerative conditions of the spine, tumors and infections of the spine, and spinal trauma.

Family
Maria Kellner, MD, Ivan Luna, Jacob Luna, and Zachary Luna

Personal Statement
Congratulations to the graduating residents and fellows on completing this part of your careers and moving on to the next step in your journey. This is not an easy process and one that involves tremendous dedication and effort, and even more important, a great deal of support from our respective families. I am very grateful to my large family for their encouragement and support throughout the years. I would also like to thank the UC Davis orthopaedic surgery staff and residents for welcoming me into the UC Davis ortho family this past year. I feel very fortunate to have trained under the instruction and guidance of four excellent spine surgeons and exemplary people: Dr. Daniel Benson, Dr. Munish Gupta, Dr. Rolando Roberto, and Dr. Eric Klineberg. Each one of them has inspired me to strive towards excellence, and to be diligent and compassionate in the care of my patients. Thank you for a great year.
The Incidence of Venous Thromboembolism After Different Types of Spinal Surgery
Luis Juarez, B.S., Mario Luna, M.D., Rolando Roberto, M.D, Richard White, M.D.

Objectives: There is limited data comparing the incidence of venous thromboembolism (VTE) after different types of spinal surgery. The aim of this study was to better understand the rates of VTE in spinal surgery using the California Discharge Database.

Methods: The California Discharge database records were used to determine the 3 month cumulative incidence (CI) of VTE including deep venous thrombosis (DVT) and pulmonary emboli (PE), as well as the 3 month CI of death and hospital readmission, during the time period from 1996 to 2006. ICD 9-CM codes were used to identify specific surgical procedures, and specified ICD 9-CM used to identify the VTE outcome events. Cases with prior diagnosis of VTE (back to July 1, 1990) were excluded.

Results: During the study period 144,183 cases underwent discectomy (ICD-9-CM= 80.51) (Mean age 49±15). The CI of VTE was 404 (0.28%), with 202 (50%) having DVT alone and 202 (50%) with PE, with or without DVT. Overall, 135 (33%) of the VTE events occurred during the index hospitalization and 269 (66%) occurred after hospital discharge but within 91 days of the surgery. There were 186 (0.13%) deaths in the index hospital and 9,383 cases (6.5%) required readmission for care within 3 months. LaminectomyICD-9-CM= 03.09) was performed in 88,001 patients (Mean age 64±14 yrs), and the CI of VTE was 427 (0.5%), 201 had DVT alone (47%) and 226 had PE (53%). Of the total VTE cases, 192 (45%) occurred during the index hospitalization and the remainder occurred after discharge. In this cohort, 431 patients (0.49%) died and 8986 (10.2%) required readmission to a hospital within 3 months.
Among the 65,983 patients (Mean age55±15) that underwent posterior lumbar fusion (ICD-9-CM 81.08) 534 (0.81%) patients were diagnosed with VTE, 262 (49%) with DVT, and 272 (51%) with PE. Among the VTE cases, 252 (47%) were diagnosed in the hospital and 282...
53% after discharge. Only 36 patients died (0.2%) and 6,033 (9.1%) patients required readmission to a hospital within 91 days. There were 19,134 cases (Mean age 47±12) that underwent anterior lumbar or lumbosacral fusions (ICD-9-CM=81.06), and 228 cases were diagnosed with VTE (1.2%), which was significantly higher compared with posterior lumbar fusion (Chi2 > 24, p<0.0001). DVT was diagnosed more frequently with 156 (0.82%) cases, compared to PE with 72 (0.38%) cases. Diagnosis of VTE was made in the hospital in 113 (50%) cases after hospital discharge in 115 (50%). Overall, 1,950 patients (10.2%) required hospital readmission and a total of 31 (0.16%) patients died within 91 days of surgery.

Conclusions: As the complexity of the spinal surgery increased, the incidence of VTE also increased, with the highest incidence noted after anterior lumbar fusion. Approximately half of all the events were DVT alone, and half of all events were diagnosed after hospital discharge. The crude incidence of death within 3 months was low, but significantly higher in the laminectomy cohort (p<0.001) which was significantly older compared to patients in the other procedures (p<0.001).
Next Step
I will be going into private practice pediatric orthopaedics in Des Moines, Iowa at Blank Children’s Hospital

Career Objective
To provide quality care to children with pediatric orthopaedic issues

Spouse
I am married to Thad Ferguson

Kinematic Assessment of the Upper Extremity in Brachial Plexus Birth Palsy
Teresa Mosqueda, MD; Michelle James, MD; Kyria Petuskey, MS; Anita Bagley, PhD; Estelle Abdala, MS; George Rab, MD

Children with brachial plexus birth palsy (BPBP) may have shoulder external rotation and abduction weakness that can restrict activities of daily living (ADLs). Static range of motion measurements may not measure ADL restrictions. Motion analysis has been used to quantify gait limitations and measure changes associated with treatment. The purpose of this study was to determine whether upper extremity motion analysis (UEMA) can measure the differences in shoulder motion during ADLs between children with BPBP and normal children. Following a previously described UEMA protocol, 55 children with BPBP and 51 normal children (control group) were studied. Kinematic data of selected ADLs were collected before surgery. UEMA was used to measure statistically significant differences between children with BPBP and control subjects for all planes of shoulder motion in all activities tested. The authors conclude that UEMA can discriminate between children with BPBP and control subjects during selected ADLs, and suggest that UEMA can also be used to measure the effects of surgical interventions in children with BPBP.
Next Step
Private practice in New York

Career Objective
To provide compassionate and high quality care.

Spouse
Michael R. Lace

Children
Brent M. Lace

Personal Statement
Thank you Dr. Szabo and Dr. Allen for your superb mentorship this year. Thanks also to all the residents, Tanya Johnson, Deborah Lewis and Mary Mendoza for all your help and hard work this year.
The Biomechanical Properties of Hybrid and Volar Locking Plate Fixation in Normal and Osteoporotic Distal Radius Sawbone Models
Shima Sokol, MD, Derek Amanatullah, MD, Shane Curtiss, Robert Szabo, MD

Locked plating has increased stability comminuted and osteoporotic distal radius fractures. Locking plates have greater stiffness and strength against both cyclic and non-cyclic loads compared to non-locking plates. Recently, hybrid locked plating has been considered for treating metadiaphyseal fractures. Hybrid constructs use unlocked screws placed first to obtain fracture reduction and seat the plate on the bone, followed by placement of locked screws. Information is lacking to direct the specific application of this fixation method to the distal radius. The purpose of this study was to determine if a hybrid plate construct is stronger by allowing compression to bone than a standard locking plate construct in a distal radius fracture model. Secondarily, this study tried to evaluate if osteoporotic bone quality affects these results. Eighteen osteoporotic and 26 normal left Sawbone radii were divided into two groups. Group 1 was plated with a volar locking plate using all locking screws. Group 2 was plated using a hybrid construct where the unlocked screws were applied prior to the locking screws. A 1 cm dorsal wedge osteotomy was created with the apex two cm from the volar surface of the lunate facet. Each specimen was mounted to a MTS machine using a custom built standardized axial compression jig and preloaded to 10 N. Force was delivered at 1 N/s over 3 cycles from 20 N to 100 N. The constructs were then failed at 1 mm/s. Our data show no statistical difference (p > 0.05) in initial, cyclic, failure stiffness and maximal load at failure between the hybrid and all-locked constructs. There was also no difference between the normal and osteoporotic Sawbones in any of these parameters. Our results suggest that good fixation of osteoporotic and normal distal radius fractures may not require all locking screw fixation in the metaphyseal segment. During apex dorsal bending, the close bone-plate apposition from a hybrid construct serves as a stabilizer for the dorsally positioned plate. The locking plate which lies elevated over the cortex does not benefit from this added stabilization.