

# Cycling performance after accumulated load: does durability change during a cycling season?

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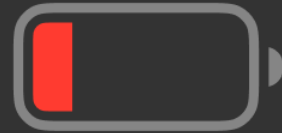
“Maintaining power output with accumulating levels of work done is a key determinant for success in Professional cycling”<sup>1</sup>

“a very important prerequisite in professional cycling is fatigue resistance”<sup>2</sup>

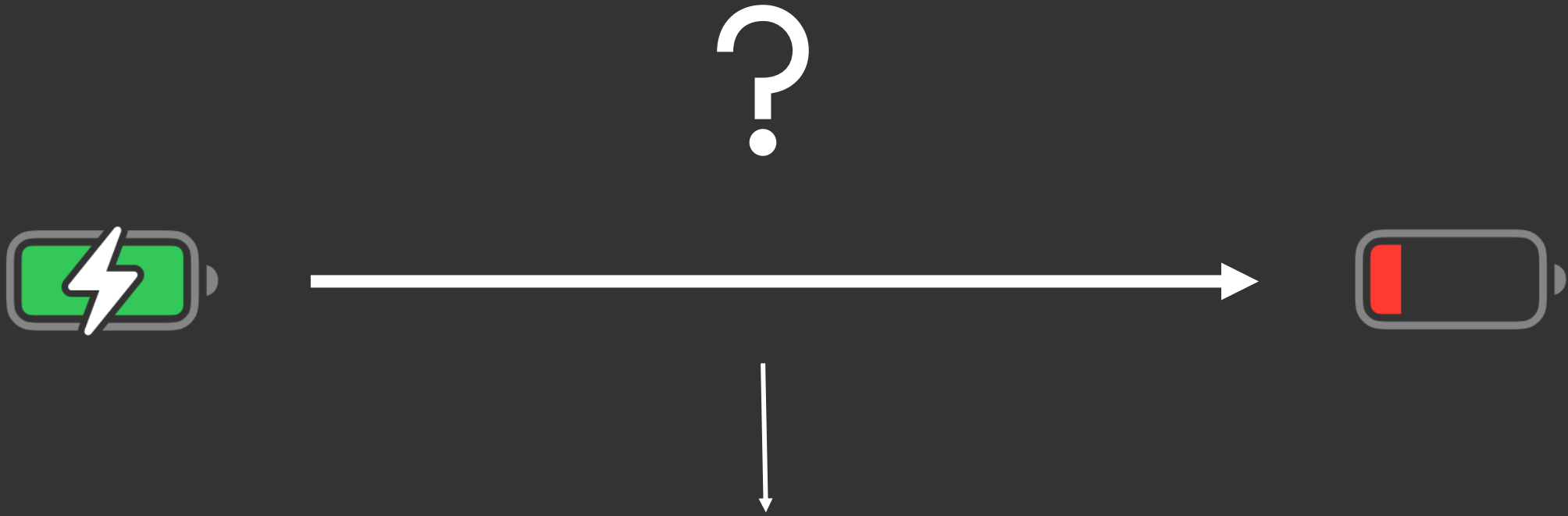
“The present study highlights the importance of accounting for fatigue in the physiological profiling of endurance athletes”<sup>3</sup>

“Our results highlight the role of the so-called durability on cycling performance”<sup>4</sup>

START



FINISH



Gross Efficiency (GE) <sup>5,6,7</sup>

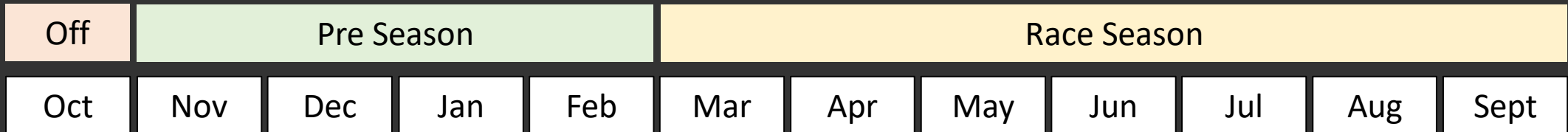
Fat and Carbohydrate (CHO) oxidation <sup>7</sup>

What are the underlying factors for durability in high-level cyclists and how does this change during a cycling season?

16 high-level cyclists ( $21 \pm 3$  years old)

All part of the same UCI Continental Cycling Team





↑  
**PRE**

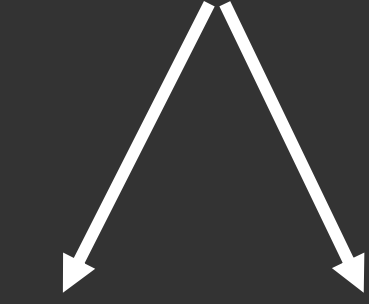
↑  
**START**

↑  
**IN**

'Fresh' state

Efficiency measurement

Power profile



1 min

10 min

6 min 55% of PPO  
6 min 65% of PPO

Calculation GE, Fat and CHO  
Oxidation

Endurance ride



3 hours at 3.2 w/kg  
= 31 ± 5 KJ/kg

'Fatigued' state

Efficiency measurement

Power profile



1 min

10 min

6 min 55% of PPO  
6 min 65% of PPO

Calculation GE, Fat and CHO  
Oxidation

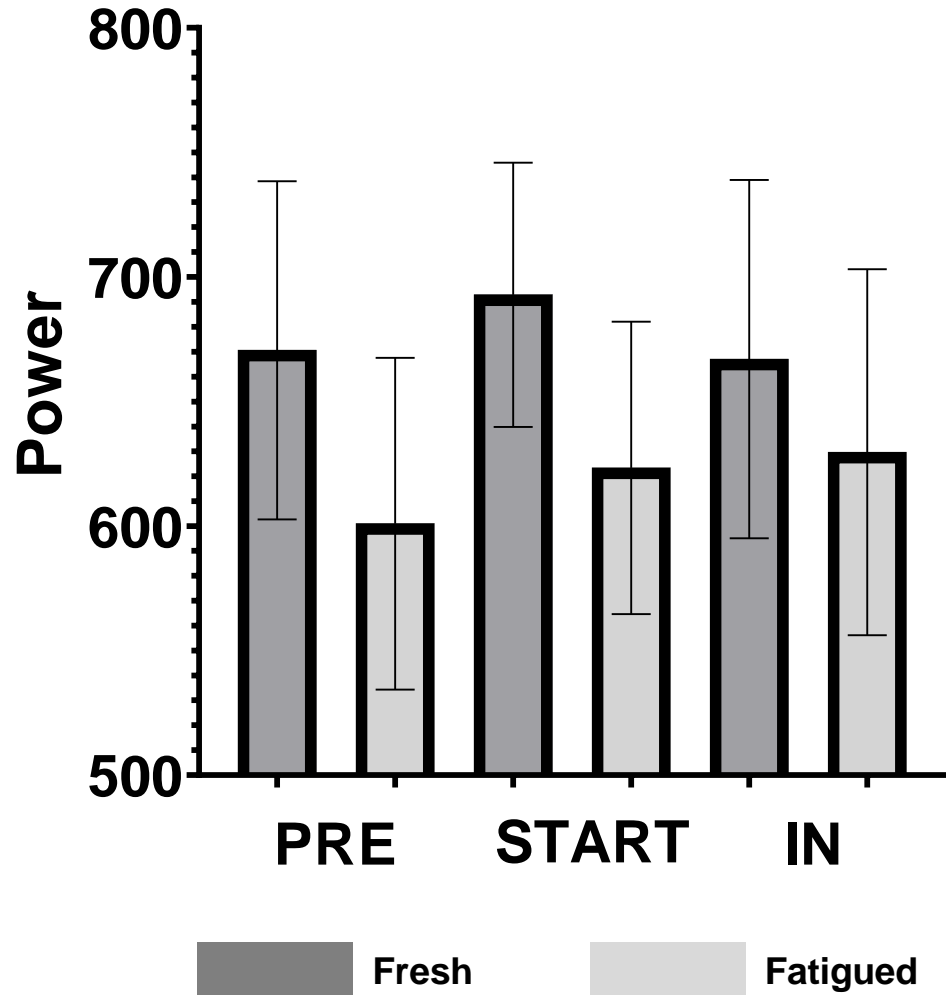


60 gr CHO/hour

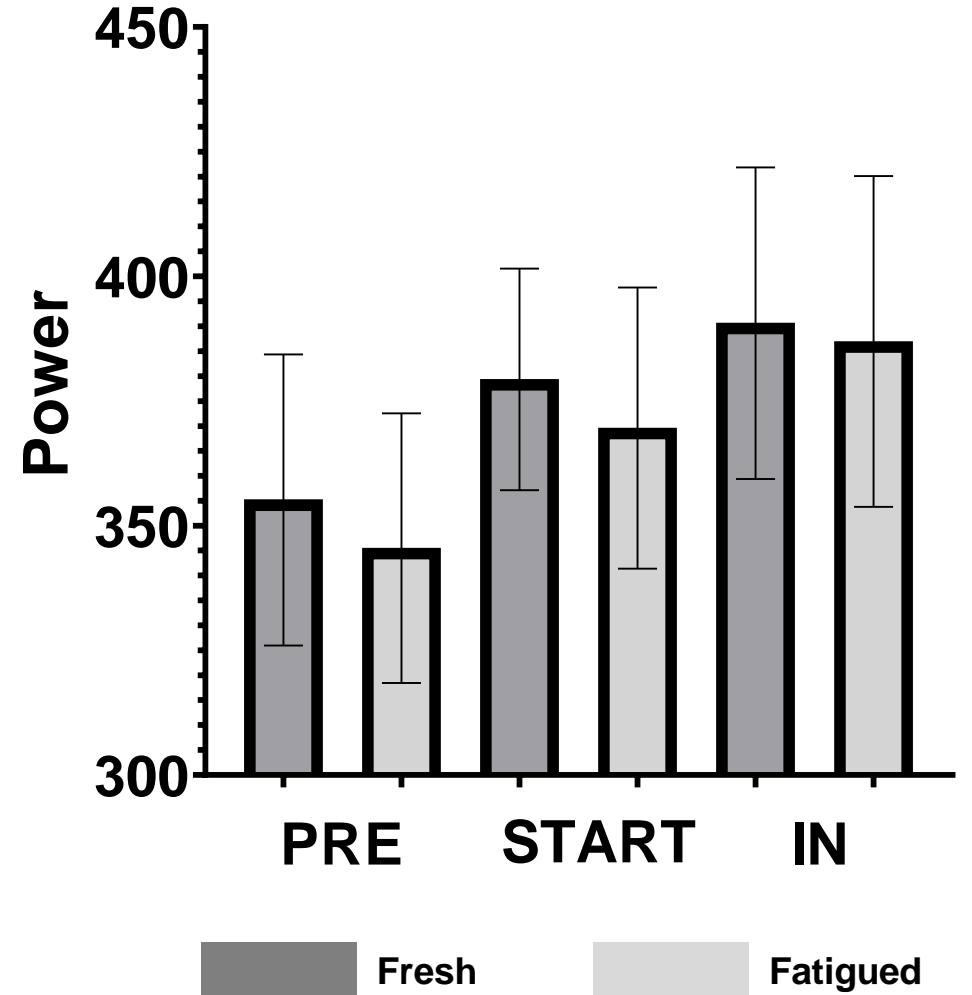


# Results

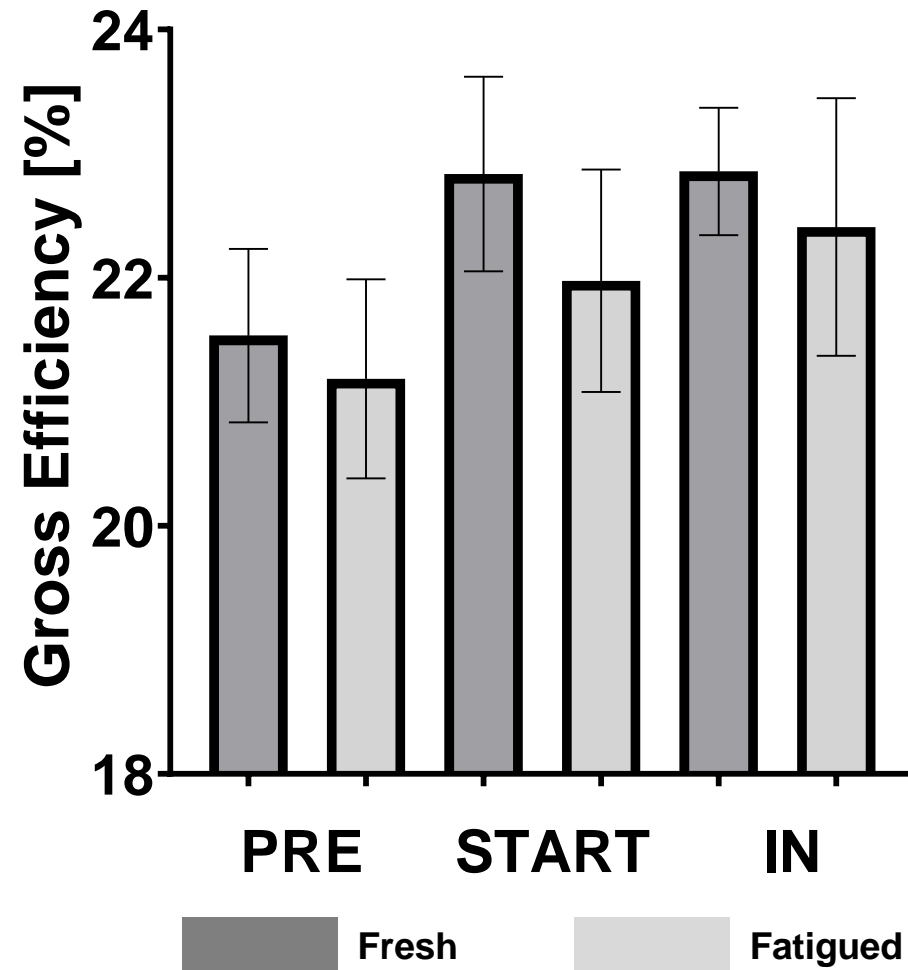
1 minute average power



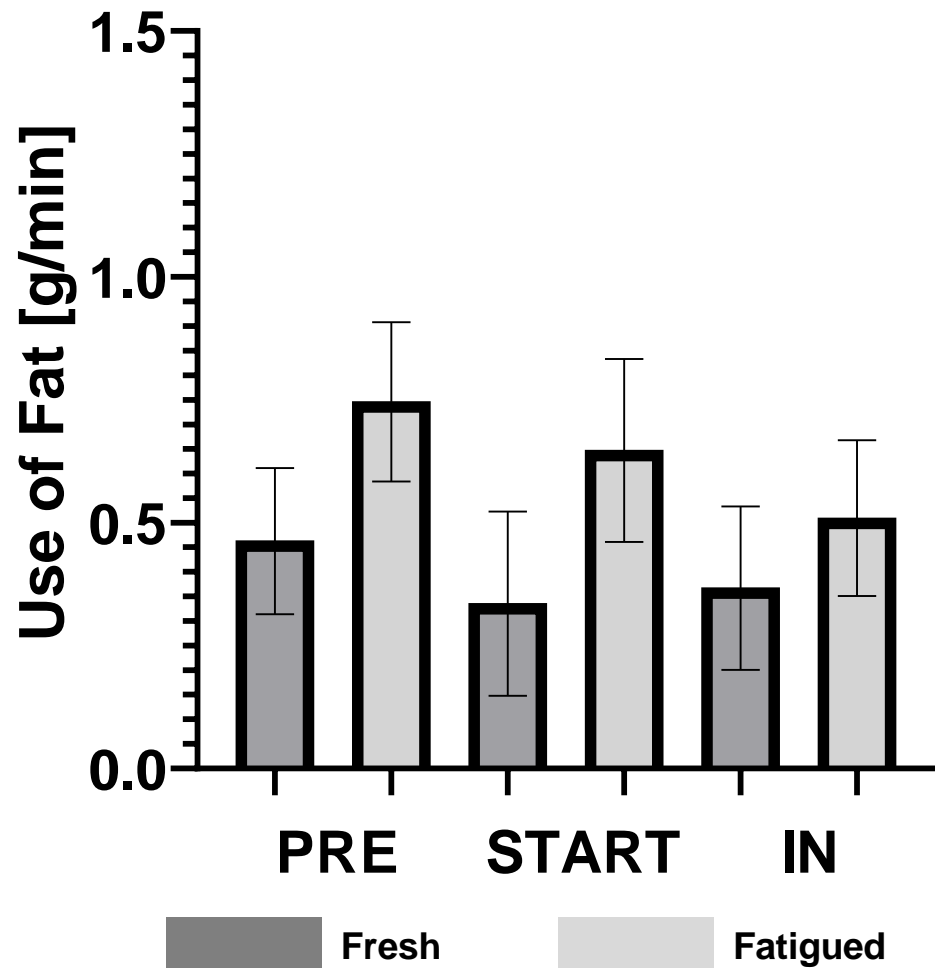
10 minute average power



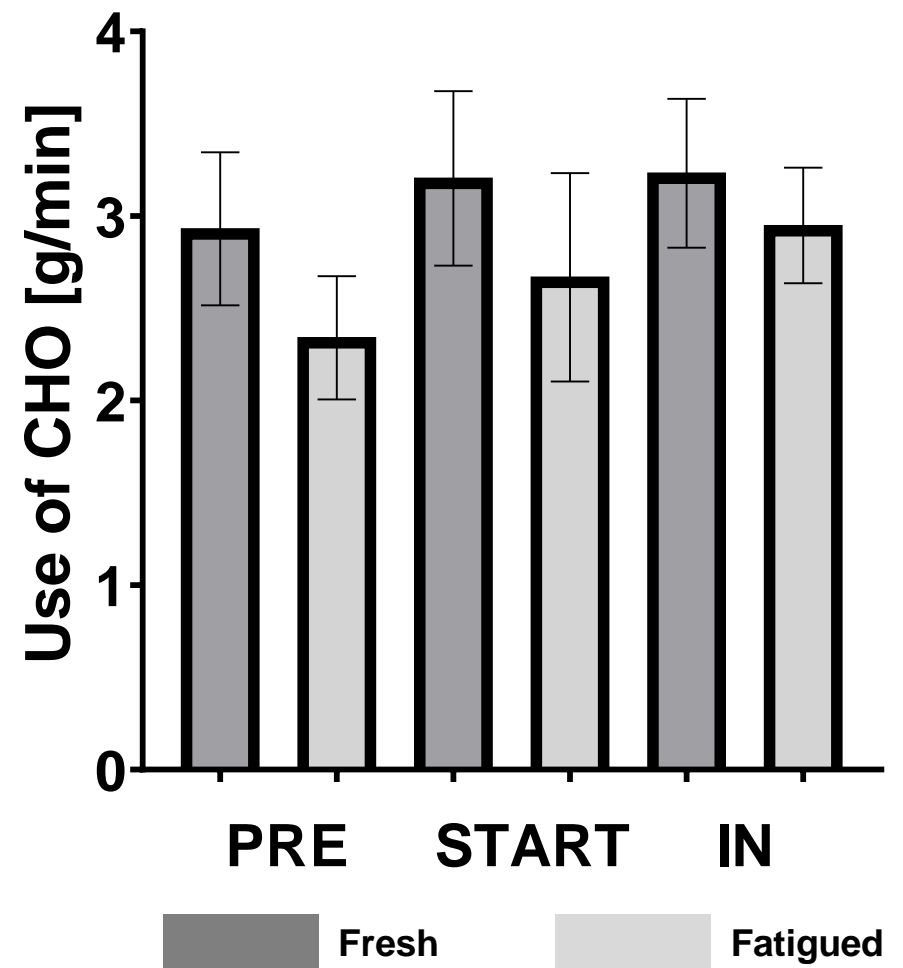
### Gross Efficiency @ 65% VO<sub>2</sub>peak



### Fat Oxidation @ 65% VO<sub>2</sub>peak



### Carbohydrate oxidation @ 65% VO<sub>2</sub>peak



## Fresh vs Fatigued state:

↓ 1 minute power  
= 10 minute power  
= GE  
↑ Fat oxidation  
↓ CHO oxidation



## Differences during the season:



=

1 minute power

↑

10 minute power

↑

GE (after accumulated load)

↓

Fat oxidation (after accumulated load)

↑

CHO oxidation (after accumulated load)

# How to use this in practice?



The effect of races

Maintaining CHO oxidation

# What's next?

Are there other predictors for durability?

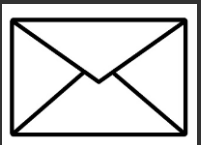
How can durability improve by training?



# Take home messages

Power output over a short period (1 min) is more affected by accumulated load than over a long period (10 min)

Substrate oxidation seems to change after accumulated load and during a cycling season



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