

Melodie Metzger, PhD, is an Associate Professor in the Department of Orthopaedics & Sports Medicine at Cedars-Sinai Medical Center and is the Director of the Orthopaedic Biomechanics Laboratory, where she has led translational research for more than 16 years. She earned her undergraduate degree from the University of California, Berkeley, completed graduate study in Management of Technology and Innovation at Berkeley, and received her doctorate from the University of California, San Francisco. Her research explores how mechanical loading, surgical techniques, and biologic interventions influence bone, tendon, ligament, and joint function, in cadaveric, small-animal, and in vitro models, using advanced motion tracking and custom loading systems. She has led studies examining systemic modifiers of tissue healing, including diabetes, osteoporosis, vitamin D deficiency, and sex hormones, with work spanning spine, sports, foot and ankle, hip, and hand surgery.

Dr. Metzger has a particular interest in women's orthopaedic health and serves on the steering committee of the Center for Research in Women's Health Science at Cedars-Sinai. Her recent work has focused on hormonal contraceptive use and musculoskeletal injury risk, including a Department of Defense Women's Health Research Award to study the potential postoperative effects of hormonal contraceptives after ACL reconstruction. In addition, her most recent sports science studies have examined quadriceps tendon graft selection for ACL reconstruction, bone quality and all-suture anchor fixation in rotator cuff repair and biceps tenodesis, and implant biomechanics in compromised bone. Across more than 60 peer-reviewed publications, Dr. Metzger continues to advance translational biomechanics with a focus on sex-specific musculoskeletal health and surgical innovation.