NATA RESEARCH & EDUCATION FOUNDATION

2025 RESEARCH GRANT AWARD

"The Relationship Between the Angle of Humeral Retroversion and Shoulder Distraction Force and Elbow Valgus Torque in the Baseball Pitching Motion"

NATA FOUNDATION MASTERS RESEARCH GRANT: 2025-2026

FUNDING: $1,000
FUNDED BY: THE RICHARD F. MALACREA RESEARCH

PROJECT SUMMARY

This study investigates the relationship between humeral retroversion (HR) angle and two key biomechanical stressors—shoulder distraction force and elbow valgus torque—during the baseball pitching motion. HR is an anatomical adaptation commonly found in overhead athletes and may influence shoulder range of motion and injury risk. Using diagnostic ultrasound to quantify HR and 3D motion capture to assess pitching biomechanics, this cross-sectional study will analyze how HR correlates with joint loading forces during pitching. By identifying whether increased HR is associated with elevated stress at the shoulder and elbow, the research seeks to enhance our understanding of injury risk factors in baseball pitchers and inform injury prevention strategies.

IMPACT ON THE ATHLETIC TRAINING PROFESSION

This study has the potential to significantly influence the athletic training profession by introducing humeral retroversion as a novel anatomical risk factor for upper extremity injuries in overhead athletes. Traditionally, injury prevention in athletic training has focused on modifiable factors such as strength, flexibility, and mechanics. Incorporating HR into screening protocols could allow athletic trainers to identify at-risk athletes earlier and develop personalized interventions based on structural characteristics. Furthermore, the findings may expand to benefit other overhead sports like volleyball and tennis, aligning with the AT Research Agenda by advancing knowledge in movement mechanics and musculoskeletal conditions. Ultimately, this research supports the evolution of evidence-based practice in athletic training by integrating anatomical assessments with biomechanical analysis for more comprehensive injury prevention models.

PRINCIPAL INVESTIGATOR:
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Kenjiro "Kenny" Shibuya is a Master of Athletic Training student at the University of Nebraska at Omaha (UNO) with a background in physical therapy and a strong passion for baseball medicine. Licensed as a physical therapist in Japan, he has experience working with collegiate and youth athletes. He is currently gaining clinical experience in athletic training in the U.S. Kenny has interned with the Iowa Cubs (Des Moines, IA), Chicago White Sox (Phoenix, AZ), and Los Angeles Angels (Tempe, AZ). He is also a member of the UNO Pitching Lab and is actively involved in baseball biomechanics research, aiming to prevent injuries and advance care for overhead athletes.