

Adam W. Anz, M.D.

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- PRACTICE** **ANDREWS INSTITUTE FOR ORTHOPAEDICS & SPORTS MEDICINE**, Gulf Breeze, FL.
Orthopaedic Surgeon Specializing in Sports Medicine and Arthroscopy.
- APPOINTMENTS** **ANDREWS RESEARCH AND EDUCATION FOUNDATION**, Gulf Breeze, FL.
Medical Director of Clinical and Orthobiologic Research- October 2012.
- CERTIFICATION:** **AMERICAN BOARD OF ORTHOPAEDIC SURGERY**- July 2014.
ABOS Orthopaedic Sports Medicine Subspecialty- August 2020.
- FELLOWSHIP
TRAINING** **THE STEADMAN CLINIC/STEADMAN PHILIPPON RESEARCH INST**, Vail, CO.
August 2011 to July 2012.
- KUALA LUMPUR SPORTS MEDICINE CENTRE**, Kuala Lumpur, Malaysia.
Clinical/Research Stem Cell Fellowship with Dr. Khay Yong Saw, Sept 2012 to Oct 2012.
- RESIDENCY
TRAINING** **WAKE FOREST UNIVERSITY BAPTIST MEDICAL CENTER**, Winston-Salem, NC.
Orthopaedic Surgery, July 2006 to June 2011.
- EDUCATION** **UNIVERSITY OF SOUTH ALABAMA COLLEGE OF MEDICINE**, Mobile, AL.
Doctor of Medicine, **AOA**, May 2006.
- VANDERBILT UNIVERSITY**, Nashville, TN.
Bachelor of Arts in Mathematics, **Summa Cum Laude**, May 2002.
- HONORS** **Pensacola Area Commitment to Excellence Award**, Professional Leader of the Year (2019).
Resident/Fellow Award Winner, Eastern Orthopaedic Association Annual Meeting (2009).
Award for Best Clinical Research, WFU Department of Orthopaedic Surgery (2008).
Charles M. Baugh Award in Biochemistry & Molecular Biology, USA College of
Medicine (2006).
Alpha Omega Alpha (2005)
Caduceus Scholarship (2005)
Alabama Merit Scholarship (2002-2006)
Russell Memorial Scholarship (2004-2006)
Phi Beta Kappa (2002)
- PUBLICATIONS** **Anz AW**, Sherman B. Concentrated Bone Marrow Aspirate is More Cellular and Proliferative
when Harvested from the PSIS than the Proximal Humerus. Arthroscopy Accepted Oct2021.
- Anz AW**, Plummer HA, Cohen A, Everts PA, Andrews JR, Hackel JG. Bone Marrow
Aspirate Concentrate Is Similar to Platelet-Rich Plasma for the Treatment of Knee
Osteoarthritis at 2Years: A Prospective, Randomized Trial. AJSM. Accepted Oct2021.
- Elston J, Anz AW. Biologics and Injection Therapy for the Management of Osteoarthritis (at
print)
- Anz AW**, Torres J, Plummer HA, Jee CS, Dekker TJ, Johnson KB, Saw KY. Mobilized
Peripheral Blood Stem Cells are Pluripotent and Can be Safely Harvested and Stored for
Cartilage Repair. Arthroscopy. 2021 Apr 30;S0749-8063(21)00399-6. (Online ahead of print)
- Anz AW**. Editorial Commentary: Point-of-Care Harvest and Application of Resident Stem
Are Practical and Cost-Effective. Arthroscopy. 2021 Sep 2021; 37(9):2883-2884.

Sheehan AJ, **Anz AW**, Bradley JP. Platelet-Rich Plasma: Fundamentals and Clinical Applications. *Arthroscopy*. 2021 Sep;37(9):2732-2734.

Saw KY, **Anz AW**, Ng RC, Jee CS, Low SF, Dorvault C, Johnson KB. Arthroscopic Subchondral Drilling Followed by Injection of Peripheral Blood Stem Cells and Hyaluronic Acid Showed Improved Outcome Compared to Hyaluronic Acid and Physiotherapy for Massive Knee Chondral Defects: A Randomized Controlled Trial. *Arthroscopy*. 2021 Aug;37(8):2502-2517.

Anz AW, Callanan M, Goodlett M, Andrews J. Cartilage Injuries in Football. *Football Injuries*. 2021 Springer Nature. Switzerland: 191-210.

Dekker MTJ, Aman ZS, DePhillipo NN, Dickens JF, **Anz AW**, LaPrade RF. Chondral Lesions of the Knee: An Evidence-Based Approach. *J Bone Joint Surg Am*. 2021 Apr 7;103(7):629-645.

Oliver GD, Friesen KB, Barfield JW, Giordano KA, Bordelon NM, Anz AW, Goodlett MD, Andrews JR. Lower Extremity Pain and Pitching Kinematics and Kinetics in Collegiate Softball Pitchers. *Int J Sports Med*. 2021 Jun;42(6):544-549.

Branch EA, Matuska AM, Plummer HA, Harrison RM, **Anz AW**. Platelet Rich Plasma Devices Can Be Used to Isolate Stem Cells from Synovial Fluid at the Point of Care. *Arthroscopy*. 2021 Mar;37(3):893-900.

Kurzweil P, Krych AJ, **Anz A**, Gwathmey FW, Loren G, Lavery M, Flanigan DC. Favorable Reoperation Rate at 2 Years Following Repair of Horizontal Cleavage Tears Using an All Suture-Based Technique: A Prospective, Multicenter Trial. *Arthrosc Sports Med Rehabil*. 2021 Mar 13;3(3):e773-e780.

Oliver GD, Downs JL, Friesen KB, Saper MG, **Anz AW**, Andrews JR. Biceps Tendon Changes and Pitching Mechanics in Youth Softball Pitchers. *Int J Sports Med*. 2021 Mar;42(3):277-282.

Callanan MC, Christensen KD, Plummer HA, Torres J, **Anz AW**. Elevation of Peripheral Blood CD34+ and Platelet Levels After Exercise With Cooling and Compression. *Arthrosc Sports Med Rehabil*. 2021 Feb 22;3(2):e399-e410.

Matuska AM, Klimovich ML, **Anz AW**, Podesta L, Chapman JR. Autologous thrombin preparations: Biocompatibility and growth factor release. *Wound Repair Regen*. 2021 Jan;29(1):144-152.

Friesen KB, **Anz AW**, Dugas JR, Andrews JR, Oliver GD. The Effects of Body Mass Index on Softball Pitchers' Hip and Shoulder Range of Motion. *Sports Med Int Open*. 2020 Dec 16;5(1):E8-E13.

Callanan MC, Plummer HA, Chapman GL, Opitz TJ, Rendos NK, **Anz AW**. Blood Flow Restriction Training Using the Delfi System Is Associated With a Cellular Systemic Response. *Arthrosc Sports Med Rehabil*. 2020 Dec 27;3(1):e189-e198.

Anz AW, Matuska A, Edison JL, Abdullah SF, Dekker TJ, Plummer HA, Brock KV, Goodlett MD. Quantification and Qualification of Stem Cells from Blood after Mobilization with Filgrastim, and Concentration Using a PRP System. *Arthroscopy*. 2020 Nov;36(11):2911-2918.

Anz AW. Editorial Commentary: Food and Drug Administration Regulation of Biologics in Orthopaedics: Am I the Only One Around Here Who Gives a Flip About the Rules?!?! *Arthroscopy*. 2020 Oct;36(10):2771-2772.

Anz AW, Edison J, Denney TS, Branch EA, Walz CR, Brock KV, Goodlett MD. 3-T MRI mapping is a valid in vivo method of quantitatively evaluating the anterior cruciate ligament: rater reliability and comparison across age. *Skeletal Radiol*. 2020 Mar;49(3):443-452.

Anz AW, Hubbard R, Rendos NK, Everts PA, Andrews JR, Hackel JG. Bone Marrow Aspirate Concentrate Is Equivalent to Platelet-Rich Plasma for the Treatment of Knee Osteoarthritis at 1 Year: A Prospective, Randomized Trial. *Orthop J Sports Med*. 2020 Feb 18;8(2):2325967119900958.

Downs J, Friesen K, **Anz AW**, Dugas JR, Andrews JR, Oliver GD. Effects of a Simulated Game on Pitching Kinematics in Youth Softball Pitcher. *Int J Sports Med*. 2019 DOI 10.1055/a-1062-6475

Oliver GD, Saper MG, Drogosz M, Plummer HA, Arakkal AT, Comstock RD, **Anz AW**, Andrews JR, Fleisig GS. Epidemiology of Shoulder and Elbow Injuries Among US High School Softball Players, 2005-2006 Through 2016-2017. *Orthop J Sports Med*. 2019 Sep 6;7(9):2325967119867428.

Oliver GD, Friesen K, Barfield JW, Giordano K, **Anz A**, Dugas J, **Andrews J**. Association of Upper Extremity Pain With Softball Pitching Kinematics and Kinetics. *Orthop J Sports Med*. 2019 Aug 21;7(8):2325967119865171.

Wasserberger K, Barfield J, **Anz AW**, Andrews J, Oliver G. Using the single leg squat as an assessment of stride leg knee mechanics in adolescent baseball pitchers. *J Sci Med Sport*. 2019 Nov;22(11):1254-1259.

Oliver GD, Gilmer GG, Friesen KB, Plummer HA, **Anz AW**, Andrews JR. Functional Differences in Softball Pitchers With and Without Upper Extremity Pain. *J Sci Med Sport*. 2019 Oct 22(10):1079-1083.

Anz AW, Pinegar CO. FDA Regulations and Their Impact. *Biologics in Orthopaedic Surgery*. 2019 Elsevier. St. Louis, MO:9-17.

Barfield JW, **Anz AW**, Osterman CL, Andrews JR, Oliver GD. The Influence of an Active Glove Arm in Softball Pitching: A Biomechanical Evaluation. *Int J Sports Med*. 2019 Mar;40(3):200-208. doi: 10.1055/a-0810-8637. Epub 2019 Jan 17.

Christensen K, Cox B, **Anz AW**. Emerging Orthobiologic Techniques and the Future. *Clin Sports Med*. 2019 Jan;38(1):143-161.

Anz AW, Parsa RS, Romero-Creel MF, Nabors A, Tucker MS, Harrison RM, Matuska AM. Exercise-Mobilized Platelet-Rich Plasma: Short-Term Exercise Increases Stem Cell and Platelet Concentrations in Platelet-Rich Plasma. *Arthroscopy*. 2019 Jan;35(1):192-200.

Biceps Tendon Changes in Youth Softball Pitchers Following an Acute Bout of Pitching. Barfield JW, Plummer HA, **Anz AW**, Andrews JR, Oliver GD. *Int J Sports Med*. 2018 Oct 16. doi: 10.1055/a-0671-2170.

Oliver GD,, **Anz AW**, Friesen KB, Brittain AR, Goodlett MD, Dugas JR, Andrews JR. Upper Extremity Pain and Pitching Mechanics in National Collegiate Athletic Association (NCAA) Division I Softball. *Int J Sports Med*. 2018 Nov;39(12):929-935.

Barfield JW, **Anz AW**, Andrews JR, Oliver GD. Relationship of Glove Arm Kinematics With Established Pitching Kinematic and Kinetic Variables Among Youth Baseball Pitchers. *Orthop J Sports Med*. 2018 Jul 12;6(7):2325967118784937.

Anz AW, Pinegar CO. Chapter 12: The Regulatory Environment for Emerging Cartilage Repair Technologies. *Cartilage Restoration: Practical Clinical Applications*. Second Edition. Farr J, Gomoll AH. Springer Nature, 2018.

Anz AW, Pinegar CO. Chapter 13: The Role of Stem Cells in Surgical Repair. *Cartilage Restoration: Practical Clinical Applications*. Second Edition. Farr J, Gomoll AH. Springer Nature, 2018.

Branch EA, Loveland D, Sadeghpour S, **Anz AW**. A Biomechanical Assessment of Biceps Femoris Repair Techniques. *Ortho J Sports Med*. 2018 Jan 17; 6(1):2325967117748891.

Andrews JR, Brotherton SL, **Anz AW**, Loveland DM. Chapter 26: Harvest Complications and Morbidity of Patellar Tendon Harvest for Bone-Patella Tendon- Bone Anterior Cruciate Ligament Reconstruction. *The Anterior Cruciate Ligament: Reconstruction and Basic Science*. Second Edition. Prodromos, CC. Elsevier, 2018. 113-116.

Andrews JR, Brotherton SL, **Anz AW**, Poage, CH. Chapter 32: Pearls for Anterior Cruciate Ligament Reconstruction. *The Anterior Cruciate Ligament: Reconstruction and Basic Science*. Second Edition. Chadwick Prodromos. Philadelphia: Elsevier, 2018. 131-133.

Anz AW. Chapter 13: Biological Augmentation of Meniscal Repairs. *The Menisci: A Comprehensive Review of their Anatomy, Biomechanical Function, and Surgical Treatment*. Springer Nature, 2017.

Anz AW, Branch EA, Rodriguez J, Chillemi F, Bruce JR, Suzuki RK, Andrews JR. Viable Stem Cells Are in the Injury Effusion Fluid and Arthroscopic Byproducts From Knee Cruciate Ligament Surgery: An In Vivo Analysis. *Arthroscopy*. 2017 Apr;33(4):790-797.

Anz AW. Current and future stem cell regulation: a call to action. *Am J Orthop*. 2016;45(5):274-278.

Anz AW, Bapat A, Murrell WD. Concepts in regenerative medicine: Past, present, and future in articular cartilage treatment. *J Clin Orthop Trauma*. 2016 Jul-Sep;7(3):137-44.

Milchtein C, Branch EA, Maughon T, Hughey J, **Anz AW**. Biomechanical Comparison of Parallel and Crossed Suture Repair for Longitudinal Meniscus Tears. *Orthop J Sports Med*. 2016 Apr 8;4(4):2325967116640263.

Saw KY, **Anz AW**, Jee CS, Ng RC, Mohtarrudin N, Ragavanaidu K. High tibial osteotomy in combination with chondrogenesis after stem cell therapy: a histologic report of 8 cases. *Arthroscopy*. 2015 Oct;31(10):1909-20.

Branch EA, **Anz AW**. Distal Insertions of the Biceps Femoris: A Quantitative Analysis. *Orthop J Sports Med*. 2015 Sep 21;3(9):2325967115602255.

Branch EA, Milchtein C, Aspey BS, Liu W, Saliman JD, **Anz AW**. Biomechanical Comparison of Arthroscopic Repair Constructs for Radial Tears of the Meniscus. *Am J Sports Med*. 2015 Sep;43(9):2270-6.

Murrell WD, **Anz AW**, Humeira B, Bennett WF, Boykin RE, Caplan AI. Regenerative Treatments to Enhance Orthopaedic Surgical Outcomes. *PM&R*. 2015 Apr;7(4):s41-S52.

Anz AW, Branch EA, Saliman JD. Biomechanical Comparison of Arthroscopic Repair Constructs for Meniscal Root Tears. *Am J Sports Med*. 2014 Nov;42(11):2699-706.

Anz AW, Lucas EP, Fitzcharles EK, Surowiec RK, Millett PJ, Ho CP. MRI T2 mapping of the asymptomatic supraspinatus tendon by age and imaging plane using clinically relevant subregions. *Eur J Radiol*. 2014 May;83(5):801-5.

Ho CP, Surowiec RK, Ferro FP, Lucas EP, Saroki AJ, Dornan GJ, Fitzcharles EK, **Anz AW**, Smith S, Wilson KJ, Philippon MJ. Subregional Anatomic Distribution of T2 Values of Articular Cartilage in Asymptomatic hips. *Cartilage* 2014 April; 5(3):154-164.

Anz AW, Hackel JG, Nilssen EC, Andrews JR. Application of biologics in the treatment of the rotator cuff, meniscus, cartilage, and osteoarthritis. *J Am Acad Orthop Surg*. 2014 Feb;22(2):68-79.

Saw KY, **Anz AW**, Jee CS, Merican S, Ching-Soong NG, Roohi SA, Ragavanaidu K. Articular Cartilage Regeneration with Autologous Peripheral Blood Stem Cells Versus Hyaluronic Acid: A Randomized Controlled Trial. *Arthroscopy*. 2013 Apr; 29(4):684-694.

Anz AW, Rodkey WG. Biologic Enhancement of Meniscus Repair and Replacement. *Sports Medicine and Arthroscopy Review*. 2012 Jun; 20(2):115-20.

Saw KY, **Anz AW**, Stabile K, Jee CS, Merican S, Tay YG, Ragavanaidu K. Articular Cartilage Regeneration with Stem Cells. *Modern Arthroscopy*. Dragoo JL. In Tech: Rijeka, Croatia; 2011.

Stubbs AJ, **Anz AW**, Frino J, Lang JE, Weaver AA, Stitzel JD. Classic measures of hip dysplasia do not correlate with three-dimensional computer tomographic measures and indices. *Hip International*. 2011 Sep;21(5):549-58.

Halvorson JJ, **Anz AW**, Langfitt M, Deonanan JK, Scott A, Teasdall RD, Carroll EA. Vascular Injury Associated with Extremity Trauma: Initial Diagnosis and Management. *J Am Acad Orthop Surg*. 2011 Aug;19:495-504.

Boykin RE, **Anz AW**, Bushnell BD, Stubbs AJ, Kocher MS, Phillipon MJ. Hip Instability. *J Am Acad Orthop Surg*. 2011 Jun; 9(6):340-49.

Saw KY, **Anz AW**, Merican S, Tay YG, Ragavanaidu K, Jee CS, McGuire DA. Articular Cartilage Regeneration with Autologous Peripheral Blood Progenitor Cells and Hyaluronic Acid After Arthroscopic Subchondral Drilling: A Report of 5 Cases with Histology. *Arthroscopy*. 2011 Apr; 27(4):493-506.

Anz AW, Schweppe M, Halvorson JJ, Bushnell BD, Sternberg M, Koman LA. Management of Venomous Snakebite Injury to the Extremities. *J Am Acad Orthop Surg*. 2010 Dec; 18(12):749-59.

Anz AW, Bushnell BD, Griffin LP, Noonan TJ, Tony MR, Hawkins RJ. Correlation of Torque and Elbow Injury in Professional Baseball Pitchers. *Am J Sports Med*. 2010 Jul; 38(7):1368-74.

Bushnell BD, **Anz AW**, Noonan TJ, Torry MR, Hawkins RJ. The Association of Maximum Pitch Velocity and Elbow Injury in Professional Baseball Pitchers. *Am J Sports Med.* 2010 Apr;38(4):728-32.

Bushnell BD, **Anz AW**, Noonan TJ. Effort Thrombosis Presenting As Pulmonary Embolism in a Professional Baseball Pitcher. *Sports Health.* 2009 Nov;1:493-499.

Weaver AA, Gilmartin TD, **Anz AW**, Stubbs AJ, Stitzel JD. A Method to Measure Acetabular Metrics from Three-dimensional Computed Tomography Pelvis Reconstructions. *Biomedical Sciences Instrumentation.* 2009;45:155-60.

Anz AW, Bushnell BD, Bynum DK, Chloros GD, Wiesler ER. Pediatric Scaphoid Fractures. *J Am Acad Orthop Surg.* 2009 Feb;17(2):77-87.

Anz AW, Jinnah R. High Flexion Total Knee Arthroplasty. *Current Orthopaedic Practice.* 2009 Jan; 20(1):40-46.

Bushnell BD, **Anz AW**, Bert JM. Venous Thromboembolism in Lower Extremity Arthroscopy. *Arthroscopy.* 2008 May;24(5):604-11.

REQUESTED LECTURES

Biologics: Emerging Applications in Sports Medicine. AOSSM Virtual Fellows Course, July 2020.

Innovations in Orthobiologics. WebInHour presented by OrthoPedia. June 2020.

Orthobiologics-What You Need to Know: A Primer and Research Update. AOSSM Webinar, May 2020.

Bone Marrow Concentrate and Platelet Rich Plasma: Literature Update, Where Are We Now? Arthrex Advancements in Orthobiologics Course, Naples, FL, March 2020.

Orthobiologics and Bone. The Biologics Association Annual Summit, Carlsbad, CA, February 2020.

Overview of the Regulatory Process. The Biologics Association Annual Summit, Carlsbad, CA, February 2020.

Cartilage and Meniscus Injuries in the Baseball Athlete. 38th Annual Injuries in Baseball Conference, Atlanta, GA, January 2020.

The Evolution of Biologics in Sports Medicine. American Osteopathic Academy of Sports Medicine Annual Conference, Auburn, AL, January 2020.

Not All Stem Cells Are Created Equal. Arthrex Foot and Ankle Orthopedic Technology and Innovation Forum, Naples, FL, October 2019.

ACL Injury. Andrews Institute Healthcare that Works, Gulf Breeze, FL, October 2019.

Stem Cells without the Hype: What about Regulatory Approval? International Cartilage Repair Society Annual Congress, Vancouver, BC, October 2019.

Orthobiologics Update: What's New in Harvest, Rehabilitation, and Surgery. Hughston Clinic Grand Rounds, Columbus, GA, September 2019.

How to Harvest and Use Biologics in Complex Knee Surgery. Minnesota Anatomic Complex Knee International Symposium, Minnesota, MN, September 2019.

Alignment Considerations in ACL Surgery. Arthrex Complex and Revision ACL Surgery, Naples, FL, August 2019.

Biologics in Sports Medicine. Peerless Surgical Round Table Discussion, Charlotte, NC, August 2019.

What are the roles of Biologics for Osteoarthritis: Treatment and Prevention. Ossur Medical Office Congress on Osteoarthritis. London, UK, June 2019.

Stem Cells and Cartilage: Status Quo and Future. Ossur Cartilage Expert Consensus Meeting. Munich, Germany, September, 2018.

Mobilized Hematopoietic Progenitor Cells: Implications for Rehabilitation, Recovery, and Regeneration. Steadman Scientific Symposium. Vail, CO, August, 2018.

Biologics: Emerging Applications in Sports Medicine. American Orthopedic Society for Sports Medicine. Orthopedic Sports Medicine Fellows Course. Chicago, IL. July 2018.

Biologics and Rotator Cuff Repair; Management of Cartilage Injury in Collegiate Football Athletes. American Orthopedic Society for Sports Medicine. Annual Meeting. San Diego, CA. July 2018.

Orthobiologics: The World of Stem Cell and Platelet Therapies. National Athletic Trainers' Association. Annual Meeting. New Orleans, LA. June 2018.

Surgical Evidence for Biologics. Steadman Weekly Sports Medicine Conference. Vail, CO, June, 2018.

Clinical Application of PRP/BMA Developing Surgical Applications. The Orthobiologic Institute Annual Meeting. Las Vegas, NV, June, 2018.

Blood Flow Restriction Therapy: Mechanisms of Action. Management of Cartilage Injuries. Andrews Research and Education Foundation Injuries in Football Conference. San Destin, FL. May 2018.

Biologic augmentation in rotator cuff repair. Steadman Shoulder Summit. Vail, CO. April 2018.

Regulation, Evidence, Research Direction: Regenerative Medicine in Sports Medicine. Forum on Regenerative Medicine in Sports Medicine. The National Academies of Sciences Engineering Medicine. Washington, DC. February, 2018.

Orthobiologics for Degenerative Conditions. Orthopaedic Technology and Innovation Forum. Naples, FL. January, 2018.

Emerging Evidence for Orthobiologics. Mesenchymal Stem Cell 2017 Conference. Cleveland, OH, Aug 2017.

The Use of Biologic Factors to Enhance Rotator Cuff Healing. International Society of Arthroscopy, Knee Surgery, and Orthopaedic Sports Medicine. Shanghai, China, June 2017.

The Evolution and Regulation of Orthobiologics. Surgical Management of Multiligament Knee Injury. An Honest Look at Orthobiologics for Tendon and Ligament Injury. North Dakota Orthopaedic Society Annual Meeting. Bismark, ND, April 2017.

Hip Arthroscopy: Indications and Surgical Intervention. Andrews Research and Education Institute Weekly Conference. Gulf Breeze, FL. February, 2017.

Preserve, Don't Replace. Orthopaedic Technology and Innovation Forum. Naples, FL. January, 2017.

Cartilage Repair- From the Lab into the Joint. Steadman Shoulder Symposium. Vail, CO, June 2016.

*Intraoperative Assessment and Varus/Valgus Stress Xrays **and** Stem Cells and Complex Knee Injury.* Vail International Complex Knee Symposium. Vail, CO, June 2016.

The Current Status of Stem Cells and the Rotator Cuff. Arthroscopy Association of North America, Annual Meeting, Boston, MA. April 2016.

A Case for the Anterolateral Ligament. Andrews Institute Injuries in Football Conference. Sand Destin, FL. April 2016.

Biologics and Your Sports Medicine Practice. Arthrex Futures Forum. Naples, FL, April 2016.

The Clinical Application of Biologics: What We Know and What We Don't Know Ossur Treatment of Osteoarthritis Symposium 2016. Los Angeles, CA February 2016.

Biologics and the Sports Medicine Practice: How and What is the Evidence? Steadman Philippon Research Institute Education Weekly Conference, Vail, CO, February 2016.

*Biologics: What are your Choices and Regulatory Concerns **and** Tendinopathy and Biologics: What is the Evidence?* Metcalf/Arthroscopy Association of North America Combined Surgery Seminar 2016. Sun Valley, ID, February 2016.

Hip Arthroscopy: Indications and Surgical Intervention. Andrews Research and Education Institute Weekly Conference. Gulf Breeze, FL. February, 2016.

Integrating Patient Satisfaction Scores into Your Clinical Practice. Arthrex Orthopaedic Technology and Innovation Forum. Naples, FL, January 2016.

The Challenge of Research in Private Practice. Arthroscopy Association of North America Fall Course, Dallas, TX, November 2015.

Knee Injury, Pain, & Osteoarthritis: Current Options & Future Aspirations. Andrews Institute Health Care that Works, Gulf Breeze, FL, October 2015.

Stem Cells, Cartilage, and Playing to Win in Sports Medicine. National Center for Regenerative Medicine Innovations in Cell-Based Regenerative Therapies Conference. Cleveland, OH, Aug 2015.

Biologic Principles and the Sports Medicine Practice. American Orthopaedic Society for Sports Medicine. Orlando, FL. July 2015.

*Intraoperative Assessment and Varus/Valgus Stress Xrays **and** Biologic Augmentation of ACL Reconstruction: What is Available and What is on the Horizon.* Vail International Complex Knee Symposium. Vail, CO, June 2015.

Biologic and Stem Cell Symposium: Current Biologic Options. International Society of Arthroscopy, Knee Surgery, and Orthopaedic Sports Medicine. Lyon, France, June 2015.

ACL Graft Choice: Patient Selection and Evidence. Complex Knee Injuries. Andrews Institute Injuries in Football Conference. Pensacola, FL. May 2015.

Biologic Principles and the Sports Medicine Practice. American Medical Society for Sports Medicine. Miami, FL. April 2015.

Articular Cartilage Regeneration with Peripheral Blood Stem Cells. Pensacola Rotary Club, Pensacola, FL. March 2015.

Regulatory Pathway for Biologic Products. American Orthopaedic Society for Sports Medicine Sports Injuries II Think Tank Meeting (Closed Meeting). Colorado Springs, CO. February 2015.

Articular Cartilage Regeneration with Peripheral Blood Stem Cells. 11th Middle East Orthopaedics Conference. Dubai, UAE. January 2015.

Biologic Augmentation: What We Know and What We Don't Know. University of South Alabama Orthopaedic Surgery Grand Rounds. Mobile, AL. August 2014.

Biologic Principles and the Sports Medicine Practice. American Orthopaedic Society for Sports Medicine. Seattle, WA. July 2014.

The Andrews Institute Experience: Biologics to Accelerate Healing. The Orthobiologic Institute 5th Annual PRP and Regenerative Medicine Symposium. Las Vegas, NV. June 2014.

Hip Arthroscopy and Biologics. 10th Middle East Orthopaedics Conference. Dubai UAE. February 2014.

Patellofemoral Disorders in Baseball Players. 32nd Annual Injuries in Baseball Course. Atlanta, GA. January 2014.

Cartilage Repair and Stem Cells: Update on Clinical and Regulatory Progress. The Orthobiologic Institute 4th Annual PRP and Regenerative Medicine Symposium. Los Angeles, CA. June 2013.

Femoroacetabular Impingement. University of South Alabama Orthopaedic Surgery Grand Rounds. Mobile, AL. April 2013.

Complex Knee Injuries. Hip Injuries in Football. Andrews Institute Injuries in Football Conference. Sand Destin, FL. March 2013.

Hip Injuries in the Athletic Population. Taylors Medical School Grand Rounds. Kuala Lumpur, Malaysia. February 2013.

Physical Examination of the Elbow. American Sports Medicine Institute Injuries in Baseball Course. Pheonix, AZ. January 2013.

Surgical Application of Biologics. Andrews Research and Education Institute Weekly Conference. Gulf Breeze, FL. December 2012.

RECENT SCIENTIFIC PRESENTATIONS

Kohner AD, Plummer, HA, Anz AW. *Environmental Mobilization of Hematopoietic Stem Cells with Exercise, Compression, and Cooling using the Vasper Training.* Tactical Athlete Human Factors Summit. Auburn, AL, Sept 2018.

Plummer, HA, Kohner AD, Anz AW. *Quantification of Hematopoietic Stem Cell Peripheral Circulation After Acute Resistance Exercise with Vascular Restriction Using the Delfi Tourniquet System.* Tactical Athlete Human Factors Summit. Auburn, AL, Sept 2018.

Oliver G, Gilmer G, Friesen K, Brittain A, **Anz A**, Goodlett M, Dugas J, Andrews J. *Pitching Mechanics and Pain History in Collegiate Softball Pitchers.* *International Society of Biomechanics in Sport*, Auckland, NZ. Sept 2018.

Anz AW, Hansen DR, Warrell CS, Parsa RS, Plummer HA, Stelly JM, Rendos NK. *Environmental Mobilization of Hematopoietic Stem Cells with Exercise, Compression, and Cooling.* American College of Sports Medicine Annual Meeting. Minneapolis, MN. May 2018.

Matsuka AM, **Anz AW**. *Short-term Exercise Increases Stem Cell and Platelet Concentrations in Platelet-rich Plasma.* Orthopedic Research Society Annual Meeting, New Orleans, LA. March 2018.

Anz AW, Hansen DR, Christensen KD, Warrell CS, Parsa RS, Plummer HA, Stelly JM, Rendos NK. *Environmental Mobilization of Hematopoietic Stem Cells with Exercise, Compression, and Cooling.* POSTER PRESENTATION. AAOS Optimizing Clinical Use of Biologics in Orthopaedic Surgery. Stanford, CA. February 2018.

Anz AW, Loveland D, Branch EA. *An In Vitro Biomechanical Assessment of Biceps Femoris Repair.* International Society of Arthroscopy, Knee Surgery, and Orthopaedic Sports Medicine. Shanghai, China, June 2017

Anz AW, Branch EA, Saliman JD. Strength of Arthroscopic Radial Meniscal Repair Constructs. International Society of Arthroscopy, Knee Surgery, and Orthopaedic Sports Medicine. Lyon, France, June 2015

Anz AW, Branch EA, Saliman JD. Strength of Arthroscopic Meniscal Root Repair Constructs. Arthroscopy Association of North America 2014 Annual Meeting, Hollywood, FL, May 2014.

Saw KY, **Anz AW**. Articular Cartilage Regeneration with Autologous Peripheral Blood Stem Cells Versus Hyaluronic Acid: A Randomized Controlled Trial. American Academy of Orthopaedic Surgeons 2013 Annual Meeting, Chicago, IL, March 2013, Arthroscopy Association of North America 2013 Annual Meeting, San Antonio, TX, April 2013.

Anz AW, Van der Meijden OA, Millett PJ. Biologics in Rotator Cuff Repair. Rocky Mountain Shoulder and Elbow Society 2011 Annual Meeting, Avon, Colorado, Aug 2011.

Stubbs AJ, Holst D, **Anz AW**. Effect of atraumatic hip pain duration on degree of acetabular chondromalacia in athletes. ISAKOS Biennial Congress, Rio De Janeiro, Brazil, May 2011.

Anz AW, Saw KY, Merican S, Tay YG, Ragavanaidu K, Jee CS, McGuire DA. Articular cartilage regeneration with autologous peripheral blood progenitor cells and hyaluronic acid following arthroscopic marrow stimulation. ISAKOS Biennial Congress, Rio De Janeiro, Brazil, May 2011.

Anz AW, Bushnell BD, Noonan TJ, Torry MR, Hawkins RJ. Biomechanical Risk factors and elbow injury in professional baseball pitchers. AOSSM Annual Meeting, Providence, Rhode Island, July 2010.

Noonan TJ, Bushnell BD, **Anz AW**, Torry MR, Hawkins RJ. The association of pitch velocity and elbow injury in professional baseball pitchers. 7th Biennial AAOS/ASES Shoulder and Elbow Meeting, Aventura, Florida, April 2010.

Anz AW, Frino J, Lang JE, Weaver AA, Stitzel JD, Stubbs AJ. Classical radiographic measurements of hip dysplasia do not correlate with three-dimensional computed tomographic reconstructions of volume and surface area. NCOA Annual Meeting, Pinehurst, NC, September 2009.

REQUESTED INTERVIEWS

OrthopaedicToday. "More research needed to fully harness power of stem cells in sports medicine." December 2014.

ESPN Radio Sports Medicine Weekly. "Knee and hip stem cell research." September 2014

Sports Illustrated Monday Morning Quarterback. "Stem cell treatments: out from the shadows, onto the cutting edge." July 2014.

AAOS Now. "Are biologics the future of orthopaedics?" February 2014.

WSRE Conversations with Jeff Weeks. "Stem cells and orthopaedics." December 2013.

COMMITTEES

International Society of Arthroscopy, Knee Surgery, and Orthopaedic Sports Medicine: Orthopaedic Sports Medicine Committee. 2015-2019.

EXPERIENCE

Auburn University Athletics, Consultant Team Physician, 2013-Present.

United States Ski and Snowboard Association, Physician Coverage, Nor-AM Cup Competition Coverage, Lake Louise, Canada December 2015; World Cup Competition Coverage Ofterschwang, Germany March 2013; Training New Zealand, Chile, and Colorado, Aug-Nov 2011;

Escambia High School Athletics, Team Physician, 2012-Present.

Wake Forest University Varsity Athletics, Resident Team Physician, 2008-2011.

Forsyth Country Day High School Athletics, Resident Team Physician, 2008-2011

Winston-Salem State University Varsity Athletics, Resident Team Physician, 2009-2010

Construction Mission Trip to Biabou, St. Vincent. Missionaries in Action, August 2003.

Medical Mission Trip to Bucharest, Romania. Missions to the World, July 2001.

PERSONAL

Date/Place of Birth- August 19, 1980; Opelika, Alabama

Marriage- Candace Boulter Anz, MD (Allergy and Immunology)

SOCIETIES

American Academy of Orthopaedic Surgeons, Active Member, 2016 to present.
Arthroscopy Association of North America, Active Member, 2016 to present.
American Orthopaedic Society for Sports Medicine, Active Member, 2016 to present.
International Society of Arthroscopy, Knee Surgery, and Orthopaedic Sports Medicine, Member, 2015.

On-going Research Projects/Support:

Demineralized Bone Matrix Rotator Cuff Study. Site Initiation March 2020 Sponsor: Arthrex

Optimized Bone Marrow Aspiration for Rotator Cuff Surgery. Evaluate best practice for harvesting bone marrow aspirate for rotator cuff surgery. Award Date: 11/7/2019 Sponsor: Arthrex \$25,974

GraftNet BioACL Project. Evaluate the cellular content of different tissues harvested with the GraftNet for ACL Reconstruction. Award Date: 10/23/19 Sponsor: Arthrex \$60,000

Regenerative Medicine Center at the Andrews Research and Education Foundation. The goal of this appropriation was to fund the equipping, staffing, and emerging studies on the use of biologics within orthopedic sports medicine. **Sponsor: State of Florida- \$1,250,000**

A Multi-Center, Randomized Study to Evaluate Efficacy and Safety of Intra-articular Injections of Autologous Peripheral Blood Stem Cells and Hyaluronic Acid Adjuvant Therapy Following Subchondral Drilling Surgery for the Treatment of Articular Cartilage Injury in the Knee The goal of this study is to produce phase II data for the further development of a biologics license application to bring peripheral blood stem cells to market in the United States for the indication of cartilage repair. Responsibilities include: local facility funding, facility design, and facility oversight as well as serving as a clinician whose patients will be enrolled in the study. **Sponsors: City of Gulf Breeze-\$350,000; Kuala Lumpur Sports Medical Center- \$142,000**

Quantification and Qualification of Stem Cells after Peripheral Mobilization and Harvest for Orthopaedic Point of Care Applications The goal of this study is to define the stem cell, platelet, and cytokine composition of a mobilized blood compared to unmobilized blood to determine the potential of a new harvest technique. Responsibilities include: study design, volunteer enrollment, overseeing the laboratory processes, and data processing. **Sponsor: Arthrex- \$45,305; Edward Via College of Osteopathic Management- \$32,000**

Efficacy of Bone Marrow Aspirate Concentrate Compared with Platelet Rich Plasma for the Treatment of Symptomatic Knee Osteoarthritis in a General Population: A Randomized, Controlled Clinical Trial The goal of this trial is to document and compare outcome data regarding the use of platelet rich plasma and bone marrow aspirate for the treatment of osteoarthritis. Responsibilities include: study design, patient enrollment, and service provider. **Sponsor: Emcyte- \$240,000**

Completed Projects

MRI T2 Mapping of the Normal and Reconstructed Anterior Cruciate Ligament The goal of this study is to develop and implement a non invasive outcome tool for ACL maturation after reconstruction. Responsibilities include: study design, segmentation of regions of interest after scan acquisition, manuscript preparation and submission. **Sponsor: Edward Via College of Osteopathic Medicine-\$26,250; Published in Skeletal Radiology 2019**

Biceps Femoris Repair Utilizing Modern Suture Anchor Techniques: A Biomechanical Analysis The goal of this study was to evaluate the biomechanical properties of biceps femoris repairs utilizing modern suture anchor techniques. Responsibilities included: study design, laboratory execution, manuscript preparation and submission. **Sponsor: Arthrex-\$5,182 Published in OJSM Jan 2018.**

Isolation of Human Mesenchymal Stem Cells From Intra-articular Tissues During Anterior Cruciate Ligament Reconstruction The objective of this study is to determine the potential for isolation of stem cells from waste tissues during ACL and PCL reconstruction. Responsibilities include: study design, patient enrollment, specimen acquisition, manuscript preparation and submission. **Sponsor: Celling Biosciences- \$5,120 Published Arthroscopy April 2017.**

Biomechanical Comparison of Repair Construct for All-Inside Longitudinal Meniscus Tears The goal of this study was to compare the biomechanical properties of two suture repair constructs for longitudinal meniscus repairs. Responsibilities included: study design, laboratory execution, manuscript preparation and submission. **Sponsor: Arthrex- \$20,365, Published OJSM April 2016.**

Biomechanical Comparison of Arthroscopic Suture Repair Constructs for Radial Meniscus Tears The goal of this study was to compare the biomechanical properties of suture repair constructs of radial tears of the meniscus. Responsibilities included: study design, laboratory execution, manuscript preparation and submission. **Sponsor: Ceterix Orthopaedics- \$36,458, Published AJSM September 2015.**

Insertional Anatomy of the Biceps Femoris, Fibular Collateral Ligament, and Anterolateral Ligament: A Quantitative Analysis The goal of this study was to quantitatively assess the insertions of the biceps femoris, fibular collateral ligament, and anterolateral ligament on the fibula and proximal tibia as well as establish relationships to pertinent surgical anatomy. Responsibilities included: study design, laboratory execution, manuscript preparation and submission. **Sponsor: Arthrex- \$4,186, Published OJSM September 2015.**

Biomechanical Comparison of Arthroscopic Suture Repair Constructs for Meniscal Root Tears The goal of this study was to compare the biomechanical properties of suture repair constructs of meniscal root repairs. Responsibilities included: study design, laboratory execution, manuscript preparation and submission. **Sponsor: Ceterix Orthopaedics- \$48,142, Published AJSM November 2014.**