

# The San Antonio Orthopaedic Journal

2022-Volume V



## IN MEMORIAM

Charles A. Rockwood Jr., MD

## EDITORS

Christina I. Brady, MD; Jose M. Gutierrez-Naranjo, MD;  
Trevor J. Wait, MD; Boris A. Zelle, MD, FAAOS, FAOA



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1. Higuera-Rueda C, Emara AK, Nieves-Malloure Y, et al. The Effectiveness of Closed Incision Negative Pressure Therapy versus Silver-Impregnated Dressings in Mitigating Surgical Site Complications in High-Risk Patients after Revision Knee Arthroplasty: The PROMISES Randomized Controlled Trial. J Arthroplasty (2021), doi: <https://doi.org/10.1016/j.arth.2021.02.076>.

2. Cooper HJ, Bongards C, Silverman RP. Cost-effectiveness of closed incision negative pressure therapy for surgical site management after revision total knee arthroplasty: Secondary analysis of a randomized clinical trial. Presented at: American Association of Hip and Knee Surgeons Annual Meeting, November 11-14, 2021, Dallas, Texas.

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# PREFACE

*By Christina I. Brady, MD and Boris A. Zelle, MD  
Editors-in-Chief*



Christina I. Brady, MD  
Editor-in-Chief



Boris A. Zelle, MD,  
FAAOS, FAOA  
Editor-in-Chief

Welcome to the fifth edition of the *San Antonio Orthopaedic Journal* (SAOJ). This edition is dedicated to the life and accomplishments of Charles A. Rockwood Jr., MD, founding chairman of our Department of Orthopaedics. A true visionary, Dr. Rockwood established our department in 1966 and created a premier environment for countless students, residents, fellows, and faculty to thrive. He was a giant in shoulder surgery as well as the overall field of orthopaedic surgery. He was admired for his skill as a surgeon and his inexhaustible entrepreneurship. To our fortune, he was also devoted to the city of San Antonio, his adopted hometown. At the same time, his global outreach shaped the field of modern-day orthopaedic surgery worldwide. Numerous trainees from all over the world enjoyed the privilege of learning from Dr. Rockwood. Our Memoriam to Dr. Rockwood includes contributions from highly regarded experts who trained under his watchful eye and became leaders in their fields. We greatly appreciate the contributions and heartfelt words from Drs. Green, Burkhead, Corley, DeLee, Dutta, Gerber, Guy, Heckman, Matsen, McCollum, and Wirth.

Following Dr. Rockwood's example, UT Health San Antonio Orthopaedics will continue to strive for excellence in patient care, education, research, and mentorship. Our journal nicely reflects the results of these endeavors. Our clinical divisions continue to thrive with the expansion of the faculty and the increasing footprint of UT Health San Antonio within the South Texas region. We are excited about the great opportunities that will come with the new 144-bed UT Health San Antonio Multispecialty and Research Hospital, which is projected to open its doors in 2024. Our educational program continues to be successful, and the orthopaedic residency recently increased from six to seven residents per class. We are looking back at a stellar match cycle with our orthopaedic residency program, the shoulder fellowship, and the orthopaedic trauma fellowship all matching their very top-tier candidates. Furthermore, our research reports reflect on the increased productivity. Since the last edition of the *San Antonio Orthopaedic Journal*, our department has published an impressive number of approximately 80 peer-reviewed journal manuscripts. Currently, our department is involved in a total of 16 clinical trials that are supported by industry sponsors as well as the Department of Defense (DoD). These numerous scholarly activities provide a platform for mentoring students, residents, fellows, and faculty. We are very proud of our rich history and our distinguished group of alumni depicted in this edition. UT Health San Antonio Orthopaedics continues to be an ideal environment for producing leaders in orthopaedics.

# EDITORIAL

*By Trevor J. Wait, MD, Resident Editor-in-Chief*



As the resident Editor-In-Chief, it is my highest privilege to present the fifth edition of the *San Antonio Orthopaedic Journal* (SAOJ) 2022. Overall, this past year was an exciting and rewarding year to be a part of UT Health San Antonio Orthopaedics as we continue to expand and grow in our clinical volume and aspirations. This growth is despite the numerous challenges that our department faced, including the ever-present COVID-19 pandemic that remains a relentless obstacle in all of our lives personally and professionally. Although COVID-19 has been present, it was not a defining memorandum to our progress as we have remained steadfast with our creativity and commitment to serve our patients, as well as our local and international communities, through education and research. It is my pleasure to touch on a few of these highlights that are reflected further hereafter:

The life of Dr. Charles A. Rockwood, Jr., the founding Chairman of our department, is celebrated in this edition as we reflect on his astounding career here at UT Health San Antonio that spanned over six decades becoming one of the most influential orthopaedists in our profession. Dr. Rockwood laid the foundation for the successes that we enjoy today, and his influence and leadership to our department and to the overarching orthopaedic profession cannot be overstated.

The fifth edition highlights the exciting expansion of volume and clinical utility of our department within the community. Our department has expanded our faculty taking calls at multiple hospitals within our community for both adult and pediatric trauma which is unprecedented in our department's history. We are anticipating this rate to increase with the addition of our very own UT Health San Antonio Multispecialty and Research Hospital and the addition of the Women and Children's Hospital expansion to University Hospital in the upcoming years. We have taken on a new partnership with UTSA Athletics and have excelled at our role as sole-provider of medical care for the entire athletics department. Through education, the quality of the residency continues to be one of the pressing priorities of the department. This edition features the graduating class of 2022 including Jorge Clint (J.C.) De Leon, MD, Joel I. Edionwe, MD, Jordan "Jordi" E. Handcox, MD, Dietrich W. Kayser, MD, Riikka E. Koso, MD, and Trevor J. Wait, MD. The high volume and exceptional autonomy that our residency is founded upon is reflected throughout. Dr. Ryan Rose has transitioned as the new Program Director and has provided exceptional leadership and attentiveness in the ever-changing environment of COVID-19. Our residency also saw an expansion to seven residents which is a reflection of the heightened volume as mentioned.

The fifth edition highlights the growing research department, led by the Vice-Chair of Research Dr. Boris Zelle, in seeing an astounding 80 publication abstracts within the past year for the Department of Orthopaedics and Podiatry. This accomplishment is a manifestation of the commitment to orthopaedic excellence by the department and the influence it is having on the broader orthopaedic community and medical profession at large.

In closing, we hope the readers can get an appreciation of the dedication to excellence in the lives of our faculty and residents. We also hope our alumni can remain proud of the department's work-ethic and accomplishments as a reflection of the foundation laid before us as we continue to grow at an increasing rate in patient care, education, research, and community and global outreach. Please enjoy the SAOJ Fifth Edition of 2022 as we celebrate our department and the life of Dr. Charles A. Rockwood Jr.

# FOREWORD

By Kaye E. Wilkins DVM, MD  
Professor Emeritus of Orthopaedics and Pediatrics



It is an honor to produce this forward for the 2022 fifth edition of the *San Antonio Orthopedic Journal*. The Editors-in-Chief, Drs. Boris A. Zelle and Christina Brady, as always, are to be congratulated on compiling an excellent combination of outstanding scientific and informational articles produced by the collaborative work of our faculty, residents, and research staff. An abundance of research abstracts also is included highlighting a broad range of cutting-edge orthopedic research.

Anyone reading this journal will understand the importance of a department that is well-balanced in its programs of education, service, and research which greatly enhance the orthopedic community. These qualities, along with the dedicated staff, make the department one that is considered by many as one of the best in the nation.

On a personal note, I am especially pleased to be a part of this journal memorializing the leadership of the former Chairman Dr. Charles A. Rockwood Jr. This forward will highlight the memorials to Dr. Rockwood, as well as updates on the residents and faculty, research activities, and finally the important changes in the administrative and clinical activities of UT Health San Antonio Department of Orthopedics. Formerly referred to as The University of Texas Health Science Center Department of Orthopaedics, I will refer to it simply as “the department.”

In light of the touching memorials honoring the first chairman of the department, I will try to focus on how Dr. Rockwood’s influence and leadership affected the development of each of the programs and activities contained in this volume. They all demonstrate that Dr. Rockwood has left a wonderful and lasting legacy, to say the least.

I had the privilege of working with Dr. Rockwood as a member of the faculty of the department for 45 years. Years ago, in seeking an academic position following my training, it became readily apparent that the new programs being developed by Dr. David P. Green and Dr. Rockwood in the newest medical school in San Antonio, Texas had enormous potential. In my first years as a member of the department, I was able to observe Dr. Rockwood’s unique leadership skills. I believe his enthusiasm and unique leadership style were key factors in the department rapidly becoming recognized not only nationally, but also worldwide as a leader in the development of educational tools such as Dr. Rockwood’s textbooks on fractures in both adults and children. It must be mentioned that Dr. Rockwood’s goals and efforts were greatly enhanced by the same dedication of his esteemed colleague Dr. Green.

Through their work, and the work and dedication of many others, the department over the years has likewise become recognized as one of the outstanding orthopaedic teaching programs both nationally and internationally. Following Dr. Rockwood’s lead, we became a department of true leaders. Many of the faculty were elected to leadership roles as presidents or vice-presidents of the Texas Orthopaedic Association, the Academy of Orthopaedic Surgeons, the American Society for Surgery of The Hand, the Pediatric Society of North America, and the American Orthopaedic Society for Sports Medicine.

Dr. Rockwood made it one of his priorities to develop very strong bonds with the residents. He always considered them family. And the feeling was mutual with the residents as was demonstrated time and again in the admiration and respect they showed him.

He encouraged activities of social interaction to foster an atmosphere of “*esprit de corps*.” In social gatherings, he always made sure that the wives and significant others were included. This family atmosphere is captured in images throughout this volume of Dr. Rockwood with students, residents, and staff invariably having a good time.

Included in these pages are many memorials and comments by past and present residents, in addition to some very prominent national and international orthopedic surgeons. A special section describes where some of the former residents are working now and what is developing in both their professional and personal lives.

I read with interest the names of former residents by class year included in this volume. Seeing the names of those with whom I had worked since my first year in 1973 brought back so many fond memories. I am sure that will be the same for some of the present faculty and former residents.

Since the department began there have been many changes in the delivery of acute and chronic orthopaedic care. These changes have required upgrades and other organizational changes in our facilities and care processes to incorporate the new treatment procedures along with their delivery methods.

The department is fortunate to have as its present Chief Dr. Robert Quinn. Dr. Quinn has produced a special section, *The Chairman’s Corner*, in which he shares valuable information regarding the changes required to keep up with the increased need to provide expanding clinical services. His dedication to keeping the department financially sound and recruiting high-quality teaching staff has been a blessing for all of us.

This edition of the journal dedicates a plethora of pages to abstracts of articles detailing the large body of scientific research contributed by the faculty, residents, and research staff. This confirms that the department, in addition to providing outstanding education activities and clinical care, also contributes significantly to the understanding of the basic science of the conditions that confront the practicing orthopaedic surgeon.

In any organization, some unsung heroes perform the very basic but important administrative and clinical support activities. Without their efforts, the smooth functioning of all aspects of conducting the major activities of the department would be severely curtailed. It speaks well for the two Editors-in-Chief to recognize their importance and include information about their unwavering dedication and service.

In summary, our editors-in-chief have compiled an outstanding array of information about UT Health San Antonio’s Department of Orthopedics that reinforces the legacy of excellence set in motion by its very first chairman. Indeed, Dr. Rockwood’s enthusiasm, dedication, and superior clinical skills are reflected on every page. And, as a result, the BEST is yet to come.

Perhaps the Resident Editor-in-Chief Trevor Wait says it best: “We reflect on his astounding career here at UT Health San Antonio that spanned over six decades becoming one of the most influential Orthopedists in our profession. Dr. Rockwood laid the foundation for the successes that we enjoy today, and his influence and leadership to our department and the overarching orthopaedic profession cannot be overstated.”

I conclude this forward with one personal comment: I have been truly blessed to have been a part of this outstanding team.

# Chairman's Corner

By Robert H. Quinn, MD, FAAOS, FAOA  
Chair, Department of Orthopaedics



I am pleased to introduce the fifth edition of the *Orthopaedic Journal* of UT Health San Antonio, marking our department's 54th anniversary. I am very proud of the superb faculty we have either recruited or retained across all of our disciplines. I am particularly proud of the winning culture we have created. Our residency and fellowship programs are re-invigorated and thriving while attracting the best and brightest applicants from across the country.

It is with a heavy heart that I must announce that this year saw the passing of Dr. Charles A. Rockwood, Jr. An iconic and beloved figure in our department, university, and the greater orthopaedic world at large, he will always be remembered and revered. Charlie remained connected with the department, faculty, residents, and alumni until the very end. He will eternally represent the soul of this department.

Although COVID-19 has continued its disruptive course, overall operations were minimally impacted compared to last year.

Construction is now well underway for the UT Health Multidisciplinary and Research Hospital. It will be a cancer/specialty hospital with a significant orthopaedic footprint. Doors will open in three years. The single biggest impediment to growth at UT Health since its founding has been a lack of a large revenue source with which we can invest in our future. The practice plan has done exceedingly well but simply does not create the type of margin necessary to advance our missions of patient care, education, and research into the top tier of academic medical centers. This hospital represents a great step forward in the evolution of our academic medical center.

Separately, we are about to begin construction on a new medical office building with complete imaging capabilities and a freestanding ambulatory surgical center. Doors are scheduled to open in two years. This building will be located on the campus of our sister institution

UTSA. It will represent a major hub for our outpatient musculoskeletal service line activities with a heavy emphasis on sports medicine.

Speaking of sports medicine, last year we finalized an exciting partnership with UTSA Athletics and are now responsible for sports medicine coverage of all teams. What a great time to have started this relationship — just before the UTSA football team won their first conference championship after a nearly undefeated season. KJ Kenneth-Nwosa, MD, has been hired as the Director of UTSA Sports Medicine and is an exciting addition to our team. Thomas DeBerardino, MD, will also be joining our sports team after a long and industrious academic career at West Point and the University of Connecticut.

We have also initiated a multi-disciplinary spine center under the direction of Dr. Chris Chaput. It will be a partnership between orthopaedics, neurosurgery, and PM&R. We welcome Jeffrey Hills, MD, to the spine division and look forward to his efforts to expand our spine center and grow a clinical research program.

We anticipate substantial and progressive growth in elective orthopaedic procedures in preparation for the new hospital, particularly in the areas of adult reconstruction and spine, and we will be working aggressively to expand our clinical volume and faculty recruitment in these areas. Chance Moore, MD, a graduate of our residency program in 2019 has joined the adult reconstruction division after completing his fellowship.

We have recruited Lee Rogers, DPM, to head up our podiatry division. Dr. Rogers is currently president of the American Board of Podiatric Medicine. We look forward to helping Dr. Rogers achieve his vision to reestablish our program as the international leader in the management of diabetic foot challenges.

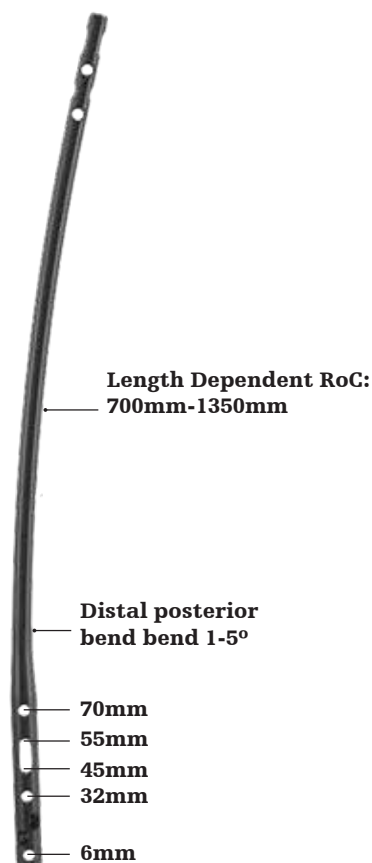
I remain proud, and humbled, to lead such a great group of faculty, residents, researchers, and staff. These are exciting times in San Antonio and I look forward to watching our great program grow and mature.

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IN MEMORIAM OF  
DR. CHARLES A. ROCKWOOD JR.  
(1929- 2022)

## ROCKWOOD REMINISCES – For the Department of Orthopaedics

*By David P. Green, MD*

With the passing of Charles A. Rockwood, Jr., MD on February 1, 2022, American Orthopaedics lost one of its giants, UTHSCSA lost one of its founding fathers, and I lost a dear friend. Thinking back on our 50-year friendship reminds me of many wonderful memories and stories about this energetic, creative, and colorful character.



It is a bit ironic to discover that this man who was to contribute so much to American Orthopaedics was not accepted in his first application to medical school. After doing graduate work for a year, his second attempt was successful, and he entered the University of Oklahoma Medical School with the class of 1956. After his Air Force-sponsored orthopaedic residency in Oklahoma, he owed the military five years of pay-back. He fulfilled that obligation at Wilford Hall Medical Center in San Antonio, where he had his first opportunity to direct an orthopaedic residency program.

When his active-duty commitment was completed in 1966, the University of Texas had just opened a new medical school in San Antonio, and Dr. Rockwood became the third member of the surgical faculty, hired as Chief of the Division of Orthopaedics. I joined him in 1970 and, for a few years, the Orthopaedic Division meetings were Rockwood and Green walking down the hall making plans. Before long Charlie had wrangled full-fledged departmental status from the Dean and the program began to develop a strong national reputation. The number of faculty has since grown to 24 full-time surgeons and an equal number of allied professionals, and the residency program has educated more than 300

orthopaedic surgeons. Rockwood's shoulder fellowship attracted applicants from many states and foreign countries. He devised a prosthetic replacement for the shoulder and traveled all over the world to teach surgeons in its technique and applications.

He was many things but above all, he was a teacher and educator. His style was unique. His lectures and comments in conferences were always punctuated with humor – and occasional profanity – but he delivered his take-home messages in blunt and practical language. He was passionate about education, and almost everything he did was related to that in some way.

He was a leader. Charlie loved to be in charge. He organized or led every group he ever belonged to from his grade school graduating class to Presidency of the American Academy of Orthopaedic Surgeons and its fund-raising arm, the Orthopaedic Research and Education Foundation. In 1996 his many accomplishments were recognized by his induction as one of the very few physicians chosen for the Oklahoma Hall of Fame.

What makes a great leader? My definition is one who can inspire others around him to be better than they might be on their own. People have often asked me, "Didn't Rockwood take advantage of you?" to which I always reply, "Absolutely ... but he afforded me unique opportunities, supported me, and led me to places I could never have reached on my own." An exceptional leader is one who makes those around him better. He did just that.

He was the finest medical politician I've ever known, and I say that in the best sense of the word. Many people over the years were fooled by his aw-shucks, down-home Oklahoma country boy demeanor. Beneath that façade, however, was a man with brilliant strategic plans and razor-sharp tactics. He was a master at getting what he wanted with a combination of negotiation, horse-trading, persuasion, flattery, and if necessary, intimidation.

Perhaps Charlie's greatest skill, one which I admired and envied, was his amazing ability to defuse angry or hostile patients. I recall seeing more than one patient go into his exam room with fire coming out of every orifice, furious about something.

Fifteen minutes later, the patient walked out arm and arm with Dr. Rockwood, smiling and joking with his new best friend.

Charlie loved golf. Taking up the game at a very young age, at one time he was a near scratch golfer, and he said that if he hadn't gone to medical school, he might have tried his luck on the pro tour. He just loved being on the course with his friends.

Shortly before his death, Charlie told me that all the awards and recognition he had received, all the books he

had written, and all the accomplishments he had achieved meant nothing in comparison to what mattered most to him – his family. It is that legacy for which he wanted to be remembered.

God blessed Charles Rockwood with an abundance of leadership skills, and he used those talents in everything he did. He was a truly remarkable man. Those of us who were fortunate enough to have a relationship with him were all made better for having known him.



## Reflections upon the Death of Charles A. Rockwood Jr., MD

By Wayne Burkhead, MD

How many people have come into your life that you think about every day, perhaps several times a day? When I leave my office, I must look at a picture of Dr. Rockwood and my father on either side of my door. They are positioned on purpose. I can't leave without looking those two men in the eye. I can't see a patient in the recovery room and gently straighten their arm relieving a lot of their postoperative pain, I can't revise a failed cuff repair, I can't sit in an American Shoulder and Elbow Surgeons meeting room without seeing Dr. Rockwood in his golf pants on the front row for the first lecture. He would buy ten copies of my CDs when they were released: one for himself and nine for his children. In the Hippocratic oath, the first important requirement concerning one's duties as a physician states, "I will hold my teacher of this art equal to my own parents". For the students of Dr. Rockwood, this was an easy task.

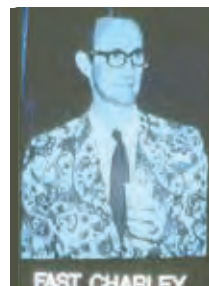
A natural father figure, all of us who trained closely with him, shared a universal palpable desire to make him proud of us, and, to a certain extent, prove ourselves worthy of being his student. Like a good father, he was proud of our accomplishments yet understanding of our failures not just in orthopaedics or shoulder surgery, but also in life itself. He was always there for us when we needed him. He was a one-of-a-kind, who taught us by example to be ourselves and not fear what others may think of us. He taught us to think carefully about our sacred obligations as physicians.

In 1983, Dr. Rockwood gave me the opportunity to be his first outside fellow, unpaid I might add. Our lives, and the lives of my brother fellows, and ASES members have been intertwined since. Having had a melanoma earlier in that year with an unsure prognosis, I had only wanted to stay 3 months, but he convinced me by telling me about

this new shoulder and elbow society formed the year before which was going to require a six month fellowship. I was thus gifted the incredible opportunity to meet and learn from the "old masters" Charles Neer II, Carter Rowe, Frank Jobe, Bob Neviaser, and their students. Dr. Rockwood toughened you up; those with thin skins might have been offended by some of his comments. He threatened to turn me into a dermatologist, and offered to pay for my bus ticket to Durham, NC when I suggested a patient needed a biceps tenodesis. I was an outsider who forever became "Biceps Buzzy the Dallas Dandy" shortened to "Biceps" when I played a practical joke on him by creating a music video of his patients moving their arms to a "ZZ Top" song. Thus, forcing him to show it at the closed shoulder and elbow meeting because he thought it was the only copy available. After that, I became one of his boys, and for my sins he "gifted" me (voluntold me) the chapter on the biceps tendon in his textbook "The Shoulder."

An obituary for most of us is the final mention of an individual. Except for the occasional thoughts and memories of close friends and family, we pass into the ether with this document being the summary and sum total of our lives, a final chapter. However, when we teach and write, like Charlie Rockwood did, there's an afterword, or more appropriately, yet, another edition that is perpetual; an afterlife, if you will, that mirrors immortality. Because of his ability to organize, distill, and impart knowledge in such a unique way, Dr. Rockwood will be in the hearts and minds of orthopaedic surgeons, and their grateful patients for generations to come.

Wayne Zealous Burkhead Jr.  
aka Biceps Buzzy the Dallas Dandy  
Dallas Tx 03/02/2022.



**LEFT:** Charlie and me at ASES 2007 the year I was president of the organization that helped shape my career.

**RIGHT:** My favorite picture of Dr. Rockwood when we had competing shoulder replacements. I would query the audience: Would you buy a used car or a new shoulder from this man?

## Dr. Rockwood Memoriam

*By Fred G. Corley, MD*

Had anyone struck a match near me, I am sure I would have enveloped in flames. I had a Hong Kong tailored double knit suit and had flown for 36 hours from Danang, Republic of Vietnam, where I was stationed, to San Antonio, TX.

Dave Green grilled me like a chicken. He was trying and learning how to smoke a pipe and then Dr. Rockwood walked in, white shoes, a Mexican guayabera, and tacos from a Mexican restaurant, my life was changed. I knew where I wanted to be.

Dr. Rockwood, Dave Green, Kaye Wilkins, Harry Snowdy, Jesse DeLee, Jim Heckman, and a host of others, trained and guided me. They took me in as an associate, and I never looked back.

Dr. Rockwood gave you free rein to do what you wanted and supported you. He demanded accountability, hard work, honesty, and always doing what was in the patient's best interest.

He could be stern, but not mean. Not controlling, and never worrying.

He could sleep soundly with nine children, his wife Patsy did most of the worrying.

He could leave a desk filled with letters, tasks, urgent calls, and stacks of paper to down a couple of tacos and

a Big Red, and maybe play nine holes of golf. Worrying was not in his vocabulary, concern was. He had great concern for his patients, his family, and his residents.

The traditions of the profession, the school, and the department were all of great value to him, and his alumni, graduates, and associates were always in his thoughts. He rarely forgot a name.

He was always more interested in the man than in his accomplishments. What did he like to do outside of orthopaedics? What was his family like? What were his future plans? He thought you could learn more about a man on the golf course in nine holes than reading his biography. When he called you in for discussion, you better have a plan, or you were going to have to adopt his plan - be prepared. Boy Scouts, the church, fishing, hunting, travel, golf, barbecue, his family, and orthopaedics were his life, and what a life.

If we interviewed a resident applicant who had eleven brothers and sisters, was an Eagle Scout, had attended seminary, and worked as a caddy, there was no way that he was not going to be one of our residents.

He was a great man whom I admired, loved, and respected. I cherished our time together and our friendship.

## Dr. Rockwood Memoriam

*By Jesse C. Delee, MD*

I came to San Antonio in the Spring of 1971 to interview in the Division of Orthopaedics at The University of Texas Health Science Center residency program. As was the custom in those times, I was dressed in my finest attire, a leather jacket with tassels and a tie. I was being interviewed by a very proper but stern newly-hired hand surgeon, Dr. David Green. Suddenly, the door flew open and in walked a character with an uncanny resemblance to Washington Irving's character, Ichabod Crane. He picked up my application, looked it over, and while looking at me said "what is your 'expletive' ... hurry!" Charles Rockwood had exploded into my life, which was changed forever.

Dr. Rockwood was indeed a unique character. His academic accomplishments, orthopaedic textbooks, orthopaedic political maneuverings, and orthopaedic implant designs are legendary. These, however, are not his legacy. The academic papers and certificates will yellow with time, the textbooks will be revised, his political contributions will be modified and his implant designs will be improved. The effect Dr. Rockwood had on me, many of his residents, myriads of medical students, and the patient community are indeed his legacy. These will not change with time.

Dr. Rockwood, to me, was a role model as a physician and orthopaedic surgeon, teacher, and disciplinarian with a compassionate soul. In my case, he became a dear father figure, extraordinary friend, and later a business partner.

As a physician and orthopaedist, he always placed the patient first. He was emphatic that one evaluates the entire patient, not just the patient's orthopaedic issue. His clinic was a tutorial in human relations. As a teacher, he demanded his residents have a detailed knowledge of orthopaedic literature and taught his students to apply the literature to each patient's situation.

He could, however, be a strict disciplinarian. In one of the many incidents when I wavered from the goals he set for me, he said "Jesseeeee, if you do that again, you will be studying dermatology at Duke." This was a most unique and effective way of threatening my dismissal from the program.

Charles Rockwood had a compassionate soul, which was evident within the religious and medical communities and the community at large. His faith was central to his being, and he devoted much time and support to his church.

When a resident had a personal problem or issue, he was supportive and quick to provide time and resources to resolve the issue. In addition, on more than one occasion, he created a position within the Orthopaedic Department for a community physician who was having personal difficulty.

Dr. Rockwood was the consummate optimist. He never saw a glass as "half empty." I remember he asked me to research the best binoculars available. I reported to him there were two brands, each with equal quality but different warranties – lifetime and thirty years. He was 82 at the time, and immediately responded "we'll take the lifetime warranty, Jesse." I said in reply, "at 82, 30 years is a lifetime warranty!" Charles quickly quipped, "you do not know that for a fact."

Through the training of over three hundred residents and fellows, Dr. Rockwood has affected the lives of countless people. It has been said the story of our lives is finished in the lives of other people whom we have loved, led, taught, influenced, and inspired. Dr. Rockwood's story is indeed NOT finished.

## Dr. Rockwood Memoriam

*By Anil K. Dutta, MD*

When Dr. Rockwood asked me to come to San Antonio to interview for a position at UTHSCSA in 2005, my initiation was the quintessential experience at his Via Finita Street residence. I remember the hot South Texas sun and the peaceful patio. I remember the immediate sense of belonging that represents Dr. Rockwood's unconditional embrace of young surgeons and their potential. Of course, I also remember the summary dismissal at 9 pm with the ringing of the bell and the threat of the sprinkler being turned on the guests and myself. A day hasn't gone by since where some point of reference has not directed me to him. His commitment and respect for education is built into the brick and mortar of our program. Dr. Rockwood's internationalism is felt anywhere you look in the world. He has directly trained surgeons who are now practicing in the most distant corners of the globe. His travels brought his uniquely inclusive and commonsensical Texas perspective to so many universities and societies.

His guidance is codified in the indispensable textbooks which bear his name in call rooms and personal libraries of doctors everywhere. As an educator, I find myself promulgating his vision and experience in a never-ending parable or allegory to be retold to the next generation of surgeons. I have witnessed Dr. Rockwood transform from my icon to my partner and then to a father figure. I have had the honor of late of simply enjoying the precious time and company of a grand patriarch. His recent years were a tenacious fight to live every day out and were nothing short of heroic. He was as much the iconic representation of the patient who transcended illness as he was the physician who transcended medicine. February 1st, 2022 was another perfect warm Texas day on that same Via Finita patio as Dr. Rockwood bid his final farewell. His voice resounds in our lives and his legacy is omnipresent. All one must do is look in the right direction.



## Dr. Charles A. Rockwood Jr.: Teacher, Mentor, Role Model

*By Christian Gerber, MD, FRCS*

My wife Elisabeth, our two children, Chrisof and Annina, and I arrived at the end of December 1983 in San Antonio, longing for the warm sunny weather in South Texas. It was snowing. Dr. Rockwood could not pick us up at the airport because of the “d... snow.” After that, all the warmth came from him to me and my family and largely compensated for the bad weather.

On January 2, I joined the Department which had the reputation as the strongest one in the country. The names, and later the strong personalities, of Drs. Heckman, Green, O’Brien, Deffer, DeLee, Corley, Wilkins and others were intimidating for a young and inexperienced Swiss, not knowing the language well and not understanding the system. I would ask, “Dr. Rockwood how is this organization? There are so many professors here, what is their respective role?” “Don’t worry, son,” he replied, “they are all professors, but I am The Professor.” There was quite some clarity in these words – even for a Swiss.

We moved into our house and were a bit uncomfortable because there were some beetles in our kitchen busy eating the chocolate we had brought along to treat our potential homesickness. I asked, “Dr. Rockwood, in our kitchen there are bugs or beetles, or whatever you call them, what should we do?” He replied, “Welcome to Texas, those are cockroaches. Enjoy them.”

The real treat was Dr. Rockwood’s shoulder surgery and his truly amazing talent and dexterity to handle patients. Even if his treatment results weren’t near excellent in more than 75 to 90 percent of Dr. Rockwood’s patients, they would have kissed his feet. What they did not know, was that he deserved it. Whether you were a fellow, faculty, secretary, or cleaning personnel, if you needed help, Dr. Rockwood would be there for you as his first priority.

My first weeks were the period of the final edition of the red book. I remember how Dr. Rockwood gave me Dr. Neer’s chapter on fractures. I told Dr. Rockwood that Dr. Neer had erroneously called a ‘T-plate’ a condylar plate and that this made a bad impression in the book, and Dr. Neer should use the correct terms. He said, “Huh, are you sure that it is not called a T- plate?” I replied, “Yes Sir, absolutely sure, this is an AO implant!” He quipped, “You better be, I will let Charlie know, but if this is a condylar plate, you better apply for foot surgery.”

Thank you for showing, and teaching me shoulder surgery, thank you for transmitting enthusiasm. Thank you for having been a role model, and thank you for all the warmth of South Texas.

Christian Gerber, MD, FRCS



## Alamo Orthopaedic Society Tribute

*By Daniel K. Guy, MD, Class of 87'*

*AAOS President 2022*

There have been many heartfelt and deserving tributes to Charles A. Rockwood and we all feel that combination of loss and gratitude for the extraordinary man who shaped our lives and our careers. I have enjoyed reading these remembrances and thank all that have shared warm memories of affection, admiration, and respect. As members of the Alamo Orthopaedic Society we have a unique, shared experience with Dr. Rockwood that others can only envy. Our alumni gatherings offered the chance to see colleagues from training, share memories, and always admire the latest fashion statement from the Chairman. Famous for embracing a style of sports coat that few, IF ANY, would wear, much less purchase, he was so enamored of one particular plaid that he owned two of them.

He is largely responsible for the many traditions associated with our alumni organization and inspired the great camaraderie we have all enjoyed. The Guajalote Award is just one of these and a sip of tequila as you read this is certainly appropriate. He noted, "we've ALL got a few bad cases" and this event honored those combined missteps in judgment, technique, or, that unlucky combination of both, that was deserving of the embarrassing narrative and the obligatory incriminating 'x-rays.' Always accompanied with spirits, much laughter, and, perhaps this silent prayer: "There, but by the grace of God, go I." Along with him, we looked forward to these and he would share his disappointment when few or none were offered. I think this was his way of continuing to teach us long after we had been turned out into the world. Never judgmental of these inevitable blunders, his own laughter taught us the important lesson that we need to accept shortcomings, learn from mistakes and continue to serve

our patients. A superb clinician and surgeon, unparalleled teacher and mentor, Dr. Rockwood provided us so many opportunities throughout our internship to our years in practice to learn both orthopaedics and life lessons with both humor and humility.

Thanks again to all who have shared memories over the past weeks. Jesse DeLee noted that "Professor" stories will continue to bring laughter and will keep his memory alive. We all have our own treasured moments with him, both shared and individually and while we will miss his presence, we will always know that he helped make us the orthopaedic surgeons we are today. The Alamo Orthopaedic Society is synonymous with Charles Rockwood; he built it from the ground up. Like you, I will always be proud of my good fortune to be among those he trained and to share the legacy of this great man.



## Charles A. Rockwood Jr., MD: The Idea Man

By James D. Heckman, MD



“Idea Man: a person with an unusual capacity for visualizing and formulating new techniques, approaches, and products.” Merriam Webster Dictionary.

I know of no orthopaedic surgeon of the twentieth century who more accurately or more fully met the dictionary definition of “idea man” than “Charlie” Rockwood.

Early on, as the third surgeon hired at the newly created Health Science Center in San Antonio, he had a vision of creating the best orthopaedic surgery residency in the world and requested and received from the Residency Review Committee six resident slots annually. Such a large number was rarely granted to even well-established programs, but he convinced the RRC that the huge service needs required a large number of residents. He then spread those numbers across many different hospitals (county, VA, children’s, and even a sports rotation in Austin) to create a balanced and very rich clinical experience fulfilling his objective to create one of the best American orthopaedic residency programs.

As a young trauma surgeon in the early 1970s, he became aware of the need for improved prehospital care for injured patients. He led the creation of a city-wide Emergency Medical System in San Antonio and went on to serve as Medical Director of San Antonio/Bexar County EMS for 12 years. Simultaneously, leading the American Academy of Orthopaedic Surgeons’ Committee on Injuries, he developed and edited the gold standard textbook for Basic EMT training which, now in its eleventh edition, continues to be the most widely used textbook in the United States.

Charlie reinvented the medical textbook. Working with

David Green MD on Fractures, and later with Rick Matsen MD on The Shoulder, he saw the need for a fully referenced, comprehensive resource for both residents and practitioners. His novel addition of “The Author’s Preferred Method” for each textbook chapter made them more useful for the reader. To this day, both of these reference texts remain the leading resource for the orthopaedic community.

Having extraordinary leadership skills, it is not surprising that he quickly rose to prominence nationally in organized orthopaedics, culminating in his election to the presidency of the American Academy of Orthopaedic Surgeons in 1981. At that time, the integrity of the AAOS was threatened by splintering into multiple subspecialties, much as general surgery had a generation before. To address this threat, in his presidential address, with his entire family including his nine children standing behind him, he made a plea to keep the orthopaedic family together under the umbrella of the AAOS. Then during the next year under his leadership, the Academy revised many of its policies and procedures and succeeded in keeping the orthopaedic family united for another generation.

These are just a few examples of Dr. Rockwood’s genius. His incredible ability to recruit colleagues to join with him in pursuit of such great ideas made him unique among orthopaedic surgeons, and these efforts resulted in many positive changes for orthopaedics worldwide. His many ideas and his legacy will endure for generations to come.

## Dr. Charles Rockwood was the Abe Lincoln of Orthopaedics

*By Frederick A. Matsen, III, MD*

Like Abe, he always came off as a common man, never exalting himself above others. He admonished others to humility: we were a bunch of “hot shot” ABC traveling fellows – he took us all out one night and said, “look up at the stars and you’ll realize how small you really are.” When the Father of American Shoulder Surgery stated at a meeting of the Academy that all “rotator cuff tears were reparable,” Charlie came next to the podium and admitted, “There are quite a few cuff tears that I can’t repair.” As a result he inspired so many of us to be our best yet our most humble and honest selves as we strive to serve our patients.

Like Abe, he was a unionist; at a time when there were specialist separatists who wanted to splinter from the American Academy of Orthopaedic Surgeons, as AAOS president, he strove to keep the orthopaedic family together. When he gave his presidential address, he invited his wife Patsy and their nine children on the stage to emphasize the importance of family togetherness.

Like Abe, he was a teacher, selflessly sharing his hard-won knowledge through student clerkships, residency, fellowships, texts, and courses – touching directly or indirectly every orthopaedic surgeon around the world.

Like Abe, he had a great sense of humor. Lincoln was the first United States president to make jokes and laughter tools of the office; no other occupant of the White House has since matched his embrace of the jocular. At Charlie’s first board meeting on becoming President of AAOS, he broke the ice by wearing a cap with two divergent bills bearing the inscription, “I’m their leader, which way did they go”. Like Lincoln, some of his jokes were ever so slightly off-color. Sometime I’ll tell you his story of the lineman who got bit in a special part of his anatomy by a rattlesnake.

I miss him, as I know you all do. He was a friend, an enabler, and a guide for so many of us. Charles, thanks for everything.



## The Past, Present, and Future Reflections on Dr. Rockwood

*By Stephen M. McCollum, MD, Class of 87'*

I purposely waited to pen my thoughts about Dr. Rockwood until after I attended his funeral service and had a chance to reconnect with old friends. I read each of the emails sent out on the Alamo email list. I viewed Dr. Rockwood's UTSA founder's interview. I then met with our 1987 "young lions" class the night before his service swapping many of our happy war stories at a great Mexican restaurant. I subsequently attended the celebration of his life at St. Luke's church. I intently listened to the wonderful eulogy by Dr. Green where he boiled down the essence of all the good Dr. Rockwood was. I got to spend 24 hours with not only my classmates, but with the faculty and many residents who trained before, with, and after me: in essence, my professional family. It brought me great joy as I listened to each of the epic stories of years past from my mentor faculty and many of my fellow residents. I never get tired of hearing them as they remind me of the happy foundational years I spent in San Antonio and how I was so lucky to be chosen as a resident. I wanted to process all of this before placing my thoughts on paper.

I have come to believe in the wisdom of the adage "the days are long, and the years are short." How could it be that 40 years have elapsed since I stepped foot in the medical school to start my training with an MD behind my name, yet knowing so little? So many memories: the "I am the chief talk," Monday night fracture rounds with Dr. Heckman where your knowledge gaps were laid bare for all to witness, the annual residents' party at Dr. Rockwood's house which ended abruptly at 9 pm on the dot, triage at the VA with the rich irony of veterans smoking through their tracheostomies, the Bexar county brownie, the 48 hours of straight weekend call at "the county" in the early years, the wild moonlighting stories, the sage profanity of Dr. Rockwood's teaching style in the OR, sipping fine tequila in his office as chiefs where we solved the problems of the world as we knew them. Then there was the monumental, accumulated orthopaedic wisdom of the founders of the department that Dr. Rockwood assembled. Not until I completed two subsequent fellowships elsewhere and started my practice did I fully understand what a gift I had been given to be exposed to such a wealth of material and wisdom. Equally impactful was having formed lifelong friendships that I cherish to this day.

My past training in San Antonio has made me so much of what I am in the present. Not a day goes by that I do not practice what I learned in some fundamental way. After each surgery, in the back of my mind, I hear Dr. Corley ask "have you talked to the family yet?" I use Dr. Rockwood's common-sense teaching concepts as I consider and occasionally reject a new technique or delay using it to see if it will stand the test of time. The words "a triumph of technique over reason" resonate in my head when it doesn't make good sense. In Haiti, with the skills I learned working with Dr. Wilkins, I can open a supracondylar distal humerus fracture in a child with confidence, then quietly and once again thank God I spent those happy years in San Antonio.

As Dr. Rockwood became homebound in his final years, I came to realize how happy I could make him by simply picking up the phone for a few minutes to share with him the news of my family. He genuinely cared about me as a person. Even better was to visit him with my co-residents in person and see the joy on his face as he greeted us at his door.

The common thread for each of our successes has been all that Dr. Rockwood was and did before, during, and even after we left San Antonio. He was directly or indirectly responsible for every teaching experience during my formative residency years by creating and nurturing the department. Without a doubt, he created a legacy that will live on in me and you into the future.

As I fly home tonight, I find myself honored to have been asked to reflect on Dr. Rockwood. I am part of a most special family created by Dr. Rockwood. None of it would have been possible had I not opened my residency match envelope some 40+ years ago and seen "UTHSCSA Dept. of Orthopaedics." For me, I left Tulane and the comfort of New Orleans and took "the road less traveled." I have never regretted it and cherish all that Dr. Rockwood's influence had on my life. As I reflect on his life, I am reminded of the bible passage in the book of Mathew – "Well done my good and faithful servant ..." May he rest in peace.

## Knowing That This Moment Would Come Has Not Made It Any Easier

By Michael A. Wirth, MD

Knowing that this moment would come has not made it any easier. In this Texas, national, and international vigil of mourning, it is clear how much we loved this good man, and how greatly we will miss him. The true measure of any man is what he does with the opportunities life offers and by that standard, Charles Rockwood was one of America's greatest. Born at the beginning of the depression on September 19, 1929, Charles and Dorothy Rockwood hoped in a future of better things for their son. As it turned out, there would be a great unparalleled future in a journey of 92 years that would fill them with loving pride.

Charles Rockwood rose from a young boy who didn't have much to a man who had it all. That's how the Boy Scout became an Eagle Scout; and the medical student an orthopaedic resident; and the US Air Force Captain a Colonel; and the orthopaedic surgeon an American-British-Canadian Traveling Fellow; and the Division Chief the first Department Chairman; and an American Academy of Orthopaedic Surgeons member to the President of AAOS; and a founding member of American Shoulder and Elbow Surgeons to the President of ASES. Charles believed in F. Scott Fitzgerald's dictum that there are no second acts in life. The achievements added up all his life, yet he rarely boasted except in his faith, his family, and his love for teaching orthopaedics.

Charles was confident and courageous in his bearing. In judgment, he was sober and serious, unafraid of decisions, calm and steady by nature, always the lighthouse rather than the clubhouse. His humor, integrity, vision, and commitment were respected by all, but I believe he will be remembered most for his ability to inspire us. It has been said the greatest leader is not necessarily the one who does the greatest things. He is the one that gets people to do the greatest things. <sup>(1)</sup>

Charles inspired his residents by reaching out far beyond what he could attain. Like a good coach, he understood the value of inspiration; to simply look out into the future and cheer people on, to remind them that anything is possible. Charles reminded us that we could make a difference.

Charles was always busy. He was a man in motion from the time he opened his eyes early in the morning until he

rested his head on his pillow at night, but never too busy to share his love of life with those around him. Charles taught us to love our families, orthopaedics, and the outdoors. He loved playing golf at Augusta National Golf Club or the public course, he loved fly fishing for trout on the Deschutes River in Oregon. He loved smoking La Casa del Habano cigars while serving at the Wild Game Dinner fundraiser at St. Luke's Catholic Church. He loved working on manuscripts for the *Journal of Bone and Joint Surgery* while sitting in a deer blind on his South Texas ranch and he loved watching dogs flush pheasant on cold mornings in Amarillo.

Charles was an eternal optimist, his glass was always half full and the horizons he viewed were always bright and full of hope. That vision helped to shape all of us and made us believe that all things were possible. Charles could relate to people from all walks of life. He was generous with his time and resources. He valued character over pedigree and looked for the good in each person. He taught us that service is noble and needful; that one can serve with integrity and hold true to important values, like faith and family. Charles loved to laugh, placed great value on a good joke, and was a master storyteller. There always seemed to be enough of Charles to go around despite his many friendships; he had an enormous capacity to give of himself. Many of us would tell you that Charles became a mentor and a father figure in our lives, making us brothers and sisters from different mothers. And although in his final years, we have moved on to different parts of the country, that bond was never broken.

To us, he was nearly perfect, but not totally perfect. Following the annual "I am the Chief" talk to welcome new residents into the University of Texas, San Antonio Department of Orthopaedic fold, the Rockwoods would host the residents in the back yard of their home with tamales and beer. Any late-night (which was defined as 9 pm) stragglers were treated to a bon voyage by manual operation of lawn sprinklers.

Charles Rockwood was to the men and women who were blessed to know him what Andrea Mosconi was to stringed instruments of inestimable value. Max Lucado<sup>(2)</sup> said it best; he writes that Mosconi followed the same routine six mornings a week. The Italian maestro donned a coat and

tie, went to the city hall in Cremona, Italy, and entered the museum which contained two violins and a viola built by the Amati family, two violins by the Guarneris, and the most precious of all a violin crafted by the hands of the master himself, Antonio Stradivari. Left untouched, untuned, and unstruck, the instruments would begin to lose their vibrancy. Every morning but Sunday, Mosconi would reverently remove each instrument from its elaborate, multilocked case, play it for a few moments, and then return it. By the time he finished his work, the museum had heard the sweetest music on earth. And what Mosconi did for some of the most priceless instruments

on the planet, Charles did for all the men and women who were blessed to know him, and he brought out the best in us.

So for now, Charles – farewell. We will always be grateful for your good life. In Almighty God, we place our confidence and to Him we confirm you, with our love and prayers.

(1) Ronald Reagan

(2) Max Lucado, from the Applause of Heaven

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## ANNOUNCEMENTS

## New Faculty



**Jeffrey M. Hills, MD**

Dr. Jeffrey Hills was born and raised in Kansas City, KS. He received a degree in Biochemistry and graduated with honors from the University of Kansas. He attended medical school at the University of Kansas and was elected to the Alpha Omega Alpha honor society. He went on to complete his orthopaedic surgical residency at Vanderbilt University in Nashville, Tennessee. During residency, he was heavily involved in research and authored numerous publications on topics including risk factors for readmission, the impact of preoperative and postoperative opioids on outcomes after spine surgery, and predictive modeling for complications following spinal deformity surgery. Dr. Hills has presented his research at international spine meetings and earned several awards for his efforts. Following residency, he completed a fellowship in spine surgery at Washington University School of Medicine/Barnes-Jewish hospital in St. Louis, Missouri. As a fellow, he trained extensively in pediatric and adult spinal deformity and complex revision spine surgery. He continued his research efforts and was awarded the AO Spine North America Fellows Forum Best Clinical Abstract for his analysis of normative spinal alignment.

Dr. Hills joined the UT Health Department of Orthopaedics in September 2021. He treats a wide range of cervical, thoracic, and lumbar conditions and has a special interest in adult spinal deformity and revision spine surgery. He continues to pursue his research interests at UT Health and is currently pursuing a master's degree in Clinical Investigation and Translational Science at the UT Health and Science Center in San Antonio. He is involved in multiple international study groups and is collaborating with the clinical informatics division to establish a research infrastructure at UT Health. His goal is to improve patient outcomes and reduce complications by incorporating predictive analytics into routine clinical practice.

In his free time, he loves spending time with his wife and exploring San Antonio and South Texas with his friends and family. He loves woodworking and working on projects around the house. Dr. Hills is excited to be in San Antonio and part of the UT Health faculty.



**Kenneth O. Kenneth-Nwosa, MD**

Dr. Ken was born and raised in Flower Mound, TX, and attended Baylor University, where he graduated with a degree in Biology and Chemistry. He attended medical school at the University of Texas Medical Branch in Galveston, TX, and served as president of the Sports Medicine Interest Group for two years. After medical school, he completed a Family Medicine residency at UTMB and had the honor to serve as chief resident. He then completed a Primary Sports Medicine fellowship at the world-renowned Andrews Sports Medicine and Orthopaedics Clinic through the American Sports Medicine Institute in Birmingham, AL. He is an active member of the American Medical Society for Sports Medicine.

Dr. Ken subspecializes in primary care sports medicine and focuses on non-surgical orthopaedic conditions and interventions. He serves as the head team physician for UTSA and their NCAA Division I Athletics program. He also holds a clinic at the UT Health San Antonio MARC for weekend warriors and individuals with sprains, aches, strains, and bruises. He sees a range of conditions that includes osteoarthritis, tendinitis, sprains and strains of the upper and lower extremity, and concussions sustained during sport.

Dr. Ken accepted the position as assistant professor at UT Health San Antonio Department of Orthopaedics to provide elite sports medicine care in the San Antonio area. He is excited to help build upon their burgeoning sports medicine division. He also wants to continue to practice cutting-edge interventions involving ultrasound-guided minimally invasive procedures and orthobiologics such as platelet-rich plasma. Dr. Ken also accepted the position as head team physician for UTSA Athletics and plans on leading the medical care team to become the gold standard as they elevate to the American Athletic Conference. Dr. Ken is married to his wife, Krystal, and they enjoy participating in church activities, traveling, and attending sporting events. Dr. Ken is an avid high school, collegiate, and professional sports fan and collects limited edition sneakers in his spare time.



**Chance C. Moore, MD**

Dr. Moore is a native of Austin, Texas. He attended high school at St. Michael's Catholic Academy and went on to obtain a Bachelor of Science Degree in Biology from The University of Georgia (2021 NCAA football National Champs, go Dawgs). He returned to Texas and completed medical school and residency here at UT Health San Antonio. Itching to get back to the Southeast for one last hurrah, Dr. Moore completed a fellowship in Adult Reconstruction at the renowned Emory University in Atlanta, Georgia.

He met a beautiful and intelligent native San Antonian attending Saint Mary's University law school while he was in medical school. He and his wife Alexa were married and had two amazing daughters (Cameron 5, and Landon 4) during residency. Alexa is currently part of the legal department at UT Health San Antonio. While not in the OR, Dr. Moore enjoys spending time with his family hunting in South Texas, fishing on the Texas coast, hanging at the beach in Port Aransas, making ranch trips to the hill country, getting away to the mountains in Ruidoso, New Mexico, and cheering on the Dawgs and Horns in the fall.

Treating simple to complex hip and knee pathology, Dr. Moore has a particular interest in both direct anterior primary and revision total hip replacements, as well as minimally invasive total joint replacement. He also has taken the plunge into the world of robotic total joint replacement. He is quickly learning about the ample revision work available in South Texas. Other interests include, but are not limited to, advancing the fields of outpatient total joints, partial knee replacements, and hip resurfacing along with improving outcomes and reducing complications.

Honored to graduate residency from UT Health San Antonio, Dr. Moore is humbled to be working alongside many of his former attendings. He is extremely excited about the opportunity to work with the residents and pass along some of the things he has picked up along the way. Together, he believes we can provide excellent care to the South Texas community while representing a growing and thriving orthopaedic department and institution.



**Lee C. Rogers, DPM**

Lee C. Rogers, DPM, became the new chief of the Division of Podiatry in the Department of Orthopaedics at UT Health San Antonio. "I'm honored to take the helm of a historic program that is responsible for producing many of the "greats" in our profession. "I see my role as honoring our past while we chart a continued course into the future," Rogers stated.

Dr. Rogers is a graduate of Des Moines University College of Podiatric Medicine and Surgery and completed his residency training at St. Vincent Catholic Medical Centers of New York. He completed a fellowship in Diabetic Limb Salvage and Research at Rosalind Franklin University of Medicine and Science in North Chicago, IL. He has authored over 150 published papers, books, and book chapters on limb salvage and policy and practice and he has delivered more than 500 lectures in all 50 states and more than 30 countries.

Dr. Rogers is currently the President of the American Board of Podiatric Medicine where he led the effort to create the certificate of added qualification program and authored the Board's guidance on hospital and surgical privileges for podiatrists.

Dr. Rogers is the Associate Editor (Diabetic Foot Section) for the *Journal of the American Podiatric Medical Association*. He received the Rising Star Award from the American Podiatric Medical Association for outstanding national accomplishments in 2011, and was selected by *Podiatry Management* Magazine as one of the most influential podiatrists in America. He was chair of the American Diabetes Association's Foot Care Council and is one of a select few American podiatrists to be honored as a Fellow Faculty of Podiatric Medicine of the Royal College of Physicians and Surgeons of Glasgow.

Previously, Dr. Rogers founded and served as medical director of the Amputation Prevention Centers of America, a division of RestorixHealth which manages 230 wound centers in 35 states.

## Notable UT Health San Antonio Orthopaedic Alumni:

Class of 1987; **Daniel K. Guy, MD** - American Academy of Orthopaedics President 2021-2022

Class of 2012; **John W. Hinchey, MD** - Texas Orthopaedic Association current President 2022-2023.

# Endowments

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## **The Fred G. Corley, MD Chair in Orthopaedics, #57700223**

Ravi Karia, MD was appointed holder of this prestigious endowment on December 1, 2020. This endowment was established in 2004 to honor Dr. Corley who is one of our most respected long-term faculty. He has special expertise in surgery of the upper extremities, especially in management of trauma of the elbow, wrist, and hand. He serves as a role model for medical students and residents and has been the Chief of Hand Services at this institution for more than two decades. The purpose of this endowment is to support the Distinguished Professorship and establish a permanent education resource for training residents and medical students in surgery of the hand, shoulder and elbow.

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## **John J. Hinchey, MD and Kathryn Hinchey Chair in Orthopaedics, #57700024**

This endowment and quasi-endowment funding is held by Robert H. Quinn, MD. It was established in 1992 to honor Dr. Hinchey for his tremendous contributions to orthopaedics and to the medical community during his many years of orthopaedic practice in San Antonio. Dr. Hinchey died on March 3, 2000 and Mrs. Kathryn Hinchey died in December, 2011. The purpose of the endowment is to establish an endowed position in the Department of Orthopaedics to support clinical and basic research.

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## **Charles A. Rockwood, Jr., MD Chair in Orthopaedics, #57700574**

Anil K. Dutta, MD was appointed to this prestigious endowment on December 1, 2020. The endowment and quasi funding were established in 2003 to honor Dr. Rockwood who is recognized internationally for his contributions to orthopaedic surgery. Dr. Charles A. Rockwood, Jr., Emeritus, Department of Orthopaedics at UT Health San Antonio died on February 1, 2022. His name, inventions and textbooks will persist for decades to come. The endowments were created to support research and education specializing in shoulder disorders in the Department of Orthopaedics at UT Health San Antonio. These endowments were previously held by Michael A. Wirth, MD who retired on June 30, 2019.

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## **President's Council/Dielmann Chair in Pediatric Orthopaedic Surgery, #57700241.**

Sekinat K. McCormick, MD was appointed holder of this prestigious endowment on October 1, 2021. This endowment was established in 2005 to honor Henry B. and Edna Smith Dielmann. Mrs. Dielmann, a community philanthropist, died in 2002 and left a generous portion of her estate to UTHSCSA. She was the widow of Henry B. Dielmann, a prominent San Antonio attorney, three-time member of the Texas House of Representatives and former Dean of the St. Mary's University Law School in San Antonio. This endowment was created to provide pediatric orthopaedic training and programs to medical students and residents at UT Health San Antonio as well as specialty training to countries with limited resources.

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## **Erwin Orthopaedic Sarcoma Research Endowment in Honor of Dr. Rajiv Rajani, #57700616.**

This quasi-funded endowment is received from the Erwin Family Foundation in honor of Dr. Rajiv Rajani. Funds distributed from the endowment will be used to provide support for research, visiting professors, and work dedicated to treatment options for bone and soft tissue sarcomas, under the direction of the Chair of the Department in accordance with the Regents' Rules and Regulations.

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## **Frances and Blackstone Dilworth Professorship in Orthopaedic Oncology, #57700639.**

Robert H. Quinn, MD was appointed holder to this prestigious endowment on March 1, 2021. Funds distributed from this endowment shall support the Professorship in accordance with the Regents' Rules and Regulations and applicable policies pertaining to endowed academic positions. As additional funds are received, this endowment will be elevated to the highest level of endowment for which it qualifies.

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**Kaye E. Wilkins, D.V.M., MD Orthopaedic Professorship, #57700675.**

This prestigious endowment was created to honor the legacy of Dr. Wilkins by contributing to the musculoskeletal care of children. Funds distributed from the endowment shall be used to support the Professorship in accordance with the Board of Regents' Rules and Regulations and applicable policies pertaining to endowed academic positions. Distributions may also be used to support residents within the school.

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**Steve and Mary Anne Lynch Professorship in Medicine, #57700706.**

Katherine C. Bartush, MD was appointed holder to this prestigious endowment on January 1, 2022. This endowment was created to benefit a promising "rising star" faculty who is dedicated to excellence in patient care, teaching and mentoring students/residents with special interest in orthopaedics and other clinical specialties at UT Health San Antonio. Funds distributed from the endowment will support the Professorship in accordance to the Regents' Rules and Regulations and applicable policies pertaining to endowed academic positions.

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***Orthopaedics Supporting Honorary Lectureships*****The Charles A. Rockwood, Jr., MD Endowed Lecture Series, #57700233**

This endowment, established in 2004, honors Dr. Rockwood's recognition of the Orthopaedic Residents as they graduate from our Residency Program. Dr. Charles A. Rockwood, Jr., Emeritus, Department of Orthopaedics at UT Health San Antonio died on February 1, 2022; his name, inventions and textbooks will persist for decades to come. This endowment was created to defray all or part of the expenses associated with the annual Orthopaedic Resident Graduation. This includes expenses to invite a distinguished guest lecturer and expenses associated with the Grand Rounds lecture, evening lecture and Graduation.

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**The Philip A. Deffer, Sr., MD Lecture Series, #57700070**

This endowment was established in 1994 in honor of Dr. Deffer, who was a Retired Brigadier General, Associate

Professor in the Department of Orthopaedics and Rehabilitation at the Health Science Center, and Director of the Orthopaedic Clinics at the University Health Center-Downtown from 1982-2003. Dr. Deffer died on October 26, 2006. The sole purpose for this endowment is to defray or offset expenses associated with inviting a distinguished guest speaker to the annual educational lecture to interact, share experiences and offer insights with our residents and medical students.

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**The Laura B. Flawn, MD Endowed Distinguished Professorship in Diseases of the Spine and Spine Trauma, #57700189**

Christopher Chaput, MD was appointed to this prestigious endowment effective January 1, 2019. Dr. Flawn received high praise for her surgical skill and her contributions to the advancement of surgery of the spine before and after her death on October 20, 2001. She was active in the Scoliosis Research Society and pioneered the development of practices and procedures to improve the treatment of scoliosis. The purpose of this endowment is to support the Distinguished Professorship and hold the annual Laura B. Flawn, MD Lecture. The annual lecture benefits medical students, residents, and faculty at UT Health San Antonio. It is funded by Dr. and Mrs. Peter Flawn, Dr. John P. Howe, III and Ms. Tyrrell Flawn.

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***Podiatry*****Louis T. Bogy, DPM Professorship in Podiatric Medicine and Surgery, #57700098.**

Crystal Ramanujam, DPM was appointed holder on September 1, 2020. This Professorship was established in 1998 to honor Louis T. Bogy, Chairman Emeritus of the Podiatry residency training program at UTHSCSA. Dr. Bogy was instrumental in establishing the residency training program, which began in 1972 with one resident. More than 100 residents have graduated since 1972. Dr. Bogy died on February 9, 2004. The first supported faculty member to be supported by this Professorship was Lawrence Harkless, DPM from 1999 to 2007. This endowment was created to support the Professorship, research and resident education in the area of diabetic foot care.

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**Lee J. Sanders, MD Professorship in Lower Extremity Amputation Prevention, #57700196.**

Thomas Zgonis, DPM has been holder of this prestigious endowment since 2008. The Professorship was established in 2003 to honor Lee J. Sanders, DPM, Chief of Podiatry Service, Acute Care, and Specialty Services at the Veterans Administration Medical Center in Lebanon, PA. Dr. Sanders is one of the foremost leaders in prevention of lower-extremity amputation in diabetics. The purpose of the Professorship would be to support a faculty member in the Podiatry Division of the Orthopaedic Department and to support podiatric research and education in amputation prevention and other podiatric needs deemed appropriate by the Chair of Orthopaedics.

**The Lawrence B. Harkless DPM Endowed Program Fund in Podiatry, #57700476**

This endowed program fund was created March 26, 2014 from a \$10,000 gift in 2007 from G. Javier Cavazos, Jr., DPM, to support an endowment for the Orthopaedics Department, Podiatry Division in the School of Medicine. Future plans will be to use this endowment for podiatry faculty research, travel and miscellaneous expenses to support the academic mission of the Program Fund in Podiatry.

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- Small Fragment Set
- Schanz Pins
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# Residency Updates

## Program Director's Report



**Ryan A. Rose, MD**

There has been considerable development in the residency over the past academic year. Yet, I would be remiss if I didn't highlight Lashun Matthews first and foremost. Lashun became the Program Coordinator several years ago and has thrived. She quickly became the beacon for the program and the residents during these turbulent times. If that was not enough, she passed her C-TAGME this year and only added to her considerable knowledge and experience. The residents and I are eternally grateful for all that she brings now and in the future.

COVID-19 has dominated the headlines for the past few years, inside the program and out. Yet, the residents have exemplified resilience in handling their training and aiding their community in peril. Forty percent of the residents only know residency in the setting of COVID, yet none have fallen in despair, and even more impressively, many have helped cross-cover COVID units. This is a testament to the residents and the quality of residents UT Health San Antonio match.

2021-2022 saw tremendous growth within the residency as well as faculty. Each orthopaedic service has expanded across San Antonio and, more importantly, increased surgical cases. With increased coverage, the residents have amplified their 75 percent open surgical case volume. The now seven resident class of the PGY-1s have possibly benefited the most out of all the residents. They now find themselves one-on-one with faculty performing trauma cases that other residencies would not see until their third year or later. This experience started on day one of the academic year.

The recent addition of UTSA Athletics has become a solid adjunct to the resident's experience with high-level athletic care. They now can cover Division 1 athletic games and help manage athletes' care from start to finish. As a result, the sports experience continues to flourish, exemplified by several PGY-5s and PGY-4s choosing

sports as their fellowship training choice.

There have been some tremendous accomplishments for the residents since the last update. All of the 2021 graduating chiefs successfully passed ABOS Part 1 with ease. Each chief spectacularly took ownership of their education while preparing for the boards. The upcoming seniors took notice of their example. Those upcoming seniors instituted significant changes to the education curriculum, one such being the considerable addition of faculty to the classically resident-led Friday didactics. Their OITE scores averaged 20 percent higher than the previous year within four months of that change. The program also achieved full Continued Accreditation by the ACGME without citations, areas of concern, or warnings.

While the accomplishments above are celebrated, the core principle of the residency is still the same: operate well and often while caring for San Antonians. This tenet has led to multiple fellowship directors reaching out, and expressing the skillfulness of our graduates. The residents are truly at the core of the practice and why the faculty stay at UTHSCSA.

I look forward to excelling past our current metrics in the upcoming years.

Thank you to the faculty, administrators, clinic staff, OR staff, and all those involved in training the residents and improving their education.

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## Graduating Class of 2022



**Jorge Clint "J.C." De Leon, MD**

J.C. was born and raised in Lubbock, Texas. He took his talents to College Station, Texas and graduated as a proud member of the Fightin' Texas Aggie Class of 2012! He took a year off between Texas A&M and medical school, during which, he worked as a professional tutor at College Station. He was fortunate to match at UT Health San Antonio Long School of Medicine. He had an incredible four years, where he met his four best friends, and decided on

Orthopaedic Surgery as a specialty because of trauma. In orthopaedics, you may rarely have the chance to save lives, but you routinely have an impact on the quality of life. He has found that is what patients remember the most. He matched to UT Health San Antonio Orthopaedic Surgery Residency program where he enjoyed a great amount of autonomy while developing his operative skills. This program trained him how to operate and did not train him to just talk about operating. He is going to Denver Health for an orthopaedic trauma fellowship after graduation. His wife, Kathleen, his 3-year-old daughter Lily, and their two dogs will be coming with him. He sees himself at an academic institution as an academic orthopaedic trauma surgeon after his fellowship. He hopes that it lands him back here in San Antonio, where both sets of his family are, but he is open to going anywhere. If he could go back in time, he would choose this program over again without any hesitation!



**Joel I. Edionwe, MD**

Joel Edionwe was born in Lincoln, Nebraska in 1990. He is of Nigerian descent. He lived the majority of his life in the Rio Grande Valley where he eventually completed his degree as a biology major at the University of Texas Pan American. He transitioned to the University of Texas Medical Branch at Galveston for the acquisition of his medical degree. From there, he realized his love and enjoyment of orthopaedics which prompted him to apply and subsequently match to UTHSCSA Orthopaedics Residency. This program is family-oriented with hardworking individuals who are focused on doing what is right for their patients. He enjoyed the overall humility of the residents and team attitude with the appropriate autonomy given by the faculty. In particular, he has been blessed to have great co-residents. His residency experience is placed in the backdrop of the beautiful San Antonio. While here, he was able to enjoy the culture and the beautiful outdoors (trails, etc). After he completes his residency, he will be transitioning to the Texas Back Institute, in Plano, Texas, for a yearlong fellowship in Spine. This fellowship will assist him in becoming a well-rounded surgeon with a focus on spinal pathology. He sees himself in the future working, learning, and growing as an orthopaedic surgeon in private practice. He will eventually curtail a significant

amount of his focus to medical outreaches as well as product development for surgical tool innovations which will incorporate 3D instrument and implant printing.



**Jordan "Jordi" E. Handcox, MD**

Jordan "Jordi" Handcox, MD, was born and raised in Austin, Texas. She went to Stanford University, earning undergraduate degrees in Psychology and International Relations. For the next five years, she worked full-time for a children's health nonprofit while simultaneously attending night school to complete her premed requirements. It was also during this time that she met and later married her amazing husband, Danny, a source of constant love and support throughout her journey. Jordi then obtained her medical degree from the University of California San Francisco, and decided it was time for this Texas gal to make the move back closer to home.

From the moment Jordi completed her sub-internship rotation at UT Health San Antonio, she felt like this program was exactly where she belonged. She believes the camaraderie and mentorship among the residents make this a truly special place to train. She says the residency program has provided unparalleled surgical training opportunities while also providing her the chance to work in advocacy, most notably through positions with the Texas Orthopaedic Association and AAOS. Finally, leading the residents as Admin Chief Resident this year has been a highlight of her time in residency.

After graduation, Jordi will be taking a gap year before completing a fellowship in Adult Reconstruction. She plans to work as a locum tenens here in the states, as well as study arthroplasty abroad in the UK, during her time off. After fellowship, she plans to practice in the Central Texas area, and continue pursuing her passions of advocacy, teaching, and mentorship.



### **Dietrich W. Kayser, MD**

Motivated by a love for people, a passion for science, and a need to fix things, Dietrich traveled from the Carolinas to UT Health San Antonio. He took advantage of the learning opportunities provided and built a foundation of knowledge that he will use to serve as a General Orthopaedist in the Air Force. In addition to professional development, Dietrich also was successful in finding a wonderful Texas woman as well as a lab puppy. They are looking forward to the adventures of life and eventually putting down roots in the Carolinas to build a family.



### **Riikka E. Koso, MD**

Riikka was born in Cork, Ireland and raised in Ohio. She attended Emory University, where she graduated summa cum laude with a B.S. in neuroscience and a minor in Global Health. She then studied at Duke University School of Medicine, where she cofounded DukeMed Engage, a program that supported Duke medical students to carry out health initiatives locally and abroad. Since moving to San Antonio, Riikka has enjoyed getting to learn orthopaedic surgery and exploring all of the nature Texas has to offer. After residency, she will be doing a hand and upper extremity fellowship at UPMC in Pittsburgh. She is looking forward to moving back west and starting practice when her training is complete.



### **Trevor J. Wait, MD**

Trevor was born in Longview, TX in a family of six with his parents and three siblings (Erin, Eric, and Tara) who were all raised with the three pillars of church, school, and sports. His father being a coach, Trevor was raised in the athletic arena where he learned the essentials of hard work, sacrifice, and discipline that were applied equally to both the classroom and the field. He was fortunate to attend Abilene Christian University where he walked-on the basketball team and was convinced by his parents at the

last second to pursue a pre-med degree. After many hours of studying in the library and running on the basketball court, he was fortunate to get accepted into medical school at UT Health San Antonio where he was exposed to all areas of medicine as well as a true enjoyment for learning and healing, which became foundational to his successes. After seeing the montage of intellect, grit, and manual dexterity that is required in orthopaedics, he felt there wasn't any other specialty better suited for him. He is so proud to have been accepted into the fame and wealth behind this program and could not have asked for a better mix of volume, academia, mentorship, autonomy, and companionship the program fosters and he will always cherish the relationships he has built. Next year, he will be heading to Denver, CO at the Steadman-Hawkins Clinic with his incredible wife, Shelby, and two kids, Everett and Reeves, for a one-year fellowship training in Sports Medicine to round out his strong foundation in orthopaedics. In the future, he hopes to see himself as a hardworking generalist in Longview, TX with a particular interest in sports medicine while still being able to fix fractures, replace joints, and repair hands and feet with the best of surgeons, while never neglecting his responsibilities as a husband, father, son, brother, and friend.



UT San Antonio Orthopaedics graduating Class of 2022 during their Intern Orthopaedic Boot Camp in Houston, TX in June 2017.



Dr. Andrew Haus (left) presenting the “Fred G. Corley, MD Outstanding Faculty Mentor in Orthopaedics” award to Dr. Anil Dutta (right) for the 2020-2021 Academic Year at Graduation 2021.



Dr. Ryan Rose (right) presenting the Outstanding Resident Mentor in Orthopaedics award to graduating resident Dr. Andrew Haus (left). This award was voted on by the junior residents in the residency.



UT Health San Antonio Orthopaedics Graduating Class of 2021 (top row) and their corresponding spouses (bottom row seated in front). Residents pictured in top row from left to right: Braden J. Boyer, MD, Ryan C. Egbert, MD, Andrew J. Haus, MD, Isaac S. Kim, MD, Case W. Martin, MD, and J. Conner Ryan, MD.

# Orthopaedic Residents 2022-2023

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## PGY 5 2018 - 2023

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Jason Goodrum



David Heath



Galen Mills



Liliana Ogden



Gus Strauss



Adam Ward

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## PGY 4 2019 - 2024

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Connor Armstrong



Jacob Brennan



Adam McNulty



Gautham Prabhakar



Clinton Ulmer



Meagan Womack

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## PGY 3 2020 - 2025

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Stephanie Jones



Ezekial Koslosky



Kathleen Lundquist



Sam Ornell



Annat Rabinovich



Loc-Uyen Vo

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## PGY 2 2021 - 2026

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Travis Bullock



Jordan Carter



Andrew Eck



Chimobi Emukah



Ahmed Makhani



John Parker



William Young

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## PGY 1 2021 - 2027

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Doha Hussien



Zachary Jodoin



Casey McDonald



Mallory Ogburn



Kyle Paul



Elizaveta Reznichenko



Luke Verlinsky

# Clinical Division Updates

## Adult Reconstruction

*Chance C. Moore, MD*



There have been many exciting changes in the adult reconstruction division at UT Health over the past year.

Dr. Chance Moore has been hired as the newest faculty member in the total joints division. Dr. Moore is a graduate of UT Health Long School of Medicine (2014) and the Orthopaedic Residency Program (2019). He completed an Adult Reconstruction fellowship at Emory University in 2020 under the mentorship of surgeons such as previous American Board of Orthopaedic Surgery president Dr. James Roberson and renowned joint surgeons Dr. Thomas Bradbury, Dr. George Guild, and Dr. Greg Erens. Dr. Moore has a particular interest in direct anterior total hip arthroplasty and has begun performing robotic knee arthroplasties. He has been hard at work in his first six months of practice at UT Health tackling some of the most challenging revision hip and knee arthroplasty surgeries that South Texas has to offer. Dr. Moore also has an appointment at the South Texas Veterans Health Care System with the opportunity to mentor the orthopaedic residents at UT Health. In addition to the VA, Dr. Moore is performing cases at Methodist and Baptist hospitals throughout San Antonio along with University Hospital.

Belinda Pena FNP, a former University Hospital circulating nurse, has completed her nurse practitioner training and has joined the adult reconstruction division. She is quickly expanding her practice and has proven to be an integral part of the total joints team.

Resident training continues to thrive on the total joints service with two-month rotations for all PGY3 and PGY5 residents. The interns on the Methodist rotation are getting early exposure to total joints facilitating a strong knowledge foundation. There have been multiple Bulverde cadaver labs offered to the residents to get hands-on experience outside of the operating room.

University Hospital is participating in the American Joint Replacement Registry (AJRR). Participation in this program is essential to further the field of total joints

research. Also, there are plans underway to participate in a research study involving a novel approach to managing periprosthetic joint infections.

Dr. Frank Buttacavoli, adult reconstruction division chair, has been named a member of the American Academy of Orthopaedic Surgeons Hip, Knee and Adult Reconstruction Evaluation Committee to educate residents and orthopaedic surgeons around the country. He has also been named the director of multiple total joints service lines at hospitals around the city to continue improving patient care, safety, and service line efficiency.

COVID-19 has been a challenging time for total joint surgeons around the country. UT Health has used this opportunity to help standardize outpatient total joints in the appropriate patient population. There has been a noticeable increase in outpatient total joints during the past two years and the faculty is working diligently with the hospital and clinical care teams to efficiently execute this process. Patients have reported significant satisfaction with their outpatient total joint experience.

The growth of the adult reconstruction division has proven to be an exciting time at UT Health. With the aging population and increased number of arthroplasties being performed throughout the world, there is a growing demand for total joint surgeons. The division continues to focus on expansion and providing the best care for patients. We look forward to providing updates on our progress in the next journal division update.

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## Foot and Ankle Surgery

*Mayo J. Galindo Jr., MD*



Our foot and ankle division is staffed by three full-time faculty. They are Rose E. Cortina, MD, Mayo J. Galindo Jr., MD, and our Sports Medicine surgeon Katherine C. Bartush, MD who contributes her sports acumen to the department. Our residents also participate in the private sector with Mark M. Casillas, MD.

In their two-month rotation, our residents are exposed to not just common foot and ankle problems and low energy trauma, but also complex reconstructions. Diabetic foot salvage challenges are part of their experience along with total ankle replacement surgery. Ankle and hindfoot arthroscopy, sports injuries, and sports reconstruction are included. With the addition of another PGY-1 resident, there may be an opportunity for more exposure to this discipline.

In the past, we have hosted residents from a sister school in Monterrey, Mexico. We are open to continuing that relationship, but because of the COVID-19 crisis and institutional policy, visitors from other institutions are not yet eligible to participate in our service. The pandemic has posed a challenge as the elective census has been reduced, but at the time of this writing it is beginning to recover.



Katherine C. Bartush, MD   Rose E. Cortina, MD

## Hand and Plastics

*Christina I. Brady, MD*



Within the upper extremity division, the hand and orthoplastics service continues to grow in San Antonio to serve the needs of Bexar County with trauma, reconstruction, and elective hand surgery.

This expansion is thanks to the unrelenting efforts of Drs. Ryan Rose, Douglas Cromack, Fred Corley, and Christina Brady, in addition to our supporting staff PAs Marc Deschaine, John Kodosky, Pricilla Ramos, Ashlee Blume, and hand therapists Susan Haas and Jessica Mickey. Most importantly, this year marks the 40th anniversary of Dr. Corley's service and the 20th anniversary of Dr. Cromack's service with the Department of Orthopaedic Surgery. Both gentlemen remain strongholds of the hand service and the department.

Currently, there are four residents on the "red service," consisting of an intern, second year, and chief, in addition

to a plastic surgery fellow. The upper extremity division covers the level one trauma needs of University Hospital, thanks to our strong presence led by Dr. Cromack. He continues to do valuable work with complex hand reconstruction, pediatric hand, and brachial plexus, in addition to the soft tissue coverage of the orthopaedic trauma division. Both Drs. Rose and Brady continue to augment the demand for hand surgical cases within University Hospital, as we have increasingly expanded our overall footprint in San Antonio and into Boerne through our UT Health Hill Country Clinic. Within the Veterans Administration, Dr. Brady continues to serve the local Veterans of South Texas. Dr. Rose and Dr. Corley have continued to build a robust, complete upper extremity practice through the MARC. Finally, Dr. Corley remains dedicated to the Bexar county citizens through his critical clinic at the Texas Diabetes Institute.

With this growth, we look forward to the upcoming addition of Brian Sager MD. Dr. Sager graduated from UT Health Science Center San Antonio from the Long School of Medicine. He completed his orthopaedic surgery residency at UT Southwestern and his fellowship as an Emmanuel Kaplan Fellow in Hand and Upper Extremity Surgery at the prestigious New York University Hospital for Joint Diseases. For the past two years, Dr. Sager has been practicing in Abilene, Texas, focusing on traumatic and reconstructive hand surgery. He looks forward to returning as a teacher to his alma mater.

This year marks several accomplishments within the red service. Dr. Rose has completed his board certification with the ABOS and his hand certification with the ASSH. Drs. Brady, Rose, and Corley, along with Dr. James Saucedo from Houston Methodist, outreached on the topic of providing indigent care in orthopaedic surgery to the AOA Critical Issues and an upcoming article in JBJS. Additionally, we hope to showcase our expanding research efforts in this edition of the SAOJ with publications spanning hand infections, delivery of care, health disparities, and especially Dr. Cromack's contribution to the literature on free flaps.

As the upper extremity division grows, we will continue our commitment to serving San Antonio and Bexar county, training the next generation of orthopaedic surgeons, and providing quality care through the work we do.

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## Orthopaedic Oncology

*Robert H. Quinn, MD*



With the departure of Rajiv Rajani, MD to accept the chair position at the Department of Orthopaedic Surgery at Texas Tech University Health Science Center at El Paso, Robert Quinn, MD, is the sole musculoskeletal oncologist in the Department. Although Dr. Rajani is missed, we are proud of his achievement and look forward to his successful tenure as a department chair. The move was timely in that Dr. Quinn has been able to enthusiastically absorb the increased patient load and teaching opportunities due to a relative decrease in national leadership responsibilities and institutional administrative burden.

Ashlee Blume, PA-C, joined the division last year as our oncology midlevel practitioner. Ashlee has been a welcome addition to the team and has taken over much of Marc Deschaine's oncology responsibilities.

The service has a fourth year resident. Clinic occurs at the MARC and Mays Cancer Center. Surgery occurs at University Hospital and the MARC ASC. A multi-disciplinary tumor board occurs every week.

Construction is now underway for the UT Health San Antonio Multispecialty and Research Hospital which is on track to open its doors in the Summer of 2024. This will prove an exciting addition to UT Health and most oncology procedures will likely be performed there.

The oncology service continues the mission of expert multi-disciplinary management of bone and soft tissue sarcomas, benign tumors, metastatic tumors, metabolic bone disease, and limb salvage.

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## Orthopaedic Spine

*Christopher D. Chaput, MD*



The spine service has undergone dramatic growth this year with the addition of Dr. Jeff Hills. Dr. Hills completed his orthopaedic surgery residency at Vanderbilt University in Nashville, TN, and fellowship in spine

surgery at Washington University School of Medicine/ Barnes-Jewish hospital in St. Louis, MO. He joined UT Health Department of Orthopaedics in September of 2021. Dr. Hills treats a wide variety of cervical, thoracic, and lumbar conditions, with a special interest in spinal deformity and complex revision spine surgery. As a fellow, he trained extensively in pediatric and adult spinal deformity and his goal is to establish UT Health as the premier spinal deformity center in Texas.

Dr. Hills is actively involved in multiple international study groups, has presented at numerous international spine conferences, and won several awards for his efforts. At UT Health, he is collaborating with the Clinical Informatics division to build an efficient and effective spine research infrastructure, and to broaden his skillset he is currently pursuing a master's degree in Clinical Investigation and Translational Science at the UT Health Science Center in San Antonio. His overarching research goal is to improve the value of care provided for all spinal disorders. He aims to develop and implement predictive analytics into routine clinical practice to improve treatment planning, patient optimization, and shared decision-making.

With this exciting addition, a host of changes have been implemented in the spine service that will significantly improve the experience orthopaedic residents receive in spine surgery. Probably the most significant change is expanding the role of orthopaedic surgery in trauma call at University Health System. Instead of one weekend a month, Ortho Spine now takes a full week of spine call each month, with Dr. Hills now taking the lead in ensuring San Antonians have access to the latest care for trauma and emergent spine issues, while at the same time dramatically expanding the knowledge and skill set of our residents in spinal surgery. A second major change is in the increased capacity to take on major adult deformity cases. Dr. Hills and Dr. Chaput are currently working together to take on the most complex revision cases in the city, and at the same time establish best practices and protocols to minimize risk and improve outcomes. A third change is the official start of the process of integrating elective spinal care with both Neurosurgery and Physical Medicine and Rehabilitation in the setting of a multidisciplinary spine center. This new center will have dedicated space in the MARC and will be the first in the city to provide integrated care among all major service lines that treat spinal disorders, by only fellowship-

trained specialists. If this endeavor is successful, patients will truly be able to receive care for all spinal disorders, including pediatric deformity, minimally-invasive spine surgery, and complex adult deformity. Most importantly, a team approach that emphasizes avoiding surgery when possible and the collection of patient outcomes will ensure that patients in San Antonio get safe, effective and appropriate care for all of their spine problems when they come to UT Health, regardless of whether they see Ortho, Neurosurgery, or PM&R at the new spine center. We hope to be in our new space in Q1 2023.

## Orthopaedic Trauma

*Boris A. Zelle, MD*

*Chief of Orthopaedic Trauma*



It has been another exciting year for the orthopaedic trauma division. The division of orthopaedic trauma continues to be a centerpiece of the clinical and academic mission of the orthopaedic department. Our division includes a total of four fellowship-trained orthopaedic trauma surgeons including Animesh Agarwal, Thomas Hand, Ravi Karia, and Boris Zelle. Moreover, Dr. Anil Dutta, as a shoulder & elbow fellowship-trained surgeon, as well as Dr. Douglas Cromack, as a plastic surgeon, provide invaluable support to our division. Additional members of the team include our outstanding mid-level providers, Priscilla Ramos (PA-C), Christopher Delallo (PA-C), and John Kodosky (PA-C) (Figure 1A-B), as well as our trauma nurses, Melissa Lopez, Pat Bueno, and Monica Lopez. Furthermore, we feel privileged to have a fantastic clinic team of healthcare providers at our University Health System Trauma Clinic (Figure 2). Our team strives to provide excellent surgical care for a broad spectrum of injuries including high-energy injuries, ground-level falls, fragility fractures, and infections. Orthopaedic trauma continues to be the busiest division within the department and among the busiest surgical services within the UT system.

The core of our clinical practice is at the University Health System, the only civilian level-1 trauma center in San Antonio, and one of the busiest trauma centers state- and nationwide (Figure 3). The great hospital support and

the strong collaborations with other surgical and non-surgical services allow us to care for trauma patients who frequently present with multiple injuries and complex medical problems. We greatly appreciate the support from other services starting from patient admission in the emergency department, throughout the hospital stay, and during the post-injury rehab. Besides our service to the University Hospital, we have further extended our trauma services to the San Antonio community and cover orthopaedic calls within the Methodist Healthcare System and at Baptist Medical Center. We have greatly enjoyed expanding our footprint within the local hospitals, serving the community, and collaborating with local physicians. Our goal is to continue to expand and grow as a division.

Training the next generation of orthopaedic surgeons remains a central goal of our mission. On a daily basis, we train medical students, residents, and fellows, who are rotating through our service. At any given time, we have nine orthopaedic residents on the orthopaedic trauma service. This includes our own UT residents as well as orthopaedic residents from the San Antonio Military Medical Center (SAMMC) as well as the Houston Methodist residency program. We feel that the high patient volume and the high level of injury complexity allows our residents to advance in their education, gain experience, and thrive as orthopaedic surgeons. Specifically, over the last few years, we have seen a sustained interest in our residents to pursue an orthopaedic trauma career. We are very proud that we had the chance to mentor our current and former residents Dr. Thomas Hand (orthopaedic trauma fellowship 2019/2020 at UHSCSA), Dr. Case Martin (orthopaedic trauma fellowship 2021/2022 at Stanford University), Dr. Isaac Kim (orthopaedic trauma fellowship 2021/2022 at University of New Mexico), and Dr. Jorge De Leon (orthopaedic trauma fellowship 2022/2023 at Denver Health). We feel honored and privileged to be part of their orthopaedic trauma careers.

In 2017, we established an orthopaedic trauma fellowship that has been accredited by the Orthopaedic Trauma Association (OTA). Within a relatively short amount of time, our fellowship evolved to a nationally top-tier training program. Our program provides the fellows with great exposure to high-energy injuries, periarticular fracture, as well as pelvic and acetabular fractures. Our trauma fellows can expect to complete more than 800 operative cases per year with approximately 150 pelvis/acetabular surgeries.

These case numbers place our fellowship in the very top ranks of all accredited orthopaedic trauma fellowships in the nation. Besides acute trauma care, our fellows have the opportunity to develop additional trauma-related surgical skills, such as soft tissue reconstructions, knee ligament reconstructions, arthroplasty, or pediatric trauma. Our fellowship has remained highly competitive, and we consistently match one of our top-ranked candidates. We feel blessed that Drs. Thomas Hand (2019/2020), Shain Howard (2020/2021), Kisan Parikh (2021/2022), and Peter Wasky (2022/2023) chose to do their orthopaedic trauma fellowship at UT Health San Antonio (Figure 4). We look forward to working with our future trauma fellows in the years to come and becoming part of their trauma education.

The orthopaedic trauma division also participates in numerous scholarly activities. Dr. Agarwal is the editor of two books “Nonunions” published in 2017 and “Malunions” published in 2020 and Dr. Cromack recently edited a comprehensive textbook on “Upper and Lower Extremity Reconstruction” (Figure 5A-C). Other scholarly activities include presentations as invited speakers at various meetings, courses, and webinars. Another highlight is our AO Community Development Program that is sponsored by the AO North America. In this lecture series, we meet with surgeons from the San

Antonio Military Medical Center (SAMMC) as well as surgeons from the community for discussion of complex orthopaedic trauma cases (Figure 6). We truly cherish this exchange and hope to expand these relationships with the military as well as the community. The orthopaedic trauma division also takes a leadership role within the department regarding clinical research. Currently, we enroll patients into three different clinical trials that include industry-sponsored trials as well as Department of Defense (DoD) funded investigations. Moreover, we remain prolific publishing papers and in 2021, the orthopaedic trauma division published a total of thirteen journal manuscripts in the peer-reviewed literature (References). In this context, we would also like to express our gratitude to the research team that is supporting our endeavors including Rachel Pesek, RN, our previous research fellows Sam Ornell, Travis Shane Bullock, and Luis Salazar, as well as our current research fellows Eduardo Valero-Moreno, MD and José M. Gutierrez-Naranjo, MD.

We anticipate that in the years to come the orthopaedic trauma division will continue to play a leadership role in clinical excellence, education, and clinical research. We look forward to further expanding our program, train the next generation of orthopaedic surgeons, and contribute high-impact research.



(Figure 1A) John Kodosky (PA-C), Christopher Delallo (PA-C), and Priscilla Ramos (PA-C).



(Figure 1B) John Kodosky on his birthday at work.



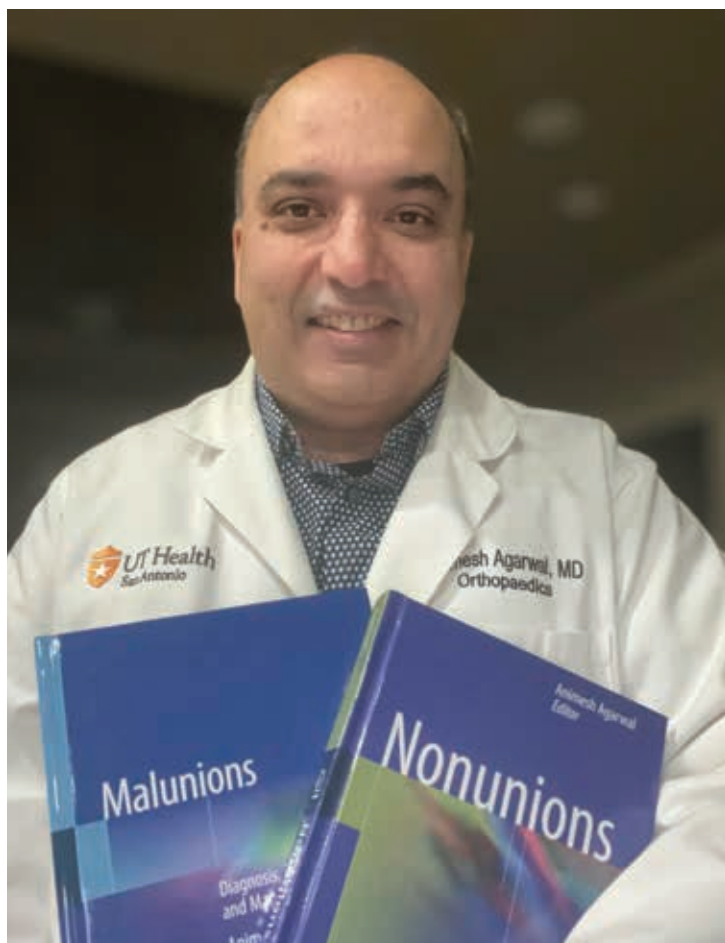
(Figure 2) UHS Trauma Clinic team.



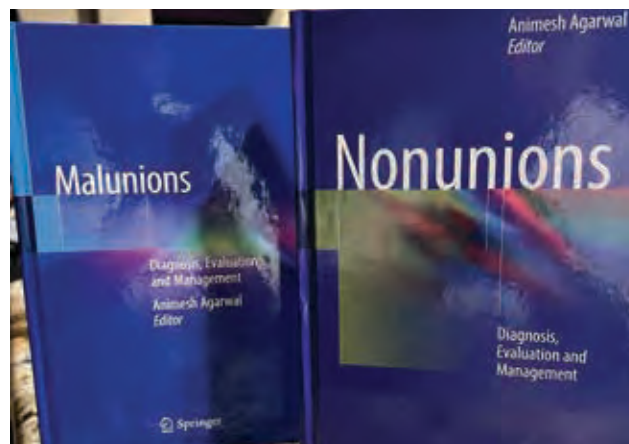
(Figure 3) UHS level-1 trauma center.



(Figure 4) San Antonio Orthopaedic Trauma Fellowship reunion at the Orthopaedic Trauma Association (OTA) in September 2021. Drs. Thomas Hand, Kisan Parikh, Shain Howard, Boris Zelle, and Case Martin.



(Figure 5A) Dr. Agarwal with his books.



(Figure 5B) "Nonunions" published in 2017, "Malunions" published in 2020.



(Figure 5C) Dr. Cromack with his book on soft tissue reconstructions.



(Figure 5D) AO Trauma North America Community Development project with case-based dinner discussions among surgeons from UT, SAMMC and the local community.

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## Pediatric Orthopaedics

*Sekinat K. McCormick, MD*



Partners within the pediatric division continue to grow in their administrative responsibilities. Dr. McCormick continues her work as director of medical student diversity within the Long School of Medicine. In addition to this, she has been appointed Interim Vice Dean for the Office for Inclusion and Diversity while the school undergoes a national search for someone to permanently serve in the role. Dr. McCormick is excited to use this opportunity to further advance the cause of diversity in medicine and to bring new ideas to the department of orthopaedics regarding increasing diversity and improving health equity within orthopaedics. Diversity and health equity are Dr. McCormick's passions and so serving in this interim role is a welcome opportunity. Similarly, Dr. Gibbons has also taken on more administrative responsibility. He has recently been named associate program director within the Department of Orthopaedics. Dr. Gibbons will serve to aid Dr. Rose in all things to further advance our residents' educational experience and he has already hit the ground running as he has worked to improve the resident rotation to accommodate our new compliment of seven residents per year. Congrats to both peds faculty on their new appointments and best of luck as they work diligently to improve the medical student and resident experience respectively.

The peds division is excited to have Dr. Matthew Landrum pick up the baton for the resident didactic lectures. For decades, this role job has been covered by the legendary Dr. Kaye Wilkins. With his retirement first from clinical work and then from resident education in recent years, there was an undeniable gap that the residents were experiencing during their dedicated 6-month rotation on the peds service. It did not take too much convincing to get Dr. Landrum, the most junior peds partner, to agree to attempt to fill this void. While Dr. Wilkins' lectures are as legendary as himself, Dr. Landrum is off to a great start in providing the residents with the pearls and keys to what makes the pediatric orthopaedic practice so distinctive from all other divisions of orthopaedic surgery. While Dr. Landrum leads our residents in their academic

growth, he is also the founder of the St. Martin's Society, an esteemed book club that offers residents and faculty an opportunity to discuss non-orthopaedic literature. The St. Martin's Society meets at regular intervals throughout the year at The Winchester on Broadway. We are grateful for Dr. Landrum's leadership and enthusiasm for residents in the operating room and out!

University Health System is building the Women and Children's hospital, scheduled to open fall 2023. As those providing care to children, the peds division is excited for all of the opportunities for expanded care to the children of South Texas that this new building will bring. Be sure to find the team spreading good spirit and holiday cheer on the floors of University Hospital dedicated to the care of children. This past year, Dr. Gibbons, Dr. Landrum, and their resident reindeer were spotted bringing gifts to those kids admitted during the Christmas holiday. If you are interested in donating to these efforts, please answer University Hospital's annual call for new, unopened gifts! Until next year, all the best from the Peds division!



Orthopaedic partners following Dr. McCormick's DreamWeek 2022 Speaker series talk on her experience as a Black woman in orthopaedic surgery. Pictured from left to right: Dr. Ada Montalvo, Dr. Caitlyn Mooney, Dr. Sekinat McCormick along with resident Jordan Handcox.



Residents along with faculty members spreading holiday cheer to the children admitted to University Hospital on Christmas Eve. Pictured from left to right: PGY-4 Jason Goodrum, PGY-3 Connor Armstrong, attending Steve Gibbons, attending Matthew Landrum and PGY-5 Dietrich Kayser.

## Podiatry

*Lee C. Rogers, DPM, FFPM, RCPS(Glas)*  
*Division Chief*



### Attending Faculty

**Lee C. Rogers, DPM, Division Chief**  
**Alexander Blaschke, DPM, Residency Director**  
**Michael Sobolevsky, DPM**

## Education

The podiatry division is home to one of the oldest podiatry residencies in the country, and the first residency in an academic medical center. In 2022, we are celebrating our 50th anniversary of providing post-graduate training for podiatrists. The Podiatric Medicine and Surgery Residency (PMSR) is a 3-year program approved by the Council on Podiatric Medical Education (CPME). The UT Health San Antonio PMSR accepts three residents

per year for a total of nine residents. The program is undergoing a review by CPME to expand to five per year starting in 2022.

The Advanced Foot and Ankle Reconstruction Fellowship accepts one post-graduate fellow per year. The fellowship focuses on diabetic foot reconstruction, including orthoplastics, Charcot foot, and external fixation techniques. The 2022-2023 fellow is Steven Stuto, DPM.

The Division receives students from all nine US podiatry schools for externships. The tenth podiatry school is expected to open in 2022 at UT Rio Grande Valley and the founding Dean is Dr. Lawrence B. Harkless, former Division Chief at UTHSCSA from 1987 to 2005. UTHSA is expected to become a core training site for UTRGV.

## Clinical Activities

The Division's clinical work includes inpatient services at University Hospital (UH) and Methodist Texsan, outpatient services at Texas Diabetes Institute (TDI) and the UT Health Medical Arts and Research Center (MARC). The residents are involved in training and

clinical work at the Audie L. Murphy VA Medical Center with five additional adjunct faculty.

The division's case volume has increased and resulted in 11,000 new patient referrals at TDI during 2021 and the daily inpatient census was up to 34 on service at UH and ten at Texsan in December 2021.

#### **CME Educational Programs**

The 15th Annual International External Fixation Symposium (IEFS) in December 2021 was postponed due to the COVID-19 pandemic. The IEFS is presented by UT Health San Antonio and was founded by Dr. Thomas Zgonis in 2005 and focuses on diabetic foot and ankle surgery with internationally renowned surgeons. The IEFS has hosted surgeons from 32 countries for unparalleled surgical training on the diabetic foot and ankle. The division hopes to welcome participants from around the world in December 2022. Receive updates at [www.exfix.org](http://www.exfix.org).

The Great Debates and Updates: Diabetic Foot is a new conference with plans to be accredited by UTHSA and take place in December 2022 on the Riverwalk. The conference is a collaboration between co-chairs Dr. Lee C. Rogers (UTHSA) and Dr. Lawrence A. Lavery (UTSW) and will focus on evidence-based treatments and multidisciplinary team approach to the complicated diabetic foot.

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## **Shoulder and Elbow Surgery**

*Anil K. Dutta, MD*



The Shoulder and Elbow Service remains as a testament to the strength of Charles A. Rockwood's legacy within our institution. As one of the pillars of the UTHSCSA Orthopaedic Surgery Program, the division continues to spearhead the tertiary care of complex shoulder and elbow problems from South Texas to around the world. The current full-time shoulder and elbow faculty are Dr. Bernard Morrey, Dr. Anil Dutta, Dr. Phil Jacobs, and Dr. Ian Whitney.

Dr. Morrey continues to lead the division and spearheads the fellowship, research, and teaching agenda. Under his guidance, the program has expanded from its origins as one of the pioneering centers for shoulder surgery to becoming one of the most comprehensive shoulder and elbow programs in the nation. The fellowship is newly focused on the changing landscape of orthopaedics and Dr. Morrey's experience as an orthopaedic leader has reinvigorated the program. He has also developed links between UTHSCSA and the Mayo Clinic Shoulder and Elbow program with two joint publications this past year and further collaborations ongoing.



Dr. Vaibhav Kanawade (left) Dr. Jongmin Kim (right)

Dr. Dutta continues his work in shoulder and elbow trauma and is jointly assigned orthopaedic trauma. In the area of joint replacement, he is working with the Hospital for Special Surgery in their development of a new total elbow system. He is also involved in the launch of a navigation and guidance system for total shoulders.

Dr. Jacobs, both a Rockwood and Christian Gerber fellow, continues his leadership with shoulder surgery and sports medicine. He is one of the key members of the UTSA sports coverage team. He continues his investigative work with research on the rotator cuff including a joint venture with UTSA evaluating the utility of elastometry in the diagnosis of rotator cuff disease. He is also actively involved in sports coverage in the community school arena as well.

Dr. Ian Whitney, a graduate of our program, completed his fellowship with Dr. Rockwood's longtime colleague and co-author, Dr. Rick Matsen. He continues to grow his practice in both shoulder and elbow comprehensive care as well as adult reconstruction and sports. He has developed a complex tertiary care practice that includes extending care to the major private centers in San Antonio and beyond. Ian has also developed unique strategies in the treatment of shoulder infection and the care of sternoclavicular instability.



Graduation ceremony for the Charles A. Rockwood Shoulder and Elbow Fellowship honoring graduate Dr. Vaibhav Kanawade. Pictured from left to right: Dr. Robert Hartzler, Dr. Bernard Morrey, Dr. Vaibhav Kanawade, Dr. Ian Whitney, and Dr. Anil Dutta.

The shoulder and elbow fellowship continues as the Charles A. Rockwood Shoulder and Elbow Fellowship. The program is one of the nation's finest and most complete fellowships with a comprehensive exposure including trauma, reconstruction, and sports. This past year's graduate, Vaibhav Kanawade complete the fellowship with a special research interest in elbow injuries inducing a publication focusing on medial elbow pain. He also has submitted a paper on the use of landmarks to guide rotational alignment in humeral fracture nailing. The fellowship has expanded to include the addition of Dr. Robert Hartzler from The San Antonio Orthopaedic Group

TSAOG, where the fellows are exposed to Dr. Hartzler's complex practice with a focus on arthroscopic shoulder reconstruction and arthroplasty. The fellows continue to have a robust rotation at the VA with preceptors Dr. John Hinchey and Dr. Travis Burns, graduates of UTHSCSA and SAMMC respectively. The VA rotation includes all types of shoulder and elbow pathologies and is the referral center for South Texas veterans. The care of veterans was a cornerstone of Dr. Rockwood's mission statement and remains an enduring testimony to all that he stood for.

## Sports Medicine

*Katherine C. Bartush, MD*



This year the Sports Medicine division expanded their coverage and is now taking care of all of The University of Texas San Antonio Athletics Department. We have a new addition to the team in Dr. Kenneth Nwosa. Originally from Flower Mound, he is a Primary Care Sports Medicine physician with fellowship training experience from Andrews Sports Medicine. He and his wife Krystal enjoy being a part of the UTSA community.

To assist in patient care, we have also added a UTSA Patient Navigator, Jaime Aguirre, ATC. He is well-respected in the San Antonio sports community, has worked in both the clinical and sideline setting, and is a welcome addition to the team.

The department is also pleased to announce the recent addition of Dr. Thomas DeBerardino. He completed the John A. Feagin, Jr. Sports Medicine Fellowship at West Point, and has an interest in reconstruction of the knee and shoulder.

The division continues to be staffed by Dr. Katherine Bartush, Dr. Philip Jacobs, Dr. Ian Whitney, and Dr. Caitlyn Mooney. Dr. Bartush was recently awarded the Steve and Mary Anne Lynch Professorship in Medicine Endowment.

Dr. Jacobs enhances our practice across the state by continuing to be the orthopaedic surgeon overseeing the Houston Open, PGA Tour Event. Over the last year, Michelle Aguirre, ATC has been working with a local

youth soccer organization, Soccer Central with which UT Health has developed a relationship.

Marie Charpentier, PT, continues to serve as the Director of Rehabilitation at UTSA. The Department's first Athletic Training Residency Program is nearing the end of its first year, and will recruit three more students this fall.

In addition to Marie, UT Health continues to support UTSA's Athletic Department with two full-time athletic trainers, Nik Turner, ATC, and Brian Benitez, ATC. The department is also grateful to our other subspecialty providers across UT Health who keep our athletes healthy.

In February, Dr. Bartush and Dr. Jesse Delee, Clinical Professor, successfully hosted the largest UT Health Sports Medicine Symposium yet, an educational event for surrounding sports medicine providers and athletic trainers. This year's attendees came from across the US, and Hong Kong. Next year, will be the 50th anniversary of the event.

The division continues to work collaboratively with Sports Medicine Associates of San Antonio (SMASA). SMASA surgeons include Drs. David Schmidt, Bud Curtis, and Richard Steffen. Dr. Curtis is currently the director of the fellowship program.

The residents continue to show great enthusiasm for Sports Medicine. The second-year resident spends time with Dr. Bartush. The fourth-years enjoy learning from Dr. Michael Heckman who generously provides education, experience, and mentorship through his practice, San Antonio Sports Medicine. The VA experience is overseen by Dr. Travis Burns. The residents also participate in our new Friday Night Lights Clinic, designed to provide urgent care to South Texas athletes every Friday evening during football season.

While our clinical services are expanding, our academic offerings are also growing. Dr. David Heath, PGY4, has published several papers in collaboration with our sports faculty. Most recently his paper, "Medial Meniscus Repair in Major League Soccer Players Results in Decreased Performance Metrics for One Year and Shortened Career Longevity" was published in the *Open Access Journal of Sports Medicine*. Finally, we have one resident pursuing Sports Medicine fellowships next year: Dr. Trevor Wait will attend the UC Health Steadman Hawkins Clinic at Denver.



Dr. Katherine Bartush (left) and Dr. Kenneth Nwosa performing sideline coverage during a UTSA Football game.



Dr. Katherine Bartush and Dr. Kenneth Nwosa standing in front of a UT Health San Antonio sideline clinical tent at a UTSA Football game.

## Coding and Billing



**Eric Hartgraves, CPC**

Bundling errors occur when a procedure or service with a unique CPT code is included as part of a “more extensive” procedure or service provided at the same time. This is known as unbundling.

Unbundling is a frequent cause of claim denial. Knowledge and access to resources are critical to preventing further bundling denials.

The Center for Medicare & Medicaid Services (CMS) has determined which procedures should be included in a more extensive procedure and will deny the unbundled services. For example, when a sports surgeon performs a knee arthroscopy many codes are considered bundled. For example, CPT code 29877 - Arthroscopy knee, surgical; and debridement/shaving of articular cartilage is bundled into CPT code 29888 - ACL repair. Logically, the debridement/shaving must be done to accomplish the more extensive ACL repair. Therefore, if CPTs 29877 and 29888 are billed together, the payor would allow the lesser valued procedure and deny the higher allowed procedure.

How does the Revenue team assist in preventing these denials? A good revenue team (surgery schedulers, coders, and appeal specialists) will take the preventive steps of informing providers of bundled codes. There are exceptions to bundled codes and your billing staff can indicate such with an appropriate modifier indicating that this was, in fact, a totally separate procedure. For example, if a provider is removing hardware from a patient with a nonunion fracture and fixating the fracture again, the hardware is typically bundled into the fixation. However, if the hardware is removed through a separate incision from the nonunion repair, then the hardware removal is unbundled and payable. The surgeon is doing the extra work and should be paid accordingly.

Bundling applies to procedures performed in a clinic setting as well as surgical care. If a hand surgeon performs carpal and trigger finger injections, these would be bundled. If a podiatrist treats a patient for diabetic foot care, trimming the patient’s nails and cutting the patient’s foot lesions, these two codes are considered bundled.

If a provider performs non-operative management of a fracture, then the cast application is bundled into the fracture care code.

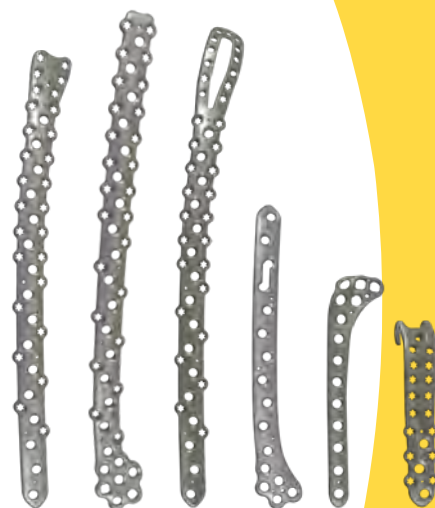
To prevent a claim denial and the claim appeal (which increases your claim turnaround time) a clean claim needs to be prepared at the onset of the claims process. If the coder knows that the procedures are typically considered bundled, it is part of their process to remove the less extensive procedure code or append a modifier to indicate the procedures were separately identifiable. Modifiers that indicate separately identifiable procedures are available for both federal and private payors. CMS allows modifier XS for a separate structure. For example, as mentioned earlier, nail trimming and lesion paring are generally considered bundled, but if provided on separate structures, such as toe, nails, or heel, the modifier XS would indicate the correct unbundling of the procedures. Commercial payors accept modifier 59 to indicate a distinct procedural difference.

There are many pitfalls with coding and billing, but the proper medical record documentation, support staff and continuing education to providers and staff alike can lead to cleaner billing, shorter claim turnaround time and a more robust bottom line.

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# Research Updates

## Clinical Research Update

*Boris A. Zelle, MD*

*Vice Chair of Research*



The Department of Orthopaedics continues to produce high-impact research. In 2021, our department published over 51 journal manuscripts in the peer-reviewed literature. Many of these articles were published in the top-tier orthopaedic journals. The successful

completion of a research project requires rigorous efforts along multiple steps that include protocol development, data collection and analysis, as well as the publishing process. Therefore, we greatly appreciate the time and energy that our research staff, medical students, residents, fellows, and faculty put into the orthopaedic research program.

We feel blessed to have the opportunity to work with a great group of external collaborators who are crucial for the success of our research efforts. Over the years, we have established very productive collaborations within the Health Science Center including the departments of emergency medicine, medicine, neurosurgery, occupational therapy, pediatrics, physical therapy, and the Barshop Institute. Within the UT system, we also collaborate with investigators from the University of Texas at San Antonio (UTSA) as well as the Dell School of Medicine in Austin. We are also very grateful for our international collaborations with McMaster University in Hamilton, ON (Canada), University of Sao Paulo (Brazil), and University of Zurich (Switzerland). Moreover, we continue to expand our collaborative efforts with the San Antonio Military Medical Center (SAMMC) and The San Antonio Orthopaedic Group (TSAOG).

Participation in multicenter trials has become an increased focus of our clinical research. Recently, our spine division as well as our arthroplasty division have made significant strides in establishing our center as a study site for various industry-sponsored trials. Similarly, the orthopaedic trauma division continues to participate in different industry-sponsored trials as well as randomized clinical trials that are funded by the Department of Defense

(DoD). We are very grateful for the strong support that we have received from our study sponsors. Another clinical research focus will be on large databases and patient registries. Our center has recently become part of the American Joint Replacement Registry (AJRR), which contains data on over two million procedures including Patient-Reported Outcome Measures (PROMs). We anticipate that this involvement may become an interesting venue for future research projects.

Our research endeavors also play an important role in our educational mission. The vast majority of journal articles published by our department are co-authored by our medical students, orthopaedic residents, and fellows. Research participation remains an important element of residency training as it teaches the residents the process of conducting research and, importantly, how to interpret research papers. We were particularly proud of our performance at local resident research competitions. David Heath won the 2021 Albert Sanders/Roy Davis Resident Research Competition with his paper on Marijuana use in pediatric trauma patients (Figure 1). This was the second year in a row that an orthopaedic resident from our department won this competition after Case Martin in 2020.

Regarding the educational mission of our research program, we are very pleased with the success of our orthopaedic research fellowship. Our research fellowship was established in 2018. Our goal is to promote highly competitive medical students with an interest in an academic orthopaedic career. Our target group includes medical students between their third and fourth year of medical school, who are willing to take a year off from medical school and dedicate this time to high-quality research. This fellowship year is an honor program, and we choose applicants based on their academic credentials and their prospects of being competitive candidates in the orthopaedic residency match. During the fellowship year, we closely work with the research fellow to ensure that they succeed in their research and boost their record of publications. We could not have asked for a stronger group of individuals to start off this program. Samuel Ornell, MD (Figure 2A) was our first research fellow in 2018/2019, and he has become a successful orthopaedic

resident within our residency program. He was followed by Travis Shane Bullock (2019/2020), who is currently an orthopaedic intern at UT Health (Figure 2B). Luis Salazar (Figure 2C) is our most recent research fellow (2020/2021), and he matched for an orthopaedic residency position at Rush University in Chicago, one of the top residency programs in the nation. All three of these individuals were highly competitive candidates on the interview trail for orthopaedic residency and were strong

representatives of our institution.

We are excited about the multiple research accomplishments over the last year, and we are looking forward to more successful years to come. The Department of Orthopaedics is very grateful for all the strong support from our sponsors and collaborators, and we will continue to foster these relationships.

(Figure 1) David Heath, winner of the 2021 Roy Davis Resident Research Competition.



#### Orthopaedic Research Fellows



(Figure 2A)

Samuel Ornell  
(AY 2018/2019)



(Figure 2B)

Travis Bullock  
(AY 2019/2020)



(Figure 2C)

Luis Salazar  
(AY 2020/2021)

## Basic Science Division – A Year in Review

Vaida Glatt, PhD



I am an assistant professor and the Director of Basic Science Research for the Department of Orthopaedic Surgery at the University of Texas Health Science Center San Antonio (UTHSCSA). It is my pleasure to share our latest endeavors, progress, and accomplishments in the research division over the past year. The research team at the Glatt Lab has been heavily involved in scientific projects combining both engineering and biological approaches to develop novel treatment strategies for the regeneration and repair of bone. The team consists of Senior Research Fellow, Anna Woloszyk, PhD, who will be leaving us at the end of January for a new job in industry; Leonardo Aguilar, BS, who will soon be promoted to the position of lab manager; a second-year medical student, Anoop Vemulapalli; Research Scholar Christopher Fox-Good, MD; and in January a new member joined the lab, research assistant, Emily Salinas, BS.

In November 2020, my lab moved to the Sam and Ann Barshop Institute for Longevity and Aging Studies. Since joining the Aging Institute, I applied and received a pilot grant entitled “Targeting Senescent Cells to Prevent Chemotherapy Induced Bone Loss in Aged Mice” from the Nathan Shock Center of Excellence in the Biology of Aging. This innovative project is using a completely new approach to prevent and revert chemotherapy-induced bone loss by exploring the use of senolytic drugs as a way to enhance the osteo-regenerative properties of aging bone, and to recover osteo-degeneration that occurs as a result of chemotherapeutic regimens. Anoop Vemulapalli is one of the key persons working on this project.

Last year, I was awarded the President’s Translational Entrepreneurial Research Fund (PTEF) from UTHSCSA for a project entitled “Biomimetic Hematoma: Novel Carrier for the Delivery of Growth Factors to Enhance Bone Healing”. This study is based on my patented technology which was filed as a provisional patent (62/845,500) on May 9, 2019, through the Office of Technology Commercialization, UTHSCSA. This proprietary patent application relates to the compositions and the treatment method comprising of a natural carrier,

the Biomimetic Hematoma, that mimics the structural and biological properties of naturally healing fracture hematoma to deliver an extremely low dose of rhBMP-2 or other growth factors in patients with large segmental bone defects and non-union of fractures. These projects are being conducted jointly between my research team Anna Woloszyk, PhD, myself, and Animesh Agarwal, MD, who is an orthopaedic trauma surgeon and the Chief of Orthopaedic Trauma Division for the Department of Orthopaedic Surgery at UTHSCSA. We have completed all in vivo studies and are currently analyzing the data. Furthermore, I submitted a second provisional patent based on the findings of the study. Finally, we have been in talks with one of the Orthopaedic Implant companies to develop this technology together for clinical applications.

The Basic Science Research Division has been continuing collaborations with multidisciplinary projects on musculoskeletal research with collaborators on nearly every continent. For example, collaborations are ongoing with Mikhail Samchukov, MD, and Alexander Cherkashin, MD, from Texas Scottish Rite Hospital for Children, Dallas, TX, and Christopher Iobst, MD, Center for Limb Lengthening and Reconstruction, Nationwide Children’s Hospital, Columbus, OH, on a project concerning the improvement and acceleration of bone healing and bone regenerate consolidation through the manipulation of the mechanical environment provided by implant stability using a large animal model. We are currently working on the publication of a study that we will soon submit to the *Journal of Bone and Joint Surgery*. Likewise, prospective studies at the Texas Scottish Rite Hospital for Children, Dallas, TX, and in the UK, South Africa, Brazil, and Russia are all underway based on optimizing and accelerating bone healing using the fixation stability of implants. Specifically, each will base their studies around Reverse Dynamization, which is a method previously invented by myself to accelerate the healing of fractures. Moreover, the Glatt Lab research team has continued our collaboration with Kevin Tetsworth, MD FRACS (Australia), who is an expert in limb salvage and reconstruction, to explore the biologic activity of Masquelet membranes as an aide to heal large bone defects. These collaborations have already proven to be fruitful, resulting in an awarded grant from the Orthopaedic Trauma Association in January 2020. Christopher Fox-Good is a leading scientist on the project.

Collectively over the past year, the Glatt Lab has

contributed 15 peer-reviewed publications to the orthopaedic literature and presented basic science and clinical research work at several national and international conferences. Furthermore, in 2021 I was an invited speaker and lecturer at the Vail Scientific Summit, CO, Orthopaedic Trauma Association meeting on Biomimetic Hematoma in Ft. Worth, TX, and the AAOS Annual meeting on Biomimetic Hematoma in San Diego, CA, and presented several talks at the virtual meeting

organized by the Ilizarov Center in Kurgan, Russia. I have also become the Chair of Basic Science on the digital platform LearnORS, which is an online training course for researchers, residents, fellows, and clinicians on basic science and clinical subjects. Finally, our research division is actively involved in resident research here at UTHSCSA that is focused on establishing a pathway to gain the experience needed to design clinical studies and write manuscripts.

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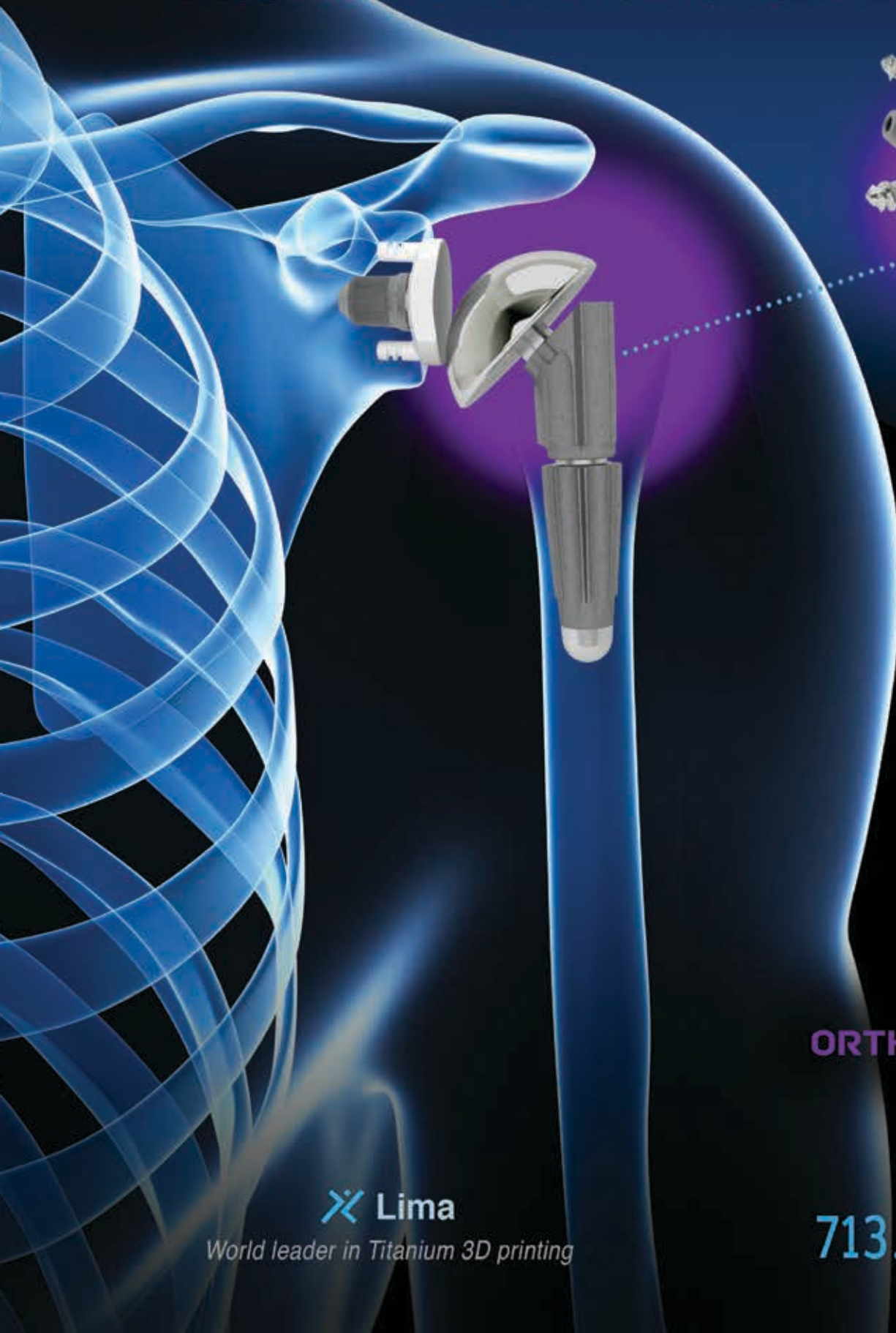
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## Gravity-Assisted Passive Flexion in Total Knee Arthroplasty Recovery

*Frank A Buttacavoli<sup>1</sup>*

<sup>1</sup>Department of Orthopaedics, University of Texas Health San Antonio, San Antonio, TX, USA

### Abstract

This study examined the use of gravity-assisted passive flexion (GAP-FLEX) for perioperative total knee arthroplasty (TKA) recovery. The main questions associated with this technique were: (1) Can GAP-FLEX improve patient recovery of range of motion after TKA? (2) Does GAP-FLEX reduce patient time and effort associated with therapy compared with continuous passive motion (CPM)? (3) Does GAP-FLEX reduce overall episodic care cost? A prospective, randomized multicenter study was conducted. Two senior surgeons used identical surgical approach, prosthesis, and postoperative management protocols. Patients consenting to the study were randomly assigned to either standard of care (CPM) or GAP-FLEX groups. Active flexion range of motion (ROM) was measured via goniometer with a primary endpoint established at 4 weeks after surgery. Secondary endpoints included pain and functional mobility. A total of 27 patients completed the study. Average ROM in the GAP-FLEX sample was 8.4° greater than the CPM sample ( $P=.009$ ) at study endpoint. The GAP-FLEX patients achieved greater postoperative ROM within 2 days and maintained an improvement over CPM to study endpoint. Eighty-five percent (11 of 13) of GAP-FLEX patients achieved or surpassed their baseline ROM by study endpoint, compared with 50% (7 of 14) of CPM patients. These improvements occurred while requiring 90% less therapy time on device compared with the CPM patients. Patients did not report any statistically different pain levels but did exhibit higher functional mobility at endpoint ( $P=.026$ ).

## Spinopelvic Instability in Conversion Total Hip Arthroplasty: A Complicated Case of Loeys-Dietz Syndrome

*Jorge De Leon<sup>1</sup>, Farhan Ahmad<sup>2</sup>, Kavina Patel<sup>2</sup>, Frank Buttacavoli<sup>1</sup>*

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<sup>2</sup>Joe R. & Teresa Lozano Long School of Medicine, University of Texas Health at San Antonio, San Antonio, TX, USA.

### Abstract

A 53-year-old patient with a history of Loeys-Dietz syndrome (LDS) presented with cutout after a right femoral neck fracture treated with a dynamic hip screw. This was treated with conversion total hip arthroplasty (THA), the second reported THA in a patient with LDS and the first in a post-traumatic reconstruction setting. The patient had 2 episodes of posterior hip dislocations within 2 weeks after the operation requiring a revision THA utilizing dual-mobility bearing to achieve stability. LDS is a connective-tissue disorder that is associated with joint hypermobility and spinal deformities, among other features. These factors can affect hip pathology, approaches to treatment, and outcomes. Patients with LDS should have a comprehensive musculoskeletal evaluation and history such as those with Marfan syndrome or Ehlers-Danlos syndrome, especially if undergoing THA. Further research on the implications of LDS on the hip and spine should be performed.

**Keywords:** Hip-spine syndrome; Loeys-Dietz syndrome; Orthopaedic surgery; Spinopelvic relationship; Total hip arthroplasty.

## Disseminated Coccidioidomycosis of the Knee Joint Requiring Synovectomy and Arthrotomy

*Farhan Ahmad<sup>1</sup>, Kavina Patel<sup>1</sup>, Jorge Clint De Leon<sup>1</sup>, Frank A Buttacavoli<sup>1</sup>*

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### Abstract

**Introduction:** Coccidioidomycosis is a fungal infection endemic to the Southwestern United States, Mexico, and South America. While uncommon, inhalation of spores or direct cutaneous contact can lead to disseminated infection in the immunocompetent, with the involvement of the musculoskeletal and integumentary systems.

**Case report:** A 49-year-old patient with a history of pulmonary coccidioidomycosis presented with the right knee pain and multiple symptomatic abscesses beneath the suprapatellar and infrapatellar fat pads. Arthrocentesis and culture confirmed the infection, and open synovectomy, arthrotomy, and drainage of the infection were performed without complication.

**Conclusion:** Disseminated coccidioidomycosis is an uncommon fungal infection that may involve joints and become refractory to pharmacotherapy. Management may require surgical intervention, along with infectious disease consultation and close follow-up. Patients from endemic regions should be evaluated with a comprehensive history of this disease.

**Keywords:** Coccidioidomycosis; arthrotomy; fungal infection; knee; orthopaedic surgery; septic arthritis; synovectomy.

## Degenerative Meniscus Lesions: An Expert Consensus Statement Using the Modified Delphi Technique

*Erik Hohmann<sup>1</sup>, Richard Angelo<sup>2</sup>, Robert Arciero<sup>3</sup>, Bernard R Bach<sup>4</sup>, Brian Cole<sup>4</sup>, Mark Cote<sup>3</sup>, Jack Farr<sup>5</sup>, Julian Feller<sup>6</sup>, Brad Gelbart<sup>7</sup>, Andreas Gomoll<sup>8</sup>, Andreas Imhoff<sup>9</sup>, Robert LaPrade<sup>10</sup>, Bert R Mandelbaum<sup>11</sup>, Robert G Marx<sup>8</sup>, Juan C Monllau<sup>12</sup>, Frank Noyes<sup>13</sup>, David Parker<sup>14</sup>, Scott Rodeo<sup>15</sup>, Nicholas Sgaglione<sup>16</sup>, Kevin Shea<sup>17</sup>, Donald K Shelbourne<sup>18</sup>, Shinichi Yoshiya<sup>19</sup>, Vaida Glatt<sup>20</sup>, Kevin Tetsworth<sup>21</sup>*

### Abstract

**Purpose:** The purpose of this study was to perform an evidence-based, expert consensus survey using the Delphi panel methodology to develop recommendations for the treatment of degenerative meniscus tears.

**Methods:** Twenty panel members were asked to respond to 10 open-ended questions in rounds 1 and 2. The results of the first 2 rounds served to develop a Likert-style questionnaire for round 3. In round 4, the panel members outside consensus were contacted and asked to either change their score in view of the group's response or argue their case. The level of agreement for round 4 was defined as 80%.

**Results:** There was 100% agreement on the following items: insidious onset, physiological part of aging, tears often multiplanar, not all tears cause symptoms, outcomes depend on degree of osteoarthritis, obesity is a predictor of poor outcome, and younger patients (<50 years) have better outcomes. There was between 90% and 100% agreement on the following items: tears are nontraumatic, radiographs should be weightbearing, initial treatment should be conservative, platelet-rich plasma is not a good option, repairable and peripheral tears should be repaired, microfracture is not a good option for chondral defects, the majority of patients obtain significant improvement and decrease in pain with surgery but results are variable, short-term symptoms have better outcomes, and malalignment and root tears have poor outcomes.

**Conclusions:** This consensus statement agreed that degenerative meniscus tears are a normal part of aging. Not all tears cause symptoms and, when symptomatic, they should initially be treated nonoperatively. Repairable tears should be repaired. The outcome of arthroscopic partial meniscectomy depends on the degree of osteoarthritis, the character of the meniscus lesion, the degree of loss of joint space, the amount of malalignment, and obesity. The majority of patients had significant improvement, but younger patients and patients with short-term symptoms have better outcomes.

**Level of evidence:** Level V - expert opinion.

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Hohmann E, Angelo R, Arciero R, Bach B, Cole B, Cote M, Farr J, Feller J, Gelbart B, Gomoll A, Imhoff A, LaPrade R, Mandelbaum B, Marx R, Monllau J, Noyes F, Parker D, Rodeo S, Sgaglione N, Shea K, Shelbourne D, Yoshiya S, Glatt V, Tetsworth K. Degenerative Meniscus Lesions: An Expert Consensus Statement Using the Modified Delphi Technique. *Arthroscopy*. 2020;36(2), 501 – 512.

## Is platelet-rich plasma effective for the treatment of knee osteoarthritis? A systematic review and meta-analysis of level 1 and 2 randomized controlled trials

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<sup>5</sup>Queensland University of Technology, Brisbane, Australia.

<sup>6</sup>Orthopaedic Research Centre of Australia, Brisbane, Australia.

<sup>7</sup>University of Texas Health Science Center, San Antonio, TX, USA.

### Abstract

**Introduction:** The purpose of this study was to perform a systematic review and meta-analysis comparing intra-articular knee injection of PRP and hyaluronic acid and investigate clinical outcomes and pain at both 6 and 12 months.

**Methods:** A systematic review of Medline, Embase, Scopus, and Google Scholar was performed in the English and German literature reporting on intra-articular knee injections for knee osteoarthritis. All level 1 and 2 studies with a minimum of 6-month follow-up in patients with knee osteoarthritis from 2010 to 2019 were included. Clinical outcome was assessed by WOMAC and IKDC scores and pain by VAS and WOMAC pain scores. Subgroup analysis for autologous platelet-rich plasma (ACP) was performed. Publication bias and risk of bias were assessed using the Cochrane Collaboration's tools. The GRADE system was used to assess the quality of the body of evidence. Heterogeneity was assessed using  $\chi^2$  and I<sup>2</sup> statistics. Results: Twelve studies (1,248 cases; 636 PRP, 612 HA) met the eligibility criteria. The pooled estimate demonstrated non-significant differences between PRP and HA for clinical outcomes at 6 months ( $p = 0.069$ ) and at 12 months ( $p = 0.188$ ). However, the pooled estimate for pain did demonstrate significant differences in favour of PRP at 6 months ( $p = 0.001$ ) and 12 months ( $p = 0.001$ ). For the ACP subgroup (249 cases), the pooled estimate for these studies demonstrated significant differences in favour of PRP ( $p < 0.0001$ ) at 6 months. Conclusion: The results of this systematic review and meta-analysis suggest that PRP is superior to HA for symptomatic knee pain at 6 and 12 months. ACP appears to be clearly superior over HA for pain at both 6 and 12 months. There were no advantages of PRP over HA for clinical outcomes at both 6 and 12 months. Level of evidence: Level 2; systematic review and meta-analysis.

**Keywords:** Autologous conditioned plasma (ACP); Hyaluronic acid; Knee osteoarthritis; Knee pain; Meta-analysis; PRP; Platelet-rich plasma; Systematic review.

## Platelet-Rich Plasma Versus Corticosteroids for the Treatment of Plantar Fasciitis: A Systematic Review and Meta-analysis

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<sup>7</sup>Department of Orthopaedics, University of Texas Health Science Center, San Antonio, Texas, USA.

### Abstract

**Background:** Plantar fasciitis is a common cause of heel pain. Corticosteroid injections are commonly used and proven to be effective, and lately platelet-rich plasma (PRP) has been used with mixed results. Purpose: To perform a systematic review and meta-analysis comparing intralesional injections of PRP and steroid infiltration. Study design: Systematic review and meta-analysis. Methods: A systematic review of Medline, Embase, Scopus, and Google Scholar including all level 1 and 2 studies from 2010 to 2019 was performed. American Orthopaedic Foot and Ankle Society and visual analog scale for pain scores were used as outcome variables. Publication bias and risk of bias was assessed with the Cochrane Collaboration tools. The Grading of Recommendations, Assessment, Development and Evaluations system was used to assess the quality of the body of evidence. Heterogeneity was assessed with  $\chi^2$  and I<sup>2</sup> statistics. Results: Fifteen studies were included in the analysis. Nine studies had a high risk of bias. There was 1 study with high quality, 9 with moderate, 2 studies with low, and 3 with very low quality. The pooled estimate for the American Orthopaedic Foot and Ankle Society score demonstrated nonsignificant differences at 1 month ( $P = .4$ ) and 3 months ( $P = .076$ ). At 6 months ( $P = .009$ ) and 12 months ( $P = .009$ ), it indicated significant differences in favor of PRP. The pooled estimate for visual analog scale demonstrated nonsignificant differences at 1 month ( $P = .653$ ). At 3 months ( $P = .0001$ ), 6 months ( $P = .002$ ), and 12 months ( $P = .019$ ), it yielded significant differences in favor of PRP. Conclusion: The results of this systematic review and meta-analysis suggest that PRP is superior to corticosteroid injections for pain control at 3 months and lasts up to 1 year. In the short term, there is no advantage of corticosteroid infiltration. However, the low study quality, high risk of bias, and different protocols for PRP preparation reduce the internal and external validity of these findings, and these results must be viewed with caution.

**Keywords:** PRP; autologous conditioned plasma (ACP); heel pain; meta-analysis; plantar fasciitis; platelet-rich plasma; systematic review.

## What is the optimal timing for bone grafting during staged management of infected non-unions of the tibia? A systematic review and best evidence synthesis

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### Abstract

**Purpose:** To summarize the best available evidence with regards to timing of staged bone grafting for infected tibial non-union, and to extract evidence-based criteria indicating when bone grafting can be safely performed.

**Methods:** Medline, Embase, Scopus, and Google Scholar were searched, and publications of evidence Level I-IV from 2000 to 2020 were included. Risk of bias was assessed with the Cochrane Collaboration's Risk of Bias Tool and ROBINS-I tool. Study quality was assessed with the GRADE system, Coleman methodology score, and Methodological Index for Non-Randomized Studies (MINORS). Heterogeneity was assessed with the I<sup>2</sup> statistic. A forest plot was used to pool the timing of bone grafting for all included studies. For data synthesis and analysis, a best evidence synthesis was used.

**Results:** A total of 15 studies were included (353 cases). Risk of bias was high in 8 studies and the quality for 14 studies was assessed as very low, with a mean Coleman score of 33.5 and a mean MINORS score of 7.9. The mean time from the index surgery to bone grafting was 7.03 weeks ranging from 2 to 15 weeks (lower limit 6 weeks, upper limit 8.07 weeks). Best evidence analysis demonstrated that 8 of the 15 studies (53%) with 237 cases (67%) performed staged bone grafting inside this window. Union was achieved in 92%.

**Conclusion:** The results of this best evidence systematic review suggest that, for most infected tibial non-unions, secondary bone grafting can be successfully performed between 6-8 weeks with expected union rates over 90%.

**Keywords:** Bone grafting; Fractures; Infection; Non-union; Osteomyelitis; Staged surgery.

## Three-dimensional quantitative measurements of atrophy and fat infiltration in sub-regions of the supraspinatus muscle show heterogeneous distributions: a cadaveric study

Jose H Trevino Iii<sup>1</sup>, Takuma Yuri<sup>1,2</sup>, Taku Hatta<sup>3</sup>, Yoshiro Kiyoshige<sup>2</sup>, Philip M Jacobs<sup>4</sup>, Hugo Giambini<sup>5,6</sup>

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### Abstract

**Introduction:** Rotator cuff tears are common in the older population. Atrophy and fat infiltration develop un-evenly in torn supraspinatus (SSP) muscles leading to pre- and post-surgical complications. The purpose of the current study was twofold: first, to implement a volumetric and quantitative magnetic resonance imaging (MRI) approach to quantify the degree of muscle atrophy and fat infiltration within the SSP muscle and its four sub-regions (AS, PS, AD, and PD); second to compare 3-D MRI outcomes to the standard 2-D assessment and investigate their relationship with tear size.

**Materials and methods:** Fifteen cadaveric shoulders were obtained and MRI performed. Quantitative 3-D outcomes included SSP muscle volume, fossa volume, fat-free muscle volume, and fat fraction for the whole SSP muscle and its four sub-regions. 2-D and qualitative measurements included tear size, 2-D fat infiltration using the Goutallier classification, tangent sign, and occupation ratio.

**Results:** Linear regression outcomes with tear size were not significant for both cross-sectional area ( $r = -0.494$ ,  $p = 0.061$ ) and occupation ratio ( $r = -0.011$ ,  $p = 0.969$ ). Tear size negatively correlated with fat-free muscle volume for both AS and PS sub-regions (AS:  $r = -0.78$ ,  $p < 0.001$ ; PS:  $r = -0.68$ ,  $p = 0.005$ , respectively) while showing no significant correlation with fat fraction outcomes. AD and PD sub-regions positively correlated with tear size and fat fraction outcomes (AD:  $r = 0.70$ ,  $p = 0.017$ ; PD:  $r = 0.52$ ,  $p = 0.045$ , respectively), while no significant correlation was observed between tear size and fat-free muscle volumes. Conclusion: Quantitative 3-D volumetric assessment of muscle degeneration resulted in better outcomes compared to the standard 2-D evaluation. The superficial supraspinatus muscle sub-regions primarily presented muscle atrophy, while the deep sub-regions were mainly affected by fat infiltration. 3-D assessments could be used pre-surgically to determine the best course of treatment and to estimate the muscles' regenerative capacity and function.

**Keywords:** Atrophy; Fat infiltration; Goutallier classification; Muscle

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Trevino Iii JH, Yuri T, Hatta T, Kiyoshige Y, Jacobs PM, Giambini H. Three-dimensional quantitative measurements of atrophy and fat infiltration in sub-regions of the supraspinatus muscle show heterogeneous distributions: a cadaveric study. Arch Orthop Trauma Surg. 2021 Jan 23.

## Classification of Bone Defects: An Extension of the Orthopaedic Trauma Association Open Fracture Classification

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### Abstract

**Objectives:** To develop a post-traumatic bone defect classification scheme and complete a preliminary assessment of its reliability.

**Design:** Retrospective classification.

**Setting:** Tertiary referral trauma center.

**Patients/participants:** Twenty open fractures with bone loss.

**Intervention:** Assignment of a bone defect classification grade.

**Main outcome measurements:** Open fractures were classified based on orthogonal radiographs, assessing the extent and local geometry of bone loss, including D1-incomplete defects, D2-minor/subcritical (complete) defects (<2 cm), and D3-segmental/critical-sized defects (≥2 cm). Incomplete defects (D1) include D1A-<25% cortical loss, D1B-25%-75% cortical loss, and D1C->75% cortical loss. Minor/subcritical (complete) defects (<2 cm) (D2) include D2A-2 oblique ends allowing for possible overlap, D2B-one end oblique/one end transverse, and D2C-2 transverse ends. Segmental/critical-sized Defects (≥2 cm) include D3A-moderate defects, 2 to <4 cm; D3B-major defects, 4 to <8 cm; and D3C-massive defects, ≥8 cm. Reliability was assessed among 3 independent observers using Fleiss' kappa tests.

**Results:** Interobserver reliability demonstrated the classification scheme has very good agreement,  $\kappa = 0.8371$ ,  $P < 0.0005$ . Intraobserver reliability was excellent,  $\kappa = 1.000$  (standard error 0.1478-0.1634),  $P < 0.00001$ . Interobserver reliability for the distinction between categories alone (D1, D2, or D3) was also excellent,  $\kappa = 1.000$  (standard error 0.1421-0.1679),  $P < 0.00001$ .

**Conclusions:** This classification scheme provides a robust guide to bone defect assessment that can potentially facilitate selection of the most appropriate treatment strategy to optimize clinical outcomes.

## The posterior horn of the medial and lateral meniscus both reduce the effective posterior tibial slope: a radiographic MRI study

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### Abstract

**Purpose:** The purpose of this study was to quantify the posterior horn meniscal slope and determine its contribution to the reduction in posterior tibial slope.

**Methods:** Patients aged between 16 and 60 years and had intact menisci with no evidence of previous injury or surgery were included. Patients with radiological evidence of osteoarthritis Grade II-IV, any acute or chronic meniscus injuries, fractures, and ligamentous injuries were excluded. The posterior bony slope (PTS) and the meniscus slope (MS) of the posterior horns were measured at 25, 50, and 75% from the medial and lateral borders of the tibial plateau.

**Results:** 325 MR images (mean age  $37.1 \pm 10.9$  years) were included. There were 194 males and 131 females, with 162 left and 163 right knees. The PTS in the medial compartment ranged from (-)  $2.8^\circ$  to  $3.7^\circ$  and from (-)  $1.3^\circ$  to  $1.9^\circ$  in the lateral compartment ( $p = 0.0001$ ). The MS in the medial compartment ranged from  $27.4^\circ$  to  $28.2^\circ$ , and from  $27.8^\circ$  to  $28.7^\circ$  in the lateral compartment ( $p > 0.05$ ). The differences between the medial and lateral knee compartment were statistically significant. At the 25% interval the  $p$  level was 0.037, at 50%  $p = 0.00001$ , and at 75%  $p = 0.0001$ . There were no significant between gender differences.

**Conclusions:** The results of this study demonstrated a significant reduction in posterior tibial bone slope by the posterior horns of both the medial and lateral meniscus, from a mean of (-)  $1^\circ$  to  $2^\circ$  to a more horizontal anterior slope. The posterior bone slope was larger in the medial compartment by  $1^\circ$ , resulting in a smaller slope reduction in the lateral compartment.

**Keywords:** Anterior cruciate ligament injuries; Meniscal slope; Posterior horn meniscus; Posterior tibial slope.

## Reverse Dynamization Accelerates Bone-Healing in a Large-Animal Osteotomy Model

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### Abstract

**Background:** Reverse dynamization is a mechanical manipulation regimen designed to accelerate bone-healing and remodeling. It is based on the hypothesis that a fracture that is initially stabilized less rigidly allows micromotion to encourage initial cartilaginous callus formation. Once substantial callus has formed, the stabilization should then be converted to a rigid configuration to prevent the disruption of neovascularization. The aim of the present study was to investigate whether bone-healing can be accelerated using a regimen of reverse dynamization in a large-animal osteotomy model.

**Methods:** Transverse 2-mm tibial osteotomies were created in 18 goats, stabilized using circular external fixation, and divided into groups of 6 goats each: static fixation (rigid fixation), dynamic fixation (continuous micromotion using dynamizers), and reverse dynamization (initial micromotion using dynamizers followed by rigid fixation at 3 weeks postoperatively). Healing was assessed with the use of radiographs, micro-computed tomography, and mechanical testing.

**Results:** Radiographic evaluation showed earlier and more robust callus formation in the dynamic fixation and reverse dynamization groups compared with the static fixation group. After 8 weeks of treatment, the reverse dynamization group had reduced callus size, less bone volume, higher bone mineral density, and no evidence of radiolucent lines compared with the static fixation and dynamic fixation groups. This appearance is characteristic of advanced remodeling, returning closest to the values of intact bone. Moreover, the tibiae in the reverse dynamization group were significantly stronger in torsion compared with those in the static fixation and dynamic fixation groups.

**Conclusions:** These findings confirmed that tibial osteotomies under reverse dynamization healed faster, healed objectively better, and were considerably stronger, all suggesting an accelerated healing and remodeling process.

**Clinical relevance:** This study demonstrates that the concept of reverse dynamization challenges the current understanding regarding the optimal fixation stability necessary to maximize the regenerative capacity of bone-healing. When reverse dynamization is employed in the clinical setting, it may be able to improve the treatment of fractures by reducing the time to union and potentially lowering the risk of delayed union and nonunion.

## The anatomical relationship of the common peroneal nerve to the proximal fibula and its clinical significance when performing fibular-based posterolateral reconstructions

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### Abstract

**Purpose:** The common peroneal nerve (CPN) can be injured during fibular-based posterolateral reconstructions due to its close relationship to the neck of the fibula. Therefore, the purpose of this study was to observe the course of the CPN and its branches around the fibular head and neck and quantify the position in relation to relevant bony landmarks and observe the relation between tunnel drilling for posterolateral corner reconstruction and both the tunnel entry and exit at the proximal fibula and the CPN and its branches was observed.

**Methods:** In 101 (mean age =  $70.6 \pm 16$  years) embalmed cadaver knees, the relationship between bony landmarks (tibial tuberosity, styloid process of fibula (APR)) and the CPN and its branches were established and 8 (M1-M8) distances from these landmarks measured; mean, SD and 95% CI were recorded. In 21 of these knees, a fibula tunnel was drilled as in PLC reconstruction and the association of the CPN and its branches to the tunnel entry and exit were judged by two independent observers. Fisher's exact test of independence was used to determine significant differences between genders. Tunnel intersection was analysed in a binary yes/no fashion and was described in frequencies and percentages.

**Results:** The mean distance from the APR to where the CPN reaches the fibula neck (M1) was  $31.4 \pm 8.9$  mm (CI:29.8-33.0); from the apex of the styloid process (APR) to where the CPN passes posterior to the broadest point of the fibular head (M3) was  $21.7 \pm 12.6$  mm (CI:19.4-24.0); from the apex of the APR to the most proximal point of the CPN/CPN first branch in the midline of the fibular head (M2) was  $37.0 \pm 6.7$  mm (CI: 35.4-37.7). Out of the 21 randomly selected knees for drilling, the first branch of the CPN was damaged at the tunnel entry point in 7 (33%), and in 5 knees (24%), the CPN was damaged at the tunnel exit. In one knee, at both the tunnel entry and exit, the first branch of the CPN and the CPN were intersected, respectively.

**Conclusion:** The results of this study strongly suggest that the CPN is at risk when drilling the fibula tunnel performing fibula-based posterolateral corner reconstructions. The total injury rate was 57% with a 33% incidence of injury to the first branch of the nerve at the tunnel entry and 24% to the CPN at the tunnel exit.

**Clinical relevance:** Due to the high incidence of injury, percutaneous placement of guide pins and tunnel drilling is not recommended. The nerve should be visualized and protected by either a traditional open approach or minimally invasive techniques. With a minimally invasive approach, the nerve should be identified at the fibula neck and then followed ante- and retrograde.

**Keywords:** Common peroneal nerve; Iatrogenic nerve injuries; Minimally invasive surgery; Posterolateral corner reconstructions; Proximal fibula.

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Hohmann E, Van Zyl R, Glatt V, Tetsworth K, Keough N. The anatomical relationship of the common peroneal nerve to the proximal fibula and its clinical significance when performing fibular-based posterolateral reconstructions. Arch Orthop Trauma Surg. 2021 Mar;141(3):437-445.

## Healing of sub-critical femoral osteotomies in mice is unaffected by tacrolimus and deletion of recombination activating gene 1

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### Abstract

Clinical management of delayed healing or non-union of long bone fractures and segmental defects poses a substantial orthopaedic challenge. There are suggestions in the literature that bone healing may be enhanced by inhibiting the activities of T and B lymphocytes, but this remains controversial. To examine this matter in more detail, sub-critical-sized segmental defects were created in the femora of mice and it was assessed whether there might be a benefit from the administration of a Food and Drug Administration (FDA)-approved drug that blocks T cell activation (tacrolimus). Defects were stabilised using an internal plate. In certain groups of animals, 1 mg/kg or 10 mg/kg tacrolimus was delivered locally to the defect site for 3 or 7 d using an implanted osmotic pump with a silicon catheter directing drug delivery into the defect area. Healing was monitored by weekly X-ray and assessed at 12 weeks by mechanical testing,  $\mu$ CT and histology. Radiographic and histological evaluations revealed that 100 % of defects healed well regardless of tacrolimus dosage or duration. A comparison of healed C57BL/6 and Rag1<sup>-/-</sup> femora by  $\mu$ CT and ex vivo torsion testing showed no differences within mouse strains in terms of bone volume, tissue volume, bone volume/tissue volume ratio, shear modulus, torsional rigidity or torsional stiffness. These data failed to support an important role for tacrolimus in modulating the natural healing of segmental defects under those experimental conditions.

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Liu, T. Y., Bartnikowski, M., Wu, A. C., Veitch, M., Sokolowski, K. A., Millard, S. M., Pettit, A. R., Glatt, V., Evans, C. H., & Wells, J. W. Healing of sub-critical femoral osteotomies in mice is unaffected by tacrolimus and deletion of recombination activating gene 1. *European Cells and Materials*. 2021;41,345-354.

### 3D-Microtissue Derived Secretome as a Cell-Free Approach for Enhanced Mineralization of Scaffolds in the Chorioallantoic Membrane Model

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#### Abstract

Bone regeneration is a complex process and the clinical translation of tissue engineered constructs (TECs) remains a challenge. The combination of biomaterials and mesenchymal stem cells (MSCs) may enhance the healing process through paracrine effects. Here, we investigated the influence of cell format in combination with a collagen scaffold on key factors in bone healing process, such as mineralization, cell infiltration, vascularization, and ECM production. MSCs as single cells (2D-SCs), assembled into microtissues (3D-MTs) or their corresponding secretomes were combined with a collagen scaffold and incubated on the chicken embryo chorioallantoic membrane (CAM) for 7 days. A comprehensive quantitative analysis was performed on a cellular level by histology and by microcomputed tomography (microCT). In all experimental groups, accumulation of collagen and glycosaminoglycan within the scaffold was observed over time. A pronounced cell infiltration and vascularization from the interface to the surface region of the CAM was detected. The 3D-MT secretome showed a significant mineralization of the biomaterial using microCT compared to all other conditions. Furthermore, it revealed a homogeneous distribution pattern of mineralization deposits in contrast to the cell-based scaffolds, where mineralization was only at the surface. Therefore, the secretome of MSCs assembled into 3D-MTs may represent an interesting therapeutic strategy for a next-generation bone healing concept.

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Otto L, Wolint P, Bopp A, Woloszyk A, Becker AS, Boss A, Böni R, Calcagni M, Giovanoli P, Hoerstrup SP, Emmert MY, Buschmann J. 3D-microtissue derived secretome as a cell-free approach for enhanced mineralization of scaffolds in the chorioallantoic membrane model. *Sci Rep.* 2021 Mar 8;11(1):5418.

## Reverse Dynamisation: A Modern Perspective on Stephan Perren's Strain Theory

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### Abstract

The present review acknowledges the tremendous impact of Stephan Perren's strain theory, considered with respect to the earlier contributions of Roux and Pauwels. Then, it provides further insight by examining how the concept of reverse dynamisation extended Perren's theory within a modern context. A key factor of this more contemporary theory is that it introduces variable mechanical conditions at different time points during bone healing, opening the possibility of manipulating biology through mechanics to achieve the desired clinical outcome. The discussion focusses on the current state of the art and the most recent advances made towards optimising and accelerating bone regeneration, by actively controlling the mechanical environment as healing progresses. Reverse dynamisation utilises a very specific mechanical manipulation regimen, with conditions initially flexible to encourage and expedite early callus formation. Once callus has formed, the mechanical conditions are intentionally modified to create a rigid environment under which the soft callus is quickly converted to hard callus, bridging the fracture site and leading to a more rapid union. The relevant literature, principally animal studies, was surveyed to provide ample evidence in support of the effectiveness of reverse dynamisation. By providing a modern perspective on Stephan Perren's strain theory, reverse dynamisation perhaps holds the key to tipping the balance in favour of a more rapid and reliable union when treating acute fractures, osteotomies, non-unions and other circumstances where it is necessary to regenerate bone.

## Functional Outcomes and Quality of Life Following Complex Tibial Fractures Treated with Circular External Fixation: A Comparison between Proximal, Midshaft, and Distal Tibial Fractures

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### Abstract

**Aim and objective:** The purpose of this study was to compare clinical results following complex proximal, midshaft, and distal tibial fractures and investigate whether there are differences in outcomes between these locations. Materials and methods: Patients between 18 years and 65 years of age and minimum follow-up of 12 months with complex tibial fractures treated with a circular ring fixator were included. Functional outcomes were assessed using the Association for the Study and Application of Methods of Ilizarov (ASAMI) functional and bone scores, Foot Function Index (FFI), Four Step Square Test (FSST), and Timed Up and Go Test (TUG). Quality of life was assessed by the EQ-5D score.

**Results:** A total of 45 patients were included: proximal fractures, n = 11; midshaft fractures, n = 17; and distal fractures, n = 17. ASAMI functional (p = 0.8) and bone scores (p = 0.3) were not different. Excellent and good bone scores were achieved in >90% in all groups. FFI was 30.9 + 24.7 in the proximal group, 33.9 + 27.7 in the midshaft group, and 28.8 + 26.9 in the distal group (p = 0.8). TUG was 9.0 + 2.7 sec in the proximal group, 9.0 + 3.5 in the midshaft group, and 8.5 + 2.0 in the distal group (p = 0.67). FSST was 10.7 + 2.5 sec in the proximal, 10.3 + 3.8 in the midshaft, and 8.9 + 1.8 in the distal fracture groups (p = 0.5). EQ-5D index value was highest in the distal (0.72), lowest in the proximal (0.55), and 0.70 in the midshaft fracture groups (p = 0.001). EQ-5D VAS was significantly different between the proximal (65) and midshaft (82.3) (p = 0.001) and between the distal (75) and proximal (65) fracture groups (p = 0.001).

**Conclusions:** The results of this study suggest that the functional outcomes between proximal, midshaft, and distal complex tibial fractures are comparable. Their ability to ambulate afterward is comparable to age-related normative data, but complex tasks are more difficult and better compared to the ambulating ability of a healthy population aged 65 to 80 years. Patients with proximal tibial fractures had significantly more disability by at least one functional level and/or one health dimension. Keywords: Circular external fixation; Clinical outcomes; Complex tibial fractures.

## Stiffness of the infraspinatus and the teres minor muscles during shoulder external rotation: An in-vitro and in-vivo shear wave elastography study

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### Abstract

**Background:** A better understanding of the morphological and functional differences in the anatomical sub-regions of the rotator cuff muscles is critical so that appropriate surgical and rehabilitation methodologies can be implemented in patients with shoulder-related injuries. The purpose of the current study was to develop a comprehensive imaging protocol using shear-wave elastography for the infraspinatus and teres minor muscles, and investigate differences in elastic properties of three distinct infraspinatus muscle sub-regions and of the teres minor muscle.

**Methods:** First, we developed a protocol for probe positioning for both muscles using three cadaveric shoulders. Second, we evaluated in-vivo elastic properties [passive and active stiffness (kPa)] and excursion (mm) outcomes from these muscles during shoulder external rotation.

**Findings:** Elastic properties were significantly different among the infraspinatus muscle sub-regions and teres minor muscle. Passive stiffness decreased with increasing rotation angles except for the middle sub-region of the infraspinatus muscle which showed a decreased up to mid-range followed by an increment towards the end-range. Overall, active stiffness of the infraspinatus muscle and teres minor muscle decreased with increasing rotation angles, while that of the middle sub-region increased up to mid-range, and decreased at the end-range.

**Interpretation:** Distinct characteristics of the infraspinatus and teres minor muscles, and more importantly, of the individual sub-regions within the infraspinatus muscle call for an in-depth analysis of their morphological and functional differences. Special attention should be put into these sub-regions when performing surgical and rehabilitation procedures for patients with shoulder-related injuries.

**Keywords:** Excursion; Infraspinatus; Shear-wave elastography; Sub-regions; Teres minor.

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Yuri T, Trevino JH, Hatta T, Kiyoshige Y, Jacobs PM, Giambini H. Stiffness of the infraspinatus and the teres minor muscles during shoulder external rotation: An in-vitro and in-vivo shear wave elastography study. Clin Biomech 2021 May;85:105328.

## Treatment with a long-acting chimeric CSF1 molecule enhances fracture healing of healthy and osteoporotic bones

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### Abstract

Macrophage-targeted therapies, including macrophage colony-stimulating factor 1 (CSF1), have been shown to have pro-repair impacts post-fracture. Preclinical/clinical applications of CSF1 have been expedited by development of chimeric CSF1-Fc which has extended circulating half-life. Here, we used mouse models to investigate the bone regenerative potential of CSF1-Fc in healthy and osteoporotic fracture. We also explored whether combination of CSF1-Fc with interleukin (IL)-4 provided additional fracture healing benefit in osteopenic bone. Micro-computed tomography, in situ histomorphometry, and bone mechanical parameters were used to assess systemic impacts of CSF1-Fc therapy in naive mice (male and female young, adult and geriatric). An intermittent CSF1-Fc regimen was optimized to mitigate undesirable impacts on bone resorption and hepatosplenomegaly, irrespective of age or gender. The intermittent CSF1-Fc regimen was tested in a mid-diaphyseal femoral fracture model in healthy bones with treatment initiated 1-day post-fracture. Weekly CSF1-Fc did not impact osteoclasts but increased osteal macrophages and improved fracture strength. Importantly, this treatment regimen also improved fracture union and strength in an ovariectomy-model of delayed fracture repair. Combining CSF1-Fc with IL-4 initiated 1-week post-fracture reduced the efficacy of CSF1-Fc. This study describes a novel strategy to specifically achieve bone regenerative actions of CSF1-Fc that has the potential to alleviate fragility fracture morbidity and mortality.

**Keywords:** Bone regeneration; Colony stimulating factor 1; Fracture repair; Osteal macrophages; Osteomacs; Osteoporotic fracture.

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## Medial and Lateral Posterior Tibial Slope Are Independent Risk Factors for Noncontact ACL Injury in Both Men and Women

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### Abstract

**Background:** Higher posterior tibial slope (PTS) is a risk factor for anterior cruciate ligament (ACL) injury in men and women. The individual contribution of the lateral (LPTS) and medial (MPTS) slope has not yet been investigated.

**Purpose:** To determine whether either the LPTS or the MPTS is an independent risk factor for ACL injury, and to determine sex-specific differences between patients with ACL-deficient and ACL-intact knees.

**Study design:** Cohort study; Level of evidence, 3.

**Methods:** We reviewed knee magnetic resonance (MR) images performed on ACL-deficient and ACL-intact knees between January 2018 and June 2020 at a single institution. Inclusion criteria were isolated ACL injury and noncontact mechanism (ACL-deficient group) and nonspecific knee pain and no history of injury (ACL-intact group). Exclusion criteria for both groups were the following: previous knee surgery; meniscal, collateral ligament, posterior cruciate ligament, or multiligamentous injuries; radiological evidence of osteoarthritis; and chondral damage on the tibia. The MR images were used to establish the posterior bony slope at 25%, 50%, and 75% from the medial and/or lateral border of the tibial plateau with respect to the proximal tibial anatomic axis. One-way analysis of variance (ANOVA) was used to determine differences in PTS at the 25%, 50%, and 75% distances for the medial and lateral tibial plateau between the groups and between the sexes.

**Results:** Overall, 325 images were included (mean age,  $36.1 \pm 11.1$  years; 142 ACL-deficient images [82 men and 60 women]; 183 ACL-intact images [112 men and 71 women]). MPTS and LPTS were significantly higher at 25%, 50%, and 75% in the ACL-deficient group (range,  $-2.7^\circ$  to  $-5.7^\circ$ ) compared with the ACL-intact group (range,  $-2.1^\circ$  to  $1.5^\circ$ ;  $P = .00001$ ). Similarly, MPTS and LPTS were significantly different in men versus women ( $P = .00001$ ). ANOVA revealed that there were no significant differences in PTS between men and women for all measures (MPTS, LPTS, ACL-deficient, ACL-intact;  $P = .68$ ).

**Conclusion:** The study results demonstrated that higher MPTS and LPTS is a potential risk factor for ACL injury in both men and women. However, despite being highly statistically significant, the differences between groups and sexes were small and may not be clinically relevant.

**Keywords:** anterior cruciate ligament injuries; noncontact; posterior tibial slope; risk factors.

## Anterior Minimally Invasive Plate Osteosynthesis for Humeral Shaft Fractures Is Safer Than Open Reduction Internal Fixation: A Matched Case-Controlled Comparison

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### Abstract

**Objective:** Compare anterior minimally invasive plate osteosynthesis (MIPO) to open reduction/internal fixation (ORIF) for humeral shaft fractures, assessing complications and clinical outcomes.

**Design:** Retrospective matched case-controlled cohort.

**Setting:** Tertiary referral trauma centre.

**Patients/participants:** Humeral shaft fractures identified retrospectively over 5 years; 31 were treated by MIPO and 54 by ORIF. Matched-case cohort assembled according to fracture pattern, sex, age, and comorbidities, with 56 total patients (28 per group).

**Interventions:** MIPO and ORIF.

**Main outcome measures:** Complication rate was the primary outcome (radial nerve injury, nonunion, infection, and reoperation). Radiographic alignment and the Disabilities of the Arm, Shoulder and Hand Score were secondary outcomes.

**Results:** Cumulative complication rates were 3.6% after anterior MIPO and 35.7% after ORIF ( $P = 0.0004$ ). The only complication after anterior MIPO was a nonunion, managed with revision ORIF and bone graft. The ORIF group had 10 complications, including 5 superficial infections, 4 iatrogenic radial nerve injuries, and 1 nonunion. The mean Disabilities of the Arm, Shoulder and Hand score after MIPO was  $17.0 \pm 18.0$  and after ORIF was  $24.9 \pm 19.5$ . The mean coronal plane angulation after MIPO was  $1.8 \pm 1.3$  degrees and after ORIF was  $1.0 \pm 1.2$  degrees. The mean sagittal plane angulation after MIPO was  $3.0 \pm 2.9$  degrees and after ORIF was  $1.0 \pm 1.2$  degrees.

**Conclusions:** The cumulative complication rate was 10 times higher after ORIF of humeral shaft fractures compared with the MIPO technique. MIPO achieved nearly equivalent radiographic alignment, with no clinically meaningful differences observed. MIPO is the safer option and should be considered for patients with humeral shaft fractures that would benefit from surgical intervention.

**Level of evidence:** Therapeutic Level III. See Instructions for Authors for a complete description of levels of evidence.

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Randell M, Glatt V, Stabler A, Bussoletti T, Hohmann E, Tetsworth K. Anterior Minimally Invasive Plate Osteosynthesis for Humeral Shaft Fractures Is Safer Than Open Reduction Internal Fixation: A Matched Case-Controlled Comparison. *J Orthop Trauma*. 2021 Aug 1;35(8):424-429.

## Biomechanical Studies for Glenoid Based Labral Repairs With Suture Anchors Do Not Use Consistent Testing Methods: A Critical Systematic Review

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### Abstract

**Purpose:** The purpose of this systematic review was to investigate variability in biomechanical testing protocols for laboratory-based studies using suture anchors for glenohumeral shoulder instability and SLAP lesion repair.

**Methods:** A systematic review of Medline, Embase, Scopus, and Google Scholar using Covidence software was performed for all biomechanical studies investigating labral-based suture anchor repair for shoulder instability and SLAP lesions. Clinical studies, technical notes or surgical technique descriptions, or studies treating glenoid bone loss or capsulorrhaphy were excluded. Risk of bias (ROB) was assessed with the ROBINS-I tool. Study quality was assessed with the Quality Appraisal for Cadaveric Studies. Heterogeneity was assessed with the I<sup>2</sup> statistic.

**Results:** A total of 41 studies were included. ROB was serious and critical in 27 studies, moderate in 13, and low in 1; 6 studies had high quality, 21 good quality, 10 moderate quality, 2 low quality, and 2 very low quality. Thirty-one studies used and 22 studies included cyclic loading. Angle of anchor insertion was reported by 33 studies. The force vector for displacement varied. The most common directions were perpendicular to the glenoid (n = 9), and anteroinferior or anterior (n = 8). The most common outcome measures were load to failure (n = 35), failure mode (n = 23), and stiffness (n = 21). Other outcome measures included load at displacement, displacement at failure, tensile load at displacement, translation, energy absorbed, cycles to failure, contact pressure, and elongation.

**Conclusion:** This systematic review demonstrated a clear lack of consistency in those cadaver studies that investigated biomechanical properties after surgical repair with suture anchors for shoulder instability and SLAP lesions. Testing methods between studies varied substantially with no universally applied standard for preloading, load to failure and cyclic loading protocols, insertion angles of suture anchors, or direction of loading. To allow comparability between studies standardization of testing protocols is strongly recommended.

## Subacromial Decompression in Patients With Shoulder Impingement With an Intact Rotator Cuff: An Expert Consensus Statement Using the Modified Delphi Technique Comparing North American to European Shoulder Surgeons

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### Abstract

**Purpose:** To perform a Delphi consensus for the treatment of patients with shoulder impingement with intact rotator cuff tendons, comparing North American with European shoulder surgeon preferences.

**Methods:** Nineteen surgeons from North America (North American panel [NAP]) and 18 surgeons from Europe (European panel [EP]) agreed to participate and answered 10 open-ended questions in rounds 1 and 2. The results of the first 2 rounds were used to develop a Likert-style questionnaire for round 3. If agreement at round 3 was  $\leq 60\%$  for an item, the results were carried forward into round 4. For round 4, the panel members outside consensus ( $>60\%$ ,  $<80\%$ ) were contacted and asked to review their response. The level of agreement and consensus was defined as 80%.

**Results:** There was agreement on the following items: impingement is a clinical diagnosis; a combination of clinical tests should be used; other pain generators must be excluded; radiographs must be part of the workup; magnetic resonance imaging is helpful; the first line of treatment should always be physiotherapy; a corticosteroid injection is helpful in reducing symptoms; indication for surgery is failure of nonoperative treatment for a minimum of 6 months. The NAP was likely to routinely prescribe nonsteroidal anti-inflammatory drugs (NAP 89%; EP 35%) and consider steroids for impingement (NAP 89%; EP 65%).

**Conclusions:** Consensus was achieved for 16 of the 71 Likert items: impingement is a clinical diagnosis and a combination of clinical tests should be used. The first line of treatment should always be physiotherapy, and a corticosteroid injection can be helpful in reducing symptoms. The indication for surgery is failure of no-operative treatment for a minimum of 6 months. The panel also agreed that subacromial decompression is a good choice for shoulder impingement if there is evidence of mechanical impingement with pain not responding to nonsurgical measures.

**Level of evidence:** Level V, expert opinion.

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## Osteal macrophages support osteoclast-mediated resorption and contribute to bone pathology in a postmenopausal osteoporosis mouse model

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### Abstract

Osteal macrophages (osteomacs) support osteoblast function and promote bone anabolism, but their contribution to osteoporosis has not been explored. Although mouse ovariectomy (OVX) models have been repeatedly used, variation in strain, experimental design and assessment modalities have contributed to no single model being confirmed as comprehensively replicating the full gamut of osteoporosis pathological manifestations. We validated an OVX model in adult C3H/HeJ mice and demonstrated that it presents with human postmenopausal osteoporosis features with reduced bone volume in axial and appendicular bone and bone loss in both trabecular and cortical bone including increased cortical porosity. Bone loss was associated with increased osteoclasts on trabecular and endocortical bone and decreased osteoblasts on trabecular bone. Importantly, this OVX model was characterized by delayed fracture healing. Using this validated model, we demonstrated that osteomacs are increased post-OVX on both trabecular and endocortical bone. Dual F4/80 (pan-macrophage marker) and tartrate-resistant acid phosphatase (TRAP) staining revealed osteomacs frequently located near TRAP+ osteoclasts and contained TRAP+ intracellular vesicles. Using an in vivo inducible macrophage depletion model that does not simultaneously deplete osteoclasts, we observed that osteomac loss was associated with elevated extracellular TRAP in bone marrow interstitium and increased serum TRAP. Using in vitro high-resolution confocal imaging of mixed osteoclast-macrophage cultures on bone substrate, we observed macrophages juxtaposed to osteoclast basolateral functional secretory domains scavenging degraded bone byproducts. These data demonstrate a role for osteomacs in supporting osteoclastic bone resorption through phagocytosis and sequestration of resorption byproducts. Overall, our data expose a novel role for osteomacs in supporting osteoclast function and provide the first evidence of their involvement in osteoporosis pathogenesis. © 2021 American Society for Bone and Mineral Research (ASBMR).

**Keywords:** bone resorption; macrophage; osteomac; osteoporosis; osteoporotic fracture.

Batoon L, Millard SM, Raggatt LJ, Wu AC, Kaur S, Sun LWH, Williams K, Sandrock C, Ng PY, Irvine KM, Bartnikowski M, Glatt V, Pavlos NJ, Pettit AR. Osteal macrophages support osteoclast-mediated resorption and contribute to bone pathology in a postmenopausal osteoporosis mouse model. *J Bone Miner Res.* 2021 Nov;36(11):2214-2228.

## Three-Stage Limb Salvage in Tibial Fracture Related Infection with Composite Bone and Soft-Tissue Defect

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### Abstract

**Introduction:** Managing critical-sized tibial defects is one of the most complex challenges orthopaedic surgeons face. This is even more problematic in the presence of infection and soft-tissue loss. The purpose of this study is to describe a comprehensive three-stage surgical protocol for the reconstruction of infected tibial injuries with combined bone defects and soft-tissue loss, and report the clinical outcomes.

**Materials and methods:** A retrospective study at a specialized limb reconstruction center identified all patients with infected tibial injuries with bone and soft-tissue loss from 2010 through 2018. Thirty-one patients were included. All cases were treated using a three-stage protocol: (1) infected limb damage control; (2) soft-tissue coverage with a vascularized or local flap; (3) definitive bone reconstruction using distraction osteogenesis principles with external fixation. Primary outcomes: limb salvage rate and infection eradication.

**Secondary outcomes:** patient functional outcomes and satisfaction.

**Results:** Patients in this series of chronically infected tibias had been operated upon 3.4 times on average before starting our limb salvage protocol. The mean soft-tissue and bone defect sizes were 124 cm<sup>2</sup> (6-600) and 5.4 cm (1-23), respectively. A free flap was performed in 67.7% (21/31) of the cases; bone transport was the selected bone-reconstructive option in 51.7% (15/31). Local flap failure rate was 30% (3/10), with 9.5% for free flaps (2/21). Limb salvage rate was 93.5% (29/31), with infection eradicated in all salvaged limbs. ASAMI bone score: 100% good/excellent. Mean VAS score was 1.0, and ASAMI functional score was good/excellent in 86% of cases. Return-to-work rate was 83%; 86% were "very satisfied" with the treatment outcome.

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Corona PS, Carbonell-Rosell C, Vicente M, Serracanta J, Tetsworth K, Glatt V. Three-stage limb salvage in tibial fracture related infection with composite bone and soft-tissue defect. Arch Orthop Trauma Surg. 2021 Dec 22.

## Minimally Invasive Achilles Repair Techniques

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### Abstract

Achilles tendon rupture is an increasingly common problem with an aging population participating in high-level physical activities. Appropriate treatment has been debated for decades, but good outcomes have been reported after conservative and surgical management. The development of minimally invasive surgical techniques for Achilles repair has reduced the incidence of complications and maintained the high level of function reported after open surgery. The Achilles Midsubstance SpeedBridge repair is a newer minimally invasive technique that has demonstrated promising results and is the authors' preferred treatment of Achilles tendon rupture in athletes and active patients.

**Keywords:** Achilles Midsubstance SpeedBridge; Achilles repair; Achilles rupture; Mini-open; Minimally invasive; Percutaneous Achilles Repair System (PARS).

## Providing Hand Surgery Care to Vulnerably Uninsured Patients

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### Abstract

Economically vulnerable US patients are at risk for undertreatment of hand-related conditions as well as poorer outcomes. The cost of indigent care can be substantial to both the patients and their communities. Caring for these patients in a system that depends on inconsistent coverage requires a network of safety-net hospitals. To ensure that patients have access to care, the protection of safety-net hospitals should be prioritized when discussing federal and state funding allocation. On an individual scale, surgeons can also make changes in their practices to help find sustainable ways to care for indigent patients.

**Keywords:** Affordable Medical Care Act; Hand surgery; Indigent care; Medicaid; Poverty; Safety-net hospital; Social determinants of health; Unfunded at-risk patient.

## Development and Validation of Scoring System to Predict Secondary Amputations in Free Flap Reconstruction

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### Abstract

Need for amputation is a potential complication when limb salvage is attempted. The present study aimed to develop a risk assessment tool to predict the risk of future amputation when counseling patients about their reconstructive options.

**Methods:** All patients undergoing a free flap lower extremity soft tissue reconstruction by the senior author from 2005 to 2019 were retrospectively identified. Patient's demographics, comorbidities, and technical aspects of the operation were extracted. Logistic regressions were used to create a predictive scoring system for future amputation.

**Results:** A total of 277 patients were identified. Of these patients, two-thirds (183) were used to derive the scoring system and one-third (94) were used to validate the score. In total, 25 of 183 patients (14%) underwent an amputation. A stepwise forward logistic regression identified age > 55 years, smoking, acute wound, aggressive fluid resuscitation intra-operatively, inability to use a superficial vein for drainage, and inability to use the posterior tibialis artery for anastomosis as independent predictors of need for future amputations. The beta co-efficients were used to create the scoring system, and the patients were categorized into mild, moderate, and severe risk based on their cumulative score. The validity of the scoring system was verified by using the one-third validation cohort.

**Conclusions:** In patients undergoing free flap reconstruction of the lower extremity, the need for future amputation is 14%. The use of a scoring system can guide the surgeon's and patient's decision regarding limb salvage.

## Further evidence supporting a potential role for ADH1B in obesity

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## Abstract

Insulin is an essential hormone that regulates glucose homeostasis and metabolism. Insulin resistance (IR) arises when tissues fail to respond to insulin, and it leads to serious health problems including Type 2 Diabetes (T2D). Obesity is a major contributor to the development of IR and T2D. We previously showed that gene expression of alcohol dehydrogenase 1B (ADH1B) was inversely correlated with obesity and IR in subcutaneous adipose tissue of Mexican Americans. In the current study, a meta-analysis of the relationship between ADH1B expression and BMI in Mexican Americans, African Americans, Europeans, and Pima Indians verified that BMI was increased with decreased ADH1B expression. Using established human subcutaneous pre-adipocyte cell lines derived from lean (BMI < 30 kg m<sup>-2</sup>) or obese (BMI ≥ 30 kg m<sup>-2</sup>) donors, we found that ADH1B protein expression increased substantially during differentiation, and overexpression of ADH1B inhibited fatty acid binding protein expression. Mature adipocytes from lean donors expressed ADH1B at higher levels than obese donors. Insulin further induced ADH1B protein expression as well as enzyme activity. Knockdown of ADH1B expression decreased insulin-stimulated glucose uptake. Our findings suggest that ADH1B is involved in the proper development and metabolic activity of adipose tissues and this function is suppressed by obesity.

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Morales LD, Cromack DT, Tripathy D, Fourcaudot M, Kumar S, Curran JE, Carless M, Göring HHH, Hu SL, Lopez-Alvarenga JC, Garske KM, Pajukanta P, Small KS, Glastonbury CA, Das SK, Langefeld C, Hanson RL, Hsueh WC, Norton L, Arya R, Mummidi S, Blangero J, DeFronzo RA, Duggirala R, Jenkinson CP. Further evidence supporting a potential role for ADH1B in obesity. *Sci Rep.* 2021 Jan 21;11(1):1932.

## Flow-through Anterolateral Thigh Flaps: Report of 3 Consecutive Cases and Review of its Utility

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### Abstract

In the field of plastic and reconstructive surgery, soft tissue reconstruction of Gustilo 3B with peripheral vascular disease or 3C fractures is a complex treatment algorithm. The concomitant issue of soft tissue coverage with vascular reconstruction is the main challenge when opting for free tissue transfer. The flow-through flap offers the surgeon the ability to treat a vascular injury or high-grade stenosis to maintain distal perfusion, while also providing soft tissue coverage. In this study, we present a case series of 3 patients who underwent flow-through anterolateral thigh free flap for lower extremity soft tissue coverage. Each patient had a history of trauma and either single vessel runoff or a dominant branch with diminutive secondary blood flow to the foot. All patients successfully underwent free flap reconstruction of lower extremity wounds while concomitantly reconstructing diseased arterial supply. Only 1 patient suffered partial flap loss postoperatively that was treated with debridement and split thickness skin grafting. Flow-through free tissue transfer is a valuable treatment option not only in Gustilo 3C fractures requiring soft tissue coverage, but also in patients with Gustilo 3B fractures with peripheral vascular disease.

## The Cutting Edge: Surface Texture Analysis following Resection of Nerve Stumps Using Various Instruments

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### Abstract

**Background:** Preparation of nerve ends is an essential part of nerve repair surgery. Multiple instruments have been described for this purpose; however, no consensus exists regarding which is the least traumatic for tissue handling. We believe that various instruments used for nerve-end excision will lead to different surface roughness.

**Methods:** Median and ulnar nerves from fresh frozen cadavers were dissected, and 1-2 cm lengths were excised using a No. 11 blade, a razor blade, or a pair of scissors. Using electron microscopy, 3-dimensional surface analysis of roughness (Sa) for each specimen was performed using ZeeScan optical hardware and GetPhase software (PhaseView, Buisson, France). An ANOVA or Kruskal-Wallis test compared roughness measures among cutting techniques.

**Results:** Forty nerves were included. Of these, 13 (32.5%) were cut using scissors, 15 (37.5%) using a razor blade, and 12 (30%) using a No. 11 blade. An ANOVA test showed statistical differences in Sa among the cutting techniques ( $P = 0.002$ ), with the lowest mean Sa noted in the scissors group ( $7.2 \mu\text{M}$ , 95% CI: 5.34-9.06), followed by No. 11 blade ( $7.29 \mu\text{M}$ , 95% CI: 5.22-9.35), and razor blade ( $11.03 \mu\text{M}$ , 95% CI: 9.43-12.62). Median Ra (surface profile roughness) was 4.58 (IQR: 2.62-5.46). A Kruskal-Wallis test demonstrated statistical difference in Ra among techniques ( $P = 0.003$ ), with the lowest by No. 11 blade ( $3 \mu\text{M}$ , IQR: 1.87-4.38), followed by scissors ( $3.29 \mu\text{M}$ , IQR: 1.56-4.96), and razor ( $5.41 \mu\text{M}$ , IQR: 4.95-6.21).

**Conclusion:** This novel technique of 3-dimensional surface analysis found razor blade use demonstrated poor roughness, whereas a No. 11 blade or nerve-specific scissors led to equivocally smooth nerve ends.

## Not all flaps are created equal: Assessing the impact of active smoking in muscle-only versus perforator flaps for patients undergoing nonelective extremity-free tissue transfer-A case control study

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### Abstract

**Introduction:** Active smoking is known to impair wound healing following free tissue transfer for reconstruction due to its vasoconstrictive effect on the microcirculation. The aim of this study was to evaluate the impact of flap selection on flap loss, in nonelective, traumatic extremity-free soft tissue transfer in active smokers.

**Methods:** All patients undergoing a free tissue transfer for acute trauma of the extremity at a level I trauma center from 2011 to 2017 were identified. Breast reconstruction and osseous/osseocutaneous flaps were excluded. The study population was divided in two groups based on the type of flap used (muscle versus perforator flap). Factors known to be associated with impaired wound healing were extracted from the database. Primary outcome was major smoking related complications (complete/partial flap loss). Secondary outcomes included minor flap-related complications (infection, dehiscence) and donor site complications. The impact of smoking was assessed for the different type of flaps using multivariate analyses.

**Results:** A total of 118 flaps were identified during the study period. Out of those, 52 were perforator-based fasciocutaneous flaps, while 66 were muscle flaps. Active smoking status resulted in a statistically significant increase in the incidence of major and minor complications in the perforator flap group (36% vs. 4%, adjusted odds ratio, AOR [95%CI]: 2.31[1.48,19.30], adj-p = 0.021 and 32% vs. 17%, AOR [95% CI]: 1.23[1.11,14.31], adj-p = 0.034) but had no impact in the muscle group.

**Conclusions:** The present study suggests a higher incidence of flap related complications in smokers when a perforator flap was selected but no impact when a muscle flap was utilized.

## Bilateral Osteonecrosis of the Capitate: A Case Report

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### Abstract

**Case:** We report a case of bilateral capitate osteonecrosis in a patient who has a history of acute lymphocytic leukemia treated with systemic steroids and other chemotherapeutic agents. After exhausting conservative treatment, the patient underwent surgical management with a right-sided 4-corner arthrodesis and left-sided vascular pedicle graft, providing pain relief and improved function.

**Conclusion:** In patients with a history of hematologic malignancy, clinicians should consider osteonecrosis of the capitate as a cause of wrist pain. Salvage procedures and vascularized grafts can provide pain relief in the presence of both early and late capitate osteonecrosis or collapse.

## Use of Clindamycin for Necrotizing Soft Tissue Infection Decreases Amputation Rate

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### Abstract

**Objective:** To identify the impact of clindamycin use on mortality and amputation rates in patients with necrotizing fasciitis

**Design:** Retrospective review.

**Setting:** Level 1 trauma center, single center study.

**Patients/participants:** All patients from 2008-2019 with a diagnosis of necrotizing fasciitis. 190 patients were included in statistical analysis.

**Intervention:** Use of clindamycin in the initial antibiotic regimen in the treatment of necrotizing soft tissue infection.

**Main outcome measurements:** Amputation and mortality rates.

**Results:** Patients who received clindamycin had 2.92 times reduced odds of having an amputation when compared to their counterparts, even when ASA scores, comorbidities, smoking, drug use, alcohol consumption, race, ethnicity, gender, and age were controlled for and regardless of other antibiotics started ( $p = 0.015$ ). There was no significant difference in mortality rate between those patients who did and did not receive clindamycin as part of their initial antibiotic regimen (8.3% vs. 11.6%, respectively;  $p = 0.453$ ).

**Conclusion:** The use of clindamycin in the initial antibiotic regimen for treatment of NSTI was shown to significantly decrease rates of amputation but not mortality.

**Level of evidence:** Therapeutic Level III. See Instructions for Authors for a complete description of levels of evidence.

**Keywords:** Clindamycin; Amputation; Necrotizing Fasciitis; Necrotizing Soft Tissue Infection

## A Life- and Limb-Threatening Case of *Clostridium septicum* in a Total Hip Arthroplasty

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### Abstract

A 46-year-old male with bilateral metal-on-metal hip prostheses presented with a left periprosthetic hip infection, as well as chronic, progressive osteolysis of the proximal femur and acetabulum with pelvic erosion. Three years before, the bearing surface was changed to metal-on-polyethylene prosthesis during an attempted revision but was complicated by extensive blood loss. At our institution, gross inspection demonstrated a soft-tissue hip mass of unknown etiology. Open biopsy and culture were performed, but extensive hemorrhaging required interventional radiology. Cultures revealed *Clostridium septicum* infection-known for its associations with gastrointestinal malignancy. Workup in the hospital was negative for malignancy, and definitive management was left hip disarticulation and intravenous antibiotics. The patient developed a chronic wound on the left hip incision but was ultimately lost to follow-up.

**Keywords:** *Clostridium septicum*; Malignancy; Periprosthetic infection; Total hip arthroplasty.

## Periosteal Chondroma of the Pelvis: An Uncommon Tumor in an Unusual Location

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### Abstract

Periosteal chondromas (PCs) are rare tumors composed of hyaline cartilage that are typically present in long bones and tubular bones of the hand. These lesions are easily mistaken for other, more common tumors. This study reports a case of PC located in the posterior pelvis of a 24-year-old female. The patient initially presented with a four-month history of pelvic pain with a presumptive diagnosis of endometriosis. However, when an MRI was performed, a 6.0 cm x 5.6 cm x 4.5 cm mass was found along the right posterior ilium extending to the ipsilateral sacroiliac joint. The patient underwent intralesional excision and curettage of the mass. Histologic analysis of the excised lesion revealed a proliferation of chondrocytes and abundant hyaline cartilage without chondroblasts, further suggesting the diagnosis of PC. The current study highlights the unusual location of this rare tumor and alerts the physician of the clinical presentation and differential diagnosis.

**Keywords:** orthopaedic tumor; pelvis; periosteal chondroma.

## Primary Rosai-Dorfman Disease in 39-Year-Old Woman With Osseous Tibial Lesion Manifestation: A Case Report and Literature Review

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### Abstract

Rosai-Dorfman disease (RDD), otherwise known as sinus histiocytosis with massive lymphadenopathy (SHML), is a very rare and typically benign disorder of unknown etiology with <10% bone involvement. The report is of a case seen at the authors' hospital of a patient presenting with several months' onset unspecified nontraumatic ankle pain. There was no physical mass or lymphadenopathy appreciated on examination. Plain radiographs and magnetic resonance images demonstrated an osteolytic lesion at the medial malleolus. Biopsy revealed the diagnosis of intraosseous manifestation of Rosai-Dorfman disease.

**Keywords:** Rosai-Dorfman; SHML; bone tumors; foot and ankle; rare tumors; tumors.

## Variability in Discharge Disposition Across US Trauma Centers After Treatment for High-Energy Lower Extremity Injuries

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### Abstract

**Objective:** To evaluate the association between patient- and center-level characteristics and discharge to an inpatient facility versus home after treatment for lower extremity trauma, as well as examine the variability in discharge disposition across clinical centers after controlling for these factors.

**Design:** This is an analysis of data collected prospectively across 5 multicenter studies of extremity trauma. Setting: US Trauma Centers. Participants: Patients 18-80 years with lower extremity trauma treated at 1 of 55 participating centers.

**Main outcome measure:** Discharge disposition.

**Results:** Among 2365 patients treated at 1 of 55 centers across 13 states, 673 (28.5%) were discharged to an inpatient facility, and 1692 (71.5%) were discharged home. Individuals who were older, female, unmarried, insured, higher body mass index, history of severe alcohol abuse, Gustilo type IIIB or IIIC open injuries, bilateral, spine and upper extremity injuries, higher injury severity score scores, or intensive care unit stay were more likely to be discharged to an inpatient facility. Even after accounting for patient- and center-level characteristics, there was substantial variation in discharge disposition across centers (likelihood ratio test:  $P < 0.001$ ).

**Conclusion:** Variation in discharge disposition may represent a potential for improvement in resource utilization and cost savings. Further studies are needed to examine the relationship between utilization of postdischarge inpatient facility after trauma and outcomes.

**Level of evidence:** Prognostic Level III. See Instructions for Authors for a complete description of levels of evidence.

## Gram-Negative Antibiotic Coverage in Gustilo-Anderson Type-III Open Fractures

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### Abstract

- Gustilo-Anderson type-III open fractures remain a considerable cause of morbidity and amputation.
- Systemic antibiotic prophylaxis with cephalosporins was introduced in the 1970s and substantially reduced the prevalence of infectious complications following injury.
- The use of antibiotics with an extended gram-negative (EGN) spectrum, such as aminoglycosides, is controversial; however, they are commonly used in type-III open fractures.
- Emerging literature has suggested that EGN antibiotic prophylaxis for type-III open fractures may not reduce infectious complication rates.
- Reducing the routine use of EGN antibiotics may be an important component of antimicrobial stewardship in orthopaedic trauma to reduce bacterial resistance and thus more complicated infections.

## Effect of Intrawound Vancomycin Powder in Operatively Treated High-risk Tibia Fractures: A Randomized Clinical Trial

Major Extremity Trauma Research Consortium (METRC)

### Abstract

**Importance:** Despite the widespread use of systemic antibiotics to prevent infections in surgically treated patients with fracture, high rates of surgical site infection persist.

**Objective:** To examine the effect of intrawound vancomycin powder in reducing deep surgical site infections.

**Design, setting, and participants:** This open-label randomized clinical trial enrolled adult patients with an operatively treated tibial plateau or pilon fracture who met the criteria for a high risk of infection from January 1, 2015, through June 30, 2017, with 12 months of follow-up (final follow-up assessments completed in April 2018) at 36 US trauma centers.

**Interventions:** A standard infection prevention protocol with (n = 481) or without (n = 499) 1000 mg of intrawound vancomycin powder.

**Main outcomes and measures:** The primary outcome was a deep surgical site infection within 182 days of definitive fracture fixation. A post hoc comparison assessed the treatment effect on gram-positive and gram-negative-only infections. Other secondary outcomes included superficial surgical site infection, nonunion, and wound dehiscence.

**Results:** The analysis included 980 patients (mean [SD] age, 45.7 [13.7] years; 617 [63.0%] male) with 91% of the expected person-time of follow-up for the primary outcome. Within 182 days, deep surgical site infection was observed in 29 of 481 patients in the treatment group and 46 of 499 patients in the control group. The time-to-event estimated probability of deep infection by 182 days was 6.4% in the treatment group and 9.8% in the control group (risk difference, -3.4%; 95% CI, -6.9% to 0.1%; P = .06). A post hoc analysis of the effect of treatment on gram-positive (risk difference, -3.7%; 95% CI, -6.7% to -0.8%; P = .02) and gram-negative-only (risk difference, 0.3%; 95% CI, -1.6% to 2.1%; P = .78) infections found that the effect of vancomycin powder was a result of its reduction in gram-positive infections.

**Conclusions and relevance:** Among patients with operatively treated tibial articular fractures at a high risk of infection, intrawound vancomycin powder at the time of definitive fracture fixation reduced the risk of a gram-positive deep surgical site infection, consistent with the activity of vancomycin.

**Trial registration:** ClinicalTrials.gov Identifier: NCT02227446.

## Safety and efficacy of a novel cephalomedullary nail femoral shaft fractures: a retrospective observational cohort in 33 patients

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### Abstract

**Background:** Despite advances in femoral shaft fracture fixation, the nonunion rate remains relatively high; and there is limited data on the efficacy and failure rate of specific implants. A novel cephalomedullary nail provides the ability to treat femur shaft fractures in isolation, with associated ipsilateral femur injuries, and provides various options for proximal and distal fixation exists on the market; but literature remains limited on the safety and efficacy of this implant. The aim of this study is to evaluate the early failure rate of this cephalomedullary nail, while comparing the nonunion rate to what is currently presented in the literature. This study is the first of its kind in evaluation of a specific implant for treatment of femoral shaft fractures and ipsilateral pathology.

**Methods:** Patients over 18 years of age, with traumatic femur shaft fractures, treated with this particular cephalomedullary nail and available for a minimum of 3-month follow-up were included for analysis. Data was collected by retrospective chart review and review of existing radiographs. Demographic data, injury details, AO/OTA fracture classification, and implant details were recorded for each patient. Primary outcome measured was implant failures (screw or nail breakage). Secondary outcomes measured included malunion, nonunion, deep infection, post-operative complications, and need for reoperation.

**Results:** Of the 33 patients included for analysis, 1 patient went on to non-union. There were no cases of implant failure. The single nonunion was a high-energy mechanism, open fracture, and higher level AO/OTA classification. The remaining 32 reached radiographic union at 3 months.

**Conclusion:** The nonunion rate of this novel cephalomedullary nail is comparable to what is reported in the literature. This nail is a safe and effective implant to treat femoral shaft fractures with a variety of ipsilateral femoral shaft injuries and reliably leads fracture union. Further studies are needed analyzing implant failure and comparing specific implants.

**Keywords:** Femur fracture; Femur shaft implant failure; Femur shaft nonunion; Intramedullary nail failure; META-TAN.

## Hypoalbuminemia and Obesity in Orthopaedic Trauma Patients: Body Mass Index a Significant Predictor of Surgical Site Complications

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### Abstract

The purpose of this investigation was to identify the prevalence of hypoalbuminemia and obesity in orthopaedic trauma patients with high-energy injuries and to investigate their impact on the incidence of surgical site complications. Patients 18 years of age and older undergoing intramedullary nail fixation of their femoral shaft fractures at a university-based level-1 trauma centre were assessed. Malnutrition was measured using serum markers (albumin <3.5 g/dL) as well as body mass index (BMI) as a marker of obesity (BMI > 30 kg/m<sup>2</sup>). The primary outcome measure was surgical wound complications. A total of 249 patients were included in this study. Ninety-eight patients (39.4%) presented with hypoalbuminaemia and 80 patients (32.1%) were obese. The overall incidence of wound complications in our study population was 9.65% (n = 25/259). A logistic regression model showed that non-obese patients (BMI < 30 kg/m<sup>2</sup>) were at significantly reduced risk for perioperative wound complications (Odds Ratio 0.400 [95% confidence interval 0.168, 0.954], p = 0.039). This study demonstrated a substantial prevalence of hypoalbuminemia and obesity among orthopaedic trauma patients with high-energy injuries. Obesity may increase the risk of surgical site complications. Future studies are required to further define malnutrition and its correlation with surgical site complications in orthopaedic trauma patients.

## Prevalence, injury-, and non-injury-related factors associated with anxiety and depression in polytrauma patients - A retrospective 20 year follow-up study

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### Abstract

**Introduction:** Survival rate after polytrauma increased over the past decades resulting in an increase of long-term complaints. These include physical and psychological impairments. The aim of this study was to describe the prevalence and risk factors for developing depression and anxiety more than twenty years after polytrauma.

**Methods:** We contacted patients who were treated due to a polytrauma between 1973 and 1990 at one level 1 trauma center after more than 20 years. These patients received a self-administered questionnaire, to assess symptoms of depression and anxiety. Analysis based on multivariable logistic regression models include injury severity and non-injury related factors to determine risk factors associated with the development of depression and anxiety.

**Results:** Patients included in this study (n = 337) had a mean ISS of 20.3 (4 to 50) points. In total, 173 (51.3%) showed psychiatric sequelae (depression n = 163, 48.2%; anxiety n = 14, 4.1%). Injury severity was not associated with the development of depression or anxiety. However, the patients, who required psychiatric therapy prior to the injury had higher risk of developing psychiatric symptoms (OR 1.3, 95%CI 1.1 to 1.8, p = 0.018) as did patients who suffered from additional psychiatric insults after the injury (OR 1.4, 95%CI 1.2 to 2.0, p = 0.049).

**Conclusion:** More than half of polytrauma patients developed psychiatric sequelae. Risk factors include mainly non-injury related factors such as psychiatric comorbidities and additional psychiatric insults after the injury.

## Effect of Prehabilitation in Older Adults Undergoing Total Joint Replacement: An Overview of Systematic Reviews

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### Abstract

**Purpose of review:** To review and discuss the findings of systematic reviews that synthesized the evidence on the effect of preoperative exercises (prehabilitation) on postoperative functional recovery in older adults undergoing total knee or hip joint replacement.

**Recent findings:** Ten systematic reviews (8 meta-analyses) were included in this review. Findings from the systematic reviews indicated that prehabilitation decreases length of hospital stay but does not improve postoperative functional recovery in older adults undergoing joint replacement. Individual studies in the systematic reviews varied considerably in prehabilitation protocol, assessment timepoints, and outcome measures. Most importantly, systematic reviews did not assess the outcomes pre-post prehabilitation as this timepoint was not addressed in most individual studies. Therefore, it is not known whether the prehabilitation programs improved outcomes preoperatively.

**Summary:** There is a need to develop comprehensive prehabilitation protocols and systematically assess the preoperative and postoperative effectiveness of prehabilitation protocols on functional outcomes (i.e., self-reported and performance-based) in older adults undergoing total joint replacement.

**Keywords:** osteoarthritis; physical function; prehabilitation; preoperative exercise; total hip replacement; total knee replacement.

## Skin closure with surgical staples in ankle fractures: a safe and reliable method

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### Abstract

**Purpose:** The purpose of this study is to examine the rates of surgical site complications of staple closure versus suture closure following open reduction and internal fixation of closed unstable ankle fractures.

**Methods:** Between 2014 and 2016, a total of 545 patients with closed ankle fractures were treated at our level-1 trauma centre by means of open reduction and internal fixation. A total of 360 patients matched the inclusion criteria and were included in the final analysis of this study. This included 119 patients undergoing wound closure using sutures and 241 patients using surgical staples. The demographics, clinical data, and injury characteristics were recorded. The primary outcome measure was the adverse event of any type of surgical site complication.

**Results:** The overall rate of patients with a surgical site complication was 15.6%. There was a trend towards a higher risk of surgical site complication in patients undergoing wound closure with sutures as compared with staples (20.2% versus 13.3%); however, this difference was not statistically significant ( $P = 0.0897$ ). The rate of superficial surgical site infection also trended higher in patients undergoing wound closure with sutures versus staples without demonstrating statistical significance (10.1% versus 5%,  $P = 0.0678$ ). The rate of deep surgical site infection was similar in both groups.

**Conclusion:** The use of metal staples remains controversial in the setting of orthopaedic surgery, particularly involving the foot and ankle. The current study supports that metal staples are a safe and reliable option in the closure of traumatic ankle fractures.

**Keywords:** Ankle fracture; Closure; Infection; Staples; Sutures.

## Fate of the Uninsured Ankle Fracture: Significant Delays in Treatment Result in an Increased Risk of Surgical Site Infection

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### Abstract

**Objective:** To examine the impact of insurance status on access to orthopaedic care and incidence of surgical site complications in patients with closed unstable ankle fractures.

**Design:** Retrospective chart review.

**Setting:** Certified Level-1 urban trauma center and county facility.

**Participants:** Four hundred eighty-nine patients with closed unstable ankle fractures undergoing open reduction and internal fixation between 2014 and 2016.

**Intervention:** Open reduction and internal fixation of unstable ankle fracture.

**Main outcome measures:** Time from injury to presentation, time from injury to surgery, rate of surgical site infections, and loss to follow-up.

**Results:** A total of 489 patients (70.5% uninsured vs. 29.5% insured) were enrolled. Uninsured patients were more likely to be present to an outside hospital first ( $P = 0.004$ ). Time from injury to presentation at our hospital was significantly longer in uninsured patients ( $4.5 \pm 7.6$  days vs.  $2.3 \pm 5.5$  days,  $P < 0.001$ ). Time from injury to surgery was significantly longer in uninsured patient ( $9.4 \pm 8.5$  days vs.  $7.3 \pm 9.1$  days,  $P < 0.001$ ). Uninsured patients were more likely to be lost to postoperative follow-up care ( $P = 0.002$ ). A logistic regression analysis demonstrated that delayed surgical timing was directly associated with an increased risk of postoperative surgical site infection ( $P = 0.002$ ).

**Conclusions:** Uninsured patients with ankle fractures requiring surgery experience significant barriers regarding access to health care. Delay of surgical management significantly increases the risk of surgical site infections in closed unstable ankle fractures.

**Level of evidence:** Prognostic Level III. See Instructions for Authors for a complete description of levels of evidence.

## Surgical Site Complications in Open Pronation-Abduction Ankle Fracture-Dislocations With Medial Tension Failure Wounds

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### Abstract

**Objectives:** To examine the incidence of surgical site complications associated with pronation-abduction ankle fracture-dislocations with an open medial tension wound.

**Design:** Retrospective case series.

**Setting:** Accredited Level-1 trauma center.

**Patients/participants:** Forty-eight open pronation-abduction ankle fracture-dislocations with medial tension failure wounds treated at our institution from 2014 to 2016.

**Intervention:** Immediate irrigation and debridement along with surgical stabilization of open ankle fracture-dislocation.

**Main outcome measures:** The primary outcome measure was deep surgical site infection. Secondary outcome measures included other surgical site complications and adverse radiographic events.

**Results:** A total of 5 patients (10.4%) developed a deep surgical site infection requiring additional surgical debridement. One of the patients with a deep surgical site infection required a below-knee amputation as a result of sepsis. Adverse radiographic outcomes included 3 fibular nonunions (6.3%), 3 implant failures related to syndesmotic fixations (6.3%), one periimplant fracture (2.1%), and postoperative collapse of the tibial plafond in 3 patients (6.3%).

**Conclusions:** Open pronation-abduction ankle fracture-dislocations with medial tension failure wounds remain a challenging and potentially devastating injury. Our study suggests that with appropriate surgical debridement, early stabilization, and primary wound closure, acceptable outcomes with a relatively low risk of surgical site complications can be achieved.

**Level of evidence:** Therapeutic Level IV. See Instructions for Authors for a complete description of levels of evidence.

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Martin CW, Ryan JC, Bullock TS, Cabot JH, Makhani AA, Griffin LP, Zelle BA. Surgical site complications in open pronation-abduction ankle fracture-dislocations with medial tension failure wounds. *J Orthop Trauma*. 2021 Dec 1;35(12): e481-e485.

## **An Analysis of Traumatic Ankle Fracture Patients: Does Income Status Influence Access to Acute Orthopaedic Surgical Care?**

*Travis S Bullock, Gautham Prabhakar, Case W Martin, John H Cabot, Farhan Ahmad, Luis M Salazar, Leah P Griffin, Gustavo J Almeida, Boris A Zelle*

### **Abstract**

**Purpose:** To evaluate if income status affects the timing of presentation to orthopaedic care, surgical treatment, or continuity of care following a closed ankle fracture.

**Methods:** This retrospective study identified 434 patients with closed ankle fractures treated with operative fixation from 2014 to 2016. Median income data were extracted using the patients' ZIP codes and data from the U.S. Census Bureau.

**Results:** Lower-income patients presented to the hospital and received surgical treatment significantly later than others. They were also more often uninsured and nonadherent with postoperative weightbearing precautions. Additionally, these patients less frequently sought care on the day of their injury, and they had both shorter inpatient stays and duration of overall follow-up in comparison with others.

**Conclusion:** Socioeconomic status is a vital consideration for improving patient access to acute orthopaedic surgical care. Lower-income patients are more susceptible to multiple time-sensitive delays in their care, and these patients frequently encounter difficulties maintaining appropriate follow-up care.

## Outpatient surgery in patients with ankle fractures minimises hospital admissions and utilisation of healthcare resources

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### Abstract

**Purpose:** The recent outbreak of the novel coronavirus (SARS-CoV-2) has emphasised the need to minimise hospital admissions and utilisation of healthcare resources. The purpose of this study was to examine the outcomes of an outpatient surgery protocol for acute closed ankle fractures.

**Methods:** In this retrospective study, 262 patients underwent outpatient surgery for their closed ankle fractures at our level-1 trauma centre. A total of 196 patients met our inclusion criteria and were ultimately included in the final analysis. Our primary outcomes' measures included post-operative admission to the emergency department within 30 days after surgery and unplanned hospital readmission within 30 days after surgery. Our secondary outcome measure included the incidence of surgical site infection (SSI) within 12 weeks after surgery.

**Results:** Thirty-two patients (16.3%) had an unplanned emergency department visit within 30 days of fracture fixation and two patients (1.0%) required hospital readmission within 30 days of their surgery. Sixteen patients (8.2%) developed SSI, which included 11 (5.6%) superficial and five (2.6%) deep infections.

**Conclusion:** Strategic outpatient management of acute closed ankle fractures is associated with acceptable rates of unplanned emergency department visits, hospital readmissions, and SSIs. In the context of the recent SARS-CoV-2 outbreak, outpatient management of these injuries may aide in the mitigation of nosocomial infections and the preservation of finite healthcare resources.

**Keywords:** Ankle fracture; COVID-19; Open reduction and internal fixation; Outpatient; SARS-CoV-2.

## Risk of Surgical Site Infections in OTA/AO Type C Tibial Plateau and Tibial Plafond Fractures: A Systematic Review and Meta-Analysis

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### Abstract

**Objectives:** To analyze the current incidence of postoperative infection for OTA/AO type C fractures of the tibial plateau and tibial plafond.

**Data sources:** Three medical databases: PubMed/MEDLINE, ScienceDirect, and the Cochrane Library, were used in our systematic literature search. Search results were restricted to articles transcribed in English/Spanish and publication date after January 1, 2000, to present day.

**Study selection:** Inclusion criteria were studies reporting postoperative infection data for OTA/AO type 41C, 43C, or equivalent fractures of skeletally mature individuals. A minimum of 6 total fractures of interest and a frequency of 75% overall were required. Studies reporting on pathologic fractures, stress fractures, or low-energy fracture types were excluded.

**Data extraction:** Two authors independently screened abstracts, evaluated full-text manuscripts, and extracted relevant data from included studies. Any instances of discrepancy were resolved within the study committee by consensus.

**Data synthesis:** Outcomes were expressed using direct proportions (PR) with a 95% confidence interval. The effects of comorbidities on infection rates were reported using odds ratios with a 95% confidence interval. All analyses used a DerSimonian-Laird estimate with a random-effects model based on heterogeneity. The presence of publication bias was evaluated using funnel plots and Egger's tests.

**Conclusions:** Patients with these specific fractures develop infections at a notable frequency. The rates of deep infections were approximately 6% in tibial plateau fractures and 9% in tibial plafond fractures. These results may be useful as a reference for patient counseling and other future studies aimed at minimizing postoperative infection for these injuries.

**Level of evidence:** Prognostic Level IV. See Instructions for Authors for a complete description of levels of evidence.

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Bullock TS, Ornell SS, Gutierrez-Naranjo JM, Morton-Gonzaba N, Ryan P, Petershack M, Salazar LM, Moreira A, Zelle BA. Risk of surgical site infections in OTA/AO type C tibial plateau and tibial plafond fractures: a systematic review and meta-analysis. J Orthop Trauma. 2022 Mar 1;36(3):111-117.

## Nutrition and Vitamin Deficiencies Are Common in Orthopaedic Trauma Patients

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### Abstract

Macro- and micronutrients play important roles in the biological wound-healing pathway. Although deficiencies may potentially affect orthopaedic trauma patient outcomes, data on nutritional deficiencies in orthopaedic trauma patients remain limited in the literature. The purpose of this study was to (1) evaluate the prevalence of macro- and micronutrient deficiencies in orthopaedic trauma patients with lower extremity fractures and (2) evaluate the impact of such deficiencies on surgical site complications. This retrospective study identified 867 patients with lower extremity fractures treated with surgical fixation from 2019 to 2020. Data recorded included albumin, prealbumin, protein, vitamins A/C/D, magnesium, phosphorus, transferrin and zinc, as well as wound complications. Nutritional deficiencies were found for prealbumin, albumin and transferrin at 50.5%, 23.4% and 48.5%, respectively. Furthermore, a high prevalence of micronutrient deficiencies (vitamin A, 35.4%; vitamin C, 54.4%; vitamin D, 75.4%; and zinc, 56.5%) was observed. We also recorded a statistically significant difference in wound complications in patients who were deficient in prealbumin (21.6% vs. 6.6%,  $p = 0.0142$ ) and vitamin C (56.8% vs. 28.6%,  $p = 0.0236$ ). Our study outlines the prevalence of nutritional deficiencies in an orthopaedic trauma population and identifies areas for possible targeted supplementation to decrease wound complications.

**Keywords:** lower extremity; nutrition wound healing; nutritional deficiencies; orthopaedic trauma; vitamins; wound complications.

## Healthcare disparities in adolescent idiopathic scoliosis: the impact of socioeconomic factors on Cobb angle

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### Abstract

**Study design:** Retrospective chart review.

**Objectives:** The aim of this study is to assess the role of insurance type, geographic socioeconomic status, and ethnicity in AIS disease severity in a state with mandated scoliosis screenings. Early detection of adolescent idiopathic scoliosis (AIS) is associated with reduced curve progression, surgical treatment, and long-term sequelae. Type of insurance, ethnicity, and socioeconomic status are important determinants in healthcare access.

**Methods:** Data were obtained for 561 AIS patients aged 10-18 years, living within a single county, and presenting to a single healthcare system for initial evaluation of AIS between 2010 and 2016 that met inclusion criteria. Demographic data including gender, age, self-reported ethnicity, insurance, and zip code were collected. Outcome measures included Cobb angle, curve severity, and referral delay. A single fellowship-trained pediatric orthopaedic surgeon calculated presenting Cobb angle for each case. Zip code was used as a proxy for household income level. Independent sample t tests, analysis of variance and covariance, and  $\chi^2$  analysis were used to determine the significant differences and correlations.

**Results:** Female patients ( $n = 326$ ,  $CA = 22.4^\circ$ ) had significantly greater Cobb angle measurements compared with male patients ( $n = 117$ ,  $CA = 18.1^\circ$ ). Patients with government-supported insurance had significantly higher Cobb angles ( $CA = 22.1^\circ$ ) than privately insured patients ( $CA = 19.2^\circ$ ) but were both classified within the "mild" range clinically, and are likely not clinically significant. There was no correlation between income level and Cobb angle. Referral delay and Cobb angle severity did not vary by age, income, or insurance. A  $\chi^2$  analysis showed no association between Cobb angle and race.

**Conclusions:** Cobb angle severity was not influenced by SES factors, including ethnicity and household income. Level of evidence: Level-II.

**Keywords:** AIS; Adolescent idiopathic scoliosis; Cobb angle; Healthcare disparities; Socioeconomic factors.

## Antegrade Elastic Intramedullary Nailing Insertion Technique Results in Higher Incidence of Symptomatic Implants in Pediatric Ulnar Fractures

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### Abstract

Retrograde and antegrade nailing techniques are the two options available to a surgeon when using elastic stable intramedullary nailing; however, the literature comparing these two nailing techniques is scarce. Thus, we conducted a retrospective review of all pediatric and adolescent ulnar fractures treated with elastic stable intramedullary nailing at our facility. We hypothesize that the clinical outcomes (implant and wound complications) and the time between surgery and radiographic union will be similar for both techniques.

**Methods:** A retrospective chart review of pediatric ulnar fracture patients treated at our facility was performed. Demographic and health information associated with the injury were collected, and the clinical outcomes of the two techniques were compared.

**Results:** A total of 53 patients with 54 fractures were included in this study. Antegrade nail insertion was used to treat 59.2% fractures. Radiographic union was achieved in all patients. Nail insertion technique was not associated with postoperative wound complications, time to radiographic union or implant removal, or significant deficits in upper extremity rotation ( $P > 0.05$ ). Antegrade nailing resulted in a symptomatic implantation 3.97 times more frequently than compared with retrograde nailing ( $P = 0.036$ ).

**Discussion:** Antegrade nailing demonstrates a similar healing profile but higher implant complications compared with the retrograde nailing technique in pediatric ulnar fractures.

## Does bracing for adolescent idiopathic scoliosis affect operative results?

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### Abstract

**Study Design:** Retrospective comparative study.

**Objectives:** We hypothesize that preoperative bracing for idiopathic scoliosis results in increased stiffness, as measured by reduced correction on bending films, ultimately leading to decreased surgical correction. Bracing is the primary nonoperative treatment for immature AIS patients with mild to moderate curves. For patients who fail bracing and proceed to operative intervention, it is unknown whether their nonoperative treatment impacts their surgical results.

**Methods:** We conducted a single-center, retrospective, comparative study on 181 consecutive adolescent idiopathic scoliosis patients, aged 11-17 years, who underwent posterior spine fusion between 2011 and 2013. Patient flexibility was measured as percent change in the curve angle of the spine from standing to supine bend. Overall curve correction was calculated as the preoperative to postoperative change in standing coronal measure divided by the preoperative measurement and reported as a percentage.

**Results:** One hundred and twelve subjects (62%) underwent bracing prior to fusion. Braced patients had similar preoperative major Cobb angles than unbraced patients (56.5 vs 59.0,  $p = 0.07$ ). Preoperatively, braced patients achieved less primary curve correction in bending films (33.6%) than unbraced patients (40.6%,  $p = 0.003$ ). Postoperatively, Cobb angle correction was not different between the braced (75.7%) and unbraced group (77.2%) overall ( $p = 0.41$ ). There was no difference in blood loss ( $p = 0.14$ ) or surgical time ( $p = 0.96$ ) between braced and unbraced groups when adjusted for surgeon and number of levels fused.

**Conclusions:** While braced patients may demonstrate less preoperative flexibility, there is no evidence that braced patients experience decreased curve correction compared to unbraced patients. Bracing treatment did not impact operative results, as indicated by similar Cobb angle correction, estimated blood loss, and surgical time in both groups.

**Level of evidence:** III.

**Keywords:** Adolescent; Adolescent idiopathic scoliosis; Bracing; Posterior spine fusion; Scoliosis.

## Inequalities in Pediatric Fracture Care Timeline Based on Insurance Type

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### Abstract

**Introduction:** Socioeconomic and insurance status are often linked with limited access to health care. Despite several government-funded projects aimed at curtailing these barriers, pediatric orthopaedic patients continue to experience delays in receiving timely care for fracture treatments. This delay has been well-identified within the orthopaedic literature but, to our knowledge, has never been characterized based on timeline. Thus, the goal of this study is to evaluate the role of ethnicity, socioeconomic status, and insurance type on the timeline of pediatric patients to obtain orthopaedic care within our community.

**Methods:** Pediatric patients presenting to our clinic for the treatment of one of 21 most common fractures were included. Patient demographics and the timeline of patient care were collected by retrospective chart review.

**Results:** Government-funded insurance accounted for 60.6% of the 413 patients. These patients experienced significant ( $P < 0.001$ ) delays in access to care when compared with commercial insurance patients; the time between injury and referral as well as the overall time from injury to orthopaedic evaluation was 2.8 and twofold greater at 4.4 days and 9.2 days, respectively. A strong correlation was established between income levels and insurance type.

**Discussion:** Pediatric patients with a lower socioeconomic status are more likely to rely on government-funded insurance and experience delays in fracture evaluation.

## Evaluating Trends and Outcomes of Spinal Deformity Surgery in Cerebral Palsy Patients

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### Abstract

**Background:** There is a paucity of literature examining surgical trends and outcomes in both child and adult cerebral palsy (CP) patients. We aimed to evaluate surgical trends, complications, length of stay, and charges for spinal deformity surgery in CP patients.

**Methods:** Using the Nationwide Inpatient Sample (NIS) from 2001 to 2013, patients with CP scoliosis who underwent spinal fusion surgery were identified. Patient characteristics and comorbidities were recorded. Trends in spinal fusion approaches were grouped as anterior (ASF), posterior (PSF), or combined anterior-posterior (ASF/PSF). Complication rates, length of stay, and charges for each approach were analyzed. Bivariate analyses using adjusted Wald tests and multivariate analyses using linear (logarithmic transformation) and logistic regressions were performed.

**Results:** Of the 5191 adult CP patients who underwent spinal fusion the majority underwent PSF (86.5%), followed by the ASF/PSF approach (9.3%). The rate of PSF for cerebral palsy patients with spinal deformity increased significantly per 1 million people in the US population (0.90 to 1.30;  $P = .048$ ). Complication rate, hospital length of stay, and charges were higher for patients undergoing ASF/PSF ( $P < .05$ ). The overall complication rate for all surgical approaches was 25.7%. Patient comorbidities and combined ASF/PSF increased the odds of complication. Combined ASF/PSF was also associated with an increased length of stay and charges.

**Conclusion:** Combined ASF/PSF in patients with CP accounted for only 9.3% of surgical cases but was associated with the longest hospital stay, highest charges, and increased complications. Further scrutiny of the surgical indications and preoperative risk stratification should be undertaken to minimize complications, reduce length of stay, and decrease charges for CP patients undergoing spinal fusion.

**Level of evidence:** IV.

**Keywords:** Nationwide Inpatient Sample (NIS); cerebral palsy; complications; hospital charges; length of stay; spinal deformity; trends.

## The Variability of Pelvic Obliquity Measurements in Patients with Neuromuscular Scoliosis

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### Abstract

Pelvic obliquity (PO), or pelvic alignment in the coronal plane, is an important radiographic parameter to indicate fusion levels and judge success of scoliosis correction in patients with neuromuscular scoliosis. There are multiple commonly used techniques to measure PO that have good to excellent interrater and intrarater reliability, but these different methods yield inconsistent values when used on the same radiograph. This study evaluates the inconsistency in the magnitude of PO measurements for patients with neuromuscular scoliosis among 5 common measurement techniques.

**Methods:** Radiographs of 63 patients with neuromuscular scoliosis were evaluated by 5 raters. Each rater measured PO on each radiograph using the Osebold, O'Brien, Allen and Ferguson, Lindseth, and Maloney techniques. Patients were divided into 2 cohorts based on coronal balance or imbalance. Interrater and intrarater analyses were performed using a 2-way random effects model to calculate absolute agreement. The mean difference in PO between all possible pairs of the techniques was compared using a 2-tailed t test. Results: The Maloney and Osebold techniques demonstrated excellent interrater reliability, and the Maloney, Osebold, and O'Brien techniques demonstrated excellent intrarater reliability. Significant differences in PO measurement were found in 6 of the 10 comparisons for the balanced spines and 8 of the 10 comparisons for the unbalanced spines. Variability in measurement was captured by best-fit lines, which demonstrated greater dispersion between the means for the Osebold and Maloney techniques in the unbalanced spines than in the balanced spines. Conclusions: To our knowledge, this study is the first to evaluate mean differences in magnitude of PO among common measurement techniques while accounting for coronal imbalance. Although there is no gold standard for measuring PO, the Maloney and Osebold techniques are the most consistent. This study suggests that those 2 techniques can be used interchangeably when the spine is coronally balanced, but the Osebold technique becomes more inconsistent than the Maloney technique when coronal imbalance exceeds 2 cm. Clinical relevance: This information is relevant to surgeons using PO to plan fusion levels and striving for objective ways to judge correction intraoperatively as well as for researchers compiling PO data from multiple centers or studies.

## Musculoskeletal and Sports Medicine Curriculum Guidelines for Pediatric Residents

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### Abstract

Musculoskeletal (MSK) and sports-related conditions are relatively common in the pediatric population. Pediatric residencies should provide residents with the knowledge and skills to assess and manage both acute and chronic MSK and sports injuries and complaints. Residents should develop the competencies and attitudes to safeguard and promote a healthy and active lifestyle for youth. Programs can use a variety of educational tools, both in the clinic and on the field, to provide a well-rounded MSK curriculum throughout the residency years. This article provides a review of general pediatric sports medicine curriculum guidelines and suggested implementation strategies.

## Marijuana Use Results in Increased Time to Union in Surgically Treated Pediatric Fracture Patients

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### Abstract

**Objective:** To identify the impact of marijuana use on fracture healing in surgically treated pediatric patients.

**Design:** Retrospective review.

**Setting:** Level 1 trauma center, single-center study.

**Patients/participants:** Surgically treated pediatric patients 10-18 years with extremity fractures from 2010 to 2020. Conservatively treated patients and patients with nonunions were excluded from the study. Three hundred thirty-nine patients were included in the study, 21 of which were confirmed marijuana users by toxicology screening.

**Intervention:** Surgical treatment of extremity fractures by any type of fixation.

**Main outcome measurements:** Time to union was the primary outcome and was defined as radiographic evidence of bridging callus on all sides of the fracture and absence of the previous fracture line. Analysis of covariance, logistic regression analysis, and Fisher exact tests were used to establish the relationship between all collected variables and time to radiographic union.

**Results:** The average time to union for marijuana users ( $159.1 \pm 69.5$  days, 95% confidence interval) was significantly longer than for nonusers ( $80.3 \pm 7.8$  days),  $P < 0.001$ . The odds of having a time to union of greater than 4 months and greater than 6 months were 4.17 ( $P = 0.00192$ ) and 6.19 ( $P = 0.000159$ ), respectively, for marijuana users compared with nonusers.

**Conclusion:** Marijuana users demonstrated longer time to union in surgically treated pediatric fracture patients.

**Level of evidence:** Prognostic Level III. See Instructions for Authors for a complete description of levels of evidence.

## The impact of segmental spinal alignment on the development of proximal junctional kyphosis after instrumented posterior spinal fusions for idiopathic scoliosis

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### Abstract

**Purpose:** To assess if the preservation of preoperative kyphosis within the cephalad two motion segments of instrumented posterior spinal fusions (PSF), for idiopathic scoliosis (IS), would be associated with lower frequency of proximal junctional kyphosis (PJK) at 2 years postoperatively. Previous studies on PJK in IS have reported conflicting findings; none has evaluated the relationship between segmental kyphosis within the cephalad instrumented construct and PJK.

**Methods:** One hundred consecutive patients undergoing PSF for IS by a single surgeon with minimum 2-year follow-up were evaluated. Radiographic evaluation focused on sagittal alignment of the upper instrumented vertebrae (UIV), the 1 and 2 vertebrae cephalad (UIV + 1, UIV + 2) and caudal (UIV - 1, UIV - 2). This was measured between the inferior endplate of the UIV and the superior endplate of the UIV + 1 and UIV + 2 or between the superior endplate of the UIV and the inferior endplate of the UIV - 1 and UIV - 2. PJK was defined as present if the final UIV + 2  $\geq 10^\circ$  and final UIV + 2-preop UIV + 2  $\geq 10^\circ$ .

**Results:** There were 78 females and 22 males whose mean age was 14.6 ( $\pm 2.1$ ) years at surgery; mean follow-up was 3.9 (2-9.3) years. The overall frequency of PJK was 25% (25/100) at final follow-up. Preoperative mean coronal curve measured  $63^\circ$  ( $40^\circ$ - $107^\circ$ ) with a mean 66% correction at final follow-up. UIV was T2 (n = 15), T3 (n = 47) or T4 (n = 38). More caudal UIVs were associated with PJK development (p = 0.04): T2 (13%), T3 (21%) and T4 (34%). Greater preoperative T5-T12 thoracic kyphosis and UIV - 2, and lower major curve apex (below T12) were more likely to develop PJK (p = 0.019, p = 0.004 and p = 0.007, respectively). Post-operatively, larger values for UIV - 1 (p  $\leq 0.001$ ) and UIV - 2 (p = 0.002) were associated with PJK at final follow-up. Longer fusion lengths (10-13 vs. 6-9 segments, p = 0.02) and the presence of thoracolumbar/lumbar structural curves (Lenke 3-6 vs. 1-2, p = 0.032) had higher rates of PJK (32% vs 10% and 37% vs 18%, respectively). Changes in UIV - 1 and UIV - 2 (preoperatively to immediately post-op) did not influence the development of PJK. At final follow-up, no patient required revision surgery for symptomatic proximal junctional kyphosis.

**Conclusions:** In this study, changes in UIV - 1 and UIV - 2 at surgery were not related to PJK. Greater preoperative T5-T12 thoracic kyphosis and UIV - 2, lower major curve apex (T12 and below), and greater post-operative UIV - 1 and UIV - 2 were associated with higher frequencies of PJK. Higher UIV (T2 vs. T4) and LIV levels had a protective effect against PJK. Based on this study, the preservation of segmental kyphosis within the instrumented cephalad two levels of the PSF did not minimize the occurrence of radiographic PJK.

**Level of evidence:** Level IV.

**Keywords:** Idiopathic scoliosis; Posterior spinal fusion; Proximal junctional kyphosis; Sagittal spinal alignment.

Luhmann SJ, Roth J, DeFreitas D, McCormick S. The impact of segmental spinal alignment on the development of proximal junctional kyphosis after instrumented posterior spinal fusions for idiopathic scoliosis. *Spine Deform.* 2021 Sep 3.

## Variability in evaluation and treatment of tibial tubercle fractures among pediatric orthopaedic surgeons

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### Abstract

The purpose of this study was to determine the variability in clinical management of tibial tubercle fractures among a group of pediatric orthopaedic surgeons. Nine fellowship-trained academic pediatric orthopaedic surgeons reviewed 51 anteroposterior and lateral knee radiographs with associated case age. Respondents were asked to describe each fracture using the Ogden classification (type 1-5 with A/B modifiers), desired radiographic workup, operative vs. nonoperative treatment strategy and plans for post-treatment follow-up. Fair agreement was reached when classifying the fracture type using the Ogden classification ( $k = 0.39$ ;  $P < 0.001$ ). Overall, surgeons had a moderate agreement on whether to treat the fractures operatively vs. nonoperatively ( $k = 0.51$ ;  $P < 0.001$ ). Nonoperative management was selected for 80.4% (45/56) of type 1A fractures. Respondents selected operative treatment for 75% (30/40) of type 1B, 58.3% (14/24) of type 2A, 97.4% (74/76) of type 2B, 90.7% (39/43) of type 3A, 96.3% (79/82) of type 3B, 71.9% (87/121) of type 4 and 94.1% (16/17) of type 5 fractures. Regarding operative treatment, fair/slight agreement was reached when selecting the specifics of operative treatment including surgical fixation technique ( $k = 0.25$ ;  $P < 0.001$ ), screw type ( $k = 0.26$ ;  $P < 0.001$ ), screw size ( $k = 0.08$ ;  $P < 0.001$ ), use of washers ( $k = 0.21$ ;  $P < 0.001$ ) and performing a prophylactic anterior compartment fasciotomy ( $k = 0.20$ ;  $P < 0.001$ ). Furthermore, surgeons had fair/moderate agreement regarding the specifics of nonoperative treatment including degree of knee extension during immobilization ( $k = 0.46$ ;  $P < 0.001$ ), length of immobilization ( $k = 0.34$ ;  $P < 0.001$ ), post-treatment weight bearing status ( $k = 0.30$ ;  $P < 0.001$ ) and post-treatment rehabilitation ( $k = 0.34$ ;  $P < 0.001$ ). Significant variability exists between surgeons when evaluating and treating pediatric tibial tubercle fractures.

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## Surgery for the diabetic foot: A key component of care

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### Abstract

Surgery for acute and chronic diabetic foot problems has long been an integral component of care. While partial foot amputations remain as important diabetic limb-salvaging operations, foot-sparing reconstructive procedures have become equally important strategies to preserve the functional anatomy of the foot while addressing infection, chronic deformities, and ulcerations. A classification of types of diabetic foot surgery is discussed in accordance with the soft tissue status and acuity of the presenting foot problem. This brief overview from the Association for Diabetic Foot Surgeons describes common conditions best treated by surgical interventions, as well as specific indications. While techniques and indications continue to evolve, effective surgical management of the diabetic foot remains an integral component of care as well as for the prevention of recurrent ulceration.

**Keywords:** Charcot; diabetic foot; infection; surgery; ulcers.

## Modification of the abductor digiti minimi muscle flap for soft tissue coverage of the diabetic foot

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### Abstract

The local intrinsic abductor digiti minimi muscle flap is ideal for lateral, plantar lateral traumatic or diabetic foot wounds following adequate surgical debridement to eradicate any soft tissue and/or osseous infection. Although the indications and surgical technique have been well-described in the literature, the authors present a unique modification of tunnelling the harvested muscle flap directly from the donor site to the plantar recipient foot wound by maintaining the intact overlying skin island at the surface of the fifth metatarsal base. This modification allows preservation of the patient's skin integrity in this area, thereby minimising potential morbidity at the major pedicle site. After the harvested muscle is tunnelled through the intact skin island, an adjacent local random flap mobilisation, autogenous or allogeneic skin graft can then be used for coverage over the muscle inset if primary wound closure is not feasible. Simultaneous soft tissue or osseous surgical procedures and/or surgical offloading with external fixation at the time of index surgery may be necessary to achieve optimal outcomes. The authors present a modified surgical technique for the abductor digiti minimi muscle flap that can be performed in the surgical reconstruction of a soft tissue wound in patients with diabetic Charcot neuroarthropathy.

**Keywords:** abductor digiti minimi; diabetic Charcot neuroarthropathy; foot osteomyelitis; muscle flap; plastic surgery.

## Surgical treatment of midfoot Charcot neuroarthropathy with osteomyelitis in patients with diabetes: a systematic review

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### Abstract

**Objective:** A wide range of clinical presentations of Charcot neuroarthropathy of the foot with concomitant osteomyelitis in patients with diabetes has been described. Existing literature provides an equally diverse list of treatment options. The purpose of this systematic review was to assess the outcomes specifically for the surgical management of midfoot Charcot neuroarthropathy with osteomyelitis in patients with diabetes. **Methods:** A systematic review was conducted by three independent reviewers using the following databases and search engines: Cumulative Index of Nursing and Allied Health Literature (CINAHL), Cochrane Library, EMBASE (Excerpta Medica dataBASE), Google Scholar, Ovid, PubMed and Scopus. Search terms used were: Charcot neuroarthropathy, osteoarthropathy, neuro-osteoarthropathy, neurogenic arthropathy, osteomyelitis, midfoot, foot, ankle, diabetes mellitus, ulceration, wound, infection, surgical offloading, diabetic reconstruction, internal fixation, external fixation. Studies meeting the following criteria were included: English language studies, studies published from 1997-2017, patients with diabetes mellitus surgically treated for Charcot neuroarthropathy of the midfoot (specified location) with concomitant osteomyelitis, with or without internal and/or external fixation, follow-up period of six months or more postoperatively, documentation of healing rates, complications, and need for revisional surgery. Studies which were entirely literature reviews, descriptions of surgical-only technique and/or cadaveric studies, patients without diabetes, studies that did not specify location of osteomyelitis and Charcot neuroarthropathy, and treatment proximal to and including Chopart's/midtarsal joint specifically talonavicular, calcaneocuboid, subtalar, ankle were excluded. **Results:** A total of 13 selected studies, with a total of 114 patients with diabetes of which 56 had surgical treatment for midfoot Charcot neuroarthropathy with osteomyelitis, met the above inclusion criteria and were used for data extraction. **Conclusion:** Surgical intervention for midfoot Charcot neuroarthropathy with osteomyelitis in patients with diabetes demonstrated a relatively high success rate for a range of procedures including debridement with simple exostectomy, arthrodesis with or without internal or external fixation, and advanced soft tissue reconstruction. However, this systematic review emphasises the need for larger, better designed studies to investigate the efficacy and failure rates of surgical treatment in this group of patients.

**Keywords:** Charcot neuroarthropathy; diabetes; fixation; foot; infection; osteomyelitis; peripheral neuropathy.

## Surgical treatment of midfoot Charcot neuroarthropathy with osteomyelitis in patients with diabetes: a systematic review

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### Abstract

**Objective:** A wide range of clinical presentations of Charcot neuroarthropathy of the foot with concomitant osteomyelitis in patients with diabetes has been described. Existing literature provides an equally diverse list of treatment options. The purpose of this systematic review was to assess the outcomes specifically for the surgical management of midfoot Charcot neuroarthropathy with osteomyelitis in patients with diabetes. **Methods:** A systematic review was conducted by three independent reviewers using the following databases and search engines: Cumulative Index of Nursing and Allied Health Literature (CINAHL), Cochrane Library, EMBASE (Excerpta Medica dataBASE), Google Scholar, Ovid, PubMed and Scopus. Search terms used were: Charcot neuroarthropathy, osteoarthropathy, neuro-osteoarthropathy, neurogenic arthropathy, osteomyelitis, midfoot, foot, ankle, diabetes mellitus, ulceration, wound, infection, surgical offloading, diabetic reconstruction, internal fixation, external fixation. Studies meeting the following criteria were included: English language studies, studies published from 1997-2017, patients with diabetes mellitus surgically treated for Charcot neuroarthropathy of the midfoot (specified location) with concomitant osteomyelitis, with or without internal and/or external fixation, follow-up period of six months or more postoperatively, documentation of healing rates, complications, and need for revisional surgery. Studies which were entirely literature reviews, descriptions of surgical-only technique and/or cadaveric studies, patients without diabetes, studies that did not specify location of osteomyelitis and Charcot neuroarthropathy, and treatment proximal to and including Chopart's/midtarsal joint specifically talonavicular, calcaneocuboid, subtalar, ankle were excluded. **Results:** A total of 13 selected studies, with a total of 114 patients with diabetes of which 56 had surgical treatment for midfoot Charcot neuroarthropathy with osteomyelitis, met the above inclusion criteria and were used for data extraction. **Conclusion:** Surgical intervention for midfoot Charcot neuroarthropathy with osteomyelitis in patients with diabetes demonstrated a relatively high success rate for a range of procedures including debridement with simple exostectomy, arthrodesis with or without internal or external fixation, and advanced soft tissue reconstruction. However, this systematic review emphasises the need for larger, better designed studies to investigate the efficacy and failure rates of surgical treatment in this group of patients.

**Keywords:** Charcot neuroarthropathy; diabetes; fixation; foot; infection; osteomyelitis; peripheral neuropathy.

## **The Significance of the Global Vascular Guidelines for Podiatrists: Answers to Key Questions in the Diagnosis and Management of the Threatened Limb**

*Lee C Rogers, Michael S Conte, David G Armstrong, Lawrence A Lavery, Joseph L Mills, Richard F Neville*

### **Abstract**

The publication of the Global Vascular Guidelines in 2019 provide evidence-based, best practice recommendations on the diagnosis and treatment of chronic limb-threatening ischemia (CLTI). Certainly, the multidisciplinary team, and more specifically one with collaborating podiatrists and vascular specialists, has been shown to be highly effective at improving the outcomes of limbs at risk for amputation. This article uses the Guidelines to answer key questions for podiatrists who are caring for the patient with CLTI.

## **The Unique Bipolar Clavicle Dislocation: A Novel Reconstruction Technique and Case Report**

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### **Abstract**

A bipolar clavicle separation is defined as a simultaneous dislocation of the ipsilateral sternoclavicular joint (SCJ) and acromioclavicular joint (ACJ). This rare injury pattern is usually the result of a high-energy mechanism, such as a motor vehicle collision or fall from height. While there are several treatment options such as screw fixation, sutures, or plate fixations, there is no single standard approach for this infrequent injury. We describe a unique case of bipolar clavicle dislocation, specifically an anteriorly displaced SCJ and posteriorly displaced ACJ, treated with a novel surgical technique-a TightRope technique (Arthex®) and semitendinosus allograft.

## Management of humeral nonunions following failed surgical fixation

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### Abstract

**Introduction:** Management of humerus nonunions with previously failed fixation presents a complex problem. There are multiple revision fixation strategies, of which compression plating is a mainstay. The aim of this study was to assess the results of open reduction and direct compression plating without the need for autograft or allograft in the setting of revision humerus open reduction internal fixation.

**Methods:** This study is a retrospective analysis of 19 patients treated between 2008 and 2017 for humerus nonunions following failed fixation who were treated by a single surgeon using direct compression plating with bone graft substitutes. Patients were treated with neurolysis of the radial nerve, hardware removal, debridement of the nonunion site with shortening osteotomies, compression plating, and augmentation with bone graft substitutes. All patients were followed until radiographic and clinical union.

**Results:** Nineteen patients were identified for the study and 17 had adequate follow-up for final analysis. Humeral union was achieved in 16/17 (94.1%) patients with a mean time to union of 23 weeks. Two patients required a repeat compression plating with bone graft substitute to achieve union. The one patient with a nonunion radiographically reported minimal clinical symptoms and opted for no revision surgery. An association with the index procedure was seen, as three out of four of the patients who experienced radial nerve palsies after their index procedure subsequently experienced a radial nerve palsy after the procedure to repair their nonunion. All patient's all experienced a return of function in their radial nerve either back to baseline or improved from before the revision nonunion surgery.

**Conclusion:** The use of humeral shortening osteotomy and compression plating without autograft or allograft is a viable option for management of humeral nonunions which avoids the morbidity associated with autograft harvest. The patients with radial nerve palsy after the index procedure are likely to have a transient radial nerve palsy as well after the revision surgery necessitating proper informed consent prior to the operation.

**Keywords:** Autograft; Bone graft substitute; Compression plating; Humerus; Nonunion.

## Distal Biceps Tendon Repair and Reconstruction

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### Abstract

Distal biceps tendon ruptures can result in functionally significant loss of supination and flexion strength, as well as decreased resistance to fatigue. Although the diagnosis of distal biceps tendon ruptures remains straightforward, substantial debate continues with regards to surgical indications, pertinent surgical anatomy, single- versus double-incision surgical technique, and fixation options. This review discusses the latest evidence-based literature regarding distal biceps tendon repair/reconstruction including types of tears, demographics, clues for diagnosis, surgical indications, anatomy with special attention to how the distal tendon inserts distally and the relevant tuberosity anatomy (height and cam effect), common reconstruction techniques (single- vs double-incision and single-incision power optimizing cost-effective technique), fixation techniques (bone tunnels, distal biceps button, interference screw, button plus screw), surgical technique pearls, postoperative rehabilitation, postoperative outcomes, as well as the treatment of chronic tears with special reconstruction techniques including Achilles allograft, pedicled latissimus transfer, and the use of a free innervated gracilis.

**Keywords:** Biceps; distal biceps; gracilis; latissimus.

## Early outcomes of magnetic intramedullary compression nailing for humeral fractures

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### Abstract

**Purpose:** The optimal treatment protocol for humeral shaft fractures at risk for nonunions is controversial. Here, we aim to describe magnetic intramedullary compression nailing as an option for these challenging scenarios and to evaluate its clinical and radiographic outcomes.

**Methods:** This retrospective case series was performed at an urban university-based level-1 trauma center. Patients aged 18-65 who underwent fixation of their at-risk humerus shaft fracture using the PRECICE nail were included in this investigation. These fractures are characterized by a persistent distraction gap, minimal callous formation, or malalignment greater than 20 degrees. The study data were collected through a retrospective chart review and review of the radiographic studies. Primary outcome measure was radiographic union. Secondary outcome measures included mechanical failure, nonunion, malunion, medical, and surgical complications. Functional outcome was determined by range of motion and restoration of rotator cuff strength.

**Results:** A total of six patients were included who underwent treatment of their humeral shaft fracture with a NuVasive PRECICE nail after failure of conservative management. After nail placement along with our compression protocol, all patients achieved bony union and experienced favorable outcomes with return to their previous working status. Two complications included a superficial incisional infection treated with antibiotics and a backing out of proximal screw which did not cause discomfort. No other mechanical failures, surgical complications, or medical complications occurred.

**Conclusions:** Early results of controlled compression nailing for humeral shaft fracture demonstrated favorable clinical outcomes. This technique may be utilized for these challenging situations.

**Keywords:** Humeral shaft fractures; Nonunion; PRECICE nail.

## ***Parvimonas micra* causing native hip joint septic arthritis**

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### **Abstract**

*Parvimonas micra* is a bacterium normal to oral and gastrointestinal flora that has been implicated in cases of discitis, osteomyelitis, and prosthetic joint infections, often involving dental procedures or periodontal disease. It is an extremely rare cause of infection outside of these circumstances. We describe a case of septic arthritis of the native hip joint due to *P. micra*.

**Keywords:** Hip; *Micromonas*; *Parvimonas micra*; *Peptostreptococcus*; native; septic arthritis; septic joint.

## The Clinical Manifestations of Femoral-Facial Syndrome in an Orthopaedic Patient

*Abdullah Ghali<sup>1</sup>, Luis Salazar<sup>1</sup>, David Momtaz<sup>1</sup>, Gautham Prabhakar<sup>1</sup>, Preston Richier<sup>1</sup>, Anil Dutta<sup>1</sup>*

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### Abstract

Femoral-facial syndrome (FFS) is an exceedingly rare congenital disorder of unknown etiology related to maternal diabetes during pregnancy. It is characterized by variations of bilateral femoral hypoplasia and facial anomalies. We discuss an interesting case of a 3-year-old girl with FFS with an extensive surgical history who presented to a pediatric orthopaedic clinic with ankle pains and absent femurs. As this disease process is not frequently encountered, it is imperative for the practicing clinician to be aware of the various presentations. In this study, we discuss the different orthopaedic presentations in the literature and discuss various management recommendations.

## Results of pre-contoured titanium anterior plating of midshaft clavicle fractures

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### Abstract

**Background:** Plating midshaft clavicle fractures anteriorly is gaining popularity because of low complication rates. Improvements in plate fixation constructs for midshaft clavicle fractures have unclear clinical significance. The purpose of this study was to present the early clinical and radiographic outcomes of pre-contoured titanium anterior plates for the treatment of midshaft clavicle fractures.

**Methods:** Skeletally mature patients who underwent plate fixation of a midshaft clavicular fracture from 2008 to 2015 using pre-contoured titanium anterior plates were included in this retrospective investigation. The primary outcome measures were union rate and hardware removal rate. The secondary outcome measures included reoperation for all causes and mechanical implant failure.

**Results:** A total of 26 patients were included. Complete healing occurred in 96% of patients without further surgical intervention, and all patients achieved union. Medical complications occurred in 2 patients (7.7%), consisting of cellulitis (n = 1) and chronic pain (n = 1). In 1 patient (3.8%), delayed union occurred and the use of a bone stimulator was required postoperatively to achieve union. Finally, 2 patients (7.7%) had symptomatic implants that required removal.

**Conclusions:** In the acute fracture setting, the anterior plating system used in this study led to a high rate of union with decreased rates of implant irritation. Only 7.7% of patients required hardware removal for symptomatic hardware, as opposed to the estimated 20%-60% reported in the literature in patients with symptomatic superior clavicle plates.

**Keywords:** Clavicle; anterior plating; complications; fractures; hardware failure; hardware retention; pre-contoured titanium plate; superior plating.

## Ultrasonic Percutaneous Tenotomy for Recalcitrant Lateral Elbow Tendinopathy: Clinical and Sonographic Results at 90 Months

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### Abstract

**Background:** In a study from our institution, ultrasonic percutaneous tenotomy of the brevis and the common extensor tendon for recalcitrant lateral elbow tendinopathy showed excellent safety profiles, high tolerability, efficiency, sustained pain relief, functional improvement, and sonographic evidence of tissue healing in 20 patients at 3 years' follow-up.

**Purpose:** To explore the long-term clinical and sonographic results of ultrasonic percutaneous tenotomy of the brevis and the common extensor tendon.

**Study design:** Case series; Level of evidence, 4.

**Methods:** The same cohort of 20 patients was recalled after 7 years, and visual analog scale (VAS) for pain and Disabilities of the Arm, Shoulder and Hand (DASH) scores, need for secondary intervention, and overall satisfaction were assessed. They were also reassessed using ultrasound imaging of the brevis and the common extensor tendon to evaluate tendon hypervascularity, tendon thickness, and the progress or the recurrence of the hypoechoic scar tissue.

**Results:** We successfully scored 19 patients and performed ultrasound on 16 patients with a median follow-up of 90 months (range, 86-102 months). There were no adverse outcomes and satisfaction remained at 100% (6 patients, satisfied; 13 patients, very satisfied). No patient developed a recurrence of symptoms and signs of lateral elbow tendinopathy, and therefore no secondary intervention was required. The improvement from baseline and early term scores was sustained ( $P < .001$  for all). At 90 months, there was a significant improvement in VAS scores and DASH-Compulsory scores compared with preprocedure scores and all follow-up times until 3 months. There was no difference in VAS scores and DASH-Compulsory scores at 90 months compared with 6 and 36 months. For DASH-Work scores, there was a significant improvement at 90 months compared with preprocedure scores, but there was no difference between DASH-Work scores at 90 months and scores at all other points of follow-up. At 90 months, hypervascularity remained resolved in 79% of patients, while all patients had reduced tendon swelling and sustained resolution or reduction of the hypoechoic lesion.

**Conclusion:** At the long-term follow-up of 90 months, ultrasonic percutaneous tenotomy of the brevis and the common extensor tendon, previously shown to enhance recovery of lateral elbow tendinopathy, demonstrated good durability of pain relief and functional recovery that was previously achieved. This was accompanied by sustained sonographic tissue healing with no significant deterioration.

**Keywords:** lateral epicondylitis; minimally invasive; recalcitrant tendinopathy; tennis elbow; ultrasonic percutaneous tenotomy.

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Ang BFH, Mohan PC, Png MA, Allen JC Jr, Howe TS, Koh JSB, Lee BP, Morrey BF. Ultrasonic Percutaneous Tenotomy for Recalcitrant Lateral Elbow Tendinopathy: Clinical and Sonographic Results at 90 Months. *Am J Sports Med.* 2021 Jun;49(7):1854-1860.

## **An Unusual Terrible Triad Variant Associated with an Essex-Lopresti Injury**

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### **Abstract**

Essex-Lopresti injuries and terrible triad injuries of the elbow are rare injuries that typically result from high-energy trauma such as falling from a height or a motor vehicle collision. However, the combination of an Essex-Lopresti injury and terrible triad injury is unique and poses a significant challenge for treatment as these injuries are independently associated with poor functional outcomes if they are not acutely diagnosed. We describe a case of a 19-year-old who presented with an unusual variant of a terrible triad injury associated with an Essex-Lopresti injury. The patient had a distal radioulnar joint (DRUJ) and elbow dislocation, a radial head and coronoid process fracture, and a distal radius fracture. Almost a reverse Essex-Lopresti, this injury was successfully managed with open reduction and repair of the distal radius, radial head, and damaged ligaments in the elbow, along with an internal joint stabilizer (IJS).

## Dual-energy estimates of volumetric bone mineral densities in the lumbar spine using quantitative computed tomography better correlate with fracture properties when compared to single-energy BMD outcomes

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### Abstract

It is estimated that over 200 million people worldwide are affected by osteoporosis. Vertebral fracture risk prediction using dual energy x-ray absorptiometry (DXA) is confounded by limitations of the technology, such as 2D measurements of bone mineral density (BMD), inability to measure bone distribution and heterogeneity, and potential overestimations of BMD due to degenerative diseases. To overcome these shortcomings, single energy (SE) quantitative computed tomography (QCT) imaging estimates of Hounsfield units (HU) and volumetric BMD have been implemented as alternative methodologies for assessing fracture risk. However, marrow fat within the vertebrae can highly affect the vBMD and fracture properties estimations. To address this issue, 54 vertebrae were dissected from nine cadaveric spines and scanned using SE-QCT (120kVp) and dual energy (DE)-QCT (80/140 kVp), with the latter accounting for marrow fat within the vertebrae. The vertebrae were then scanned using DXA and subjected to mechanical testing to obtain fracture properties. aBMD outcomes from DXA showed a better correlation with DE-QCT vBMD versus SE outcomes [DE: aBMD vs. vBMD ( $R^2$ : 0.61); SE: aBMD vs. vBMD ( $R^2$ : 0.27)]. SE-QCT underestimated vertebral vBMD by -56% ( $p < 0.0001$ ) when compared to DE-QCT. vBMD estimates from SE-QCT could predict 45% and 37% of the vertebral failure loads and stiffness, respectively, compared to 67% and 46% from DE-QCT. DE-QCT vBMD outcomes highly correlated with fracture properties of vertebrae as compared to SE-QCT metrics. As DE scanning has the ability to correct for the effects of bone marrow fat, estimated vBMD from SE-QCT were significantly underestimated compared to DE-QCT. Dual energy CT scanning has the potential to more accurately predict vertebral failure and aid the clinician in the evaluation of appropriate interventions. Future studies should consider implementing DE-QCT in their fracture assessment.

**Keywords:** DXA; Osteoporosis; Prediction; QCT; Vertebral fracture.

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Jimenez S, Saldarriaga S, Chaput C, Giambini H. Dual-energy estimates of volumetric bone mineral densities in the lumbar spine using quantitative computed tomography better correlate with fracture properties when compared to single-energy BMD outcomes. *Bone*. 2020;130.8756-3282

## Opportunistic application of phantom-less calibration methods for fracture risk prediction using QCT/FEA

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### Abstract

**Objectives:** Quantitative computed tomography (QCT)-based finite element analysis (FEA) implements a calibration phantom to estimate bone mineral density (BMD) and assign material properties to the models. The objectives of this study were to (1) propose robust phantom-less calibration methods, using subject-specific tissues, to obtain vertebral fracture properties estimations using QCT/FEA; and (2) correlate QCT/FEA predictions to DXA values of areal BMD.

**Methods:** Eighty of a cohort of 111 clinical QCT scans were used to obtain subject-specific parameters using a phantom calibration approach and for the development of the phantom-less calibration equations. Equations were developed based on the HU measured from various soft tissues and regions, and using multiple linear regression analyses. Thirty-one additional QCT scans were used for cross-validation of QCT/FEA estimated fracture loads from the L3 vertebrae based on the phantom and phantom-less equations. Finally, QCT/FEA-predicted fracture loads were correlated with aBMD obtained from DXA.

**Results:** Overall, 217 QCT/FEA models from 31 subjects (20 females, 11 men) with mean ages of 69.6 (13.1) and 67.3 (14) were used to cross-validate the phantom-less equations and assess bone strength. The proposed phantom-less equations showed high correlations with phantom-based estimates of BMD (99%). Cross-validation of QCT/FEA-predicted fracture loads from phantom-less equations and phantom-specific outcomes resulted in high correlations for all proposed methods (0.94-0.99). QCT/FEA correlation outcomes from the phantom-less equations and DXA-aBMD were moderately high (0.64-0.68).

**Conclusions:** The proposed QCT/FEA subject-specific phantom-less calibration methods demonstrated the potential to be applied to both prospective and retrospective applications in the clinical setting.

**Key points:** • QCT/FEA overcomes the disadvantages of DXA and improves fracture properties predictions of vertebrae. • QCT/FEA fracture estimates using the phantom-less approach highly correlated to values obtained using a calibration phantom. • QCT/FEA prediction using a phantom-less approach is an accurate alternative over phantom-based methods.

**Keywords:** Bone density; Finite element analysis; Phantom-less; Quantitative computed tomography; Spine.

## Medial Meniscus Repair in Major League Soccer Players Results in Decreased Performance Metrics for One Year and Shortened Career Longevity

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### Abstract

**Background:** The rate of medial meniscus tear (MMT) in professional soccer players is high. There are no studies on objective performance metrics following medial meniscus repair in these athletes.

**Purpose:** Examine the impact of MMT treated with surgical repair on performance metrics and career longevity in Major League Soccer (MLS) players.

**Methods:** MLS players who sustained an MMT between 1993 and 2019 were identified via publicly available databases. These players were each matched to 2 uninjured controls by debut date, experience, position, race, ethnicity, height, weight, and body mass index (BMI). Demographic data and performance metrics were then collected for both groups. Matches, minutes, goals, assists, shots, shots on target, duels, and duel percentage won are collectively referred to as performance metrics. Statistical analysis compared demographic distributions and performance metrics between the MMT and control groups.

**Results:** Thirty-three MLS players who had undergone medial meniscus repair were identified and matched to 66 controls. All performance metrics decreased in the MMT group when compared to their controls in the first year after injury. This difference remained significant even when the performance metrics were normalized with respect to time, indicating that the injured players both played less and were not as productive. At 2 years after injury, performance metrics returned to pre-injury levels and were equivalent to those of the healthy controls. Career length was found to be significantly different between the two groups at  $8.81 \pm 3.9$  years for the MMT group and  $12.63 \pm 3.51$  years for the control group ( $P < 0.001$ ).

**Conclusion:** MLS players undergoing medial meniscus repair had decreased performance metrics in the first year after injury but returned to baseline levels of play at the second year after injury. Their careers were also shorter than those of their uninjured controls.

**Keywords:** meniscus tear; return to play; return to sport; soccer.

## What Is the Prevalence of Burnout, Depression, and Substance Use Among Orthopaedic Surgery Residents and What Are the Risk Factors? A Collaborative Orthopaedic Educational Research Group Survey Study

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### Abstract

**Background:** Burnout and depression among healthcare professionals and trainees remain alarmingly common. In 2009, 56% of orthopaedic surgery residents reported burnout. Alcohol and illicit drug use are potential exacerbating factors of burnout and depression; however, these have been scarcely studied in residency populations.

**Questions/purposes:** (1) What proportion of orthopaedic residents report symptoms of burnout and depression? (2) What factors are independently associated with an orthopaedic resident reporting emotional exhaustion, depersonalization, low personal accomplishment, and depression? (3) What proportion of orthopaedic residents report hazardous alcohol or drug use? (4) What factors are independently associated with an orthopaedic resident reporting hazardous alcohol or drug use?

**Methods:** We asked 164 orthopaedic surgery programs to have their residents participate in a 34-question internet-based, anonymous survey, 28% of which (46 of 164) agreed. The survey was distributed to all 1147 residents from these programs, and 58% (661 of 1147) of these completed the survey. The respondents were evenly distributed among training years. Eighty-three percent (551 of 661) were men, 15% (101 of 661) were women, and 1% (nine of 661) preferred not to provide their gender. The survey asked about demographics, educational debt, sleep and work habits, perceived peer or program support, and substance use, and validated instruments were used to assess burnout (abbreviated Maslach Burnout Inventory), depression (Patient Health Questionnaire-2), and hazardous alcohol use (Alcohol Use Disorder Identification Test-Consumption). The main outcome measures included overall burnout, emotional exhaustion, depersonalization, low personal accomplishment, depression, and hazardous alcohol and drug use. Using the variables gathered in the survey, we performed an exploratory analysis to identify significant associations for each of the outcomes, followed by a multivariable analysis.

**Results:** Burnout was reported by 52% (342 of 661) of residents. Thirteen percent of residents (83 of 656) had positive screening results for depression. Factors independently associated with high emotional exhaustion scores included early training year (odds ratio 1.15; 95% confidence interval, 1.01-1.32;  $p = 0.03$ ) unmanageable work volume (OR 3.13; 95% CI, 1.45-6.67;  $p < 0.01$ ), inability to attend health maintenance appointments (OR 3.23; 95% CI, 1.69-6.25;  $p < 0.01$ ), lack of exercise (OR 1.69; 95% CI, 1.08-2.70;  $p = 0.02$ ), and lack of program support (OR 3.33; 95% CI, 2.00-5.56;  $p < 0.01$ ). Factors independently associated with depersonalization included early training year (OR 1.27; 95% CI, 1.12-1.41;  $p < 0.01$ ), inability to attend health maintenance appointments (OR 2.70; 95% CI, 1.67-4.35;  $p < 0.01$ ), and lack of co-resident support (OR 2.52; 95% CI, 1.52-4.18;  $p < 0.01$ ). Low personal accomplishment was associated with a lack of co-resident support (OR 2.85; 95% CI, 1.54-5.28;  $p < 0.01$ ) and lack of program support (OR 2.33; 95% CI, 1.32-4.00;  $p < 0.01$ ). Factors associated with depression included exceeding duty hour restrictions (OR 2.50; 95% CI, 1.43-4.35;  $p < 0.01$ ) and lack of program support (OR 3.85; 95% CI, 2.08-7.14;  $p < 0.01$ ). Sixty-one percent of residents (403 of 656) met the criteria for hazardous alcohol use. Seven percent of residents (48 of 656) reported using recreational drugs in the previous year. Factors independently associated with hazardous alcohol use included being a man (OR 100; 95% CI, 35-289;  $p < 0.01$ ), being Asian (OR 0.31; 95% CI, 0.17-0.56;  $p < 0.01$ ), single or divorced marital status (OR 2.33; 95% CI, 1.47-3.68;  $p < 0.01$ ), and more sleep per night (OR 1.92; 95% CI, 1.21-3.06;  $p < 0.01$ ). Finally, single or divorced marital status was associated with drug use in the past year (OR 2.30; 95% CI, 1.26-4.18;  $p < 0.01$ ).

**Conclusions:** The lack of wellness among orthopaedic surgery residents is troubling, especially because most of the associated risk factors are potentially modifiable. Programs should capitalize on the modifiable elements to combat burnout and improve overall wellbeing. Programs should also educate residents on burnout, focus on work volume, protect access to health maintenance, nurture those in the early years of training, and remain acutely aware of the risk of substance abuse. Orthopaedic surgery trainees should strive to encourage peer support, cultivate personal responsibility, and advocate for themselves or peers when faced with challenges. At a minimum, programs and educational leaders should foster an environment in which admitting symptoms of burnout is not seen as a weakness or failure.

**Level of evidence:** Level II, prognostic study.

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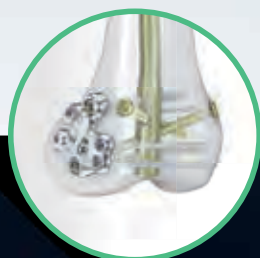
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# Alumni

## Alamo Orthopaedic Society

*Animesh Agarwal, MD, FAOA, FAAOS  
President/Treasurer*



The Alamo Orthopaedic Society was established in 1972 by Dr. Charles Rockwood, Jr. as the official alumni association for the Department of Orthopaedics at UTHSCSA. The establishment of Orthopaedics at UTHSCSA pre-dated the actual opening of the school by two years when Dr. Rockwood was recruited to establish an orthopaedic program in 1966.

COVID-19 has changed our world forever, but I hope everyone is staying safe with all the new variants out there. As you know, the pandemic canceled our planned biennial meeting in 2020 and subsequently, we had to reschedule for 2021. COVID put our plans on hold once again and we postponed it from April of 2021, due to the Delta variant surge, to October. We were able to celebrate our own Danny Guy at the AAOS Annual Meeting in San Diego this past September; the original AAOS meeting also was postponed due to the Delta variant. Our Alamo Reception at the AAOS meeting was held at Mister A's restaurant, a terrific venue with a beautiful view of San Diego. Additionally, we were able to have a successful meeting this past year in October of 2021 at the J.W. Marriott, at which Danny Guy was also our guest speaker. He provided us with several excellent lectures. We had approximately 40 alumni join us over the Halloween weekend. The society remains strong with approximately 120 active members, but this is only a fraction of the approximately 300 that have graduated from this program. We have had seven AAOS Presidents that have been affiliated with our program, which is an amazing achievement [Hinchey (1971), Rockwood (1984), Morrey (1994), Heckman (1998), Teuscher (2015), Williams (2016), and Guy (2021)]. I urge many of you that may have let your membership expire to renew and re-engage with the society and the department. Although you will

always be an alumnus of the program, dues help to cover meeting expenses for the AAOS reception as well as the biennial meeting. We will also be rolling out a new and improved website in the coming months. Please find some pictures from the past two events. Our next event is planned for the AAOS meeting in Chicago depending on anticipated attendance. Anna Conti continues to serve as the administrator for the society. Please contact me at [agarwal@uthscsa.edu](mailto:agarwal@uthscsa.edu) or Anna at [Conti@uthscsa.edu](mailto:Conti@uthscsa.edu) for more information.



The view from Mister A's in San Diego at the Alamo AAOS reception in 2021.



Danny Guy (Class of 87), receiving a bottle of Blanton's as a thank you from the AAOS along with Animesh Agarwal (Class of 97) and Fred Corley (Class of 78).



Danny Guy, President AAOS and Alamo Orthopaedic Society alumnus (Class of 87) giving an overview of the future of Orthopaedic Education.



(From L to R) Danny Guy (Class of 87), Peter McGanity (Class of 80), Animesh Agarwal (Class of 97), James D. Heckman (Past Chairman of the Department), Fred Corley (Class of 78) enjoying a little Blanton's bourbon.



Class of 2001, always a great turnout, (L to R), Keith Lawson, John Foote, Ian Weber (Class of 2005), Lance Farnworth, Fred Corley (Class of 1978), Gary Go, and Jeff Schlimmer.

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# Alumni - Where are they Now?

*Ben S. Francisco, MD*

Not a day goes by that I don't think about my residency and the impact that those five years had on my life. I graduated from residency in 2016 and then completed a hand fellowship with Dr. Green. I left San Antonio and drove north to The (Real) Cowboy State and stopped in Lander, Wyoming, population 7500. Lander is isolated geographically and medically. The nearest Level I trauma center is five hours away in Salt Lake City. The nearest Level II facility is in Casper, 2 ½ hours away. My practice, with partner Cory Lamblin, provides orthopaedic care for about a 150-mile radius.

Residency was instrumental in helping me see what I wanted in my own practice. During third year, I realized quickly that I didn't want to be in a large group, nor did I want to be working at multiple hospitals spread across a large city. I also discovered that I wanted to be my own boss. I wanted to be in control of my schedule, my time, and my commitments. That narrowed the scope of what I was looking for in a practice.

In the 4½ years that I have been in practice, I have become a true “hand” surgeon — I operate on everything that I can get my hands on. My OR block may consist of a

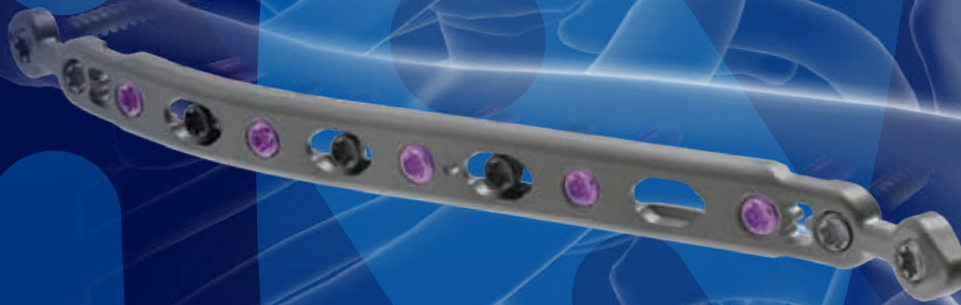
rotator cuff repair, a total hip, a Dupuytren's case, and then a comminuted distal humerus fracture. Thankfully, my training prepared me well to practice in this remote location. Whenever I find myself dealing with a difficult surgical problem I ask myself, “What would (insert any attending) do?” and I can always find my way out of difficult spots.

I grew up loving the mountains, hunting, and riding and breaking horses. Since moving here, I'm getting back to my roots. I try to spend as much time as I can exploring the rugged, isolated beauty of the mountains with people I care about, especially on horseback. I particularly enjoy elk hunting. I get to go on those cover-of-hunting-magazine-horse-pack trips every fall.

I have a lot of satisfaction in my practice; it is a great fit for me. I love living in this little town. I don't worry if my patients miss a follow-up, I can check on them at the grocery store or when I am out to dinner. It's amazing to me that my residency experience prepared me so well for this small-town practice, which is more like University Hospital than you might imagine.







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# UTHSCSA Orthopaedic Surgery Alumni by Class

## Class of 1971

Robert D. Bilderback  
Michael V. Galo  
Thomas R. Reid  
Robert G. Stone  
Hilario Trevino

## Class of 1972

Juan J. Capello  
Gary N. Pamplin  
Vernon L. Ryan  
James M. Steel  
Joe W. Tippet  
Richard P. Wilson

## Class of 1973

Edward D. Campbell, Jr.  
Ralph D. Cash  
Warren W. Kendall  
John T. Phillips  
Rafael V. Urrutia, Jr.  
Charles M. Younger

## Class of 1974

John R. Anderson  
George N. Armstrong, Jr.  
John E. Blattman  
William A. Graham  
William H. Matthews  
Richard W. Williamson, Jr.

## Class of 1975

James W. Adams  
Jesse C. DeLee  
John A. Genung  
Glenn C. Terry

## Class of 1976

Billy E. Allison  
Robert K. Blair  
Jack W. Crosland, III  
Ray M. Fitzgerald  
John A. Richards

## Class of 1977

C. Robert Boone  
Phillip R. Craven  
Donald R. Davis  
Jerold N. Friesen  
Raymond S. Gruby  
James E. Kever

## Class of 1978

William M. Allen, Jr.  
Kenneth P. Butters  
Fred G. Corley, Jr.  
Donald C. Jones  
Randy J. Pollet  
Archie K. Whittemore

## Class of 1979

Ray A. Fambrough  
Howard G. Miller  
C. Bart Norton  
William E. Sanders  
Wilburn A. Smith, Jr.  
R. Fred Torstrick

## Class of 1980

Michael B. Clendenin  
Charles E. Lewis  
Peter L. J. McGanity  
Wayne L. McLemore  
James B. Stiehl  
John (Jack) M. Thomas, Jr.

## Class of 1981

Thomas O. Clanton  
Gary H. Jackson  
Allen S. Kent  
Robert B. Kimmel  
Michael R. McLean  
Loddie F. Roeder

## Class of 1982

Jonathan P. Bacon  
Steven C. Dickhaut  
Donald W. Floyd  
James L. Griffin  
Walter M. Knight  
Joe B. Wilkinson

## Class of 1983

George S. Edwards, Jr.  
James B. Giles  
Alan G. Lewis  
Edward C. Liu  
Mark B. Riley  
Elizabeth A. Szalay

## Class of 1984

Stephen E. Earle  
Gary P. Goodfried  
Theodore T. Peters  
G. Steven White

## Class of 1985

Cary C. Alkire  
Hal S. Crane  
Ralph J. Curtis, Jr.  
Michael L. McCarty  
Robert E. Mitchell  
David R. Schmidt

## Class of 1986

Eric C. Carlson  
Jeffrey T. DeHaan  
Phillip M. Graehl  
Michael J. Hanley  
Scott H. Kitchel  
Matthew C. Reckmeyer

## Class of 1987

Jon T. Abbott  
Daniel K. Guy  
Stephen M. McCollam  
Daniel G. Nelson  
Jacob F. Patterson  
Rex E. Wilcox

## Class of 1988

Ples L. Kujawa  
James M. Odor  
John C. Pearce  
Pat A. Peters  
Ronald E. Talbert  
Donald R. Watson

## Class of 1989

Donna M. Boehme  
Jimmy H. Conway  
Daniel E. Cooper  
Stewart M. Dean  
Gerald R. Williams

## Class of 1990

Jerry A. Benham  
Gary T. Brock  
Daniel F. Craviotto, Jr.  
Kerry M. Donegan  
Kurt J. Kitziger  
Michael A. Wirth

## Class of 1991

Joseph W. Clark  
Frank J. Garcia  
Carolyn M. Hyde  
David E. Nonweiler  
James O. Sanders  
John C. Sparks, Jr.  
Daniel C. Valdez

## Class of 1992

Robert L. Burke  
N. Thomas Carstens  
Mark S. Failing  
Manuel E. Molina  
Keith J. Odegard  
Barry L. Veazey

## Class of 1993

Jerry L. Followwill  
Michael G. McNamara  
Praveen K. Reddy  
Francisco J. Rodriguez, Jr.  
Mark J. Rosen

## Class of 1994

Keith D. Bjork  
Mario A. Bustamante-Montes, Jr.  
Kathryn A. Caulfield  
Robert W. Dennis  
Eduardo Gomez  
Dean N. Walker

## Class of 1995

John W. Gardemal  
Christopher K. Hersh  
John W.P. Horan  
Todd C. Johnson  
James M. Lovelace  
Tommy L. McMillion  
Joseph O. Muscat

## Class of 1996

Bradley J. Broussard  
Robert E. Carlson  
Jon M. Goodnight  
Randall R. Hardison  
Sanjay Misra

---

**Class of 1997**

Animesh Agarwal  
Theresa L. Colosi  
James P. Flanagan  
Dale A. Funk  
Miguel A. Hernandez, III  
Phillip M. Jacobs  
Ian S. Kovach

**Class of 1998**

Neil B. Callister  
Mark A. Foreman  
Melinda D. Garcia  
Matthew P. Simonich  
Steven J. Wilson  
Robert S. Wolf

**Class of 1999**

Andrea J. Barrett  
G. Troy Birk  
David J. Clare  
Jeffery W. Meincke-Reza  
Brian E. Schulze  
Thomas C. Young

**Class of 2000**

Eric A. Eifler  
R. Thane Morgan  
John Q. Smith  
Robert A. Ward  
George N. Zoys

**Class of 2001**

Lance R. Farnworth  
John D. Foote  
Gary A. Go  
Joseph J. Iero  
Keith W. Lawson  
Charles F. Mess  
Jeffrey R. Schlimmer

**Class of 2002**

David M. Burt  
P. Douglas deHoll  
Patrick J. Miller  
Alexander S. Rowland  
Gregory W. Smith

**Class of 2003**

Jorge E. Casa-Ganem  
William H. Hadnott, III  
David A. Hester

Keith R. Johnson  
R. Bradley Ray  
J. David Schillen  
Vudhi V. Slabisak

**Class of 2004**

Armin Afsar-Keshmiri  
Gordon R. Bozarth  
Mitchell W. Larsen  
James M. Mahalek  
Jeffrey B. Phelps  
Stacé S. Rust

**Class of 2005**

Brett C. Anderson  
Daniel L. Boyd  
Ramon A.C. Esteban  
Geoffrey M. Millican  
Brian T. Rose  
Ian C. Weber

**Class of 2006**

Matthew S. Grunkemeyer  
Brandon R. Horne  
Hank L. Hutchinson  
Russell C. McKissick

**Class of 2007**

Doug S. Clouse  
Gregory D. Gordon, Jr.  
Florian G. Huber  
William K. Koeck  
Edwin C. Newman, III  
Erik V. Nott

**Class of 2008**

Brent M. Adcox  
Stephanie H. Alford  
Cody N. Anderson  
Jerome M. Benavides  
Emeka O. Ofobike, Jr.  
Anup A. Shah  
Eric M. Stehly

**Class of 2009**

Jamey W. Burrow  
John Pal S. Elton  
Ravi A. Karia  
Abilio A. Reis  
Patrick W. Sander  
Brandon A. Tinkler

**Class of 2010**

Matthew C. Murray  
Arthur L. Strahan  
Ryan B. Thomas  
Hussein W. Turki  
J. Carr Vineyard  
Joshua T. Woody

**Class of 2011**

Justin R. Brazeal  
Michael E. Johnson  
Farbod Malek  
Guy E. Reyes, Jr.  
Brandon M. Seifert  
Michael S. Vrana

**Class of 2012**

Alison L. Cabrera  
John W. Hinchey  
Jason P. Richards  
Jay M. Stanley  
Zachary S. Stinson  
Darin D. Tessier

**Class of 2013**

William B. Bell  
R. Zachary Garza  
Daniel R. Grant  
Matthew M. Hussey  
Matthew C. Kergosien  
James R. Meadows

**Class of 2014**

Frank A. Buttacavoli  
Bradley D. Gilliam  
Chad M. Kennedy  
Aaron M. O'Brien  
David M. Rowley  
Ian J. Whitney

**Class of 2015**

J. Cuyler Dear  
Robert G. W. Girling, V  
Vishwas B. Patil  
Jeremy S. Somerson  
Marion M. Swall  
Michael A. Weathers

**Class of 2016**

Davin D. Cordell  
Ben S. Francisco  
Nicholas E. Gerken  
Todd C. Pitts

Gurpreet Singh  
Danilo M. Volpini

**Class of 2017**

Kevin D. Christenson  
Richard E. Edeen  
Jason R. Gray  
Brandon D. Mennear  
Evan M. Tavakoli  
Zibin Zhao

**Class of 2018**

Katherine C. Bartush  
Christina I. Brady  
Gregory V. Gomez  
Brett M. Hall  
Christopher G. Larkins  
Gina R. Lesko

**Class of 2019**

Thomas L. Hand  
Andrew M. Lee  
Hanna E. Mendez  
Chance C. Moore  
Jason Thompson  
Antonio J. Webb

**Class of 2020**

Khang H. Dang  
Stephen Ernst  
Brock T. Kitchen  
Kenneth S. Mensch  
Alexander V. Nguyen  
Nikhil Shelke

**Class of 2021**

Braden J. Boyer  
Ryan C. Egbert  
Andrew J. Haus  
Isaac S. Kim  
Case W. Martin  
James C. Ryan

**Class of 2022**

Jorge C. De Leon  
Joel I. Edionwe  
Jordan E. Handcox  
Dietrich W. Kayser  
Riikka E. Koso  
Trevor J. Wait

# Ortho Illustrated

## Fellowships - *Shoulder and Elbow*



Dr. Bernard Morrey speaking at the graduation ceremony for the Charles A. Rockwood Shoulder and Elbow Fellowship honoring graduate Dr. Vaibhav Kanawade.

## Fellowships - Trauma



Graduation ceremony for the San Antonio Orthopaedic Trauma Fellowship honoring Shain Howard, DO. Pictured from Left to Right: attendings Dr. Ravi Karia, Dr. Thomas Hand, fellow Dr. Shain Howard, attendings Dr. Animesh Agarwal, and Dr. Boris Zelle.



UT Health San Antonio Trauma representation at annual Orthopaedic Trauma Association 2021 meeting held in Fort Worth, TX. Pictured from left to right are Dr. Boris Zelle, Dr. Case Martin (Class of 2021), Dr. Shain Howard, Dr. Thomas Hand, current fellow Dr. Kisan Parikh, Dr. Anil Dutta, Dr. Andrew Lee (Class of 2019).

## Resident Life



PGY-4 David Heath spending downtime in the orthopaedic workroom at University Hospital.



PGY-4 Jaime Strauss placing postoperative orders on the Pediatric Orthopaedics service.



Residents and supporting colleagues celebrating the end of "No-Shave November" with mustaches of all varieties.

## Resident Life



PGY-3 Connor Armstrong attempting to exchange scrubs outside of the operating rooms at University Hospital.



PGY-1 Andrew Eck and PGY-2 Loc-Uyen Vo play pickleball against PGY-2 Kathleen Lundquist at sponsored Fracture Rounds at local restaurant Chicken N Pickle.



PGY-5's Dietrich Kayser and Jordan Handcox at an adult reconstruction course with sponsoring Stryker sales representatives.

## Resident Life



Pediatric Orthopaedics team sharing the Christmas spirit for a patient. Pictured from left to right: PGY-3 Connor Armstrong, PGY-5 Dietrich Kayser, attending Steven Gibbons (Santa Clause), attending Matthew Landrum, and PGY-4 Jason Goodrum.



Residents celebrating finishing the Orthopaedic In-Training Examination at Wursthfest 2021.

## Resident Life



Current orthopaedic residents at a Journal Club. Pictured from Left to Right: PGY-2 Stephanie Jones, PGY-5 Riikka Koso, PGY-5 Jordan Handcox, PGY-4 Lillian Ogden, PGY-2 Kathleen Lundquist, PGY-2 Loc-Uyen Vo, PGY-2 Annat Rabinovich.



PGY-4 Galen Mills and attending Matthew Landrum discuss pediatric scoliosis deformity in the multispeciality pediatric spinal deformity clinic.

## Resident Life



PGY-2 Loc-Uyen Vo assisting with a surgery on the Orthopaedic Trauma rotation at University Hospital.



PGY-1 John Parker and PGY-1 Ahmed Makhani practice spinal navigation at a local sponsored cadaver lab.

## Resident Life



2022 Albert Sanders/Roy Davis Resident Research Competition Semifinal presentations held during UT Orthopaedic Grand Rounds moderated by Dr. Boris Zelle. Two out of the three finalist were chosen from UT Health Orthopaedics.



Orthopaedics residents enjoying the 2021 Alamo Bowl held at the Alamo Dome in San Antonio.

## Resident Life



Dr. Corley teaching anatomy to residents in a cadaver lab session.



PGY-5 Jordan Handcox performing cuts in a cadaver lab at an adult reconstruction course sponsored by Stryker.



Class of 2021 Graduating Residents and faculty at the UT Health San Antonio 2021 Orthopaedics Graduation.

Orthopaedic residents at a cadaver lab in Bulverde, TX.



## Resident Life



PGY-2 Sam Ornell (left), PGY-1 Andrew Eck (middle), and PGY-3 Connor Armstrong (right) performing a competition of grip strength with a dynamometer before morning rounds on the VA service.



Incoming intern class of academic year 2021-2022 during their intern orientation navigating a new virtual reality device for surgical simulation.



PGY-3 residents Clint Ulmer (left) and Adam McNulty (right) participating in didactics. Didactics for the residency takes place weekly on Fridays at 7:00-10:00 AM.

## Visiting Professorships



Chairman Dr. Robert Quinn (left) and Chief of Spine Surgery Dr. Christopher Chaput (right) presenting the annual guest-lecturer Laura B. Flawn Leadership in Orthopaedics plaque to John G. Devine, MD.



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readmission rates<sup>1\*</sup>

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reduction in cost for  
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1. Higuera-Rueda C, Emara AK, Nieves-Malloure Y, et al. The Effectiveness of Closed Incision Negative Pressure Therapy versus Silver-Impregnated Dressings in Mitigating Surgical Site Complications in High-Risk Patients after Revision Knee Arthroplasty: The PROMISES Randomized Controlled Trial. J Arthroplasty (2021), doi: <https://doi.org/10.1016/j.arth.2021.02.076>.

2. Cooper HJ, Bongards C, Silverman RP. Cost-effectiveness of closed incision negative pressure therapy for surgical site management after revision total knee arthroplasty: Secondary analysis of a randomized clinical trial. Presented at: American Association of Hip and Knee Surgeons Annual Meeting, November 11-14, 2021, Dallas, Texas.

NOTE: Specific indications, limitations, contraindications, warnings, precautions and safety information exist for these products and therapies. Please consult a clinician and product instructions for use prior to application. Rx only.

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