



Emily Kraus

Clinical Assistant Professor, Orthopaedic Surgery

 Curriculum Vitae available Online

CLINICAL OFFICE (PRIMARY)

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ACADEMIC CONTACT INFORMATION

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Bio

BIO

Dr. Kraus is a Clinical Assistant Professor at Stanford Children's Orthopedic and Sports Medicine Center trained in the specialty of Physical Medicine and Rehabilitation (PM&R) sports medicine. She has research and clinical interests in endurance sports medicine, injury prevention, running biomechanics, prevention of bone stress injuries, and the promotion of health and wellness at any age of life. Dr. Kraus is the director of the FASTR Program, which stands for Female Athlete Science and Translational Research. The FASTR program is supported by the Wu Tsai Human Performance Alliance and seeks to close the gender gap in sports science research with an emphasis on early identification and interventions to prevent injury and identify ways to optimize performance in female athletes. Dr. Kraus is also a member of the U.S. Olympic and Paralympic Committee Women's Health Task Force and is the medical director of the Stanford Children's Motion Analysis and Sport Performance Lab. She has completed nine marathons including the Boston Marathon twice and one 50k ultramarathon. With running and staying physically active as one of her personal passions, she recognizes the importance of fitness for overall wellbeing and the prevention of chronic medical conditions.

CLINICAL FOCUS

- Running Injuries
- Relative Energy Deficiency in Sport
- Female Athlete Triad
- Stress Fractures
- Overuse Injuries
- Female Athlete
- Sports Medicine

ACADEMIC APPOINTMENTS

- Clinical Assistant Professor, Orthopaedic Surgery
- Member, Wu Tsai Human Performance Alliance
- Member, Maternal & Child Health Research Institute (MCHRI)

PROFESSIONAL EDUCATION

- Board Certification: Physical Medicine and Rehab, American Board of Physical Medicine and Rehabilitation (2017)
- Board Certification: Sports Medicine, American Board of Physical Medicine and Rehabilitation (2017)
- Fellowship: Stanford University Sports Physical Med and Rehab Fellowship (2017) CA
- Residency: Stanford University Physical Medicine and Rehabilitation (2016) CA
- Internship: University of Nebraska Medical Center Internal Medicine Residency (2013) NE
- Medical Education: University of Nebraska College of Medicine (2012) NE

Teaching

STANFORD ADVISEES

Med Scholar Project Advisor

Austin Stoner

Publications

PUBLICATIONS

- **Asymmetrical lower extremity biomechanics during squats and drop jumps in adolescents with MPFL reconstruction.** *Knee surgery, sports traumatology, arthroscopy : official journal of the ESSKA*
Hsu, C. J., Morgan, J. J., Callahan, D. M., Gamble, J. G., Kraus, E. A., Shea, K. G.
2026
- **Decoding menstrual health across the lifespan: a scoping review of digital health tools in research.** *medRxiv : the preprint server for health sciences*
Johnson, S. C., O'Day, J., Kraus, E., Delp, S., Hicks, J.
2026
- **Assessing Risk Factors For Relative Energy Deficiency In Sport In Female Ultramarathon Trail Runners**
Flora, J. L., McIntyre, A., Ahanu-Hunter, N., Roche, M., Kraus, E.
LIPPINCOTT WILLIAMS & WILKINS.2025: 102-103
- **Infographic. Translating the international Delphi consensus on bone stress injuries into clinical practice.** *British journal of sports medicine*
Hoenig, T., Hollander, K., Popp, K. L., Fredericson, M., Kraus, E. A., Warden, S. J., Tenforde, A. S.
2025
- **Influence of cadence manipulation on running biomechanics in high school cross-country runners.** *Sports biomechanics*
Garcia, M. C., Heiderscheit, B. C., Kraus, E., Murray, A. M., Norte, G. E., Bazett-Jones, D. M.
2025: 1-14
- **International Delphi consensus on bone stress injuries in athletes.** *British journal of sports medicine*
Hoenig, T., Hollander, K., Popp, K. L., Fredericson, M., Kraus, E. A., Warden, S. J., Tenforde, A. S., Bone Stress Injury Authorship Group, Alonso, J., Alway, P., Barrack, M. T., Beck, B., Bouxsein, M. L., et al
2024
- **Standardising health history and injury surveillance of participants in endurance events: a modified Delphi consensus statement from the AMSSM runner health consortium.** *British journal of sports medicine*
Tenforde, A. S., Kraus, E., Kliethermes, S. A., Fontana, M. A., Barrack, M. T., Dubon, M., Heikura, I. A., Hollander, K., Kroshus, E., Joachim, M. R., Lopes, A. D., Rauh, M. J., Chastain, et al
2024
- **Low energy availability surrogates are associated with Relative Energy Deficiency in Sport outcomes in male athletes.** *British journal of sports medicine*
Holtzman, B., Kelly, R. K., Saville, G. H., McCall, L., Adelzedah, K. A., Sarafin, S. R., Nikam, P., Meneguzzi, I., McIntyre, A., Kraus, E. K., Ackerman, K. E.

2024

- **Impact Of Time Of Day On Neuromuscular Performance Of The Star Excursion Balance Test In Young Women**
Weed, L., Thompson, S., Kraus, E., Delp, S., Zeitzer, J.
LIPPINCOTT WILLIAMS & WILKINS.2024: 257-258
- **Low Energy Availability Surrogates Are Associated With Relative Energy Deficiency In Sport Outcomes In Male Athletes**
Holtzman, B., Kelly, R. K., Saville, G. H., McCall, L. M., Adelzedah, K. A., Sarafin, S. R., Nikam, P., Meneguzzi, I., McIntyre, A., Kraus, E. K., Ackerman, K. E.
LIPPINCOTT WILLIAMS & WILKINS.2024: 718-720
- **Bone Characteristics Among Female Endurance Athletes At Risk For Relative Energy Deficiency In Sport**
Flora, J. L., Smith, M., Roberts, A., Kent, K., Long, J., Zhong, Y., Roche, M., Snyder, M., Kraus, E.
LIPPINCOTT WILLIAMS & WILKINS.2024: 58-59
- **An Update on Triad Prevalence and Exploratory Hormonal Biomarker Analyses in Ultramarathon Runners** *CLINICAL JOURNAL OF SPORT MEDICINE*
Roche, M., Sainani, K., Walker, M., McIntyre, A., Kelly, R., Hoeg, T., Fredericson, M., Kraus, E.
2024; 34 (5): 469-473
- **How can we better engage female athletes? A novel approach to health and performance education in adolescent athletes** *BMJ OPEN SPORT & EXERCISE MEDICINE*
Roche, M., McIntyre, A., Oliver, C., Sainani, K., Boyd, T., Stoner, A., Kraus, E.
2024; 10 (3): e001901
- **An update to terminology describing abnormal uterine bleeding in female athletes: facilitating cross-disciplinary health care.** *British journal of sports medicine*
Oleka, C. T., Anderson, T., Ackerman, K. E., Elliott-Sale, K. J., Kraus, E., Casey, E., Stellingwerff, T., Donaldson, A. T., Finnoff, J. T., Post, E. G., Adams, W. M.
2024
- **Centering the female athlete voice in a sports science research agenda: a modified Delphi survey with Team USA athletes.** *British journal of sports medicine*
McCleery, J., Diamond, E., Kelly, R., Li, L., Ackerman, K. E., Adams, W. M., Kraus, E.
2024
- **Infographic. Head to toe considerations for the postpartum endurance athlete.** *British journal of sports medicine*
Afifi, T., Barrack, M. T., Casey, E., Huddle, M., Kliethermes, S. A., Kraus, E., Toresdahl, B. G., Wasfy, M. M., Tenforde, A. S.
2024
- **Healthy runner project: a 7-year, multisite nutrition education intervention to reduce bone stress injury incidence in collegiate distance runners** *BMJ OPEN SPORT & EXERCISE MEDICINE*
Fredericson, M., Roche, M., Barrack, M. T., Tenforde, A., Sainani, K., Kraus, E., Kussman, A., Olson, E., Kim, B., Fahy, K., Miller, E., Diamond, E., Meraz, et al
2024; 10 (1)
- **Risk Factors for Running-Related Injury in High School and Collegiate Cross Country Runners: A Systematic Review.** *The Journal of orthopaedic and sports physical therapy*
Joachim, M. R., Kuik, M. L., Krabak, B. J., Kraus, E. M., Rauh, M. J., Heiderscheit, B. C.
2023: 1-36
- **Higher Triad Risk Scores Are Associated With Increased Risk for Trabecular-Rich Bone Stress Injuries in Female Runners.** *Clinical journal of sport medicine : official journal of the Canadian Academy of Sport Medicine*
Roche, M., Nattiv, A., Sainani, K., Barrack, M., Kraus, E., Tenforde, A., Kussman, A., Olson, E. M., Kim, B., Fahy, K., Miller, E., Diamond, E., Meraz, et al
2023
- **Biomechanical And Perceived Effort Responses Of Adolescent Runners To Cadence Manipulation In A Natural Environment**
Garcia, M. C., Heiderscheit, B. C., Kraus, E., Murray, A. M., Norte, G. E., Bazett-Jones, D. M.
LIPPINCOTT WILLIAMS & WILKINS.2023: 655-656

- **The Menstrual Cycle; A Priority Research Area For Team Usa Female Athletes**
Diamond, E., McCleery, J., Kelly, R. K., Li, J., Adams, W. M., Ackerman, K. E., Kraus, E.
LIPPINCOTT WILLIAMS & WILKINS.2023: 8
- **Team Dynamics And Interpersonal Relationships: An Area Of Research Priority For Elite Female Athletes**
McCleery, J., Kraus, E., Kelly, R., Diamond, E., Li, L., Adams, W., Ackerman, K.
LIPPINCOTT WILLIAMS & WILKINS.2023: 718
- **A Novel Approach To Female Athlete Sports Science Education**
McIntyre, A., Roche, M., Oliver, C., Boyd, T., Kraus, E.
LIPPINCOTT WILLIAMS & WILKINS.2023: 333-334
- **Perception Of Thinness Promoting Faster Running Is Associated With Lower Energy Availability In Collegiate Runners**
Barrack, M. T., Fredericson, M., Sainani, K., Kraus, E., Roche, M., Diamond, E., Lewis, T., McIntyre, A., Nattiv, A.
LIPPINCOTT WILLIAMS & WILKINS.2023: 776
- **Mental Health Matters: A Cross-Sectional Survey on Depression and Anxiety Symptoms and the Female and Male Athlete Triad** *CLINICAL JOURNAL OF SPORT MEDICINE*
Olson, E., Miro, E., Roche, M., Mehta, S., Sainani, K., Kraus, E.
2023; 33 (4): 368-375
- **Mental Health Matters: A Cross-Sectional Survey on Depression and Anxiety Symptoms and the Female and Male Athlete Triad.** *Clinical journal of sport medicine : official journal of the Canadian Academy of Sport Medicine*
Olson, E. M., Miro, E., Roche, M., Mehta, S., Sainani, K., Kraus, E.
2023; 33 (4): 368-375
- **Tarsal Navicular Bone Stress Injuries: A Multicenter Case Series Investigating Clinical Presentation, Diagnostic Approach, Treatment, and Return to Sport in Adolescent Athletes.** *The American journal of sports medicine*
Mehta, S., Zheng, E., Heyworth, B. E., Rizzone, K., Halstead, M., Brown, N., Stinson, Z., Nussbaum, E. D., Gray, A., Segovia, N., Kraus, E.
2023: 3635465231170399
- **Preferred temporal-spatial parameters, physical maturation, and sex are related to vertical and braking forces in adolescent long-distance runners.** *Sports biomechanics*
Garcia, M. C., Heiderscheid, B. C., Kraus, E. A., Norte, G. E., Murray, A. M., Bazett-Jones, D. M.
2023: 1-11
- **Healthy Runner Project: a 7-year, multisite nutrition education intervention to reduce bone stress injury incidence in collegiate distance runners.** *BMJ open sport & exercise medicine*
Fredericson, M., Roche, M., Barrack, M. T., Tenforde, A., Sainani, K., Kraus, E., Kussman, A., Miller Olson, E., Kim, B. Y., Fahy, K., Miller, E., Diamond, E., Meraz, et al
2023; 9 (2): e001545
- **One size does not fit all: Influence of sex and maturation on temporal-spatial parameters for adolescent long-distance runners.** *Journal of sports sciences*
Garcia, M. C., Heiderscheid, B. C., Murray, A. M., Norte, G. E., Kraus, E., Bazett-Jones, D. M.
2022: 1-6
- **Analysis of limb kinetic asymmetry during a drop vertical jump in adolescents post anterior cruciate ligament reconstruction.** *Clinical biomechanics (Bristol, Avon)*
Bakal, D. R., Morgan, J. J., Lyons, S. M., Chan, S. K., Kraus, E. A., Shea, K. G.
2022; 100: 105794
- **Stress Injuries of the Knee.** *Clinics in sports medicine*
Kraus, E., Rizzone, K., Walker, M., Brown, N., Kaur, J., Magrini, D., Glover, J., Nussbaum, E.
2022; 41 (4): 707-727
- **Dietary Behaviors Associated With Lower Nutrient Intake In Collegiate Endurance Runners**
Barrack, M. T., Fredericson, M., Kraus, E., Tenforde, A., Roche, M., Kussman, A., Gravani, K., Ansari, Y., Olson, C., Nattiv, A.
LIPPINCOTT WILLIAMS & WILKINS.2022: 590
- **Evaluating Genetic Predictors Of Bone Health In Ultramarathon Runners: Are Females Overriding Their Genetic Predisposition?**

- Roche, M., Sainani, K., Walker, M., Kelly, R., Fredericson, M., Kraus, E.
LIPPINCOTT WILLIAMS & WILKINS.2022: 526-527
- **Medical and Biomechanical Risk Factors for Incident Bone Stress Injury in Collegiate Runners: Can Plantar Pressure Predict Injury?** *Orthopaedic journal of sports medicine*
Wilzman, A. R., Tenforde, A. S., Troy, K. L., Hunt, K., Fogel, N., Roche, M. D., Kraus, E., Trikha, R., Delp, S., Fredericson, M.
2022; 10 (6): 23259671221104793
 - **Evidence-Based Management of Medial Tibial Stress Syndrome in Runners** *CURRENT PHYSICAL MEDICINE AND REHABILITATION REPORTS*
Kuwabara, A., Dyrek, P., Olson, E., Kraus, E.
2021
 - **Joint Level Analysis Of Mechanical Power During Drop Vertical Jumps In Youth Post ACL Reconstruction**
Morgan, J. J., Lyons, S. M., Chan, S. K., Shea, K. G., Kraus, E. A.
LIPPINCOTT WILLIAMS & WILKINS.2021: 145
 - **Prevalence and Factors Associated with Bone Stress Injury in Middle School Runners.** *PM & R : the journal of injury, function, and rehabilitation*
Tenforde, A. S., DeLuca, S., Wu, A. C., Ackerman, K. E., Lewis, M., Rauh, M. J., Heiderscheid, B., Krabak, B. J., Kraus, E., Roberts, W., Troy, K. L., Barrack, M. T.
2021
 - **Prevalence of Female and Male Athlete Triad Risk Factors in Ultramarathon Runners.** *Clinical journal of sport medicine : official journal of the Canadian Academy of Sport Medicine*
Hoeg, T. B., Olson, E. M., Skaggs, K., Sainani, K., Fredericson, M., Roche, M., Kraus, E.
2021
 - **The Male Athlete Triad-A Consensus Statement From the Female and Male Athlete Triad Coalition Part 1: Definition and Scientific Basis.** *Clinical journal of sport medicine : official journal of the Canadian Academy of Sport Medicine*
Nattiv, A., De Souza, M. J., Koltun, K. J., Misra, M., Kussman, A., Williams, N. I., Barrack, M. T., Kraus, E., Joy, E., Fredericson, M.
2021
 - **The Male Athlete Triad-A Consensus Statement From the Female and Male Athlete Triad Coalition Part II: Diagnosis, Treatment, and Return-To-Play.** *Clinical journal of sport medicine : official journal of the Canadian Academy of Sport Medicine*
Fredericson, M., Kussman, A., Misra, M., Barrack, M. T., De Souza, M. J., Kraus, E., Koltun, K. J., Williams, N. I., Joy, E., Nattiv, A.
2021
 - **Narrative Review - Knee Pain in the Pediatric Athlete.** *Current reviews in musculoskeletal medicine*
Kuwabara, A., Kraus, E., Fredericson, M.
2021
 - **Dietary Supplement Use According to Sex and Triad Risk Factors in Collegiate Endurance Runners.** *Journal of strength and conditioning research*
Barrack, M., Fredericson, M., Dizon, F., Tenforde, A., Kim, B., Kraus, E., Kussman, A., Singh, S., Nattiv, A.
2020
 - **Identifying Triad Risk Factors In Ultramarathon Runners**
Skaggs, K. F., Fredericson, M., Miller, E. K., Roche, M., Hoeg, T. B., Sainani, K., Kraus, E.
LIPPINCOTT WILLIAMS & WILKINS.2020: 68
 - **Relationship Between Dynamic Limb Symmetry And Subjective Limb Confidence Post ACL Reconstruction In Youth Athletes**
Morgan, J. J., Lyons, S. M., Chan, S. K., Chan, C. M., Shea, K. G., Kraus, E. A.
LIPPINCOTT WILLIAMS & WILKINS.2020: 2-3
 - **Dietary Intake Patterns And Risk Of Energy Deficiency In Ncaa Endurance Athletes**
Hernandez, C., Fredericson, M., Nattiv, A., Kraus, E., Kussman, A., Gravani, K., Miller, B., Papanos, L., Roche, M., Agans, D., Grohmann, E., Brotman, C., Barrack, et al
LIPPINCOTT WILLIAMS & WILKINS.2020: 753
 - **Genetic Predictions Of Bone Mineral Density In Ultramarathon Runners: For Men, But Not For Women**

Miller, E. K., Fredericson, M., Roche, M., Skaggs, K., Hoeg, T., Sainani, K., Kraus, E.
LIPPINCOTT WILLIAMS & WILKINS.2020: 783–84

- **Food Accessibility And Eating Patterns In Elite Collegiate Endurance Runners**
Agans, D., Barrack, M., Fredericson, M., Kraus, E., Kussman, A., Gravani, K., Miller, B., Papanos, L., Roche, M., Hernandez, C., Grohmann, E., Brotman, C., Nattiv, et al
LIPPINCOTT WILLIAMS & WILKINS.2020: 757
- **Predictors And Prevalence Of Low Bone Mineral Density And Bone Stress Injuries In Ultramarathon Runners**
Hoeg, T. B., Fredericson, M., Sainani, K. L., Skaggs, K. F., Roche, M. D., Miller, E., Kraus, E.
LIPPINCOTT WILLIAMS & WILKINS.2020: 492
- **Youth running consensus statement: minimising risk of injury and illness in youth runners.** *British journal of sports medicine*
Krabak, B. J., Roberts, W. O., Tenforde, A. S., Ackerman, K. E., Adami, P. E., Baggish, A. L., Barrack, M. n., Cianca, J. n., D'Hemecourt, P. n., Fredericson, M. n., Goldman, J. T., Harrast, M. A., Heiderscheit, et al
2020
- **Prevalence of Female Athlete Triad Risk Factors and Iron Supplementation Among High School Distance Runners: Results From a Triad Risk Screening Tool.** *Orthopaedic journal of sports medicine*
Skorseth, P. n., Segovia, N. n., Hastings, K. n., Kraus, E. n.
2020; 8 (10): 2325967120959725
- **Impact of Adaptive Sports Participation on Quality of Life.** *Sports medicine and arthroscopy review*
Diaz, R., Miller, E. K., Kraus, E., Fredericson, M.
2019; 27 (2): 73–82
- **Iron Supplementation and the Female Athlete Triad in High School Distance Runners**
Skorseth, P., Dingel, A., Hastings, K., Segovia, N., Kraus, E.
LIPPINCOTT WILLIAMS & WILKINS.2019: 736
- **Bone stress injuries in male distance runners: higher modified Female Athlete Triad Cumulative Risk Assessment scores predict increased rates of injury.** *British journal of sports medicine*
Kraus, E., Tenforde, A. S., Nattiv, A., Sainani, K. L., Kussman, A., Deakins-Roche, M., Singh, S., Kim, B. Y., Barrack, M. T., Fredericson, M.
2018
- **Corrigendum to "A little bit faster: Lower extremity joint kinematics and kinetics as recreational runners achieve faster speeds" [J. Biomech. 71 (2018) 167-175].** *Journal of biomechanics*
Orendurff, M. S., Kobayashi, T., Tulchin-Francis, K., Tullock, A. M., Villarosa, C., Chan, C., Kraus, E., Strike, S.
2018
- **Team Approach: Bone Health in Children and Adolescents.** *JBJS reviews*
Kraus, E., Bachrach, L. K., Grover, M.
2018
- **Utilization And Efficacy Of The "Run Fueled" Smart-phone Application Among Collegiate Endurance Runners**
Barrack, M., Fredericson, M., Kraus, E., Kim, B., Singh, S., Gravani, K., Miller, B., Nattiv, A.
LIPPINCOTT WILLIAMS & WILKINS.2018: 82
- **A Review and Proposed Rationale for the use of Ultrasonography as a Diagnostic Modality in the Identification of Bone Stress Injuries.** *Journal of ultrasound in medicine : official journal of the American Institute of Ultrasound in Medicine*
Fukushima, Y., Ray, J., Kraus, E., Syrop, I. P., Fredericson, M.
2018
- **Nutrition Goals Prioritized By Elite Endurance Runners Undergoing A Nutrition Education Intervention**
Barrack, M., Fredericson, M., Adam, T. S., Kraus, E., Kim, B., Singh, S., Kussman, A., Gravani, K., Ansari, Y., Miller, B., Nattiv, A.
LIPPINCOTT WILLIAMS & WILKINS.2017: 852
- **Preliminary Results from a Prospective Study Using the Female Athlete Triad Cumulative Risk Assessment**
Kraus, E., Nattiv, A., Tenforde, A., Kussman, A., Barrack, M., Kim, B., Deakins-Roche, M., Mistra, N., Singh, S., Fredericson, M.
LIPPINCOTT WILLIAMS & WILKINS.2017: 1098

- **Integrating Musculoskeletal Education and Patient Care at Medical Student-Run Free Clinics.** *PM & R : the journal of injury, function, and rehabilitation*
McQuillan, T., Wilcox-Fogel, N., Kraus, E., Ladd, A., Fredericson, M.
2017
- **Poster 155 Higher Cumulative Risk Assessment Scores Are Associated with Delayed Return to Play in Division I Collegiate Distance Runners.** *PM & R : the journal of injury, function, and rehabilitation*
Kraus, E. A., Kim, B., Nattiv, A., Tenforde, A., Barrack, M., Deakins-Roche, M., Kussman, A., Singh, S., Morkos, J., Fredericson, M.
2016; 8 (9S): S212-S213
- **Piriformis Syndrome With Variant Sciatic Nerve Anatomy: A Case Report.** *PM & R : the journal of injury, function, and rehabilitation*
Kraus, E., Tenforde, A. S., Beaulieu, C. F., Ratliff, J., Fredericson, M.
2016; 8 (2): 176-179
- **Bone Stress Injuries in Runners.** *Physical medicine and rehabilitation clinics of North America*
Tenforde, A. S., Kraus, E., Fredericson, M.
2016; 27 (1): 139-149