

# Longitudinal Performance Analysis: A Tale of Four Athletes

An evidence-based review of key performance trends and statistical insights from 12 months of monitoring data.

# The Analytical Framework: Defining Performance Metrics and Thresholds

Our analysis is grounded in established sports science literature. Performance is evaluated against team-specific thresholds, with alerts triggered by statistically significant deviations from baseline.

## Jump Height (m)

### Alert Logic

↓ >10–15% from baseline



### Interpretation

Indicates neuromuscular fatigue or reduced explosive capacity

## Peak Propulsive Power (W)

### Alert Logic

↓ >5% across consecutive sessions



### Interpretation

Suggests cumulative fatigue or insufficient recovery

## Peak Velocity (m/s)

### Alert Logic

↓ >5% from baseline



### Interpretation

Declines may indicate fatigue; potential injury risk

## Speed Max (m/s)

### Alert Logic

<90% of personal best sprint speed



### Interpretation

Suggests suboptimal readiness; taper or recovery is needed.

## Distance Total (m)

### Alert Logic

↑ >20% above rolling 7-day average



### Interpretation

Exceeding safe load progression increases risk of overtraining or injury.

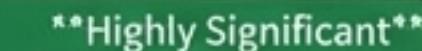
# Player 995 (Men's Basketball): A Profile of Consistent, Statistically Significant Improvement

Analysis over the last 12 months reveals Player 995 is improving across five key metrics, with explosive power and jump height showing exceptionally strong positive trends.

Peak Propulsive Power

Improving 

p-value: 2.139e-07

 \*\*Highly Significant\*\*

Jump Height

Improving 

p-value: 0.006

 \*\*Significant\*\*

Mrsi

Improving 

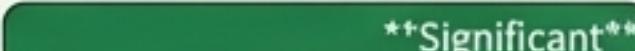
p-value: 0.021

 \*\*Significant\*\*

Peak Velocity

Improving 

p-value: 0.011

 \*\*Significant\*\*

Speed\_Max

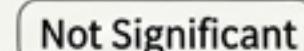
Improving 

p-value: 0.386

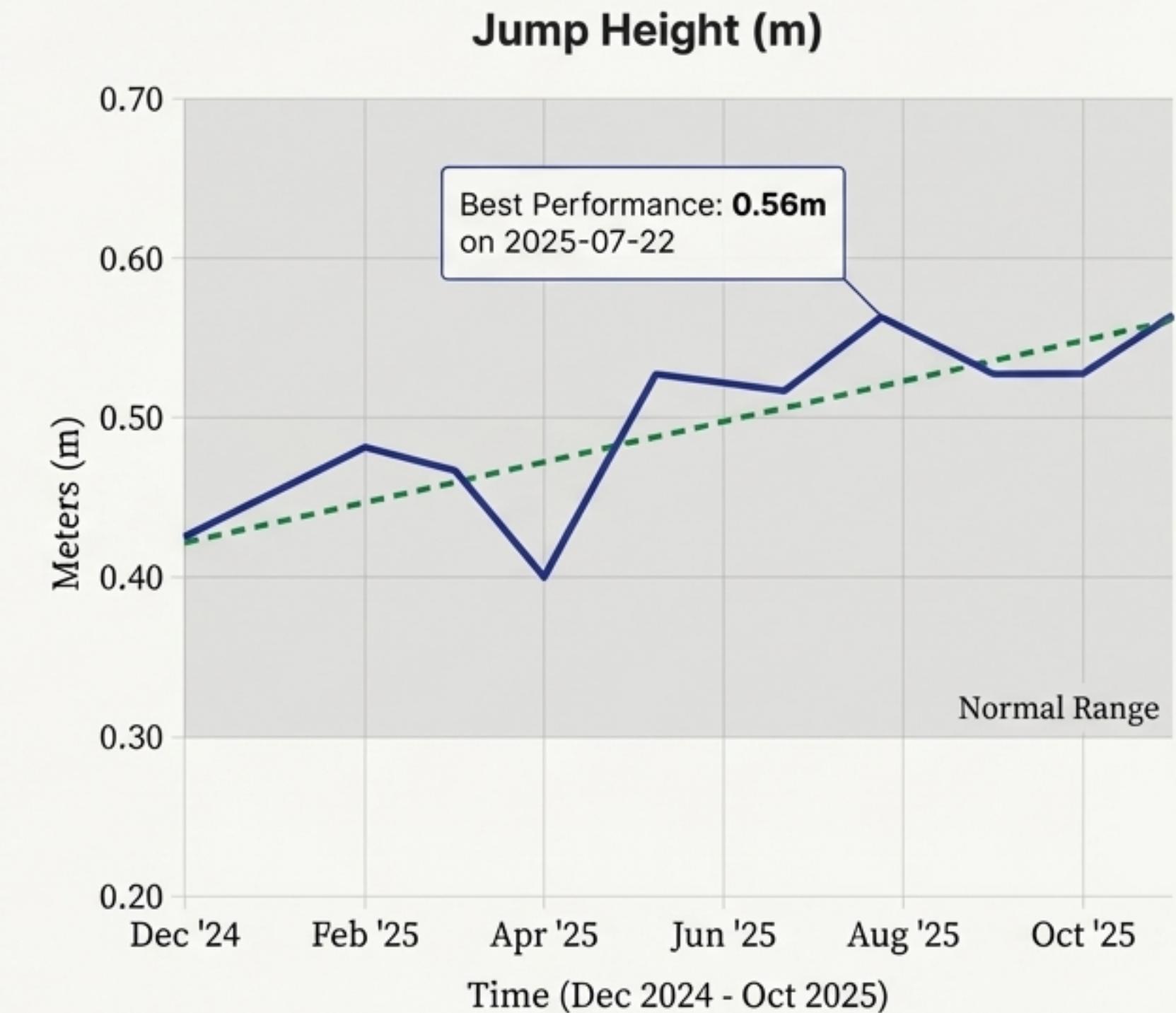
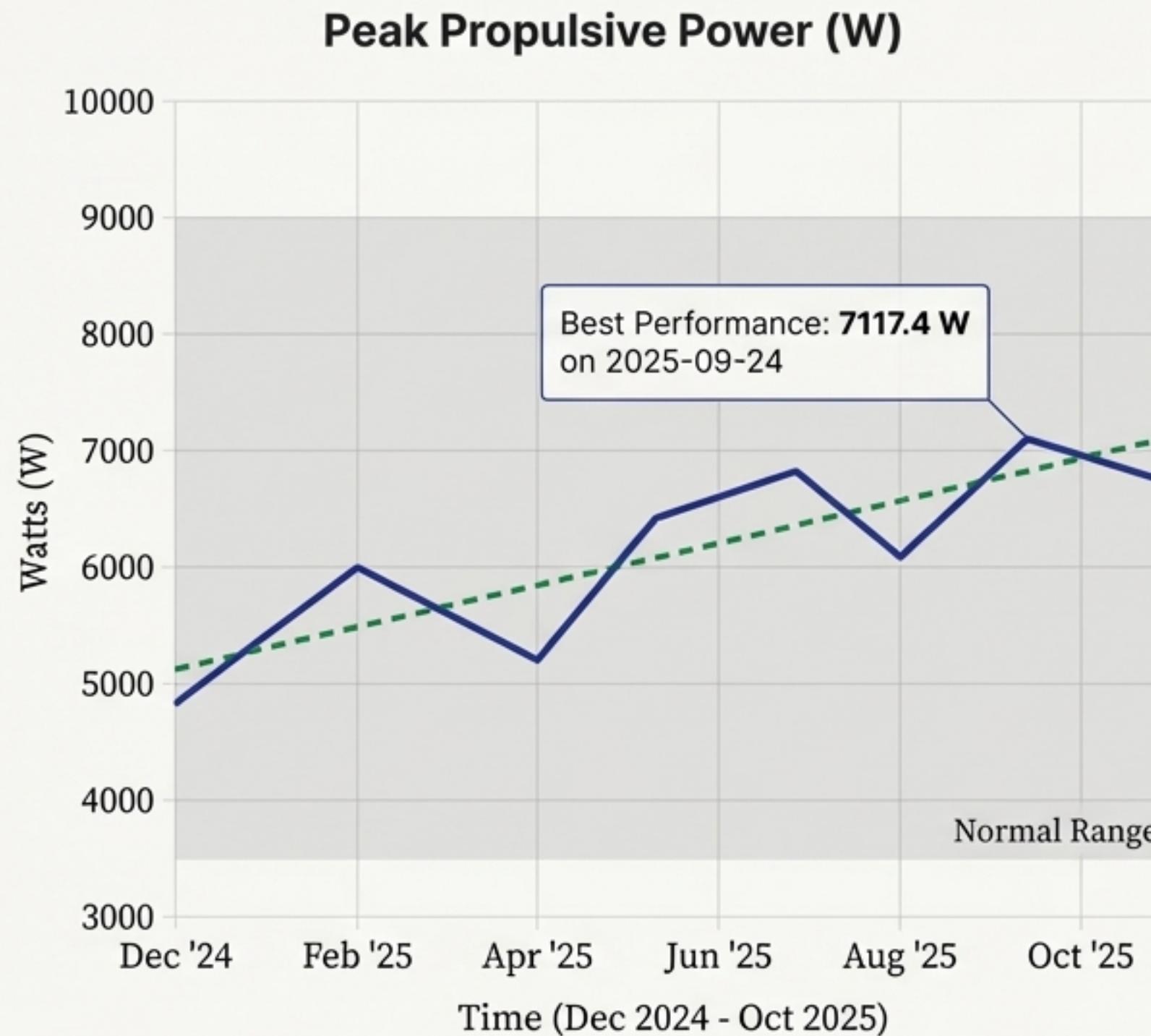
Distance\_Total

Declining 

p-value: 0.755

 Not Significant

# Player 995 Performance Timeline: Visualizing Gains in Explosive Power



# Player 555 (Women's Basketball): Broad-Based Gains in Speed and Neuromuscular Function

Player 555 shows a positive trajectory, with statistically significant improvements in maximum speed and the Modified Reactive Strength Index (Mrsi), indicating enhanced performance efficiency.

**Speed\_Max**

Improving ↑

p-value: 0.0017

\*\*Highly Significant\*\*

**Mrsi**

Improving ↑

p-value: 0.0052

\*\*Significant\*\*

**Distance\_Total**

Declining ↓

p-value: 0.028

\*\*Significant\*\*

**Jump Height**

Improving ↑

p-value: 0.322

**Peak Velocity**

Improving ↑

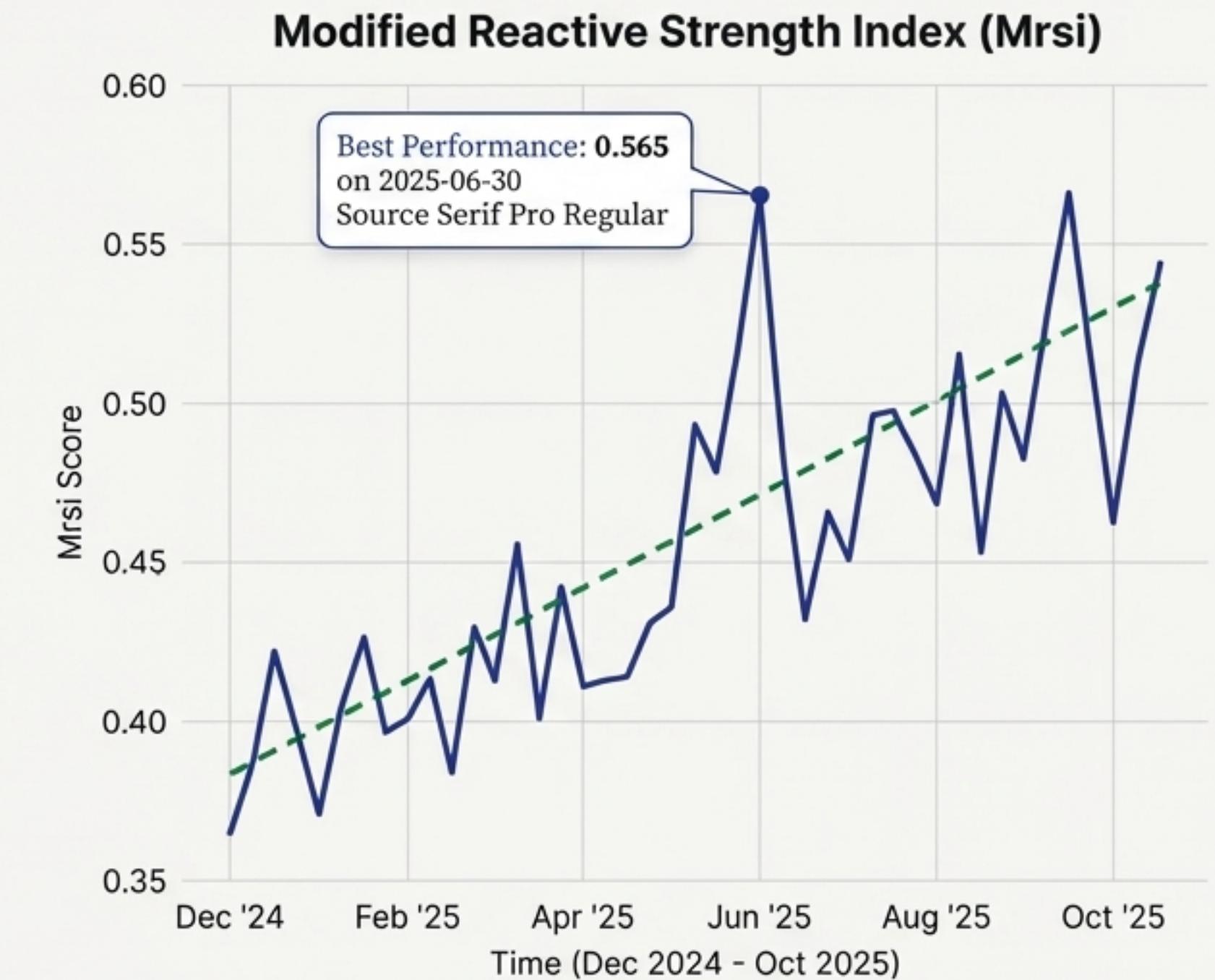
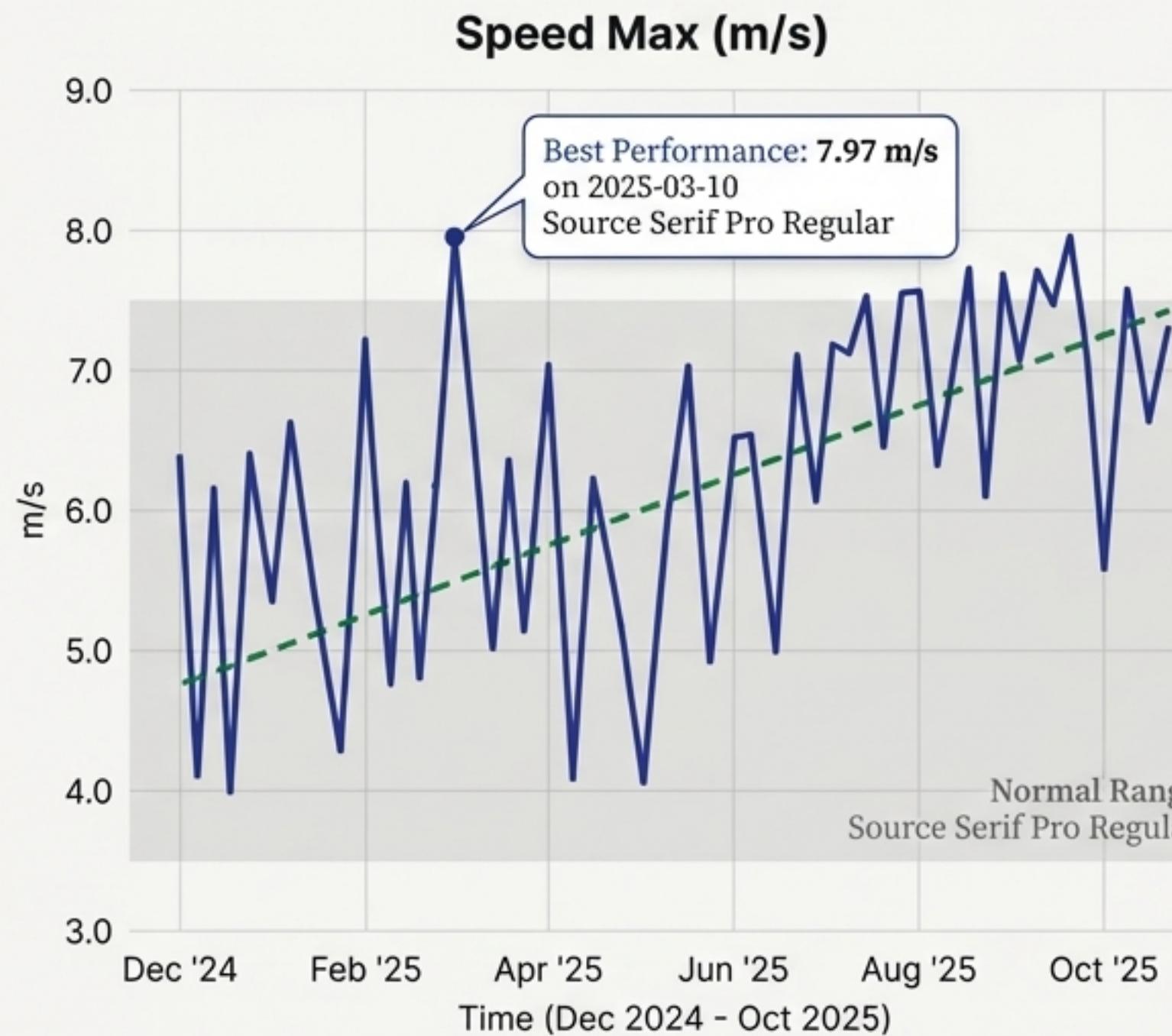
p-value: 0.351

**Peak Propulsive Power**

Improving ↑

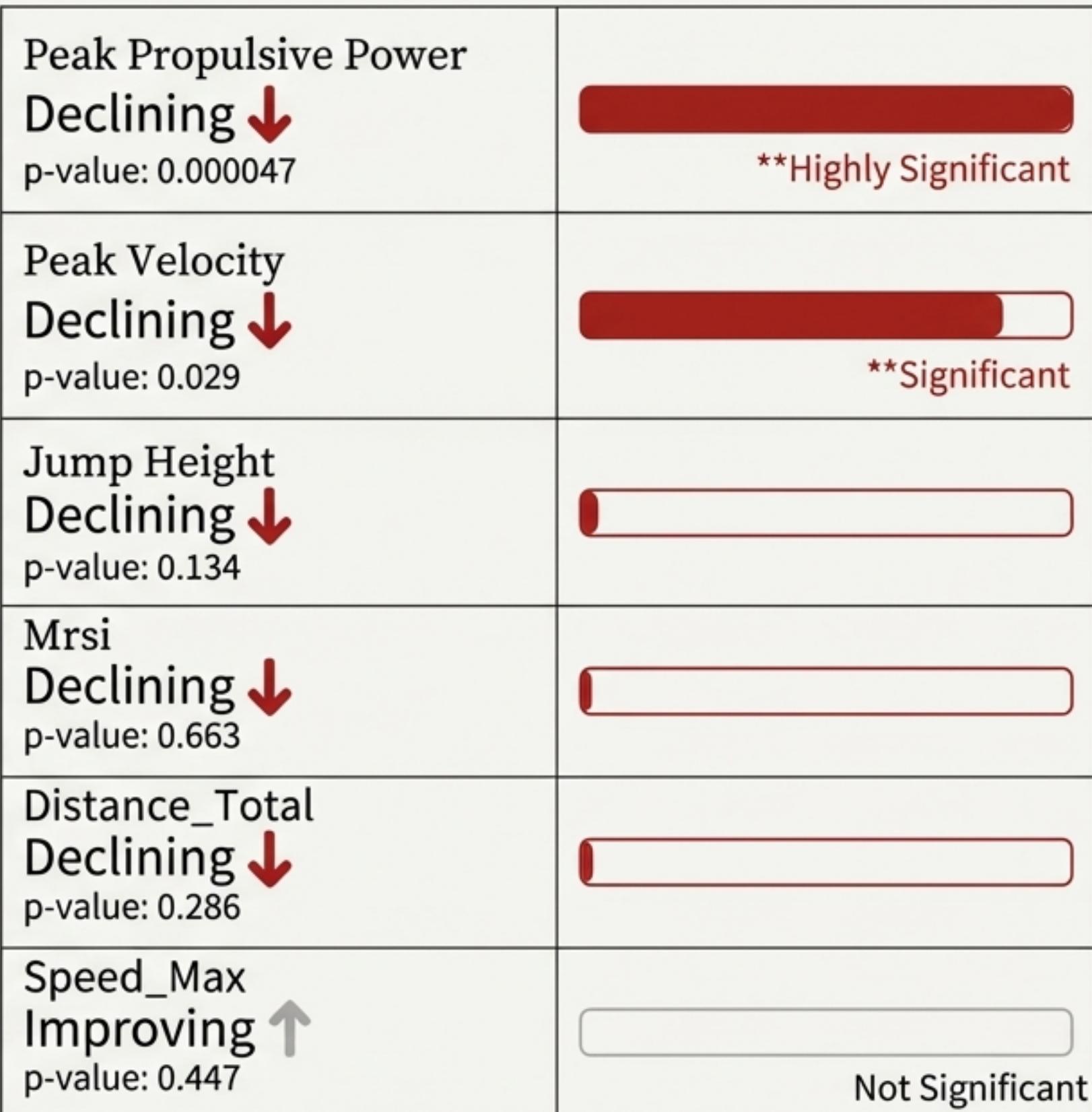
p-value: 0.899

# Player 555 Performance Timeline: Charting Speed and Efficiency Improvements



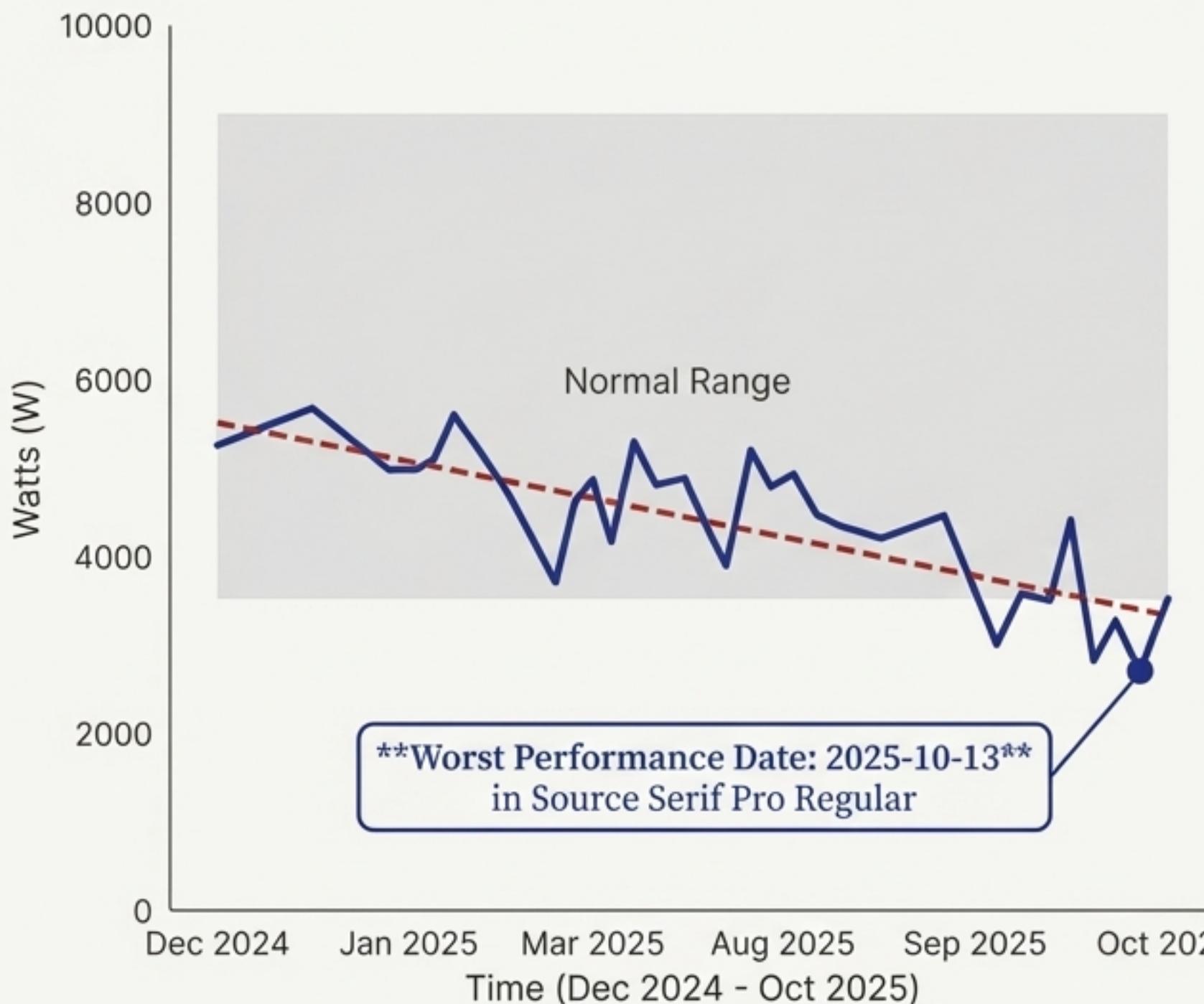
# Player 755 (Men's Basketball): Declining Power and Velocity Raise Early Concerns

In contrast to peers, Player 755 exhibits a concerning pattern. Multiple metrics are declining, with statistically significant drops in Peak Propulsive Power and Peak Velocity warranting a closer look at load and recovery.

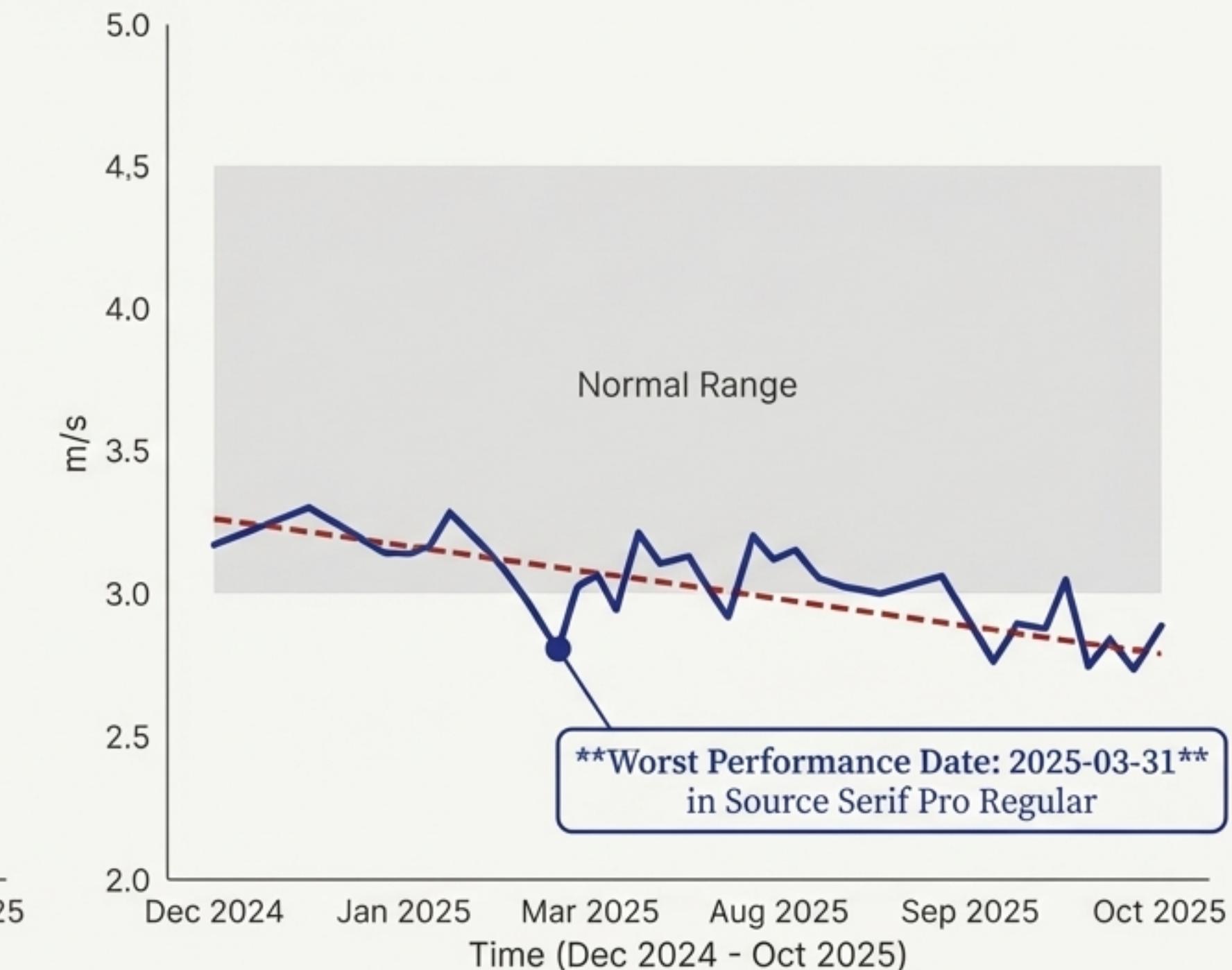


# Player 755 Performance Timeline: A Visual Pattern of Decline

## Peak Propulsive Power (W)



## Peak Velocity (m/s)

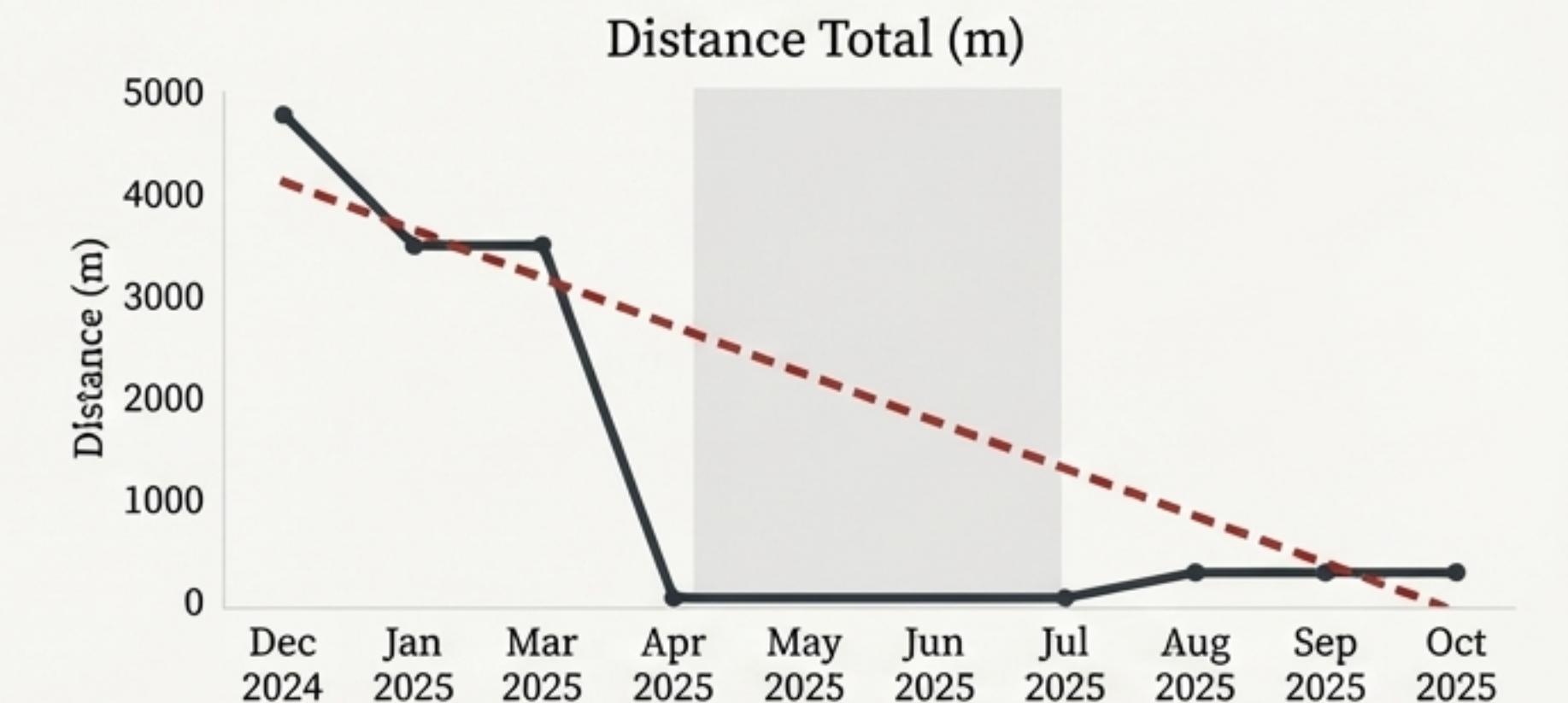
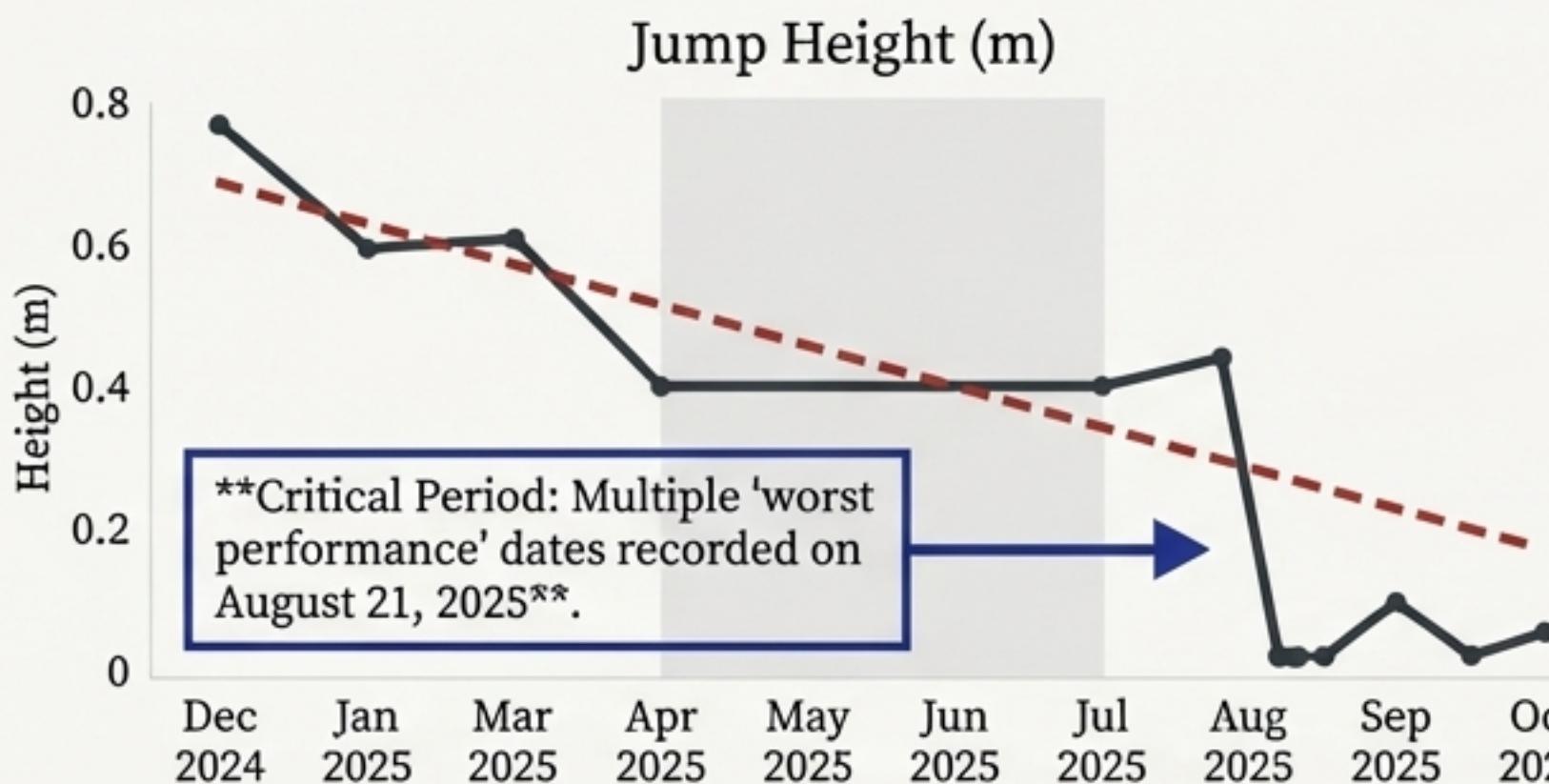
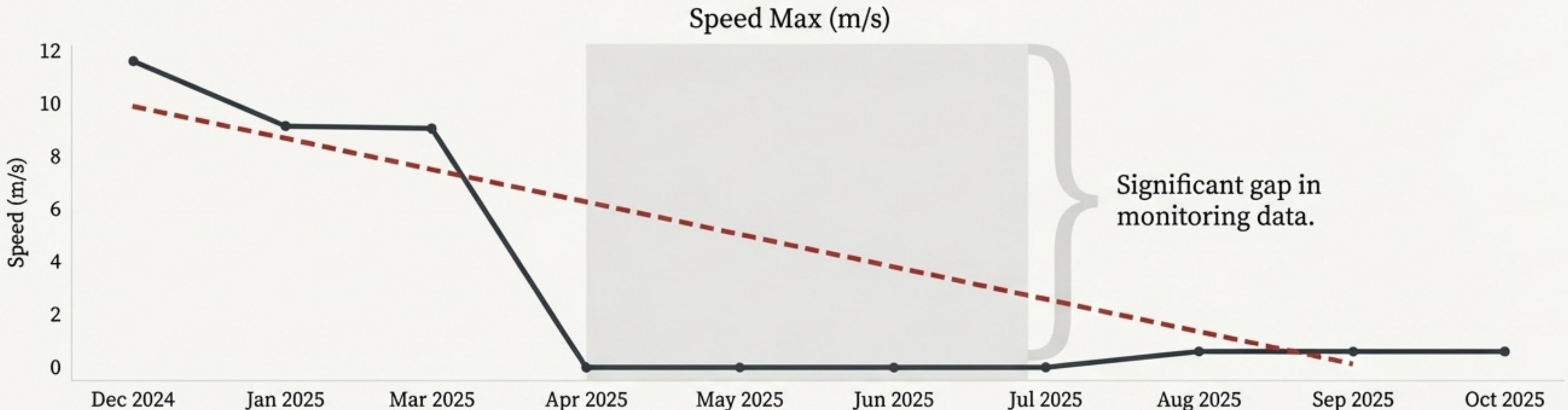


# Player 741 (Women's Basketball): A Critical and Universal Decline Across All Monitored Metrics

The data for Player 741 presents a clear and urgent red flag. Every single performance metric shows a statistically significant decline over the last 12 months, indicating a high risk of overtraining, illness, or impending injury.

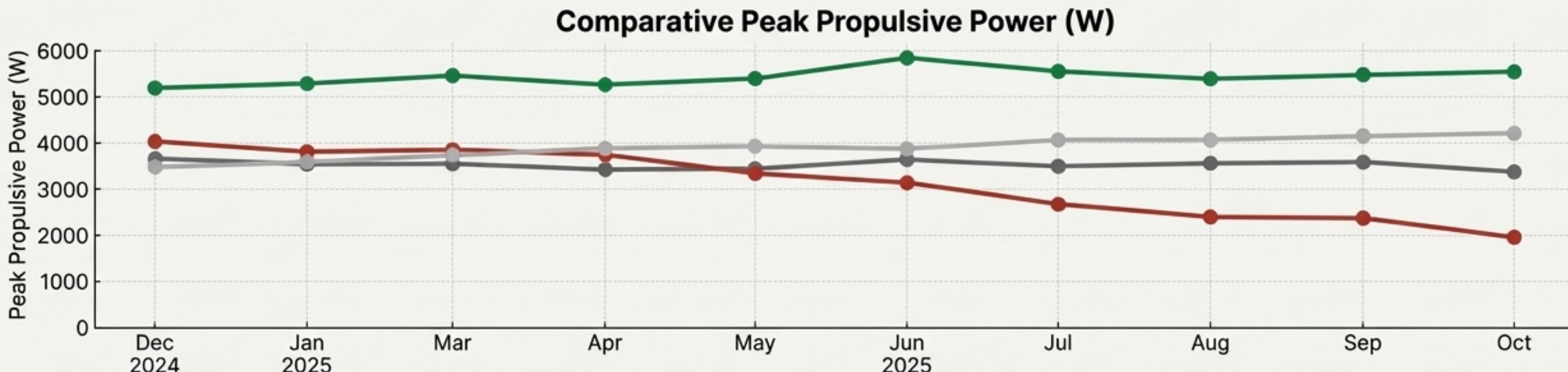
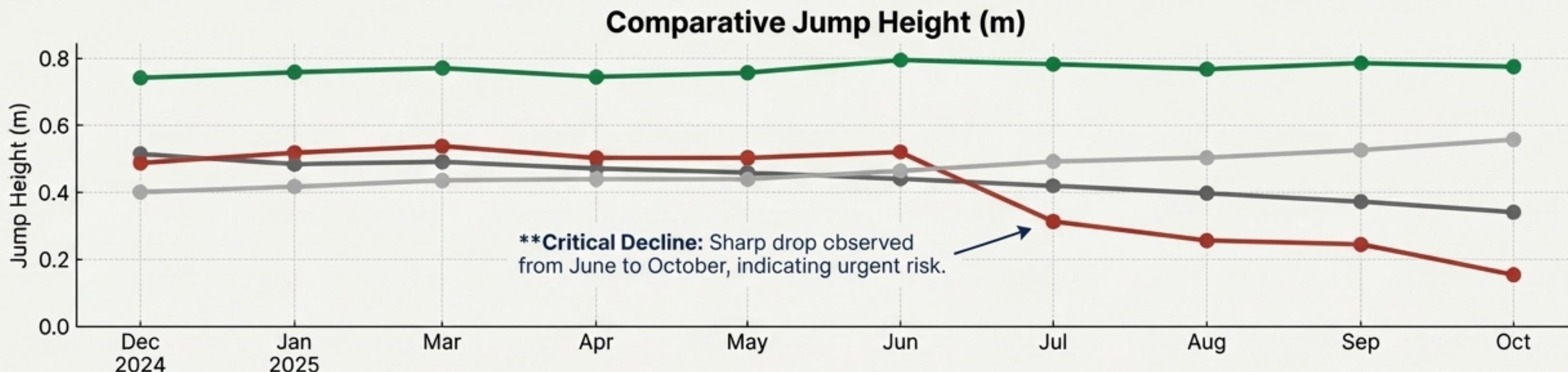
Speed_Max <b>Declining</b> p-value: 1.360e-08	↓	**Extremely Significant**
Jump Height <b>Declining</b> p-value: 0.0001	↓	**Highly Significant**
Distance_Total <b>Declining</b> p-value: 0.0003	↓	**Highly Significant**
Peak Velocity <b>Declining</b> p-value: 0.0004	↓	**Highly Significant**
Peak Propulsive Power <b>Declining</b> p-value: 0.0013	↓	**Highly Significant**
Mrsi <b>Declining</b> p-value: 0.0021	↓	**Highly Significant**

# Player 741 Performance Timeline: Evidence of a Sharp Performance Drop-Off



# Four Athletes, Four Trajectories: A Comparative View

● Player 995 (High Performer) ● Player 741 (Critical Decline) ● Player 755 (Early Concerns) ● Player 555 (Steady Improver)



# Key Findings from the 12-Month Analysis

1

## Positive Adaptation & High Performance

Player 995 exemplifies successful training adaptation, showing statistically significant improvement in explosive power and jump height. This profile serves as a model for effective programming.

2

## Early Warnings of Performance Decline

Player 755 presents early warning signs. Statistically significant declines in power and velocity, despite non-significant trends in other metrics, suggest a need for proactive review of training load and recovery protocols.

3

## Critical State Requiring Immediate Intervention

Player 741 is in a critical state. A universal, statistically significant decline across all metrics, coupled with a gap in monitoring, points to a high risk of overtraining or injury and requires immediate, comprehensive intervention.

# From Data to Decision: Recommended Actions

Player 741

**URGENT**

**Action:** Conduct an immediate and thorough review, including medical evaluation, to identify the root cause of the performance decline and mitigate injury risk.

**Goal:** Develop a structured recovery and rehabilitation plan.

Player 755

**PROACTIVE**

**Action:** Review the athlete's recent training loads, recovery scores, and subjective wellness data to address the specific declines in power and velocity.

**Goal:** Adjust programming to prevent further decline and foster positive adaptation.

Player 995 & 555

**REPLICATION**

**Action:** Analyze the training programs and interventions that contributed to the significant improvements seen in these athletes.

**Goal:** Identify key success factors that may be applicable to other athletes in the other athletes in the program.

# Appendix: Analytical Methodology

The findings in this report are based on the analysis of longitudinal performance data for four selected athletes over the last 12 months.

**Data Source:** Athlete performance data collected via Hawkins Dynamics and Kinexon Kinexon systems.

**Metrics Analyzed:** Jump Height, Peak Propulsive Power, Peak Velocity, Speed Max, Total Distance, and Mrsi.

**Trend Analysis:** Simple linear regression was performed for each metric over the 12-month period for each individual athlete.

**Statistical Significance:** The p-value was calculated for each trend line to determine if the observed improvement or decline was statistically significant ( $p < 0.05$ ).

**Performance Dates:** Best and worst performance dates were identified by finding the maximum and minimum values for each metric within the analysis period.

# Q & A

Thank you.