

Andrew and Marjorie McCain Human Performance Lab

OVERVIEW

The Andrew and Marjorie McCain Human Performance Laboratory (HPL) is a research, education and clinical service facility within the Faculty of Kinesiology at the University of New Brunswick (UNB). The mission of the state-of-the-art laboratory is to discover, disseminate and apply knowledge in biomechanics and neuromuscular physiology of human movement. The goal of the HPL Research Group is to increase its understanding of movement impairments and develop innovative approaches to help humanity achieve optimal function.

RESEARCH CAPABILITIES

- Physical Disabilities
- Fitness and Performance Analysis
- Human Motion
- Rehabilitation
- Workplace Injury
- Movement Analysis
- Ergonomics
- Occupational Therapy

MAJOR PROJECTS

Ergonomic Assessment of a Video Gaming Console

Researcher(s): Dr. Victoria Chester and Dr. Usha Kuruganti

Studying musculoskeletal stressors and the impact on the body such as repetitive strain injuries and eye strain during prolonged sitting while playing video games.

Clinical and Performance Analysis

Researcher(s): Dr. Victoria Chester, Dr. Usha Kuruganti and Dr. Chris McGibbon

Analyzing the clinical gait of children with developmental disorders; arthritis research examining the interrelationship between movement impairments, adaptation and function; arthroplasty research examining differences in movement patterns between individuals with total knee arthroplasty, unicompartmental arthroplasty and normative data; exploring factors that affect information processing and motor learning (skill acquisition); and exploring various issues regarding sports performance using statistics.

Ergonomics and Occupational Biomechanics

Researcher(s): Dr. Usha Kuruganti and Dr. Wayne Albert

Investigating posture, biomechanical loading and muscle activity in the upper body in order to provide insight into muscle fatigue to provide strategies for employee injuries.

Three-Dimensional Gait Analysis for Foot/Ankle Orthopaedic Surgery

Researcher(s): Dr. Victoria Chester and Dr. Gwyneth de Vries

Using the latest motion capture system, three-dimensional gait analysis is completed on orthopaedic surgery patients. The multi-segment foot kinematic model developed is used to better help predict surgical treatments and assessing treatment effectiveness.

High Density Electromyography (EMG) Analysis for Neuromuscular Function

Researcher(s): Craig Prime, Dr. Usha Kuruganti and Dr. Yves Losier

Employing multi-channel EMG or high density EMG to examine muscle activity patterns of able-bodied and those with limb deficiencies. The data obtained from these systems allows researchers to examine muscle activation patterns and develop better methods of multifunction myoelectric prosthetic control.

Strength Assessment and Neuromuscular Function

Researcher(s): Dr. Vicky Chester and Dr. Usha Kuruganti

Using an isokinetic dynamometer to test lower body strength, strength assessment is completed on various populations (athletes and non-athletes, older adults, pediatric populations) to examine differences in strength production with and without targeted training. This data is combined with EMG measures to examine the neuromuscular function differences between groups to obtain a better understanding of how to improve and maintain the strength requirements needed for efficient movement.

SPECIALIZED EQUIPMENT

- 12 Vicon Nexus T160 cameras
- Zerowire EMG system
- Delsys Trigno wireless 8ch EMG
- Noraxon wireless system
- Cybex isokinetic dynamometer
- XSensor pressure imaging system
- Kistler force plates
- BalanceQuest (balance tracking, IScan 3D pupil tracking system)
- Clinical gait analysis service

For more information please visit: www.unb.ca/fredericton/kinesiology/research/humanperformance.html