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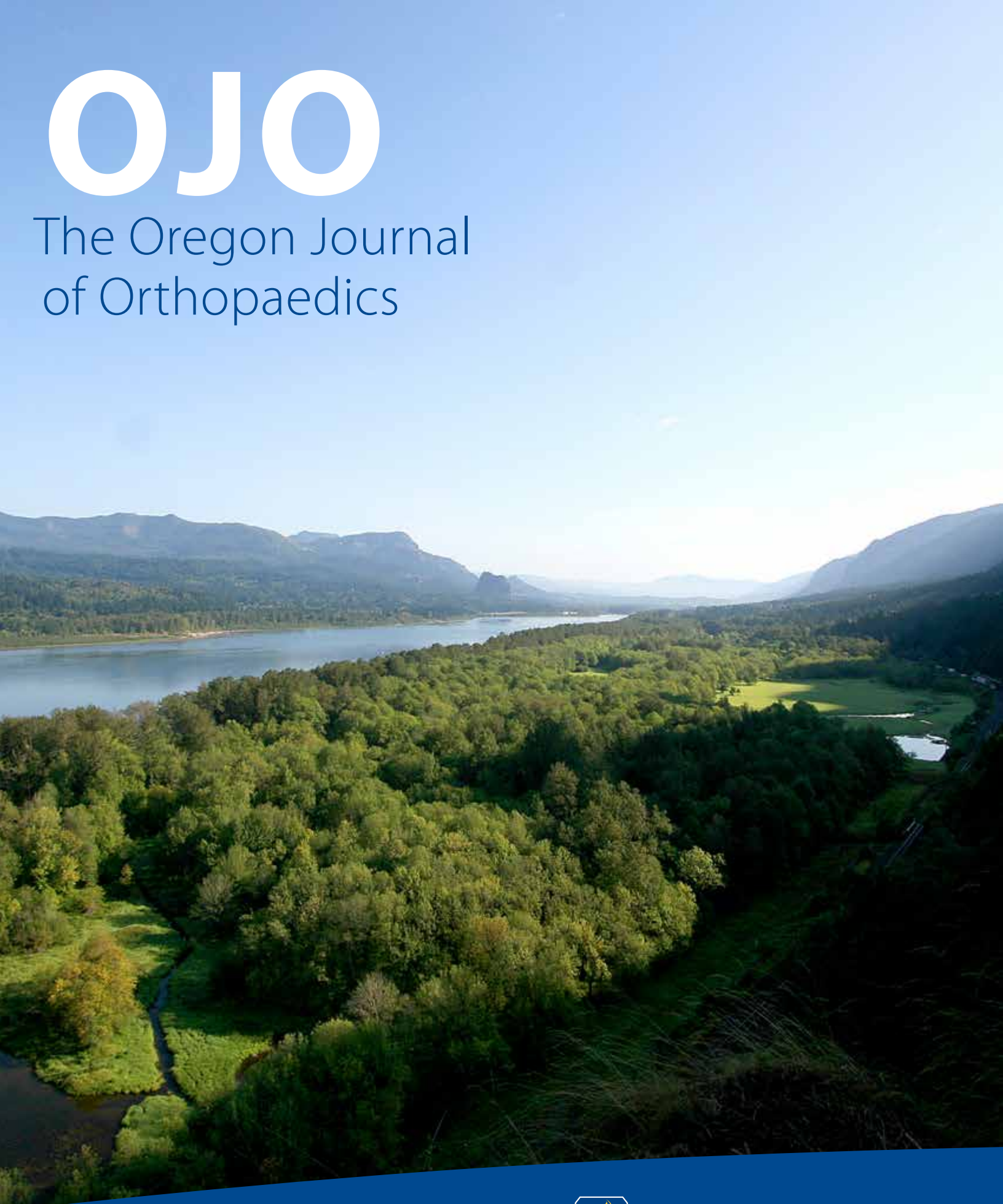
The Oregon Journal of Orthopaedics



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Letter from the Editors

Welcome to the fourth volume of *The Oregon Journal of Orthopaedics*. We would like to take this opportunity to thank all those who have contributed to the development and perpetuation of this journal, including faculty, residents, and alumni. In an effort to highlight the growth of our department we look back on our past, featuring the surgeons who significantly impacted the development of orthopaedics in Oregon.

In this volume we showcase a historical perspective of the evolution of Oregon orthopaedics. Legacy Emanuel faculty member Dr. Richard Gellman offers his insight into the beginning of orthopaedics at Emanuel Hospital. We explore the growth of orthopaedics in Southern Oregon and the development of Southern Oregon Orthopedics, Inc. In a Q&A with Dr. Ted Vigeland, from the Portland Veterans Affairs Hospital, we had the opportunity to delve into a pertinent viewpoint of a cherished faculty member. We learn what inspired Dr. Vigeland to a lifelong pursuit of orthopaedics, transitioning from private practice to academic medicine. In continuing with the tradition of highlighting our newest faculty member, we welcome orthopaedic traumatologist Dr. Brad Yoo in a Q&A. We are fortunate to have acquired Dr. Yoo from UC Davis and he has already contributed greatly to resident education. We finish our editorial session with a look to the future of surgical training by highlighting the development of the VirtuOHSU Simulation and Surgical Training Center with a feature by Dr. Jacqueline Munch. Dr. Munch has returned to OHSU as a new faculty member after completing her sports medicine fellowship at The Hospital for Special Surgery in New York City.

We continue to showcase the outstanding contributions to orthopaedic research from the OHSU department faculty and residents in our research section that includes selected abstracts and published articles. This year we are excited to include research from the residents in Corvallis at Samaritan Health Services, Orthopaedic Surgery Residency Program.

The alumni from the class of 2012 are featured in this year's alumni update. They give us an update on their careers from fellowship to their current practices, and fill us in on their family lives. We would like to congratulate the upcoming graduation of our chief residents, the OHSU class of 2015. We wish them the absolute best in their future endeavors and thank them for the many contributions that they have made to our education. Abstracts from their senior projects are featured in a dedicated section, honoring their contributions to the department.

Letter from the OHSU Chairman

There is a well-known poem by Robert Frost which begins:

Two roads diverged in a yellow wood,
And sorry I could not travel both
And be one traveler, long I stood
And looked down one as far as I could...

I have just completed my ten years as the chair of this program. Like all life's journey, you never really know what you are getting into when you say "yes". However, I have the fortune to never regret such a life decision. Once decided, I assume that the only road left to me is to be committed to the road that I have chosen. No matter how difficult the task, we can make it work by taking one day and one step at a time. My wife used to ask my children, "How do you eat an elephant sandwich?" The answer was one bite at a time.

The poem ends:

Two roads diverged in a wood, and I—
I took the one less traveled by,
And that has made all the difference.

It is a poem about Frost's personal journey. I am sure that his fulfillment was not just the decision to take the road less traveled but his commitment to that road, as well.

I am surrounded by people who take each day and each step as that precious work needed to be done on life's journey. We as physicians are fortunate that each step we take fulfills our duties as healer, educator, student, and above all as a fellow man/woman. When I made my decision I was alone, but now I am walking the road with you. I am grateful to be traveling with this community of committed and amazing people. Thank you.

Sincerely,

Jung Yoo, MD
Chair and Professor
OHSU Department of Orthopaedics & Rehabilitation

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Letter from the OHSU Program Director

Another year of Orthopaedic Surgery residency brings another group of fantastic new residents. OHSU continues to attract excellent physicians. We had 21 medical students rotate at OHSU during the fall application season and received over 750 applications for an orthopaedic surgery residency position. We were fortunate enough to attract five stellar interns, including two who graduated from OHSU Medical School. At the same time we graduated five senior residents. All have moved on to strong fellowship positions and are in the final stages of making arrangements for a new career. In short, we are very proud of the residents and the education program we provide.

Our year began in January 2014 with a site visit from the Orthopaedic Residency Review Committee. Although this always represents a significant amount of work, it represented an opportunity to showcase the significant changes within the residency program over the past 10 years. The Accreditation System has changed from past years and is now more data driven. Our Residency program passed the site review with accolades and no citations. Nonetheless we have more program improvements to make and a great desire to improve the educational opportunity for each resident.

Although the standard orthopaedic subspecialty rotations continue as always, we are still adding more surgical skills training into our curriculum. While last year we added several sawbones skills sessions, as the new VirtuOHSU simulation facility has opened at OHSU, we have had the opportunity to add cadaver based skills sessions for the residents on almost a monthly basis. We received a small grant to purchase arthroscopy skills training equipment in anticipation of new requirements that all residents may have to pass a national Fundamentals of Arthroscopic Surgery test in coming years. Drs. Munch, Herzka and Crawford are in the final stages of setting up a weekly cadaver based arthroscopy skills curriculum for the two residents on the Sports Medicine rotation.

Nationally, the quality improvement movement is not only sweeping through hospitals, but also through resident education. All Programs are required to teach and involve residents in quality improvement initiatives. Our program has had several grand rounds presentations on quality improvement topics to teach this new skill to both faculty and residents alike. Furthermore, each resident is now participating in a formal Operating Room Quality Project for a week during their PGY4 research rotation. We are proud of the work of these residents during each project, and that the Orthopaedic Department has been leading the Performance Excellence movement here at OHSU.

Thank you for taking the time to read this edition of the *Oregon Journal of Orthopaedics*. Looking through the hard work it takes to produce this every year is perhaps the best testament of the great work our residents do each and every day.

Sincerely,

Darin Friess, MD
Residency Program Director
OHSU Department of Orthopaedics & Rehabilitation

Samaritan Health Services Orthopaedic Surgery Residency Program

Letter from the Assistant Program Director

The Orthopaedic Surgery residency program at Good Samaritan Regional Medical Center is a community based Osteopathic training program located in Corvallis, Oregon. We currently accept three residents per year and have established a number of educational affiliations with local universities and training institutions, such as Western University of Health Sciences, Oregon State University, Legacy Health System, Shriners Hospital for Children, and OHSU.

We are proud to be graduating our first class of residents this academic year. Our graduates will both be pursuing fellowship training in the area of Orthopaedic Trauma.

During the 2014-15 academic year, our residents continue to excel in both clinical practice and research. Currently, our residents have expressed interest in a wide variety of Orthopaedic specialties including Upper Extremity, Adult Reconstruction, Pediatrics, Spine, Foot and Ankle, and Sports Medicine.

It is the mission of our residency program to continue to foster education in all facets of orthopaedics and produce high quality clinicians for many years to come.

Regards,

Jonathan Evans, D.O.
Assistant Program Director,
Chief of the Department of Surgery

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Adult Reconstruction

Thomas Huff, MD

Kathryn Schabel, MD

Foot & Ankle

James Meeker, MD

General Orthopaedics

Alex Herzberg, MD

Infectious Disease

Penelope Barnes, MBBS, MRCP, FRCPath, PhD

Orthopaedic Oncology

Yee-Cheen Doung, MD

James Hayden, MD, PhD
Quality Director

Pediatrics

Matthew Halsey, MD

Physical Medicine & Rehabilitation

Hans Carlson, MD

Nels Carlson, MD

Podiatry

Trish Ann Marie Otto, DPM

Research / Basic Science

Brian Johnstone, PhD
Director, Orthopaedic Research

Lynn Marshall, ScD

Spine

Alex Ching, MD

Robert Hart, MD
Director, Spine Fellowship

Jayme Hiratzka, MD

Jung Yoo, MD
Chairman

Sports Medicine (Primary Care)

Rachel Bengtzen, MD

James Chesnutt, MD

Melissa Novak, DO

Ryan Petering, MD
Co-Program Director,
Sports Medicine Fellowship

Charles Webb, DO
Director,
Sports Medicine Fellowship

Sports Medicine (Surgical)

Dennis Crawford, MD, PhD
Director, Sports Medicine

Andrea Herzka, MD

Jacqueline Munch, MD

Trauma

Darin Friess, MD
Director,
Trauma & Residency Education

Brad Yoo, MD

OHSU

Upper Extremity

Adam Mirarchi, MD
Co-Director of OHSU
Hand Fellowship

Robert Orfaly, MD

Portland VA Medical Center Faculty

Jesse McCarron, MD
Chief of VA Orthopaedics

Ted Vigeland, MD

Michael Aiona, MD
Chief of Staff, Program Director

Jeremy Bauer, MD

Charles d'Amato, MD
Director of Spinal Deformity

J. Krajbich, MD, FRCS(C)

Ellen Raney, MD

Dennis Roy, MD
Director of Education

Michael Sussman, MD

Doug Beaman, MD
Foot & Ankle

Britton Frome, MD
Hand/Upper Extremity

Richard Gellman, MD
Orthopaedic Traumatologist
Foot & Ankle

Steve Madey, MD
Hand/Upper Extremity

Corey Vande Zandschulp, MD
Orthopaedic Traumatologist

Amer Mirza, MD
Trauma/Adult Reconstruction

Brett Andres, MD

McPherson Beall III, MD

J. Brad Butler, MD

James Davitt, MD

Alec Denes Jr, MD

Paul Duwelius, MD

Joyce Jenkins, DPM

Edwin Kayser, MD

Jason Kurian, MD

Edward Lairson, MD

Hans Moller III, MD

Rosalyn Montgomery, MD

Linda Okereke, MD

Rolf Sohlberg, MD

Venessa Stas, MD

Robert Tennant, MD

Stephen Renwick, MD

Ronald Turker, MD

Sports Medicine Primary Care Fellows

Daniel Pederson, DO

Megan Bailey, MD

Spine Fellows

Renuka Reddy Kuruvalli, MBBS

Sourabh Mukherjee, MBBS

Hand Fellow

Omar Nazir, MD

PGY-5 Class

Alex DeHaan, MD
Hometown: Portland, OR
Medical School: Boston University School of Medicine
Fellowship Plans: Adult Reconstruction - Tahoe Arthroplasty Fellowship

Troy Miles, MD
Hometown: Chico, CA
Medical School: Albert Einstein College of Medicine of Yeshiva University
Fellowship Plans: Adult Reconstruction - UC Davis

Dustin Larson, MD
Hometown: Port Angeles, WA
Medical School: Oregon Health & Science University
Fellowship Plans: Hand Surgery - University of New Mexico

Vivek Natarajan, MD
Hometown: Marlboro, NJ
Medical School: Emory University School of Medicine
Fellowship Plans: Pediatric Orthopedics - Children's Hospital of Pittsburgh

John Seddon, MD
Hometown: Eugene, OR
Medical School: Saint Louis University School of Medicine
Fellowship Plans: Foot & Ankle
1. Dr. Tim Schneider; Melbourne Orthopaedic Group, Melbourne, Australia
2. Dr. Douglas Beaman; Summit Orthopaedics, Portland, OR

PGY-4 Class

Jake Adams, MD

Hometown: Elkridge, UT
Medical School: University of Utah School of Medicine
Fellowship Plans: Adult Reconstruction - Mayo Clinic, Scottsdale, AZ

Kirsten Jansen, MD

Hometown: Florissant, MO
Medical School: University of Missouri - Kansas City School of Medicine
Fellowship Plans: Adult Reconstruction - Indiana University

Tom Kowalik, MD

Hometown: Seattle, WA
Medical School: Dartmouth Medical School
Fellowship Plans: Trauma & Adult Reconstruction -
1. Dr. Paul Duwelius; Orthopedic + Fracture Specialists, Portland, OR
2. Sydney Australia Arthroplasty & Trauma

Jared Mahylis, MD

Hometown: Gillette, WY
Medical School: University of North Dakota Medicine & Health Sciences
Fellowship Plans: Shoulder & Elbow - Cleveland Clinic

Farbod Rastegar, MD

Hometown: San Diego, CA
Medical School: University of Chicago, The Pritzker School of Medicine
Fellowship Plans: Spine - Cleveland Clinic

PGY-3 Class

John Cox, MD
Hometown: Gallup, NM
Medical School: University of New Mexico School of Medicine
Fellowship Plans: Adult Reconstruction

Ryland Kagan, MD
Hometown: Portland, OR
Medical School: Albany Medical College
Fellowship Plans: Adult Reconstruction

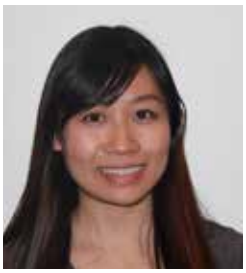
Joseph Langston, MD
Hometown: Dallas, TX
Medical School: Texas Tech University Health Science Center
Fellowship Plans: Adult Reconstruction

Michael Rose, MD
Hometown: Mansfield, TX
Medical School: Duke University School of Medicine
Fellowship Plans: Sports Medicine

Ryan Wallenberg, MD
Hometown: Medford, OR
Medical School: Creighton University School of Medicine
Fellowship Plans: Undecided

PGY-2 Class

Hannah Aultman, MD
Hometown: Portland, OR
Medical School: Tufts University School of Medicine
Fellowship Plans: Undecided



Karlee Lau, MD
Hometown: Plano, TX
Medical School: University of Texas Southwestern School of Medicine
Fellowship Plans: Undecided

Dayton Opel, MD
Hometown: Sheboygan, WI
Medical School: University of Wisconsin School of Medicine
Fellowship Plans: Undecided

Derek Smith, MD
Hometown: Topana, CA
Medical School: Columbia University School of Medicine
Fellowship Plans: Undecided

Benjamin Winston, MD
Hometown: Denver, CO
Medical School: University of Colorado School of Medicine
Fellowship Plans: Undecided

PGY-1 Class

Peter Cohn, MD
Hometown: Gladwyne, PA
Medical School: Jefferson Medical College of Thomas Jefferson University
Fellowship Plans: Undecided

Elizabeth Lieberman, MD
Hometown: Lake Oswego, OR
Medical School: Oregon Health & Science University
Fellowship Plans: Undecided

Shanjean Lee, MD
Hometown: Newport Beach, CA
Medical School: Duke University
Fellowship Plans: Undecided

Peters Otlans, MD
Hometown: Lakewood, WA
Medical School: Boston University
Fellowship Plans: Undecided

Travis Philipp, MD
Hometown: Olathe, KS
Medical School: Oregon Health & Science University
Fellowship Plans: Undecided

Orthopaedic Surgery Residents

Seth Criner, DO
PGY-5
Interest: Trauma

Brian Hodges, DO
PGY-5
Interest: Trauma

Jason Malone, DO
PGY-4
Interest: Pediatrics

Blake Obrock, DO
PGY-4
Interest: Adult Reconstruction

Kelli Baum, DO
PGY-4
Interest: Adult Reconstruction

Ryan Callahan, DO
PGY-3
Interest: Foot/Ankle

Craig Gillis, DO
PGY-3
Interest: Hand/Upper Extremity

Andrew Nelson, DO
PGY-3
Interest: Sports Medicine

Orthopaedic Surgery Residents

Doug Blaty, DO
PGY-2
Interest: Spine

Jun Kim, DO
PGY-2
Interest: Joints/Spine

Stefan Yakel, DO
PGY-2
Interest: Trauma/Spine

Tim Degan, DO
PGY-1
Interest: General Orthopedics

Brian Scrivens, DO
PGY-1
Interest: Adult Reconstruction

Heidi Smith, DO
PGY-1
Interest: Sports Medicine

The First Orthopaedists

A History of OHSU Department of Orthopaedics

By Ryan Wallenberg, MD

"It is not the strongest or the most intelligent who will survive but those who can best manage change."
– Charles Darwin

Change is something that we have become accustomed to in our field of work. Adaptation to new techniques is a key trait in a successful orthopaedist, a trait that Dr. Richard Dillehunt, Dr. Rodney Beals and Dr. William Snell possessed. The aforementioned quote was once referenced by Dr. Beals when discussing the orthopaedic culture in the state of Oregon. The culture of a constantly shifting environment has deep roots here at OHSU. The Orthopaedics & Rehabilitation program began as a general surgery division and over the years has grown into a department of its own. This article will reflect on our past and serve to honor those significant educators that volunteered countless hours to build the program that exists today. The information in this article is referenced from the "Oral History Project" interviews with Dr. William Snell in 1999 and Dr. Rodney Beals in 2008.

Orthopaedic Surgery originated as a division of general surgery throughout the nation. The first "orthopaedists" had general surgical training with specific musculoskeletal interest. One doctor in particular, Dr. Richard Dillehunt, was a pioneer in the transition of the practice. Dr. Dillehunt was a general surgeon who "got a feel for orthopaedics abroad" while working overseas during World War I. Upon his return to Oregon, he brought with him a particular curiosity in various surgical subspecialties. This charismatic surgeon is considered the first orthopaedist in Oregon, a sentiment rightfully earned. He moved through the medical ranks starting as an anatomy instructor and eventually ascended to be Dean at University of Oregon Medical School (UOMS). Dr. Dillehunt developed the first orthopaedic training program on the West Coast, in what is now known as OHSU.

Figure 1: Black and white portrait of Richard B. Dillehunt, mounted on a black paper album page

In the first years of the orthopaedic training program at OHSU, private practice doctors would donate their time to the education of the residents. The program began with time split between Multnomah County, Emanuel and Shriners Hospitals. The second Shriners Hospital in the country was built in Portland in the 1930s in an effort to care for children with a variety of physical disabilities. Shriners Hospitals have now expanded to greater than 20 hospitals throughout Canada, Mexico and the United States. Dr. Dillehunt was the first Chief of Surgery at Portland's Shriners Hospital and as such he hand selected the first orthopaedics resident in the Oregon program, Dr. Leo Lucas.

Dr. Lucas began his medical career as a student at UOMS and a member of the orthopaedic program created by Dr. Dillehunt. After training in Iowa for a year, he joined Dr. Dillehunt as a staff member at Shriners and UOMS, where he ultimately succeeded his mentor as Chief of Orthopaedics. When imagining what traits describe an ideal surgeon a few things come to mind, which include being both compassionate and inspiring. Dr. Lucas effortlessly embodied those traits. He conducted teaching sessions every Saturday for his residents and these were rarely missed. He was admired greatly by many, and among those admirers was Dr. William Snell.

(continued)

Dr. Snell was born on the Columbia River in 1921 to Oregon Governor Earl Snell. Snell had his first brush with Dr. Dillehunt during his early childhood when he was evaluated for his "bad feet" at the original location of UOMS in Salem, Oregon. It was this meeting and the lasting impression that the charismatic Dr. Dillehunt left on Snell that steered him toward the medical field. Dr. Snell began medical school at UOMS in 1942 while simultaneously serving as a Navy Reservist. He focused on his academic performance because, in his words, "if you were kicked out of medical school, you were sent out into service as an enlisted man". He spent his intern year in San Diego and returned to Oregon for his orthopaedic residency, which included training at Multnomah County, Emanuel and Shriners Hospitals. Coincidentally it was the very doctor that succeeded Dr. Dillehunt as Chief who became Dr. Snell's mentor, Dr. Leo Lucas. In 1951, upon completion of his residency, Dr. Snell joined forces with Dr. Lucas, where he spent the next 30 years teaching students and residents in Oregon. William Snell assisted some of the most influential orthopaedists in history and laid impressive groundwork for his predecessor, Dr. Rodney Beals, who took his place as Chief of Orthopaedics in 1981.

While Dr. Beals and Dr. Snell were alike in their origins, both being Oregon grown, Dr. Beals differed in that the medicine calling did not grasp him until he was halfway through his undergraduate education. Dr. Beals quickly shifted focus and enrolled at UOMS in 1952. After graduation, Dr. Beals travelled to Minnesota for his internship and to San Bernardino for one year of surgery residency. Though he initially declined an orthopaedic surgery residency position in Oregon, he ultimately returned to his home state. When explaining his deep roots with the Oregon medical community, Rodney Beals stated: "I was the forty-first resident trained at the medical school. And just because of the circumstances, I knew every orthopedist that preceded me that trained there, and I have known every one since. So I'm kind of unique in having been acquainted with every resident that ever trained there."

Figure 2: Black and white photographic portrait of William E. Snell, M.D.

Figure 3: "Photograph of Dr. Rodney Beals during his time as Chief of Orthopaedics & Rehabilitation

Dr. Beals finished his residency in 1961 and began his almost 50 year career as faculty at then UOMS, now OHSU, the very next day. While his initial practice was in the Division of Orthopaedics and Rehabilitation, Dr. Beals was part of a nationwide transition of how we categorize the specialty. Orthopaedics evolved from a division to a department, something Beals described by saying "Orthopaedists think of orthopaedics as being different kinds of trees in the forest versus being a branch of general surgery". Dr. Rodney Beals was a part of not only an evolving categorization of his practice but also the evolution of surgical indications, implant designs, and surgical approaches. The impact of Dr. Beals is still felt today with present day residents at OHSU and beyond.

The department of Orthopaedics & Rehabilitation at OHSU has been molded by many influential educators and staff members throughout its long and proud history, including: Richard Dillehunt, E.G. Chuinard, Leo Lucas, John Le Cocq, William Snell, Larry Noall, Paul Campbell, Don Slocum, Harold Davis, Joe Davis, Howard Cherry, Rodney Beals, Charlie Bird, Ted Vigeland, and Jung Yoo. To honor the tireless efforts of these people, and in keeping with the tradition of evolution that came before us, we will work every day to make this great hospital a place of comfort and care for our patients in this rewarding specialty.

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Orthopaedic Residency at Emanuel Hospital

Richard Gellman, MD
(Acknowledgment to David Noall, MD for assistance on history)

The history of orthopaedic residency training at Emanuel Hospital began in 1920 under the direction of Dr. Richard Dillehunt when he accepted Dr. Leo Lucas as the first OHSU resident. The affiliation between Emanuel and the residency was more informal than today. Although Dr. Dillehunt was the OHSU Director of Orthopaedics, he maintained a private practice and operated at Emanuel Hospital, taking Dr. Lucas with him.

A brief study of the OHSU Orthopaedic Alumni Directory at the back of this journal details the growth of the program. Between 1924 and 1944, 10 residents graduated, which reflects the gradual rise of orthopaedics as its own specialty and takes into account the upheavals of the Great Depression (no graduates 1932-34) and World War II (no graduates 1943-44). Since 1945, the orthopaedic residency has had graduates each year. The residents divided their training between Emanuel Hospital, Multnomah County Hospital (now OHSU) and the Shriners Hospital.

Drs. Dillehunt, Lucas and E.G. Chuinard (1935 OHSU graduate) were active into the 1960's, founding the Portland Orthopedic Clinic (POC) along with Dr. Richard Zimmerman (1964 OHSU graduate). Emanuel grew and relocated to its current location in 1968. Three OHSU residents, a PGY2, 3 and 4, rotated full-time at Emanuel. In-house call, in the days before pagers and cell phones, was every third night. The residents stayed in an apartment located where the Summit Orthopaedics medical office building now stands.

In the mid-80s, the residency experience at Emanuel began a gradual transition from a community hospital treating elective orthopaedic and community trauma, to one more focused on orthopaedic referral trauma. Dr. Paul Campbell of the Portland Orthopedic Clinic led the initial efforts to develop the current orthopaedic trauma program. At that time, community general surgeons managed the complex multi-trauma patients. Dr. Campbell recruited a trauma fellowship trained general surgeon, Dr. William Long from Maryland Shock Trauma Hospital, to take the lead in establishing Emanuel as a trauma hospital. Dr. Long worked closely with the State Trauma Division to develop the current system with designated Level I trauma centers at Emanuel and OHSU. By the late 80's, there were two residents from OHSU rotating at Emanuel and this has continued to the current time.

In the early to mid 90's, the Portland Orthopedic Clinic grew significantly. It merged with several orthopaedic groups and reached 20 members by 1997. The majority of the complex trauma was managed by Drs. Scott Grewe, Greg Irvine and Charles Wilson. In 1995, Dr. Doug Beaman joined the POC, becoming the second fellowship trained Foot and Ankle orthopaedist in the Portland region. Dr. Beaman also developed an Ilizarov reconstruction practice to treat not only foot and ankle reconstructive problems, but also to manage the large volume of complex tibial non-unions and infected open fractures of the lower extremity referred to the trauma center.

In 1996, Dr. James Krieg joined the POC, becoming the first dedicated, fellowship-trained orthopaedic surgeon at Emanuel. Dr. Krieg quickly developed new standards for orthopaedic trauma care, working closely with Dr. Long. Dr. Steven Madey arrived in 1997 and developed a practice centered on upper extremity trauma and free flap reconstruction.

The Portland Orthopedic Clinic, by then one of the oldest orthopaedic groups in the country, dissolved on January 1, 2000. Portland Orthopedic

Specialists (POS) was founded by Drs. Krieg, Madey and Beaman with a focus on orthopaedic trauma, hand trauma and reconstruction of the foot and ankle. The resident experience changed as well. Drs. Krieg and Madey each mentored a resident on a more consistent one-on-one basis instead of the residents being spread among many surgeons. In 2001, when I joined POS, the orthopaedic residents were on-call Monday, Tuesday, Wednesday until 5 PM, and Thursday, Friday, and Sunday with no physician assistant support.

Portland Orthopedic Specialists grew to 7 members, but then dissolved in 2006. Summit Orthopedics was founded by Drs. Madey, Beaman, Gellman and Britton Frome (who joined POS in 2005), adding Dr. Corey Vande Zandschulp in 2007. About that time, physician assistants were added to help in the practice and to take call.

In 2013, a PGY4 DO resident from Samaritan Health Services in Corvallis was added to the Emanuel rotation. Our current residency training continues to focus on trauma, foot and ankle reconstruction, hand trauma and now, with the addition of Dr. Amer Mirza to Summit Orthopedics in 2014, total joint reconstruction.

The year 2020 will mark the 100th anniversary of an OHSU resident working at Emanuel Hospital. I am honored to have been a part of the assistant clinical faculty here. The residents continue to amaze and teach me each year and I hope my teaching skills continue to improve so that the Emanuel rotation remains a valuable asset to the OHSU program.

Historical Confluence Creates Orthopedic Excellence in Southern Oregon

By: Southern Oregon Orthopedics, Inc.

Southern Oregon Orthopedics, Inc. (SOOI) is an example of what can happen when circumstances conspire to bring tangible resources, human excellence and intangible factors together. Southern Oregon might seem to be an unlikely place for a cutting-edge medical community to take root and blossom. However, that is exactly what has happened and SOOI is one example of the fruit. The seeds were planted between 1900 and 1930 when families such as the Carpenters, Frohnmayers, and Cheneys came to the region. Establishing themselves in the agricultural, banking and legal sectors, these families shared strong philanthropic convictions. Together, they used their wealth and influence to support their local communities, supporting excellence in healthcare and the arts. This level of support created an atmosphere where two hospitals, Three Sisters of Providence and Community Hospital, could thrive. Due to a limited population base, the Medford area provided only one medical staff to support both hospitals. This fostered an unusually collegial and collaborative environment among medical professionals, while philanthropic support continually provided them with the very latest in tools and procedures.

In 1952, three orthopedists arrived separately in the Medford area. They happened to be some of the brightest and most forward thinking pioneers of their day. While they practiced independently, they shared privileges at both hospitals, today named Providence Medford Medical Center and Rogue Regional Medical Center. These orthopedists shared a community spirit, leading them to collaborate in such a way that in the 1950's two groups formed, Medford Orthopedic Group and the Orthopedic and Fracture Clinic. These two groups, while distinct, continued to collaborate on complex cases and met frequently. As a community, they were more focused on providing excellent medical care, constantly honing one another's skill sets.

Two young, fellowship-trained subspecialists entered this stage a few decades later. Dr. Richard Chamberlain was hired at the Medford Orthopedic Group in 1984 and Dr. Charles Versteeg joined the Orthopedic and Fracture Clinic in 1981. With the hiring of Dr. Chamberlain, Medford Orthopedic Group committed to hiring only fellowship trained subspecialists from that time forward. In 1996, the two groups combined into one, forming Southern Oregon Orthopedics, Inc. Dr. Chamberlain, Dr. Galt and Dr. Versteeg carry the legacy of these former groups and continue to practice today.

Since 1996, SOOI has grown to include twelve fellowship-trained orthopedic surgeons offering orthopedic care for every part of the body. This ability to service an entire region is rare in Oregon, outside of our metro areas. One would expect to find progressive medical procedures and the most up to date technology in a larger city, but one might be surprised to learn that SOOI has been utilizing Computer Assisted Joint Replacement technology for over ten years.

There is one more factor that plays a role in the excellence of the medical community surrounding Medford. While it remains somewhat intangible, Southern Oregon offers lifestyle factors that are very enticing to different segments of the population. A temperate climate, combined with a wide variety of retirement-living options, makes Medford one of the top places to retire in the nation. The natural beauty of our surrounding regions creates an attraction for skiers, hikers,

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kayakers, cyclists and others who love outdoor pursuits. These factors draw a large patient base for orthopedists. The rural environment fosters low crime rates, good schools, and almost non-existent commute times which provide a draw for those physicians who desire just those qualities that promote family-life.

Dr. Patrick Denard, shoulder specialist and more recent addition to the SOOI team, was attracted for just these reasons. Dr. Denard says, "The philosophy of SOOI is to provide the highest quality orthopaedic care possible. Multiple studies in medicine and orthopaedics have demonstrated that outcomes are improved with subspecialization. Based on our group philosophy and this knowledge about outcomes, we recruit and hire only orthopaedic surgeons that have fellowship training. All surgeons at SOOI are subspecialized within orthopaedics. Because we are geographically isolated and because of their level of training, our surgeons provide care from the simple to the complex. We rarely have a need to refer our patients to higher-level institutions."

Dr. Denard continues, "An additional philosophy of SOOI is the belief that patient care is best when directed by the physician and patient. As such, we strongly believe in the private practice model. More than 50% of graduating residents currently are employed by a hospital. SOOI has continued to grow and prosper. With a large group size we are able to practice as independent physicians but have a voice with other players in health care, such as insurance companies and hospitals. Our success at doing this is one reason why three of our last six hires have been graduates of OHSU orthopaedic residency."

Looking toward the future, SOOI intends to continue to add fellowship-trained surgeons to their team and to adjust their administrative procedures as needed to provide the best patient experience possible. SOOI currently has plans to add two or three physicians over the next couple of years. As patient intake technologies and reimbursement demands change, SOOI is in a position to take proactive measures. Each physician on staff contributes his or her personal commitment to staying abreast of developments in their subspecialty, to utilizing the most cutting edge technology available and to enjoying the community around them in southern Oregon.

The future for SOOI is bright. Because of the size and expertise of the practice, it is the orthopedic institution of choice to recruit for the predicted growth of demand in the future and succession planning for retiring physicians. As Obama Care takes form, SOOI will work with both local healthcare systems to achieve the "Triple AIM," and to participate in the bundle payment programs of both ACO and Medicare.

Interview with Dr. Vigeland

By: Ben Winston, MD

Can you give us the story of your path to and through orthopaedic surgery?

I grew up in a small town in North Dakota and moved to Salem, Oregon as a high school senior. I didn't know a lot of people when we moved, so my English teacher lined me up with a date for my senior prom – who eventually turned out to be my wife Julie; we will celebrate our 50th anniversary this summer. As an English teacher, Julie put me through medical school so I owe a lot to her. We have two children – one son and one daughter - and six grandchildren. My father was a general practitioner and his father was a general practitioner, so medicine was a part of my life growing up and they are probably the reason I chose to pursue medicine as a career. After three years at Pacific Lutheran University in Tacoma, I entered medical school at the University of Oregon Medical School, as it was called at that time, and then remained to do my internship. That was 1969, during Vietnam, and all doctors at that time were drafted. So I was drafted, along with all of my colleagues. I knew I was starting active duty as a general medical officer as soon as my internship was over.

My brother was in Vietnam at the time as a doctor, and as a rule they didn't send two people from the same family to Vietnam at the same time, so I was assigned to Germany. After six weeks basic training in San Antonio, my wife, four month old daughter and I headed to the next adventure.

What I didn't know was that Germany was considered a "vacation tour", so instead of two years, it ended up being nearly four. However, one of the benefits of being stationed in Germany for four years was that we had the opportunity to travel throughout Europe and even spent three weeks behind the iron curtain in Poland, Czechoslovakia and the Soviet Union in 1972.

Figure 1: Resident colleagues and community on route to Zimmer factory in Warsaw, IN

Figure 2: On maneuvers with the 4th Orthopaedists Armored Division

I was a general medical officer in the fourth armored division at a small community infirmary in southern Germany. Since the demand for my services by a healthy group of 18 year olds was minimal, I drove daily to a large army hospital in Nuremberg where I volunteered in the orthopaedic department. It turned out to be an experience that confirmed my desire to pursue a profession in orthopaedics. The only time I came back to the states in those four years was to interview for

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orthopaedic residency. I interviewed at Chapel Hill, California and Portland. It was too hot and humid in Chapel Hill, so I knew I didn't want to go there.

One night, Bill Snell, the chair at the time, called me and offered me a residency slot. So I did my orthopaedic surgery residency here on the hill. It was a great experience. Dr. Beals, of course, was an outstanding educator, Bill Snell was an extremely interesting gentleman; very wise and very helpful. Charlie Bird was the third staff member and an excellent teacher. There were twelve residents and three staff when I was here – things have changed considerably.

Residency in those days was, how should I say… frequently unmonitored. We were on our own from day one and the training from the chief residents played a major role. As a first year resident I was told to go over to the University Hospital and start a triple arthrodesis on a kid. Of course, I'd never seen one or even read about one. After four years of that kind of residency we were very experienced, if not always skilled, in all aspects of orthopaedics. Very few colleagues took fellowships in those days, so orthopaedic surgery practices were truly general.

After completing my orthopaedic residency here I went into private practice with Scott Struckman in Tigard and had a terrific partnership. It was just the two of us covering Meridian Park and Newberg Hospital; it was a very busy private practice… very rewarding. Since I practiced in Tigard, which has a lot of retired people, I saw a lot of arthritic joints. I ended up doing about 300 total joints a year in addition to the general orthopaedic cases frequently including CLOSED treatment of fractures. Unfortunately, about 15 years into our partnership Dr. Struckman developed a brain tumor and it subsequently defeated him after a long courageous battle. During his illness, our practice merged with the Portland Orthopedic Clinic which was a larger group and I had several good years there with Dick Zimmerman, and other colleagues. That large group disbanded in 2000 due to some of the changes that were going on in Portland medical circles. Fortunately for me, Dr. Bird called and asked me to teach orthopaedics at the University as full time faculty. I will be forever grateful to Charlie for that opportunity. I cannot thank him enough for making that call.

After 22 years in private practice, I spent 10 years on the faculty in the Department of Orthopaedics at OHSU. That experience was extremely rewarding. Watching the department expand under the leadership of Dr. Yoo has been truly amazing. Transitioning to full time practice at the Veterans Hospital in 2010 has been another change that has been very fulfilling. Caring for veterans is a real privilege and I will miss it when I retire sometime in the near future.

Any comments on the changes in medicine and orthopaedics?

The changes in orthopaedics in terms of implants, procedures and techniques are dramatic and ongoing. There continues to be nothing clearly black and white about decisions in orthopaedics. It is mostly gray and we can all have different opinions and debate the best treatment for our patients. That keeps it all very exciting. I enjoy that challenge.

There have also been a tremendous amount of changes in medicine as a whole. The improvement in knowledge base has been dramatic. Most of the literature at the time that I trained was kind of anecdotal type of evidence rather than the high-quality studies that are done today. Many procedures have undergone significant improvement. When I first started doing arthroscopy of the knee I had my glasses to the lens of the scope and my nose about six inches from the knee. The exposures for hip replacements have changed, and we cemented everything in my residency days. We also did a lot of trochanteric osteotomies and wired those down, which can create a lot of complex problems, but all of that trochanteric osteotomy for exposure went away finally and certainly simplified hip replacements – it's been a big change.

I think one of the disappointing things is that the entrepreneurship of going into medicine has been eliminated to a great degree. Very few people go out and start a whole new business and hire bookkeepers, receptionists, x-ray technicians; truly

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start and run a business. The Portland Orthopedic Clinic was about a 15 million dollar a year business which meant a lot of things for the doctor partners to think about and manage. When it was just a two man group it was truly entrepreneurship. We had to keep track of expenses ourselves. Of course, billing systems were a lot simpler then, but it was still running a business. My impression is that a lot of new graduates are taking salaried positions and aren't going out as an entrepreneur any more. That's good in a lot of ways but I think the challenges and satisfaction with that change as well.

Another thing that concerns me is that the physician is getting more remote from direct patient care. We didn't have PAs and we didn't have NPs in the clinic so it was really a hands-on experience. I put on all my own casts for 20 years and those were great times to converse with the patient and answer questions – patients loved it. They may not be getting personal attention as much now. PA, NP and MA assistants are all critical in the high demand practices we all have and they make our lives much easier and provide excellent care to our patients. But I have no doubt patients still love to see their surgeon.

Plans for the future?

David Shaw was highlighted in OJO two years ago for his international work. Ted Ragsdale and David Knoll and I continue to assist Dr. Shaw in South America treating children with orthopaedic bone deformities. Dr. Shaw has been doing that now for almost 20 years and he chose children because in an area where demand far out outnumbers supply, he thought he got the biggest bang for the buck taking care of kids. Children have a lifetime in front of them and in South America, if you can't walk you can't go to school. Anything that makes a child ambulatory is a lifesaver for them. That work has been a tremendous experience and I would encourage all of the residents and people out in practice to get involved in that kind of care. It is extremely rewarding. I hope to be in Peru this next February with Dr. Shaw and his team and we will see what happens from there.

Closing thoughts?

Change is good. My change from private practice to the University was very rewarding and my latest change to the VA hospital has also been very satisfying. I think the patients at the VA may be the most grateful patients that I have dealt with. And finally, having the privilege of helping train residents has been the highlight of my years in practice and I know the patients they will be caring for in the future are in good hands.

New Faculty Spotlight:

A Q&A session with Brad Yoo, MD, orthopaedic trauma surgeon at OHSU

By: Ryland Kagan, MD

How have the first six months of your practice gone?

It has been a transition, in one word busy. Starting in August, in the peak of trauma season, it was go from minute one. With two rooms almost every day, it was hectic but was also satisfying. We had the whole spectrum of trauma, from community level to high energy level one cases.

What made you choose to become an Orthopaedic Traumatologist?

My interest began during my residency at Shock Trauma. I enjoyed being in the trauma resuscitation bay at Shock, often active all night doing reductions or managing trauma patients. You would meet patients on the worst day of their lives, but guiding them through the healing process was very rewarding.

What have been the greatest challenges in your transition to OHSU?

Being proceeded by such a well-respected surgeon with a style differing from my own. I had to find middle ground with what the institution is accustomed to and what I brought to the table. Joining OHSU at such a high volume time for the trauma service, it was difficult for some of the staff to adjust to my idiosyncrasies.

What current research interests do you have?

I am very interested in biomechanical research and reviving our biomechanics lab. Currently I am examining supra-patellar nailing of tibia fractures and trauma outcomes research. Starting at OHSU, I am delighted to have the opportunity to help build an orthopaedic trauma database.

What are your goals for the trauma service at OHSU?

We are working to broaden the educational experience for everyone involved, from medical students to the chiefs. We are already underway with the bi-weekly trauma conference for residents, our first step in an evolving progression. We are also working on cultivating our referral base, which will help us to increase volume even in the non-peak trauma seasons. Educating community providers of the availability to refer anything to OHSU is the first step in this process.

What are your favorite things about Portland?

My affinity for the Pacific Northwest began during my trauma fellowship training in Seattle. The quirky culture was something that I appreciated after growing up in New England. Portland captures the spirit of the Northwest in its easy accessibility to outdoor activity, diverse food culture, independent movie theatres, craft breweries, and more. My wife's family is in the area and it is a joy to be able to spend time with them exploring all that Portland has to offer.

Every morning at conference there seems to be a different breakfast Tupperware and thermos that you have; what is your usual meal?

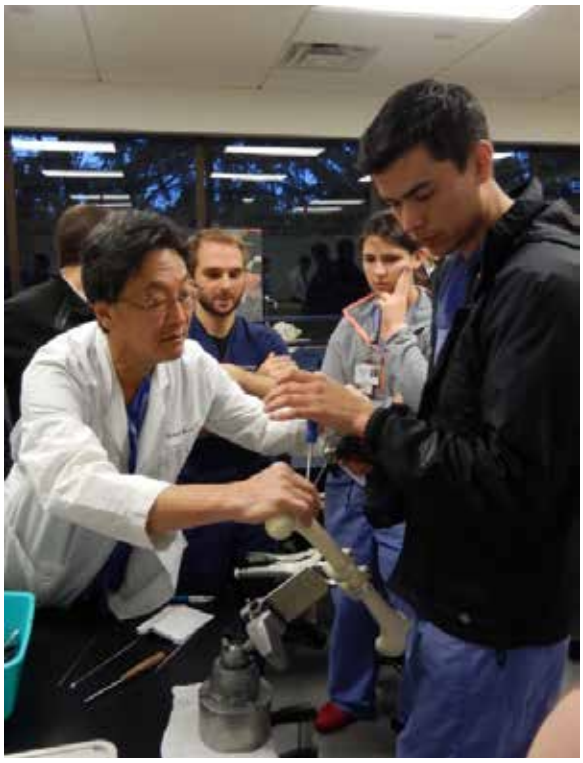
My wife makes me breakfast every morning, and it's always the same: Kale, brown rice, and a thermos of hot water. No salt, no pepper, no coffee. I have to eat in the morning; if you have seen those Snickers commercials you know the saying: "you aren't you when you're hungry". I am no exception to the rule. I get hangry.

VirtuOHSU Simulation and Surgical Training Center

By: Jacqueline Munch, MD

The education of surgical residents in all specialties has evolved significantly over the past few years, in part due to work hour restrictions and the resultant concerns raised by reducing time in the operating room for each trainee. For general surgeons, simulation, or surgical training in a non-clinical setting, has become a standard part of the residency curriculum. The Fundamentals of Laparoscopic Surgery training program is an evidence-based simulation curriculum that is now required by the Accreditation Council for Graduate Medical Education (ACGME) for general surgery residency program accreditation. Orthopaedic residents are exposed to the general surgery simulation curriculum as interns, and orthopaedic surgery residency programs are now required by the ACGME to incorporate their own simulation curriculum into the intern year. The American Board of Orthopaedic Surgery (ABOS) created a simulation curriculum consisting of seventeen modules based on fundamental principles of our specialty, and these modules serve as the basis for our simulation curriculum. The modules range from simple principles of operating room setup to specific surgical skills such as fracture fixation, arthroscopy, and arthroplasty.

Implementation of the required curriculum is left largely up to the individual residency programs, as resources at specific institutions may vary. At OHSU, the simulation curriculum has been implemented using the resources at the VirtuOHSU center on campus. A multidisciplinary operational team oversees the utilization of OHSU's two simulation spaces, VirtuOHSU and its dry lab-only sister site for the medical school, the Collaborative Life Sciences Building (CLSB). VirtuOHSU consists of 7,500 square feet of learning space, including a 70-seat amphitheater with live streaming technology to/from the lab space or even the clinical operating



Residents practice proximal femoral osteotomy under the guidance of the pediatric orthopaedic faculty at the Doernbecher and Shriners Hospitals

Residents practice techniques for intramedullary fixation of long bone fractures in cadaveric extremities with instruction from the trauma faculty

room space on campus; 8 full OR wet lab stations, 2 full "flex" OR stations that can be used as wet lab or dry lab space, a 24-seat lab-classroom area, and a 10-station minimally invasive surgery classroom with tools for laparoscopy and arthroscopy.

In anticipation of more global integration of simulation into orthopaedic residency training, OHSU has involved all residents, rather than only interns, in the simulation curriculum. The orthopaedic residents and the designated faculty for each session meet once monthly for the two-hour Friday morning simulation sessions.

The feedback regarding the orthopaedic surgery simulation experience at OHSU has been overwhelmingly positive. Residents note that they have a chance to practice start-to-finish surgical techniques in a safe and controlled setting well before they might have the opportunity in the operating room. Junior residents benefit from senior resident input and guidance as they encounter fundamental techniques for the first time, and senior residents practice teaching surgical skills in a safe setting. Faculty feel that residents have a detailed understanding of the techniques and instrumentation sooner than they would if they only had exposure in the clinical setting, and this improvement allows residents to operate more competently at an earlier point in their training. As the program grows, we plan to implement a comprehensive curriculum with attention paid to each subspecialty as the ABOS modules are addressed. Where possible, wet lab resources will be utilized to complement and increase the clinical relevance of the dry lab simulation experience.

Arthroscopic simulators are used to practice basic skills such as triangulation and hand-eye coordination

Stem cell–derived endochondral cartilage stimulates bone healing by tissue transformation. Bahney CS; Hu DP; Taylor AJ; Ferro F; Britz HM; Hallgrimsson B; Johnstone B; Miclau T; Marcucio RS. *J Bone Miner Res* 2014 May;29(5):1269-82.

Although bone has great capacity for repair, there are a number of clinical situations (fracture non-unions, spinal fusions, revision arthroplasty, segmental defects) in which auto- or allografts attempt to augment bone regeneration by promoting osteogenesis. Critical failures associated with current grafting therapies include osteonecrosis and limited integration between graft and host tissue. We speculated that the underlying problem with current bone grafting techniques is that they promote bone regeneration through direct osteogenesis. Here we hypothesized that using cartilage to promote endochondral bone regeneration would leverage normal developmental and repair sequences to produce a well-vascularized regenerate that integrates with the host tissue. In this study, we use a translational murine model of a segmental tibia defect to test the clinical utility of bone regeneration from a cartilage graft. We further test the mechanism by which cartilage promotes bone regeneration using in vivo lineage tracing and in vitro culture experiments. Our data show that cartilage grafts support regeneration of a vascularized and integrated bone tissue in vivo, and subsequently propose a translational tissue engineering platform using chondrogenesis of mesenchymal stem cells (MSCs). Interestingly, lineage tracing experiments show the regenerate was graft derived, suggesting transformation of the chondrocytes into bone. In vitro culture data show that cartilage explants mineralize with the addition of bone morphogenetic protein (BMP) or by exposure to human vascular endothelial cell (HUVEC)-conditioned medium, indicating that endothelial cells directly promote ossification. This study provides preclinical data for endochondral bone repair that has potential to significantly improve patient outcomes in a variety of musculoskeletal diseases and injuries. Further, in contrast to the dogmatic view that hypertrophic chondrocytes undergo apoptosis before bone formation, our data suggest cartilage can transform into bone by activating the pluripotent transcription factor Oct4A. Together these data represent a paradigm shift describing the mechanism of endochondral bone repair and open the door for novel regenerative strategies based on improved biology.

Transforming growth factor beta-releasing scaffolds for cartilage tissue engineering.
Madry H; Rey-Rico A; Venkatesan JK; Johnstone B; Cucchiarini M. *Tissue Eng Part B Rev* 2014 Apr;20(2):106-25.

The maintenance of a critical threshold concentration of transforming growth factor beta (TGF-β) for a given period of time is crucial for the onset and maintenance of chondrogenesis. Thus, the development of scaffolds that provide temporal and/or spatial control of TGF-β bioavailability has appeal as a mechanism to induce the chondrogenesis of stem cells in vitro and in vivo for articular cartilage repair. In the past decade, many types of scaffolds have been designed to advance this goal: hydrogels based on polysaccharides, hyaluronic acid, and alginate; protein-based hydrogels such as fibrin, gelatin, and collagens; biopolymeric gels and synthetic polymers; and solid and hybrid composite (hydrogel/solid) scaffolds. In this study, we review the progress in developing strategies to deliver TGF-β from scaffolds with the aim of enhancing chondrogenesis. In the future, such scaffolds could prove critical for tissue engineering cartilage, both in vitro and in vivo.

Kyphosis and paraspinal muscle composition in older men: a cross-sectional study for the Osteoporotic Fractures in Men (MrOS) Research Group. Katzman WB; Miller-Martinez D; Marshall LM; Lane NE; Kado DM. *BMC Musculoskelet Disord* 2014 Jan 16;15:19.

BACKGROUND

The prevalence of hyperkyphosis is increased in older men; however, risk factors other than age and vertebral fractures are not well established. We previously reported that poor paraspinal muscle composition contributes to more severe kyphosis in a cohort of both older men and women.

METHODS

To specifically evaluate this association in older men, we conducted a cross-sectional study to evaluate the association of paraspinal muscle composition and degree of thoracic kyphosis in an analytic cohort of 475 randomly selected participants from the Osteoporotic Fractures in Men (MrOS) study with baseline abdominal quantitative computed tomography (QCT) scans and plain thoracic radiographs. Baseline abdominal QCT scans were used to obtain abdominal body composition measurements of paraspinal muscle and adipose tissue distribution. Supine lateral spine radiographs were used to measure Cobb angle of kyphosis. We examined the linear association of muscle volume, fat volume and kyphosis using loess plots. Multivariate linear models were used to investigate the association between muscle and kyphosis using total muscle volume, as well as individual components of the total muscle volume, including adipose and muscle compartments alone, controlling for age, height, vertebral fractures, and total hip bone mineral density (BMD). We examined these associations among those with no prevalent vertebral fracture and those with BMI < 30 kg/m2.

RESULTS

Among men in the analytic cohort, means (SD) were 74 (SD = 5.9) years for age, and 37.5 (SD = 11.9) degrees for Cobb angle of kyphosis. Men in the lowest tertile of total paraspinal muscle volume had greater mean Cobb angle than men in the highest tertile, although test of linear trend across tertiles did not reach statistical significance. Neither lower paraspinal skeletal muscle volume (p-trend = 0.08), or IMAT (p-trend = 0.96) was associated with greater kyphosis. Results were similar among those with no prevalent vertebral fractures. However, among men with BMI < 30 kg/m2, those in the lowest tertile of paraspinal muscle volume had greater adjusted mean kyphosis (40.0, 95% CI: 37.8 – 42.1) compared to the highest tertile (36.3, 95% CI: 34.2 – 38.4).

CONCLUSIONS

These results suggest that differences in body composition may potentially influence kyphosis.

Physical performance and radiographic and clinical vertebral fractures in older men.
Cawthon PM; Blackwell TL; Marshall LM; Fink HA; Kado DM; Ensrud KE; Cauley JA; Black D; Orwoll ES; Cummings SR; Schousboe JT. *J Bone Miner Res* 2014 Sep;29(9):2101-18.

In men, the association between poor physical performance and likelihood of incident vertebral fractures is unknown. Using data from the MrOS study (N = 5958), we describe the association between baseline physical performance (walking speed, grip strength, leg power, repeat chair stands, narrow walk [dynamic balance]) and incidence of radiographic and clinical vertebral fractures. At baseline and follow-up an average of 4.6 years later, radiographic vertebral fractures were assessed using semiquantitative (SQ) scoring on lateral thoracic and lumbar radiographs. Logistic regression modeled the association between physical performance and incident radiographic vertebral fractures (change in SQ grade ≥1 from baseline to follow-up). Every 4 months after baseline, participants self-reported fractures; clinical vertebral fractures were confirmed by centralized radiologist review of the baseline study radiograph and community-acquired spine images. Proportional hazards regression modeled the association between physical performance with incident clinical vertebral fractures. Multivariate models were adjusted for age, bone mineral density (BMD, by dual-energy X-ray absorptiometry [DXA]), clinical center, race, smoking, height, weight, history of falls, activity level, and comorbid medical conditions; physical performance was analyzed as quartiles. Of 4332 men with baseline and repeat radiographs, 192 (4.4%) had an incident radiographic vertebral fracture. With the exception of walking speed, poorer performance on repeat chair stands, leg power, narrow walk, and grip strength were each associated in a graded manner with an increased risk of incident radiographic vertebral fracture (p for trend across quartiles <0.001). In addition, men with performance in the worst quartile on three or more exams had an increased risk of radiographic fracture (odds ratio [OR] = 1.81, 95% confidence interval [CI] 1.33-2.45) compared with men with better performance on all exams. Clinical vertebral fracture (n =149 of 5813, 2.6%) was not consistently associated with physical performance. We conclude that poorer physical performance is associated with an increased risk of incident radiographic (but not clinical) vertebral fracture in older men.

Methods and reliability of radiographic vertebral fracture detection in older men: the Osteoporotic Fractures in Men study. Cawthon PM; Haslam J; Fullman R; Peters KW; Black DM; Ensrud KE; Cummings SR; Orwoll ES; Barrett-Connor E; Marshall L; Steiger P; Schousboe JT. *Bone* 2014 Oct;67:152-5.

We describe the methods and reliability of radiographic vertebral fracture assessment in MrOS, a cohort of community dwelling men aged ≥65yrs. Lateral spine radiographs were obtained at Visit 1 (2000-2) and 4.6years later (Visit 2). Using a workflow tool (SpineAnalyzer™, Optasia Medical), a physician reader completed semi-quantitative (SQ) scoring. Prior to SQ scoring, technicians performed "triage" to reduce physician reader workload, whereby clearly normal spine images were eliminated from SQ scoring with all levels assumed to be SQ=0 (no fracture, "triage negative"); spine images with any possible fracture or abnormality were passed to the physician reader as "triage positive" images. Using a quality assurance sample of images (n=20 participants; 8 with baseline only and 12 with baseline and follow-up images) read multiple times, we calculated intra-reader kappa statistics and percent agreement for SQ scores. A subset of 494 participants' images was read regardless of triage classification to calculate the specificity and sensitivity of triage. Technically adequate images were available for 5958 of 5994 participants at Visit 1, and 4399 of 4423 participants at Visit 2. Triage identified 3215 (53.9%) participants with radiographs that required further evaluation by the physician reader. For prevalent fractures at Visit 1 (SQ≥1), intra-reader kappa statistics ranged from 0.79 to 0.92; percent agreement ranged from 96.9% to 98.9%; sensitivity of the triage was 96.8% and specificity of triage was 46.3%. In conclusion, SQ scoring had excellent intra-rater reliability in our study. The triage process reduces expert reader workload without hindering the ability to identify vertebral fractures.

Functional limitations due to stiffness as a collateral impact of instrumented arthrodesis of the lumbar spine. Hart RA; Marshall LM; Hiratzka SL; Kane MS; Volpi J; Hiratzka JR. *Spine* 2014 Nov 5;39(24):E1468-74.

STUDY DESIGN
Prospective cohort

OBJECTIVE
To understand whether patients actually perceive increased limitations as compared to their pre-operative state due to stiffness following lumbar arthrodesis.

SUMMARY OF BACKGROUND DATA
Lumbar arthrodesis by intention eliminates spinal motion in an attempt to decrease pain, deformity and instability. Independent of pain, loss of mobility can impact ability to perform certain activities of daily living (ADLs). The Lumbar Stiffness Disability Index (LSDI) is a validated measure of the effect of lumbar stiffness on functional activities. To date, no prospective evaluations of stiffness impacts on patient function following lumbar arthrodesis have been reported.

METHODS
The LSDI, Short Form-36 (SF-36) and Oswestry Disability Index (ODI) were administered pre-operatively and at 2-year minimum follow-up to 62 adult patients undergoing lumbar fusion for degenerative disease or spinal deformity. Patients also completed a satisfaction questionnaire at 2 years. Patients were separated according to the number of lumbar arthrodesis levels. Pre- and post-operative LSDI, SF-36 Physical Composite Score (PCS), and ODI scores were compared using paired t-tests.

RESULTS
Significant improvements in ODI were seen across all arthrodesis levels, and significant improvements in PCS were seen at 1-level and at 5 or more levels. Patients undergoing 1-level arthrodesis demonstrated statistically significant decreases in LSDI scores, indicating less impact from stiffness than at baseline. Patients with 3 or 4 levels and 5 or more levels of arthrodesis showed increases in LSDI scores, although none reached significance with the numbers available. Forty-six percent of patients reported that low back stiffness created significant limitations in ADLs, although 97% indicated that they would undergo the same procedure again and 91% reported that any increase in stiffness was an acceptable trade-off for their functional improvements from lumbar arthrodesis.

CONCLUSIONS
Patients undergoing elective lumbar arthrodesis reported relatively limited functional deficit due to stiffness at 2-year follow-up. Paradoxically, patients undergoing 1-level arthrodesis actually reported significantly less limitation due to stiffness post-operatively. While the effects of stiffness did trend toward greater impacts among patients undergoing longer fusions, 91% of patients were satisfied with trade-offs of function and pain relief in exchange for perceived increases in lumbar stiffness.

Spine surgery training: is it time to consider categorical spine surgery residency? Daniels AH; Ames CP; Garfin SR; Shaffrey CI; Riew KD; Smith JS; Anderson PA; Hart RA. *Spine J* 2014 Nov 6. pii: S1529-9430(14)01320-5. [Epub ahead of print]

BACKGROUND CONTEXT

Current spine surgeon training in the United States consists of either an orthopedic surgery or a neurological surgery residency followed by an optional spine surgery fellowship. In recent years, spine surgery has matured into a complex medical and surgical specialty, with a large number of procedures and techniques for spinal surgeons to understand and learn before entering independent practice. The current training system with two parallel paths to spine surgery may not be the optimal model to train tomorrow's spine surgeons.

PURPOSE

To propose a spinal surgery training pathway of categorical spine surgery residency which would complement (rather than replace) the existing training pathways.

METHODS

Review of literature and proposal of novel training pathway.

RESULTS

Integration of the orthopedic spine and neurosurgical spine surgery educational programs offers one option to enhance spine surgeon training in an effort to improve patient outcomes and advance scientific knowledge. The development of categorical spine surgery residency programs would provide a focused and pertinent spine training experience aimed at training the next generation of spine surgeons.

CONCLUSION

Potential benefits of unifying spine training appear substantial, although several barriers to a unified approach exist. Discussion regarding the future of spine surgery training and the possibility of creating dedicated categorical spine surgery residency training for the benefit of patients, spine surgeons, and society as a whole appears appropriate.

Variability in spine surgery procedures performed during orthopaedic and neurological surgery residency training: an analysis of ACGME case log data. Daniels AH; Ames CP; Smith JS; Hart RA. *J Bone Joint Surg Am* 2014 Dec 03;96(23):e196.

BACKGROUND

Current spine surgeon training in the United States consists of either an orthopaedic or neurological surgery residency, followed by an optional spine surgery fellowship. Resident spine surgery procedure volume may vary between and within specialties.

METHODS

The Accreditation Council for Graduate Medical Education surgical case logs for graduating orthopaedic surgery and neurosurgery residents from 2009 to 2012 were examined and were compared for spine surgery resident experience.

RESULTS

The average number of reported spine surgery procedures performed during residency was 160.2 spine surgery procedures performed by orthopaedic surgery residents and 375.0 procedures performed by neurosurgery residents; the mean difference of 214.8 procedures (95% confidence interval, 196.3 to 231.7 procedures) was significant ($p = 0.002$). From 2009 to 2012, the average total spinal surgery procedures logged by orthopaedic surgery residents increased 24.3% from 141.1 to 175.4 procedures, and those logged by neurosurgery residents increased 6.5% from 367.9 to 391.8 procedures. There was a significant difference ($p < 0.002$) in the average number of spinal deformity procedures between graduating orthopaedic surgery residents (9.5 procedures) and graduating neurosurgery residents (2.0 procedures). There was substantial variability in spine surgery exposure within both specialties; when comparing the top 10% and bottom 10% of 2012 graduates for spinal instrumentation or arthrodesis procedures, there was a 13.1-fold difference for orthopaedic surgery residents and an 8.3-fold difference for neurosurgery residents.

CONCLUSIONS

Spine surgery procedure volumes in orthopaedic and neurosurgery residency training programs vary greatly both within and between specialties. Although orthopaedic surgery residents had an increase in the number of spine procedures that they performed from 2009 to 2012, they averaged less than half of the number of spine procedures performed by neurological surgery residents. However, orthopaedic surgery residents appear to have greater exposure to spinal deformity than neurosurgery residents. Furthermore, orthopaedic spine fellowship training provides additional spine surgery case exposure of approximately 300 to 500 procedures; thus, before entering independent practice, when compared with neurosurgery residents, most orthopaedic spine surgeons complete as many spinal procedures or more. Although case volume is not the sole determinant of surgical skills or clinical decision making, variability in spine surgery procedure volume does exist among residency programs in the United States.

High-grade spondylolisthesis treated using a modified Bohlman technique: results among multiple surgeons. Hart RA; Domes CM; Goodwin B; D'Amato CR; Yoo JU; Turker RJ; Halsey MF. *J Neurosurg Spine* 2014 May;20(5):523-30.

OBJECT

The ideal surgical management of high-grade spondylolisthesis remains unclear. Concerns regarding the original Bohlman transsacral interbody fusion technique with stand-alone autologous fibular strut include late graft fracture and incomplete reduction of lumbosacral kyphosis. The authors' goal was to evaluate the radiographic and surgical outcomes of patients treated for high-grade spondylolisthesis with either transsacral S-1 screws or standard pedicle screw fixation augmenting the Bohlman posterior transsacral interbody fusion technique.

METHODS

A retrospective review of patients who underwent fusion for high-grade spondylolisthesis in which a Bohlman oblique posterior interbody fusion augmented with either transsacral or standard pedicle screw fixation was performed by 4 spine surgeons was completed. Estimated blood loss, operating time, perioperative complications, and need for revision surgery were evaluated. Upright pre- and postsurgical lumbar spine radiographs were compared for slip percent and slip angle.

RESULTS

Sixteen patients (12 female and 4 male) with an average age of 29 years (range 9-66 years) were evaluated. The average clinical follow-up was 78 months (range 5-137 months) and the average radiographic follow-up was 48 months (range 5-108 months). Ten L4-S1 and 6 L5-S1 fusions were performed. Five fibular struts and 11 titanium mesh cages were used for interbody fusion. Six patients had isolated transsacral screws placed, with 2 (33%) of the 6 requiring revision surgery for nonunion. No nonunions were observed in patients undergoing spanning pedicle screw fixation augmenting the interbody graft. Six patients experienced perioperative complications including 3 iliac crest site infections, 1 L-5 radiculopathy without motor involvement, 1 deep vein thrombosis, and 1 epidural hematoma requiring irrigation and debridement. The average estimated blood loss and operating times were 763 ml and 360 minutes, respectively. Slip percent improved from an average of 62% to 37% ($n = 16$; $p < 0.01$) and slip angle improved from an average of 18° to 8° ($n = 16$; $p < 0.01$). No patient experienced L-5 or other motor deficit postoperatively.

CONCLUSIONS

The modified Bohlman technique for treatment of high-grade spondylolisthesis has reproducible outcomes among multiple surgeons and results in significant improvements in slip percent and slip angle. Fusion rates were high (14 of 16; 88%), especially with spanning instrumentation augmenting the oblique interbody fusion. Rates of L-5 motor deficit were low in comparison with techniques involving reduction of the anterolisthesis.

The current state of US spine surgery training: a survey of residency and spine fellowship program directors. Daniels AH; DePasse M; Magill ST; Fischer S; Palumbo MA; Ames C; Hart RA. *Spine Deformity* 2014 May 1:2(3):176-185. Featured article: *Becker's Spine Review*, May 14th, 2014.

STUDY DESIGN
Program director survey.

OBJECTIVES
To collect data on spine surgical experience during orthopedic and neurological surgery residency and assess the opinions of program directors (PDs) from orthopedic and neurological surgery residencies and spine surgery fellowships regarding current spine surgical training in the United States.

SUMMARY OF BACKGROUND DATA
Current training for spine surgeons in the United States consists of a residency in either orthopedic or neurological surgery followed by an optional spine surgery fellowship. Program director survey data may assist in efforts to improve contemporary spine training.

METHODS
An anonymous questionnaire was distributed to all PDs of orthopedic and neurological surgery residencies and spine fellowships in the United States (N = 382). A 5-point Likert scale was used to assess attitudinal questions. A 2-tailed independent-samples t test was used to compare responses to each question independently.

RESULTS
A total of 147 PDs completed the survey. Orthopedic PDs most commonly indicated that their residents participate in 76 to 150 spine cases during residency, whereas neurological surgery PDs most often reported more than 450 spine cases during residency ($p < .0001$). Over 88% of orthopedic surgery program directors and 0% of neurological surgery PDs recommended that their trainees complete a fellowship if they wish to perform community spine surgery ($p < .001$). In contrast, 98.1% of orthopedic PDs and 86.4% of neurological surgery PDs recommended that their trainees complete a fellowship if they wish to perform spinal deformity surgery ($p = .038$). Most PDs agreed that surgical simulation and competency-based training could improve spine surgery training (76% and 72%, respectively).

CONCLUSIONS
This study examined the opinions of orthopedic and neurological surgery residency and spine fellowship PDs regarding current spine surgery training in the United States. A large majority of PDs thought that both orthopedic and neurological surgical trainees should complete a fellowship if they plan to perform spinal deformity surgery. These results provide a background for further efforts to optimize contemporary spine surgical training.

Life expectancy and metastatic spine scoring systems: an academic institutional experience. Ragel BT; Mendez GA; Reddington J; Ferachi D; Kubicky CD; Philipp TC; Zusman NL; Klimo P; Hart R; Yoo J; Ching AC. *J Spinal Disord Tech* 2014 Aug 1. [Epub ahead of print]

OBJECT

The authors evaluated the efficacy of posterior instrumentation for the management of spontaneous spinal infections. Standard surgical management of spontaneous spinal infection is based on debridement of the infected tissue. However, this can be very challenging as most of these patients are medically debilitated and the surgical debridement requires a more aggressive approach to the spine either anteriorly or via an expanded posterior approach. The authors present their results using an alternative treatment method of posterior-only neuro-decompression and stabilization without formal debridement of anterior tissue for treating spontaneous spinal infection.

METHODS

Fifteen consecutive patients were treated surgically by 2 of the authors. All patients had osteomyelitis and discitis and were treated postoperatively with intravenous antibiotics for at least 6 weeks. The indications for surgery were failed medical management, progressive deformity with ongoing persistent spinal infection, or neurological deficit. Patients with simple epidural abscess without bony instability were treated with laminectomy and were not included in this series. Fourteen patients were treated with posterior-only decompression and long-segment rigid fixation, without formal debridement of the infected area. One patient was treated with staged anterior and posterior surgery due to delay in treatment related to medical comorbidities. The authors examined as their outcome the ambulatory status and recurrence of deep infection requiring additional surgery or medical treatment.

RESULTS

Of the initial 15 patients, 10 (66%) had a minimum 2-year follow-up and 14 patients had at least 1 year of followup. There were no recurrent spinal infections. There were 3 unplanned reoperations (1 for loss of fixation, 1 for early superficial wound infection, and 1 for epidural hematoma). Nine (60%) of 15 patients were nonambulatory at presentation. At final followup, 8 of 15 patients were independently ambulatory, 6 required an assistive device, and 1 remained nonambulatory.

CONCLUSIONS

Long-segment fixation, without formal debridement, resulted in resolution of spinal infection in all cases and in significant neurological recovery in almost all cases. This surgical technique, when combined with aggressive antibiotic therapy and a multidisciplinary team approach, is an effective way of managing serious spinal infections in a challenging patient population.

Adverse events recording and reporting in clinical trials of cervical total disk replacement. Anderson PA; Hart RA. *Am Acad Orthopaed Surgeons Instr Course Lect* 2014;63:287-96.

Adverse events reporting in pivotal trials of new technologies, such as cervical total disk replacement, are essential to determine safety. Important questions concerning the adequacy of reporting about such new technologies in peer-reviewed publications have prompted this analysis to assess the safety of cervical disk replacement compared with fusion as presented in peer-reviewed publications and FDA summary reports. Identifying differences among these reports highlight the poor quality of adverse event reporting in the peer-reviewed literature. Nine peer-reviewed studies and five FDA summary reports documented excellent safety for both cervical fusion and disk arthroplasty. No differences in rates of adverse events were found to exist between the two treatments. The methods of recording and the actual reporting of adverse events were poor in peer-reviewed manuscripts, whereas they were comprehensive but difficult to clinically apply in the FDA summaries. Recommendations to improve documentation and reporting of adverse events are presented.

Developing a toolkit for comparing safety in spine surgery. Mirza SK; Martin BI; Goodkin R; Hart RA; Anderson PA. *Am Acad Orthopaed Surgeons Instr Course Lect* 2014;63:271-86.

Safety information in spine surgery is important for informed patient choice and performance-based payment incentives, but measurement methods for surgical safety assessment are not standardized. Published reports of complication rates for common spinal procedures show wide variation. Factors influencing variation may include differences in safety ascertainment methods and procedure types. In a prospective cohort study, adverse events were observed in all patients undergoing spine surgery at two hospitals during a 2-year period. Multiple processes for adverse occurrence surveillance were implemented, and the associations between surveillance methods, surgery invasiveness, and observed frequencies of adverse events were examined. The study enrolled 1,723 patients. Adverse events were noted in 48.3% of the patients. Reviewers classified 25% as minor events and 23% as major events. Of the major events, the daily rounding team reported 38.4% of the events using a voluntary reporting system, surgeons reported 13.4%, and 9.1% were identified during clinical conferences. A review of medical records identified 86.7% of the major adverse events. The adverse events occurred during the inpatient hospitalization for 78.1% of the events, within 30 days for an additional 12.5%, and within the first year for the remaining 9.4%. A unit increase in the invasiveness index was associated with an 8.2% increased risk of a major adverse event. A Current Procedural Terminology-based algorithm for quantifying invasiveness correlated well with medical records-based assessment. Increased procedure invasiveness is associated with an increased risk of adverse events. The observed frequency of adverse events is influenced by the ascertainment modality. Voluntary reports by surgeons and other team members missed more than 50% of the events identified through a medical records review. Increased surgery invasiveness, measured from medical records or billing codes, is quantitatively associated with an increased risk of adverse events.

Intraoperative neurophysiological monitoring in anterior lumbar interbody fusion surgery. Yaylali I; Ju H; Yoo J; Ching A; Hart R. *J Clin Neurophysiol* 2014 Aug;31(4):352-5.

PURPOSE

Somatosensory evoked potential (SSEP) and motor evoked potentials (MEP) are frequently fused to monitor neurological function during spinal deformity surgery. However, there are few studies regarding the utilization of intraoperative neuromonitoring during anterior lumbar interbody fusion (ALIF). This study presents the authors' experience with intraoperative neuromonitoring in ALIF.

METHODS

A retrospective review of all patients undergoing ALIF with intraoperative neuromonitoring from November 2008 to July 2013 was performed. Factors including gender, operative time, blood loss, and number and levels of interbody fusions were analyzed as risk factors for interoperational alerts.

RESULTS

A total of 189 consecutive patients who underwent ALIFs were studied. All 189 patients had SSEP, and 131 patients had MEP as part of the intraoperative neuromonitoring in addition. The remaining 58 patients did not have MEP due to neuromuscular blockade requested by the exposure surgeon. There were no isolated intraoperative MEP changes. A total of 15 (7.9%) patients experienced intraoperative alerts. Thirteen (6.8%) of them were in SSEP. Two (1.1%) had MEP and SSEP changes together. None of these patients had new neurologic deficits postoperatively because of the surgeon's responses to the intraoperative alert. Increased risk of SSEP changes was seen in patients undergoing fusion of both L4/5 and L5/S1 ($P = 0.024$) and longer surgical duration ($P = 0.036$). No correlation was found between age and positive SSEP changes ($P > 0.05$).

CONCLUSIONS

Somatosensory evoked potential changes occur relatively, frequently, and intraoperatively during ALIF. No patients with positive intraoperative SSEP changes demonstrated new postoperational deficits. Concurrent fusion of both the L4/5 and L5/S1 levels was significant risk factors for SSEP changes leading to intraoperative alerts. Operative duration and increased blood loss during surgery trended toward but did not reach statistical significance.

Bone mineral density and donor age are not predictive of femoral ring allograft bone mechanical strength. Krishnamoorthy B; Bay BK; Hart RA. *J Orthop Res* 2014 Oct;32(10):1271-6.

While metal or plastic interbody spinal fusion devices are manufactured to appropriate mechanical standards, mechanical properties of commercially prepared structural allograft bone remain relatively unassessed. Robust models predicting compressive load to failure of structural allograft bone based on easily measured variables would be useful. Three hundred twenty seven femoral rings from 34 cadaver femora were tested to failure in axial compression. Predictive variables included age, gender, bone mineral density (BMD), position along femoral shaft, maximum/minimum wall thickness, outer/inner diameter, and area. We used support vector regression and 10-fold cross-validation to develop robust nonlinear predictive models for load to failure. Model performance was measured by the root-mean-squared-deviation (RMSD) and correlation coefficients (r). A polynomial model using all variables had RMSD¼7.92, r¼0.84, indicating excellent performance. A model using all variables except BMD was essentially unchanged (RMSD¼8.12, r¼0.83). Eliminating both age and BMD produced a model with RMSD¼8.41, r¼0.82, again essentially unchanged. Compressive strength of structural allograft bone can be estimated using easily measured geometric parameters, without including BMD or age. As DEXA is costly and cumbersome, and setting upper age-limits for potential donors reduces the supply, our results may prove helpful to increase the quality and availability of structural allograft.

Likelihood of reaching minimal clinically important difference in adult spinal deformity: a comparison of operative and nonoperative treatment. Liu S; Schwab F; Smith JS; Klineberg E; Ames CP; Mundis G; Hostin R; Kebaish K; Deviren V; Gupta M; Boachie-Adjei O; Hart RA; Bess S; Lafage V. *Ochsner J* 2014 Spring;14(1):67-77.

BACKGROUND

Few studies have examined threshold improvements in health-related quality of life (HRQOL) by measuring minimal clinically important differences (MCIDs) in treatment of adult spinal deformity. We hypothesized that patients undergoing operative treatment would be more likely to achieve MCID threshold improvement compared with those receiving nonoperative care, although a subset of nonoperative patients may still reach threshold.

METHODS

We analyzed a multicenter, prospective, consecutive case series of 464 patients: 225 nonoperative and 239 operative. To be included in the study, patients had to have adult spinal deformity, be older than 18 years, and have both baseline and 1-year follow-up HRQOL measures (Oswestry Disability Index [ODI], Short Form-36 [SF-36] health survey, and Scoliosis Research Society-22 [SRS-22] questionnaire). We compared the percentages of patients achieving established MCID thresholds between operative and nonoperative groups using risk ratios (RR) with a 95% confidence interval (CI).

RESULTS

Compared to nonoperative patients, surgical patients demonstrated significant mean improvement ($P<0.01$) and were more likely to achieve threshold MCID improvement across all HRQOL scores (ODI RR = 7.37 [CI 4.45, 12.21], SF-36 physical component score RR = 2.96 [CI 2.11, 4.15], SRS Activity RR = 3.16 [CI 2.32, 4.31]). Furthermore, operative patients were more likely to reach threshold MCID improvement in 2 or more HRQOL measures simultaneously and were less likely to deteriorate.

CONCLUSION

Patients in both the operative and nonoperative treatment groups demonstrated improvement in at least one HRQOL measure at 1 year. However, surgical treatment was more likely to result in threshold improvement and more likely to lead to simultaneous improvement across multiple measures of ODI, SF-36, and SRS-22. Although a subset of nonoperative patients achieved threshold improvement, nonoperative patients were significantly less likely to improve in multiple HRQOL measures and more likely to sustain MCID deterioration or no change.

Posterior fixation without debridement for vertebral body osteomyelitis and discitis.
Mohamed AS; Yoo J; Hart R; Ragel BT; Hiratzka J; Hamilton DK; Barnes PD; Ching AC. *Neurosurg Focus* 2014 Aug;37(2):E6. [PubMed - in process]

OBJECT

The authors evaluated the efficacy of posterior instrumentation for the management of spontaneous spinal infections. Standard surgical management of spontaneous spinal infection is based on debridement of the infected tissue. However, this can be very challenging as most of these patients are medically debilitated and the surgical debridement requires a more aggressive approach to the spine either anteriorly or via an expanded posterior approach. The authors present their results using an alternative treatment method of posterior-only neuro-decompression and stabilization without formal debridement of anterior tissue for treating spontaneous spinal infection.

METHODS

Fifteen consecutive patients were treated surgically by 2 of the authors. All patients had osteomyelitis and discitis and were treated postoperatively with intravenous antibiotics for at least 6 weeks. The indications for surgery were failed medical management, progressive deformity with ongoing persistent spinal infection, or neurological deficit. Patients with simple epidural abscess without bony instability were treated with laminectomy and were not included in this series. Fourteen patients were treated with posterior-only decompression and long-segment rigid fixation, without formal debridement of the infected area. One patient was treated with staged anterior and posterior surgery due to delay in treatment related to medical comorbidities. The authors examined as their outcome the ambulatory status and recurrence of deep infection requiring additional surgery or medical treatment.

RESULTS

Of the initial 15 patients, 10 (66%) had a minimum 2-year follow-up and 14 patients had at least 1 year of followup. There were no recurrent spinal infections. There were 3 unplanned reoperations (1 for loss of fixation, 1 for early superficial wound infection, and 1 for epidural hematoma). Nine (60%) of 15 patients were nonambulatory at presentation. At final followup, 8 of 15 patients were independently ambulatory, 6 required an assistive device, and 1 remained nonambulatory.

CONCLUSIONS

Long-segment fixation, without formal debridement, resulted in resolution of spinal infection in all cases and in significant neurological recovery in almost all cases. This surgical technique, when combined with aggressive antibiotic therapy and a multidisciplinary team approach, is an effective way of managing serious spinal infections in a challenging patient population.

Temporal in vivo assessment of fresh osteochondral allograft transplants to the distal aspect of the femur by dGEMRIC (delayed gadolinium-enhanced MRI of cartilage) and zonal T2 mapping MRI. Brown DS; Durkan MG; Foss EW; Szumowski J; Crawford DC. *J Bone Joint Surg* 2014 Apr 2;96(A):564-72.

BACKGROUND

Zonal T2 mapping and dGEMRIC (delayed gadolinium-enhanced magnetic resonance imaging of cartilage) are diagnostic quantitative techniques to evaluate the biochemical health of articular cartilage. We adapted these techniques to investigate the results of osteochondral allograft transplantation and correlated the findings with patient reported outcomes.

METHODS

Nine patients with contained ICRS (International Cartilage Repair Society) grade-4 defects of the articular portion of a femoral condyle were treated with fresh osteochondral allografts and were evaluated prospectively with dGEMRIC and T2 mapping before and after gadolinium administration. The KOOS (Knee Injury Osteoarthritis Outcome Score) and IKDC (International Knee Documentation Committee) subjective scores were obtained at baseline and at one and two years postoperatively. For quantitative T2 mapping, regions of interest were drawn in the deep and superficial layers of allograft and control cartilage. For dGEMRIC analyses, the relaxation rate, post-gadolinium change in relaxation rate, and ratio between changes in the allograft and control regions of interest were calculated from T1 values.

RESULTS

The mean ratio between the post-gadolinium changes in the allograft and control cartilage was 1.13 at one year and 1.55 at two years, and the ratio increased in eight of nine patients from one to two years. There was no difference between the mean T2 values in the deep zone of the allograft and control cartilage at one or two years ($p > 0.05$), but mean T2 values were higher in the superficial zone of the allograft cartilage at one ($p < 0.0001$) and two ($p < 0.028$) years. The mean improvement from baseline was significant at one and two years for the IKDC and all five KOOS subdomains ($p < 0.05$). All or nearly all patients showed improvements in all clinical outcomes scores at one year.

CONCLUSIONS

Functional MRI techniques can be applied to noninvasively assess the biochemical health of cartilage after osteochondral allograft transplantation. The MRI findings correlated with certain patient-reported outcomes in the early postoperative period. Relative glycosaminoglycan content and the collagen structure of allograft cartilage may undergo time-dependent degeneration. A patient's perception of clinical outcome and quality of life is likely multifactorial and is impacted by more than the health of the allograft cartilage.

Level of Evidence: Therapeutic Level II.

Popliteal artery injury associated with total knee arthroplasty: trends, costs and risk factors. Matsen Ko LJ; DeHart ML; Yoo JU; Huff TW. *J Arthroplasty* 2014 Jun;29(6):1181-4.

Patient-specific versus conventional instrumentation for total knee arthroplasty: peri-operative and cost differences. DeHaan AM; Adams JR; DeHart ML; Huff TW. *J Arthroplasty* 2014 Nov;29(11):2065-9.

Does recombinant human bone morphogenetic protein-2 use in adult spinal deformity increase complications and are complications associated with location of rhBMP-2 use? A prospective, multicenter study of 279 consecutive patients. Bess S; Line BG; Lafage V; Schwab F; Shaffrey CI; Hart RA; Boachie-Adjei O; Akbarnia BA; Ames CP; Burton DC; Deverin V; Fu K-M G; Gupta M; Hostin R; Kebaish K; Klineberg E; Mundis G; O'Brien M; and the International Spine Study Group. *Spine Deformity* 2014;29(3):233-42.

Patients with adult spinal deformity treated operatively report greater baseline pain and disability than patients treated nonoperatively; however, deformities differ between age groups. Fu K-M G; Bess S; Shaffrey CI; Smith JS; Lafage V; Schwab F; Burton DG; Akbarnia BA; Ames CP; Boachie-Adjei O; Deverin V; Hart RA; Hostin R; Klineberg E; Gupta M; Kebaish K; Mundis G; Mummaneni PV; and the International Spine Study Group. *Spine Deformity* 2014;39(17):1401-07.

Proximal junctional kyphosis and failure after spinal deformity surgery: a systematic review of the literature as a background to classification development. Lau D; Clark AJ; Scheer JK; Daubs MD; Coe JD; Paonessa KJ; LaGrone MO; Kasten MD; Amaral RA; Trobisch PD; Lee J-H; Fabris-Monterumici D; Anand N; Cree AH; Hart RA; Hey LA; Ames C; and the SRS Adult Spinal Deformity Committee. *Spine* 2014;39(25):2093-2102.

Association between advanced degenerative changes of the atlanto-odontoid joint and presence of odontoid fracture. Shinseki M; Zusman N; Hiratzka J; Marshall L; Yoo J. *J Bone Joint Surg* 2014 May;96(9):712-7.

Instrumenting the balance error scoring system for use with patients reporting persistent balance problems after mild traumatic brain injury. King LA; Horak FB; Mancini M; Pierce D; Priest KC; Chesnutt J; Sullivan P; Chapman JC. *Arch Phys Med Rehabil* 2014 Feb;95(2):353-9.

Knee function assessment in patients with meniscus injury: a preliminary study of reproducibility, response to treatment, and correlation with patient-reported questionnaire outcomes. Naimark MB; Kegel G; O'Donnell T; Lavigne S; Heveran C; Crawford DC. *Orthopedic Journal Sports Med* 2014;2(9):1-8.

Modular versus nonmodular neck femoral implants in primary total hip arthroplasty: which is better? Duwelius PJ; Burkhart B; Carnahan C; Branam G; Matsen Ko L; Wu YX; Froemke C; Wang L; Grunkemeier G. *Clin Orthop Relat Res* 2014 Apr;272(4):1240-5.

Sagittal cervical spine alignment influences the prevalence of C2-fracture and the magnitude of fracture displacement. Betsch M; Blizzard SR; Zusman N; Shinseki M; Yoo J.

CT scans were reviewed from trauma patients age ≥ 55 with and without cervical fracture. Sagittal alignment was measured by lordosis angle via Cobb method between C2 and T1, and sagittal inclination angles through the C5-6, C6-7 disc spaces. Angular and translational displacement measurements were made for patients with fracture. Dens fracture patients had significantly greater cervical lordosis and more caudally inclined C5-6 and C6-7 disc space. The magnitude of displacement was positively correlated to C5-6 and C6-7 inclination angles. Sagittal alignment plays a significant role in the risk of sustaining a dens fracture and in the magnitude of fracture displacement.

Degeneration of the cervical spine influences the risk of sustaining dens fractures. Betsch M; Blizzard S; Yoo JU.

Despite the high prevalence of dens fractures and their consequence to health of the aging population, there is a paucity of research identifying anatomic risk factors. CT scans were obtained for 51 patients with dens fracture and for a random sample of 741 without fracture who served as a control group. Patients with grades 2 and 3 degeneration were considered to have OA. Patients with grade 1 were considered to have no OA. Differences between fracture and control groups were assessed. Patients with OA of the atlanto-dens interval were twice as likely to sustain a fracture as patients without OA. The C5/C6 facet joints had the lowest increase in the relative dens fracture risk of 1.8; the C3/C4 facet joints had the highest increase in the relative dens fracture risk of 4.5. In patients 55 and older, OA of the C2-C6 facet joints and atlanto-dens interval appear to play a role in the risk of sustaining a dens fracture. Better understanding of the relation between fracture and OA of the cervical spine may lead to more effective prevention or treatment of these fractures.

The thoracolumbar fusion risk score (LOVE score): predicting postoperative morbidity and mortality. Munch JL; Zusman NL; Lieberman E; Stucke R; Bell C; Philipp TC; Smith S; Ching AC; Yoo JU.

We systematically examined our high-risk patients, those with The American Society of Anesthesiologists (ASA) Score of 3-4, undergoing an elective thoracic/lumbar fusion to isolate important perioperative variables, and to develop a scoring system that predicted the rate of developing major medical complications in this group. Patients who suffered major medical complications within the 30-day postoperative period between 2007 and 2011 were identified. Risk factors that affected the medical complication rate were ranked by quartiles, which were then combined to form a single composite score. We then determined the complication rate for each composite score, divided the cohort into quartiles again based on score, and compared the incidence of complications to the score. Number of fused levels, operative time, volume of intraoperative fluids, and EBL contributed to the development of medical complications. Although these four factors are not independent of one another, taken together they proved to be strongly predictive of the major medical complication rate.

Stiffness after pan-lumbar arthrodesis for adult spinal deformity does not significantly impact patient functional status or satisfaction. Hart RA; Hiratzka J; Kane MS; Lafage V; Klineberg E; Ames CP; Line BG; Schwab F; Scheer JK; Bess S; Hamilton K; Shaffrey CI; Mundis G; Smith JS; Burton DG; Sciubba D; Deverin V; Boachie-Adjei O.

The Lumbar Stiffness Disability Index (LSDI) is a validated measure of the effect of lumbar stiffness on functional activities. The LSDI, Short Form 36 (SF-36), Scoliosis Research Society-22 (SRS-22), and Oswestry Disability Index (ODI) were administered pre-operatively and at 2-year minimum follow-up to 103 adult patients from 11 centers undergoing thoraco-lumbar fusion to the sacro-pelvis for spinal deformity. Patients were separated according to the proximal arthrodesis level; upper thoracic (T2-5) to pelvis (UT-Pelvis) or thoraco-lumbar (T10-T12) to pelvis (TL-Pelvis). We found that patients undergoing pan-lumbar arthrodesis for adult spinal deformity do not experience substantial increases in disability due to stiffness of the low back. There were no significant differences in stiffness effects whether arthrodesis stopped in the thoracolumbar or upper thoracic regions. We hope that these results will be useful to spine surgeons and patients during pre-operative planning and discussions.

Correction of lumbar hypolordosis with Smith-Petersen osteotomy combined with transforaminal interbody fusion. Khaki F; Lafage V; Schwab F; Hart RA.

We evaluated the sagittal plane correction in patients undergoing surgical treatment including Smith-Petersen osteotomy (SPO) combined with transforaminal lumbar interbody fusion (SPO+TLIF) for sagittal imbalance from 2005 to 2009 at minimum 2-year follow-up. Radiographs were taken preoperatively, immediately postoperatively, and at 2-year follow-up. Measurements included focal lordosis at the SPO+TLIF level, total lumbar lordosis (LL) (T12–S1), and pelvic incidence (PI). The focal correction per level, total increase in LL, and PI minus LL were determined. The SPO+TLIF technique effectively increased focal and total lordosis in adults with sagittal imbalance. Although complications were common, all patients underwent extensive spinal reconstruction and no complications were directly attributable to SPO+TLIF. The SPO+TLIF technique should be considered as an option to restore lordosis in adults with sagittal imbalance.

Differentiating occult Proprionibacterium acnes infection from aseptic "biologic" interference screw hydrolysis following anterior cruciate ligament reconstruction: introducing a novel culture protocol for detecting low-virulence organisms. Metcalf K; Ko H-W K; Quilici S; Barnes P; Crawford DC.

We described the differentiation between occult infection and screw hydrolysis in 2 patients with sub-acute development of post-surgical medial tibial pain following anterior cruciate ligament (ACL) reconstruction using a bioabsorbable interference screw. We compared clinical presentation, operative treatment, and antibiotic therapy to better distinguish low virulence organisms in orthopedic patients.

Proprionibacterium acnes (P. acnes), an organism increasingly associated with orthopaedic hardware implantation (shoulder arthroplasty and spinal fusions), was isolated as the etiological agent in one case, whereas there was no organism in the second case, despite a near identical presentation. These cases highlight this particular organism as an etiological factor in patients with sub-acute presentation of tibial pain after ACL reconstruction and, in addition, outline an optimal culture procedure for cases of potential P. acnes infection in orthopedic patients.

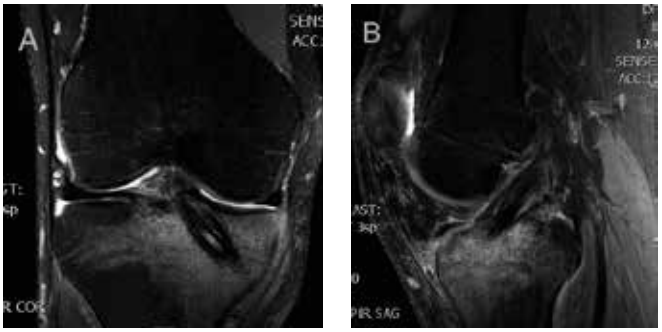


Figure 1: Patient 1 MRI in coronal (A) and sagittal (B) planes indicate subtle changes adjacent to the interference screw and represent an extensive hyperintense signal within the proximal tibia adjacent to implant.

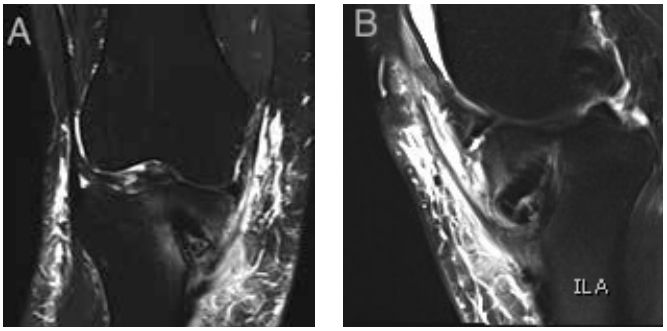
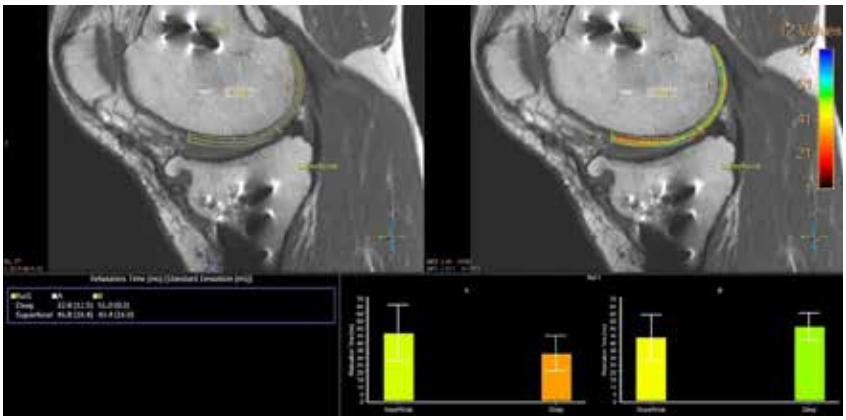


Figure 2: Example of an MRI in coronal (A) and sagittal (B) planes that exhibit a fragmented distal screw in association with soft tissue edema and minimal hyperintense signal in proximal tibia.

A prospective evaluation of articular surface changes to medial knee osteoarthritis after KineSpring® application using a novel MRI protocol. Crawford DC; Foss E.

The KineSpring® Knee Implant System is a device that reduces up to 13 kg of load for patients with early symptomatic medial compartment knee osteoarthritis. KineSpring® is approved for routine clinical use in Australia, Germany, Italy and England, and is under investigation in the United States. This procedure can be performed in an outpatient setting and provides for immediate full weight-bearing and active/passive knee range of motion. At OHSU, a unique MRI substudy with 15 patients is underway to assess changes in subchrondral edema and cartilage thickness preoperatively and 1 year post KineSpring® application, the first study of its kind worldwide. This substudy will establish whether cartilage T2 values change after KineSpring® implantation.



Sagittal non-color coded (left) and color-coded (right) MRI T2 mapping sequence images showing T2 relaxation values in the superficial and deep layers of the medial femoral condyle. The left bar graph (A) depicts T2 relaxation times for the central weight-bearing condyle, while the right bar graph (B) shows T2 relaxation times for the posterior condyle. T2 relaxation values are affected by the presence of subchondral edema in the articular cartilage, which is indicative of cartilage degeneration.

Autologous cartilage tissue implant (ACTI), NeoCart®, for the treatment of grade III chondral injury to the femur: patient reported outcomes after five years. Anderson D; Kane M; Crawford D.

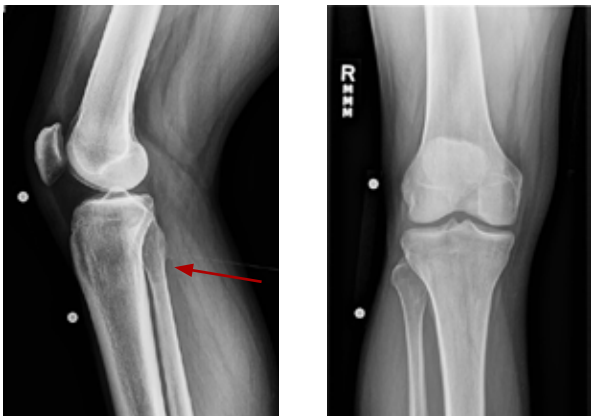
Articular cartilage demonstrates limited ability to heal after damage, and autologous chondrocyte tissue implantation (ACTI) represents a potential therapy to repair focal tissue defects. To evaluate the efficacy and safety of NeoCart, a third-generation ACTI, 29 patients with grade III cartilage lesions of the distal femur were treated with ACTI surgery and evaluated prospectively over a 60 month period for adverse events, range of motion (ROM), patient reported outcomes (PROs), and MR Imaging. Over a 53 month follow-up, 5 adverse events were reported; none related to the implant. Significant improvement was observed in mean International Knee Documentation Committee (IKDC), Short Form (SF-36) Survey, Knee Injury and Osteoarthritis Outcome Score (KOOS), and Visual Analog Scale (VAS) scores at all time points up to 60 months when compared to baseline values. ROM was significantly improved at final follow-up compared to baseline. Knee pain and function are significantly improved after treatment with NeoCart. Improvement is sustained up to a 5-year period. We conclude that NeoCart is a safe and effective treatment for grade III cartilage defects.

NeoCart in comparison to microfracture after five years: a report of primary outcome measures at study conclusion from a phase II FDA regulated randomized clinical trial. Kane M; Anderson D; Crawford D.

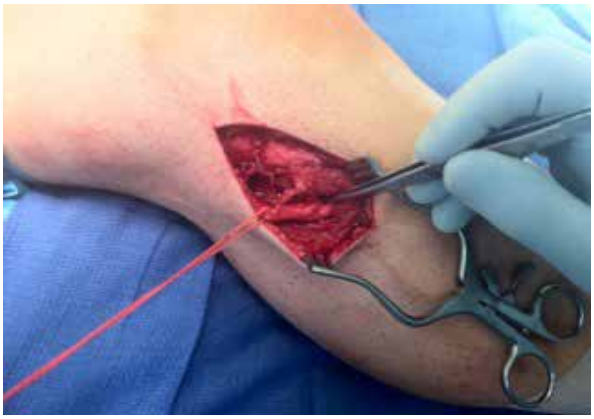
We report our findings at the 5 year conclusion of a multi-site phase II trial comparing standard of care microfracture for primary treatment of cartilage injury in the knee with NeoCart, a novel tissue engineered autologous cartilage tissue implant. 35 patients with full thickness knee cartilage injury were randomized 2 NeoCart for each microfracture, at arthroscopic confirmation of grade III ICRS lesion(s). Adverse events were few, did not differ between treatment arms, and were not related to the procedures. Responders analysis identified 67% of microfracture patients with clinical improvement in contrast to 81% of patients treated with NeoCart at final follow up. Significantly more NeoCart treated patients were therapeutic responders at 1 year. Based on outcomes from the International Knee Documentation Committee Score (IKDC) (subjective), Knee injury and Osteoarthritis Outcomes Score (KOOS) Pain, activity of daily living (ADL), quality of life (QOL), Symptoms, Sports & Recreation, Short form 36 (SF-36) and Visual Analog Scale (VAS) pain, NeoCart treatment is equally safe in comparison to microfracture surgery and associated with greater clinical efficacy 5 years after primary surgical treatment of cartilage injury in the knee.

A unique case of common peroneal nerve entrapment and review of the literature.
Myers RM; Murdock EE; Farooqi M; Van Ness G; Crawford DC.

We received the case of a previously healthy 36-year-old who awoke with complete right lower extremity foot drop. There was no history of similar symptoms, recent trauma, or peripheral nerve disease. Interestingly, antero-posterior and lateral radiographs demonstrated normal right knee with the exception of a posterior fibular neck exostosis. After failing one month of conservative therapy, the patient underwent surgical release of the common peroneal nerve and excision of the bony prominence, and had immediate improvement and returned to all activity without limitations. We present this unique case and review the literature for spontaneous peroneal entrapment, highlighting the importance of prompt diagnosis and treatment.



Radiographs demonstrate a large bony prominence on the posterior portion of the fibular head illustrated by the red arrow in the preoperative lateral view.



In this intraoperative photograph of the right proximal fibular osteofibrous band, the vessel loop is retracting the common peroneal nerve. The forceps are placed just anterior to the nerve and underneath the described osteofibrous band running from the posterior fibular head towards the myotendonous junction of the biceps femoris muscle, seen in the anterior portion of the wound.

Efficacy of arthroscopic mechanical chondroplasty of the knee in the absence of osteoarthritis. Anderson D; Wille A; Crawford D.

Arthroscopic mechanical chondroplasty is the most commonly performed surgery to treat damaged cartilage in the knee. Despite its prevalence, results when performed in the absence of additional procedures remain poorly characterized. Measurable outcomes for patients, without radiographic evidence of osteoarthritis or concurrent pathology requiring surgical care, are important for better defining indications and understanding the efficacy of this very common procedure. A retrospective review of billing and electronic medical records identified a study cohort of 101 patients who underwent an isolated chondroplasty procedure over a three-year period at OHSU. Patient-reported measures of knee function and health status will be routinely collected at baseline and annual intervals. Multivariate analysis will determine the influence of study population demographic, patient symptoms and pathology characteristics variables on clinical outcomes at an average of 24 months.

Fresh osteochondral allograft to repair an engaging reverse Hill-Sachs lesion. Black LO; Ko J-W K; Quilici SM; Crawford DC.

Reverse Hill-Sachs (McLaughlin lesion) occur in the majority of acute traumatic posterior shoulder dislocations and may give rise to mechanical shoulder instability. We describe a novel anatomic articular restoration using fresh osteochondral allograft via a press-fit technique for definitive treatment and restoration of normal function. A 24 year old male was struck by a motor vehicle while bicycling. Among other injuries, he suffered a posterior gleno-humeral dislocation and associated engaging reverse Hill-Sachs lesion. Operative treatment, delayed to allow healing of lower extremity injuries requiring crutches, was recommended. A fresh humeral head osteochondral allograft was applied using a press-fit technique. At 12 weeks, the patient demonstrated full passive shoulder motion; radiographically, the subchondral portion of the graft showed evidence of bone healing in essentially anatomic position. At 1 year, the patient was satisfied with the outcome and had returned to full unrestricted activity. Prior reports of osteochondral allograft describe the use of frozen tissue and internal fixation. However, frozen allograft tissue has demonstrated inferior chondrocyte viability compared to fresh and internal fixation requires, at minimum, disruption of the articular surface, with potential for hardware complications. Physicians might consider fresh osteochondral allograft using a press-fit technique for treatment of engaging Hill-Sachs lesions, to eliminate risk of hardware complication and provide a biologically anatomic reconstruction.

Application of KineSpring®, an extra-articular treatment for medial knee osteoarthritis as an outpatient surgical procedure: a sub-study of the multi-center SOAR trial. Crawford D.

KineSpring® (Moximed, Inc.) is an investigational device for symptomatic medial compartment OA. The surgically implanted device reduces load, up to 13 kg, acting as an extra-articular "shock absorber". In conjunction with a continuous infusion femoral nerve block (0.2% ropivacaine, 6 mL/hr), this procedure can be performed in an ambulatory surgery setting and allows for immediate full weight-bearing. Ambulation as tolerated is permitted thereafter. A multi-center prospective, single arm, pilot study (SOAR trial), enrolling patients with isolated early medial compartment OA is underway. As the first center in North America to perform this procedure and the first in the world to do so an out-patient, we are evaluating the outcomes including complications in comparison to historical controls. Currently, 30 patients have enrolled and undergone this procedure at OHSU. Patients will be followed for a total of 5 years to collect data for the primary evaluation of safety and effectiveness.

Factors predictive of improved patient reported outcomes following distal femoral osteochondral allograft transplantation. Domont ZB; Quilici S; DeHart M; Farooqi M; Crawford DC.

Fresh osteochondral allograft (OCA) transplantation is an effective surgical replacement therapy for patients with symptomatic osteochondral defects. The influence of important recipient and donor related factors remains less well characterized with respect to predicting favorable results. We evaluated clinical outcome after OCA transplantation to determine those factors most predictive of improved patient reported outcomes (PRO). Patients receiving distal femur OCA transplantation and without concurrent osteotomy were evaluated for a minimum of 24 months. Independent factors resulting in greater patient satisfaction were history of prior cartilage surgery, moderate osteoarthritis, and proper side matching. In the multivariate model, valgus alignment, smaller defect size, older donor age, younger age, and no simultaneous procedure were predictive of better outcome.

MRI measurements associated with PF instability. Munch JL; Sullivan JP; Nguyen J; Hillman A; Mintz D; Green DW; Strickland S; Shubin Stein BE.

Parameters correlating with patellofemoral instability include patella alta, tibial tubercle-to-trochlear groove (TT-TG) distance, and trochlear dysplasia. We examined whether TT-TG measurements would demonstrate lower interrater reliability in the setting of trochlear dysplasia, and whether patellar articular overlap would correlate well with indices of patellar height. MRIs of 219 knees were reviewed by 5 surgeons and 1 radiologist. Interrater reliability was high for the Dejour classification (ICC = 0.736) and TT-TG measurements. TT-PCL was moderately reliable and correlated with TT-TG. With trochlear dysplasia, reliability became progressively lower for cranial TT-TG, while caudal TT-TG reliabilities remained high. Articular overlap and percent articular coverage correlated highly with each other and with the Caton-Deschamps and Blackburne-Peel Indices. Articular overlap and % articular coverage failed to correlate with the Modified Insall-Salvati Index. The caudal trochlear measurement is the most reliable method of reporting TT-TG. Patellar articular overlap and % patellar articular coverage show promise in evaluation of patellar height, but future studies are needed to evaluate the range of normal and relationship to our traditionally used measurements.

The impact of multiple cultures on antibiotic use: a protocol for nonunion and implant infections. Kuhne M; Friess D; Gehling P; Kane M; Volpi J; Barnes P.

There is no proven gold standard method for diagnosing deep orthopaedic infection. Our institution introduced an Orthopaedic Infection Biopsy Protocol for lower limb arthroplasty revision and we examined how multiple cultures and prolonged incubation alter the microbiology and antibiotic clinical management in patients suspected of having an infected nonunion or implant related infection. 51 patients underwent irrigation and debridement of an implant-related bone infection. Five intraoperative biopsies were cultured for 10 days. Multiple biopsies changed microbiological diagnosis in 23/51 patients. In 17 cases culture-positive for virulent organisms (VOs), 11 had at least 1 negative culture. Antibiotics targeted the specific organism in 7/11 cases with potentially missed VOs. In 5/6 skin flora organism (SFO) infection cases, antibiotics targeted the SFO. All cases diagnosed with SFO contamination avoided antibiotics. Obtaining multiple biopsies changed antibiotic management in 35% of cases. The negative predictive value of all sterile cultures was 83% at 1 year follow-up.

Current trends in treatment and outcomes measurement in CMC osteoarthritis: a survey of hand surgeons. Lieberman E; Lorzano A; Mirarchi A.

Patient reported outcomes measures (PROMs) are frequently used in hand surgery; however, none has been validated for carpometacarpal osteoarthritis (CMCOA). We sought to determine standard treatment practices and which PROM is most commonly used to evaluate CMCOA. An electronic survey regarding treatment practices and PROMs use for CMCOA was designed using SurveyMonkey® software and e-mailed to members of the American Society for Surgery of the Hand. 30% of the responders utilized PROMs in their practice. Most popular were the QuickDASH (65%) and the Disability of the Arm, Shoulder, and Hand questionnaire (25%). Common treatment practices included pre-op history, exam, x-ray, splinting, steroid injections, and NSAIDs. Post-operatively, responders measured patient satisfaction, pain, ADLs, range of motion, and pinch and grip strength. 64% of responders treated using trapeziectomy with ligament reconstruction and tendon interposition.

Extensor tendon injury due to drill penetration sustained during volar plate fixation of distal radius fractures: a biomechanical analysis. Mahylis JM; Burwell AK; Bonneau L; Marshall LM; Mirarchi AJ.

Extensor tendon rupture is a complication of volar plate fixation, yet the mode of tendon failure after drill injury remains unknown. We described extensor tendon damage and change in tendon displacement during cyclic loading following drill penetration injury. Extensor Pollicis Longus (EPL) and Extensor Carpi Radials Brevis (ECRB) tendons were harvested from fresh frozen cadaveric arms and drill penetration injury was performed in either a continuous or oscillating mode. Injured tendons were subjected to cyclic load and analyzed for failure at drill sites and change in displacement throughout the testing cycle. Tendon type (ECRB, EPL), mode of injury (continuous, oscillating), and location (proximal, distal) did not significantly affect tendon displacement during loading. Complete extensor tendon failure due to drill penetration was rare (1 of 18). Drill mode did not affect the degree of elongation. Increasing cyclic loading of extensor tendons after drill penetration injury caused modest extensor tendon elongation.

Comparison of zero-degree standing anteroposterior view and forty-five-degree posteroanterior view in detecting the location of osteoarthritis of the knee: the influence of magnification on measured values. Baum K; Hsu-Rincon A; Hasenauer J; Baldwin J.

We determined the degree and significance of magnification difference between the 0 degree standing anteroposterior (0SAP) and 45 degree posteroanterior standing (45PAS) radiographic views of the knee and if the 0SAP or the 45PAS view is more effective in detecting medial or lateral joint space narrowing before and after correcting for magnification. Patients with lateral or medial compartment OA or without a diagnosis of OA underwent 0 degree standing anteroposterior and 45 degree posteroanterior standing radiographic views of one or both knees. Joint space measurements were taken by 3 trained observers. We found significantly more magnification in the 0SAP view compared to the 45PAS view, which can affect the amount of joint space narrowing when comparing quantitative measurements of joint space between different radiographic views of the knee. We also found that if only one view is obtained it should be the 45PAS view. However, obtaining both views is optimal as the 0SAP detects narrowing occurring on the anteromedial tibia in 30% of cases which is under estimated in the 45PAS view.

Immediate weight bearing as tolerated after locked plating of fragility fractures of the femur. Criner S; Krumrey J.

We carried out a retrospective case series was to determine if locked periarticular femoral plates can withstand immediate weight bearing as tolerated following open reduction internal fixation of patients who suffered a ground level fall and femur fracture, and were fixed with a periarticular plate and screws during a 5 year span. The rate of hardware failure and mortality rate at 6 and 13 months was recorded. We found that patients with low energy femur fractures may safely weight bear as tolerated following fixation with a periarticular plate and screws. There is a trend toward decreased mortality at 6 months and a statistically significant difference at 13 months following fracture fixation for patients allowed immediate weight bearing as tolerated.

Use of a central splitting approach and near complete detachment for insertional calcific Achilles tendinopathy repaired with Achilles SpeedBridge. Gillis C; Lin J.

After a period of conservative management for Insertional Calcific Achilles Tendinopathy (ICAT), operative intervention may be warranted. No consensus exists on the amount of acceptable detachment of the Achilles during debridement. This case series reports on the results of a central splitting approach with 80-90% detachment of the Achilles insertion. Patients were followed for an average of 16 months postoperatively. A central splitting approach with 80-90% Achilles insertion detachment and repair with the SpeedBridgeTM device (Arthrex, Inc) was found to be a safe and effective option in the operative treatment of ICAT.

Multiple cultures and extended incubation for hip and knee arthroplasty revision: impact on clinical care. DeHaan A; Huff T; Schabel K; Doung YC; Hayden J; Barnes P.

The impact on patient care of introducing a protocol of obtaining 5 or more intra-operative separate tissue biopsies that were cultured for 10 days was assessed for hip and knee arthroplasty revision. The charts of 73 patients undergoing 77 cases of revision arthroplasty were reviewed one year post-operatively. When compared to the prior standard of obtaining only one intra-operative culture, the protocol changed the microbiological diagnosis in 26/77 cases (34%, 95% Confidence Interval (CI): 23%-45%) and antibiotic treatment in 23/77 cases (30%, 95% CI: 20-41%). In addition, the protocol had a predictive value of joint sterility in culture negative cases of 95% (95% CI: 85-99%). This data demonstrated that the new protocol significantly changed patient care, and suggests that 1 or 2 cultures are insufficient. Adopting a similar protocol should be considered by surgeons and institutions as a new minimum standard for management of prosthetic joint infections.

Journal of Arthroplasty 2013;28,Supp1:59-65.

Local injection for the treatment of ulnar neuropathy at the elbow: a cadaveric study.

Larson DL; Mirarchi A; Orfaly R.

PURPOSE

Ulnar neuropathy is the second most common peripheral neuropathy affecting the upper limb. Local corticosteroid injection of the ulnar nerve in the cubital tunnel at the elbow has been described in the non-operative treatment of cubital tunnel syndrome with conflicting reports of clinical efficacy and concern for associated risks. The poor clinical response may be due in part to limited delivery of injected material to the multiple sites of compression of the ulnar nerve about the elbow. In this 2-phase pilot study, we hypothesize that a single blind injection of the ulnar nerve in the cubital tunnel does not reach all potential sites of compression and that ultrasound guidance improves the distribution of injected material.

METHODS

In phase 1, a single blind injection of methylene blue dye was delivered at the medial epicondyle of 6 specimens which were then dissected to determine whether injected material was delivered from the point of injection at the cubital tunnel proper to other potential sites of nerve entrapment. In phase 2,10 specimens were randomized to a blind or ultrasound guided injection of the ulnar nerve at the Arcade of Struthers and the medial epicondyle. Ultrasound characteristics of the nerves were measured and the nerves were grossly dissected to measure distribution of the dye.

RESULTS

Phase 1 showed that blind local injection of the cubital tunnel results in a limited distribution of injected material along the course of the ulnar nerve. Phase 2 demonstrated increased accuracy and distribution of injected material. Intra-articular, intra-neural, and dermal injections were identified as aberrant sites of injected material and were reduced with ultrasound guidance.

CONCLUSIONS

Blind local injection of the ulnar nerve in the cubital tunnel based on anatomic landmarks at the medial epicondyle results in limited delivery of the injected solution to all potential sites of nerve entrapment with increased complications. Ultrasound guided injections at the Arcade of Struthers and medical epicondyle appears to improve accuracy and distribution of injected material along the course of the ulnar nerve about the elbow and reduce complications.

Phase One: Potential Sites of Compression Percent Stained

	Arcade of Struthers	Arcuate ligament	Flexor-carpi ulnaris	Flexor-pronator aponeurosis
Blind Injection	**0%**	**89%**	**44%**	**11%**

Phase Two: Potential Sites of Compression Percent Stained

	Arcade of Struthers	Arcuate ligament	Flexor-carpi ulnaris	Flexor-pronator aponeurosis
Blind Injection	**20%**	**80%**	**10%**	**0%**
Ultrasound Injection	**100%**	**100%**	**100%**	**20%**

Electronic collection of patient reported outcomes is more efficient than paper methods.

Miles T; Lorzano A; Mirarchi A.

INTRODUCTION

Patient reported outcomes (PROs) are likely to play a large role in future quality-based payment systems, self-monitoring for recertification, and the healthcare reform process for establishing the value of orthopedics. With the trend toward quality monitoring, it is increasingly important to find ways to efficiently and accurately collect these data in the routine clinical setting. Our hypothesis was that electronic data collection of PROs provides more useful data than traditional paper methods.

METHODS

We designed a two arm study with retrospective review of survey collection data and a prospective randomized trial of timing and demographic data. The retrospective arm analyzed capture, completion and usefulness of electronic versus paper PROs surveys in a university-based upper extremity practice. We established a custom online survey which included The Visual Analog Pain Scale (VAS); The VR-12 Health Survey; and The Quick - Disabilities of the Arm, Shoulder, and Hand Survey (Quick-DASH). This was administered via a tablet personal computer (tablet), unless the paper version was requested. Completion rates were compared via two sample t-test. The randomized trial evaluated completion time and its relation to patient age, comfort with computers, survey preference, and comfort with the assigned survey. Results were compared via student's t-test.

RESULTS

Through 18 months, there were 2,842 entries, of which 460 (16%) were acquired using paper forms and 2,382 (84%) were acquired electronically via the tablet. Of the 2,382 completed via the tablet, 2,016 (85%) were complete. There were 460 paper surveys, 178 (39%) were complete, and 282 (61%) were incomplete or incorrectly completed ($p<0.001$). 36 patients were included in the randomized trial. The average time for completion of the tablet was significantly faster than that with the paper format (6:33 vs 7:38, $p=0.004$). It was also found that age greater than 60 (12:42 vs 5:57, $p<0.00044$) and stated preference of the paper format (11:10 vs 6:15, $p=0.015$) significantly increased completion times. General discomfort with computers also trended toward increasing survey completion times (9:37 vs 5:49, $p=0.063$).

DISCUSSION

Tablets, with the use of online research database tools, appear to be a superior method for gathering PROs data when compared to traditional paper methods. Electronic surveys are also significantly faster to complete than paper surveys. Patients who rate themselves as uncomfortable with computers, indicate that they prefer the paper format, or are over age 60 years old may require additional attention to ensure that their surveys are completed correctly and in a timely manner.

	iPad	Paper
Total	2382	460
Complete	2016	178
Incomplete	366	282
% Useful	0.85*	0.39

Table 1: Total, complete, and incomplete surveys, electronic and paper, and percent useful for analysis purposes.

*iPad surveys produced significantly higher quality data than paper surveys ($p<0.001$).

	Average (std dev.)	Median
iPad	6:33* (2:45)	5:30
Paper	7:38 (2:04)	6:49

Table 2: Average and median completion times (minutes) of iPad and paper surveys.

*iPad surveys were significantly faster to complete when compared to paper surveys ($p<0.0045$).

Vitamin D deficiency in patients with osteoarthritis undergoing total knee arthroplasty.

Natarajan V; Schabel K; Huff T.

BACKGROUND

Vitamin D deficiency is common among adults in the United States. Previous studies have indicated a high prevalence of Vitamin D deficiency in patients undergoing elective total knee arthroplasty (TKA). The association of Vitamin D deficiency with functional outcomes following TKA is unclear.

METHODS

Pre-operative 25(OH)D3 levels were measured in 60 participants undergoing TKA at our institution and basic demographic data including age, sex and BMI were collected. The Knee Injury and Osteoarthritis Outcome Score (KOOS) instrument was used to assess functional outcomes pre-operatively and at 6 week, 6 month, and 1 year follow-up points. The WOMAC score was calculated post-hoc based on the KOOS results.

RESULTS

60 participants completed the KOOS survey pre-operatively and had 25(OH)D3 levels measured. Post-operative functional outcome scores were available for 50 participants at 6 weeks, 48 participants at 6 months, and 45 participants at 1 year. There were no significant differences between the Vitamin D sufficient (VDS) and Vitamin D deficient (VDD) groups in age, sex, or BMI. Pre-operatively, there were no significant differences between groups in the WOMAC or any of the 5 KOOS subscales. At 6 weeks, the VDD group had significantly worse ($p<0.05$) scores in the KOOS Pain, Symptom, ADL, and Quality of Life subscales, as well as the WOMAC score. At 6 months, the VDD group had significantly worse ($p<0.05$) scores in the KOOS Symptom, ADL, and Quality of Life subscales and the WOMAC. At 1 year, the VDD group had significantly worse ($p<0.05$) scores in the KOOS Symptom and ADL subscales and the WOMAC.

CONCLUSIONS

There was no significant association between Vitamin D deficiency and pre-operative functional scores. Post-operatively, study participants with vitamin D deficiency demonstrated significantly worse functional outcomes than those with sufficient vitamin D levels. This disparity was most notable at early follow-up. A randomized controlled trial is needed to determine whether vitamin D supplementation could potentially improve functional outcomes following TKA.

Coaptation splint versus sling and swathe immobilization for the acute treatment of humeral shaft fractures. Seddon J; Gehling P; Friess D.

PURPOSE

The current standard of care for acute management of humeral shaft fractures is a coaptation splint. Evidence-based literature does not support this technique over other immobilization methods. Application of coaptation splints may increase patient discomfort and have no effect on selection of definitive treatment or long term outcome. Another option for acute treatment is immobilization with a simple sling and swathe. We hypothesized that acute treatment of humeral shaft fractures with a sling and swathe will provide equivalent or superior results versus use of a coaptation splint in regards to patient reported outcomes and pain levels.

METHODS

All patients between ages 18-80 with a humeral shaft fracture were screened for inclusion in this IRB approved study. Exclusion criteria included: presentation more than 48 hours after injury, head injury, open fracture, pathological fracture, known pregnancy, inmate, non-English speaking, sexual assault victim, and patient or legally authorized representative unable to provide consent. Patients were randomized to immobilization with a sling and swathe or a coaptation splint utilizing a block randomization technique. Patient questionnaires included an initial screening questionnaire and phone follow up questionnaires after initial immobilization. Final questionnaires were obtained in person or phone, but prior to definitive surgical treatment or Sarmiento bracing. At enrollment, the treating physician also completed a provider-oriented satisfaction questionnaire.

Thirteen subjects have thus far met all inclusion and exclusion criteria; 9 were randomized to the sling and swathe arm and 4 were randomized to the coaptation splint arm. Post-enrollment screening failure accounts for the inequality of assignment between arms. Recruitment and screening will continue until adequate enrollment is achieved between arms for definitive review. To meet study goals, we have expanded to additional recruitment sites, one of which is currently enrolling patients. From the data obtained thus far in our randomized controlled trial, we evaluated a case series as a pilot study for the efficacy of sling and swathe immobilization.

RESULTS

The sling and swathe data were analyzed. Pain score at presentation was 5.1 (0-10 pain scale) Seven subjects completed the final survey at a mean of 4.7 (range, 1-14) days after immobilization (1 none/normal function – 5 severe/complete disability). On average they reported sleep interference, 3.1; frequency of numbness, 2.3; toileting interference, 2.7; arm stability, 3.8; skin irritation, 1.4; neck pain, 1.9; and initial sling placement discomfort, 3.3. Immobilization satisfaction and comfort were reported as 2.4 and 2.7 respectively. The final mean pain score was 4.6. Mean EuroQol EQ-5D-5L scores were; mobility, 2.4; self-care, 3.4; usual activities, 4.1; pain/discomfort, and 2.9; anxiety/depression, 1.6. There were no reported complications from the sling and swathe.

CONCLUSION

Application of a simple sling and swathe may be a reasonable immobilization technique for acute humeral shaft fractures. Advantages include reasonable patient reported pain and functional scores and ease of application for providers with no complications. Further studies are needed to compare this method with the standard of care for humeral shaft fractures. We will continue the randomized controlled trial until adequate numbers are obtained to answer this question.

Past and Present: OHSU Annual Beals Lectureship

The Beals memorial lectureship is an annual event established in honor of the late Rodney K. Beals, MD, Professor Emeritus in the Department of Orthopaedics & Rehabilitation at Oregon Health & Science University, who taught orthopaedics for more than 50 years. Dr. Beals was a lifelong "Oregonian" and spent his entire professional career practicing orthopaedic surgery in Portland, OR. Dr. Beals was a committed clinician, master surgeon, revered educator and accomplished researcher. It was not only out of respect for his scientific accomplishments, but for his humble guidance and mentorship that the OHSU Department of Orthopaedics & Rehabilitation established the annual Beals Memorial Lecture Series.

Dr. Beals attended Willamette University for his undergraduate training, graduating in 1952, and received his medical degree from the University of Oregon Medical School (precursor to OHSU) in 1956. He completed his internship at Minneapolis General Hospital followed by a General Surgical Residency in San Bernadino County Hospital in California. He ultimately completed his training in Orthopaedic Surgery at the University of Oregon Medical School in 1961. Dr. Beals immediately joined the faculty and rapidly rose through the ranks at OHSU, serving as Head of the Division of Orthopedics from 1981 to 1994. Dr. Beals also served as the first chairman for the Department of Orthopaedic Surgery at OHSU in 1994. At the age of 77, he remained an active member of the Orthopaedic faculty at OHSU until the time of his passing on August 7, 2008.

Dr. Beals was an accomplished researcher throughout his career. He was nationally recognized for his research on skeletal manifestations of growth disturbances in children. He authored more than 150 peer-reviewed publications. Dr. Beals was also a revered educator. During his tenure at OHSU, he helped train more than 150 orthopaedic surgeons in residency. He also helped thousands of patients and mentored countless numbers of medical students. Throughout his remarkable career, Dr. Beals represented and personified excellence in medicine and orthopaedic surgery.

Visiting Professor, May 2014

Seth Leopold, MD

Professor, University of Washington School of Medicine
Department of Orthopaedics and Sports Medicine
Editor-in-Chief of Clinical Orthopaedics and Related Research® (CORR®)

Seth S. Leopold, MD, is the Editor-in-Chief of Clinical Orthopaedics and Related Research® (CORR®). CORR® provides high-impact, timely, relevant content for the international community of orthopaedic surgeons and scientists. Articles from CORR® were downloaded over 400,000 times last year, and researchers cited CORR's content more than 30,000 times. As Editor-In-Chief, Dr. Leopold's goals are to continue to improve the quality and relevance of CORR's contents to surgeons and scientists, to raise CORR's international impact and visibility, and to use columns, features, and commentary sections to make as many of its pages as possible enjoyable to all readers. Dr. Leopold received his medical degree with honors in research from Cornell University Medical College in New York. He completed his Orthopaedic training at the University of Chicago and performed a fellowship in Joint Replacement Surgery at Rush-Presbyterian - St. Luke's Medical Center. Following this, he taught arthritis surgery and performed research while on a 3- year active-duty tour in the US Army Medical Corps, where he received two consecutive Outstanding Faculty Awards for his efforts. After leaving the military, Dr. Leopold joined the faculty of the UW Department of Orthopaedics and Sports Medicine, in August 2002. He was promoted to full Professor in September, 2007, and served as Vice Chair of the Department of Orthopaedics and Sports Medicine in from 2007 to 2009. Dr. Leopold's clinical interest is Adult Reconstruction surgery of the hip and the knee. His practice serves as an integral part of the Department's resident training program. Dr. Leopold has received multiple grants, as well as local and national recognition for his research and teaching efforts. His research focuses on problems related to hip and knee arthritis, patient safety, and unusual sources of bias in the

Visiting Professor, May 2015

Riley J. Williams III, MD

Associate Professor, Hospital for Special Surgery
Department of Orthopedic Surgery

Dr. Riley J. Williams III is a specialist in the field of shoulder, knee and elbow surgery at Hospital for Special Surgery. Dr. Williams holds a dual appointment in both the Department of Orthopedic Surgery, as a full-time member of the Sports Medicine & Shoulder Service, and as a Clinician-Scientist in the Research Division. He is also an Associate Professor at Weill Cornell Medical College. Dr. Williams attended college at Yale University and the Stanford University School of Medicine. His clinical and research interests include: cartilage repair and transplantation, arthroscopic shoulder repair (rotator cuff tears, labrum tears), arthroscopic shoulder stabilization, anterior cruciate and posterior cruciate ligament reconstruction, and elbow ligament reconstruction. Dr. Williams is the Director of the Institute for Cartilage Repair at Hospital for Special Surgery.

Dr. Williams has worked with the Brooklyn Nets professional basketball team for many years. In addition, he is the head team physician for the New York Red Bulls professional soccer team, and the Iona College Department of Athletics. He has also served as Associate Team Physician for both the New York Mets professional baseball and New York Giants professional football teams. Dr. Williams is an active member of the New York Road Runners Club.

OHSU Orthopaedic Spine Professorship

Guest speaker

Darrel S. Brodke, MD

Louis and Janet Peery Presidential Endowed Chair
Professor/Vice Chairman, University of Utah School of Medicine
Department of Orthopaedics
Director of Spine Service

Dr. Brodke is well recognized in the field of orthopaedic spine surgery. He received his medical degree at the University of California, San Francisco, completed an Orthopaedic residency at the University of Wisconsin and a fellowship in spine surgery at the University of Washington in Seattle. He joined the University of Utah in 1997 where he currently holds the Louis and Janet Peery Presidential Endowed Chair and is Professor and Vice Chairman of the Depatment of Orthopaedics. He is the director of the spine service as well as the fellowship in spinal disorders in the Department of Orthopaedics.

Dr. Brodke is a prolific academic with over 100 publications authored or coauthored and has presented numerous times on the national and international stage. He sits on the Editorial Board of the Journal of Spinal Disorders and the Evidence-Based Spine Journal, serves on the Executive Board of CSRS and AOSpine North America, serves as Chairman of the Education Committee for AOSNA and currently serves as the Treasurer for CSRS.

Guest speaker

Michael G. Fehlings, MD, PhD, FRCSC, FACS

Professor of Neurosurgery, Gerry and Tootsie Halbert Chair in Neural Repair and Regeneration; Vice Chair Research, Department of Surgery
McLaughlin Scholar in Molecular Medicine
Co-Director, Spine Program, University of Toronto Head, Spinal Program
Senior Scientist, Toronto Western Research Institute
Scientist, McEwen Centre for Regenerative Medicine
Toronto Western Hospital, University Health Network

Dr. Fehlings received his medical degree from the University of Toronto in 1983. Following a surgical internship at Queen's University in 1983-84, Dr. Fehlings entered the University of Toronto Neurosurgical Training Program in 1984. During his residency, Dr. Fehlings worked towards and received his Ph.D. in 1989 in the Institute of Medical Sciences for his work on experimental spinal cord injury. Dr. Fehlings became a Fellow of the Royal College of Physicians and Surgeons of Canada in 1990 and a Fellow of the American College of Surgeons in 2006. In 1991, he undertook a post-doctoral research fellowship at NYU Medical Center under Dr. Wise Young. This was followed by a clinical spine fellowship under Dr. P. Cooper at NYU. Dr. Fehlings joined the Neurosurgical Staff at the Toronto Western Hospital in 1992. He is currently Professor in the Department of Surgery, full member of the Institute of Medical Sciences School of Graduate Studies, a Scholar in the McLaughlin Centre of Molecular Medicine, a Scientist in the McEwen Centre for Regenerative Medicine, a Senior Scientist at the Toronto Western Research Institute, Director of the University of Toronto Neuroscience Program, Co-Director of the University of Toronto Spine Program, Director of the Spinal Program at the Toronto Western Hospital, Medical Director of the Krembil Neuroscience Centre at the University Health Network and Krembil Chair in Neural Repair and Regeneration. His main clinical interests are in spinal neurosurgery, and his research focus is in molecular mechanisms underlying spinal cord injury.

Shriners Hospital for Children – Portland Lectureship Series

BEATTIE LECTURESHIP

Mr Byron Beattie was the owner and operator of a printing plant in Portland, Oregon. Mr Beattie became acquainted with Dr "French" Eldon Chuinard, while Dr Chuinard was the chief of staff at Shriners Hospital for Children, Portland. He was so impressed with the importance of the educational mission of Shriners Hospital that he created an endowment fund to support our local education activities. The first seminar was held in 1985.

Guest Lecturer 2014
William Hennrikus, MD

William Hennrikus, MD is a native of Boston. He received his medical degree from Georgetown University. He completed his Orthopaedic Residency training at Balboa Naval Hospital in San Diego and his Fellowship training at Children's Hospital in Boston/Harvard Medical School. Dr. Hennrikus is Professor of Orthopaedics and Pediatrics at Penn State College of Medicine, Associate Dean of Continuing Education and Medical Director of Pediatric Bone and Joint Center. Dr Hennrikus is Chairman of the American Academy of Pediatrics Orthopaedic Section and a Board Member of the Pediatric Society of North America (POSNA) and the Society of Military Orthopaedic Surgeons.

Dr Hennrikus has authored more than sixty scientific articles and book chapters. In 2000, he was selected as the inaugural POSNA traveling fellow to China. Dr Hennrikus has coached youth soccer for more than 12 years. He enjoys skiing, hiking, playing basketball and tennis with his athletic wife and five wonderful children.

DILLEHUNT LECTURES

The Dillehunt Memorial Lecture honors the contribution of a great surgeon and legendary teacher who inspired many orthopaedists. With his devotion to children, Dr. Richard Dillehunt was instrumental in the establishment of the Shriners Hospitals for Children, Portland OR, and served as the first Chief Surgeon. His legacy continues through the Dillehunt Memorial Trust Fund, sponsoring visiting distinguished Pediatric Orthopaedic Surgeons from throughout the world.

Guest Lecturer 2014
Richard Nicol, MB ChB FRCS (Edin) FRACS

Mr. Nicol is a New Zealand trained orthopaedic surgeon with Royal College of Edinburgh fellowship in General Surgery and Royal Australasian College of Surgeons fellowship in Orthopaedics. Currently working at Eastwood Orthopaedic Clinic and Starship Children's Hospital in Auckland, New Zealand, Mr. Nicol has travelled extensively in the pursuit of orthopaedic education. With his wife Debbie, he has four children and now four grandchildren. He also enjoys forestry, farming, and a Volvo P1800.

Leo S. Lucas Outstanding Orthopaedic Educator Award: Presented to the faculty member most instrumental in the development of future orthopaedic surgeons.

Morris Hughes Award: Presented to the resident who best demonstrates concern for patients and for education of the next generation of physicians.

Research Award: Presented to the resident recognized for a commitment to the development, execution and publication of original research during residency.

YEAR	LEO S. LUCAS	MORRIS HUGHES	RESEARCH AWARD
2007	Tom Ellis	Rob Tatsumi	Joseph Schenck
2008	Dennis Crawford	Stephan Pro	Kate Deisseroth
2009	Darin Friess	Stephan Pro	N/A
2010	Amer Mirza	Gary Kegel Gregory Byrd	Patrick Denard
2011	James Hayden	Jayme Hiratzka	Jayme Hiratzka Matthew Harrison
2012	Jesse A. McCarron	Luke Rust	Dawson Brown Matthew McElvany
2013	James Hayden	Laura Matsen Ko Jacqueline Munch	Adam Baker
2014	Adam Mirarchi	Rich Myers	Trevor McIver

Where are They Now?

DAWSON BROWN, MD

I finished my Sports Medicine / Arthroscopy fellowship at Southern California Orthopedic Institute in 2013 and joined WestSound Orthopaedics in Silverdale, WA. We're a short ferry ride to the West of Seattle. 2014 was a busy year as Elissa and I welcomed our second child - Calder "Clark" into the family. I've recently accepted partnership in the group and I continue working hard to build a robust shoulder, hip, and knee practice. We are living on Bainbridge Island where our daughter Camden will be starting kindergarten in the Fall. There are never enough hours, but we've been working hard to keep life balanced - somehow finding the time to play a little golf, ski occasionally, beachcomb, hike, etc. I frequently reflect on my time at OHSU and Legacy Emanuel with great appreciation, as I've felt well prepared for the transitions of the past couple of years. Sending our best to you all.

PETE FREDERICKS, MD

We are still settling in here in Colorado Springs, CO. Can't believe it's already been 2.5 years since we left Portland and OHSU. I am doing orthopaedic trauma here in Southern Colorado and enjoying it. Hope everyone is doing well. Cheers.

Where are They Now?

LUKE RUST, MD

After spending a cold year in Grand Rapids, Michigan doing a Foot and Ankle fellowship, Bobbi Jo, Ivy, Sifton and I have returned to the Portland area. It was a busy fellowship in a private practice and even though we had a great time in the Midwest, it's good to be back closer to friends and family. For the last year, I have been working at Rebound Orthopedics and Neurosurgery in Vancouver, which has been fantastic. My practice is almost entirely foot and ankle, mixed in with taking call at a pretty busy level 2 trauma hospital. Ivy is 5 and started kindergarten this year, while Sifton is 3 and dominating preschool. Here we are celebrating this past Halloween!

MATTHEW "MAC" MCELVANY, MD

After leaving OHSU, I did a shoulder fellowship in Seattle with Dr. Matsen and Dr. Warme. After fellowship I joined a practice at Kaiser in Santa Rosa, CA in September, 2013. My current practice is about 80%-90% shoulder. We now have 2 kids, a 4 year old Charlie and a 1 year old Isla. Juliette's parents are in nearby Sonoma. Wine country is good because your patients bring you wine from where they work (then you look up how highly it is rated to see how good their outcome really is). Bought a house, planning to stay put; maybe I'll get into leadership at Kaiser when the time is right.

GRADUATE	FELLOWSHIP TRAINING	CURRENT PRACTICE LOCATION
2014		
Zachary B. Domont	Sports Medicine - Univ. of Pennsylvania, Philadelphia, PA	Univ. of Pennsylvania, Philadelphia, PA
Jia-Wei Kevin Ko	Shoulder & Elbow - Rothman Institute, Thomas Jefferson Univ., Philadelphia, PA	Rothman Institute, Thomas Jefferson Univ., Philadelphia, PA
Trevor C. McIver	Spine - Spine Institute of Arizona, Scottsdale, AZ	Spine Institute of Arizona, Scottsdale, AZ
Richard J. Myers	Orthopaedic Trauma - Univ. of Maryland, College Park, MD	Univ. of Maryland, College Park, MD
Brent M. Roster	Foot & Ankle - Univ. of California Davis Medical Center, Sacramento, CA	Univ. of California Davis Medical Center, Sacramento CA
2013		
Adam P. Baker	Foot & Ankle - Northwest Orthopedic Specialists, Portland, OR	Adventist Hospital, Portland, OR
Michael Kuhne	Trauma Orthopedics - Univ. of California, San Francisco General Hospital, San Francisco, CA	Camp Lejeune Naval Hospital, Jacksonville, NC
Laura J. Matsen Ko	Adult Reconstruction - Thomas Jefferson Univ., Philadelphia, PA	Fellowship-Thomas Jefferson Univ., Philadelphia, PA
Jacqueline L. Munch	Shoulder Surgery, Sports Medicine - Hospital for Special Surgery, New York, NY	Oregon Health & Science Univ., Portland, OR
Daniel C. Wieking	Foot & Ankle - Melbourne Orthopaedics, Melbourne Australia	Asante Physician Partners, Grants Pass, OR
2012		
Dawson S. Brown	Sports Medicine - Southern California Orthopedic Institute, Van Nuys, CA	West Sound Orthopedics, Silverdale, WA
Peter D. Fredericks	Trauma Orthopedics - Indiana Orthopaedic Hospital, Indianapolis, IN	Colorado Springs Orthopedic Group, Colorado Springs, CO
Matthew D. McElvany	Shoulder & Elbow - Univ. of Washington Medical Center, Seattle, WA	Kaiser Permanente, Santa Rosa, CA
Cuchulain Luke Rust	Foot & Ankle - Orthopaedic Associates of Michigan, Grand Rapids, MI	Rebound Orthopedics, Vancouver, WA
2011		
Matthew J. Harrison	Foot & Ankle - Oakland Bone & Joint Specialist Clinic, Oakland CA; Middlemore Hospital, Auckland, New Zealand	Alta Orthopedics, Santa Barbara, CA
Jayme R. Hiratzka	Spine Surgery - Univ. of Utah, Salt Lake City, UT	Oregon Health & Science Univ., Portland, OR
Jackson B. Jones	Adult Reconstruction - Harvard Medical School's Brigham and Women's Hospital, Boston, MA	Reno Orthopedic Clinic, Reno, NV
2010		
Matthew W. Bradley		Orthopedic Sports Medicine & Spine Care Institute, St. Louis, MO
Gregory D. Byrd	Hand - Beth Israel Deaconess Medical Center, Boston, MA	Olympia Orthopedics, Olympia, WA
Adam E. Cabalo	Spine - Spine Care Medical Group, Daly City, CA	Southern Oregon Orthopedics, Medford, OR
Patrick J. Denard	Shoulder - Centre Orthopédique Santy, Lyon, France and San Antonio Orthopaedic Group, San Antonio, TX	Southern Oregon Orthopedics, Medford, OR
Gary Kegel	Hand - St Luke's-Roosevelt Hospital Center, New York, NY	Group Health Capital Hill Medical Center, Seattle, WA
2009		
Stephen L. Pro	Sports Medicine - Santa Monica Orthopaedic and Sports Medicine Group, Santa Monica, CA	Ortho Kansas, Lawrence, KS
Khalid Shirzad	Foot & Ankle - Duke Univ. School of Medicine, Durham, NC	Northwest Orthopedic Specialist, Spokane, WA
Abner M. Ward	Hand - SUNY Stony Brook Univ. Hospital & Medical Center, Stony Brook, NY	VA Pacific Islands Health Care System, Honolulu, HI

GRADUATE	FELLOWSHIP TRAINING	CURRENT PRACTICE LOCATION
2008		
Kate B. Deisseroth		Malcolm Grow Medical Center, Andrews Air Force Base, MD
Andy J. Kranenburg	Surgery and Trauma - San Francisco Spine Institute, San Francisco, CA	Southern Oregon Orthopedics, Medford, OR
Kenna Larsen	Hand - Univ. of New Mexico, Albuquerque, NM	Utah Orthopaedics, Ogden, UT
2007		
William Magee	Sports Medicine -TRIA Orthopaedic Center, Park Nicollet Methodist Hospital, Minneapolis, MN	Rockwood Clinics, Spokane, WA
J. Rafe Sales	Spine-San Francisco Spine Institute, San Francisco, CA	Summit Spine, Portland, OR
Joseph Schenck	Sports Medicine - Perth Orthopaedic Sports Medicine Center, Perth, Australia and Arthroscopic Surgery and Computer Navigated Total Joint Arthroplasty - Sir Charles Gairdner Hospital, Nedlands, Western Australia	Orthopedic & Sports Medicine, Portland, OR
Robert L.Tatsumi	Spine - LA Spine Institute, Santa Monica, CA	Oregon Spine Care, Tualatin, OR
2006		
Catherine A. Humphrey	Trauma - Vanderbilt Univ. Medical Center, Nashville, TN	Univ. of Rochester Medical Center, Rochester, NY
Amer J. Mirza	Trauma - Harborview Medical Center, Seattle, WA	Summit Orthopaedics, LLP, Portland, OR
Mark B. Wagner		Orthopedics NW, Tigard, OR
2005		
Patrick A. Dawson	Upper Extremity and Sports Medicine - Congress Medical Associates, Pasadena, CA	Cascade Orthopaedic Group, Tualatin, OR
Suresh Kasaraneni		Scott Memorial Hospital, Scottsburg, IN
Christopher M. Untch	Surgical Services - Davis Monthan AFB, Tucson, AZ	Arizona Orthopedics, Tucson, AZ
Corey J. Vande Zandschulp	Trauma - OrthoIndy, Methodist Hospital, Indianapolis, IN	Summit Orthopaedics, LLP, Portland, OR
2004		
Benjamin C. Kam		Joint Base Elmendorf - Richardson, Anchorage, AK
Britton (Polzin) Frome	Hand Surgery - UT Southwestern, Dallas, TX	Summit Orthopaedics, LLP, Portland, OR
2003		
Jennifer R. Miller	Sports Medicine - Congress Medical Associates, Pasadena, CA	Idaho Sports Medicine Institute, Boise, ID
John B. Reid		Taos Orthopedic Institute, Taos, NM
Eric F. Shepherd	Trauma - UC Davis Medical Center, and Auckland City Hospital, NZ	Santa Barbara Orthopedic Associates, Santa Barbara, CA
2002		
Michael A. Binnette	Spine - Univ. of Washington, Seattle, WA	OA Center for Orthopaedics, Portland, ME
Kevin M. Kahn	Trauma - Universitatsspital, Zurich Switzerland, Vanderbilt Orthopaedic Inst., Nashville, TN	Rebound Orthopedics & Neurosurgery, Vancouver, WA
Tamara S. Simpson	Trauma - UCSF - Sports Medicine; Hennepin Medical Center, Minneapolis, MN	Cascade Orthopaedic Group, Tualatin, OR
2001		
Michael J. Gustavel	Sports Medicine - San Diego Sports Medicine and Orthopaedic Center, San Diego, CA	Idaho Sports Medicine Institute, Boise, ID
James B. Hayden	Musculoskeletal Oncology - Massachusetts General Hospital, Boston, MA	Oregon Health & Science Univ., Portland, OR
Todd W. Ulmer	Sports Medicine - Univ. of Washington, Seattle, WA	Columbia Orthopedic Associates, Portland, OR

GRADUATE	FELLOWSHIP TRAINING	CURRENT PRACTICE LOCATION
2000		
Mark S. Metzger	Joint, Spine & Tumor - Harvard Medical School, Boston, MA	
Lorenzo L. Pacelli	Hand & Microvascular Surgery - Hand Center, San Antonio, TX	Scripps Clinic Torrey Pines, La Jolla, CA
Edward A. Perez	Trauma - R. Adams Cowley Shock Trauma Center, Baltimore, MD	Campbell Clinic Orthopaedics, Germantown, TN
1999		
Anthony I. Colorito	Sports Medicine - Cincinnati Sports Medicine and Orthopedic, Cincinnati, OH	Orthopedic & Sports Medicine, Portland, OR
John M. Kioschos	Shoulder and Elbow Surgery - Florida Orthopaedic Institute, Tampa, FL	Tri Star Skyline Medical Center, Nashville, TN
Jill A. Rider-Graves		
1998		
John D. Curtis		Dory Orthopaedics, Uab Medical West, Bessemer, AL
Darrin F. Eakins	Sports Medicine and Knee - Royal N Shore Hospital, Sydney, Australia	Ortho Wilmington, Wilmington, NC
Ronald D. Wobig	Sports Medicine and Knee - Louisiana State Univ., Lake Charles, LA	Beaver Sports Medicine, Corvallis, OR
1997		
Dennis J. Davin		
Kevin M. Lee		Upper Valley Orthopedics, Rexburg, ID
Ronald L. Teed		Cascade Orthopedic Surgery, Hillsboro, OR
1996		
Knute C. Buehler	Lower Extremity Reconstruction - Scripps Clinic and Research Foundation, San Diego, CA	Center Orthopedic & Neurosurgical Care & Research, Bend, OR
Thomas J. Croy		310 Villa Road, Ste 108, Newberg, OR
Marc R. Davidson	Sports Medicine - The Hughston Clinic, Columbus, GA	Advantage Orthopedic and Sports Medicine Clinic, LLP, Gresham, OR
1995		
Douglas R. Bagge		Cortez Orthopedics, Cortez, CO
Robert A. Foster	Hand and Microvascular Surgery - Univ. of Minnesota, MN	Texas Orthopedics Sports and Rehabilitation Association, Austin, TX
Gregory A. Voit	Hand and Microvascular Surgery - Univ. of New Mexico Health Sciences Center, Albuquerque, NM	
1994		
Robert J. Grondel	Sports Medicine and Shoulder - Mississippi Orthopaedic & Sports Medicine Clinic; Trauma - Emanuel Hospital, Portland, OR	Orthopaedic Institute of Henderson, Henderson, NV
Allen L. Hershey	Lower Extremity Reconstruction - Scripps Clinic and Research Foundation, San Diego, CA	Precision Orthopedics and Sports Medicine, Salinas, CA
Brian J. Padrta	Foot and Ankle - Florida Orthopaedic Institute, Univ. of South Florida, Tampa, FL	Northwest Orthopaedic Specialists, Spokane, WA
Mark R. Rangitsch		Cheyenne Orthopaedics LLP, Cheyenne, WY
1993		
Blaine A. Markee		
Dean K. Olsen		Park Nicollet Orthopaedics, Burnsville, MN
Andrew H. Schmidt	Adult Reconstruction, Shoulder Surgery, Trauma - Hennepin County Medical Center, Minneapolis, MN	Hennepin County Medical Center, Minneapolis, MN

GRADUATE	FELLOWSHIP TRAINING	CURRENT PRACTICE LOCATION
1992		
Edward C. Pino	Sports Medicine - Cincinnati Sports Medicine, Cincinnati, OH; Foot & Ankle - Michigan Internat. Foot and Ankle Center, Detroit, MI	Kaiser Permanente, Denver, CO
Stephen S. Tower		Anchorage Fracture & Orthopedic Clinic, Anchorage, AK
Michael R. Van Allen	Hand and Microsurgery - Univ. of Alabama, Birmingham, AL	Legacy Meridian Park Medical Center, Tualatin, OR
1991		
Ronald R. Bowman		Tigard Orthopedic & Fracture Clinic, Portland, OR
William H. Dickinson		
Richard A. Rubinstein	Methodist Sports Medicine Center, Indianapolis, IN	Providence Portland Medical Center, Portland Knee Clinic, Portland, OR
1990		
Gregory T. Bigler	Sports Medicine and Arthroscopy - Harvard Medical School, Massachusetts General Hospital, Boston, MA	Thomas & Bigler Knee and Shoulder Institute, Las Vegas, NV
Adrian B. Ryan		Anchorage Fracture & Orthopedic Clinic, Anchorage, AK
Theodore S. Woll	Foot and Ankle - Univ. of Washington, Seattle, WA	Rebound Orthopaedics, Vancouver, WA
1989		
James R. Hazel		Tri-City Orthopaedics, Kennewick, WA
Asa E. Stockton		Eureka Community Health Center, Eureka Open Door, Eureka, CA
Keith J. Ure	Joint Replacement - Joint Replacement Institute, Orthopaedic Hospital, Los Angeles, CA	Olympic Medical Center, Sequim, WA
Robert G. Zirschky		Hope Orthopedics of Oregon, Salem, OR
1988		
John D. DiPaola		Occupational Orthopedics, Tualatin, OR
Jeffrey E. Flemming	Texas Southwestern Medical Center - Texas Back Institute, Dallas, TX	Providence Portland Medical Center, Portland, OR
Morris Hughes		
Michael B. Wyman		Orthopedic Specialists, Portland, OR
1987		
Dale G. Bramlet	Orthopaedic & Plastic Surgery, Hand and Upper Extremity - Univ. of Rochester Medical Center, Rochester, NY	Advent Orthopedics, Pinellas Park, FL
Scott B. Jones		Orthopedic & Sports Medicine Center of Oregon, Portland, OR
Stefan D. Tarlow	Knee Surgery - Dr. Jan Gillquist, Sweden; Sport Medicine - Dr. James Andrews, Birmingham, AL	Advanced Knee Care, PC, Scottsdale, AZ
1986		
Mark J. Buehler	Hand - Duke Univ., Durham, NC	Providence Hospital, Portland, OR
Wendell D. Ferguson	Providence Medical Center, Portland, OR	Vallejo Kaiser Medical Center, Vallejo, CA
Paul A. Switlyk	Shoulder - Univ. of Western Ontario, London, ON	Orthopedic & Sports Medicine Center of Oregon, Portland, OR
1985		
Stanley J. Neitling		
Daniel N. Ovadia		Santa Barbara Cottage Hospital, Santa Barbara, CA

GRADUATE	FELLOWSHIP TRAINING	CURRENT PRACTICE LOCATION
1984		
Steven J. Bruce		PeaceHealth Center Orthopedics, Bellingham, WA
Kenneth A. Hermens	Knee Reconstruction - UCLA, Los Angeles, CA, Kantonsspital Bruderholz, Basel, Switzerland	Tuality Orthopedic, Sports, Spine & Rehabilitation Center, Hillsboro, OR
Wendy M. Hughes		Portland VA Medical Center, Portland, OR
1983		
Michael J. Grundy	Strong Memorial Hospital	Piedmont Hospital, Atlanta, GA
Paul J. Mills		Stanford Hospital and Clinics, Redwood City, CA
John C. Schwartz		Orthopedic Specialists, Mid Columbia Medical Center, The Dalles, OR
1982		
Julie Isaacson		Retired
James D. Livermore		Whidbey Orthopedic Surgeons, Whidbey General Hospital and Clinics, Coupeville, WA
John S. Toohey	Spine - South Texas Orthopedic and Spinal Surgery Associates, San Antonio, TX	Univ. of Texas Health Science Center, San Antonio, TX
1981		
Christopher A. Blake		Willamette Valley Orthopedics, McMinnville, OR
Wayne K. Nadamoto		Kuakini Medical Center, Honolulu, HI
Samuel K. Tabet	Sports Medicine - Univ. of Oregon, Eugene, OR	New Mexico Orthopaedics, Albuquerque, NM
1980		
Lenart C. Ceder		Retired
Jonathan H. Hoppert		Retired
Robert W. Jordan		Retired
1979		
Brian Laycoe		Retired
Donald Peterson		
James Robbins	Cincinnati Sports Medicine & Orthopaedic Center, Cincinnati, OH	
1978		
Lyle Mason		Retired
Edgar K. Ragsdale		NW Surgical Specialists, Vancouver, WA
Enoch D. Shaw		700 Bellevue Street SW, Suite 225, Salem, OR
1977		
David L. Noall		Retired
Byron K. Skubi		Whidbey Orthopedic Surgeons, Coupeville, WA
Robert K. Smith		Northwest Permanente PC, Clackamas, OR
Theodore J. Vigeland		Portland VA Medical Center, Portland, OR

GRADUATE	FELLOWSHIP TRAINING	CURRENT PRACTICE LOCATION
1976		
Wayne C. Kaesche		Retired
Walter A. Smith		Retired
Stephen J. Thomas		Retired
1975		
Randy W. Crenshaw		
John O. Hayhurst		Retired
Patrick T. Keenan		
Kelsey C. Peterson		Pacifico Orthopedics Medical Group, Huntington Beach, CA
Ned R. Schroeder		Retired
1974		
Thomas W. Hutchinson		922 51st Street SW, Everett, WA 98203
Robert J. Porter		
Frederick L. Surbaugh		Retired
1973		
James L. Baldwin		Retired
David A. Haaland		
Craig MacCloskey		Retired
1972		
Michael S. Hmura		
Grant D. Lawton		
Michael R. Marble		
1971		
Charles B. Bird		
Robert G. Chuinard		
Jim Dineen		
Ilmar O. Soot		
1970		
Philip J. Fagan		
Robert J. Foster	Univ. of Gothenburg Hospitals	Retired
Art Hauge		
Edwin A. Kayser		
Gerald T. Lisac		
Ira M. Yount		

1969
Thomas E. Fagan
Michael H. Graham
George W. Ingham
Joseph P. Klein
Scott Struckman

1968
Benjamin F. Balme
James D. Kunzman
James D. Nelson
Frederick D. Wade

1967
Michael S. Baskin
John W. Gilsdorf
John W. Thompson

1966
Charles A. Bonnett
McGregor L. Church
Don D'Amico
Fred G. Grewe
Howard E. Johnson

1965
Arthur L. Eckhardt
John Hazel
Richard L. Mercer

1964
Robert F. Corrigan
Richard C. Zimmerman

1963
Donn K. McIntosh
Michael R. Rask

1962
Phaen Gambee
Norman D. Logan
Keith A. Taylor

1961
Rodney K. Beals
Thomas A. Edwards
George Keyes
Ralph E. Peterson

1960
Charles A. Fagan
Calvin H. Kiest
Betty J. Hohmann
Robert W. Straumfjord
Bud Yost

1959
Raymond A. Case
James V. Harber

1958
Richard G. Gardner
William D. Guyer

1957
Hadley F. Fitch
Richard S. Gilbert

1956
William E. Hummel
Joseph R. McProuty
Jack B.Watkins

1955
Edward A. Attix
Max M. Bocek

1954
Howard I. Popnoe
Dale D. Popp

1953
Donald D. Smith

1952
Melvin L. Makower

1951
Bob Maris
William E. Snell
James W. Weed

1950
Ralph Thompson

1949
Howard Cherry
Boyd G. Holbrook
Richard J. Hopkins

1948
Robert F. Anderson
George W. Cottrell
Carl L. Holm

1947
Edward A. LeBold

1946
William P. Horton
Clyde D. Platner
Faulkner A. Short

1945
Joseph H. Gill

1943
Paul G. Hafner

1942
Rodney Begg
Harold E. Davis

1940
Leslie S. Porter

1938
Arthur M. Compton

1935
E.G. Chuinard

1931
Harry Leavitt

1929
D.G. Leavitt

1928
Leslie C. Mitchell

1925
John LeCocq

1924
Leo S. Lucas

Special Apology

The editors of Oregon Journal of Orthopaedics would like to sincerely apologize for the unintentional omissions in last year's edition. Dr. Paul G. Hafner should have been included as a graduate in the class of 1943. We also have included the fellowship details of Dr. Ronald D. Wobig, one of our 1998 graduates. The OJO strives for accuracy but we are aware that we will make mistakes along the way. Please feel free to contact us with any concerns about this edition or any additions you would like to make in our next edition. Thank you for your support.

Special Thanks

The editors and the entire Department of Orthopaedics and Rehabilitation at OHSU would like to thank the following individuals for their generous donations.

Mrs. Joyce Beals & Ms. Brynn R. Beals

Mrs. Joyce Beals continues her generosity to our department with contributions in the name of Dr. Rodney Beals. In addition, Ms. Brynn R. Beals has put our department in her estate plans as an eventual beneficiary. The history of our department and orthopaedics in the state of Oregon would not be the same without the significant contributions of Dr. Beals, and the Beals family contributions are vital to keeping Dr. Beals hopes for Oregon Orthopaedics alive.

William (Bill) Guyer, MD

Dr. Guyer writes that he and his wife Betty are living at Terwilliger Plaza - both in the age group, late 80's. They have fond memories of their time on the hill. Just this April, he had a minor surgical procedure by Dr. Nathan Kemalyan. It turned out that in his training in Surgery, Dr. Kemalyn rotated on Dr. Guyer's Ortho service at the VA hospital. The Sr. resident there at the time was Dr. Robert Zirshky (class of 1989). Dr. Guyer states that it was a fun visit. We wish to thank the family for their generous contribution to our department.

Mrs. Paul Hafner

Mrs. Hafner is the widow of Dr. Paul G. Hafner, who passed away at the age of 98 in September of 2011. Dr. Hafner and Mrs Hafner were Portland natives who later made Longview, Washington their home. Dr. Hafner attended Lincoln High School, Reed College, and eventually graduated from the University of Oregon. He received his M.D. from the U. of O. Medical School (now OHSU) in 1941, followed by an internship and residency at Emanuel Hospital and Shriners Hospital. Outside of his professional career, Dr. Hafner was known to enjoy golf and helping his wife with gardening and baking. We want to thank Mrs. Hafner for her generous donation and her for continuing support of our department.

Bryan Laycoe, MD

Dr. Laycoe began his orthopaedic career in 1975 with Drs. Rodney Beals and Bill Snell. Thirty-nine years later, he retired from active practice in Vancouver, WA. Dr. Laycoe currently resides and works on his small sport horse farm in Ridgefield, WA, with Diane, his wife of 45 years. At this stage, Dr. Laycoe reports that he is "all about giving back. "My American Legion veterans activities and thanking special people who gave me my start are very important to me." We wish to thank Dr. Laycoe for his generous contribution to our department.

Special Thanks

Robin Sasaoka
Residency Coordinator
A special thanks to our Residency Program Coordinator, Robin Sasaoka. She is our continual resource for all resident needs. She coordinates all conferences, call schedules, educational schedules, financial paperwork, and much more.

Marie Kane
Research Associate
The editors would like to thank Marie Kane for all of her support to make this journal a reality. Without her constant encouragement, support and expertise this publication would have never made it to the press.

The goal of this publication is to grow and mature over the next several years. We would love any input from our alumni and local community on ways to improve the journal.

If you are an alumni and your information has changed with regard to your current practice type and/or practice location, please contact us so that your information can be updated for next year's journal.

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