



Athletic Assessment Services

Updated February 1, 2021

Background

The University of Michigan Performance Research Lab (MiPR) provides core research capabilities and educational laboratory opportunities in support of the multidisciplinary mission of the University of Michigan Exercise and Sports Science Initiative (ESSI):

To optimize human potential and advance well-being for people of all ages and abilities.

Athletic assessments, incorporating both injury and performance evaluation, are a major focus of the MiPR operation. Leveraging a unique partnership with Michigan Athletics, MiPR provides cutting edge services to coaches, trainers, and student-athletes with the goal of improving both individual and team performance for Michigan's 900 student-athletes and 29 teams. With a focus on athlete health and wellness as well as top-tier performance, MiPR assessments are primarily tailored to the needs of Michigan Athletics. The assessment framework is modelled on a synergistic partnership between ATC staff, sports medicine, coaches, and MiPR to ensure the highest value of service is provided. MiPR assessments serve as a foundation upon which sport-specific questions can be tailored and answered.

Assessment Overview

Assessment options can be split into two categories: Injury prevention and performance optimization. Injury prevention centers on identifying and analyzing underlying biomechanical or biometric issues that may contribute to an individual's injury risk. Injury reports will provide **clear** and **concise** summarization of findings that can be interpreted by ATC, strength & conditioning (S&C), and coaching staff. Injury etiology is a complex and multi-factored mechanism that is best tackled using a collaborative and multidisciplinary approach. A two-way channel will be established between UM Athletic medical staff and MiPR to discern individual athlete questions. Performance optimization focuses on analyzing metrics related to sport-specific movements with the goal of providing **actionable** data to the individual, trainers, and coaching staff. MiPR will help identify performance blockers and coordinate findings with coaching and S&C staff for team and individual level implementation.

- ⇒ Injury centered report providing quantitative & actionable data
- ⇒ Synergistic approach between ATC / UM Medical staff & MiPR
- ⇒ Primary outcomes focused on health & wellness + return-to-play
- ⇒ Improve data-driven decision making



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MiPR Capabilities

Instrumented Gait Analysis

- 8+ IMU sensors: Running mechanics, gait dynamics → evidence-based deviations in running form. Highly accurate and reliable.
- Pressure sensitive treadmill: Impact forces, foot strike characterization and pressure distribution.
- Injury focused report generation + objective feedback from video



High-Speed Video

- Multi-sport
- Visual gait analysis → Injury + performance value
- Pitching/sprinting/sport-specific movement decomposition
- Qualitative information for expert review
- 2 cameras @ 1000 fps



VO2 Max Testing

- Endurance sports
- Highly accurate physiological report → track changes over time
- Improve data-driven coaching



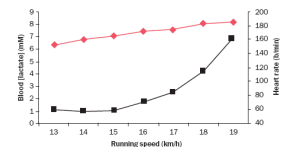
HR Zone Testing

- Multi-sport
- Provide individualized HR training zones for conditioning/coaching staff
- Design or improve sport-specific conditioning protocols



Blood Lactate Testing Protocol

- Endurance sports
- Improve data driven coaching
- Correlate intensity with pace/HR zones





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Updated December 10, 2019

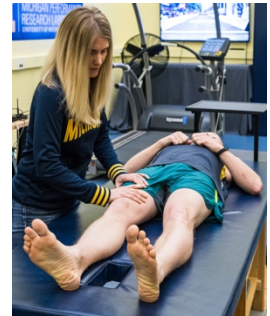
Functional Movement Assessment

- All sports
- Mobility + stability scoring protocol
- Track longitudinal changes in athlete
- Flag weakness(es) for injury risk
- Report generation for ATC (or PT suggested correction exercises)



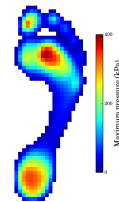
Clinical Assessment

- PT or ATC screening for injury risks and performance blockers (in-house staff or external partnership)
- Detailed interpretation of Gait Analysis + HS Video
- Report generation + actionable data for ATC staff
- Synergistic approach between UM Medical Staff and MiPR
- ATC staff refer at-risk athletes for comprehensive analysis utilizing MiPR capabilities
- Outcome focused on athlete health & wellness + return to play



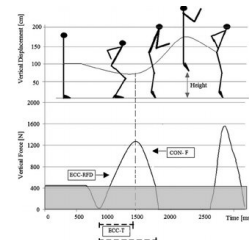
3D Foot Scan & Shoe Fitting

- All sports
- Properly fit athletes into the appropriate size & model NIKE shoe
- Provide recommendations to get athletes into the right shoe for their sport
- Reduce injury prevalence with correct footwear



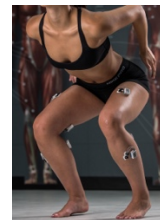
Force Plate Metrics

- Measure power production, rate of force generation, jump height, vertical/horizontal ground reaction forces, counter-movement metrics
- Bilateral asymmetries
- Validation of weight room programs with longitudinal tracking



Surface EMG Measurement

- Identify pre-injury or post-injury asymmetries in muscle activation
- Provides insight into pathological muscle function
- More targeted rehab protocols to speed return-to-play



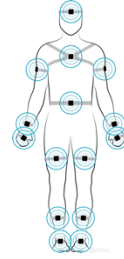


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High-Speed Accelerometers & Gyros

- Research grade instrumentation to answer novel sport-specific questions
- Equipment + staff to provide custom insights to coaching or medical staff
- Examples: football collision forces, gymnastic rotation rates, agility metrics



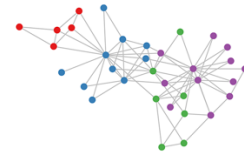
Pre-combine / Agility Testing

- Implement, measure, and interpret combine-like player skill testing protocol
- Electronic timing gates
- IMU's for Change of Direction (CoD) quantification
- Longitudinal tracking



Sensor Data Analysis

- Condense the myriad of sensor data streams (e.g., catapult and GPS) into actionable reports for coaches and staff
- Analyze, simplify, and reduce data overload
- Work with teams to answer their unique questions
- Provide proper data aggregation and storage protocols





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Current Assessment Structure & Costs

Assessment costs are provided for certain individual services (i.e. Gait, VO2, Lactate testing). Other services are provided on hourly basis and require additional consultation with lab personnel.

Service	Cost per assessment (internal UM)	Cost per assessment (external to UM)
Gait assessment	\$403.90	\$525.07
VO2 testing (field)	\$173.88	\$226.04
VO2 testing (treadmill)	\$173.88	\$226.04
Lactate testing (field)	\$122.17	\$158.82
Lactate testing (treadmill)	\$122.17	\$158.82
VO2+lactate (field)	\$219.34	\$285.15
VO2+lactate (treadmill)	\$219.34	\$285.15
Clinical assessment	\$131.29	\$170.67
Custom testing - research staff	\$28.58/hour	\$37.15/hour
Custom testing - research engineer	\$51.70/hour	\$67.22/hour
Custom testing - athletic trainer	\$58.35/hour	\$75.85/hour
Instrumented treadmill use	\$45.32/assessment	\$58.92/assessment
IMU use	\$90.74/assessment	\$117.97/assessment